TIP110, TIP115

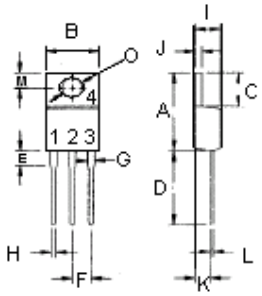
Darlington Transistors

multicomp

Features:

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

- Collector-emitter sustaining voltage-$V_{CEO\ (sus)}$ = 60V (Minimum) - TIP110, TIP115.
- Collector-emitter saturation voltage-$V_{CE\ (sat)}$ = 2.5V (Maximum) at I_C = 2.0A.
- Monolithic construction with built-in-base-emitter shunt resistor.



Pin 1. Base
2. Collector
3. Emitter
4. Collector (Case)

Dimension	Minimum	Maximum
A	14.68	15.31
B	9.78	10.42
C	5.01	6.52
D	13.06	14.62
E	3.57	4.07
F	2.42	3.66
G	1.12	1.36
H	0.72	0.96
I	4.22	4.98
J	1.14	1.38
K	2.20	2.97
L	0.33	0.55
M	2.48	2.98
O	3.70	3.90

Dimensions : Millimetres

NPN TIP110 PNP TIP115

2.0 Ampere
Darlington
Complementary Silicon
Power Transistors
60 Volts
50 Watts

TO-220

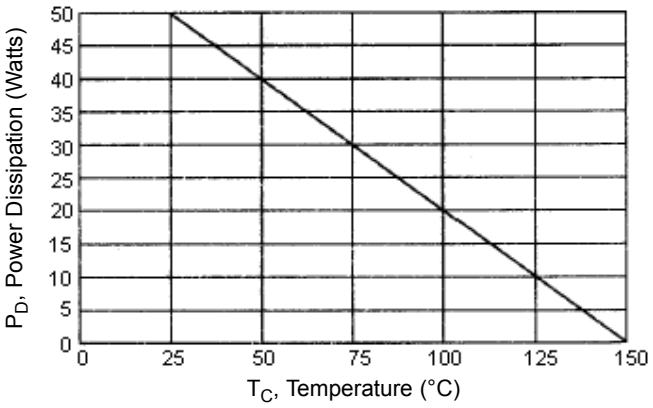
Maximum Ratings

Characteristic	Symbol	TIP110 TIP115	Unit
Collector-Emitter Voltage	V_{CEO}	60	V
Collector-Base Voltage	V_{CBO}		
Emitter-Base Voltage	V_{EBO}	5.0	
Collector Current-Continuous Peak	I_C I_{CM}	2.0 4.0	A
Base Current	I_B	50	mA
Total Power Dissipation at T_C = 25°C Derate above 25°C	P_D	50 0.4	W W/°C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150	°C

Thermal Characteristics

Characteristic	Symbol	Maximum	Unit
Thermal Resistance Junction to Case	Rθjc	2.5	°C/W

Figure - 1 Power Derating



Electrical Characteristics (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Minimum	Maximum	Unit
OFF Characteristics					
Collector-Emitter Sustaining Voltage (1) (I_C = 30mA, I_B = 0)	TIP110, TIP115	$V_{CEO\ (sus)}$	60	-	V
Collector Cut off Current (V_{CE} = 30V, I_B = 0)	TIP110, TIP115	I_{CEO}	-	2.0	mA
Collector Cut off Current (V_{CB} = 60V, I_E = 0)	TIP110, TIP115	I_{CBO}	-	1.0	
Emitter Cut off Current (V_{EB} =5.0V, I_C = 0)		I_{EBO}	-	2.0	
ON Characteristics (1)					
DC Current Gain (I_C = 1.0A, V_{CE} = 4.0V) (I_C = 2.0A, V_{CE} = 4.0V)		hFE	1000 500	-	-
Collector-Emitter Saturation Voltage (I_C = 2.0A, I_B = 8.0mA)		$V_{CE\ (sat)}$	-	2.5	V
Base-Emitter On Voltage (I_C = 2.0A, V_{CE} = 4.0V)		$V_{BE\ (on)}$	-	2.8	
Dynamic Characteristics					
Small-Signal Current Gain (I_C = 0.75A, V_{CE} = 10V, f = 1.0MHz)		h_{fe}	25	-	-
Output Capacitance (V_{CB} = 10V, I_E = 0, f = 0.1MHz)	TIP110 TIP115	C_{ob}	-	250 150	pF

(1) Pulse Test: Pulse Width = 300µs, Duty Cycle ≤2.0%.

Internal Schematic Diagram

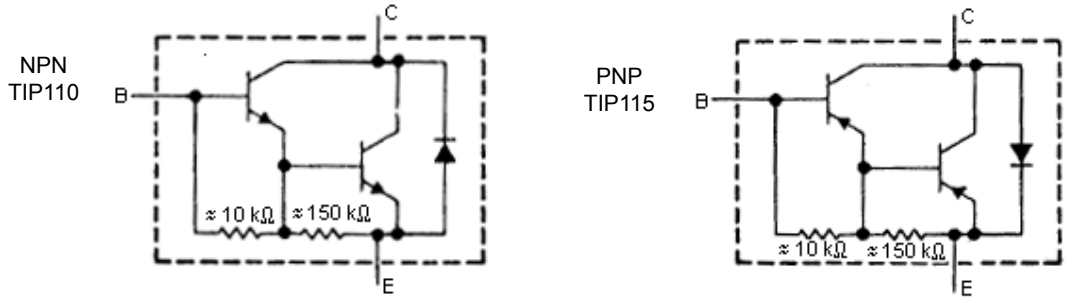


Figure - 2 Switching Time

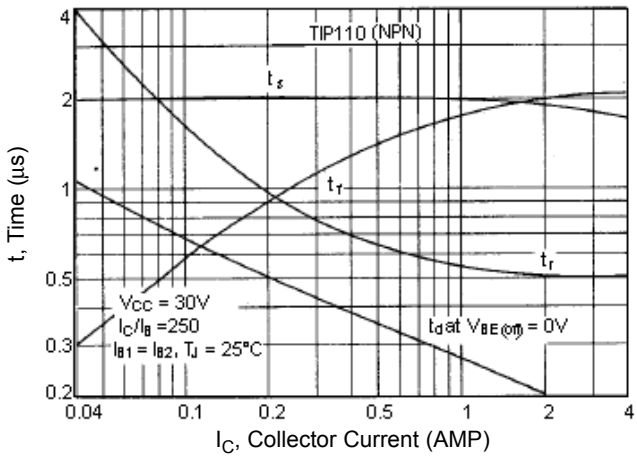


Figure - 3 Switching Time

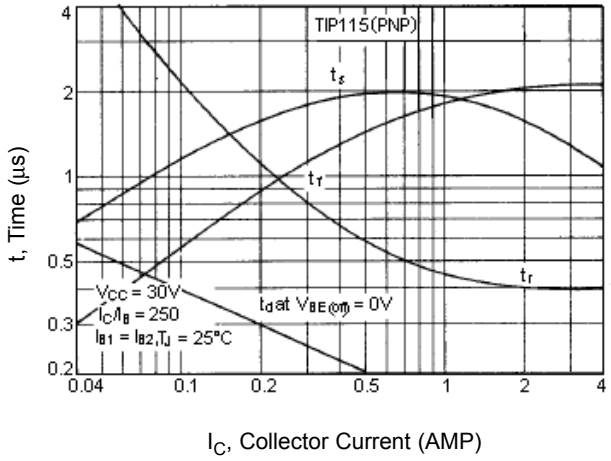


Figure - 4 Capacitances

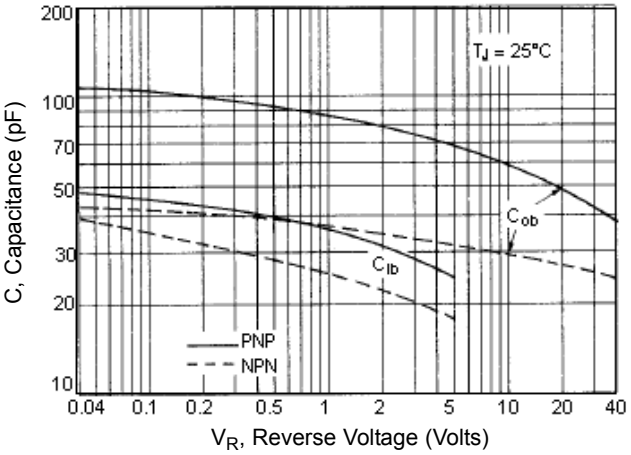


Figure - 5 Active Region Safe Operating Area

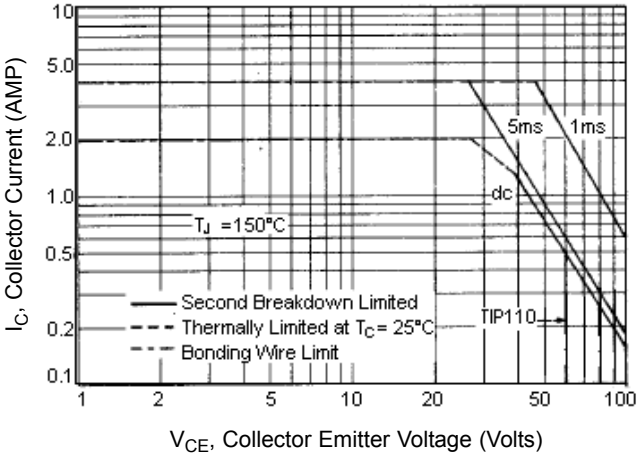
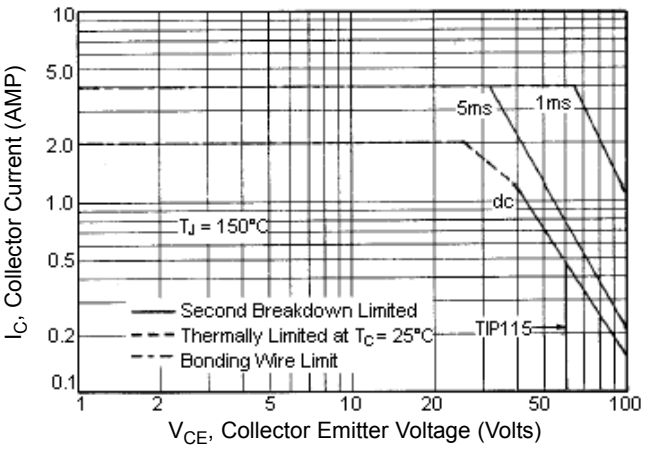


Figure - 6 Active Region Safe Operating Area



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 the curves indicate.

The data of Figure - 5 and 6 is base on $T_{J\,(PK)}$ = 150°C; T_c is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J\,(PK)} \leq$150°C, At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

Specifications

$I_{C\,(av)}$ maximum (A)	V_{CEO} maximum V	h_{FE} minimum at I_c = 1A	P_{tot} at 25°C (W)	Package	Type	Part Number
2	60	1000	50	TO-220	NPN	TIP110
					PNP	TIP115

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