

T-77-09

SL640C & SL641C

DOUBLE BALANCED MODULATORS

The SL640C and SL641C are double balanced modulators intended for use in radio systems at frequencies up to 75MHz. The SL640 has an integral output load resistor (Pin 5) together with an emitter follower output (Pin 6) whereas the SL641 has a single output designed as a current drive to a tuned circuit.

FEATURES

- No External Bias Networks Needed
- Easy Interfacing
- Choice of Voltage or Current Outputs

APPLICATIONS

- Mixers In Radio Transceivers
- Phase Comparators
- Modulators

QUICK REFERENCE DATA

- Supply Voltage: 6V
- Conversion Gain: 0dB
- Maximum Inputs: 200mV rms

ABSOLUTE MAXIMUM RATINGS

Supply voltage 9V
Storage temperature: -55°C to +125°C

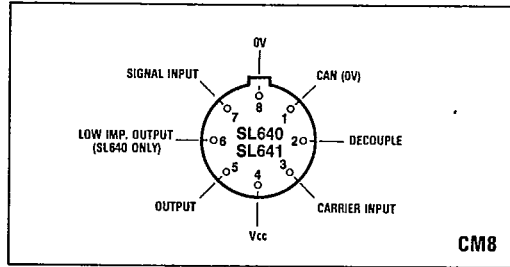


Fig. 1 Pin connections (bottom view)

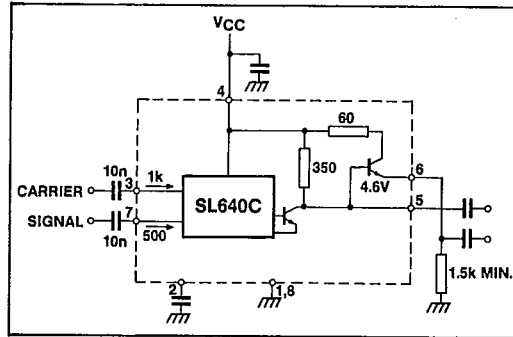


Fig. 2 Block diagram (SL640C)

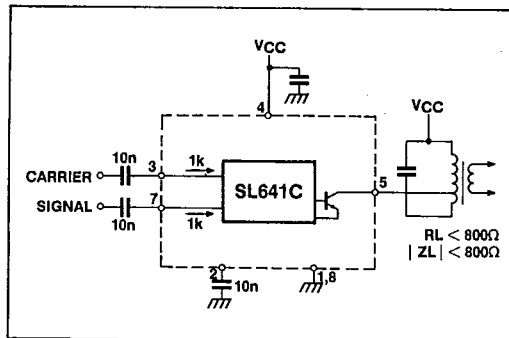


Fig. 3 Block diagram (SL641C)

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ELECTRICAL CHARACTERISTICS

PLESSEY SEMICONDUCTORS

Test conditions (unless otherwise stated):
 Supply voltage V_{CC} : 6V
 Ambient temperature: -30°C to $+85^{\circ}\text{C}$

Characteristic	Circuit	Value			Units	Conditions
		Min.	Typ.	Max.		
Supply current	SL640C		12	17	mA	
	SL641C		10	13	mA	
Conversion gain	SL640C	-3	0	+3	dB	
Conversion transconductance	SL641C	1.75	2.5	3.5	mmho	
Noise figure			10		dB	
Carrier input impedance			1		k Ω	
Signal input impedance	SL640C		500		Ω	
	SL641C		1		k Ω	
Maximum input voltage	SL640C		210		mV rms	
	SL641C		250		mV rms	
Signal leak	SL640C	-30	-18		dB	{ Signal: 70mV rms, 1.75MHz Carrier: 100mV rms, 28.25 MHz Output: 30MHz
Carrier leak	SL640C	-30	-20		dB	
Signal leak	SL641C	-18	-12		dB	{ Signal: 70mV rms, 30MHz Carrier: 100mV rms, 28.25 MHz Output: 1.75MHz
Carrier leak	SL641C	-25	-12		dB	
Intermodulation products	SL640C	-45	-35		dB	{ Signal1: 42.5mV rms, 1.75MHz Signal2: 42.5mV rms, 2MHz Carrier: 100mV rms, 28.25MHz Output: 29.75MHz
	SL641C	-45	-30		dB	

APPLICATION NOTES

The SL640C and SL641C require input and output coupling capacitors which normally should be chosen to present a low reactance compared with the input and output impedances (see Electrical Characteristics). However, for minimum carrier leak at high frequencies the signal input should be driven from a low impedance source, in which case the signal input capacitor reactance should be comparable with the source impedance. Pin 2 must be decoupled to earth via a capacitor which presents the lowest possible impedance at both carrier and signal frequencies. The presence of these frequencies at Pin 2 would give rise to poor rejection figures and to distortion.

The output of the SL641C is an open collector. If both sidebands are developed across the load its dynamic impedance must be less than 800 ohms. If only one sideband is significant this may be raised to 1600 ohms and it may be further raised if the maximum input swing of 200mV rms is not used. The DC resistance of the load should not exceed 800 ohms. If the circuit is connected to a +6V supply and the load impedance to +9V, the load may be increased to 1.8 kilohms at AC or DC. This, of course increases the gain of the circuit.

There are two outputs from the SL640C; one is a voltage source of output impedance 350 ohms and 8pF and the other is the emitter of an emitter follower connected to the first output. The output on pin 6 requires a discrete load resistor of not less than 1500 ohms to ground. The emitter follower

output should not be used to drive capacitive loads as emitter followers act as detectors under such circumstances with resultant distortion and harmonic generation. Frequency-shaping components may be connected to the voltage output and the shaped signal taken from the emitter follower.

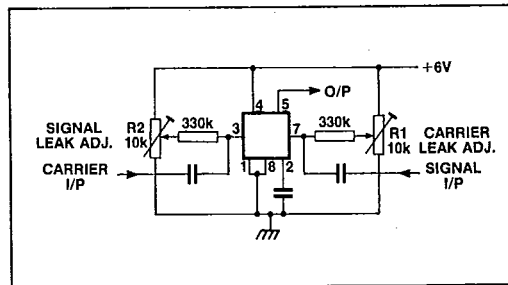


Fig. 4 Signal and carrier leak adjustment

Signal and carrier leak may be reduced by altering the bias on the carrier and signal input pins, as shown in Fig.4. With carrier but no signal R1 is adjusted for minimum carrier leak. A similar network is connected to the carrier input and with signal and carrier present, signal leak is minimised by means of R2.