

New Jersey Semi-Conductor Products, Inc.

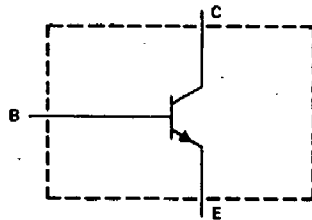
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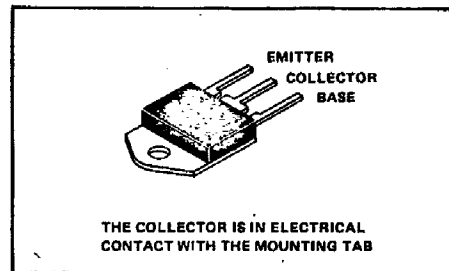
TIP55A, TIP56A, TIP57A, TIP58A N-P-N SILICON POWER TRANSISTORS

- 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



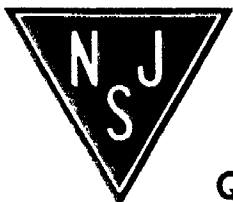
TO-218AA PACKAGE



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 $t_W < 10$ 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.



NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

Quality Semi-Conductors

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

electrical characteristics at 25°C case temperature

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

NOTES: 4. These parameters must be measured using pulse techniques, $t_w = 300 \mu\text{s}$, duty cycle $\leq 2\%$.

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	$^{\circ}\text{C/W}$
$R_{\theta JA}$			41.7	
$R_{\theta CHS}$ (see Note 6)			0.6	
$C_{\theta C}$			1.4	$\text{J}/^{\circ}\text{C}$

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	$I_C = 5 \text{ A}$, $I_{B1} = 1 \text{ A}$, $I_{B2} = -1 \text{ A}$, $V_{BE(off)} = -4 \text{ V}$, $R_L = 40 \Omega$, See Figure 1		0.04		μs
t_r			0.13		
t_g			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 ($V_{CE} \cdot I_C$)	$V_{CE} = 50 \text{ V}$, $I_C = 2 \text{ A}$, $t_{test} = 0.15 \text{ s}$	100 W
Reverse Pulse Energy $\left(\frac{I_C^2 L}{2}\right)$	$I_{CM} = 5 \text{ A}$, $L = 2 \text{ mH}$, $f = 10 \text{ Hz}$, $t_{test} = 0.5 \text{ s}$, See Figure 2	25 mJ
Forward Pulse Energy $\left(\frac{I_C^2 L}{2}\right)$	$I_{CM} = 10 \text{ A}$, $L = 5 \text{ mH}$, $V_{clamp} = V_{CE0 \text{ max rating}}$, $f = 60 \text{ Hz}$, $t_{test} = 0.5 \text{ s}$, See Figure 3	250 mJ
Operation as Commutating Switch	$I_{load} = 5 \text{ A}$, $V_{CC} = 0.8 V_{CE0 \text{ max rating}}$, $f = 20 \text{ kHz}$, $t_{test} = 0.5 \text{ s}$, See Figure 4	