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TECHNICAL DATA SHEET

Gort Road Business Park, Ennis, Co. Clare, Ireland
Tel: +353 (0) 65 6840044 Fax: +353 (0) 65 6822298

NPN SILICON DUAL TRANSISTOR

Qualified per MIL-PRF-19500 /355

DEVICES

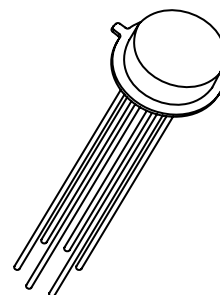
| | | |
|--------|---------|---------|
| 2N2919 | 2N2919L | 2N2919U |
| 2N2920 | 2N2920L | 2N2920U |

LEVELS

JAN
JANTX
JANTV
JANS

ABSOLUTE MAXIMUM RATINGS ($T_C = +25^\circ\text{C}$ unless otherwise noted)

| Parameters / Test Conditions | Symbol | Value | | Unit |
|---|----------------|--------------------------|----------------------------|------------------|
| Collector-Emitter Voltage | V_{CEO} | 60 | | Vdc |
| Collector-Base Voltage | V_{CBO} | 70 | | Vdc |
| Emitter-Base Voltage | V_{EBO} | 6.0 | | Vdc |
| Collector Current | I_C | 30 | | mAdc |
| | | One Section ¹ | Both Sections ² | |
| Total Power Dissipation @ $T_A = +25^\circ\text{C}$ | P_T | 200 | 350 | mW |
| Operating & Storage Junction Temperature Range | T_J, T_{stg} | -65 to +200 | | $^\circ\text{C}$ |



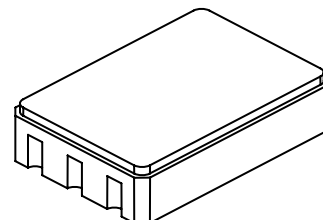
TO-78

NOTES:

- Derate linearly 1.143mW/ $^\circ\text{C}$ for $T_A > +25^\circ\text{C}$ (one section)
- Derate linearly 2.000mW/ $^\circ\text{C}$ for $T_A > +25^\circ\text{C}$ (both sections)

ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, unless otherwise noted)

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|---|---------------|------|-----------|-------------------------------------|
| OFF CHARACTERISTICS | | | | |
| Collector-Emitter Breakdown Voltage $I_C = 10\text{mAdc}$; Pulsed | $V_{(BR)CEO}$ | 60 | | Vdc |
| Collector-Base Cutoff Current $V_{CB} = 45\text{Vdc}$ $V_{CB} = 70\text{Vdc}$ | I_{CBO} | | 2.0 10 | ηAdc μAdc |
| Emitter-Base Cutoff Current $V_{EB} = 5.0\text{Vdc}$ $V_{EB} = 6.0\text{Vdc}$ | I_{EBO} | | 2.0 10 | ηAdc μAdc |



U - Package



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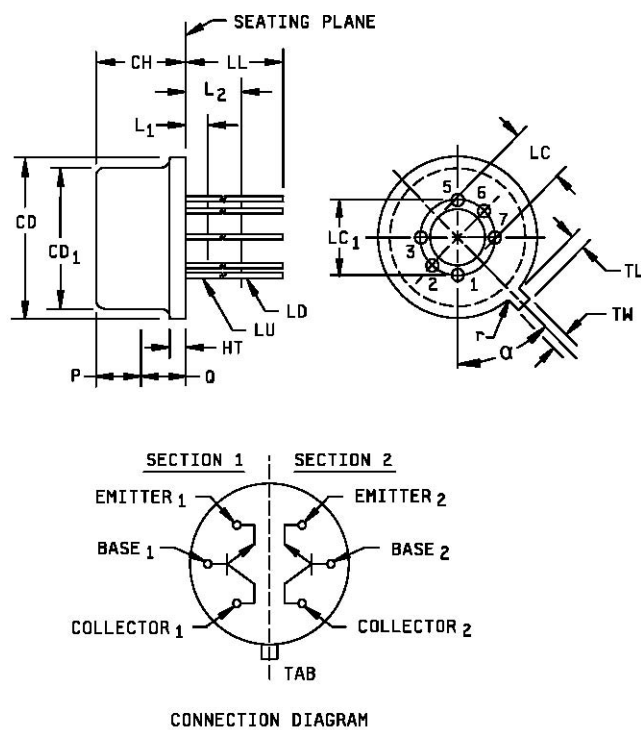
ELECTRICAL CHARACTERISTICS (con't)

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|--|---------------|-------------------|--------------------|------|
| ON CHARACTERISTICS | | | | |
| Forward-Current Transfer Ratio $I_C = 10\mu\text{Adc}$, $V_{CE} = 5.0\text{Vdc}$ $I_C = 100\mu\text{Adc}$, $V_{CE} = 5.0\text{Vdc}$ $I_C = 1.0\text{mAdc}$, $V_{CE} = 5.0\text{Vdc}$ 2N2919, 2N2919L, 2N2919U | h_{FE} | 60 100 150 | 240 325 600 | |
| $I_C = 10\mu\text{Adc}$, $V_{CE} = 5.0\text{Vdc}$ $I_C = 100\mu\text{Adc}$, $V_{CE} = 5.0\text{Vdc}$ $I_C = 1.0\text{mAdc}$, $V_{CE} = 5.0\text{Vdc}$ 2N2920, 2N2920L, 2N2920U | h_{FE} | 175 235 300 | 600 800 1000 | |
| Collector-Emitter Saturation Voltage $I_C = 1.0\text{mAdc}$, $I_B = 100\mu\text{Adc}$ | $V_{CE(sat)}$ | | 0.3 | Vdc |
| Base-Emitter Saturation Voltage $I_C = 1.0\text{mAdc}$, $I_B = 100\mu\text{Adc}$ | $V_{BE(sat)}$ | 0.5 | 1.0 | Vdc |

DYNAMIC CHARACTERISTICS

| Parameters / Test Conditions | Symbol | Min. | Max. | Unit |
|---|-------------------------|------|-------------------|------------------|
| Forward Current Transfer Ratio, Magnitude $I_C = 0.5\text{mAdc}$, $V_{CE} = 5.0\text{Vdc}$, $f = 20\text{MHz}$ | $ h_{fe} $ | 3.0 | 20 | |
| Small-Signal Short Circuit Input Impedance $I_C = 1.0\text{mAdc}$, $V_{CE} = 5\text{Vdc}$, $f = 1.0\text{kHz}$ | h_{je} | 3.0 | 30 | k Ω |
| Small-Signal Short Circuit Output Admittance $I_C = 1.0\text{mAdc}$, $V_{CE} = 5\text{Vdc}$, $f = 1.0\text{kHz}$ | h_{oe} | | 60 | μmhos |
| Output Capacitance $V_{CB} = 5.0\text{Vdc}$, $I_E = 0$, $100\text{kHz} \leq f \leq 1.0\text{MHz}$ | C_{obo} | | 5.0 | pF |
| Noise Figure $I_C = 10\mu\text{Adc}$, $V_{CE} = 5\text{Vdc}$, $f = 100\text{Hz}$, $R_G = 10\text{k}\Omega$ $I_C = 10\mu\text{Adc}$, $V_{CE} = 5\text{Vdc}$, $f = 1.0\text{kHz}$, $R_G = 10\text{k}\Omega$ $I_C = 10\mu\text{Adc}$, $V_{CE} = 5\text{Vdc}$, $f = 10\text{kHz}$, $R_G = 10\text{k}\Omega$ | F_1 F_2 F_3 | | 5.0 3.0 3.0 | dB |

PACKAGE DIMENSIONS

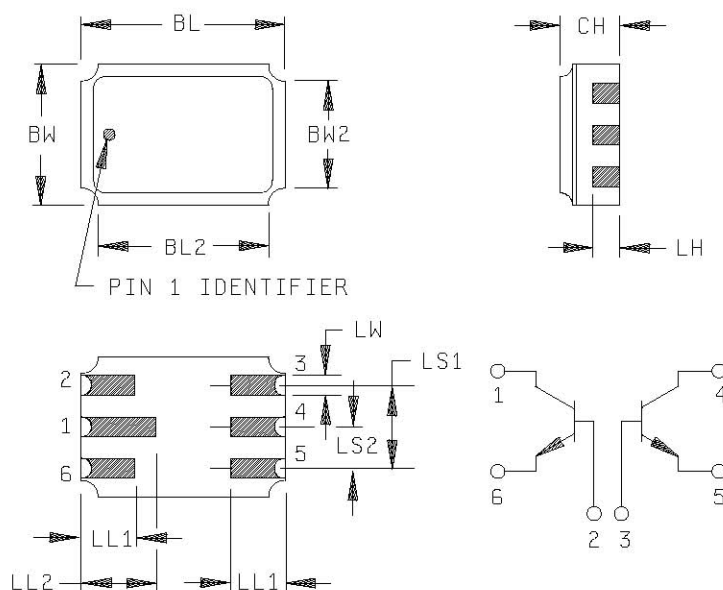


| Symbol | DIMENSIONS | | | | Notes |
|----------|-------------------------|------|-------------|------|-------|
| | Inches | | Millimeters | | |
| | Min | Max | Min | Max | |
| CD | .335 | .370 | 8.51 | 9.40 | |
| CD1 | .305 | .335 | 7.75 | 8.51 | |
| CH | .140 | .260 | 3.56 | 6.60 | |
| HT | .009 | .041 | 0.23 | 1.04 | |
| LC | .140 | .160 | 3.56 | 4.06 | |
| LC1 | .200 TP | | 5.08 TP | | 9 |
| LD | .016 | .021 | .041 | 0.53 | 10 |
| LL | See notes 10, 11 and 12 | | | | |
| LU | .016 | .019 | .041 | 0.48 | 10 |
| L1 | | .050 | | 1.27 | 10 |
| L2 | .250 | | 6.35 | | 10 |
| P | .100 | | 2.54 | | 8 |
| Q | | .050 | | 1.27 | 7 |
| TL | .029 | .045 | 0.74 | 1.14 | 5, 6 |
| TW | .028 | .034 | 0.71 | 0.86 | 4, 5 |
| r | | .010 | | 0.25 | |
| α | 45°TP | | 45°TP | | 9 |

NOTES:

- Dimensions are in inches.
- Millimeters are given for general information only.
- Tab Shown omitted.
- Lead number 4 and 8 omitted on this variation.
- Beyond r maximum, TW shall be held to a minimum length of .21 inch (5.33 mm)
- TL shall be measured from maximum CD.
- Details of outline in this zone are optional.
- CD1 shall not vary more than .010 inch (0.25 mm) in zone P. This zone is controlled for automatic handling.
- Leads at gauge plane .054 - .055 inch (1.37 - 1.40 mm) below seating plane shall be within .007 inch (0.18 mm) radius of true position (TP) at a maximum material condition (MMC) relative to the tab at MMC. The device may be measured by direct methods or by the gauge and gauging procedures described on gauge drawing GS-1.
- LU applies between L1 and L2. LD applies between L2 and LL minimum. Diameter is uncontrolled in L1 and beyond LL minimum.
- For transistor types 2N2919 and 2N2920, LL is .500 inch (12.70 mm) minimum and .750 inch (19.05 mm) maximum.
- For transistor type 2N2919L and 2N2920L, LL is 1.500 inches (38.10 mm) minimum and 1.750 inches (44.45 mm) maximum.
- In accordance with ASME Y14.5M, diameters are equivalent to ϕ x symbology.

FIGURE 1. Physical dimensions 2N2919, 2N2919L, 2N2920, and 2N2920L (TO-78).



| Symbol | Dimensions | | | |
|--------|------------|------|-------------|------|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| BL | .240 | .250 | 6.10 | 6.35 |
| BL2 | | .250 | | 6.35 |
| BW | .165 | .175 | 4.19 | 4.44 |
| BW2 | | .175 | | 4.44 |
| CH | .044 | .080 | 1.12 | 2.03 |
| LH | .026 | .039 | 0.66 | 0.99 |
| LL1 | .060 | .070 | 1.52 | 1.78 |
| LL2 | .082 | .098 | 2.08 | 2.49 |
| LS1 | .095 | .105 | 2.41 | 2.67 |
| LS2 | .045 | .055 | 1.14 | 1.39 |
| LW | .022 | .028 | 0.56 | 0.71 |

| Pin no. | Transistor |
|---------|-----------------|
| 1 | Collector no. 1 |
| 2 | Base no. 1 |
| 3 | Base no. 2 |
| 4 | Collector no. 2 |
| 5 | Emitter no. 2 |
| 6 | Emitter no. 1 |

NOTES:

- 1 Dimensions are in inches.
- 2 Millimeters are given for general information only.
- 3 In accordance with AMSE Y14.5M, diameters are equivalent to ϕ x symbology.

FIGURE 2. Physical dimensions (2N2919U and 2N2920U) Surface mount.