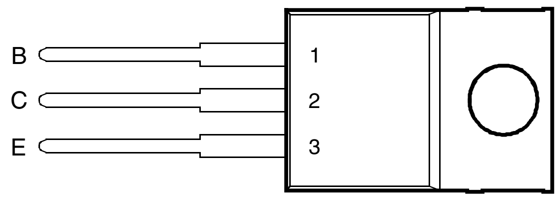
BOURNS®

- **80 W at 25°C Case Temperature**
- **7 A Continuous Collector Current**
- **10 A Peak Collector Current**
- **Maximum $V_{CE(sat)}$ of 2 V at I_C = 5 A**
- **$I_{CEX(sus)}$ 7 A at rated $V_{(BR)CEO}$**

TO-220 PACKAGE
(TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

MDTRACA

absolute maximum ratings at 25°C case temperature (unless otherwise noted)

RATING		SYMBOL	VALUE	UNIT
Collector-base voltage (I_E = 0)	TIP150	V_{CBO}	300	V
	TIP151		350	
	TIP152		400	
Collector-emitter voltage (I_B = 0)	TIP150	V_{CEO}	300	V
	TIP151		350	
	TIP152		400	
Emitter-base voltage		V_{EBO}	8	V
Continuous collector current		I_C	7	A
Peak collector current (see Note 1)		I_{CM}	10	A
Continuous base current		I_B	1.5	A
Continuous device dissipation at (or below) 25°C case temperature (see Note 2)		P_{tot}	80	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 3)		P_{tot}	2	W
Operating junction temperature range		T_j	-65 to +150	°C
Storage temperature range		T_{stg}	-65 to +150	°C
Lead temperature 3.2 mm from case for 10 seconds		T_L	260	°C

NOTES: 1. This value applies for $t_p \le 5$ ms, duty cycle ≤ 10%.
2. Derate linearly to 150°C case temperature at the rate of 0.64 W/°C.
3. Derate linearly to 150°C free air temperature at the rate of 16 mW/°C.

electrical characteristics at 25°C case temperature

PARAMETER		TEST CONDITIONS				MIN	TYP	MAX	UNIT
$V_{(BR)CBO}$	Collector-base breakdown voltage	I_C = 1 mA	I_E = 0		TIP150 TIP151 TIP152	300 350 400			V
$V_{(BR)CEO}$	Collector-emitter breakdown voltage	I_C = 10 mA (see Note 4)	I_B = 0		TIP150 TIP151 TIP152	300 350 400			V
I_{CEO}	Collector-emitter cut-off current	V_{CE} = 300 V V_{CE} = 350 V V_{CE} = 400 V	I_B = 0 I_B = 0 I_B = 0		TIP150 TIP151 TIP152			250 250 250	μA
$I_{CEX(sus)}$	Collector-emitter sustaining current	$V_{CLAMP} = V_{(BR)CEO}$				7			A
I_{EBO}	Emitter cut-off current	V_{EB} = 8 V	I_C = 0					15	mA
h_{FE}	Forward current transfer ratio	V_{CE} = 5 V V_{CE} = 5 V V_{CE} = 5 V	I_C = 2.5 A I_C = 5A I_C = 7 A	(see Notes 4 and 5)		150 50 15			
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_B = 10 mA I_B = 100 mA I_B = 250 mA	I_C = 1 A I_C = 2 A I_C = 5 A	(see Notes 4 and 5)				1.5 1.5 2	V
$V_{BE(sat)}$	Base-emitter saturation voltage	I_B = 100 mA I_B = 250 mA	I_C = 2 A I_C = 5 A	(see Notes 4 and 5)				2.2 2.3	V
V_{EC}	Parallel diode forward voltage	I_E = 7 A	I_B = 0	(see Notes 4 and 5)				3.5	V
h_{fe}	Small signal forward current transfer ratio	V_{CE} = 5 V	I_C = 0.5 A	f = 1 kHz		200			
$\|h_{fe}\|$	Small signal forward current transfer ratio	V_{CE} = 5 V	I_C = 0.5 A	f = 1 MHz		10			
C_{ob}	Output capacitance	V_{CB} = 10 V	I_E = 0	f = 1 MHz				100	pF

NOTES: 4. These parameters must be measured using pulse techniques, t_p = 300 μs, duty cycle ≤ 2%.
5. These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

thermal characteristics

PARAMETER		MIN	TYP	MAX	UNIT
$R_{\theta JC}$	Junction to case thermal resistance			1.56	°C/W
$R_{\theta JA}$	Junction to free air thermal resistance			62.5	°C/W
$C_{\theta C}$	Thermal capacitance of case		0.9		J/°C

inductive-load-switching characteristics at 25°C case temperature

PARAMETER		TEST CONDITIONS †	MIN	TYP	MAX	UNIT
t_{sv}	Voltage storage time	I_C = 5 A, $V_{(clamp)} = V_{(BR)CEO}$, $I_{B(on)}$ = 250 mA, R_{BE} = 47 Ω		3.9		μs
t_{si}	Current storage time			4.7		μs
t_{rv}	Voltage transition time			1.2		μs
t_{ti}	Current transition time			1.2		μs
t_{xo}	Cross-over time			2.0		μs

† Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

PARAMETER MEASUREMENT INFORMATION

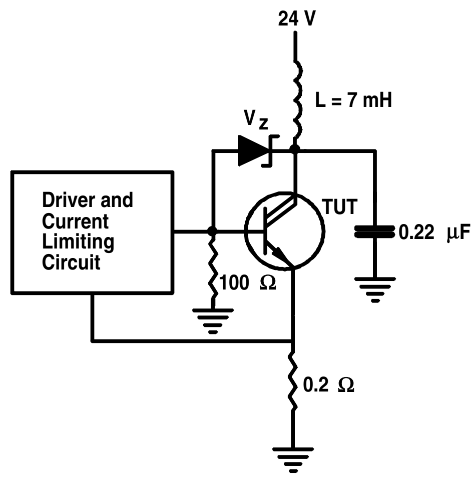


Figure 1. Functional Test Circuit

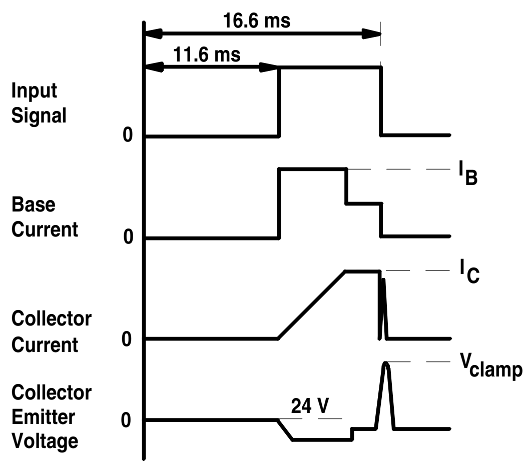


Figure 2. Functional Test Waveforms

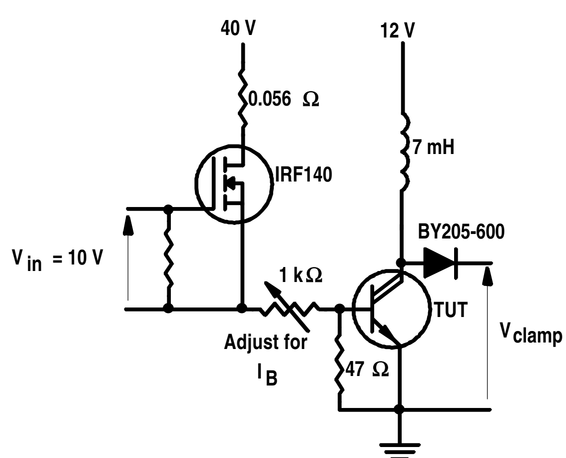


Figure 3. Switching Test Circuit

TYPICAL CHARACTERISTICS

TYPICAL DC CURRENT GAIN vs COLLECTOR CURRENT

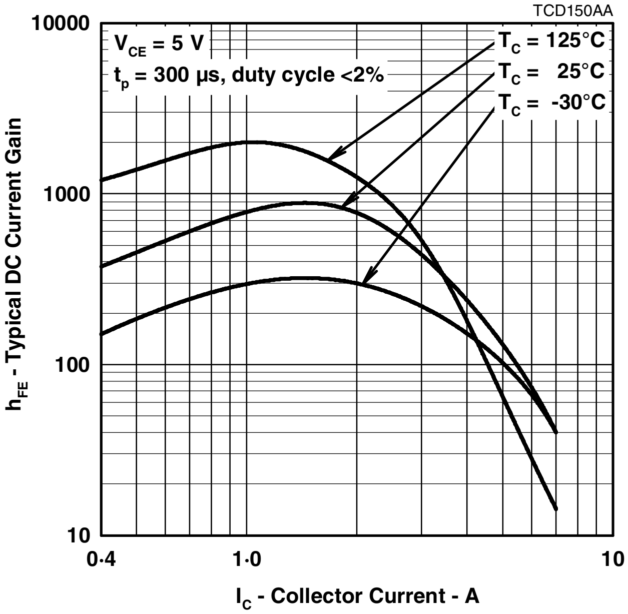


Figure 4.

COLLECTOR-EMITTER SATURATION VOLTAGE vs COLLECTOR CURRENT

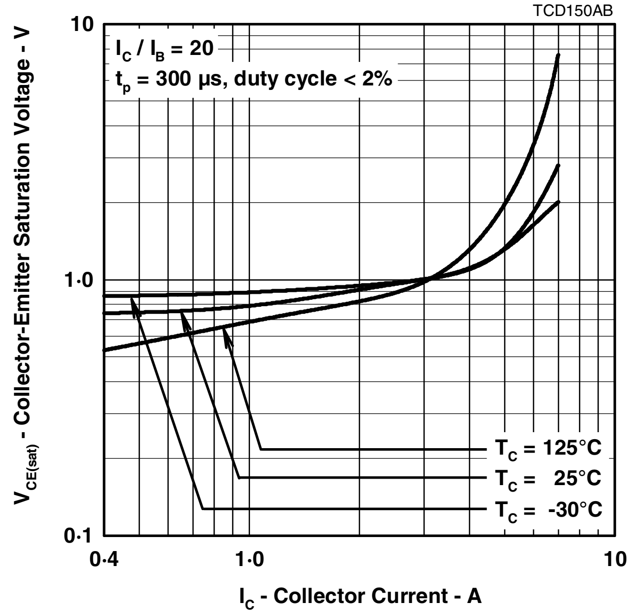


Figure 5.

BASE-EMITTER SATURATION VOLTAGE vs COLLECTOR CURRENT

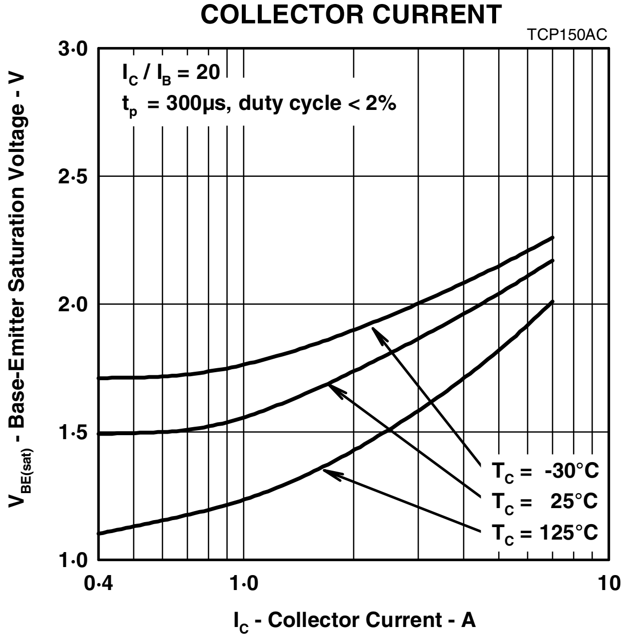


Figure 6.

COLLECTOR CUT-OFF CURRENT vs CASE TEMPERATURE

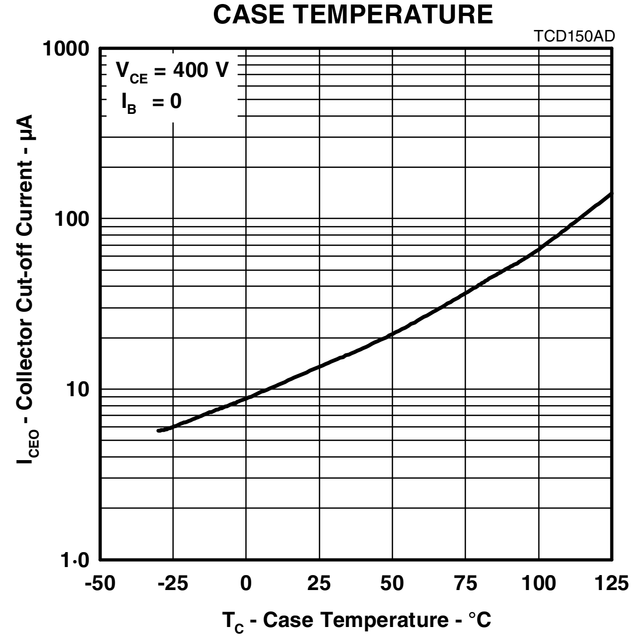


Figure 7.

MAXIMUM SAFE OPERATING REGIONS

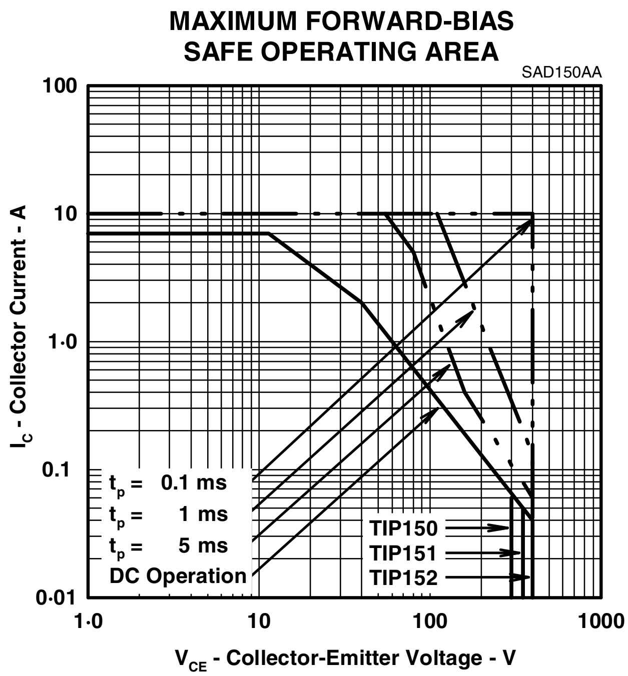


Figure 8.

THERMAL INFORMATION

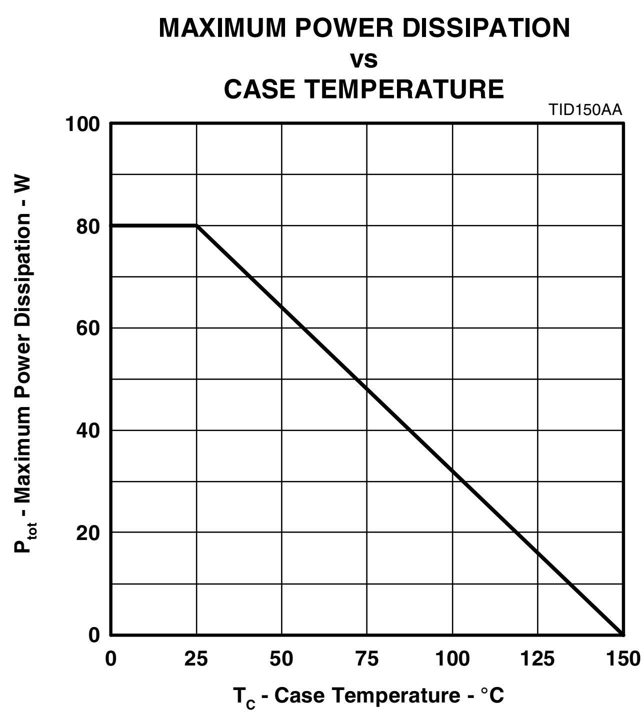


Figure 9.