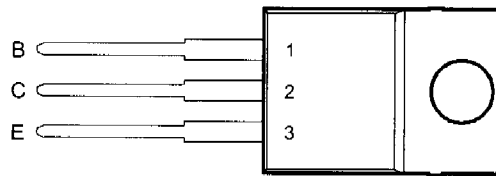


**TIP29, TIP29A, TIP29B, TIP29C  
NPN SILICON POWER TRANSISTORS**

- 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.

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

RATING		SYMBOL	VALUE	UNIT
Collector-base voltage ( $I_E = 0$ )	TIP29	$V_{CBO}$	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.



NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

## TIP29, TIP29A, TIP29B, TIP29C NPN SILICON POWER TRANSISTORS

### 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 TIP29A TIP29B TIP29C	40 60 80 100			V
$I_{CES}$ Collector-emitter cut-off current	$V_{CE} = 80 \text{ V}$ $V_{CE} = 100 \text{ V}$ $V_{CE} = 120 \text{ V}$ $V_{CE} = 140 \text{ V}$	$V_{BE} = 0$ $V_{BE} = 0$ $V_{BE} = 0$ $V_{BE} = 0$	TIP29 TIP29A TIP29B TIP29C			0.2 0.2 0.2 0.2	mA
$I_{CEO}$ Collector cut-off current	$V_{CE} = 30 \text{ V}$ $V_{CE} = 60 \text{ V}$	$I_B = 0$ $I_B = 0$	TIP29/29A TIP29B/29C			0.3 0.3	mA
$I_{EBO}$ Emitter cut-off current	$V_{EB} = 5 \text{ V}$	$I_C = 0$				1	mA
$h_{FE}$ Forward current transfer ratio	$V_{CE} = 4 \text{ V}$ $V_{CE} = 4 \text{ V}$	$I_C = 0.2 \text{ A}$ $I_C = 1 \text{ A}$	(see Notes 5 and 6)	40 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		$\mu\text{s}$
$t_{off}$ Turn-off time	$V_{BE(off)} = -4.3 \text{ V}$	$R_L = 30 \Omega$	$t_p = 20 \mu\text{s}$ , dc $\leq 2\%$		2		$\mu\text{s}$

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