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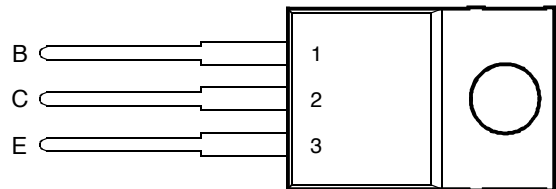


TIP29, TIP29A, TIP29B, TIP29C NPN SILICON POWER TRANSISTORS

BOURNS®

- Designed for Complementary Use with the TIP30 Series
- 30 W at 25°C Case Temperature
- 1 A Continuous Collector Current
- 3 A Peak Collector Current
- Customer-Specified Selections Available

TO-220 PACKAGE
(TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

MDTRACA



This series is obsolete and not recommended for new designs.

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

RATING		SYMBOL	VALUE	UNIT
Collector-base voltage ($I_E = 0$)	TIP29	V_{CB0}	80	V
	TIP29A		100	
	TIP29B		120	
	TIP29C		140	
Collector-emitter voltage ($I_B = 0$)	TIP29	V_{CEO}	40	V
	TIP29A		60	
	TIP29B		80	
	TIP29C		100	
Emitter-base voltage		V_{EBO}	5	V
Continuous collector current		I_C	1	A
Peak collector current (see Note 1)		I_{CM}	3	A
Continuous base current		I_B	0.4	A
Continuous device dissipation at (or below) 25°C case temperature (see Note 2)		P_{tot}	30	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 3)		P_{tot}	2	W
Unclamped inductive load energy (see Note 4)		$\frac{1}{2}LI_C^2$	32	mJ
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	250	°C

NOTES: 1. This value applies for $t_p \leq 0.3$ ms, duty cycle $\leq 10\%$.

2. Derate linearly to 150°C case temperature at the rate of 0.24 W/°C.

3. Derate linearly to 150°C free air temperature at the rate of 16 mW/°C.

4. This rating is based on the capability of the transistor to operate safely in a circuit of: $L = 20$ mH, $I_{B(on)} = 0.4$ A, $R_{BE} = 100 \Omega$, $V_{BE(off)} = 0$, $R_S = 0.1 \Omega$, $V_{CC} = 20$ V.

PRODUCT INFORMATION

JULY 1968 - REVISED SEPTEMBER 2002

Specifications are subject to change without notice.

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)	$I_B = 0$	TIP29	40			V
			TIP29A	60			
			TIP29B	80			
			TIP29C	100			
I_{CES} Collector-emitter cut-off current	$V_{CE} = 80 \text{ V}$	$V_{BE} = 0$	TIP29			0.2	mA
	$V_{CE} = 100 \text{ V}$	$V_{BE} = 0$	TIP29A			0.2	
	$V_{CE} = 120 \text{ V}$	$V_{BE} = 0$	TIP29B			0.2	
	$V_{CE} = 140 \text{ V}$	$V_{BE} = 0$	TIP29C			0.2	
I_{CEO} Collector cut-off current	$V_{CE} = 30 \text{ V}$	$I_B = 0$	TIP29/29A			0.3	mA
	$V_{CE} = 60 \text{ V}$	$I_B = 0$	TIP29B/29C			0.3	
I_{EBO} Emitter cut-off current	$V_{EB} = 5 \text{ V}$	$I_C = 0$				1	mA
h_{FE} Forward current transfer ratio	$V_{CE} = 4 \text{ V}$	$I_C = 0.2 \text{ A}$	(see Notes 5 and 6)	40			
	$V_{CE} = 4 \text{ V}$	$I_C = 1 \text{ A}$		15		75	
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_B = 125 \text{ mA}$	$I_C = 1 \text{ A}$	(see Notes 5 and 6)			0.7	V
V_{BE} Base-emitter voltage	$V_{CE} = 4 \text{ V}$	$I_C = 1 \text{ A}$	(see Notes 5 and 6)			1.3	V
h_{fe} Small signal forward current transfer ratio	$V_{CE} = 10 \text{ V}$	$I_C = 0.2 \text{ A}$	$f = 1 \text{ kHz}$	20			
$ h_{fe} $ Small signal forward current transfer ratio	$V_{CE} = 10 \text{ V}$	$I_C = 0.2 \text{ A}$	$f = 1 \text{ MHz}$	3			

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			4.17	°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	$I_C = 1 \text{ A}$	$I_{B(on)} = 0.1 \text{ A}$	$I_{B(off)} = -0.1 \text{ A}$		0.5		μs
t_{off} Turn-off time				$V_{BE(off)} = -4.3 \text{ V}$	$R_L = 30 \Omega$		2

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

TYPICAL CHARACTERISTICS

TYPICAL DC CURRENT GAIN
VS
COLLECTOR CURRENT

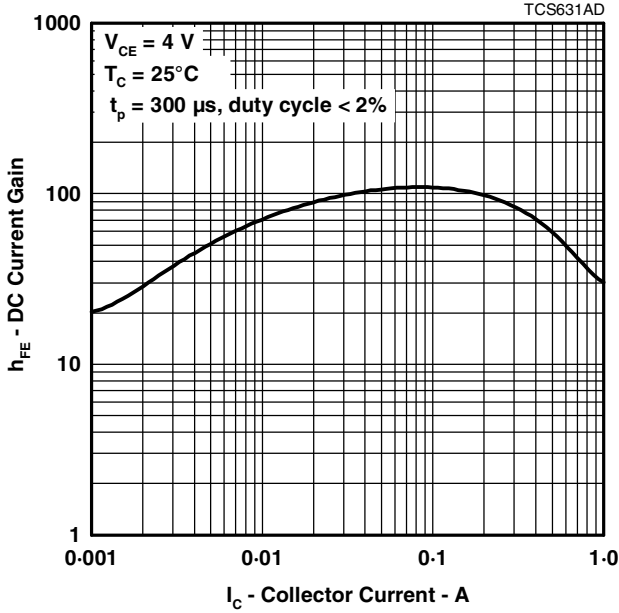


Figure 1.

COLLECTOR-EMITTER SATURATION VOLTAGE
VS
BASE CURRENT

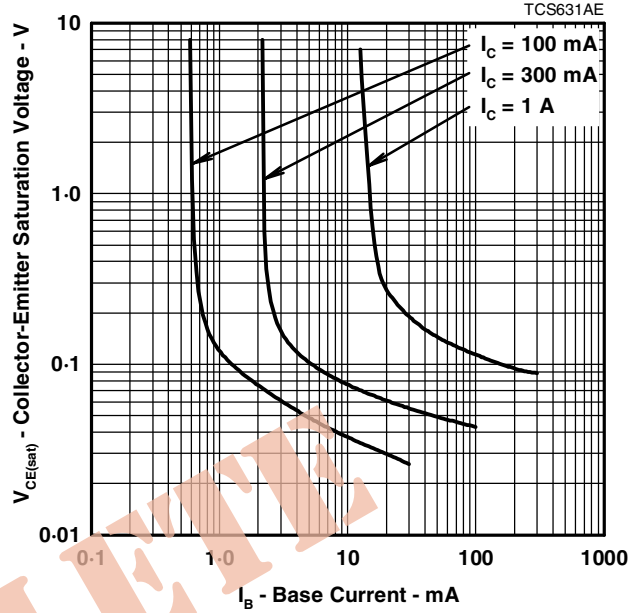


Figure 2.

BASE-EMITTER VOLTAGE
VS
COLLECTOR CURRENT

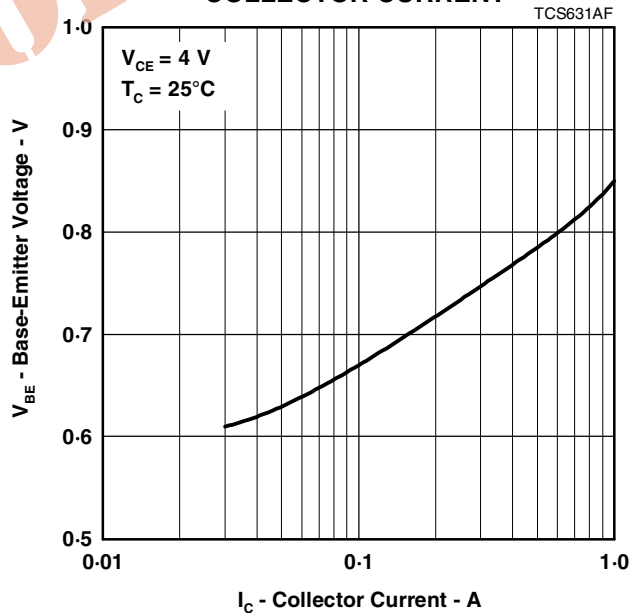
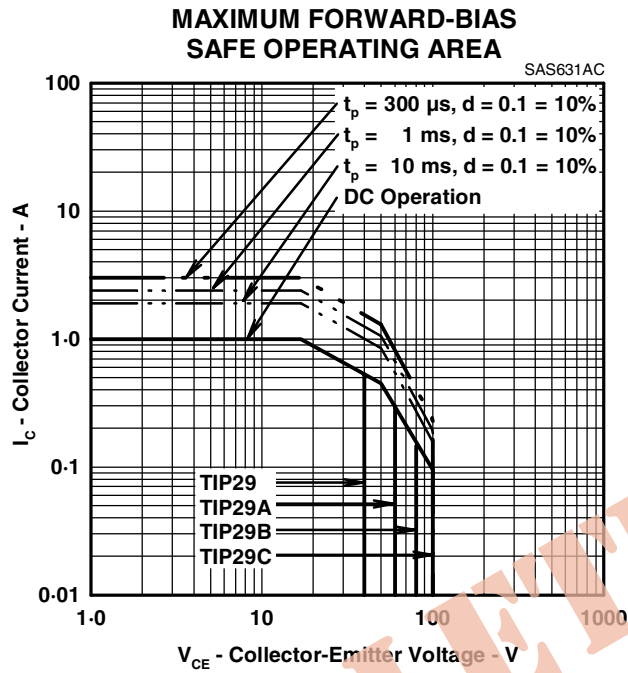


Figure 3.

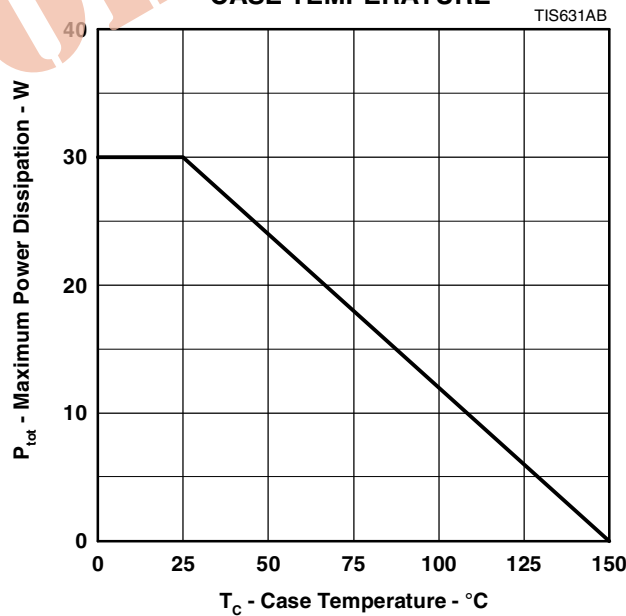
PRODUCT INFORMATION

MAXIMUM SAFE OPERATING REGIONS



THERMAL INFORMATION

**MAXIMUM POWER DISSIPATION
vs
CASE TEMPERATURE**



PRODUCT INFORMATION