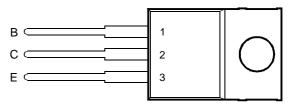
- Designed for Complementary Use with TIP100, TIP101 and TIP102
- 80 W at 25°C Case Temperature
- 8 A Continuous Collector Current
- Maximum V<sub>CE(sat)</sub> of 2.5 V at I<sub>C</sub> = 8 A

# TO-220 PACKAGE (TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

MDTRACA

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

RATING			VALUE	UNIT
	TIP105		-60	
Collector-base voltage (I <sub>E</sub> = 0)	TIP106	$V_{CBO}$	-80	V
	TIP107		-100	
	TIP105		-60	
Collector-emitter voltage (I <sub>B</sub> = 0)	TIP106	V <sub>CEO</sub>	-80	V
	TIP107		-100	
Emitter-base voltage			-5	V
Continuous collector current			-8	Α
Peak collector current (see Note 1)			-15	Α
Continuous base current			-1	Α
Continuous device dissipation at (or below) 25°C case temperature (see Note 2)			80	W
Continuous device dissipation at (or below) 25°C free air temperature (see Note 3)			2	W
Unclamped inductive load energy (see Note 4)			10	mJ
Operating junction temperature range			-65 to +150	°C
Storage temperature range			-65 to +150	°C
Lead temperature 3.2 mm from case for 10 seconds			260	°C

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

- 2. Derate linearly to 150°C case temperature at the rate of 0.64 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,  $I_{B(on)}$  = -5 mA,  $R_{BE}$  = 100  $\Omega$ ,  $V_{BE(off)}$  = 0,  $R_S$  = 0.1  $\Omega$ ,  $V_{CC}$  = -20 V.

# TIP105, TIP106, TIP107 PNP SILICON POWER DARLINGTONS

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# electrical characteristics at 25°C case temperature

PARAMETER			TEST CONDIT	IONS	MIN	TYP	MAX	UNIT
	Collector-emitter			TIP105	-60			
V <sub>(BR)CEO</sub>	breakdown voltage	$I_C = -30 \text{ mA}$	$I_B = 0$	TIP106	-80			V
	breakdown voltage	(see Note 5)		TIP107	-100			
	Collector-emitter	V <sub>CE</sub> = -30 V	I <sub>B</sub> = 0	TIP105			-50	
I <sub>CEO</sub>	cut-off current	$V_{CE} = -40 \text{ V}$	$I_B = 0$	TIP106			-50	μΑ
		V <sub>CE</sub> = -50 V	$I_B = 0$	TIP107			-50	
	Collector cut-off	V <sub>CB</sub> = -60 V	I <sub>E</sub> = 0	TIP105			-50	
I <sub>CBO</sub>	current	$V_{CB} = -80 \text{ V}$	$I_E = 0$	TIP106			-50	μΑ
	Current	V <sub>CB</sub> = -100 V	$I_E = 0$	TIP107			-50	
I <sub>EBO</sub>	Emitter cut-off	V <sub>EB</sub> = -5 V	$I_C = 0$				-8	mA
,EBO	current	AER - OA	10 - 0				J	1117 (
h <sub>FE</sub>	Forward current	V <sub>CE</sub> = -4 V	$I_C = -3 A$	(see Notes 5 and 6)	1000		20000	
"FE	transfer ratio	V <sub>CE</sub> = -4 V	$I_{C} = -8 \text{ A}$		200			
V <sub>CE(sat)</sub>	Collector-emitter	$I_B = -6 \text{ mA}$	$I_C = -3 A$	(see Notes 5 and 6)			-2	V
VCE(sat)	saturation voltage	$I_B = -80 \text{ mA}$	$I_{C} = -8 \text{ A}$	(See Notes o and o)			-2.5	v
V <sub>BE</sub>	Base-emitter	V <sub>CE</sub> = -4 V	$I_{\rm C} = -8 \text{ A}$	(see Notes 5 and 6)			-2.8	V
*BE	voltage	VGE4 V	10 - 0 A	(555 115153 5 and 6)			2.0	V
V <sub>EC</sub>	Parallel diode	I <sub>F</sub> = -8 A	I <sub>B</sub> = 0	(see Notes 5 and 6)			-3.5	V
	forward voltage		'R = 0	(555 115153 5 and 6)			0.0	V

NOTES: 5. These parameters must be measured using pulse techniques,  $t_p$  = 300  $\mu$ s, duty cycle  $\leq$  2%.

# thermal characteristics

	PARAMETER			TYP	MAX	UNIT
Ī	$R_{\theta JC}$	Junction to case thermal resistance			1.56	°C/W
Ī	$R_{\theta JA}$	Junction to free air thermal resistance			62.5	°C/W
	$C_{\theta C}$	Thermal capacitance of case		0.9		J/°C

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

PARAMETER		TEST CONDITIONS †			TYP	MAX	UNIT
t <sub>d</sub> Delay time					35		ns
t <sub>r</sub> Rise time	I <sub>C</sub> = -8 A	$I_{B(on)} = -80 \text{ mA}$	$I_{B(off)} = 80 \text{ mA}$		300		ns
t <sub>s</sub> Storage time	V <sub>BE(off)</sub> = 5 V	$R_L = 5 \Omega$	$t_p$ = 20 $\mu$ s, dc $\leq$ 2%		900		ns
t <sub>f</sub> Fall time					1.3		μs

<sup>&</sup>lt;sup>†</sup> Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

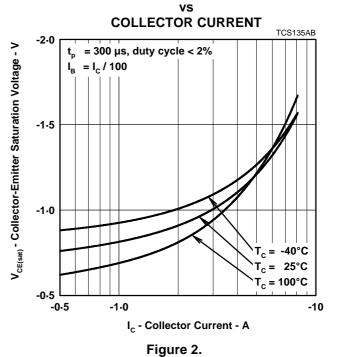
<sup>6.</sup> These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

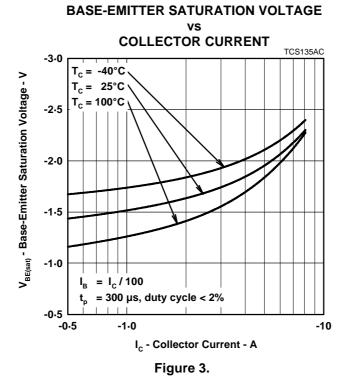
# TYPICAL CHARACTERISTICS

# TYPICAL DC CURRENT GAIN vs COLLECTOR CURRENT TCS135AA $T_{c} = -40^{\circ}\text{C}$ $T_{c} = 25^{\circ}\text{C}$ $T_{c} = 100^{\circ}\text{C}$ $T_{c} = 100^{\circ}\text{C}$ $V_{E} = -4 \text{ V}$ $t_{p} = 300 \text{ µs, duty cycle } < 2\%$ $I_{C} - \text{Collector Current - A}$

Figure 1.

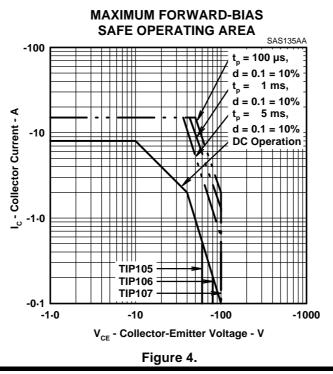
# **COLLECTOR-EMITTER SATURATION VOLTAGE**





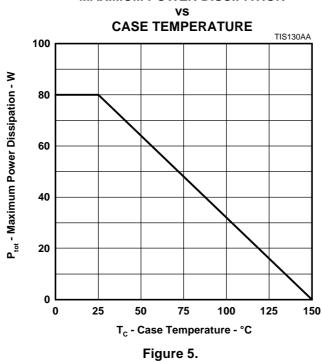


# **MAXIMUM SAFE OPERATING REGIONS**



# THERMAL INFORMATION

# **MAXIMUM POWER DISSIPATION**

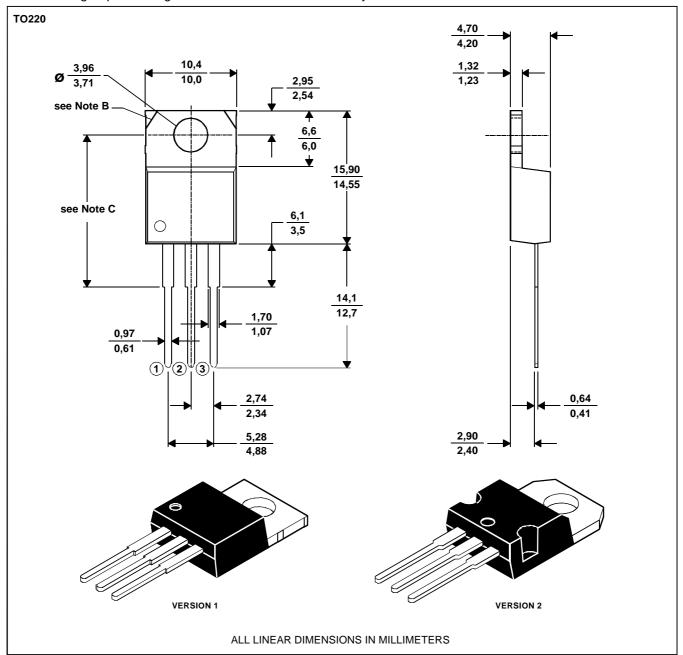


# **MECHANICAL DATA**

# **TO-220**

# 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.



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

B. Mounting tab corner profile according to package version.

C. Typical fixing hole centre stand off height according to package version. Version 1, 18.0 mm. Version 2, 17.6 mm. MDXXBE



# TIP105, TIP106, TIP107 PNP SILICON POWER DARLINGTONS

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