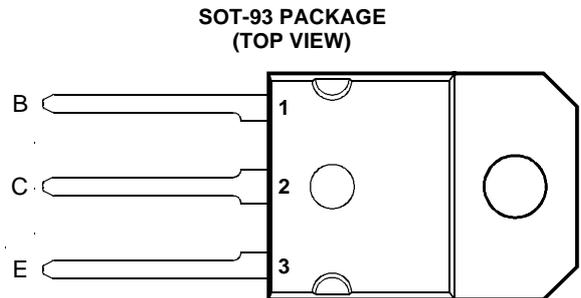


# TIP3055 NPN SILICON POWER TRANSISTOR

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DECEMBER 1970 - REVISED MARCH 1997

- **Designed for Complementary Use with the TIP2955 Series**
- **90 W at 25°C Case Temperature**
- **15 A Continuous Collector Current**
- **Customer-Specified Selections Available**



Pin 2 is in electrical contact with the mounting base.

MDTRAA

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

RATING	SYMBOL	VALUE	UNIT
Collector-base voltage ( $I_E = 0$ )	$V_{CB0}$	100	V
Collector-emitter voltage ( $I_B = 0$ ) (see Note 1)	$V_{CER}$	70	V
Emitter-base voltage	$V_{EBO}$	7	V
Continuous collector current	$I_C$	15	A
Continuous base current	$I_B$	7	A
Continuous device dissipation at (or below) 25°C case temperature (see Note 2)	$P_{tot}$	90	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 3)	$P_{tot}$	3.5	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	$T_L$	260	°C

- NOTES: 1. This value applies when the base-emitter resistance  $R_{BE} = 100 \Omega$ .  
 2. Derate linearly to 150°C case temperature at the rate of 0.72 W/°C.  
 3. Derate linearly to 150°C free air temperature at the rate of 28 mW/°C.  
 4. This rating is based on the capability of the transistor to operate safely in a circuit of:  $L = 20 \text{ mH}$ ,  $I_{B(on)} = 0.4 \text{ A}$ ,  $R_{BE} = 100 \Omega$ ,  $V_{BE(off)} = 0$ ,  $R_S = 0.1 \Omega$ ,  $V_{CC} = 10 \text{ V}$ .

## PRODUCT INFORMATION

Information is current as of publication date. Products conform to specifications in accordance with the terms of Power Innovations standard warranty. Production processing does not necessarily include testing of all parameters.



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### electrical characteristics at 25°C case temperature

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$V_{(BR)CEO}$	Collector-emitter breakdown voltage $I_C = 30 \text{ mA}$ $I_B = 0$ (see Note 5)	60			V
$I_{CER}$	Collector-emitter cut-off current $V_{CE} = 70 \text{ V}$ $R_{BE} = 100 \Omega$			1	mA
$I_{CEO}$	Collector cut-off current $V_{CE} = 30 \text{ V}$ $I_B = 0$			0.7	mA
$I_{CEV}$	Voltage between base and emitter $V_{CE} = 100 \text{ V}$ $V_{BE} = -1.5 \text{ V}$			5	mA
$I_{EBO}$	Emitter cut-off current $V_{EB} = 7 \text{ V}$ $I_C = 0$			5	mA
$h_{FE}$	Forward current transfer ratio $V_{CE} = 4 \text{ V}$ $I_C = 4 \text{ A}$ (see Notes 5 and 6) $V_{CE} = 4 \text{ V}$ $I_C = 10 \text{ A}$	20 5		70	
$V_{CE(sat)}$	Collector-emitter saturation voltage $I_B = 0.4 \text{ A}$ $I_C = 4 \text{ A}$ (see Notes 5 and 6) $I_B = 3.3 \text{ A}$ $I_C = 10 \text{ A}$			1.1 3	V
$V_{BE}$	Base-emitter voltage $V_{CE} = 4 \text{ V}$ $I_C = 4 \text{ A}$ (see Notes 5 and 6)			1.8	V
$h_{fe}$	Small signal forward current transfer ratio $V_{CE} = 10 \text{ V}$ $I_C = 0.5 \text{ A}$ $f = 1 \text{ kHz}$	15			
$ 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			1.39	°C/W
$R_{\theta JA}$ Junction to free air thermal resistance			35.7	°C/W

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

PARAMETER	TEST CONDITIONS †	MIN	TYP	MAX	UNIT
$t_{on}$ Turn-on time	$I_C = 6 \text{ A}$ $I_{B(on)} = 0.6 \text{ A}$ $I_{B(off)} = -0.6 \text{ A}$		0.6		$\mu\text{s}$
$t_{off}$ Turn-off time	$V_{BE(off)} = -4 \text{ V}$ $R_L = 5 \Omega$ $t_p = 20 \mu\text{s}$ , dc $\leq 2\%$		1		$\mu\text{s}$

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

TYPICAL CHARACTERISTICS

TYPICAL DC CURRENT GAIN  
vs  
COLLECTOR CURRENT

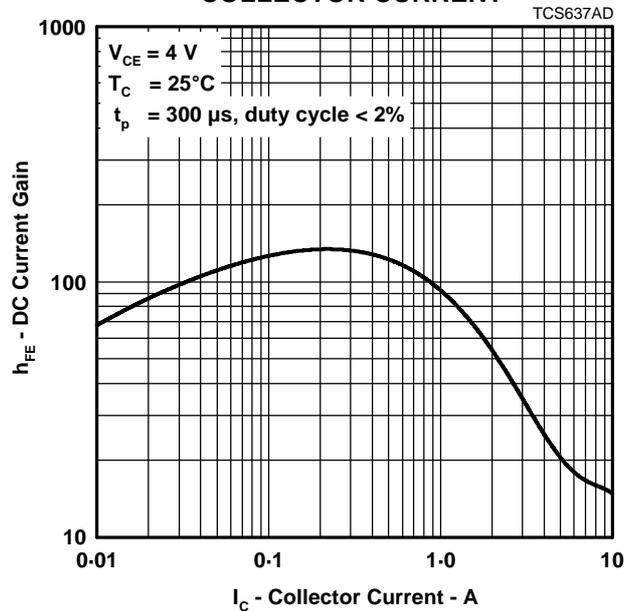


Figure 1.

MAXIMUM SAFE OPERATING REGIONS

MAXIMUM FORWARD-BIAS  
SAFE OPERATING AREA

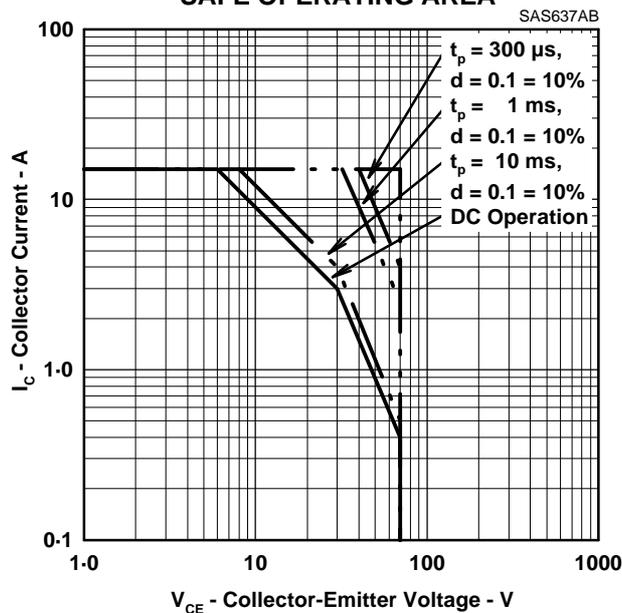


Figure 2.

# TIP3055 NPN SILICON POWER TRANSISTOR

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## THERMAL INFORMATION

### MAXIMUM POWER DISSIPATION VS CASE TEMPERATURE

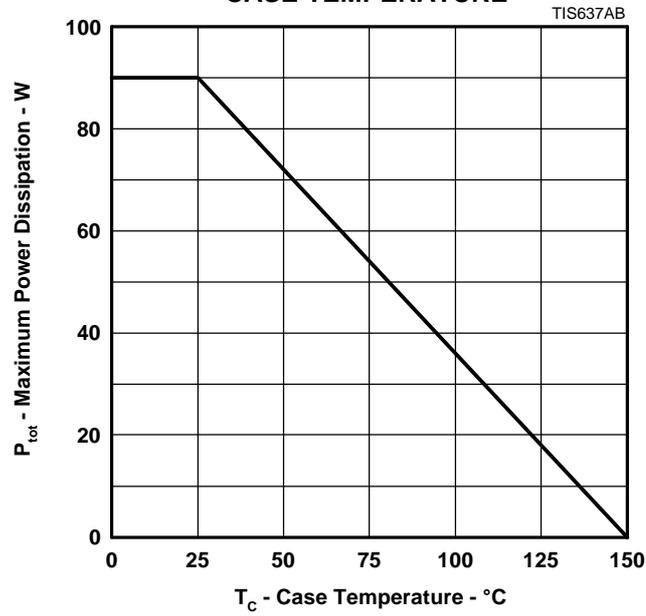


Figure 3.



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PRODUCT INFORMATION