

T-43-25

GEC PLESSEY
SEMICONDUCTORS

SL3145

1.6GHz NPN TRANSISTOR ARRAYS

The SL3145C is a monolithic array of five high frequency low current NPN transistors. The SL3145C consists of 3 isolated transistors and a differential pair in a 14 lead DIL package. The transistors exhibit typical f_{ts} of 1.6GHz and wideband noise figures of 3.0dB. The device is pin compatible with the CA3046. The SL3145E has guaranteed C_{cb} and f_t figures.

FEATURES

- f_T Typically 1.6 GHz
- Wideband Noise Figure 3.0dB
- V_{BE} Matching Better Than 5mV

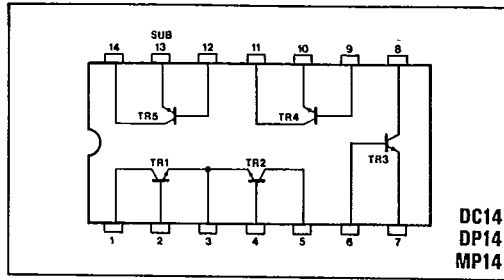


Fig.1 Pin connections SL3145

DC14
DP14
MP14

APPLICATIONS

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

ORDERING INFORMATION

- SL3145 C DC
- SL3145 C DP
- SL3145 C MP
- SL3145 CB DC
- SL3145 E DC
- SL3145 E DP

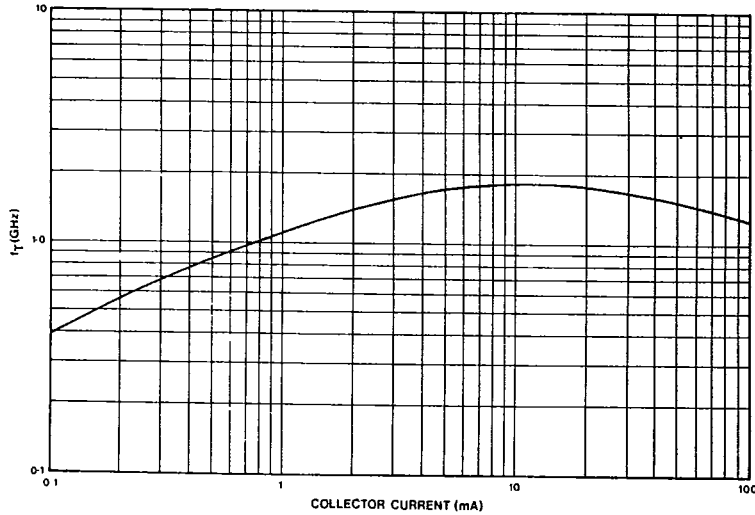


Fig.2 Transition frequency (f_T) v. collector current ($V_{CB} = 2V, f = 200MHz$)

SL3145

T-43-25

ELECTRICAL CHARACTERISTICS

Test conditions (unless otherwise stated):

 $T_{amb} = 22^{\circ}\text{C} \pm 2^{\circ}\text{C}$

Characteristic	Symbol	Value			Units	Conditions
		Min.	Typ.	Max.		
Static characteristics						
Collector base breakdown	BV_{CBO}	20	30		V	$I_C = 10\mu\text{A}, I_E = 0$
Collector emitter breakdown	LV_{CEO}	15	18		V	$I_C = 1\text{mA}, I_B = 0$
Collector substrate breakdown (isolation)	BV_{CIO}	20	55		V	$I_C = 10\mu\text{A}, I_R = I_E = 0$
Base to isolation breakdown	BV_{BIO}	10	20		V	$I_B = 10\mu\text{A}, I_C = I_E = 0$
Base emitter voltage	V_{BE}	0.64	0.74	0.84	V	$V_{CE} = 6\text{V}, I_C = 1\text{mA}$
Collector emitter saturation voltage	$V_{CE(SAT)}$		0.26	0.5	V	$I_C = 10\text{mA}, I_B = 1\text{mA}$
Emitter base leakage current	I_{EBO}		0.1	1	μA	$V_{EB} = 4\text{V}$
Base emitter saturation voltage	$V_{BE(SAT)}$		0.95		V	$I_C = 10\text{mA}, I_B = 1\text{mA}$
Base emitter voltage difference, all transistors except TR1, TR2	ΔV_{BE}		0.45	5	mV	$V_{CE} = 6\text{V}, I_C = 1\text{mA}$
Base emitter voltage difference TR1, TR2	ΔV_{BE}		0.35	5	mV	$V_{CE} = 6\text{V}, I_C = 1\text{mA}$
Input offset current (except for TR1, TR2)	ΔI_B		0.2	3	μA	$V_{CE} = 6\text{V}, I_C = 1\text{mA}$
Input offset current TR1, TR2	ΔI_B		0.2	2	μA	$V_{CE} = 6\text{V}, I_C = 1\text{mA}$
Temperature coefficient of ΔV_{BE}	$\frac{\partial \Delta V_{BE}}{\partial T}$		2.0		$\mu\text{V}/^{\circ}\text{C}$	
Temperature coefficient of V_{BE}	$\frac{\partial V_{BE}}{\partial T}$		-1.6		$\text{mV}/^{\circ}\text{C}$	$V_{CE} = 6\text{V}, I_C = 1\text{mA}$
Static forward current ratio	H_{FE}	40	100			$V_{CE} = 6\text{V}, I_C = 1\text{mA}$
Collector base leakage	I_{CBO}		0.3		nA	$V_{CB} = 16\text{V}$
Collector isolation leakage	I_{CIO}		0.6		nA	$V_{CI} = 20\text{V}$
Base isolation leakage	I_{BIO}		100		nA	$V_{BI} = 5\text{V}$
Emitter base capacitance	C_{EB}		0.4		pF	$V_{EB} = 0\text{V}$
Collector base capacitance	C_{CB}		0.4		pF	$V_{CB} = 0\text{V}$
SL3145C			0.4	1.1	pF	$V_{CB} = 0\text{V}$
SL3145E			0.4		pF	$V_{CB} = 0\text{V}$
Collector isolation capacitance	C_{CI}		0.8		pF	$V_{CI} = 0\text{V}$
Dynamic characteristics						
Transition frequency	f_T		1.6		GHz	$V_{CE} = 6\text{V}, I_C = 5\text{mA}$
SL3145C			1.2		GHz	$V_{CE} = 6\text{V}, I_C = 10\text{mA}$
SL3145E			3.0		dB	$V_{CE} = 2\text{V}, R_s = 1\text{k}\Omega$
Wideband noise frequency	NF		1		kHz	$I_C = 100\mu\text{A}, f = 60\text{MHz}$
Knee of 1/f noise curve			1		kHz	$V_{CE} = 6\text{V}, R_s = 200\Omega$ $I_C = 2\text{mA}$

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.

$V_{CB} = 20\text{ volt}$
 $V_{EB} = 4.0\text{ volt}$
 $V_{CE} = 15\text{ volt}$
 $V_{CI} = 20\text{ volt}$
 $I_C = 20\text{ mA}$

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

Package thermal resistance ($^{\circ}\text{C}/\text{watt}$):—

Package Type	DC14	DP14
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 $100^{\circ}\text{C}/\text{watt}$.

1-120

SL3145

T-43-25

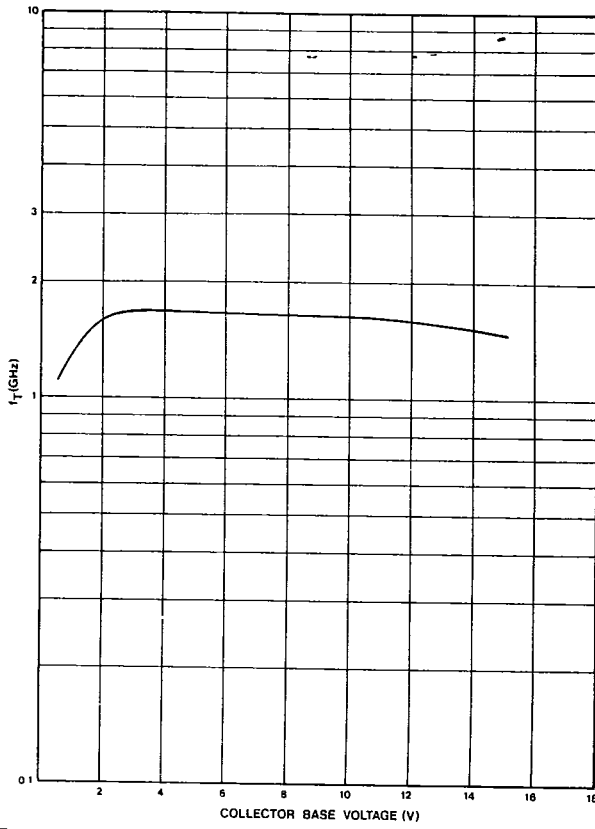


Fig.3 Transition frequency (f_T) v. collector base voltage ($I_C = 5mA$, frequency = 200MHz)

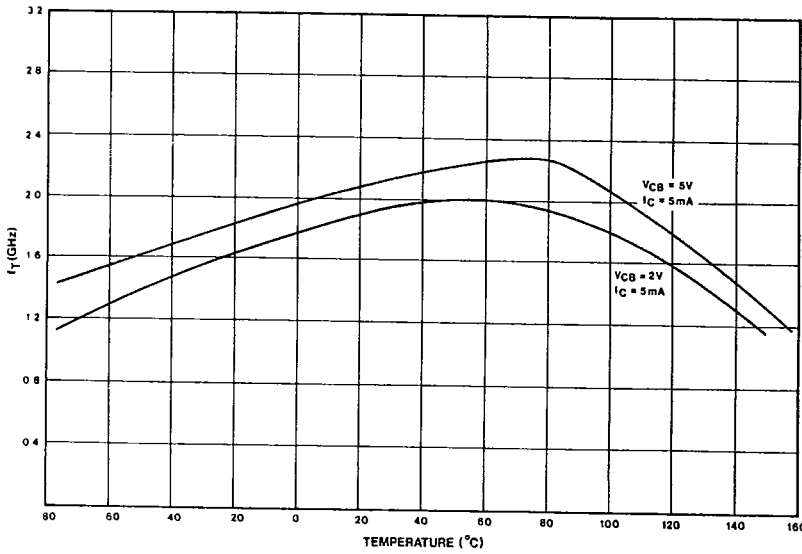


Fig 4 Variation of transition frequency (f_T) with temperature

SL3145

T-43-25

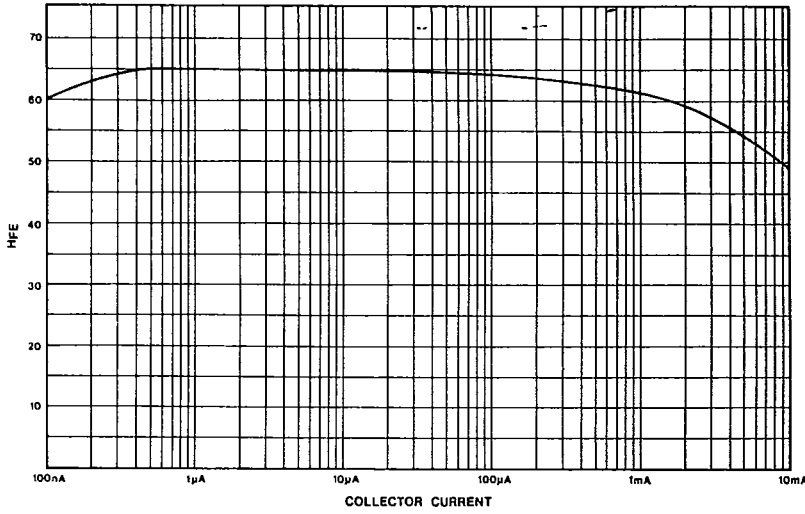


Fig.5 DC current gain v. collector current

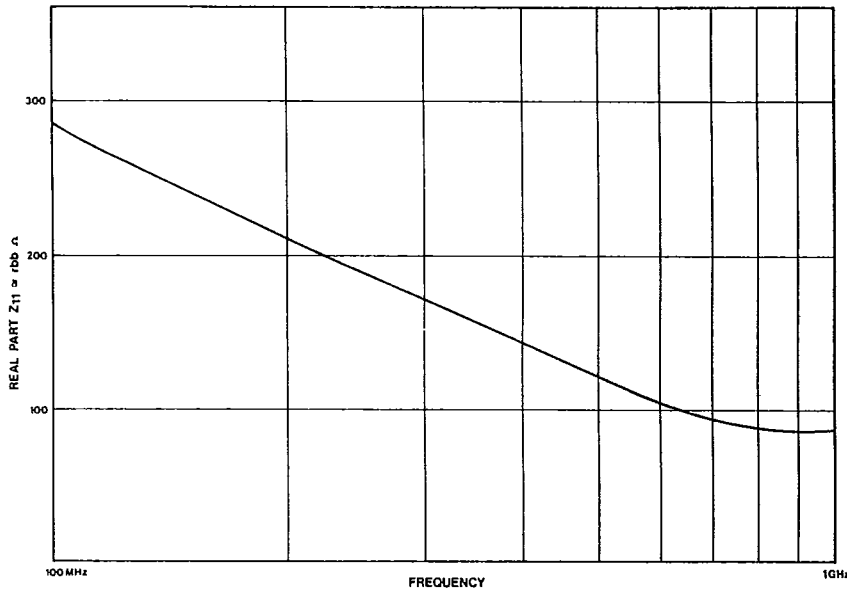


Fig.6 Z₁₁ (derived from scattering parameters) v. frequency ($Z_{11} \triangleq r_{66}$)