

T.43-25

**GEC PLESSEY**  
SEMICONDUCTORS

**SL3127**

**HIGH FREQUENCY NPN TRANSISTOR ARRAY**

The SL3127C is a monolithic array of five high frequency low current NPN transistors in a 16 lead DIL package. The transistors exhibit typical  $f_{rs}$  of 1.6GHz and wideband noise figures of 3.6dB. The SL3127C is pin compatible with the CA3127.

**FEATURES**

- $f_T$  Typically 1.6 GHz
- Wideband Noise Figure 3.6dB
- $V_{BE}$  Matching Better Than 5mV

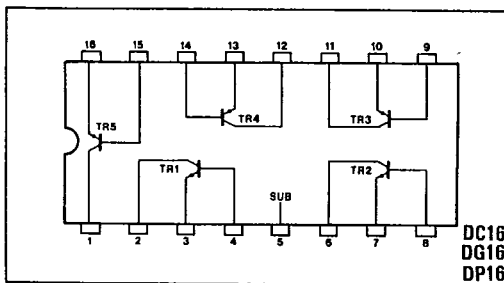


Fig.1 Pin connections SL3127

**APPLICATIONS**

- Wide Band Amplifiers
- PCM Regenerators
- High Speed Interface Circuits
- High Performance Instrumentation Amplifiers
- High Speed Modems

**ORDERING INFORMATION**

- SL3127 C DC
- SL3127 C DP
- SL3127 CB DC
- SL3127 A DG

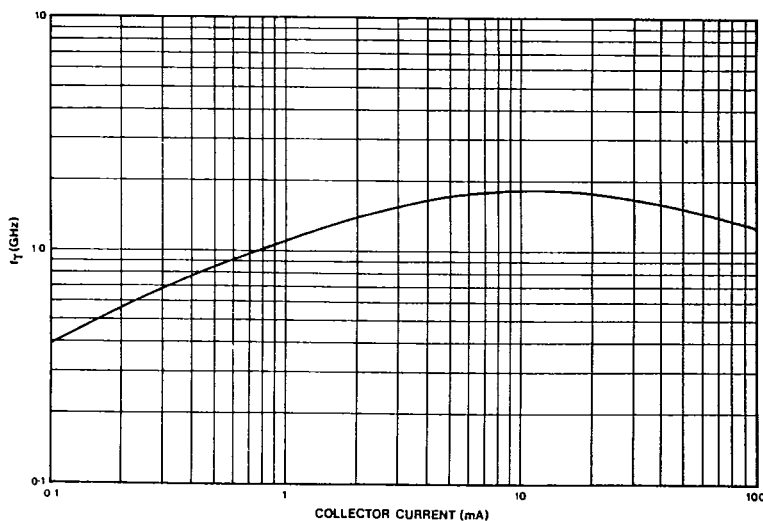


Fig.2 Transition frequency ( $f_T$ ) v. collector current ( $V_{CB}=2V, f=200MHz$ )

SL3127

T-43-25

**ELECTRICAL CHARACTERISTICS**

Test conditions (unless otherwise stated):

T<sub>amb</sub> = 22°C ± 2°C

Characteristic	Symbol	Value			Units	Conditions
		Min.	Typ.	Max.		
<b>Static characteristics</b>						
Collector base breakdown	BV <sub>CB0</sub>	20	30		V	I <sub>c</sub> = 10μA, I <sub>E</sub> = 0
Collector emitter breakdown	LV <sub>CEO</sub>	15	18		V	I <sub>c</sub> = 1mA, I <sub>B</sub> = 0
Collector substrate breakdown (isolation)	BV <sub>CI0</sub>	20	55		V	I <sub>c</sub> = 10μA, I <sub>R</sub> = I <sub>E</sub> = 0
Base to isolation breakdown	BV <sub>BI0</sub>	10	20		V	I <sub>B</sub> = 10μA, I <sub>c</sub> = I <sub>E</sub> = 0
Base emitter voltage	V <sub>BE</sub>	0.64	0.74	0.84	V	V <sub>CE</sub> = 6V, I <sub>c</sub> = 1mA
Collector emitter saturation voltage	V <sub>CE(SAT)</sub>		0.26	0.5	V	I <sub>c</sub> = 10mA, I <sub>B</sub> = 1mA
Emitter base leakage current	I <sub>EB0</sub>		0.1	1	μA	V <sub>EB</sub> = 4V
Base emitter saturation voltage	V <sub>BE(SAT)</sub>		0.95		V	I <sub>c</sub> = 10mA, I <sub>B</sub> = 1mA
Base emitter voltage difference, all transistors	ΔV <sub>BE</sub>		0.45	5	mV	V <sub>CE</sub> = 6V, I <sub>c</sub> = 1mA
Input offset current	ΔI <sub>B</sub>		0.2	3	μA	V <sub>CE</sub> = 6V, I <sub>c</sub> = 1mA
Temperature coefficient of ΔV <sub>BE</sub>	$\frac{\partial \Delta V_{BE}}{\partial T}$		2.0		μV/°C	V <sub>CE</sub> = 6V, I <sub>c</sub> = 1mA
Temperature coefficient of V <sub>BE</sub>	$\frac{\partial V_{BE}}{\partial T}$		-1.6		mV/°C	V <sub>CE</sub> = 6V, I <sub>c</sub> = 1mA
Static forward current ratio	H <sub>FE</sub>	35	95			V <sub>CE</sub> = 6V, I <sub>c</sub> = 5mA
		35	100			V <sub>CE</sub> = 6V, I <sub>c</sub> = 0.1mA
		40	100			V <sub>CE</sub> = 6V, I <sub>c</sub> = 1mA
Collector base leakage	I <sub>CB0</sub>		0.3		nA	V <sub>CB</sub> = 16V
Collector isolation leakage	I <sub>CI0</sub>		0.6		nA	V <sub>CI</sub> = 20V
Base isolation leakage	I <sub>BI0</sub>		100		nA	V <sub>BI</sub> = 5V
Emitter base capacitance	C <sub>EB</sub>		0.4		pF	V <sub>EB</sub> = 0V
Collector base capacitance	C <sub>CB</sub>		0.4		pF	V <sub>CB</sub> = 0V
Collector isolation capacitance	C <sub>CI</sub>		0.8		pF	V <sub>CI</sub> = 0V
<b>Dynamic characteristics</b>						
Transition frequency	f <sub>T</sub>		1.6		GHz	V <sub>CE</sub> = 6V, I <sub>c</sub> = 5mA
Wideband noise figure	N <sub>F</sub>		3.6		dB	f = 60MHz } V <sub>CC</sub> = 6V
Knee of 1/f noise curve			1		kHz	I <sub>c</sub> = 2mA
						R <sub>S</sub> = 200Ω

**ABSOLUTE MAXIMUM RATINGS**

The absolute maximum ratings are limiting values above which operating life may be shortened or specified parameters may be degraded.

All electrical ratings apply to individual transistors. Thermal ratings apply to the total package.

The isolation pin (substrate) must be connected to the most negative voltage applied to the package to maintain electrical isolation.

- V<sub>CB</sub> = 20 volt
- V<sub>EB</sub> = 4.0 volt
- V<sub>CE</sub> = 15 volt
- V<sub>CI</sub> = 20 volt
- I<sub>c</sub> = 20 mA

Maximum individual transistor dissipation 200 mWatt  
 Storage temperature -55°C to 150°C  
 Max junction temperature 150°C

Package thermal resistance (°C/watt):-

Package Type	DC16	DP16
Chip to case	40	
Chip to ambient	120	180

**NOTE:**

If all the power is being dissipated in one transistor, these thermal resistance figures should be increased by 100°C/watt.

SL3127

T-43-25

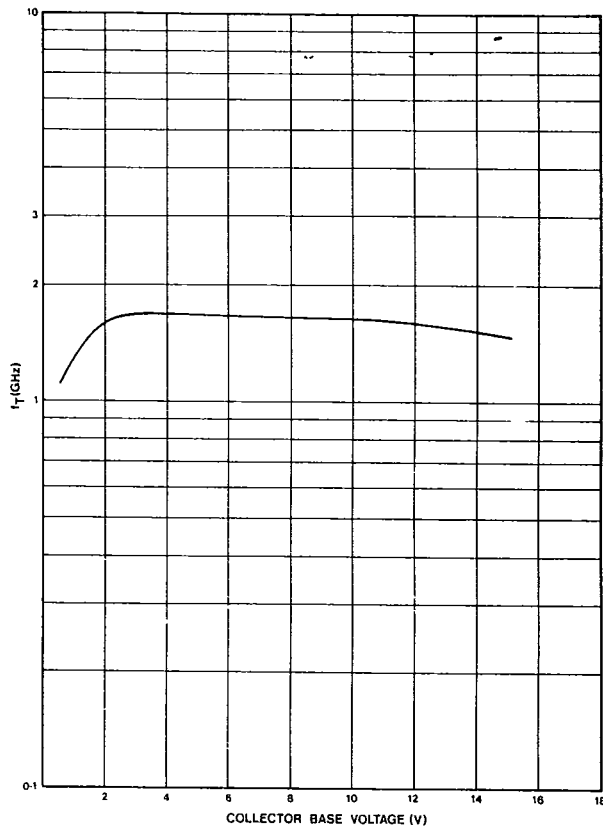


Fig.3 Transition frequency ( $f_T$ ) v. collector base voltage  
( $I_C = 5mA$ , Frequency = 200MHz)

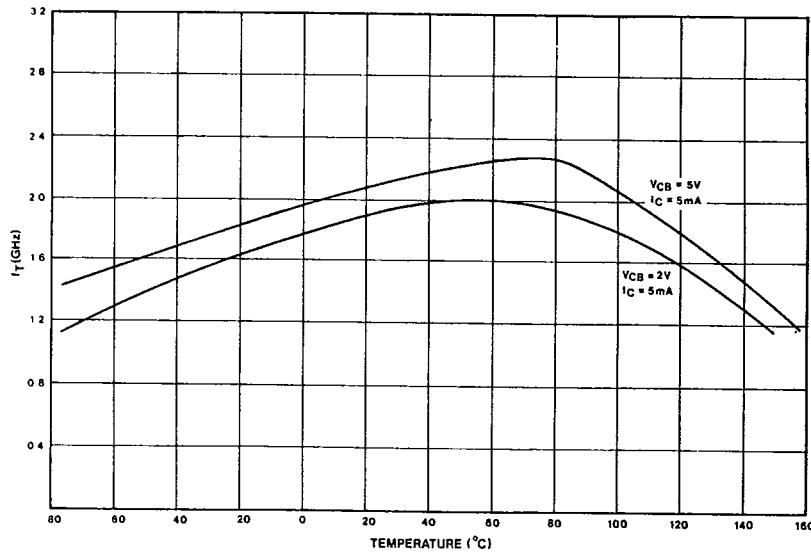


Fig.4 Variation of transition frequency ( $f_T$ ) with temperature

SL3127

T-43-25

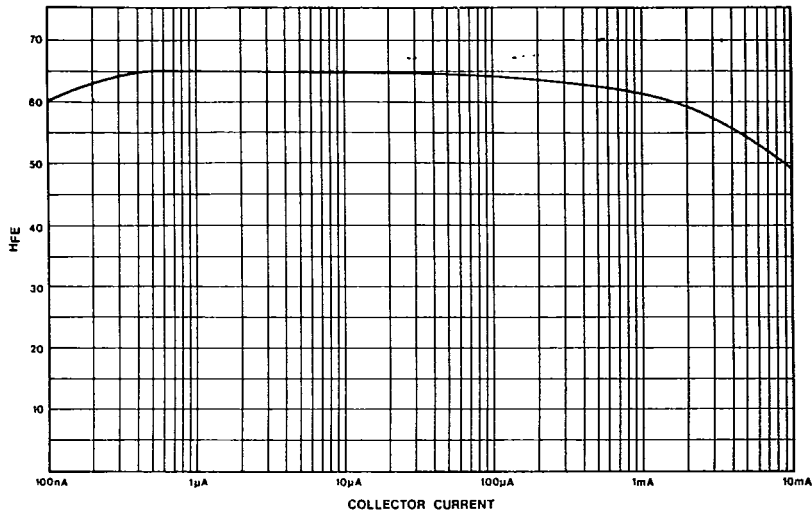


Fig.5 DC current gain v. collector current

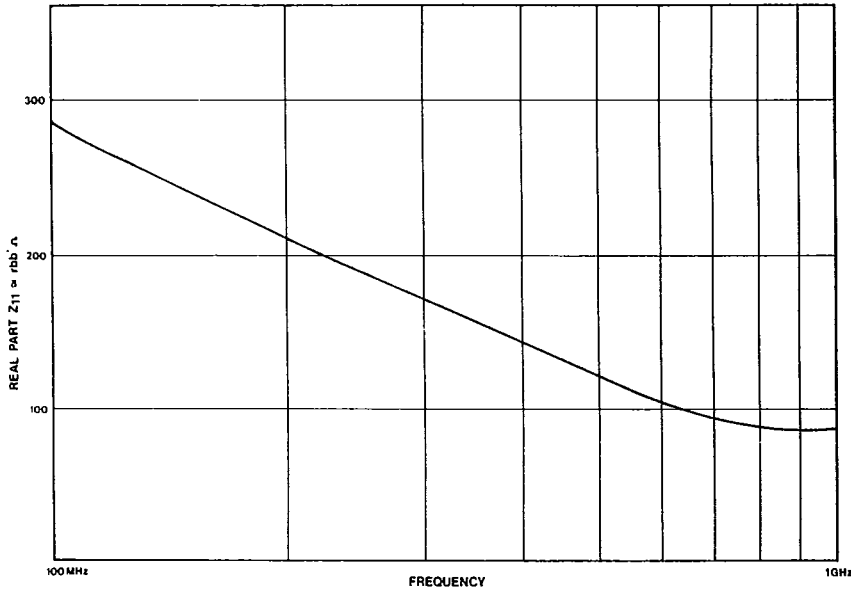


Fig.6  $Z_{11}$  (derived from scattering parameters) v. frequency ( $Z_{11} \approx r_{bb'}$ )