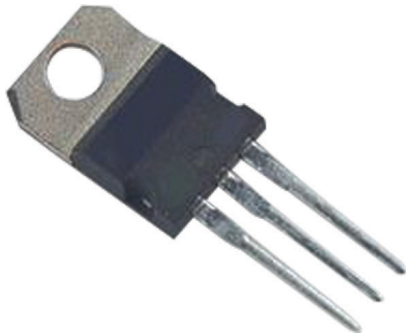


Power Transistor



Description:

Designed for use in general purpose power amplifier and switching applications.

Features:

- Collector-emitter sustaining voltage- $V_{CE(sus)} = 60V$ (Min.)
- Collector-emitter saturation voltage- $V_{CE(sat)} = 1.5V$ (Max.) at $I_C = 6A$
- Current gain-bandwidth product $f_T = 3MHz$ (Min.) at $I_C = 500mA$

Maximum Ratings

Characteristic	Symbol	TIP41A TIP42A	Unit
Collector-Emitter Voltage	V_{CEO}	60	V
Collector-Base Voltage	V_{CBO}		
Emitter-Base Voltage	V_{EBO}	5	
Collector Current-Continuous -Peak	I_C	6 10	A
Base Current	I_B	2	
Total Power Dissipation at $T_C = 25^\circ C$ Derate above $25^\circ C$	P_D	65 0.52	W W/ $^\circ C$
Operation and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150	$^\circ C$

Thermal Characteristics

Characteristic	Symbol	Max.	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.92	$^\circ C/W$

Power Transistor



Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min.	Max.	Unit
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OFF Characteristics

Collector-Emitter Sustaining Voltage (1) $I_C = 30\text{mA}$, $I_B = 0$ TIP41A TIP42A	$V_{CE(sus)}$	60	-	V
Collector Cut off Current $V_{CE} = 30\text{V}$, $I_B = 0$ TIP41A TIP42A	I_{CEO}	-	0.7	mA
Collector Cut off Current $V_{CE} = 60\text{V}$, $V_{EB} = 0$ TIP41A TIP42A	I_{CES}	-	0.4	
Emitter Cut off Current $V_{EB} = 5\text{V}$, $I_C = 0$	I_{EBO}	-	1	

ON Characteristics (1)

DC Current Gain $I_C = 0.3\text{A}$, $V_{CE} = 4\text{V}$ $I_C = 0.3\text{A}$, $V_{CE} = 4\text{V}$	h_{FE}	30 15	75	-
Collector-Emitter Saturation Voltage $I_C = 6\text{A}$, $I_B = 600\text{mA}$	$V_{CE(sat)}$	-	1.5	V
Base-Emitter On Voltage $I_C = 6\text{A}$, $V_{CE} = 4\text{V}$	$V_{BE(on)}$	-	2	

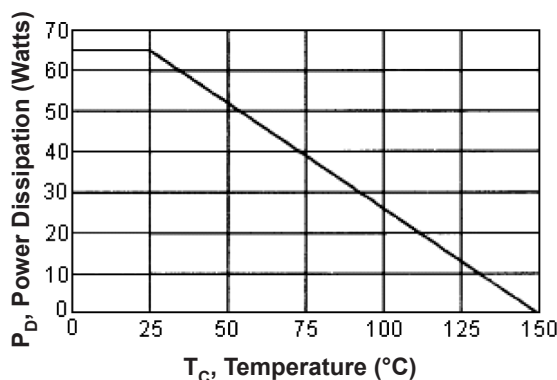
Dynamic Characteristics

Current Gain-Bandwidth Product (2) $I_C = 500\text{mA}$, $V_{CE} = 10\text{V}$, $f_{TEST} = 1\text{MHz}$	f_T	3	-	MHz
Small Signal Current Gain $I_C = 500\text{mA}$, $V_{CE} = 10\text{V}$, $f = 1\text{kHz}$	h_{FE}	20	-	-

(1) Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

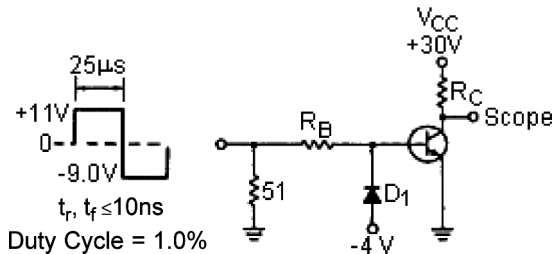
(2) $f_T = h_{FE} \cdot f_{TEST}$

Power Derating



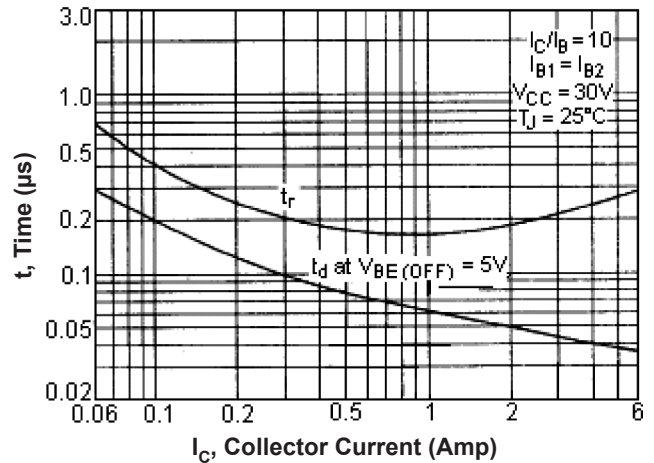
Power Transistor

Switching Time Test Circuit

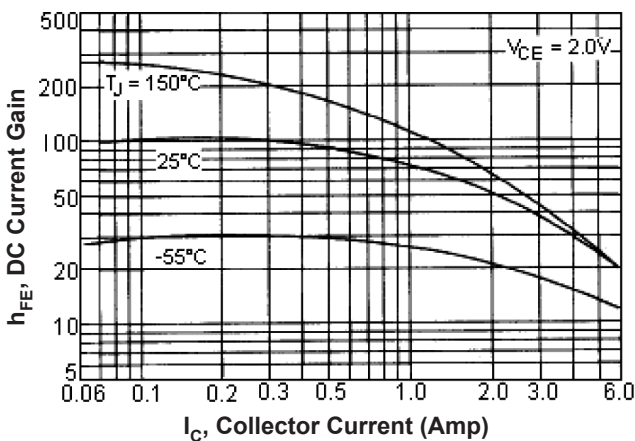


R_B and R_C Varied to Obtain Desired Current Levels
 D_1 Must be Fast Recovery Type. eg:
 M8D5000 Used Above I_B to 100mA
 MSD6100 Used Below I_B to 100mA

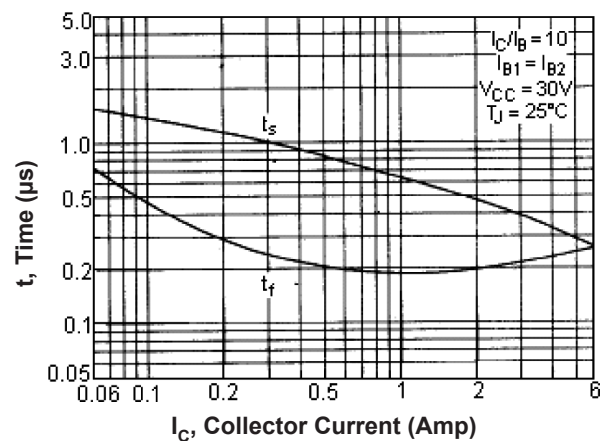
Figure - 3 Turn-On Time



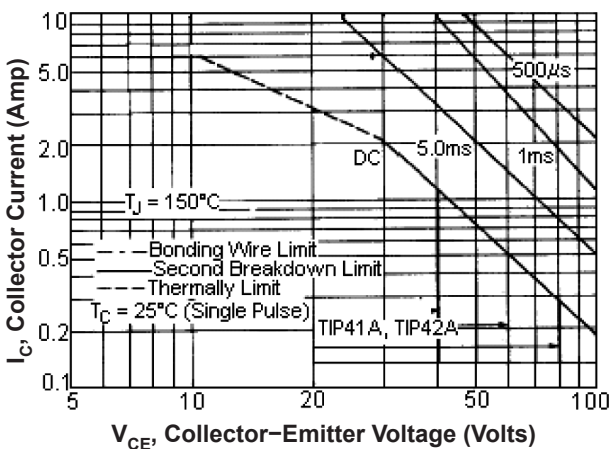
DC Current Gain



Turn-off Time



Active Region Safe Operating Area

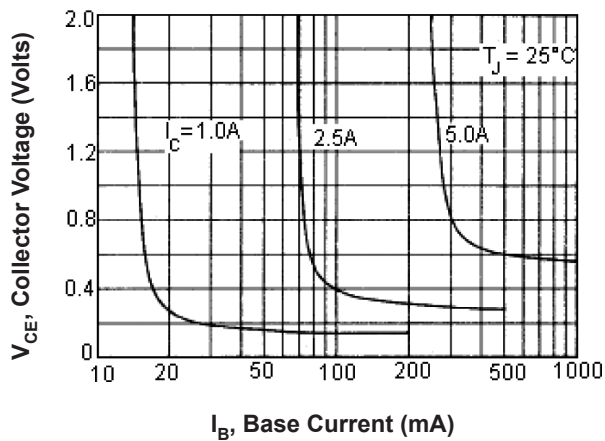


There are two limitation on the power ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate I_C - V_{CE} limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than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

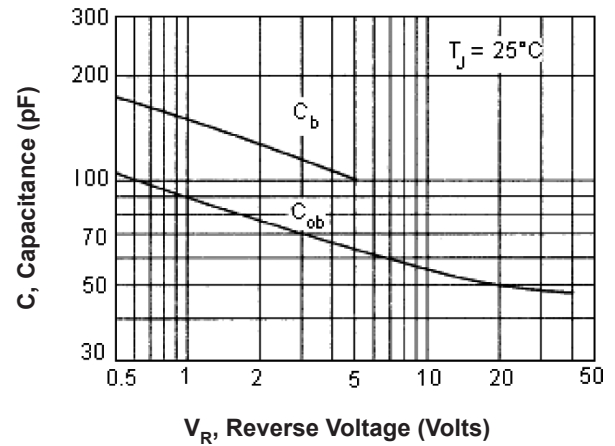
The data of curve is base on $T_{J(PK)} = 150^\circ C$; T_C is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)} \leq 150^\circ C$, at high case temperatures, thermal limitation will reduce the power that can be handled to less than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

Power Transistor

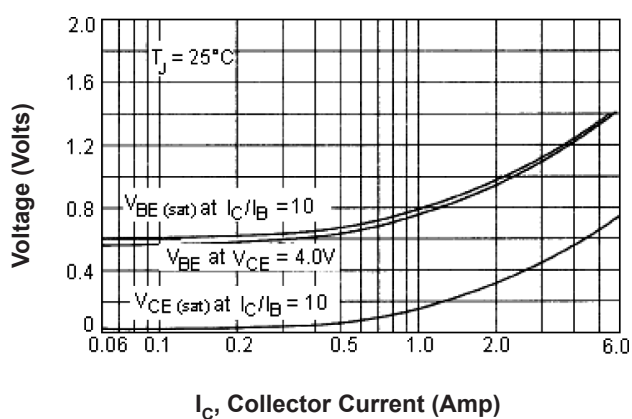
Collector Saturation Region



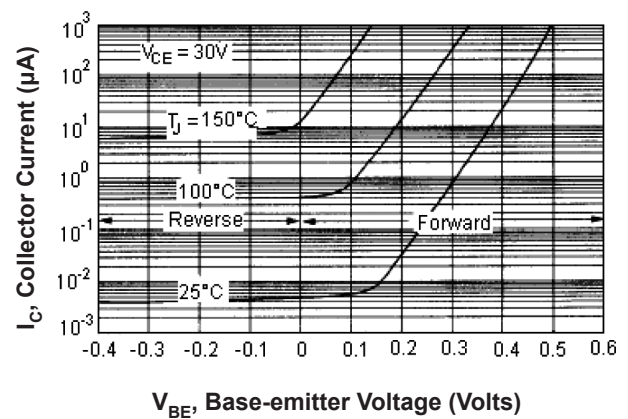
Capacitances



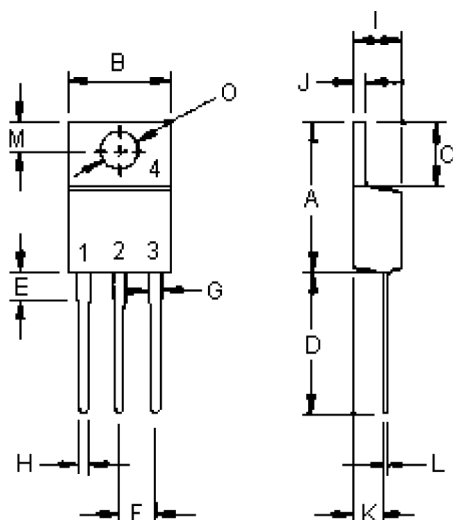
"ON" Voltage



Collector Cut off Region



Power Transistor



Pin Configuration:

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

Dimensions	Min.	Max.
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	2.2	2.97
L	0.33	0.55
M	2.48	2.98
O	3.7	3.9

Dimensions : Millimetres

Part Number Table

Description	Part Number
Transistor, NPN, TO-220	TIP41A
Transistor, PNP, TO-220	TIP42A

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