

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		μs
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		μs

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

TYPICAL CHARACTERISTICS

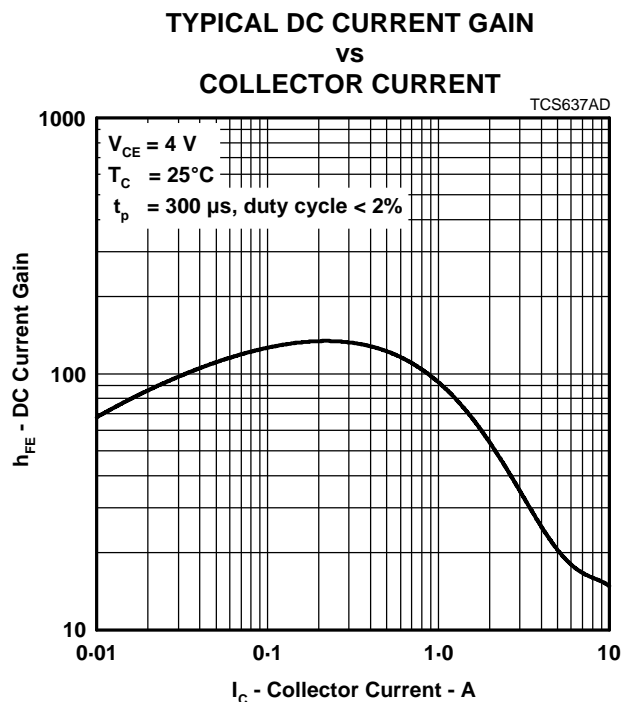


Figure 1.

MAXIMUM SAFE OPERATING REGIONS

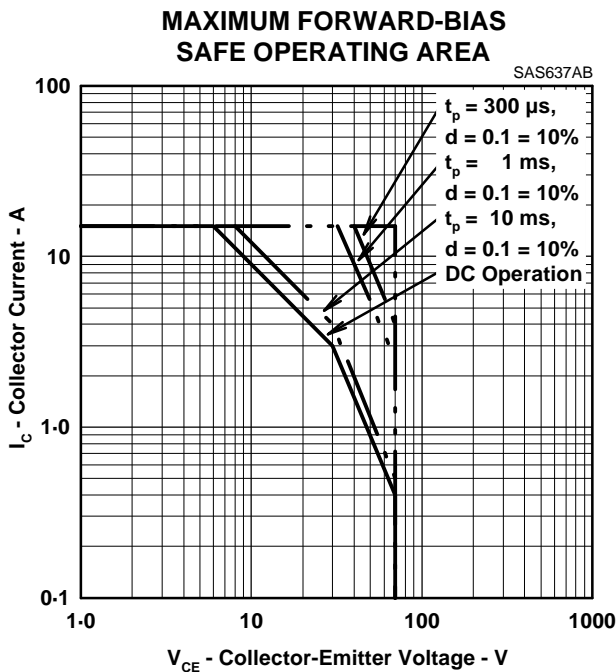


Figure 2.

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THERMAL INFORMATION

MAXIMUM POWER DISSIPATION VS CASE TEMPERATURE

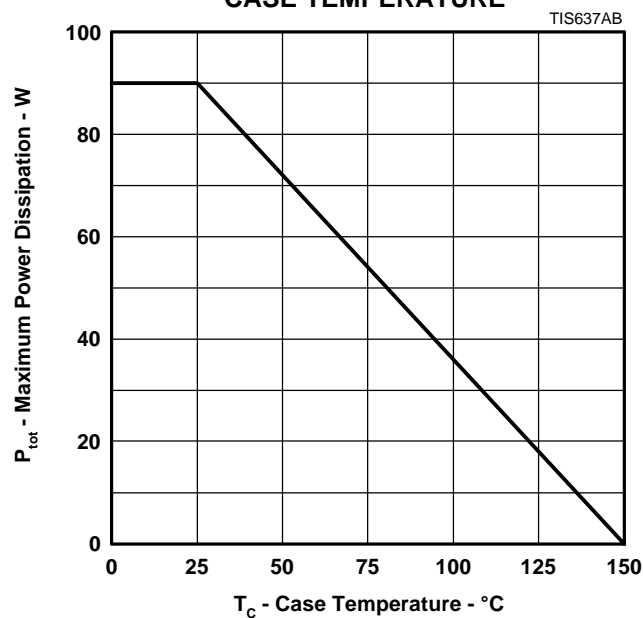


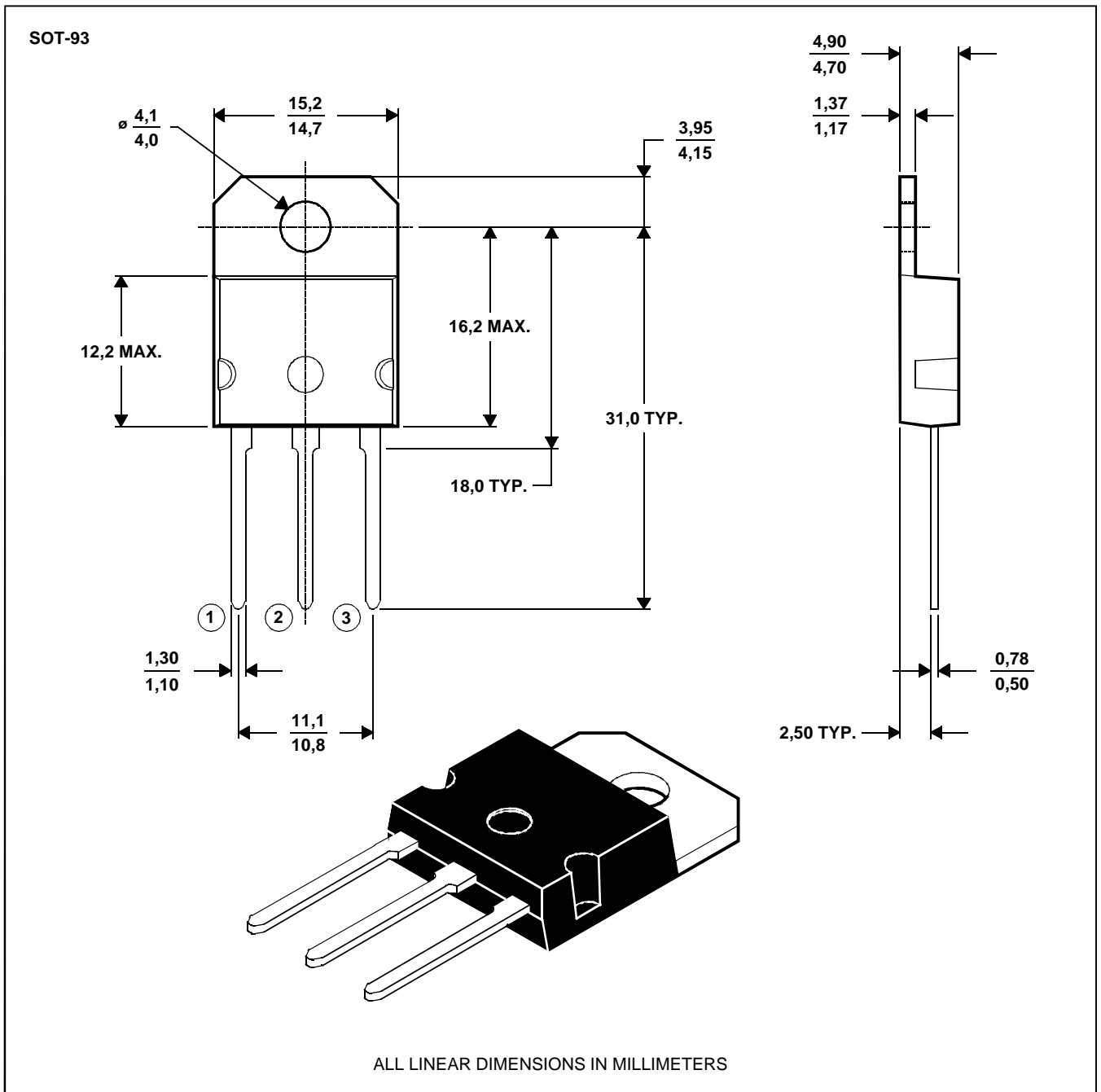
Figure 3.

MECHANICAL DATA

SOT-93

3-pin plastic flange-mount package

This single-in-line package consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.



NOTE A: The centre pin is in electrical contact with the mounting tab.

MDXXAW

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