

TIP41G, TIP41AG, TIP41BG, TIP41CG (NPN), TIP42G, TIP42AG, TIP42BG, TIP42CG (PNP)

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.67	$^{\circ}\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	57	$^{\circ}\text{C}/\text{W}$

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 (Note 2) ($I_C = 30 \text{ mAdc}$, $I_B = 0$) TIP41G, TIP42G TIP41AG, TIP42AG TIP41BG, TIP42BG TIP41CG, TIP42CG	$V_{CEO(sus)}$	40 60 80 100	- - - -	Vdc
Collector Cutoff Current ($V_{CE} = 30 \text{ Vdc}$, $I_B = 0$) TIP41G, TIP41AG, TIP42G, TIP42AG ($V_{CE} = 60 \text{ Vdc}$, $I_B = 0$) TIP41BG, TIP41CG, TIP42BG, TIP42CG	I_{CEO}	- -	0.7 0.7	mAdc
Collector Cutoff Current ($V_{CE} = 40 \text{ Vdc}$, $V_{EB} = 0$) TIP41G, TIP42G ($V_{CE} = 60 \text{ Vdc}$, $V_{EB} = 0$) TIP41AG, TIP42AG ($V_{CE} = 80 \text{ Vdc}$, $V_{EB} = 0$) TIP41BG, TIP42BG ($V_{CE} = 100 \text{ Vdc}$, $V_{EB} = 0$) TIP41CG, TIP42CG	I_{CES}	- - - -	400 400 400 400	μAdc
Emitter Cutoff Current ($V_{BE} = 5.0 \text{ Vdc}$, $I_C = 0$)	I_{EBO}	-	1.0	mAdc

ON CHARACTERISTICS (Note 2)

DC Current Gain ($I_C = 0.3 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$) ($I_C = 3.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$)	h_{FE}	30 15	- 75	-
Collector-Emitter Saturation Voltage ($I_C = 6.0 \text{ Adc}$, $I_B = 600 \text{ mAdc}$)	$V_{CE(sat)}$	-	1.5	Vdc
Base-Emitter On Voltage ($I_C = 6.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$)	$V_{BE(on)}$	-	2.0	Vdc

DYNAMIC CHARACTERISTICS

Current-Gain - Bandwidth Product ($I_C = 500 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$, $f_{test} = 1.0 \text{ MHz}$)	f_T	3.0	-	MHz
Small-Signal Current Gain ($I_C = 0.5 \text{ Adc}$, $V_{CE} = 10 \text{ Vdc}$, $f = 1.0 \text{ kHz}$)	h_{fe}	20	-	-

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

2. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

TIP41G, TIP41AG, TIP41BG, TIP41CG (NPN), TIP42G, TIP42AG, TIP42BG, TIP42CG (PNP)

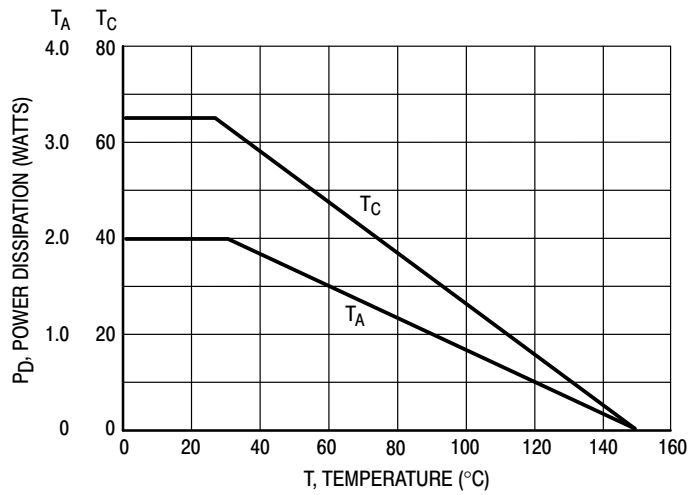
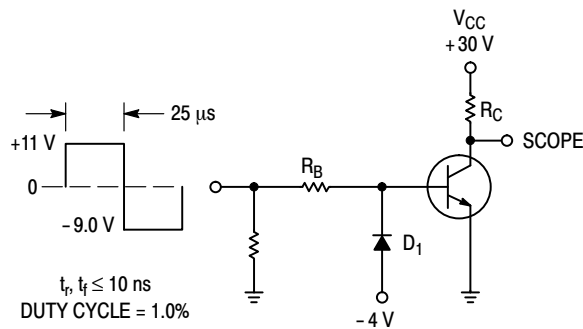


Figure 1. Power Derating



R_B and R_C VARIED TO OBTAIN DESIRED CURRENT LEVELS
 D_1 MUST BE FAST RECOVERY TYPE, e.g.:
 1N5825 USED ABOVE $I_B \approx 100 \text{ mA}$
 MSD6100 USED BELOW $I_B \approx 100 \text{ mA}$

Figure 2. Switching Time Test Circuit

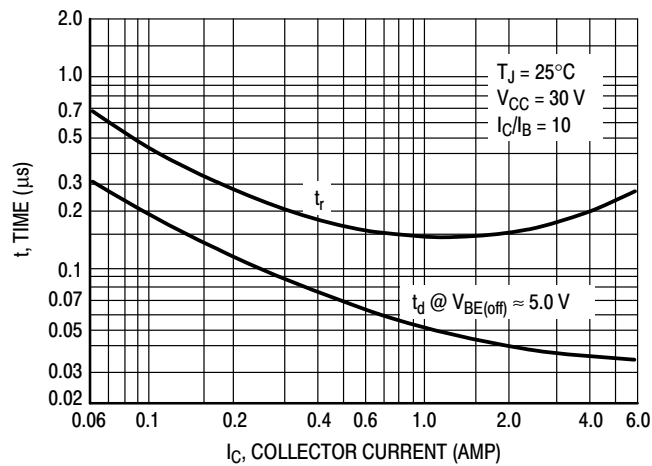


Figure 3. Turn-On Time

TIP41G, TIP41AG, TIP41BG, TIP41CG (NPN), TIP42G, TIP42AG, TIP42BG, TIP42CG (PNP)

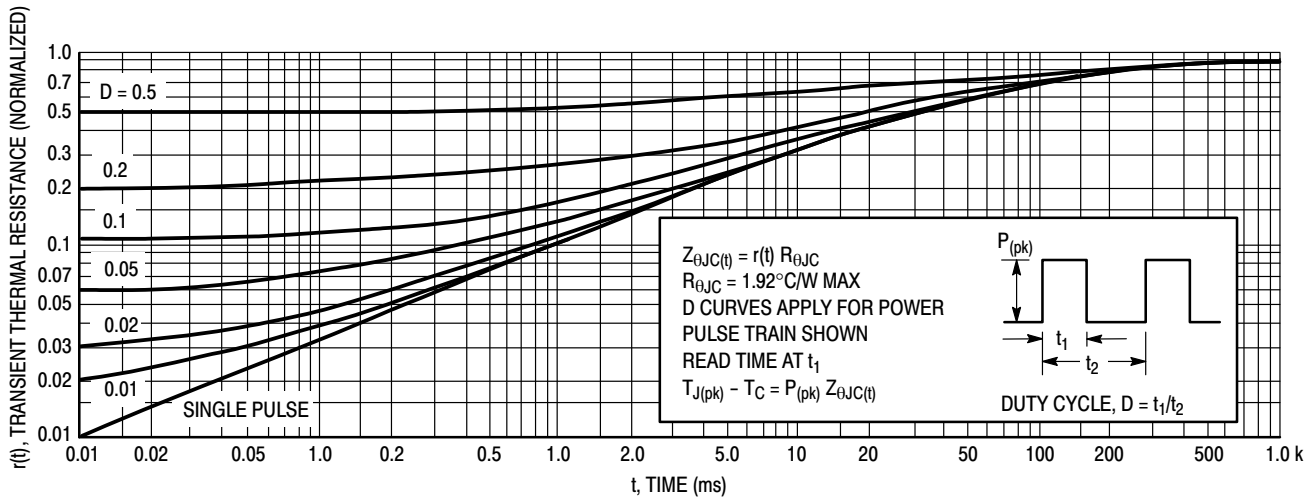


Figure 4. Thermal Response

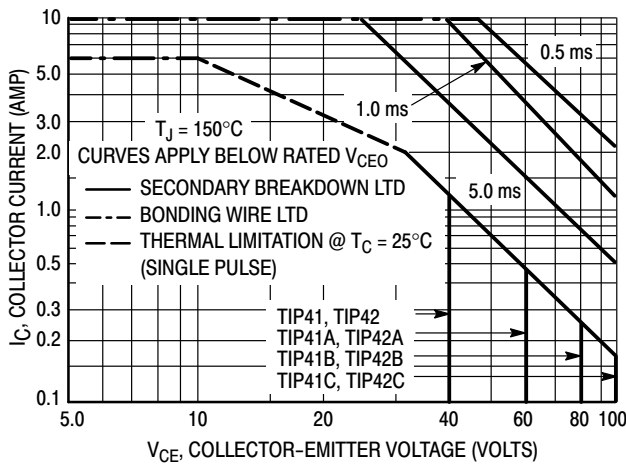


Figure 5. Active-Region Safe Operating Area

There are two limitations 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 is based on $T_{J(pk)} = 150^{\circ}\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^{\circ}\text{C}$. $T_{J(pk)}$ may be calculated from the data in Figure 4. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

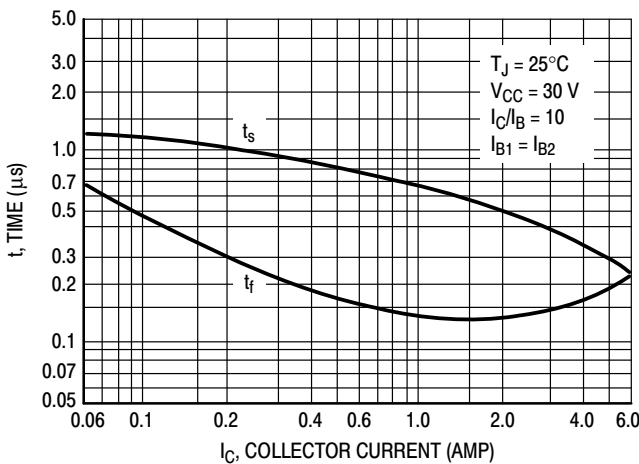


Figure 6. Turn-Off Time

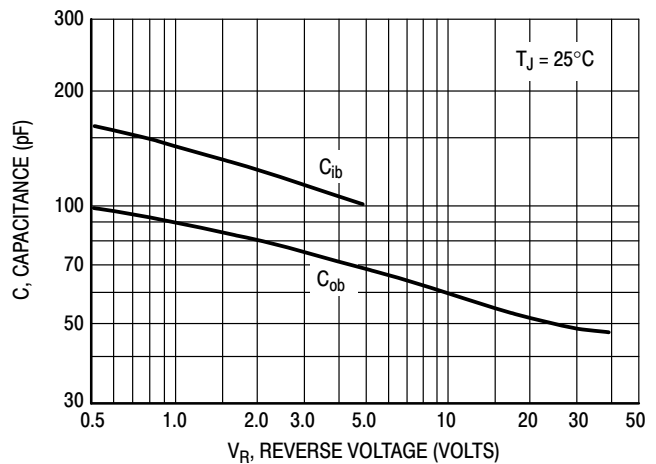


Figure 7. Capacitance

TIP41G, TIP41AG, TIP41BG, TIP41CG (NPN), TIP42G, TIP42AG, TIP42BG, TIP42CG (PNP)

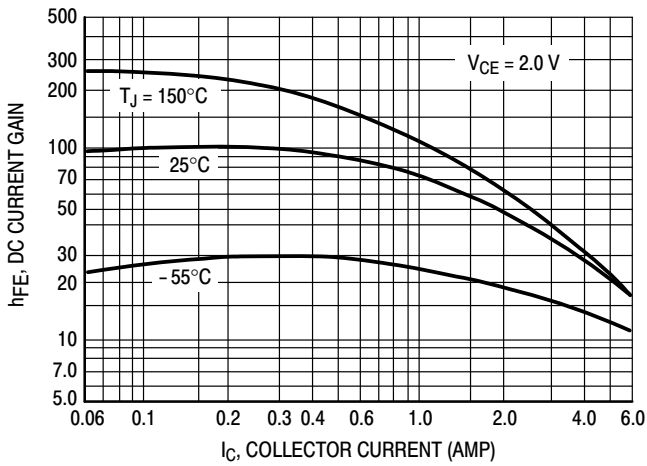


Figure 8. DC Current Gain

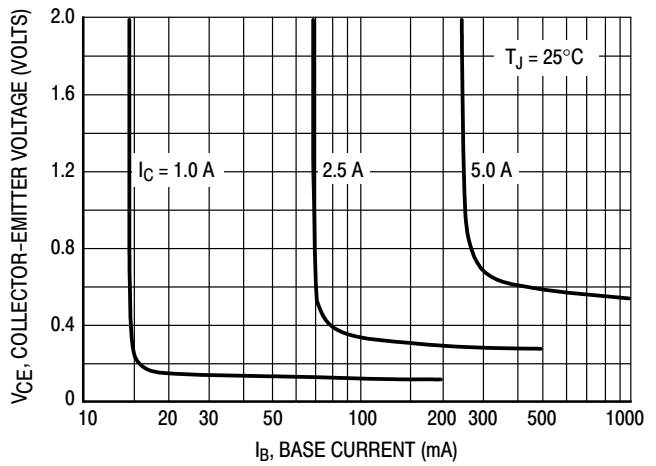


Figure 9. Collector Saturation Region

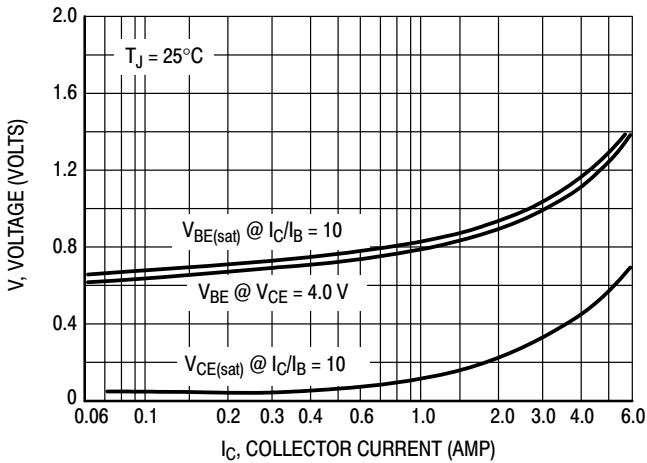


Figure 10. "On" Voltages

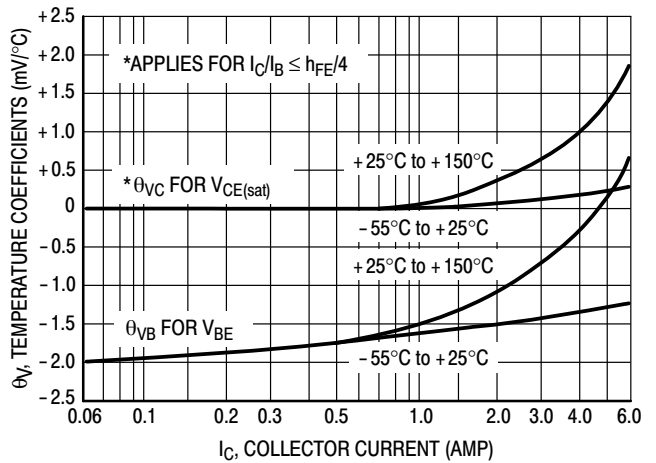


Figure 11. Temperature Coefficients

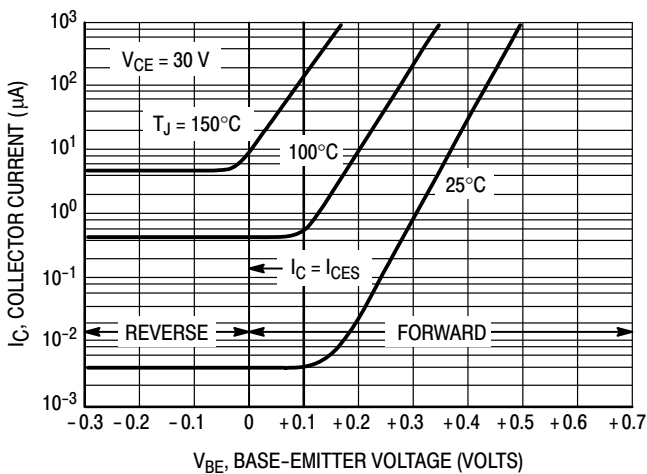


Figure 12. Collector Cut-Off Region

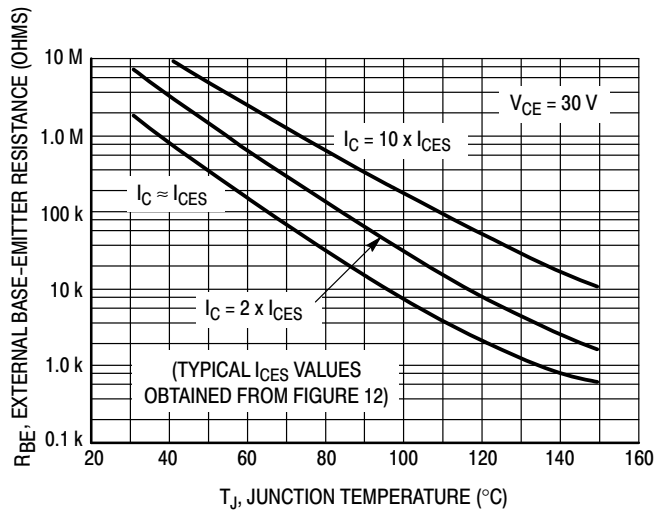


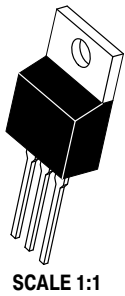
Figure 13. Effects of Base-Emitter Resistance

**TIP41G, TIP41AG, TIP41BG, TIP41CG (NPN), TIP42G, TIP42AG, TIP42BG,
TIP42CG (PNP)**

ORDERING INFORMATION

Device	Package	Shipping
TIP41G	TO-220 (Pb-Free)	50 Units / Rail
TIP41AG	TO-220 (Pb-Free)	50 Units / Rail
TIP41BG	TO-220 (Pb-Free)	50 Units / Rail
TIP41CG	TO-220 (Pb-Free)	50 Units / Rail
TIP42G	TO-220 (Pb-Free)	50 Units / Rail
TIP42AG	TO-220 (Pb-Free)	50 Units / Rail
TIP42BG	TO-220 (Pb-Free)	50 Units / Rail
TIP42CG	TO-220 (Pb-Free)	50 Units / Rail

MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



TO-220 CASE 221A ISSUE AK

DATE 13 JAN 2022



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 2009.
2. CONTROLLING DIMENSION: INCHES
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.
4. MAX WIDTH FOR F102 DEVICE = 1.35MM

DIM	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.570	0.620	14.48	15.75
B	0.380	0.415	9.66	10.53
C	0.160	0.190	4.07	4.83
D	0.025	0.038	0.64	0.96
F	0.142	0.161	3.60	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
J	0.014	0.024	0.36	0.61
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.41
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 2:
PIN 1. BASE
2. EMITTER
3. COLLECTOR
4. EMITTER

STYLE 3:
PIN 1. CATHODE
2. ANODE
3. GATE
4. ANODE

STYLE 4:
PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. MAIN TERMINAL 2

STYLE 5:
PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN

STYLE 6:
PIN 1. ANODE
2. CATHODE
3. ANODE
4. CATHODE

STYLE 7:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. ANODE

STYLE 8:
PIN 1. CATHODE
2. ANODE
3. EXTERNAL TRIP/DELAY
4. ANODE

STYLE 9:
PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

STYLE 10:
PIN 1. GATE
2. SOURCE
3. DRAIN
4. SOURCE

STYLE 11:
PIN 1. DRAIN
2. SOURCE
3. GATE
4. SOURCE

STYLE 12:
PIN 1. MAIN TERMINAL 1
2. MAIN TERMINAL 2
3. GATE
4. NOT CONNECTED

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