



## Wet Tantalum Capacitors, Military Established Reliability, MIL-PRF-39006/09/21 Qualified Styles CLR65, CLR69



### FEATURES

- Hermetically sealed
- Metal cased
- Axial lead
- Tubular

### STYLE, MILITARY SPECIFICATION

- CLR65, M39006/09 MIL-PRF-39006/09
- CLR69, M39006/21 MIL-PRF-39006/21

### LINKS TO ADDITIONAL RESOURCES



### PERFORMANCE CHARACTERISTICS

**Operating Temperature:** -55 °C to +125 °C  
(above 85 °C, voltage derating is required)

**Capacitance Range:** M39006/09 - 1.7  $\mu$ F to 1200  $\mu$ F;  
M39006/21 - 6.8  $\mu$ F to 2200  $\mu$ F

**Capacitance Tolerance:**  $\pm 5\%$ ,  $\pm 10\%$ ,  $\pm 20\%$

**Voltage Rating:** 6 V<sub>DC</sub> to 125 V<sub>DC</sub>

**Established Reliability Tantalum Capacitors to Military Specification MIL-PRF-39006:** in accordance with the military specification MIL-PRF-39006 all capacitors are marked with the military part number (M39006/xx-xxxx) rather than the older style designation (CLR65, CLR69) and should be ordered as such.

For information on the performance characteristics of these capacitors, please refer to the latest issue of the military specification.

Each order for military style capacitors requiring government inspection must state whether inspection is to be at the destination or at the Vishay plant. Orders requiring source inspection cannot be shipped until this has been accomplished.

### ORDERING INFORMATION

**M39006**  
BASIC DOCUMENT NUMBER

Indicates the basic specification;  
in this case MIL-PRF-39006

**/09**  
SLASH SHEET

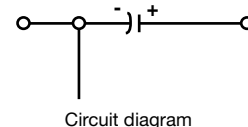
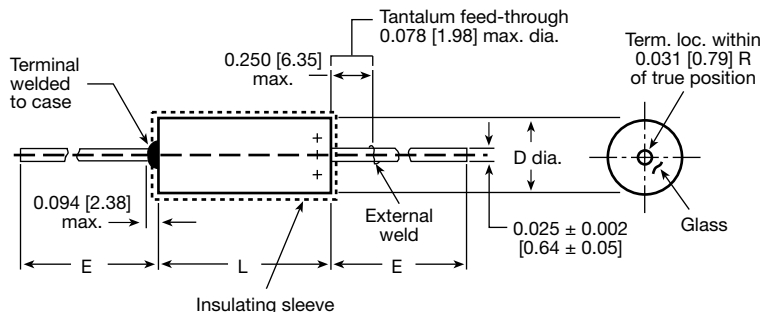
Indicates the specification sheet  
of the basic military specification

**-8005**  
DASH NUMBER

Taken from  
Standard/Extended Ratings tables

**DIMENSIONS** in inches [millimeters]

Style CLR65  
Style CLR69



| CASE CODE | BARE CASE                      |                                                | WITH INSULATING SLEEVE |                  | E<br>LEAD LENGTH                | WEIGHT<br>(oz./g)<br>(MAX.) |
|-----------|--------------------------------|------------------------------------------------|------------------------|------------------|---------------------------------|-----------------------------|
|           | D                              | L                                              | D (MAX.)               | L <sup>(1)</sup> |                                 |                             |
| T1        | 0.188 ± 0.016<br>[4.78 ± 0.41] | 0.453 + 0.031/- 0.016<br>[11.51 + 0.79/- 0.41] | 0.219<br>[5.56]        | 0.595<br>[15.11] | 1.500 ± 0.250<br>[38.10 ± 6.35] | 0.07<br>[2.0]               |
| T2        | 0.281 ± 0.016<br>[7.14 ± 0.41] | 0.641 + 0.031/- 0.016<br>[16.28 + 0.79/- 0.41] | 0.312<br>[7.92]        | 0.785<br>[19.94] | 2.250 ± 0.250<br>[57.15 ± 6.35] | 0.18<br>[5.1]               |
| T3        | 0.375 ± 0.016<br>[9.53 ± 0.41] | 0.766 + 0.031/- 0.016<br>[19.46 + 0.79/- 0.41] | 0.406<br>[10.31]       | 0.92<br>[23.37]  | 2.250 ± 0.250<br>[57.15 ± 6.35] | 0.36<br>[10.2]              |
| T4        | 0.375 ± 0.016<br>[9.53 ± 0.41] | 1.062 + 0.031/- 0.016<br>[26.97 + 0.79/- 0.41] | 0.406<br>[10.31]       | 1.225<br>[31.11] | 2.250 ± 0.250<br>[57.15 ± 6.35] | 0.49<br>[13.9]              |

**Note**

<sup>(1)</sup> Typical length, for reference only

**RATINGS AND CASE CODES - M39006/09**

| μF  | 6  | 8  | 10 | 15 | 25 | 30 | 50 | 60 | 75 | 100 | 125 |
|-----|----|----|----|----|----|----|----|----|----|-----|-----|
| 1.7 |    |    |    |    |    |    |    |    |    |     | T1  |
| 2.5 |    |    |    |    |    |    |    |    |    | T1  |     |
| 3.5 |    |    |    |    |    |    |    |    | T1 |     |     |
| 3.6 |    |    |    |    |    |    |    |    |    |     | T1  |
| 4.0 |    |    |    |    |    |    |    | T1 |    |     |     |
| 4.7 |    |    |    |    |    |    |    |    |    | T1  |     |
| 5.0 |    |    |    |    |    |    | T1 |    |    |     |     |
| 6.8 |    |    |    |    |    |    |    |    | T1 |     |     |
| 8.0 |    |    |    |    |    | T1 |    |    |    |     |     |
| 8.2 |    |    |    |    |    |    |    | T1 |    |     |     |
| 9.0 |    |    |    |    |    |    |    |    |    |     | T2  |
| 10  |    |    |    |    | T1 |    | T1 |    |    |     |     |
| 11  |    |    |    |    |    |    |    |    |    | T2  |     |
| 15  |    |    |    | T1 |    | T1 |    |    | T2 |     |     |
| 20  |    |    | T1 |    |    |    |    | T2 |    |     |     |
| 22  |    |    |    |    | T1 |    |    |    |    | T2  |     |
| 25  |    | T1 |    |    |    |    | T2 |    |    |     | T3  |
| 30  | T1 |    |    |    |    |    |    |    |    | T3  |     |
| 33  |    |    |    | T1 |    |    |    |    | T2 |     |     |
| 39  |    |    |    |    |    |    |    | T2 |    |     |     |
| 40  |    |    |    |    |    | T2 |    |    | T3 |     |     |
| 43  |    |    |    |    |    |    |    |    |    | T3  |     |
| 47  |    |    | T1 |    |    |    | T2 |    |    |     |     |
| 50  |    |    |    |    |    |    |    | T3 |    |     |     |
| 56  |    | T1 |    |    |    |    |    |    | T3 |     | T4  |
| 60  |    |    |    |    |    |    | T3 |    |    |     |     |
| 68  | T1 |    |    |    |    | T2 |    | T3 |    |     |     |
| 70  |    |    |    | T2 |    |    |    |    |    |     |     |
| 82  |    |    |    |    |    |    | T3 |    |    |     |     |
| 86  |    |    |    |    |    |    |    |    |    | T4  |     |
| 100 |    |    | T2 |    | T2 | T3 |    |    |    |     |     |

**RATINGS AND CASE CODES - M39006/09**

| $\mu\text{F}$ | 6  | 8  | 10 | 15 | 25 | 30 | 50 | 60 | 75 | 100 | 125 |
|---------------|----|----|----|----|----|----|----|----|----|-----|-----|
| 110           |    |    |    |    |    |    |    |    | T4 |     |     |
| 120           |    |    |    | T2 |    |    |    |    |    |     |     |
| 140           | T2 |    |    |    |    |    |    | T4 |    |     |     |
| 150           |    |    |    |    |    | T3 |    |    |    |     |     |
| 160           |    |    |    |    |    |    | T4 |    |    |     |     |
| 170           |    |    |    | T3 |    |    |    |    |    |     |     |
| 180           |    |    | T2 |    | T3 |    |    |    |    |     |     |
| 220           |    | T2 |    |    |    |    |    |    |    |     |     |
| 250           |    |    | T3 |    |    |    |    |    |    |     |     |
| 270           | T2 |    |    | T3 |    |    |    |    |    |     |     |
| 300           |    |    |    |    |    | T4 |    |    |    |     |     |
| 330           | T3 |    |    |    |    |    |    |    |    |     |     |
| 350           |    |    |    |    | T4 |    |    |    |    |     |     |
| 390           |    |    | T3 |    |    |    |    |    |    |     |     |
| 430           |    | T3 |    |    |    |    |    |    |    |     |     |
| 540           |    |    |    | T4 |    |    |    |    |    |     |     |
| 560           | T3 |    |    |    |    |    |    |    |    |     |     |
| 750           |    |    | T4 |    |    |    |    |    |    |     |     |
| 850           |    | T4 |    |    |    |    |    |    |    |     |     |
| 1200          | T4 |    |    |    |    |    |    |    |    |     |     |

**RATINGS AND CASE CODES - M39006/21**

| $\mu\text{F}$ | 6  | 8  | 10 | 15 | 25 | 30 | 50 | 60 | 75 | 100 | 125 |
|---------------|----|----|----|----|----|----|----|----|----|-----|-----|
| 6.8           |    |    |    |    |    |    |    |    |    |     | T1  |
| 10            |    |    |    |    |    |    |    |    |    | T1  |     |
| 22            |    |    |    |    |    |    |    |    | T1 |     |     |
| 27            |    |    |    |    |    |    |    | T1 |    |     | T2  |
| 33            |    |    |    |    |    |    | T1 |    |    |     |     |
| 39            |    |    |    |    |    |    |    |    |    | T2  |     |
| 47            |    |    |    |    |    |    |    |    |    |     | T3  |
| 56            |    |    |    |    |    | T1 |    |    |    |     |     |
| 68            |    |    |    |    | T1 |    |    |    |    | T3  |     |
| 82            |    |    |    |    |    |    |    |    | T2 |     | T4  |
| 100           |    |    |    | T1 |    |    |    | T2 |    |     |     |
| 120           |    |    |    |    |    |    | T2 |    |    | T4  |     |
| 150           |    |    | T1 |    |    |    |    |    |    |     |     |
| 180           |    | T1 |    |    |    |    |    |    | T3 |     |     |
| 220           | T1 |    |    |    |    | T2 |    | T3 | T4 |     |     |
| 270           |    |    |    |    | T2 |    | T3 | T4 |    |     |     |
| 330           |    |    |    |    |    |    | T4 |    |    |     |     |
| 390           |    |    |    | T2 |    |    |    |    |    |     |     |
| 470           |    |    |    |    |    | T3 |    |    |    |     |     |
| 560           |    |    | T2 |    | T3 | T4 |    |    |    |     |     |
| 680           |    | T2 |    |    | T4 |    |    |    |    |     |     |
| 820           | T2 |    |    | T3 |    |    |    |    |    |     |     |
| 1000          |    |    |    | T4 |    |    |    |    |    |     |     |
| 1200          |    |    | T3 |    |    |    |    |    |    |     |     |
| 1500          | T3 | T3 | T4 |    |    |    |    |    |    |     |     |
| 1800          |    | T4 |    |    |    |    |    |    |    |     |     |
| 2200          | T4 |    |    |    |    |    |    |    |    |     |     |

**STANDARD RATINGS/EXTENDED RATINGS: CLR65 <sup>(1)</sup>, M39006/09-XXXX**

| CAPACITANCE<br>(μF)                                        | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO.<br>M39006/09-<br>FAILURE RATE<br>LEVEL (%/1000 h) |      | MAX. DCL (μA)<br>AT |                   | MAX. DF<br>AT +25 °C<br>(%) | MAX. IMP.<br>AT -55 °C<br>(Ω) | MAX. CAPACITANCE<br>CHANGE (%) AT |        |         |  |
|------------------------------------------------------------|--------------|-----------------------|------------------------------------------------------------|------|---------------------|-------------------|-----------------------------|-------------------------------|-----------------------------------|--------|---------|--|
|                                                            |              |                       | L                                                          | M    | +25 °C              | +85 °C<br>+125 °C |                             |                               | -55 °C                            | +85 °C | +125 °C |  |
|                                                            |              |                       | 2.0                                                        | 1.0  |                     |                   |                             |                               |                                   |        |         |  |
| 6 V <sub>DC</sub> AT +85 °C; 4 V <sub>DC</sub> AT +125 °C  |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |  |
| 30                                                         | T1           | 20                    | 8001                                                       | 8206 | 1                   | 2                 | 9.1                         | 100                           | -40                               | +10.5  | +12     |  |
| 30                                                         | T1           | 10                    | 8002                                                       | 8207 | 1                   | 2                 | 9.1                         | 100                           | -40                               | +10.5  | +12     |  |
| 30                                                         | T1           | 5                     | 8003                                                       | 8208 | 1                   | 2                 | 9.1                         | 100                           | -40                               | +10.5  | +12     |  |
| 68                                                         | T1           | 20                    | 8004                                                       | 8209 | 1                   | 2                 | 20.4                        | 60                            | -40                               | +14    | +16     |  |
| 68                                                         | T1           | 10                    | 8005                                                       | 8210 | 1                   | 2                 | 20.4                        | 60                            | -40                               | +14    | +16     |  |
| 68                                                         | T1           | 5                     | 8006                                                       | 8211 | 1                   | 2                 | 20.4                        | 60                            | -40                               | +14    | +16     |  |
| 140                                                        | T2           | 20                    | 8007                                                       | 8212 | 1                   | 3                 | 21.3                        | 40                            | -40                               | +14    | +16     |  |
| 140                                                        | T2           | 10                    | 8008                                                       | 8213 | 1                   | 3                 | 21.3                        | 40                            | -40                               | +14    | +16     |  |
| 140                                                        | T2           | 5                     | 8009                                                       | 8214 | 1                   | 3                 | 21.3                        | 40                            | -40                               | +14    | +16     |  |
| 270                                                        | T2           | 20                    | 8010                                                       | 8215 | 1                   | 6.5               | 81.8                        | 25                            | -44                               | +17.5  | +20     |  |
| 270                                                        | T2           | 10                    | 8011                                                       | 8216 | 1                   | 6.5               | 81.8                        | 25                            | -44                               | +17.5  | +20     |  |
| 270                                                        | T2           | 5                     | 8012                                                       | 8217 | 1                   | 6.5               | 81.8                        | 25                            | -44                               | +17.5  | +20     |  |
| 330                                                        | T3           | 20                    | 8013                                                       | 8218 | 2                   | 7.9               | 49.6                        | 20                            | -44                               | +14    | +16     |  |
| 330                                                        | T3           | 10                    | 8014                                                       | 8219 | 2                   | 7.9               | 49.6                        | 20                            | -44                               | +14    | +16     |  |
| 330                                                        | T3           | 5                     | 8015                                                       | 8220 | 2                   | 7.9               | 49.6                        | 20                            | -44                               | +14    | +16     |  |
| 560                                                        | T3           | 20                    | 8016                                                       | 8221 | 2                   | 13                | 128                         | 25                            | -64                               | +17.5  | +20     |  |
| 560                                                        | T3           | 10                    | 8017                                                       | 8222 | 2                   | 13                | 128                         | 25                            | -64                               | +17.5  | +20     |  |
| 560                                                        | T3           | 5                     | 8018                                                       | 8223 | 2                   | 13                | 128                         | 25                            | -64                               | +17.5  | +20     |  |
| 1200                                                       | T4           | 20                    | 8019                                                       | 8224 | 3                   | 14                | 144.4                       | 20                            | -80                               | +25    | +25     |  |
| 1200                                                       | T4           | 10                    | 8020                                                       | 8225 | 3                   | 14                | 144.4                       | 20                            | -80                               | +25    | +25     |  |
| 8 V <sub>DC</sub> AT +85 °C; 5 V <sub>DC</sub> AT +125 °C  |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |  |
| 25                                                         | T1           | 20                    | 8021                                                       | 8226 | 1                   | 2                 | 7.6                         | 100                           | -40                               | +10.5  | +12     |  |
| 25                                                         | T1           | 10                    | 8022                                                       | 8227 | 1                   | 2                 | 7.6                         | 100                           | -40                               | +10.5  | +12     |  |
| 25                                                         | T1           | 5                     | 8023                                                       | 8228 | 1                   | 2                 | 7.6                         | 100                           | -40                               | +10.5  | +12     |  |
| 56                                                         | T1           | 20                    | 8024                                                       | 8229 | 1                   | 2                 | 17                          | 59                            | -40                               | +14    | +16     |  |
| 56                                                         | T1           | 10                    | 8025                                                       | 8230 | 1                   | 2                 | 17                          | 59                            | -40                               | +14    | +16     |  |
| 56                                                         | T1           | 5                     | 8026                                                       | 8231 | 1                   | 2                 | 17                          | 59                            | -40                               | +14    | +16     |  |
| 220                                                        | T2           | 20                    | 8027                                                       | 8232 | 1                   | 7                 | 66.4                        | 30                            | -44                               | +17.5  | +20     |  |
| 220                                                        | T2           | 10                    | 8028                                                       | 8233 | 1                   | 7                 | 66.4                        | 30                            | -44                               | +17.5  | +20     |  |
| 220                                                        | T2           | 5                     | 8029                                                       | 8234 | 1                   | 7                 | 66.4                        | 30                            | -44                               | +17.5  | +20     |  |
| 430                                                        | T3           | 20                    | 8030                                                       | 8235 | 2                   | 14                | 91.5                        | 25                            | -64                               | +17.5  | +20     |  |
| 430                                                        | T3           | 10                    | 8031                                                       | 8236 | 2                   | 14                | 91.5                        | 25                            | -64                               | +17.5  | +20     |  |
| 430                                                        | T3           | 5                     | 8032                                                       | 8237 | 2                   | 14                | 91.5                        | 25                            | -64                               | +17.5  | +20     |  |
| 850                                                        | T4           | 20                    | 8033                                                       | 8238 | 4                   | 16                | 65.8                        | 22                            | -80                               | +25    | +25     |  |
| 850                                                        | T4           | 10                    | 8034                                                       | 8239 | 4                   | 16                | 65.8                        | 22                            | -80                               | +25    | +25     |  |
| 10 V <sub>DC</sub> AT +85 °C; 7 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |  |
| 20                                                         | T1           | 20                    | 8035                                                       | 8240 | 1                   | 2                 | 6.1                         | 175                           | -32                               | +10.5  | +12     |  |
| 20                                                         | T1           | 10                    | 8036                                                       | 8241 | 1                   | 2                 | 6.1                         | 175                           | -32                               | +10.5  | +12     |  |
| 20                                                         | T1           | 5                     | 8037                                                       | 8242 | 1                   | 2                 | 6.1                         | 175                           | -32                               | +10.5  | +12     |  |
| 47                                                         | T1           | 20                    | 8038                                                       | 8243 | 1                   | 2                 | 18.1                        | 100                           | -36                               | +14    | +16     |  |
| 47                                                         | T1           | 10                    | 8039                                                       | 8244 | 1                   | 2                 | 18.1                        | 100                           | -36                               | +14    | +16     |  |
| 47                                                         | T1           | 5                     | 8040                                                       | 8245 | 1                   | 2                 | 18.1                        | 100                           | -36                               | +14    | +16     |  |
| 100                                                        | T2           | 20                    | 8041                                                       | 8246 | 1                   | 4                 | 15.2                        | 60                            | -36                               | +14    | +16     |  |
| 100                                                        | T2           | 10                    | 8042                                                       | 8247 | 1                   | 4                 | 15.2                        | 60                            | -36                               | +14    | +16     |  |
| 100                                                        | T2           | 5                     | 8043                                                       | 8248 | 1                   | 4                 | 15.2                        | 60                            | -36                               | +14    | +16     |  |
| 180                                                        | T2           | 20                    | 8044                                                       | 8249 | 1                   | 7                 | 54.4                        | 40                            | -36                               | +14    | +16     |  |
| 180                                                        | T2           | 10                    | 8045                                                       | 8250 | 1                   | 7                 | 54.4                        | 40                            | -36                               | +14    | +16     |  |
| 180                                                        | T2           | 5                     | 8046                                                       | 8251 | 1                   | 7                 | 54.4                        | 40                            | -36                               | +14    | +16     |  |
| 250                                                        | T3           | 20                    | 8047                                                       | 8252 | 2                   | 10                | 37.8                        | 30                            | -40                               | +14    | +16     |  |
| 250                                                        | T3           | 10                    | 8048                                                       | 8253 | 2                   | 10                | 37.8                        | 30                            | -40                               | +14    | +16     |  |
| 250                                                        | T3           | 5                     | 8049                                                       | 8254 | 2                   | 10                | 37.8                        | 30                            | -40                               | +14    | +16     |  |

**Note**

<sup>(1)</sup> Style CLR65 is inactive for new military design. For new design use style CLR79

**STANDARD RATINGS/EXTENDED RATINGS: CLR65 <sup>(1)</sup>, M39006/09-XXXX**

| CAPACITANCE<br>(μF)                                         | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO.<br>M39006/09-<br>FAILURE RATE<br>LEVEL (%/1000 h) |      | MAX. DCL (μA)<br>AT |                   | MAX. DF<br>AT +25 °C<br>(%) | MAX. IMP.<br>AT -55 °C<br>(Ω) | MAX. CAPACITANCE<br>CHANGE (%) AT |        |         |
|-------------------------------------------------------------|--------------|-----------------------|------------------------------------------------------------|------|---------------------|-------------------|-----------------------------|-------------------------------|-----------------------------------|--------|---------|
|                                                             |              |                       | L                                                          | M    | +25 °C              | +85 °C<br>+125 °C |                             |                               | -55 °C                            | +85 °C | +125 °C |
|                                                             |              |                       | 2.0                                                        | 1.0  |                     |                   |                             |                               |                                   |        |         |
| 10 V <sub>DC</sub> AT +85 °C; 7 V <sub>DC</sub> AT +125 °C  |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |
| 390                                                         | T3           | 20                    | 8050                                                       | 8255 | 2                   | 16                | 87.6                        | 25                            | -64                               | +17.5  | +20     |
| 390                                                         | T3           | 10                    | 8051                                                       | 8256 | 2                   | 16                | 87.6                        | 25                            | -64                               | +17.5  | +20     |
| 390                                                         | T3           | 5                     | 8052                                                       | 8257 | 2                   | 16                | 87.6                        | 25                            | -64                               | +17.5  | +20     |
| 750                                                         | T4           | 20                    | 8053                                                       | 8258 | 4                   | 16                | 56.5                        | 23                            | -80                               | +25    | +25     |
| 750                                                         | T4           | 10                    | 8054                                                       | 8259 | 4                   | 16                | 56.5                        | 23                            | -80                               | +25    | +25     |
| 15 V <sub>DC</sub> AT +85 °C; 10 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |
| 15                                                          | T1           | 20                    | 8055                                                       | 8260 | 1                   | 2                 | 5.7                         | 155                           | -24                               | +10.5  | +12     |
| 15                                                          | T1           | 10                    | 8056                                                       | 8261 | 1                   | 2                 | 5.7                         | 155                           | -24                               | +10.5  | +12     |
| 15                                                          | T1           | 5                     | 8057                                                       | 8262 | 1                   | 2                 | 5.7                         | 155                           | -24                               | +10.5  | +12     |
| 33                                                          | T1           | 20                    | 8058                                                       | 8263 | 1                   | 2                 | 12.5                        | 90                            | -28                               | +14    | +16     |
| 33                                                          | T1           | 10                    | 8059                                                       | 8264 | 1                   | 2                 | 12.5                        | 90                            | -28                               | +14    | +16     |
| 33                                                          | T1           | 5                     | 8060                                                       | 8265 | 1                   | 2                 | 12.5                        | 90                            | -28                               | +14    | +16     |
| 70                                                          | T2           | 20                    | 8061                                                       | 8266 | 1                   | 4                 | 13.1                        | 75                            | -28                               | +14    | +16     |
| 70                                                          | T2           | 10                    | 8062                                                       | 8267 | 1                   | 4                 | 13.1                        | 75                            | -28                               | +14    | +16     |
| 70                                                          | T2           | 5                     | 8063                                                       | 8268 | 1                   | 4                 | 13.1                        | 75                            | -28                               | +14    | +16     |
| 120                                                         | T2           | 20                    | 8064                                                       | 8269 | 1                   | 7                 | 36.8                        | 50                            | -28                               | +17.5  | +20     |
| 120                                                         | T2           | 10                    | 8065                                                       | 8270 | 1                   | 7                 | 36.8                        | 50                            | -28                               | +17.5  | +20     |
| 120                                                         | T2           | 5                     | 8066                                                       | 8271 | 1                   | 7                 | 36.8                        | 50                            | -28                               | +17.5  | +20     |
| 170                                                         | T3           | 20                    | 8067                                                       | 8272 | 2                   | 10                | 25.4                        | 35                            | -32                               | +14    | +16     |
| 170                                                         | T3           | 10                    | 8068                                                       | 8273 | 2                   | 10                | 25.4                        | 35                            | -32                               | +14    | +16     |
| 170                                                         | T3           | 5                     | 8069                                                       | 8274 | 2                   | 10                | 25.4                        | 35                            | -32                               | +14    | +16     |
| 270                                                         | T3           | 20                    | 8070                                                       | 8275 | 2                   | 16                | 60.9                        | 30                            | -56                               | +17.5  | +20     |
| 270                                                         | T3           | 10                    | 8071                                                       | 8276 | 2                   | 16                | 60.9                        | 30                            | -56                               | +17.5  | +20     |
| 270                                                         | T3           | 5                     | 8072                                                       | 8277 | 2                   | 16                | 60.9                        | 30                            | -56                               | +17.5  | +20     |
| 540                                                         | T4           | 20                    | 8073                                                       | 8278 | 6                   | 24                | 49                          | 23                            | -80                               | +25    | +25     |
| 540                                                         | T4           | 10                    | 8074                                                       | 8279 | 6                   | 24                | 49                          | 23                            | -80                               | +25    | +25     |
| 25 V <sub>DC</sub> AT +85 °C; 15 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |
| 10                                                          | T1           | 20                    | 8075                                                       | 8280 | 1                   | 2                 | 4.6                         | 220                           | -16                               | +8     | +9      |
| 10                                                          | T1           | 10                    | 8076                                                       | 8281 | 1                   | 2                 | 4.6                         | 220                           | -16                               | +8     | +9      |
| 10                                                          | T1           | 5                     | 8077                                                       | 8282 | 1                   | 2                 | 4.6                         | 220                           | -16                               | +8     | +9      |
| 22                                                          | T1           | 20                    | 8078                                                       | 8283 | 1                   | 2                 | 8.3                         | 140                           | -20                               | +10.5  | +12     |
| 22                                                          | T1           | 10                    | 8079                                                       | 8284 | 1                   | 2                 | 8.3                         | 140                           | -20                               | +10.5  | +12     |
| 22                                                          | T1           | 5                     | 8080                                                       | 8285 | 1                   | 2                 | 8.3                         | 140                           | -20                               | +10.5  | +12     |
| 100                                                         | T2           | 20                    | 8081                                                       | 8286 | 1                   | 10                | 31.4                        | 50                            | -28                               | +13    | +15     |
| 100                                                         | T2           | 10                    | 8082                                                       | 8287 | 1                   | 10                | 31.4                        | 50                            | -28                               | +13    | +15     |
| 100                                                         | T2           | 5                     | 8083                                                       | 8288 | 1                   | 10                | 31.4                        | 50                            | -28                               | +13    | +15     |
| 180                                                         | T3           | 20                    | 8084                                                       | 8289 | 2                   | 18                | 54.3                        | 32                            | -48                               | +13    | +15     |
| 180                                                         | T3           | 10                    | 8085                                                       | 8290 | 2                   | 18                | 54.3                        | 32                            | -48                               | +13    | +15     |
| 180                                                         | T3           | 5                     | 8086                                                       | 8291 | 2                   | 18                | 54.3                        | 32                            | -48                               | +13    | +15     |
| 350                                                         | T4           | 20                    | 8087                                                       | 8292 | 7                   | 28                | 35                          | 24                            | -70                               | +25    | +25     |
| 350                                                         | T4           | 10                    | 8088                                                       | 8293 | 7                   | 28                | 35                          | 24                            | -70                               | +25    | +25     |
| 30 V <sub>DC</sub> AT +85 °C; 20 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |
| 8.0                                                         | T1           | 20                    | 8089                                                       | 8294 | 1                   | 2                 | 4.5                         | 275                           | -16                               | +8     | +12     |
| 8.0                                                         | T1           | 10                    | 8090                                                       | 8295 | 1                   | 2                 | 4.5                         | 275                           | -16                               | +8     | +12     |
| 8.0                                                         | T1           | 5                     | 8091                                                       | 8296 | 1                   | 2                 | 4.5                         | 275                           | -16                               | +8     | +12     |
| 15                                                          | T1           | 20                    | 8092                                                       | 8297 | 1                   | 2                 | 9.1                         | 175                           | -20                               | +10.5  | +12     |
| 15                                                          | T1           | 10                    | 8093                                                       | 8298 | 1                   | 2                 | 9.1                         | 175                           | -20                               | +10.5  | +12     |
| 15                                                          | T1           | 5                     | 8094                                                       | 8299 | 1                   | 2                 | 9.1                         | 175                           | -20                               | +10.5  | +12     |
| 40                                                          | T2           | 20                    | 8095                                                       | 8300 | 1                   | 5                 | 12.2                        | 65                            | -24                               | +10.5  | +12     |
| 40                                                          | T2           | 10                    | 8096                                                       | 8301 | 1                   | 5                 | 12.2                        | 65                            | -24                               | +10.5  | +12     |
| 40                                                          | T2           | 5                     | 8097                                                       | 8302 | 1                   | 5                 | 12.2                        | 65                            | -24                               | +10.5  | +12     |

**Note**

<sup>(1)</sup> Style CLR65 is inactive for new military design. For new design use style CLR79

**STANDARD RATINGS/EXTENDED RATINGS: CLR65 <sup>(1)</sup>, M39006/09-XXXX**

| CAPACITANCE<br>(μF)                                         | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO.<br>M39006/09-<br>FAILURE RATE<br>LEVEL (%/1000 h) |      | MAX. DCL (μA)<br>AT |                   | MAX. DF<br>AT +25 °C<br>(%) | MAX. IMP.<br>AT -55 °C<br>(Ω) | MAX. CAPACITANCE<br>CHANGE (%) AT |        |         |
|-------------------------------------------------------------|--------------|-----------------------|------------------------------------------------------------|------|---------------------|-------------------|-----------------------------|-------------------------------|-----------------------------------|--------|---------|
|                                                             |              |                       | L                                                          | M    | +25 °C              | +85 °C<br>+125 °C |                             |                               | -55 °C                            | +85 °C | +125 °C |
|                                                             |              |                       | 2.0                                                        | 1.0  |                     |                   |                             |                               |                                   |        |         |
| 30 V <sub>DC</sub> AT +85 °C; 20 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |
| 68                                                          | T2           | 20                    | 8098                                                       | 8303 | 1                   | 8                 | 31                          | 60                            | -24                               | +13    | +15     |
| 68                                                          | T2           | 10                    | 8099                                                       | 8304 | 1                   | 8                 | 31                          | 60                            | -24                               | +13    | +15     |
| 68                                                          | T2           | 5                     | 8100                                                       | 8305 | 1                   | 8                 | 31                          | 60                            | -24                               | +13    | +15     |
| 100                                                         | T3           | 20                    | 8101                                                       | 8306 | 2                   | 12                | 19                          | 40                            | -28                               | +10.5  | +12     |
| 100                                                         | T3           | 10                    | 8102                                                       | 8307 | 2                   | 12                | 19                          | 40                            | -28                               | +10.5  | +12     |
| 100                                                         | T3           | 5                     | 8103                                                       | 8308 | 2                   | 12                | 19                          | 40                            | -28                               | +10.5  | +12     |
| 150                                                         | T3           | 20                    | 8104                                                       | 8309 | 2                   | 18                | 46                          | 35                            | -48                               | +13    | +15     |
| 150                                                         | T3           | 10                    | 8105                                                       | 8310 | 2                   | 18                | 46                          | 35                            | -48                               | +13    | +15     |
| 150                                                         | T3           | 5                     | 8106                                                       | 8311 | 2                   | 18                | 46                          | 35                            | -48                               | +13    | +15     |
| 300                                                         | T4           | 20                    | 8107                                                       | 8312 | 8                   | 32                | 35                          | 25                            | -60                               | +25    | +25     |
| 300                                                         | T4           | 10                    | 8108                                                       | 8313 | 8                   | 32                | 35                          | 25                            | -60                               | +25    | +25     |
| 50 V <sub>DC</sub> AT +85 °C; 30 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |
| 5.0                                                         | T1           | 20                    | 8109                                                       | 8314 | 1                   | 2                 | 3.4                         | 400                           | -16                               | +5     | +6      |
| 5.0                                                         | T1           | 10                    | 8110                                                       | 8315 | 1                   | 2                 | 3.4                         | 400                           | -16                               | +5     | +6      |
| 5.0                                                         | T1           | 5                     | 8111                                                       | 8316 | 1                   | 2                 | 3.4                         | 400                           | -16                               | +5     | +6      |
| 10                                                          | T1           | 20                    | 8112                                                       | 8317 | 1                   | 2                 | 6                           | 250                           | -24                               | +8     | +9      |
| 10                                                          | T1           | 10                    | 8113                                                       | 8318 | 1                   | 2                 | 6                           | 250                           | -24                               | +8     | +9      |
| 10                                                          | T1           | 5                     | 8114                                                       | 8319 | 1                   | 2                 | 6                           | 250                           | -24                               | +8     | +9      |
| 25                                                          | T2           | 20                    | 8115                                                       | 8320 | 1                   | 5                 | 11.2                        | 95                            | -20                               | +10.5  | +12     |
| 25                                                          | T2           | 10                    | 8116                                                       | 8321 | 1                   | 5                 | 11.2                        | 95                            | -20                               | +10.5  | +12     |
| 25                                                          | T2           | 5                     | 8117                                                       | 8322 | 1                   | 5                 | 11.2                        | 95                            | -20                               | +10.5  | +12     |
| 47                                                          | T2           | 20                    | 8118                                                       | 8323 | 1                   | 9                 | 21.4                        | 70                            | -28                               | +13    | +15     |
| 47                                                          | T2           | 10                    | 8119                                                       | 8324 | 1                   | 9                 | 21.4                        | 70                            | -28                               | +13    | +15     |
| 47                                                          | T2           | 5                     | 8120                                                       | 8325 | 1                   | 9                 | 21.4                        | 70                            | -28                               | +13    | +15     |
| 60                                                          | T3           | 20                    | 8121                                                       | 8326 | 2                   | 12                | 13.6                        | 45                            | -16                               | +10.5  | +12     |
| 60                                                          | T3           | 10                    | 8122                                                       | 8327 | 2                   | 12                | 13.6                        | 45                            | -16                               | +10.5  | +12     |
| 60                                                          | T3           | 5                     | 8123                                                       | 8328 | 2                   | 12                | 13.6                        | 45                            | -16                               | +10.5  | +12     |
| 82                                                          | T3           | 20                    | 8124                                                       | 8329 | 2                   | 16                | 24.9                        | 45                            | -32                               | +13    | +15     |
| 82                                                          | T3           | 10                    | 8125                                                       | 8330 | 2                   | 16                | 24.9                        | 45                            | -32                               | +13    | +15     |
| 82                                                          | T3           | 5                     | 8126                                                       | 8331 | 2                   | 16                | 24.9                        | 45                            | -32                               | +13    | +15     |
| 160                                                         | T4           | 20                    | 8127                                                       | 8332 | 8                   | 32                | 25.7                        | 27                            | -50                               | +25    | +25     |
| 160                                                         | T4           | 10                    | 8128                                                       | 8333 | 8                   | 32                | 25.7                        | 27                            | -50                               | +25    | +25     |
| 60 V <sub>DC</sub> AT +85 °C; 40 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |
| 4.0                                                         | T1           | 20                    | 8129                                                       | 8334 | 1                   | 2                 | 3                           | 550                           | -16                               | +5     | +6      |
| 4.0                                                         | T1           | 10                    | 8130                                                       | 8335 | 1                   | 2                 | 3                           | 550                           | -16                               | +5     | +6      |
| 4.0                                                         | T1           | 5                     | 8131                                                       | 8336 | 1                   | 2                 | 3                           | 550                           | -16                               | +5     | +6      |
| 8.2                                                         | T1           | 20                    | 8132                                                       | 8337 | 1                   | 2                 | 5                           | 275                           | -24                               | +8     | +9      |
| 8.2                                                         | T1           | 10                    | 8133                                                       | 8338 | 1                   | 2                 | 5                           | 275                           | -24                               | +8     | +9      |
| 8.2                                                         | T1           | 5                     | 8134                                                       | 8339 | 1                   | 2                 | 5                           | 275                           | -24                               | +8     | +9      |
| 20                                                          | T2           | 20                    | 8135                                                       | 8340 | 1                   | 5                 | 7.6                         | 105                           | -16                               | +10.5  | +12     |
| 20                                                          | T2           | 10                    | 8136                                                       | 8341 | 1                   | 5                 | 7.6                         | 105                           | -16                               | +10.5  | +12     |
| 20                                                          | T2           | 5                     | 8137                                                       | 8342 | 1                   | 5                 | 7.6                         | 105                           | -16                               | +10.5  | +12     |
| 39                                                          | T2           | 20                    | 8138                                                       | 8343 | 1                   | 9                 | 20.7                        | 90                            | -28                               | +10.5  | +12     |
| 39                                                          | T2           | 10                    | 8139                                                       | 8344 | 1                   | 9                 | 20.7                        | 90                            | -28                               | +10.5  | +12     |
| 39                                                          | T2           | 5                     | 8140                                                       | 8345 | 1                   | 9                 | 20.7                        | 90                            | -28                               | +10.5  | +12     |
| 50                                                          | T3           | 20                    | 8141                                                       | 8346 | 2                   | 12                | 15.3                        | 50                            | -16                               | +10.5  | +12     |
| 50                                                          | T3           | 10                    | 8142                                                       | 8347 | 2                   | 12                | 15.3                        | 50                            | -16                               | +10.5  | +12     |
| 50                                                          | T3           | 5                     | 8143                                                       | 8348 | 2                   | 12                | 15.3                        | 50                            | -16                               | +10.5  | +12     |
| 68                                                          | T3           | 20                    | 8144                                                       | 8349 | 2                   | 16                | 30.7                        | 50                            | -32                               | +10.5  | +12     |
| 68                                                          | T3           | 10                    | 8145                                                       | 8350 | 2                   | 16                | 30.7                        | 50                            | -32                               | +10.5  | +12     |
| 68                                                          | T3           | 5                     | 8146                                                       | 8351 | 2                   | 16                | 30.7                        | 50                            | -32                               | +10.5  | +12     |
| 140                                                         | T4           | 20                    | 8147                                                       | 8352 | 8                   | 32                | 25.7                        | 28                            | -40                               | +20    | +20     |
| 140                                                         | T4           | 10                    | 8148                                                       | 8353 | 8                   | 32                | 25.7                        | 28                            | -40                               | +20    | +20     |

**Note**

<sup>(1)</sup> Style CLR65 is inactive for new military design. For new design use style CLR79

**STANDARD RATINGS/EXTENDED RATINGS: CLR65 <sup>(1)</sup>, M39006/09-XXXX**

| CAPACITANCE<br>(μF)                                          | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO.<br>M39006/09-<br>FAILURE RATE<br>LEVEL (%/1000 h) |      | MAX. DCL (μA)<br>AT |                   | MAX. DF<br>AT +25 °C<br>(%) | MAX. IMP.<br>AT -55 °C<br>(Ω) | MAX. CAPACITANCE<br>CHANGE (%) AT |        |         |
|--------------------------------------------------------------|--------------|-----------------------|------------------------------------------------------------|------|---------------------|-------------------|-----------------------------|-------------------------------|-----------------------------------|--------|---------|
|                                                              |              |                       | L                                                          | M    | +25 °C              | +85 °C<br>+125 °C |                             |                               | -55 °C                            | +85 °C | +125 °C |
|                                                              |              |                       | 2.0                                                        | 1.0  |                     |                   |                             |                               |                                   |        |         |
| 75 V <sub>DC</sub> AT +85 °C; 50 V <sub>DC</sub> AT +125 °C  |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |
| 3.5                                                          | T1           | 20                    | 8149                                                       | 8354 | 1                   | 2                 | 2.5                         | 650                           | -16                               | +5     | +6      |
| 3.5                                                          | T1           | 10                    | 8150                                                       | 8355 | 1                   | 2                 | 2.5                         | 650                           | -16                               | +5     | +6      |
| 3.5                                                          | T1           | 5                     | 8151                                                       | 8356 | 1                   | 2                 | 2.5                         | 650                           | -16                               | +5     | +6      |
| 6.8                                                          | T1           | 20                    | 8152                                                       | 8357 | 1                   | 2                 | 4.1                         | 300                           | -20                               | +8     | +9      |
| 6.8                                                          | T1           | 10                    | 8153                                                       | 8358 | 1                   | 2                 | 4.1                         | 300                           | -20                               | +8     | +9      |
| 6.8                                                          | T1           | 5                     | 8154                                                       | 8359 | 1                   | 2                 | 4.1                         | 300                           | -20                               | +8     | +9      |
| 15                                                           | T2           | 20                    | 8155                                                       | 8360 | 1                   | 5                 | 7.5                         | 150                           | -16                               | +8     | +9      |
| 15                                                           | T2           | 10                    | 8156                                                       | 8361 | 1                   | 5                 | 7.5                         | 150                           | -16                               | +8     | +9      |
| 15                                                           | T2           | 5                     | 8157                                                       | 8362 | 1                   | 5                 | 7.4                         | 150                           | -16                               | +8     | +9      |
| 33                                                           | T2           | 20                    | 8158                                                       | 8363 | 1                   | 10                | 17.5                        | 90                            | -24                               | +10.5  | +15     |
| 33                                                           | T2           | 10                    | 8159                                                       | 8364 | 1                   | 10                | 17.5                        | 90                            | -24                               | +10.5  | +15     |
| 33                                                           | T2           | 5                     | 8160                                                       | 8365 | 1                   | 10                | 17.5                        | 90                            | -24                               | +10.5  | +15     |
| 40                                                           | T3           | 20                    | 8161                                                       | 8366 | 2                   | 12                | 15.2                        | 60                            | -16                               | +10.5  | +12     |
| 40                                                           | T3           | 10                    | 8162                                                       | 8367 | 2                   | 12                | 15.2                        | 60                            | -16                               | +10.5  | +12     |
| 40                                                           | T3           | 5                     | 8163                                                       | 8368 | 2                   | 12                | 15.2                        | 60                            | -16                               | +10.5  | +12     |
| 56                                                           | T3           | 20                    | 8164                                                       | 8369 | 2                   | 17                | 26                          | 60                            | -28                               | +10.5  | +15     |
| 56                                                           | T3           | 10                    | 8165                                                       | 8370 | 2                   | 17                | 26                          | 60                            | -28                               | +10.5  | +15     |
| 56                                                           | T3           | 5                     | 8166                                                       | 8371 | 2                   | 17                | 26                          | 60                            | -28                               | +10.5  | +15     |
| 110                                                          | T4           | 20                    | 8167                                                       | 8372 | 9                   | 36                | 25.7                        | 29                            | -35                               | +20    | +20     |
| 110                                                          | T4           | 10                    | 8168                                                       | 8373 | 9                   | 36                | 25.7                        | 29                            | -35                               | +20    | +20     |
| 100 V <sub>DC</sub> AT +85 °C; 65 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |
| 2.5                                                          | T1           | 20                    | 8169                                                       | 8374 | 1                   | 2                 | 5                           | 950                           | -16                               | +7     | +8      |
| 2.5                                                          | T1           | 10                    | 8170                                                       | 8375 | 1                   | 2                 | 5                           | 950                           | -16                               | +7     | +8      |
| 2.5                                                          | T1           | 5                     | 8171                                                       | 8376 | 1                   | 2                 | 5                           | 950                           | -16                               | +7     | +8      |
| 4.7                                                          | T1           | 20                    | 8172                                                       | 8377 | 1                   | 2                 | 3.6                         | 500                           | -16                               | +7     | +8      |
| 4.7                                                          | T1           | 10                    | 8173                                                       | 8378 | 1                   | 2                 | 3.6                         | 500                           | -16                               | +7     | +8      |
| 4.7                                                          | T1           | 5                     | 8174                                                       | 8379 | 1                   | 2                 | 3.6                         | 500                           | -16                               | +7     | +8      |
| 11                                                           | T2           | 20                    | 8175                                                       | 8380 | 1                   | 4                 | 5                           | 200                           | -16                               | +7     | +8      |
| 11                                                           | T2           | 10                    | 8176                                                       | 8381 | 1                   | 4                 | 5                           | 200                           | -16                               | +7     | +8      |
| 11                                                           | T2           | 5                     | 8177                                                       | 8382 | 1                   | 4                 | 5                           | 200                           | -16                               | +7     | +8      |
| 22                                                           | T2           | 20                    | 8178                                                       | 8383 | 1                   | 9                 | 11.8                        | 100                           | -16                               | +7     | +8      |
| 22                                                           | T2           | 10                    | 8179                                                       | 8384 | 1                   | 9                 | 11.8                        | 100                           | -16                               | +7     | +8      |
| 22                                                           | T2           | 5                     | 8180                                                       | 8385 | 1                   | 9                 | 11.8                        | 100                           | -16                               | +7     | +8      |
| 30                                                           | T3           | 20                    | 8181                                                       | 8386 | 2                   | 12                | 9.1                         | 80                            | -16                               | +7     | +8      |
| 30                                                           | T3           | 10                    | 8182                                                       | 8387 | 2                   | 12                | 9.1                         | 80                            | -16                               | +7     | +8      |
| 30                                                           | T3           | 5                     | 8183                                                       | 8388 | 2                   | 12                | 9.1                         | 80                            | -16                               | +7     | +8      |
| 43                                                           | T3           | 20                    | 8184                                                       | 8389 | 2                   | 17                | 19.7                        | 70                            | -20                               | +7     | +8      |
| 43                                                           | T3           | 10                    | 8185                                                       | 8390 | 2                   | 17                | 19.7                        | 70                            | -20                               | +7     | +8      |
| 43                                                           | T3           | 5                     | 8186                                                       | 8391 | 2                   | 17                | 19.7                        | 70                            | -20                               | +7     | +8      |
| 86                                                           | T4           | 20                    | 8187                                                       | 8392 | 9                   | 36                | 20.7                        | 30                            | -25                               | +15    | +15     |
| 86                                                           | T4           | 10                    | 8188                                                       | 8393 | 9                   | 36                | 20.7                        | 30                            | -25                               | +15    | +15     |

**Note**

<sup>(1)</sup> Style CLR65 is inactive for new military design. For new design use style CLR79

**STANDARD RATINGS/EXTENDED RATINGS: CLR65 <sup>(1)</sup>, M39006/09-XXXX**

| CAPACITANCE<br>(μF)                                          | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO.<br>M39006/09-<br>FAILURE RATE<br>LEVEL (%/1000 h) |      | MAX. DCL (μA)<br>AT |                   | MAX. DF<br>AT +25 °C<br>(%) | MAX. IMP.<br>AT -55 °C<br>(Ω) | MAX. CAPACITANCE<br>CHANGE (%) AT |        |         |  |
|--------------------------------------------------------------|--------------|-----------------------|------------------------------------------------------------|------|---------------------|-------------------|-----------------------------|-------------------------------|-----------------------------------|--------|---------|--|
|                                                              |              |                       | L                                                          | M    | +25 °C              | +85 °C<br>+125 °C |                             |                               | -55 °C                            | +85 °C | +125 °C |  |
|                                                              |              |                       | 2.0                                                        | 1.0  |                     |                   |                             |                               |                                   |        |         |  |
| 125 V <sub>DC</sub> AT +85 °C; 85 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |  |
| 1.7                                                          | T1           | 20                    | 8189                                                       | 8394 | 1                   | 2                 | 7                           | 1250                          | -16                               | +7     | +8      |  |
| 1.7                                                          | T1           | 10                    | 8190                                                       | 8395 | 1                   | 2                 | 7                           | 1250                          | -16                               | +7     | +8      |  |
| 1.7                                                          | T1           | 5                     | 8191                                                       | 8396 | 1                   | 2                 | 7                           | 1250                          | -16                               | +7     | +8      |  |
| 3.6                                                          | T1           | 20                    | 8192                                                       | 8397 | 1                   | 2                 | 4.1                         | 600                           | -16                               | +7     | +8      |  |
| 3.6                                                          | T1           | 10                    | 8193                                                       | 8398 | 1                   | 2                 | 4.1                         | 600                           | -16                               | +7     | +8      |  |
| 3.6                                                          | T1           | 5                     | 8194                                                       | 8399 | 1                   | 2                 | 4.1                         | 600                           | -16                               | +7     | +8      |  |
| 9.0                                                          | T2           | 20                    | 8195                                                       | 8400 | 1                   | 5                 | 10.2                        | 240                           | -16                               | +7     | +8      |  |
| 9.0                                                          | T2           | 10                    | 8196                                                       | 8401 | 1                   | 5                 | 10.2                        | 240                           | -16                               | +7     | +8      |  |
| 9.0                                                          | T2           | 5                     | 8197                                                       | 8402 | 1                   | 5                 | 10.2                        | 240                           | -16                               | +7     | +8      |  |
| 25                                                           | T3           | 20                    | 8204                                                       | 8409 | 2                   | 13                | 19                          | 93                            | -16                               | +7     | +8      |  |
| 25                                                           | T3           | 10                    | 8205                                                       | 8410 | 2                   | 13                | 19                          | 93                            | -16                               | +7     | +8      |  |
| 25                                                           | T3           | 5                     | 9026                                                       | 9029 | 2                   | 13                | 19                          | 93                            | -16                               | +7     | +8      |  |
| 56                                                           | T4           | 20                    | 9027                                                       | 9030 | 10                  | 40                | 17.5                        | 32                            | -25                               | +15    | +15     |  |
| 56                                                           | T4           | 10                    | 9028                                                       | 9031 | 10                  | 40                | 17.5                        | 32                            | -25                               | +15    | +15     |  |

**Note**

(1) Style CLR65 is inactive for new military design. For new design use style CLR79

**STANDARD RATINGS / EXTENDED RATINGS: CLR69 <sup>(1)</sup>, M39006/21-XXXX**

| CAPACITANCE<br>(μF)                                       | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO.<br>M39006/21-<br>FAILURE RATE<br>LEVEL (%/1000 h) |      | MAX. DCL (μA)<br>AT |                   | MAX. DF<br>AT +25 °C<br>(%) | MAX. IMP.<br>AT -55 °C<br>(Ω) | MAX. CAPACITANCE<br>CHANGE (%) AT |        |         |  |
|-----------------------------------------------------------|--------------|-----------------------|------------------------------------------------------------|------|---------------------|-------------------|-----------------------------|-------------------------------|-----------------------------------|--------|---------|--|
|                                                           |              |                       | L                                                          | M    | +25 °C              | +85 °C<br>+125 °C |                             |                               | -55 °C                            | +85 °C | +125 °C |  |
|                                                           |              |                       | 2.0                                                        | 1.0  |                     |                   |                             |                               |                                   |        |         |  |
| 6 V <sub>DC</sub> AT +85 °C; 4 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |  |
| 220                                                       | T1           | 20                    | 0001                                                       | 0089 | 2                   | 9                 | 50                          | 36                            | -64                               | +13    | +16     |  |
| 220                                                       | T1           | 10                    | 0002                                                       | 0090 | 2                   | 9                 | 50                          | 36                            | -64                               | +13    | +16     |  |
| 820                                                       | T2           | 20                    | 0003                                                       | 0091 | 3                   | 14                | 155                         | 18                            | -88                               | +16    | +20     |  |
| 820                                                       | T2           | 10                    | 0004                                                       | 0092 | 3                   | 14                | 155                         | 18                            | -88                               | +16    | +20     |  |
| 1500                                                      | T3           | 20                    | 0005                                                       | 0093 | 5                   | 20                | 172                         | 18                            | -90                               | +20    | +25     |  |
| 1500                                                      | T3           | 10                    | 0006                                                       | 0094 | 5                   | 20                | 172                         | 18                            | -90                               | +20    | +25     |  |
| 2200                                                      | T4           | 20                    | 0007                                                       | 0095 | 6                   | 24                | 170                         | 13                            | -90                               | +25    | +30     |  |
| 2200                                                      | T4           | 10                    | 0008                                                       | 0096 | 6                   | 24                | 170                         | 13                            | -90                               | +25    | +30     |  |
| 8 V <sub>DC</sub> AT +85 °C; 5 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |  |
| 180                                                       | T1           | 20                    | 0009                                                       | 0097 | 2                   | 9                 | 41                          | 45                            | -60                               | +13    | +16     |  |
| 180                                                       | T1           | 10                    | 0010                                                       | 0098 | 2                   | 9                 | 41                          | 45                            | -60                               | +13    | +16     |  |
| 680                                                       | T2           | 20                    | 0011                                                       | 0099 | 3                   | 14                | 130                         | 22                            | -83                               | +16    | +20     |  |
| 680                                                       | T2           | 10                    | 0012                                                       | 0100 | 3                   | 14                | 130                         | 22                            | -83                               | +16    | +20     |  |
| 1500                                                      | T3           | 20                    | 0013                                                       | 0101 | 5                   | 20                | 170                         | 18                            | -90                               | +20    | +25     |  |
| 1500                                                      | T3           | 10                    | 0014                                                       | 0102 | 5                   | 20                | 170                         | 18                            | -90                               | +20    | +25     |  |
| 1800                                                      | T4           | 20                    | 0015                                                       | 0103 | 7                   | 25                | 138                         | 14                            | -90                               | +25    | +30     |  |
| 1800                                                      | T4           | 10                    | 0016                                                       | 0104 | 7                   | 25                | 138                         | 14                            | -90                               | +25    | +30     |  |

**Note**

(1) Style CLR69 is inactive for new military design. For new design use style CLR81

**STANDARD RATINGS / EXTENDED RATINGS: CLR69 <sup>(1)</sup>, M39006/21-XXXX**

| CAPACITANCE<br>(μF)                                         | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO.<br>M39006/21-<br>FAILURE RATE<br>LEVEL (%/1000 h) |      | MAX. DCL (μA)<br>AT |                   | MAX. DF<br>AT +25 °C<br>(%) | MAX. IMP.<br>AT -55 °C<br>(Ω) | MAX. CAPACITANCE<br>CHANGE (%) AT |        |         |  |
|-------------------------------------------------------------|--------------|-----------------------|------------------------------------------------------------|------|---------------------|-------------------|-----------------------------|-------------------------------|-----------------------------------|--------|---------|--|
|                                                             |              |                       | L                                                          | M    | +25 °C              | +85 °C<br>+125 °C |                             |                               | -55 °C                            | +85 °C | +125 °C |  |
|                                                             |              |                       | 2.0                                                        | 1.0  |                     |                   |                             |                               |                                   |        |         |  |
| 10 V <sub>DC</sub> AT +85 °C; 7 V <sub>DC</sub> AT +125 °C  |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |  |
| 150                                                         | T1           | 20                    | 0017                                                       | 0105 | 2                   | 9                 | 34                          | 54                            | -55                               | +13    | +16     |  |
| 150                                                         | T1           | 10                    | 0018                                                       | 0106 | 2                   | 9                 | 34                          | 54                            | -55                               | +13    | +16     |  |
| 560                                                         | T2           | 20                    | 0019                                                       | 0107 | 3                   | 16                | 106                         | 27                            | -77                               | +16    | +20     |  |
| 560                                                         | T2           | 10                    | 0020                                                       | 0108 | 3                   | 16                | 106                         | 27                            | -77                               | +16    | +20     |  |
| 1200                                                        | T3           | 20                    | 0021                                                       | 0109 | 5                   | 20                | 137                         | 18                            | -88                               | +20    | +25     |  |
| 1200                                                        | T3           | 10                    | 0022                                                       | 0110 | 5                   | 20                | 137                         | 18                            | -88                               | +20    | +25     |  |
| 1500                                                        | T4           | 20                    | 0023                                                       | 0111 | 7                   | 25                | 114                         | 15                            | -88                               | +25    | +30     |  |
| 1500                                                        | T4           | 10                    | 0024                                                       | 0112 | 7                   | 25                | 114                         | 15                            | -88                               | +25    | +30     |  |
| 15 V <sub>DC</sub> AT +85 °C; 10 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |  |
| 100                                                         | T1           | 20                    | 0025                                                       | 0113 | 2                   | 9                 | 30                          | 72                            | -44                               | +13    | ++16    |  |
| 100                                                         | T1           | 10                    | 0026                                                       | 0114 | 2                   | 9                 | 30                          | 72                            | -44                               | +13    | +16     |  |
| 390                                                         | T2           | 20                    | 0027                                                       | 0115 | 3                   | 16                | 74                          | 31                            | -66                               | +16    | +20     |  |
| 390                                                         | T2           | 10                    | 0028                                                       | 0116 | 3                   | 16                | 74                          | 31                            | -66                               | +16    | +20     |  |
| 820                                                         | T3           | 20                    | 0029                                                       | 0117 | 6                   | 24                | 111                         | 22                            | -77                               | +20    | +25     |  |
| 820                                                         | T3           | 10                    | 0030                                                       | 0118 | 6                   | 24                | 111                         | 22                            | -77                               | +20    | +25     |  |
| 1000                                                        | T4           | 20                    | 0031                                                       | 0119 | 8                   | 32                | 92                          | 17                            | -77                               | +25    | +30     |  |
| 1000                                                        | T4           | 10                    | 0032                                                       | 0120 | 8                   | 32                | 92                          | 17                            | -77                               | +25    | +30     |  |
| 25 V <sub>DC</sub> AT +85 °C; 15 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |  |
| 68                                                          | T1           | 20                    | 0033                                                       | 0121 | 2                   | 9                 | 22                          | 90                            | -40                               | +12    | +15     |  |
| 68                                                          | T1           | 10                    | 0034                                                       | 0122 | 2                   | 9                 | 22                          | 90                            | -40                               | +12    | +15     |  |
| 270                                                         | T2           | 20                    | 0035                                                       | 0123 | 3                   | 16                | 55                          | 33                            | -62                               | +13    | +16     |  |
| 270                                                         | T2           | 10                    | 0036                                                       | 0124 | 3                   | 16                | 55                          | 33                            | -62                               | +13    | +16     |  |
| 560                                                         | T3           | 20                    | 0037                                                       | 0125 | 7                   | 28                | 76                          | 24                            | -72                               | +20    | +25     |  |
| 560                                                         | T3           | 10                    | 0038                                                       | 0126 | 7                   | 28                | 76                          | 24                            | -72                               | +20    | +25     |  |
| 680                                                         | T4           | 20                    | 0039                                                       | 0127 | 8                   | 32                | 63                          | 19                            | -72                               | +25    | +30     |  |
| 680                                                         | T4           | 10                    | 0040                                                       | 0128 | 8                   | 32                | 63                          | 19                            | -72                               | +25    | +30     |  |
| 30 V <sub>DC</sub> AT +85 °C; 20 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |  |
| 56                                                          | T1           | 20                    | 0041                                                       | 0129 | 2                   | 9                 | 22                          | 100                           | -38                               | +12    | +15     |  |
| 56                                                          | T1           | 10                    | 0042                                                       | 0130 | 2                   | 9                 | 22                          | 100                           | -38                               | +12    | +15     |  |
| 220                                                         | T2           | 20                    | 0043                                                       | 0131 | 3                   | 16                | 42                          | 36                            | -60                               | +13    | +16     |  |
| 220                                                         | T2           | 10                    | 0044                                                       | 0132 | 3                   | 16                | 42                          | 36                            | -60                               | +13    | +16     |  |
| 470                                                         | T3           | 20                    | 0045                                                       | 0133 | 8                   | 32                | 64                          | 25                            | -65                               | +20    | +25     |  |
| 470                                                         | T3           | 10                    | 0046                                                       | 0134 | 8                   | 32                | 64                          | 25                            | -65                               | +20    | +25     |  |
| 560                                                         | T4           | 20                    | 0047                                                       | 0135 | 9                   | 36                | 55                          | 20                            | -65                               | +25    | +30     |  |
| 560                                                         | T4           | 10                    | 0048                                                       | 0136 | 9                   | 36                | 55                          | 20                            | -65                               | +25    | +30     |  |
| 50 V <sub>DC</sub> AT +85 °C; 30 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |  |
| 33                                                          | T1           | 20                    | 0049                                                       | 0137 | 2                   | 9                 | 12.3                        | 135                           | -29                               | +10    | +12     |  |
| 33                                                          | T1           | 10                    | 0050                                                       | 0138 | 2                   | 9                 | 12.3                        | 135                           | -29                               | +10    | +12     |  |
| 120                                                         | T2           | 20                    | 0051                                                       | 0139 | 4                   | 24                | 22.5                        | 49                            | -42                               | +12    | +15     |  |
| 120                                                         | T2           | 10                    | 0052                                                       | 0140 | 4                   | 24                | 22.5                        | 49                            | -42                               | +12    | +15     |  |
| 270                                                         | T3           | 20                    | 0053                                                       | 0141 | 8                   | 32                | 37                          | 29                            | -46                               | +20    | +25     |  |
| 270                                                         | T3           | 10                    | 0054                                                       | 0142 | 8                   | 32                | 37                          | 29                            | -46                               | +20    | +25     |  |
| 330                                                         | T4           | 20                    | 0055                                                       | 0143 | 9                   | 36                | 38                          | 22                            | -46                               | +25    | +30     |  |
| 330                                                         | T4           | 10                    | 0056                                                       | 0144 | 9                   | 36                | 38                          | 22                            | -46                               | +25    | +30     |  |
| 60 V <sub>DC</sub> AT +85 °C; 40 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |  |
| 27                                                          | T1           | 20                    | 0057                                                       | 0145 | 3                   | 12                | 10.2                        | 144                           | -24                               | +10    | +12     |  |
| 27                                                          | T1           | 10                    | 0058                                                       | 0146 | 3                   | 12                | 10.2                        | 144                           | -24                               | +10    | +12     |  |
| 100                                                         | T2           | 20                    | 0059                                                       | 0147 | 4                   | 20                | 19                          | 54                            | -36                               | +12    | +15     |  |
| 100                                                         | T2           | 10                    | 0060                                                       | 0148 | 4                   | 20                | 19                          | 54                            | -36                               | +12    | +15     |  |
| 220                                                         | T3           | 20                    | 0061                                                       | 0149 | 8                   | 32                | 30                          | 29                            | -40                               | +16    | +20     |  |
| 220                                                         | T3           | 10                    | 0062                                                       | 0150 | 8                   | 32                | 30                          | 29                            | -40                               | +16    | +20     |  |
| 270                                                         | T4           | 20                    | 0063                                                       | 0151 | 9                   | 36                | 27                          | 23                            | -45                               | +20    | +25     |  |
| 270                                                         | T4           | 10                    | 0064                                                       | 0152 | 9                   | 36                | 27                          | 23                            | -45                               | +20    | +25     |  |

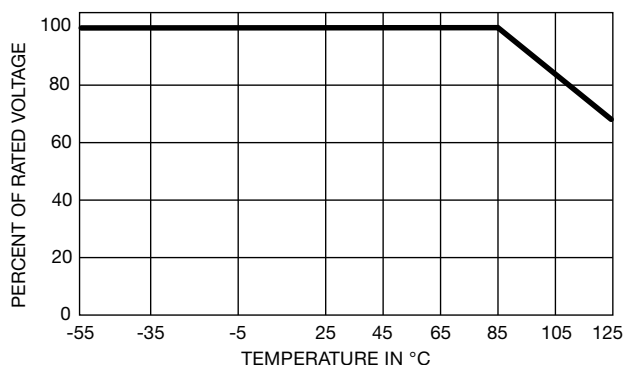
**Note**<sup>(1)</sup> Style CLR69 is inactive for new military design. For new design use style CLR81

**STANDARD RATINGS / EXTENDED RATINGS: CLR69 <sup>(1)</sup>, M39006/21-XXXX**

| CAPACITANCE<br>(μF)                                          | CASE<br>CODE | CAP.<br>TOL.<br>(± %) | PART NO.<br>M39006/21-<br>FAILURE RATE<br>LEVEL (%/1000 h) |      | MAX. DCL (μA)<br>AT |                   | MAX. DF<br>AT +25 °C<br>(%) | MAX. IMP.<br>AT -55 °C<br>(Ω) | MAX. CAPACITANCE<br>CHANGE (%) AT |        |         |
|--------------------------------------------------------------|--------------|-----------------------|------------------------------------------------------------|------|---------------------|-------------------|-----------------------------|-------------------------------|-----------------------------------|--------|---------|
|                                                              |              |                       | L                                                          | M    | +25 °C              | +85 °C<br>+125 °C |                             |                               | -55 °C                            | +85 °C | +125 °C |
|                                                              |              |                       | 2.0                                                        | 1.0  |                     |                   |                             |                               |                                   |        |         |
| 75 V <sub>DC</sub> AT +85 °C; 50 V <sub>DC</sub> AT +125 °C  |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |
| 22                                                           | T1           | 20                    | 0065                                                       | 0153 | 3                   | 12                | 8.5                         | 157                           | -19                               | +10    | +12     |
| 22                                                           | T1           | 10                    | 0066                                                       | 0154 | 3                   | 12                | 8.5                         | 157                           | -19                               | +10    | +12     |
| 82                                                           | T2           | 20                    | 0067                                                       | 0155 | 4                   | 24                | 15.2                        | 63                            | -30                               | +12    | +15     |
| 82                                                           | T2           | 10                    | 0068                                                       | 0156 | 4                   | 24                | 15.2                        | 63                            | -30                               | +12    | +15     |
| 180                                                          | T3           | 20                    | 0069                                                       | 0157 | 9                   | 36                | 24.4                        | 30                            | -35                               | +16    | +20     |
| 180                                                          | T3           | 10                    | 0070                                                       | 0158 | 9                   | 36                | 24.4                        | 30                            | -35                               | +16    | +20     |
| 220                                                          | T4           | 20                    | 0071                                                       | 0159 | 10                  | 40                | 37                          | 24                            | -40                               | +20    | +25     |
| 220                                                          | T4           | 10                    | 0072                                                       | 0160 | 10                  | 40                | 37                          | 24                            | -40                               | +20    | +25     |
| 100 V <sub>DC</sub> AT +85 °C; 65 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |
| 10                                                           | T1           | 20                    | 0073                                                       | 0161 | 3                   | 12                | 4.5                         | 200                           | -17                               | +10    | +12     |
| 10                                                           | T1           | 10                    | 0074                                                       | 0162 | 3                   | 12                | 4.5                         | 200                           | -17                               | +10    | +12     |
| 39                                                           | T2           | 20                    | 0075                                                       | 0163 | 5                   | 24                | 10.4                        | 80                            | -20                               | +12    | +15     |
| 39                                                           | T2           | 10                    | 0076                                                       | 0164 | 5                   | 24                | 10.4                        | 80                            | -20                               | +12    | +15     |
| 68                                                           | T3           | 20                    | 0077                                                       | 0165 | 10                  | 40                | 11.3                        | 40                            | -30                               | +14    | +16     |
| 68                                                           | T3           | 10                    | 0078                                                       | 0166 | 10                  | 40                | 11.3                        | 40                            | -30                               | +14    | +16     |
| 120                                                          | T4           | 20                    | 0079                                                       | 0167 | 12                  | 48                | 25                          | 30                            | -35                               | +15    | +17     |
| 120                                                          | T4           | 10                    | 0080                                                       | 0168 | 12                  | 48                | 25                          | 30                            | -35                               | +15    | +17     |
| 125 V <sub>DC</sub> AT +85 °C; 85 V <sub>DC</sub> AT +125 °C |              |                       |                                                            |      |                     |                   |                             |                               |                                   |        |         |
| 6.8                                                          | T1           | 20                    | 0081                                                       | 0169 | 3                   | 12                | 6                           | 300                           | -14                               | +10    | +12     |
| 6.8                                                          | T1           | 10                    | 0082                                                       | 0170 | 3                   | 12                | 6                           | 300                           | -14                               | +10    | +12     |
| 27                                                           | T2           | 20                    | 0083                                                       | 0171 | 5                   | 24                | 7.2                         | 90                            | -18                               | +12    | +15     |
| 27                                                           | T2           | 10                    | 0084                                                       | 0172 | 5                   | 24                | 7.2                         | 90                            | -18                               | +12    | +15     |
| 47                                                           | T3           | 20                    | 0085                                                       | 0173 | 10                  | 40                | 7.9                         | 50                            | -26                               | +14    | +16     |
| 47                                                           | T3           | 10                    | 0086                                                       | 0174 | 10                  | 40                | 7.9                         | 50                            | -26                               | +14    | +16     |
| 82                                                           | T4           | 20                    | 0087                                                       | 0175 | 12                  | 48                | 17.4                        | 32                            | -30                               | +15    | +17     |
| 82                                                           | T4           | 10                    | 0088                                                       | 0176 | 12                  | 48                | 17.4                        | 32                            | -30                               | +15    | +17     |

**Note**

<sup>(1)</sup> Style CLR69 is inactive for new military design. For new design use style CLR81

**VOLTAGE DERATING WITH TEMPERATURE**



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