



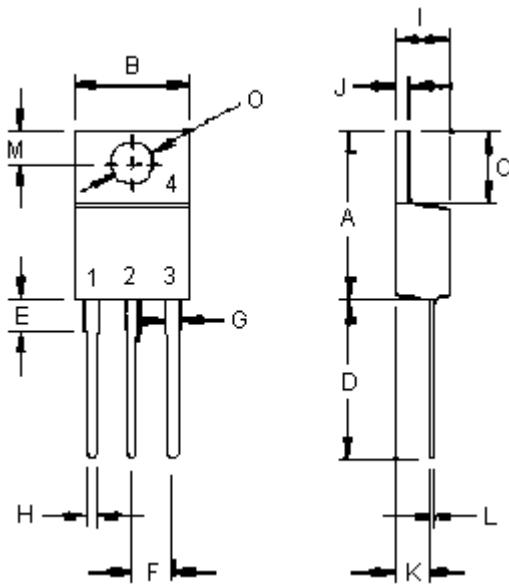
TO - 220

### Features:

- Complementary Silicon Plastic Power Transistors
- Collector - emitter sustaining voltage -  $V_{CEO(sus)} = 60\text{ V}$  (minimum)
- Collector - emitter saturation voltage -  $V_{CE(sat)} = 1.5\text{ V}$  (maximum) at  $I_C = 6\text{ A}$
- Current gain - bandwidth product  $f_T = 3\text{ MHz}$  (minimum) at  $I_C = 500\text{ mA}$

### Applications:

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



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

Dimensions : Millimetres

### Pin

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

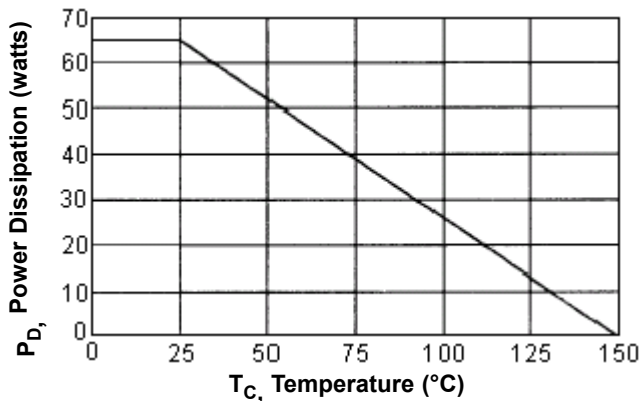
### Maximum Ratings

Characteristics	Symbol	TIP41A TIP42A	Unit
Collector - emitter voltage	$V_{CEO}$	60	V
Collector - base voltage	$V_{CBO}$	60	V
Emitter - base voltage	$V_{EBO}$	5	V
Collector current - Continuous - Peak	$I_C$	6 10	A
Base current	$I_B$	2	A
Total power dissipation at $T_c = 25^\circ\text{C}$ derate above $25^\circ\text{C}$	$P_D$	65 0.52	W W/ $^\circ\text{C}$
Operating and storage Junction temperature range	$T_j, T_{stg}$	-65 to +150	$^\circ\text{C}$

## Thermal Characteristics

Characteristic	Symbol	Maximum	Unit
Thermal resistance junction to case	$R_{\theta jc}$	1.92	$^{\circ}\text{C/W}$

Power Derating



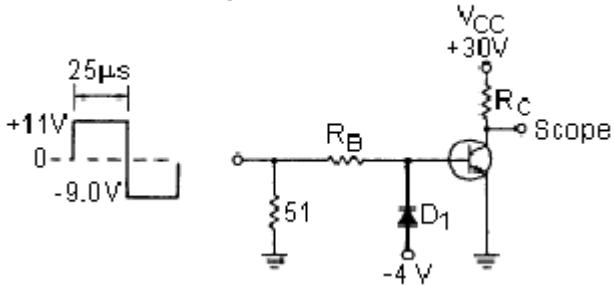
## Electrical Characteristics ( $T_C = 25^{\circ}\text{C}$ Unless Otherwise noted)

Characteristics	Symbol	Minimum	Maximum	Units
<b>Off Characteristics</b>				
Collector - emitter sustaining voltage (1) ( $I_C = 30\text{ mA}$ , $I_B = 0$ )	$V_{CEO(SUS)}$	60	-	V
Collector cut off current ( $V_{CE} = 100\text{ V}$ , $I_B = 0$ )	$I_{CEO}$	-	0.7	mA
Collector cut off current ( $V_{CE} = 60\text{ V}$ , $V_{BE} = 0$ )	$I_{CES}$	-	0.4	mA
Emitter cut off current ( $V_{EB} = 5\text{ V}$ , $I_C = 0$ )	$I_{EBO}$	-	1	mA
<b>On Characteristics (1)</b>				
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	V
<b>Dynamic characteristics</b>				
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  $\leq 2\%$

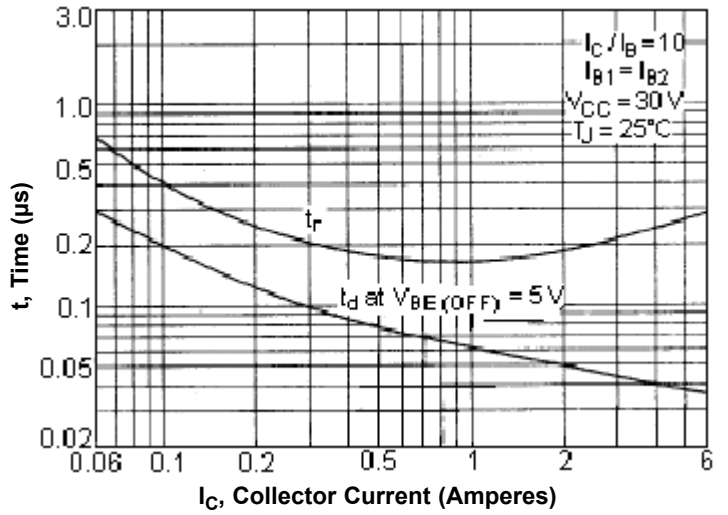
(2)  $f_T = |h_{fe}| \cdot f_{TEST}$

Switching Time Test Circuit

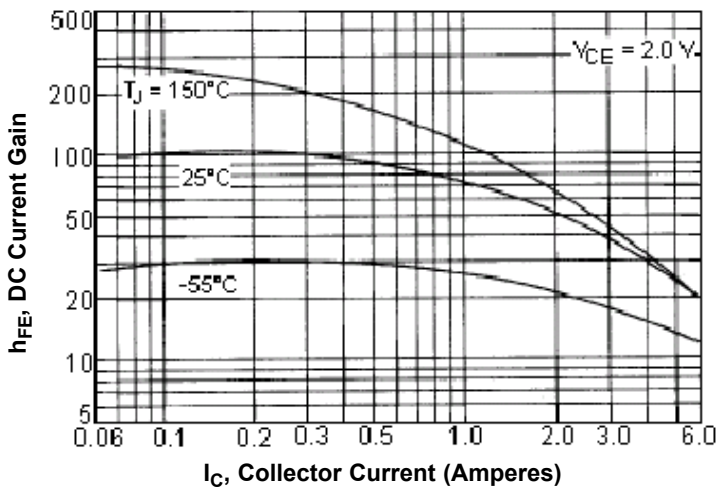


$t_r, t_f \leq 10$  ns  
 Duty cycle = 1 %  
 $R_B$  and  $R_C$  varied to obtain desired current levels  
 $D_1$  must be fast recovery type eg:  
 M8D5000 Used Above  $I_B$  to 100 mA  
 MSD6100 Used Below  $I_B$  to 100 mA

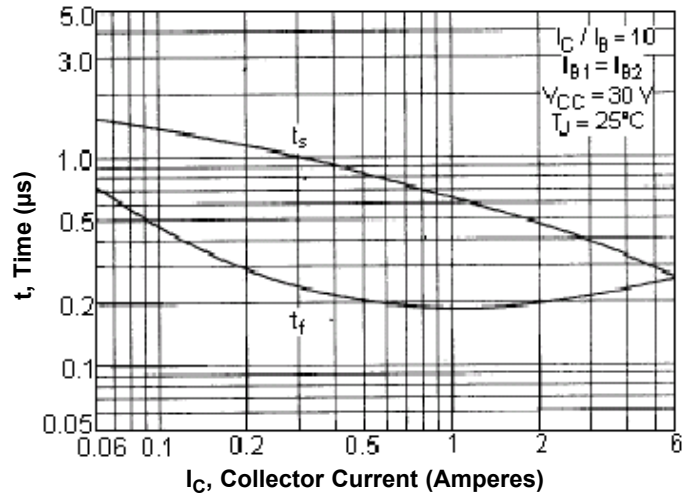
Turn-on Time



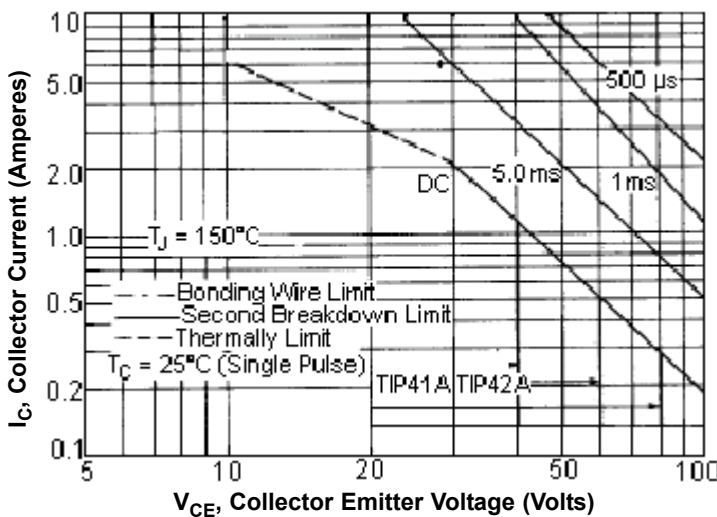
DC Current Gain



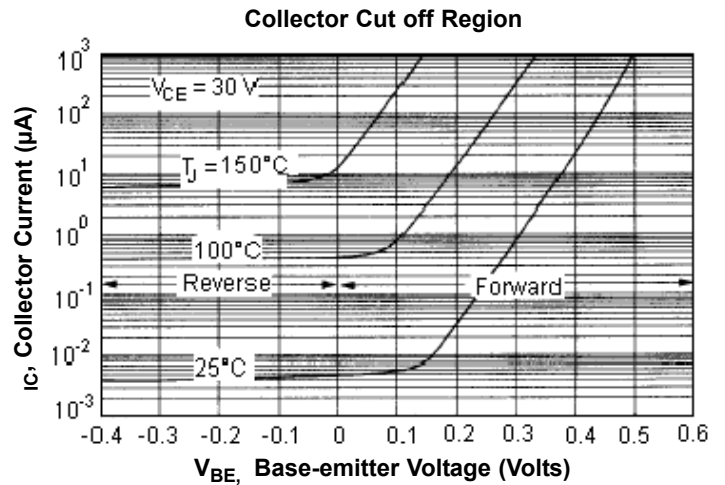
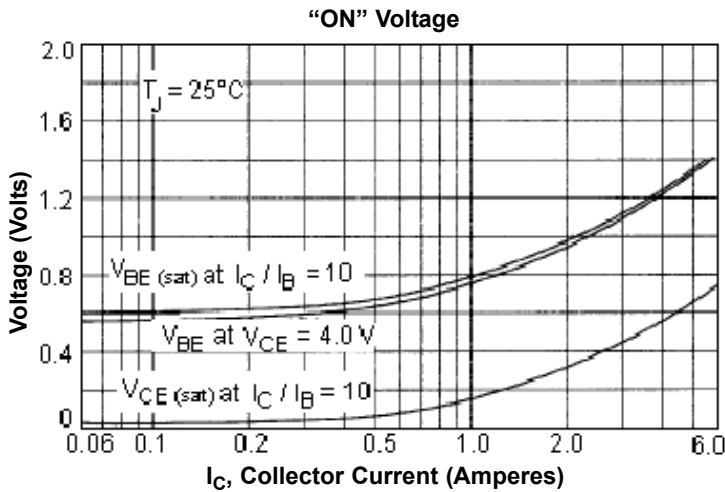
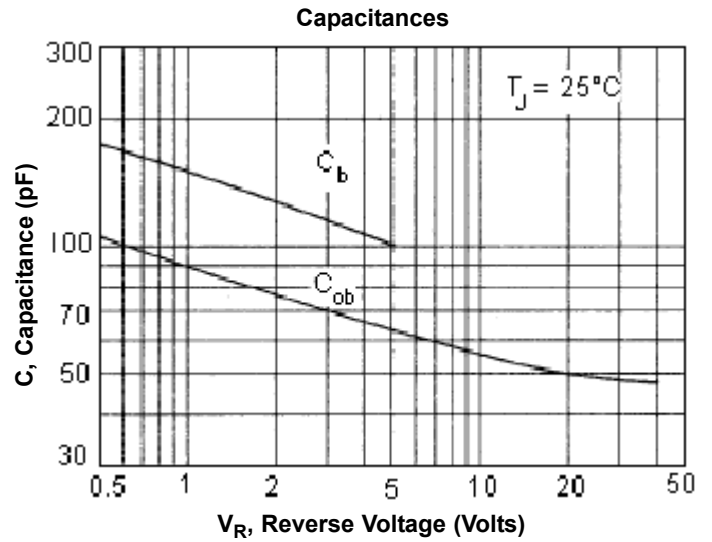
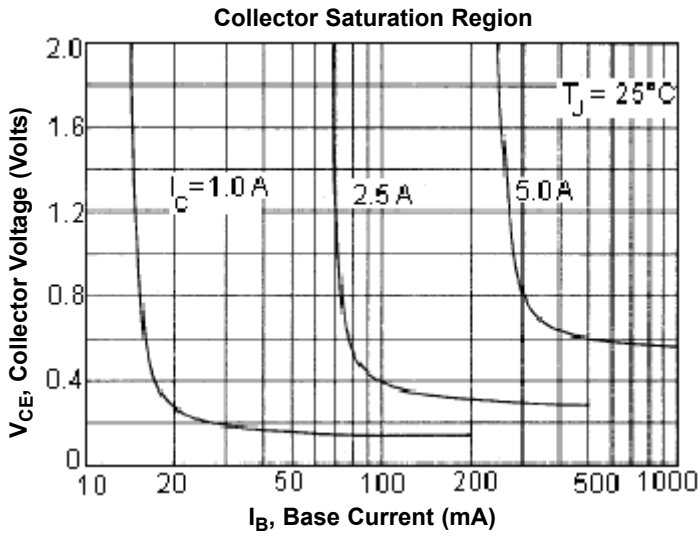
Turn-off Time



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



## Part Number Table

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

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