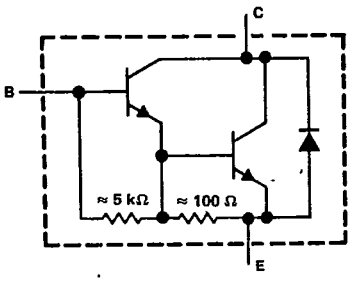
TIP130, TIP131, TIP132
N-P-N DARLINGTON SILICON POWER TRANSISTORS

REVISED OCTOBER 1984

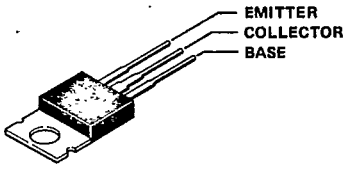
T-33-29

- Designed For Complementary Use With TIP135, TIP136, TIP137
- 70 W at 25°C Case Temperature
- 8 A Rated Collector Current
- Min h_{FE} of 1000 at 4 V, 4 A
- 75 mJ Reverse Energy Rating

device schematic



TO-220AB PACKAGE



THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE MOUNTING TAB

absolute maximum ratings at 25°C case temperature (unless otherwise noted)

	TIP130	TIP131	TIP132
Collector-base voltage	60 V	80 V	100 V
Collector-emitter voltage (I_B = 0)	60 V	80 V	100 V
Emitter-base voltage	5 V		
Continuous collector current	8 A		
Peak collector current (see Note 1)	12 A		
Continuous base current	0.3 A		
Safe operating areas at (or below) 25°C case temperature	See Figure 7		
Continuous device dissipation at (or below) 25°C case temperature (see Note 2)	70 W		
Continuous device dissipation at (or below) 25°C free-air temperature (see Note 3)	2 W		
Unclamped inductive load energy (see Note 4)	75 mJ		
Operating collector junction and storage temperature range	−65°C to 150°C		

NOTES: 1. This value applies for $t_w \leq 0.3$ ms duty cycle $\leq 10\%$.
2. Derate linearly to 150°C case temperature at the rate of 0.56 W/°C or refer to Dissipation Derating Curve, Figure 8.
3. Derate linearly to 150°C free-air temperature at the rate of 20 mW/°C or refer to Dissipation Derating Curve.
4. This rating is based on the capability of the transistor to operate safely in the circuit of L = 20 mH, R_{BB2} = 100 Ω, V_{BB2} = 0 V, R_S = 0.1 Ω, V_{CC} = 20 V. Energy ≈ $I_C^2 L/2$.

TIP130, TIP131, TIP132
N-P-N DARLINGTON
SILICON POWER TRANSISTORS

electrical characteristics at 25°C case temperature (unless otherwise noted)

PARAMETER	TEST CONDITIONS			TIP130			TIP131			TIP132			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
$V_{(BR)CEO}$	I_C = 30 mA, See Note 5	I_B = 0,		60			80			100			V
I_{CEO}	V_{CE} = 30 V,	I_B = 0				0.5							mA
	V_{CE} = 40 V,	I_B = 0							0.5				
	V_{CE} = 50 V,	I_B = 0										0.5	
I_{CBO}	V_{CB} = 60 V,	I_E = 0				0.2							mA
	V_{CB} = 80 V,	I_E = 0							0.2				
	V_{CB} = 100 V,	I_E = 0										0.2	
	V_{CB} = 60 V,	I_E = 0,	T_C = 100°C			1							
	V_{CB} = 80 V,	I_E = 0,	T_C = 100°C						1				
	V_{CB} = 100 V,	I_E = 0,	T_C = 100°C									1	
I_{EBO}	V_{EB} = 5 V,	I_C = 0				5			5			5	mA
h_{FE}	V_{CE} = 4 V, See Notes 5 and 6	I_C = 1 A,		500			500			500			
	V_{CE} = 4 V, See Notes 5 and 6	I_C = 4 A,		1000		15000	1000		15000	1000		15000	
V_{BE}	V_{CE} = 4 V, See Notes 5 and 6	I_C = 4 A,				2.5			2.5			2.5	V
$V_{CE(sat)}$	I_B = 16 mA, See Notes 5 and 6	I_C = 4 A,				2			2			2	V
	I_B = 30 mA, See Notes 5 and 6	I_C = 6 A,				3			3			3	
C_{obo}	V_{CB} = 10 V,	I_E = 0				200			200			200	pF
V_F	I_F = 8 A, See Notes 5 and 6					3.5			3.5			3.5	V

NOTES: 5. These parameters must be measured using pulse techniques, t_w = 300 μs, duty cycle ≤ 2 %.
6. These parameters are measured with voltage-sensing contacts separate from the current-carrying contacts located within 3,2 mm (0.125 inch) from the device body.

TEXAS INSTRUMENTS
POST OFFICE BOX 225012 • DALLAS, TEXAS 75265

1283

TIP130, TIP131, TIP132
N-P-N DARLINGTON
SILICON POWER TRANSISTORS

T-33-29

TYPICAL CHARACTERISTICS

STATIC FORWARD CURRENT TRANSFER RATIO
vs
COLLECTOR CURRENT

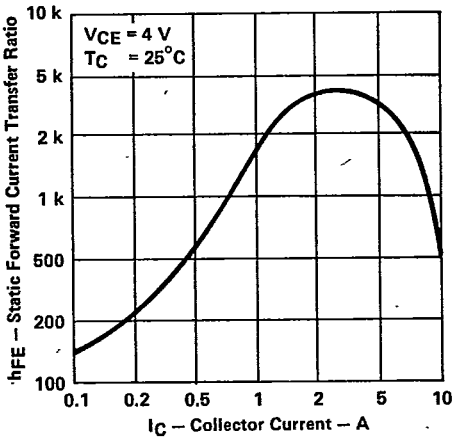


FIGURE 1

COLLECTOR-EMITTER SATURATION VOLTAGE
vs
COLLECTOR CURRENT

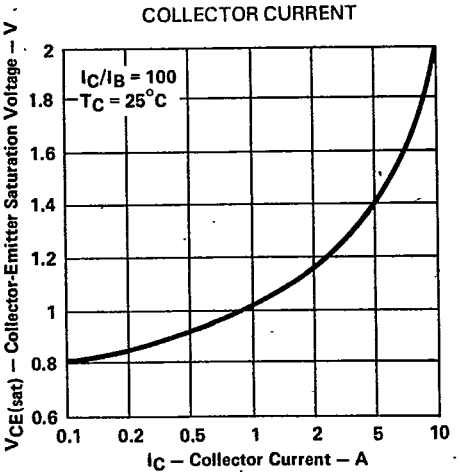


FIGURE 2

BASE-EMITTER VOLTAGE
vs
COLLECTOR CURRENT

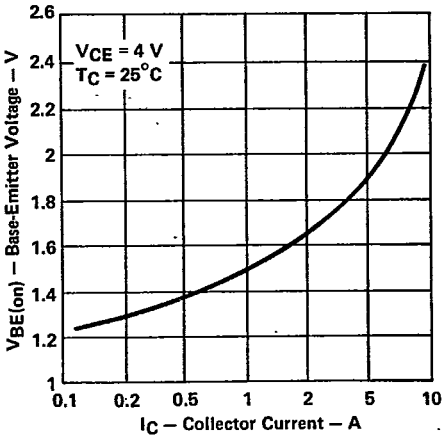


FIGURE 3

FORWARD VOLTAGE OF
COMMUTATING DIODE
vs
FORWARD CURRENT

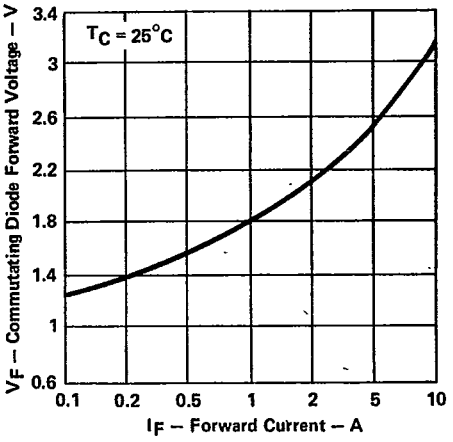


FIGURE 4

5 TIP Devices

TIP130, TIP131, TIP132
N-P-N DARLINGTON
SILICON POWER TRANSISTORS

TYPICAL CHARACTERISTICS

COLLECTOR-EMITTER VOLTAGE
vs
COLLECTOR CURRENT

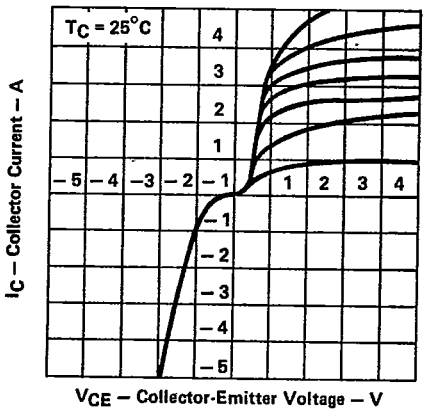


FIGURE 5

EMITTER-BASE CURRENT
vs
EMITTER-BASE VOLTAGE

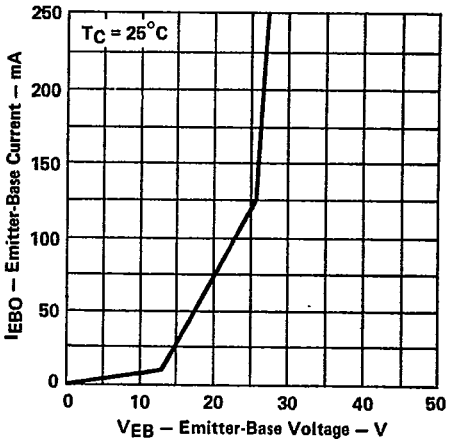


FIGURE 6

MAXIMUM SAFE OPERATING AREA

MAXIMUM COLLECTOR CURRENT
vs
COLLECTOR-EMITTER VOLTAGE

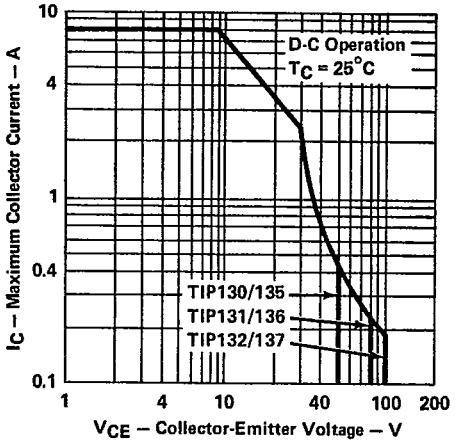


FIGURE 7

TIP Devices

THERMAL INFORMATION

T-33-29

DISSIPATION DERATING CURVE

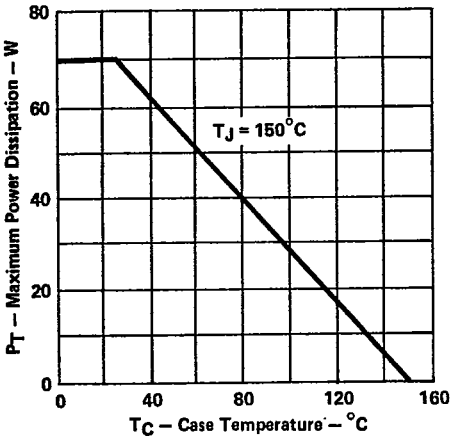


FIGURE 8