

TIP150, TIP151, TIP152

NPN SILICON POWER DARLINGTONS

BOURNS®

electrical characteristics at 25°C case temperature

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

NOTES: 4. These parameters must be measured using pulse techniques, $t_p = 300 \mu\text{s}$, duty cycle $\leq 2\%$.

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	$^{\circ}\text{C/W}$
$R_{\theta JA}$ Junction to free air thermal resistance			62.5	$^{\circ}\text{C/W}$
$C_{\theta C}$ Thermal capacitance of case		0.9		J/ $^{\circ}\text{C}$

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

PARAMETER	TEST CONDITIONS [†]	MIN	TYP	MAX	UNIT
t_{SV} Voltage storage time	$I_C = 5 \text{ A}$ $I_{B(on)} = 250 \text{ mA}$ $R_{BE} = 47 \Omega$ $V_{(clamp)} = V_{(BR)CEO}$		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.

PRODUCT INFORMATION

JUNE 1973 - REVISED SEPTEMBER 2002

Specifications are subject to change without notice.

PARAMETER MEASUREMENT INFORMATION

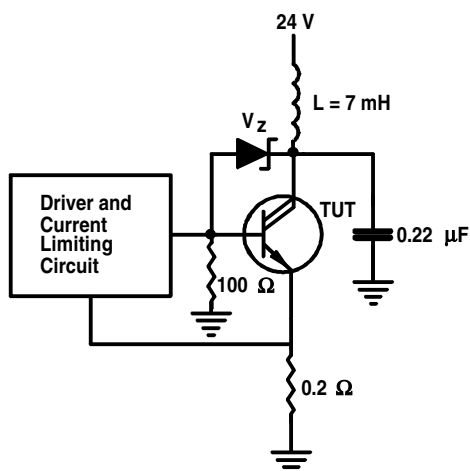


Figure 1. Functional Test Circuit

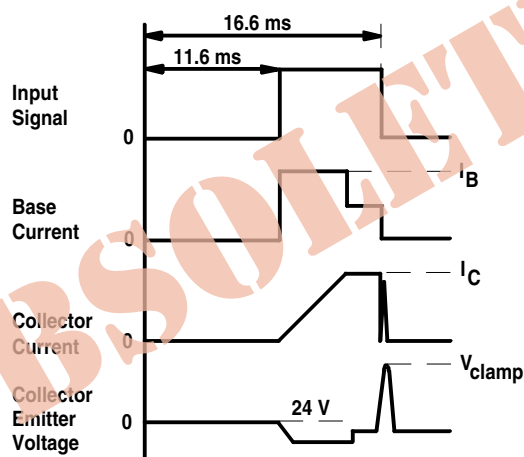


Figure 2. Functional Test Waveforms

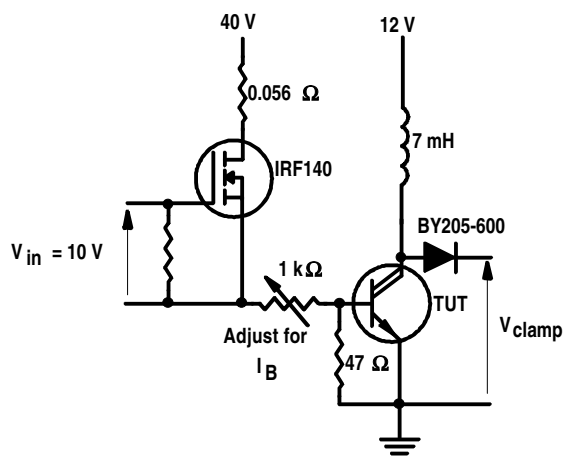


Figure 3. Switching Test Circuit

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TYPICAL CHARACTERISTICS

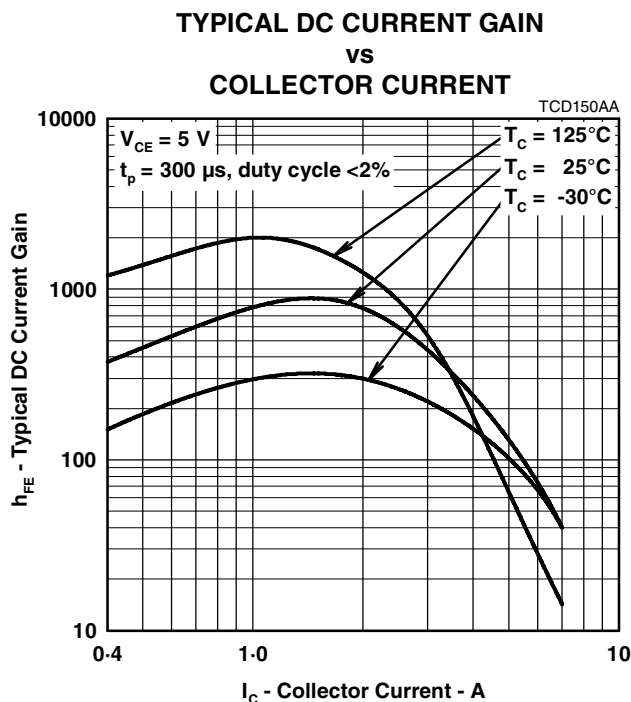


Figure 4.

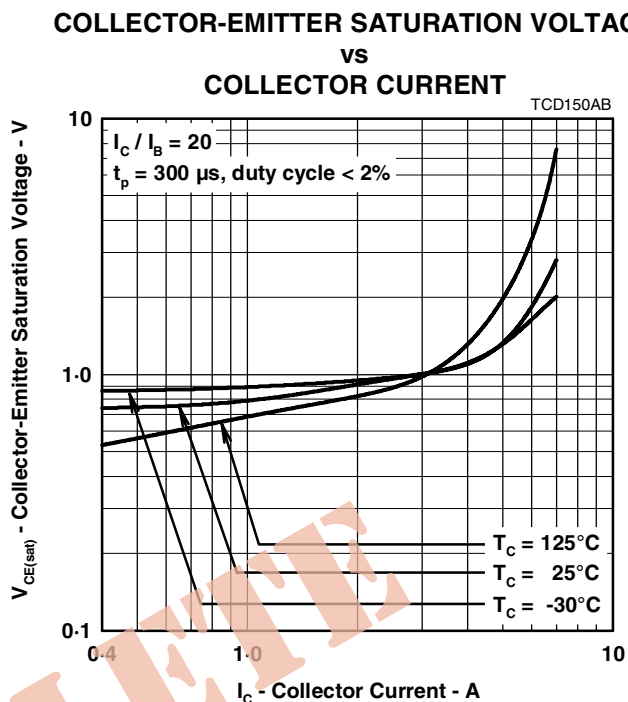


Figure 5.

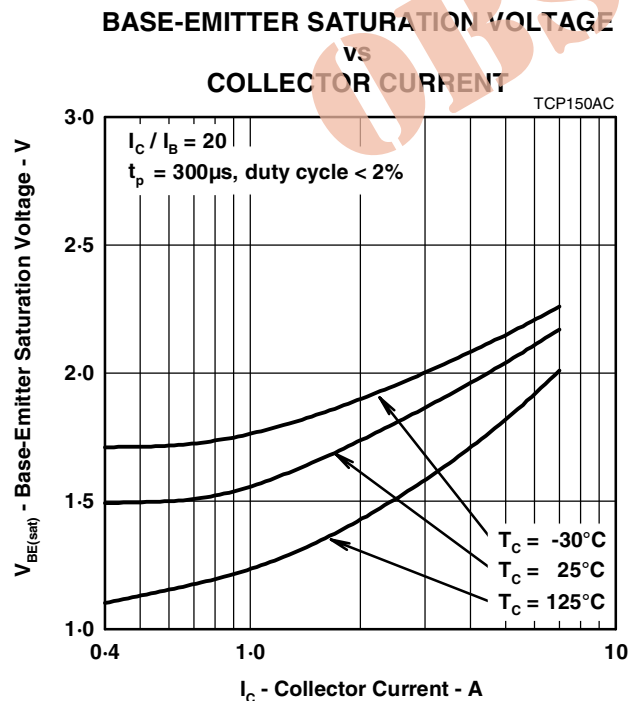


Figure 6.

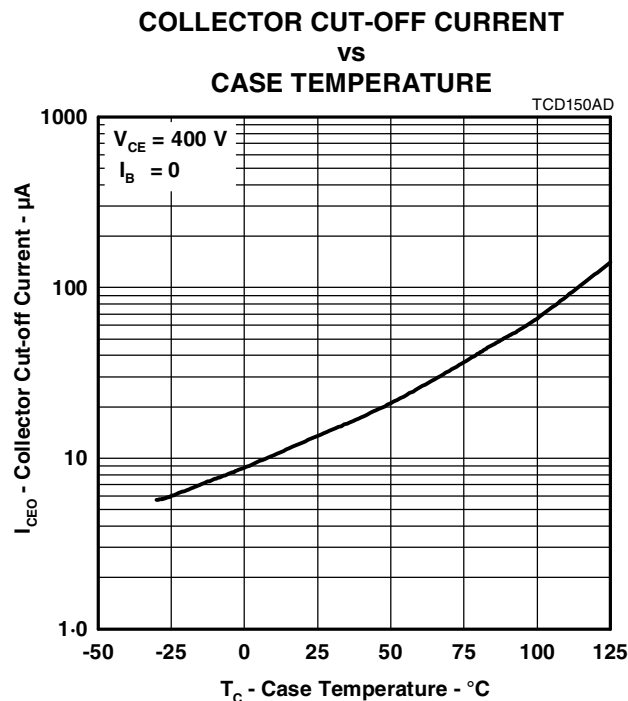


Figure 7.

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MAXIMUM SAFE OPERATING REGIONS

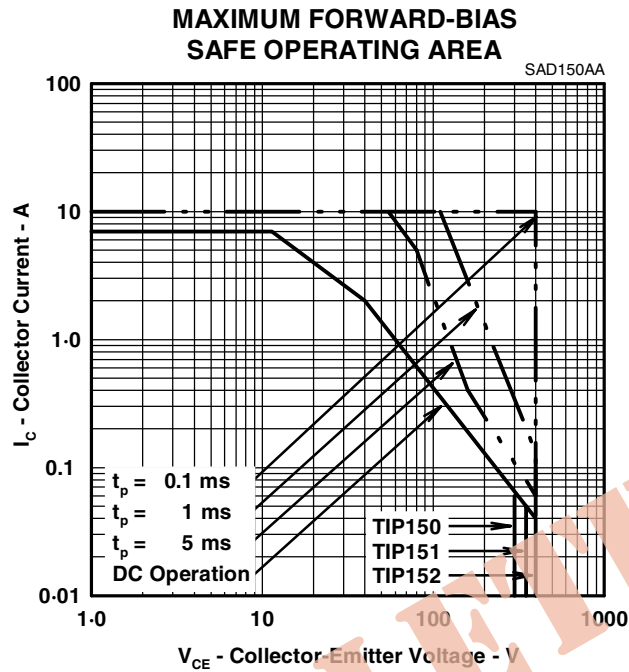


Figure 8.

THERMAL INFORMATION

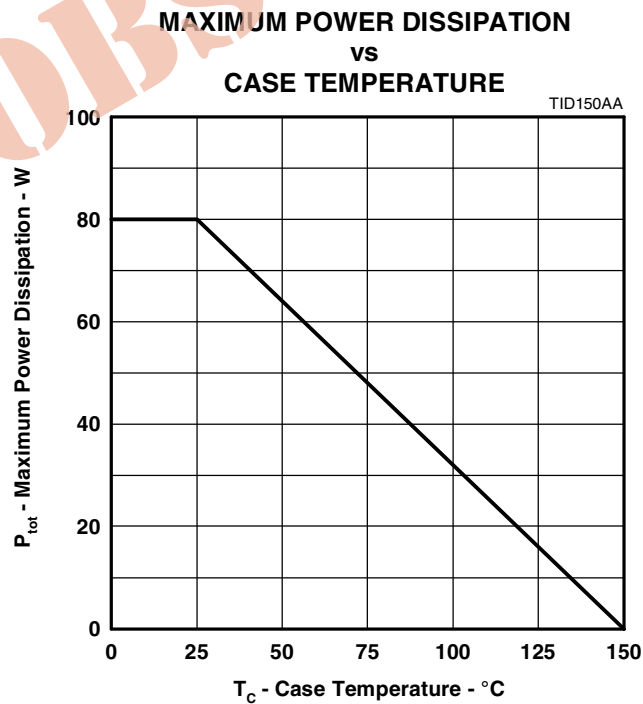


Figure 9.

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