MOSPEC

DARLINGTON COPLEMENTARY SILICON POWER TRANSISTORS

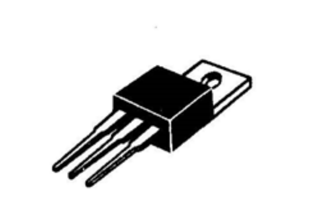
...designed for general-purpose amplifier and low speed switching applications

FEATURES:

* Collector-Emitter Sustaining Voltage-
  $V_{CEO(SUS)}$ = 60 V (Min) - TIP140T,TIP145T
  = 80 V (Min) - TIP141T,TIP146T
  = 100 V (Min) - TIP142T,TIP147T
* 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
TIP140T	TIP145T
TIP141T	TIP146T
TIP142T	TIP147T

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



TO-220

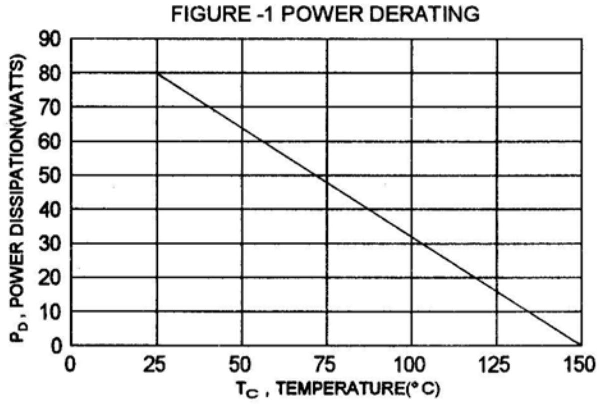
MAXIMUM RATINGS

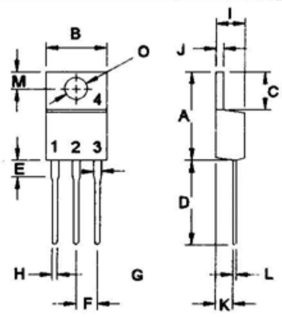
Characteristic	Symbol	TIP140T TIP145T	TIP141T TIP146T	TIP142T TIP147T	Unit
Collector-Emitter Voltage	V_{CEO}	60	80	100	V
COllector-Base Voltage	V_{CBO}	60	80	100	V
Emitter-Base Voltage	V_{EBO}	5.0			V
Collector Current-Continuous -Peak	I_C I_{CM}	10 15			A
Base Current	I_B	0.5			A
Total Power Dissipation @T_C= 25°C Derate above 25°C	P_D	80 0.64			W W/°C
Operating and Storage Junction Temperature Range	T_J ,T_{STG}	- 55 to +150			°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.56	°C/W

FIGURE -1 POWER DERATING





PIN 1.BASE
2.COLLECTOR
3.EMITTER
4.COLLECTOR(CASE)

DIM	MILLIMETERS	
	MIN	MAX
A	14.68	16.00
B	9.78	10.42
C	5.02	6.60
D	13.00	14.62
E	3.10	4.19
F	2.41	2.67
G	1.10	1.67
H	0.69	1.01
I	3.21	4.98
J	1.14	1.40
K	2.20	3.30
L	0.28	0.61
M	2.48	3.00
O	3.50	4.00

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector - Emitter Sustaining Voltage (1)		$V_{CEO(sus)}$			V
(I_C = 30 mA, I_B = 0)	TIP140T,TIP145T		60		
	TIP141T,TIP146T		80		
	TIP142T,TIP147T		100		
Collector Cutoff Current		I_{CEO}			mA
(V_{CE} = 30 V, I_B = 0)	TIP140T,TIP145T			2.0	
(V_{CE} = 40 V, I_B = 0)	TIP141T,TIP146T			2.0	
(V_{CE} = 50 V, I_B = 0)	TIP142T,TIP147T			2.0	
Collector Cutoff Current		I_{CBO}			mA
(V_{CB} = 60 V, I_E = 0)	TIP140T,TIP145T			1.0	
(V_{CB} = 80 V, I_E = 0)	TIP141T,TIP146T			1.0	
(V_{CB} = 100 V, I_E = 0)	TIP142T,TIP147T			1.0	
Emitter Cutoff Current (V_{EB} = 5.0 V, I_C = 0)		I_{EBO}		2.0	mA
ON CHARACTERISTICS (1)					
DC Current Gain		hFE			
(I_C = 5.0 A, V_{CE} = 4.0 V)			1000		
(I_C = 10 A, V_{CE} = 4.0 V)			500		
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			V
(I_C = 5.0 A, I_B = 10 mA)				2.0	
(I_C = 10 A, I_B = 40 mA)				3.0	
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

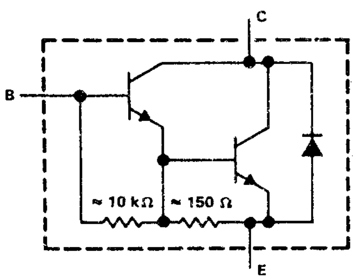
SWITCHING CHARACTERISTICS

Characteristic	Test Condition	Symbol	Min	Max	Unit
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
TIP140T
TIP141T
TIP142T



PNP
TIP145T
TIP146T
TIP147T

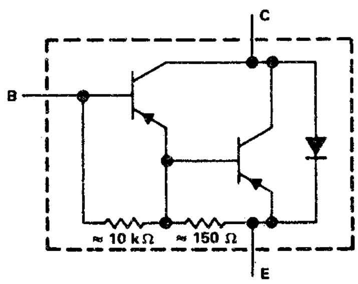
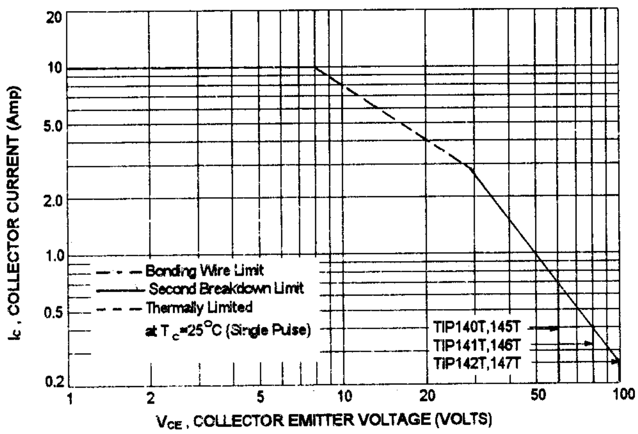


FIG-2 ACTIVE REGION SAFE OPERATING AREA



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 FIG-2 is base on $T_{J(PK)}$=150 °C;T_C is variable depending on conditions.At high case temper-atures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

FIG-3 SMALL-SIGNAL COMMON-EMITTER FORWARD CURRENT TRANSFER RATIO

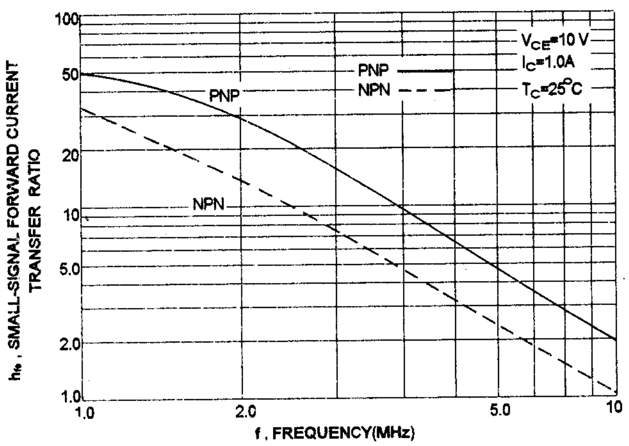


FIG-4 UNCLAMPED INDUCTIVE LOAD

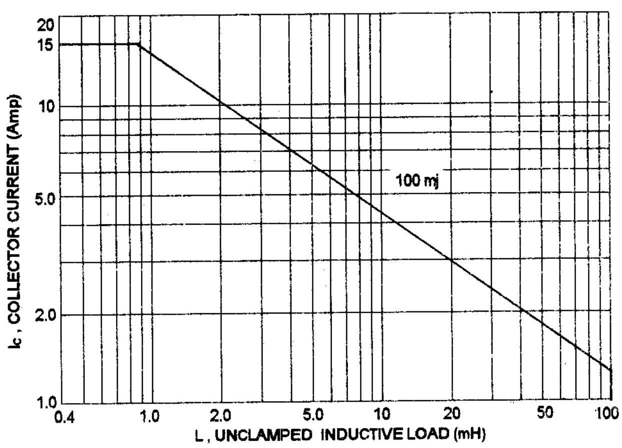


FIG-5 SWITCHING TIME

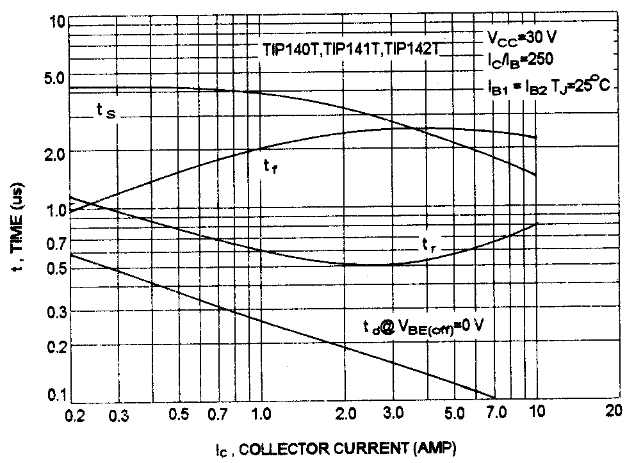
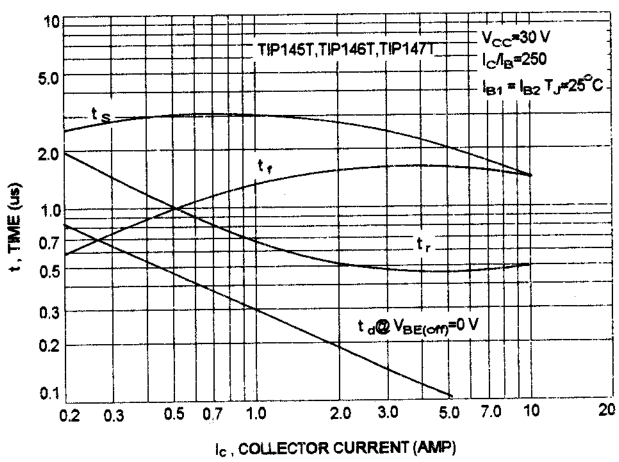


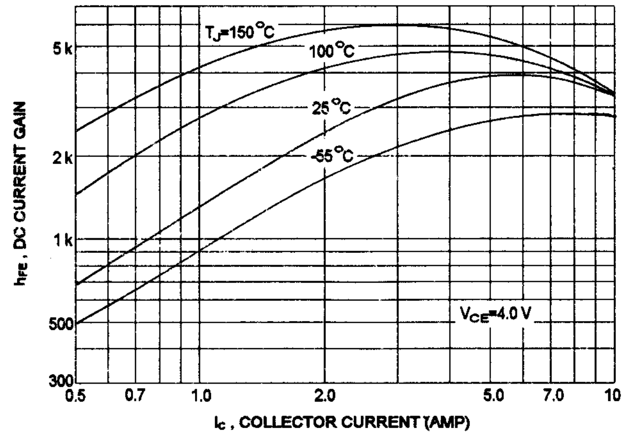
FIG-6 SWITCHING TIME



NPN TIP140T, TIP141T, TIP142T

PNP TIP145T, TIP146T, TIP147T

FIG-7 DC CURRENT GAIN



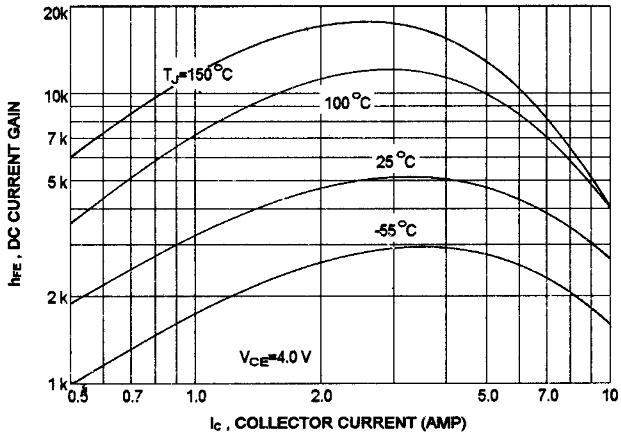
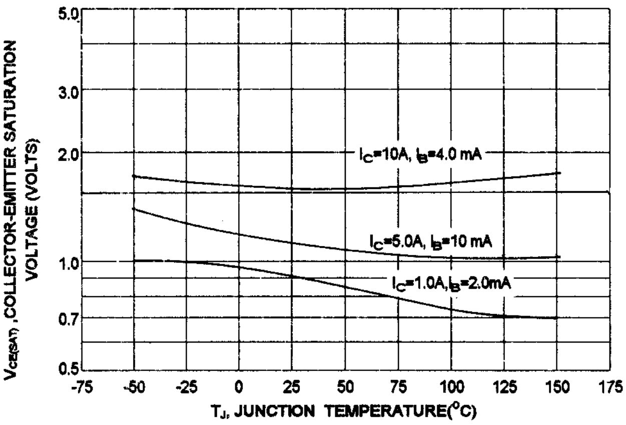


FIG-8 COLLECTOR-EMITTER SATURATION VOLTAGE



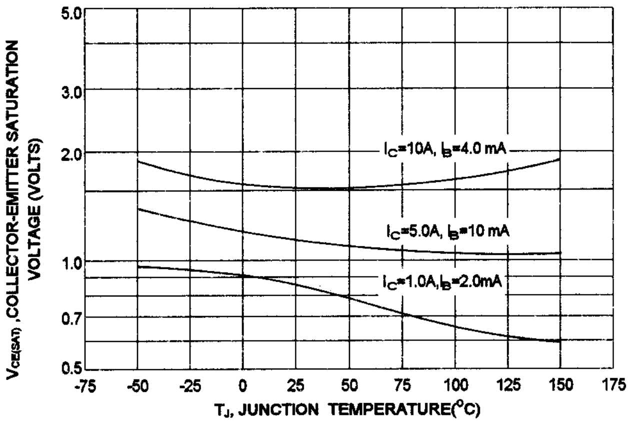
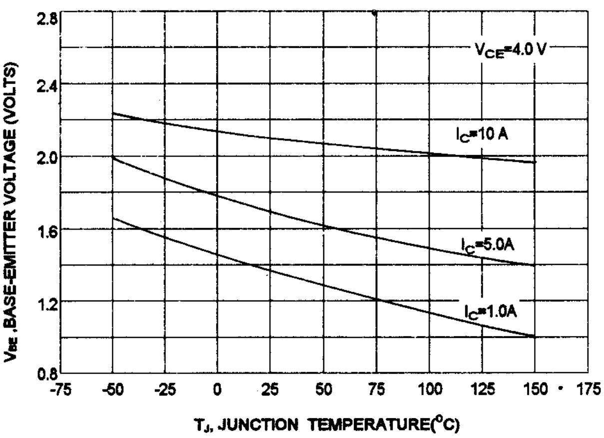
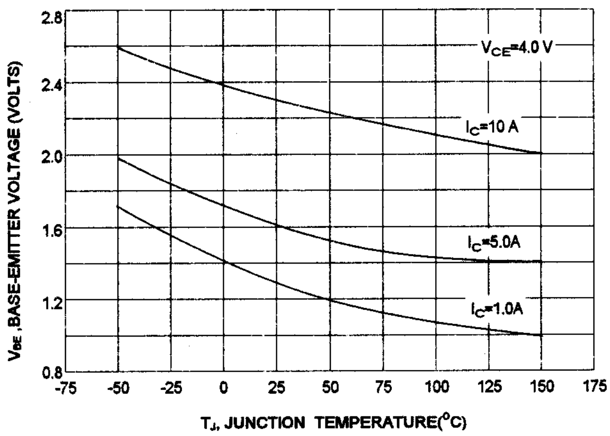


FIG-9 BASE-EMITTER VOLTAGE





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