New Jersey Semi-Conductor Products, Inc.

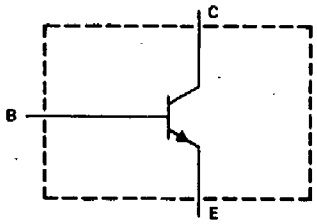
20 STERN AVE.
SPRINGFIELD, NEW JERSEY 07081
U.S.A.

TELEPHONE: (973) 376-2922
(212) 227-6005
FAX: (973) 376-8960

TIP55A, TIP56A, TIP57A, TIP58A
N-P-N SILICON POWER TRANSISTORS

- **Min $V_{(BR)CEO}$ of 250 V to 400 V**
- **50 W at 100°C Case Temperature**
- **10 A Peak Collector Current**
- **Designed for Automotive Ignition and Switching Regulator Applications**
- **Characterized For Operation In Ignition and Switching Regulator Applications**
- **High-Voltage, High Forward and Reverse Energy**

device schematic



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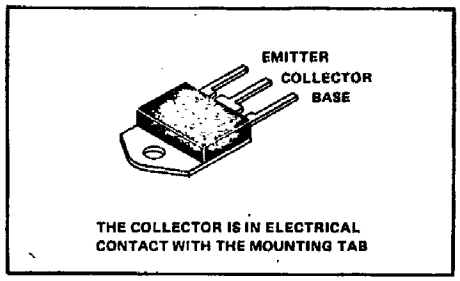

absolute maximum ratings at 25°C case temperature (unless otherwise noted)

	TIP55A	TIP56A	TIP57A	TIP58A
Collector-base voltage	350 V	400 V	450 V	500 V
Collector-emitter voltage (I_B = 0)	250 V	300 V	350 V	400 V
Emitter-base voltage	8 V	8 V	8 V	8 V
Continuous collector current	7.5 A			
Peak collector current (see Note 1)	10 A			
Continuous base current	4 A			
Safe operating area	See Figure 8			
Continuous device dissipation at (or below) 100°C case temperature (see Note 2)	50 W			
Continuous device dissipation at (or below) 25°C free-air temperature (see Note 3)	3 W			
Operating collector junction and storage temperature range	−65°C to 150°C			
Lead temperature 3,2 mm (0.125 inch) from case for 10 seconds	300°C			

NOTES: 1. This value applies for $t_w \leq 10$ ms, duty cycle ≤ 10 %.
2. Derate linearly to 150°C case temperature at the rate of 1 W/°C or refer to Dissipation Derating Curve, Figure 9.
3. Derate linearly to 150°C free-air temperature at the rate of 24 mW/°C or refer to Dissipation Derating Curve, Figure 10.

electrical characteristics at 25°C case temperature

PARAMETER	TEST CONDITIONS	TIP55A			TIP56A			TIP57A			TIP58A			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
$V_{(BR)CEO}$	I_C = 20 mA, I_B = 0, See Note 4	250			300			350			400			V
I_{CER}	V_{CE} = 350 V, R_{BE} = 27 Ω			100										μA
	V_{CE} = 400 V, R_{BE} = 27 Ω						100							
	V_{CE} = 450 V, R_{BE} = 27 Ω									100				
	V_{CE} = 500 V, R_{BE} = 27 Ω												100	
I_{EBO}	V_{EB} = 8 V, I_C = 0			100			100			100			100	μA
h_{FE}	V_{CE} = 2 V, I_C = 1 A, See Notes 4 and 5	10		100	10		100	10		100	10		100	
	V_{CE} = 2 V, I_C = 5 A, See Notes 4 and 5	6			6			6			6			
$V_{BE(sat)}$	I_B = 1 A, I_C = 5 A, See Notes 4 and 5			1.5			1.5			1.5			1.5	V
$V_{CE(sat)}$	I_B = 1 A, I_C = 5 A, See Notes 4 and 5			1.2			1.2			1.2			1.2	V
	I_B = 4 A, I_C = 10 A, See Notes 4 and 5			2.5			2.5			2.5			2.5	

NOTES: 4. These parameters must be measured using pulse techniques, t_w = 300 μs, duty cycle ≤ 2 %.
5. These parameters are measured with voltage-sensing contacts separate from the current-carrying contacts and located within 3.2 mm (0.125 inch) from the device body.

thermal characteristics

PARAMETER	MIN	TYP	MAX	UNIT
$R_{\theta JC}$			1	°C/W
$R_{\theta JA}$			41.7	
$R_{\theta CHS}$ (see Note 6)		0.6		
$C_{\theta C}$		1.4		J/°C

NOTE 6: This parameter must be measured using a (0.003 inch) mica insulator with Dow-Corning 11 compound on both sides of the insulator, 6-32 mounting screws with bushing, and a mounting torque of 8 inch-pounds.

resistive-load switching characteristics at 25°C case temperature

PARAMETER	TEST CONDITIONS†	MIN	TYP	MAX	UNIT
t_d	I_C = 5 A, I_{B1} = 1 A, I_{B2} = −1 A, $V_{BE(off)}$ = −4 V, R_L = 40 Ω, See Figure 1		0.04		μs
t_r			0.13		
t_s			1.5		
t_f			0.2		

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

functional tests at 25°C free-air temperature

TEST	TEST CONDITIONS	LEVEL
Power (V_{CE} • I_C)	V_{CE} = 50 V, I_C = 2 A, t_{test} = 0.15 s	100 W
Reverse Pulse Energy $\left(\frac{I_C^2 L}{2}\right)$	I_{CM} = 5 A, L = 2 mH, f = 10 Hz, t_{test} = 0.5 s, See Figure 2	25 mJ
Forward Pulse Energy $\left(\frac{I_C^2 L}{2}\right)$	I_{CM} = 10 A, L = 5 mH, V_{clamp} = V_{CEO} max rating, f = 60 Hz, t_{test} = 0.5 s, See Figure 3	250 mJ
Operation as Commutating Switch	I_{load} = 5 A, V_{CC} = 0.8 V_{CEO} max rating, f = 20 kHz, t_{test} = 0.5 s, See Figure 4	