

TIP47G, TIP48G, TIP50G

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

Characteristic	Symbol	Min	Max	Unit	
OFF CHARACTERISTICS					
Collector–Emitter Sustaining Voltage (Note 1) (I _C = 30 mA _{dc} , I _B = 0)	TIP47 TIP48 TIP50	V _{CEO(sus)}	250 300 400	– – –	V _{dc}
Collector Cutoff Current (V _{CE} = 150 V _{dc} , I _B = 0) (V _{CE} = 200 V _{dc} , I _B = 0) (V _{CE} = 300 V _{dc} , I _B = 0)	TIP47 TIP48 TIP50	I _{CEO}	– – –	1.0 1.0 1.0	mA _{dc}
Collector Cutoff Current (V _{CE} = 350 V _{dc} , V _{BE} = 0) (V _{CE} = 400 V _{dc} , V _{BE} = 0) (V _{CE} = 500 V _{dc} , V _{BE} = 0)	TIP47 TIP48 TIP50	I _{CES}	– – –	1.0 1.0 1.0	mA _{dc}
Emitter Cutoff Current (V _{BE} = 5.0 V _{dc} , I _C = 0)		I _{EBO}	–	1.0	mA _{dc}

ON CHARACTERISTICS (Note 1)

DC Current Gain (I _C = 0.3 A _{dc} , V _{CE} = 10 V _{dc}) (I _C = 1.0 A _{dc} , V _{CE} = 10 V _{dc})	h _{FE}	30 10	150 –	–
Collector–Emitter Saturation Voltage (I _C = 1.0 A _{dc} , I _B = 0.2 A _{dc})	V _{CE(sat)}	–	1.0	V _{dc}
Base–Emitter On Voltage (I _C = 1.0 A _{dc} , V _{CE} = 10 V _{dc})	V _{BE(on)}	–	1.5	V _{dc}

DYNAMIC CHARACTERISTICS

Current–Gain – Bandwidth Product (I _C = 0.1 A _{dc} , V _{CE} = 10 V _{dc} , f = 2.0 MHz)	f _T	10	–	MHz
Small–Signal Current Gain (I _C = 0.2 A _{dc} , V _{CE} = 10 V _{dc} , f = 1.0 kHz)	h _{fe}	25	–	–

1. Pulse Test: Pulse width ≤ 300 μs, Duty Cycle ≤ 2.0%.

ORDERING INFORMATION

Device	Package	Shipping
TIP47	TO–220	50 Units / Rail
TIP47G	TO–220 (Pb–Free)	50 Units / Rail
TIP48	TO–220	50 Units / Rail
TIP48G	TO–220 (Pb–Free)	50 Units / Rail
TIP49	TO–220	50 Units / Rail
TIP49G	TO–220 (Pb–Free)	50 Units / Rail
TIP50	TO–220	50 Units / Rail
TIP50G	TO–220 (Pb–Free)	50 Units / Rail

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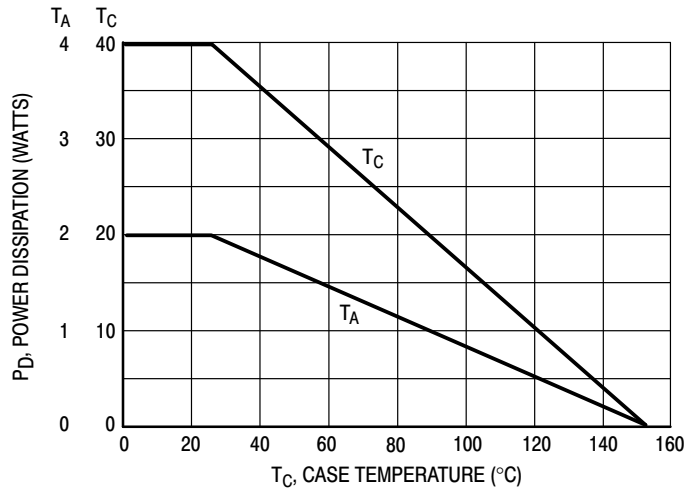
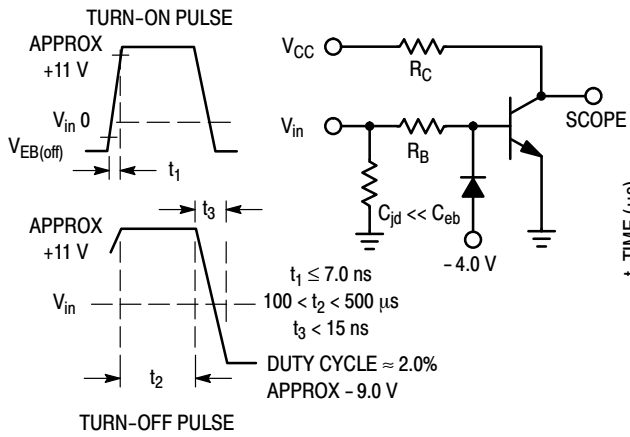


Figure 1. Power Derating



R_B and R_C VARIED TO OBTAIN DESIRED CURRENT LEVELS.

Figure 2. Switching Time Equivalent Circuit

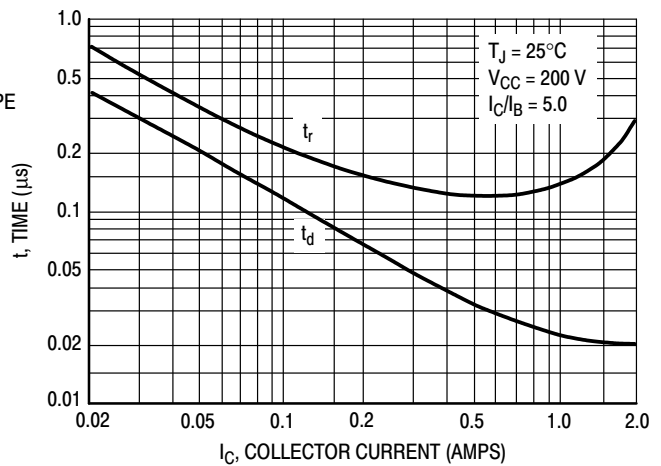


Figure 3. Turn-On Time

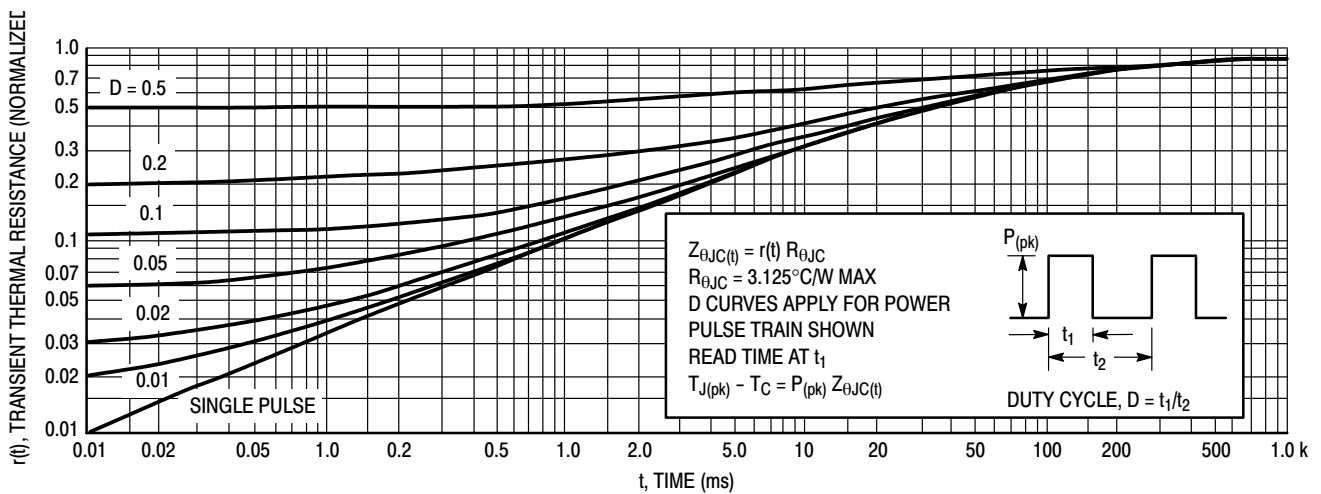


Figure 4. Thermal Response

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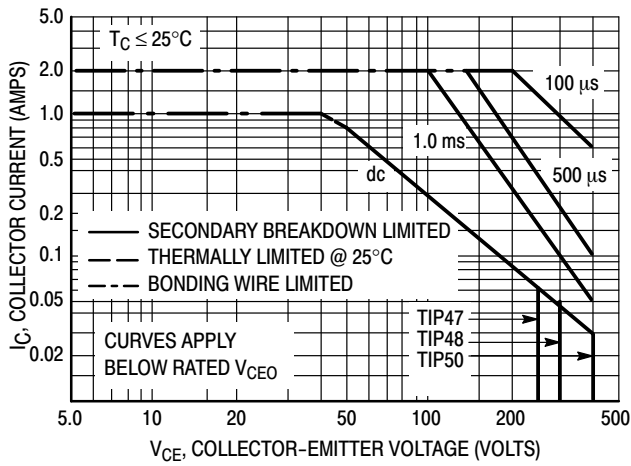


Figure 5. Active Region Safe Operating Area

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.

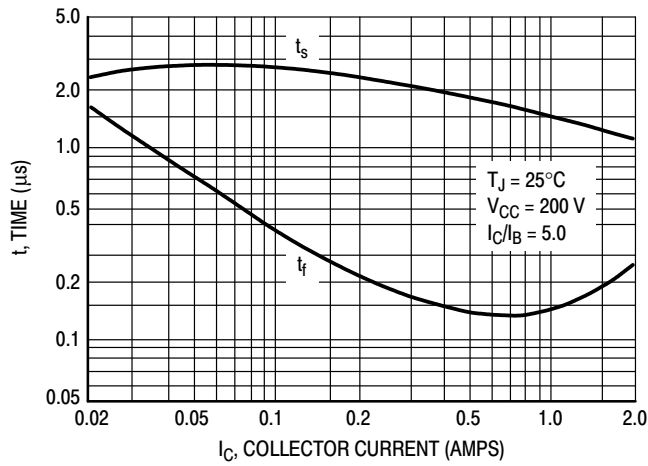


Figure 6. Turn-Off Time

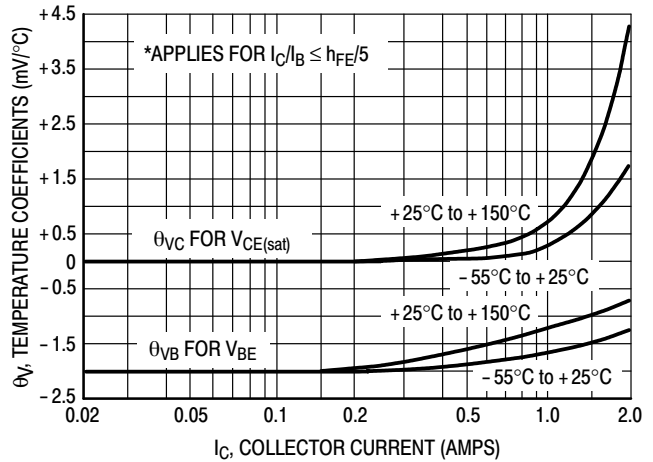
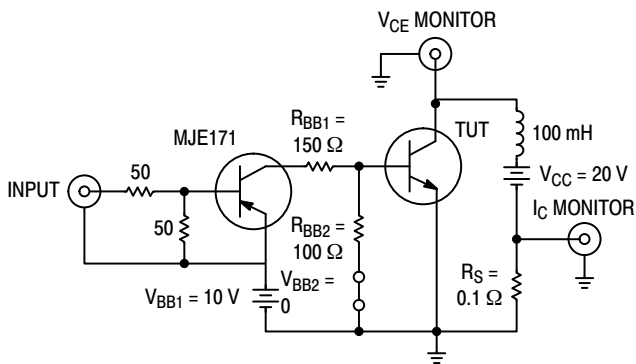


Figure 7. Temperature Coefficients



Note A: Input pulse width is increased until $I_{CM} = 0.63 \text{ A}$.

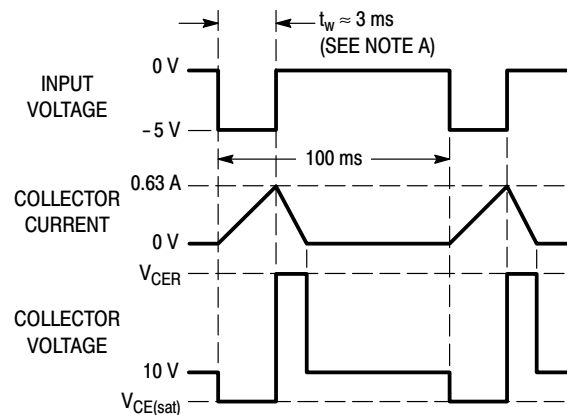


Figure 8. Inductive Load Switching

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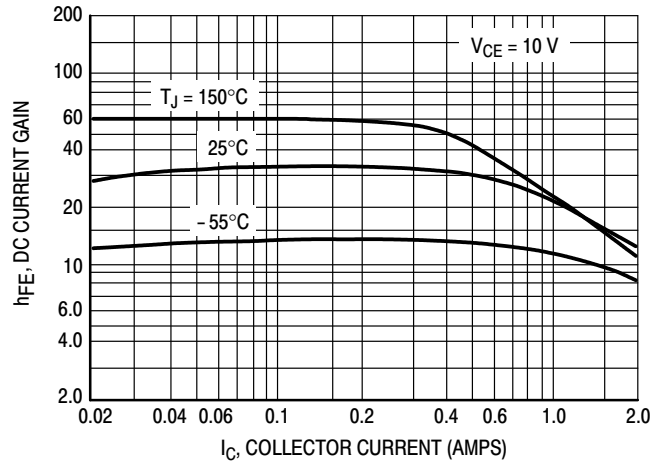


Figure 9. DC Current Gain

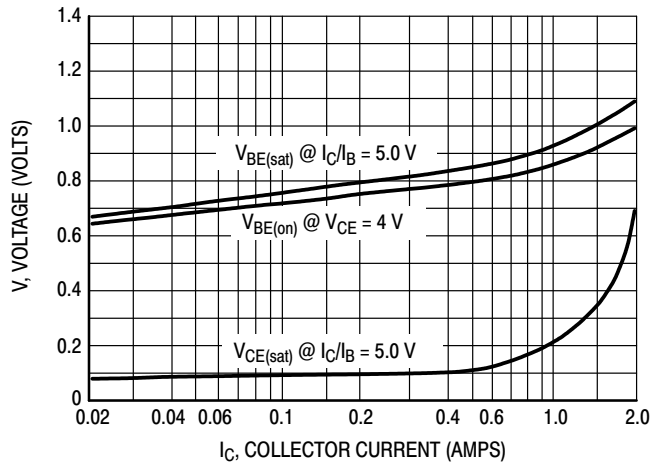
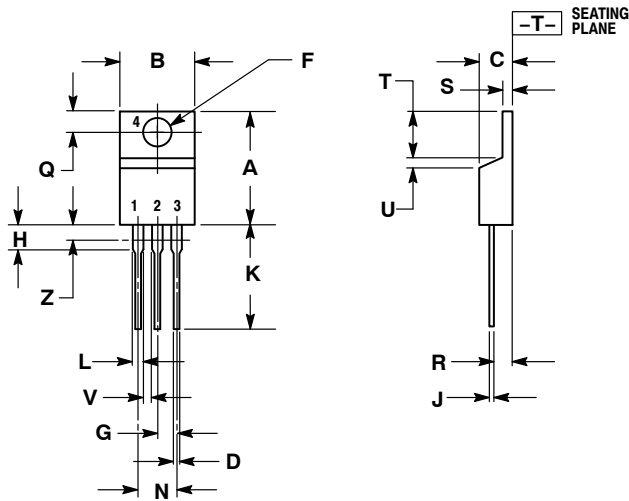


Figure 10. "On" Voltages

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PACKAGE DIMENSIONS

TO-220 CASE 221A-09 ISSUE AG



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.036	0.64	0.91
F	0.142	0.161	3.61	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
J	0.014	0.025	0.36	0.64
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	1.39
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
- COLLECTOR
- EMITTER
- COLLECTOR

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