



# THE DATASHEET OF TIP42C-S

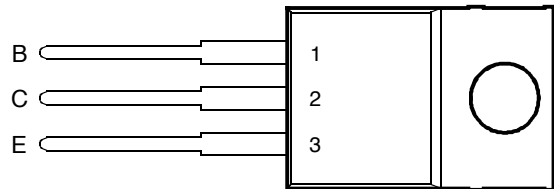


# TIP42, TIP42A, TIP42B, TIP42C PNP SILICON POWER TRANSISTORS

**BOURNS®**

- Designed for Complementary Use with the TIP41 Series
- 65 W at 25°C Case Temperature
- 6 A Continuous Collector Current
- 10 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This series is obsolete and not recommended for new designs.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 ( $I_E = 0$ )	TIP42	$V_{CB0}$	-80	V
	TIP42A		-100	
	TIP42B		-120	
	TIP42C		-140	
Collector-emitter voltage ( $I_B = 0$ )	TIP42	$V_{CEO}$	-40	V
	TIP42A		-60	
	TIP42B		-80	
	TIP42C		-100	
Emitter-base voltage		$V_{EBO}$	-5	V
Continuous collector current		$I_C$	-6	A
Peak collector current (see Note 1)		$I_{CM}$	-10	A
Continuous base current		$I_B$	-3	A
Continuous device dissipation at (or below) 25°C case temperature (see Note 2)		$P_{tot}$	65	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)		$\frac{1}{2}LI_C^2$	62.5	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 0.52 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

DECEMBER 1970 - REVISED SEPTEMBER 2002  
Specifications are subject to change without notice.

# TIP42, TIP42A, TIP42B, TIP42C

## PNP SILICON POWER TRANSISTORS

**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)	$I_B = 0$	TIP42 TIP42A TIP42B TIP42C	-40 -60 -80 -100			V
$I_{CES}$ Collector-emitter cut-off current	$V_{CE} = -80 \text{ V}$ $V_{CE} = -100 \text{ V}$ $V_{CE} = -120 \text{ V}$ $V_{CE} = -140 \text{ V}$	$V_{BE} = 0$ $V_{BE} = 0$ $V_{BE} = 0$ $V_{BE} = 0$	TIP42 TIP42A TIP42B TIP42C			-0.4 -0.4 -0.4 -0.4	mA
$I_{CEO}$ Collector cut-off current	$V_{CE} = -30 \text{ V}$ $V_{CE} = -60 \text{ V}$	$I_B = 0$ $I_B = 0$	TIP42/42A TIP42B/42C			-0.7 -0.7	mA
$I_{EBO}$ Emitter cut-off current	$V_{EB} = -5 \text{ V}$	$I_C = 0$				-1	mA
$h_{FE}$ Forward current transfer ratio	$V_{CE} = -4 \text{ V}$ $V_{CE} = -4 \text{ V}$	$I_C = -0.3 \text{ A}$ $I_C = -3 \text{ A}$	(see Notes 5 and 6)	30 15		75	
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_B = -0.6 \text{ A}$	$I_C = -6 \text{ A}$	(see Notes 5 and 6)			-1.5	V
$V_{BE}$ Base-emitter voltage	$V_{CE} = -4 \text{ V}$	$I_C = -6 \text{ A}$	(see Notes 5 and 6)			-2	V
$h_{fe}$ Small signal forward current transfer ratio	$V_{CE} = -10 \text{ V}$	$I_C = -0.5 \text{ A}$	$f = 1 \text{ kHz}$	20			
$ h_{fe} $ Small signal forward current transfer ratio	$V_{CE} = -10 \text{ V}$	$I_C = -0.5 \text{ A}$	$f = 1 \text{ MHz}$	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			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	$I_C = -6 \text{ A}$	$I_{B(on)} = -0.6 \text{ A}$	$I_{B(off)} = 0.6 \text{ A}$		0.4		$\mu\text{s}$
$t_{off}$ Turn-off time	$V_{BE(off)} = 4 \text{ V}$	$R_L = 5 \Omega$	$t_p = 20 \mu\text{s}$ , dc $\leq 2\%$		0.7		$\mu\text{s}$

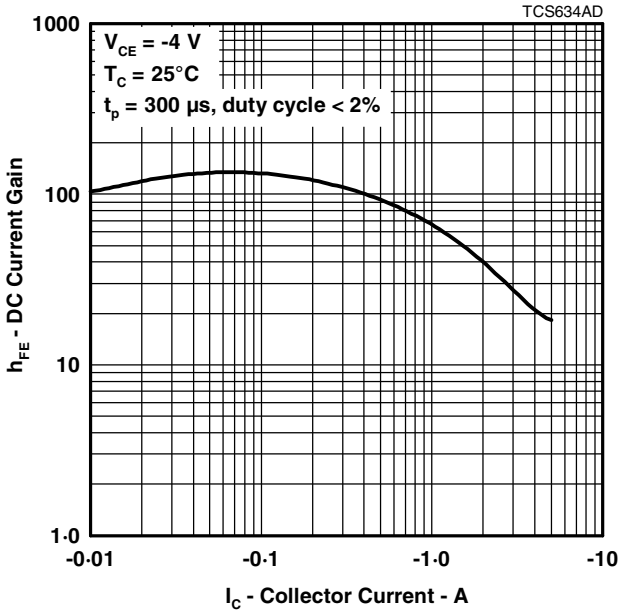
† Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

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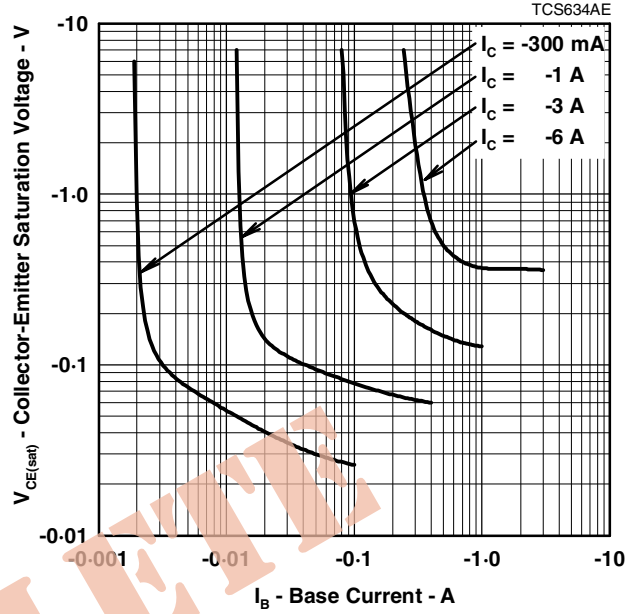
**TYPICAL CHARACTERISTICS**

**TYPICAL DC CURRENT GAIN  
vs  
COLLECTOR CURRENT**



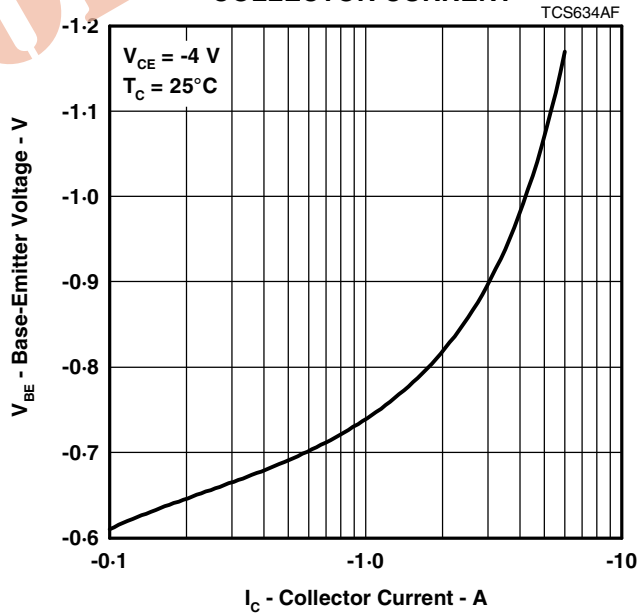
**Figure 1.**

**COLLECTOR-EMITTER SATURATION VOLTAGE  
vs  
BASE CURRENT**



**Figure 2.**

**BASE-EMITTER VOLTAGE  
vs  
COLLECTOR CURRENT**



**Figure 3.**

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**MAXIMUM SAFE OPERATING REGIONS**

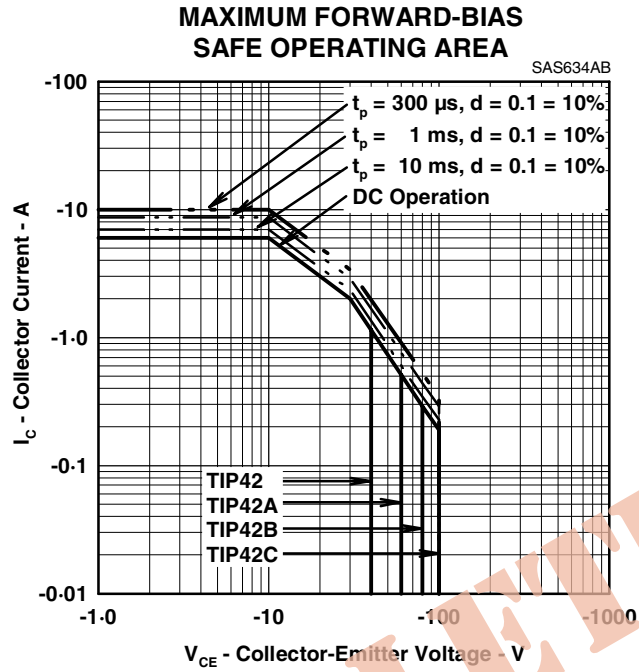


Figure 4.

**THERMAL INFORMATION**

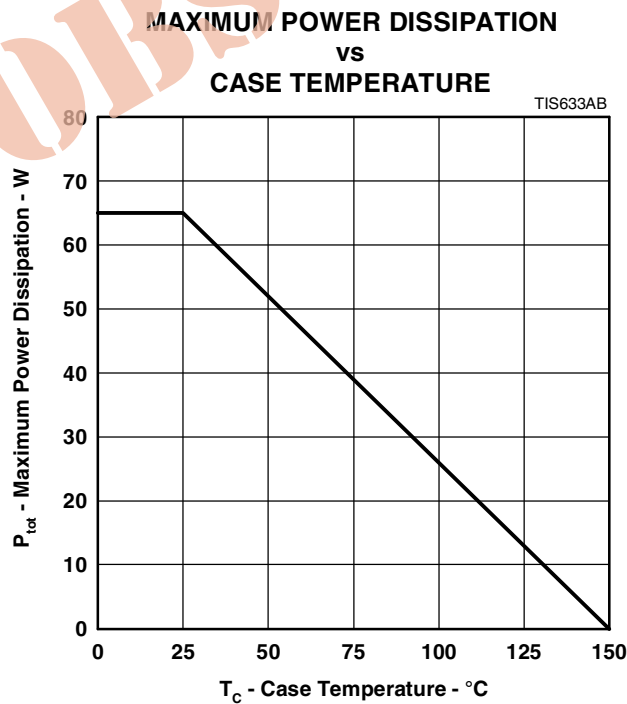


Figure 5.

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