

TIP120, TIP121, TIP122

NPN SILICON POWER DARLINGTONS

BOURNS®

electrical characteristics at 25°C case temperature

PARAMETER	TEST CONDITIONS			MIN	TYP	MAX	UNIT
$V_{(BR)CEO}$ Collector-emitter breakdown voltage	$I_C = 30 \text{ mA}$ (see Note 5)	$I_B = 0$	TIP120 TIP121 TIP122	60 80 100			V
I_{CEO} Collector-emitter cut-off current	$V_{CE} = 30 \text{ V}$ $V_{CE} = 40 \text{ V}$ $V_{CE} = 50 \text{ V}$	$I_B = 0$ $I_B = 0$ $I_B = 0$	TIP120 TIP121 TIP122			0.5 0.5 0.5	mA
I_{CBO} Collector cut-off current	$V_{CB} = 60 \text{ V}$ $V_{CB} = 80 \text{ V}$ $V_{CB} = 100 \text{ V}$	$I_E = 0$ $I_E = 0$ $I_E = 0$	TIP120 TIP121 TIP122			0.2 0.2 0.2	mA
I_{EBO} Emitter cut-off current	$V_{EB} = 5 \text{ V}$	$I_C = 0$				2	mA
h_{FE} Forward current transfer ratio	$V_{CE} = 3 \text{ V}$ $V_{CE} = 3 \text{ V}$	$I_C = 0.5 \text{ A}$ $I_C = 3 \text{ A}$	(see Notes 5 and 6)	1000 1000			
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_B = 12 \text{ mA}$ $I_B = 20 \text{ mA}$	$I_C = 3 \text{ A}$ $I_C = 5 \text{ A}$	(see Notes 5 and 6)			2 4	V
V_{BE} Base-emitter voltage	$V_{CE} = 3 \text{ V}$	$I_C = 3 \text{ A}$	(see Notes 5 and 6)			2.5	V
V_{EC} Parallel diode forward voltage	$I_E = 5 \text{ A}$	$I_B = 0$	(see Notes 5 and 6)			3.5	V

NOTES: 5. These parameters must be measured using pulse techniques, $t_p = 300 \mu\text{s}$, duty cycle $\leq 2\%$.

6. 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			1.92	°C/W
$R_{\theta JA}$ Junction to free air thermal resistance			62.5	°C/W

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

PARAMETER	TEST CONDITIONS †			MIN	TYP	MAX	UNIT
t_{on} Turn-on time	$I_C = 3 \text{ A}$	$I_{B(on)} = 12 \text{ mA}$	$I_{B(off)} = -12 \text{ mA}$		1.5		μs
t_{off} Turn-off time	$V_{BE(off)} = -5 \text{ V}$	$R_L = 10 \Omega$	$t_p = 20 \mu\text{s}$, $dc \leq 2\%$		8.5		μs

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

PRODUCT INFORMATION

DECEMBER 1971 - REVISED SEPTEMBER 2002
Specifications are subject to change without notice.

TYPICAL CHARACTERISTICS

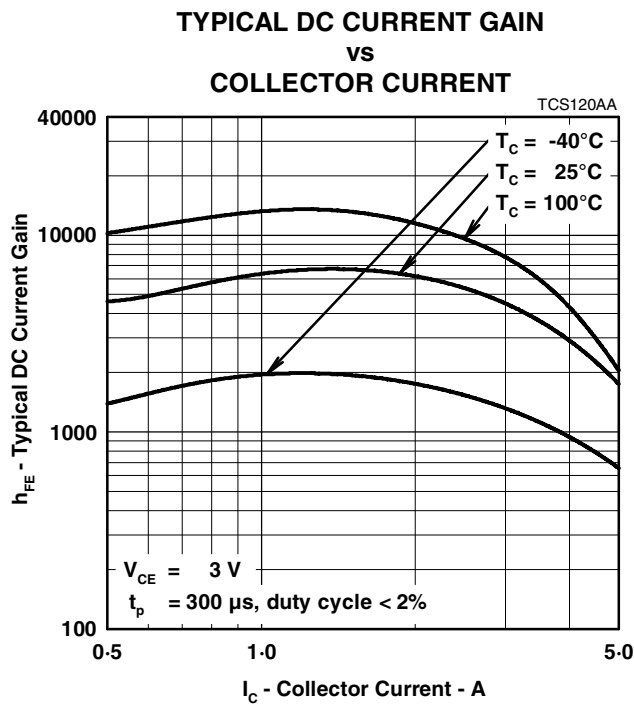


Figure 1.

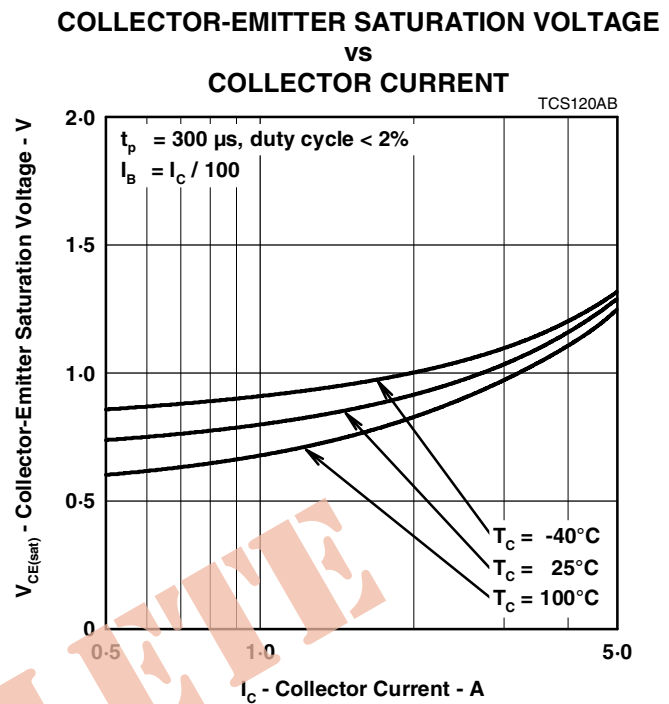


Figure 2.

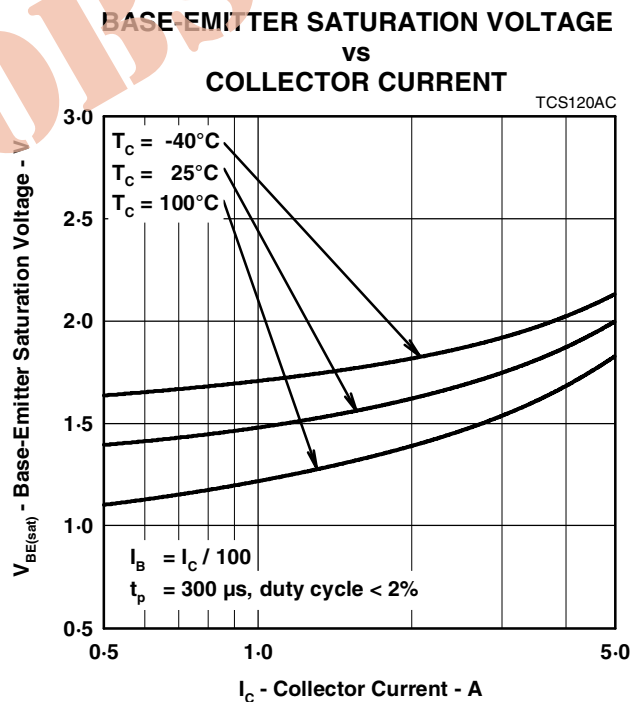


Figure 3.

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MAXIMUM SAFE OPERATING REGIONS

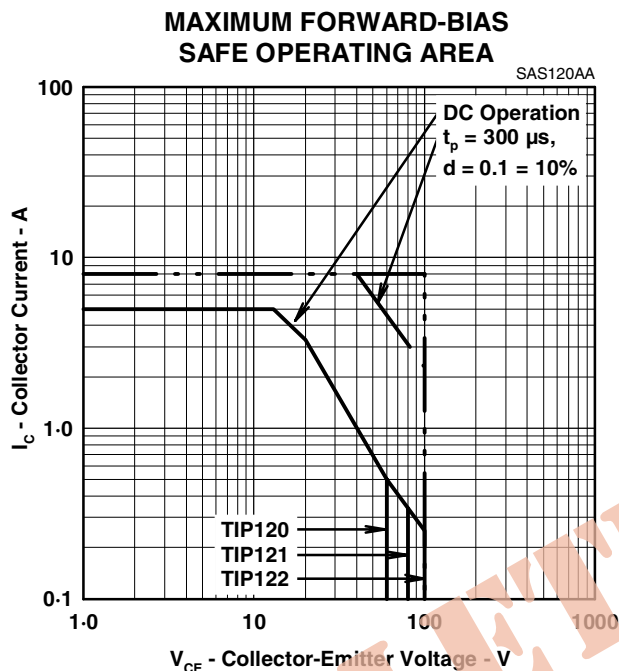


Figure 4.

THERMAL INFORMATION

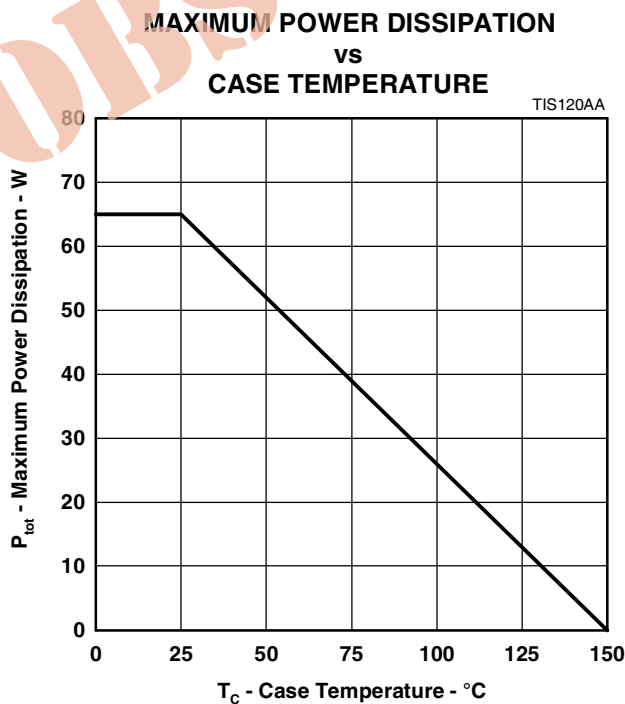


Figure 5.

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