MOSPEC

DARLINGTON COPLEMENTARY SILICON POWER TRANSISTORS

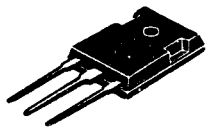
...designed for general-purpose amplifier and low speed switching applications

FEATURES:

* Collector-Emitter Sustaining Voltage-
  $V_{CEO(SUS)}$ = 60 V (Min) - TIP140,TIP145
  = 80 V (Min) - TIP141,TIP146
  = 100 V (Min) - TIP142,TIP147
* Collector-Emitter Saturation Voltage
  $V_{CE(sat)}$ = 2.0 V (Max.) @ I_C = 5.0 A
* Monolithic Construction with Built-in Base-Emitter Shunt Resistor

NPN	PNP
TIP140	TIP145
TIP141	TIP146
TIP142	TIP147

10 AMPERE
DARLINGTON
COMPLEMENTARY SILICON
POWER TRANSISTORS
60-100 VOLTS
125 WATTS



TO-247(3P)

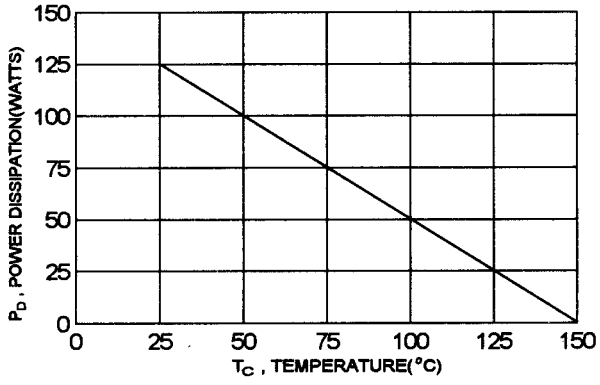
MAXIMUM RATINGS

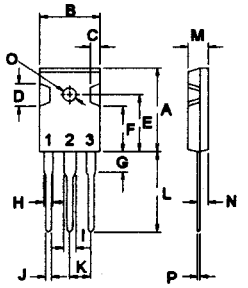
Characteristic	Symbol	TIP140 TIP145	TIP141 TIP146	TIP142 TIP147	Unit
Collector-Emitter Voltage	V_{CEO}	60	80	100	V
COllector-Base Voltage	V_{CBO}	60	80	100	V
Emitter-Base Voltage	V_{EBO}	5.0			V
Collector Current-Continuous -Peak	I_C I_{CM}	10 15			A
Base Current	I_B	0.5			A
Total Power Dissipation @T_C= 25°C Derate above 25°C	P_D	125 1.0			W W/°C
Operating and Storage Junction Temperature Range	T_J , T_{STG}	- 65 to +150			°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	Rθjc	1.0	°C/W

FIGURE -1 POWER DERATING





PIN 1.BASE
2.COLLECTOR
3.EMITTER

DIM	MILLIMETERS	
	MIN	MAX
A	20.63	22.38
B	15.38	16.20
C	1.90	2.70
D	5.10	6.10
E	14.81	15.22
F	11.72	12.84
G	4.20	4.50
H	1.82	2.46
I	2.92	3.23
J	0.89	1.53
K	5.26	5.66
L	18.50	21.50
M	4.68	5.36
N	2.40	2.80
O	3.25	3.65
P	0.55	0.70

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector - Emitter Sustaining Voltage (1) (I_C = 30 mA, I_B = 0)	TIP140,TIP145 TIP141,TIP146 TIP142,TIP147	$V_{CEO(sus)}$	60 80 100		V
Collector Cutoff Current (V_{CE} = 30 V, I_B = 0) (V_{CE} = 40 V, I_B = 0) (V_{CE} = 50 V, I_B = 0)	 TIP140,TIP145 TIP141,TIP146 TIP142,TIP147	I_{CEO}		 2.0 2.0 2.0	mA
Collector Cutoff Current (V_{CB} = 60 V, I_E = 0) (V_{CB} = 80 V, I_E = 0) (V_{CB} = 100 V, I_E = 0)	 TIP140,TIP145 TIP141,TIP146 TIP142,TIP147	I_{CBO}		 1.0 1.0 1.0	mA
Emitter Cutoff Current (V_{EB} = 5.0 V, I_C = 0)		I_{EBO}		2.0	mA
ON CHARACTERISTICS (1)					
DC Current Gain (I_C = 5.0 A, V_{CE} = 4.0 V) (I_C = 10 A, V_{CE} = 4.0 V)		hFE	1000 500		
Collector-Emitter Saturation Voltage (I_C = 5.0 A, I_B = 10 mA) (I_C = 10 A, I_B = 40 mA)		$V_{CE(sat)}$		2.0 3.0	V
Base-Emitter Saturation Voltage (I_C = 10 A, I_B = 40 mA)		$V_{BE(sat)}$		3.5	V
Base-Emitter On Voltage (I_C = 10 A, V_{CE} = 4.0 V)		$V_{BE(on)}$		3.0	V

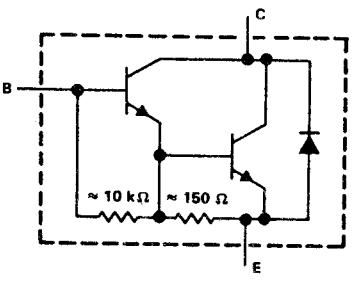
SWITCHING CHARACTERISTICS

Delay Time	V_{CC} = 30 V, I_C = 5.0 A I_{B1} = $-I_{B2}$ =20 mA, t_p = 20us, Duty Cycle ≦2.0%	t d	0.15(Typ)		us
Rise Time		t r	0.55(Typ)		us
Storage Time		t s	2.5(Typ)		us
Fall Time		t f	2.5(Typ)		us

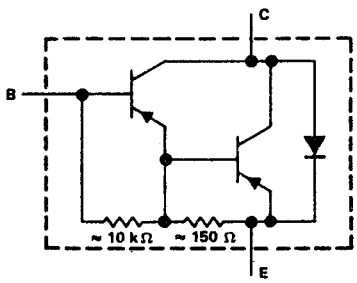
(1) Pulse Test: Pulse width = 300 us , Duty Cycle ≦ 2.0%

INTERNAL SCHEMATIC DIAGRAM

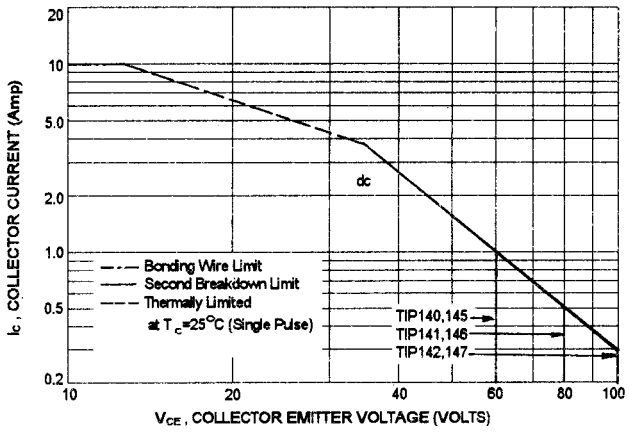
NPN
TIP140
TIP141
TIP142



PNP
TIP145
TIP146
TIP147



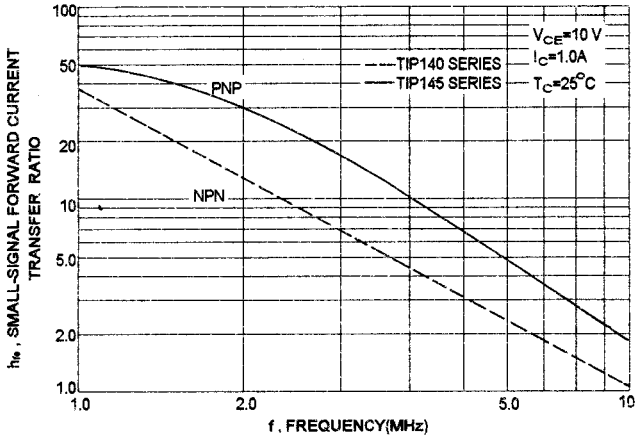
ACTIVE REGION SAFE OPERATING AREA (SOA)



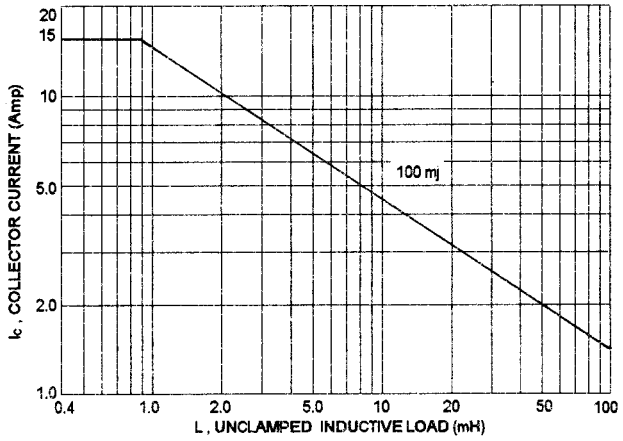
There are two limitation on the power handling ability of a transistor:average junction temperature and second breakdown safe operating area curves indicate I_C-V_{CE} limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than curves indicate.

The data of SOA curve is base on $T_{J(PK)}$=150 °C;T_C is variable depending on conditions.At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

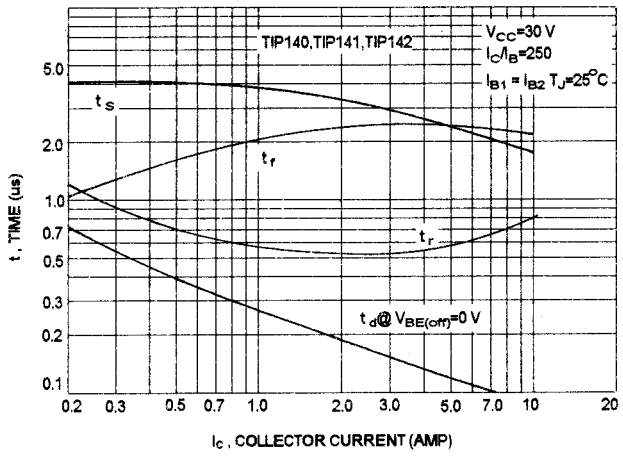
SMALL-SIGNAL COMMON-EMITTER FORWARD CURRENT TRANSFER RATIO



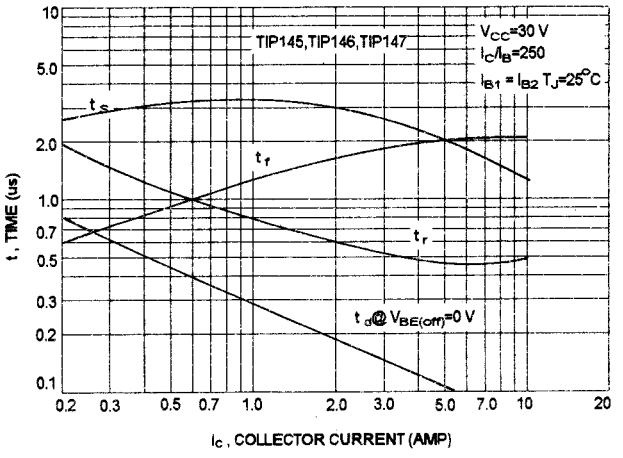
UNCLAMPED INDUCTIVE LOAD



SWITCHING TIME

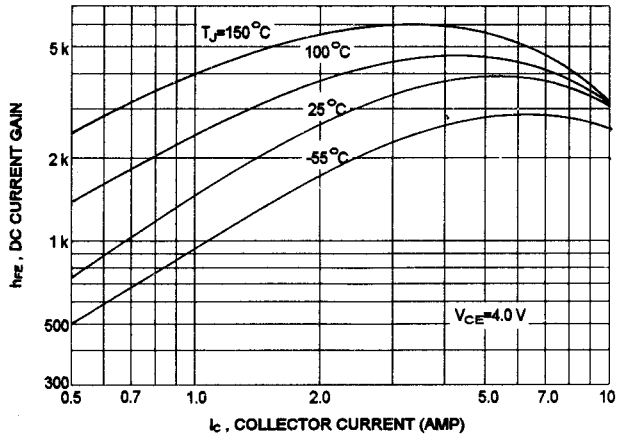


SWITCHING TIME

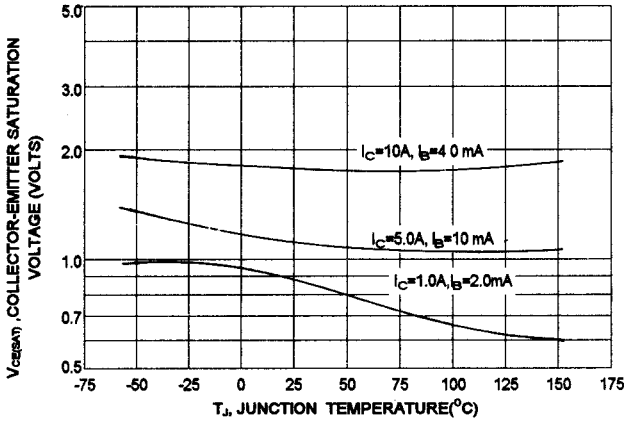


NPN TIP140, TIP141, TIP142

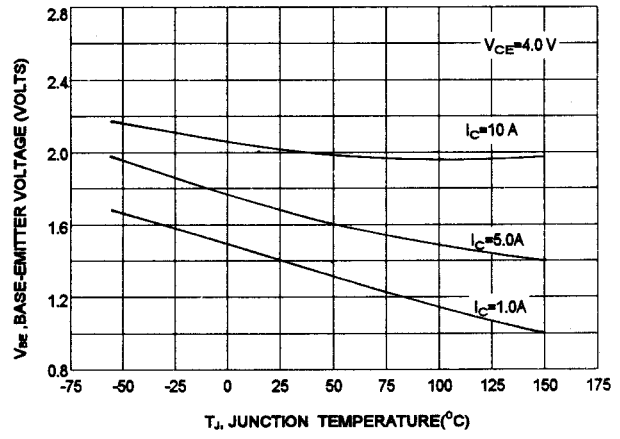
DC CURRENT GAIN



COLLECTOR-EMITTER SATURATION VOLTAGE

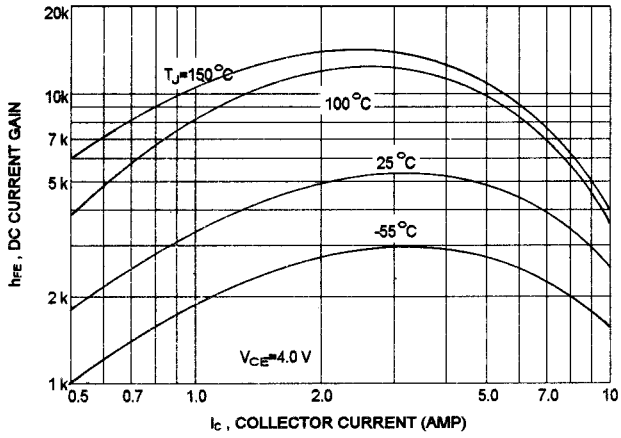


BASE-EMITTER VOLTAGE

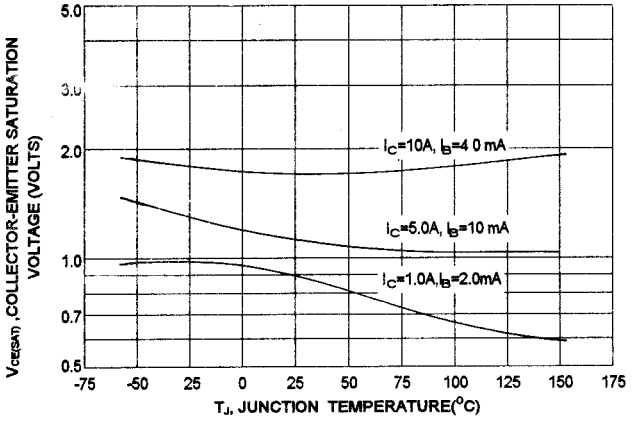


PNP TIP145, TIP146, TIP147

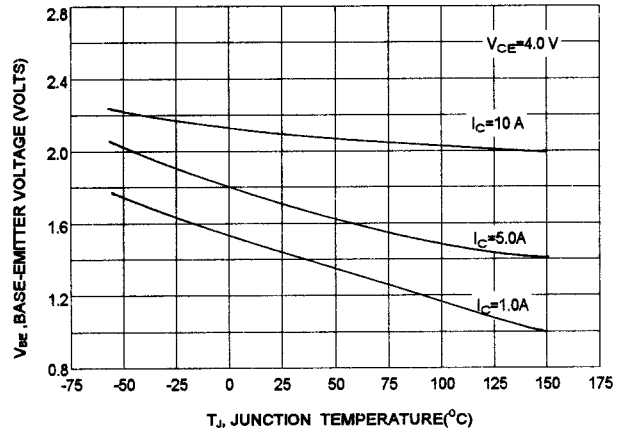
DC CURRENT GAIN



COLLECTOR-EMITTER SATURATION VOLTAGE



BASE-EMITTER VOLTAGE



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