

## SWITCHMODE Series PNP Silicon Power Transistors

The MJE5850, MJE5851 and the MJE5852 transistors are designed for high-voltage, high-speed, power switching in inductive circuits where fall time is critical. They are particularly suited for line operated switchmode applications such as:

- Switching Regulators
- Inverters
- Solenoid and Relay Drivers
- Motor Controls
- Deflection Circuits

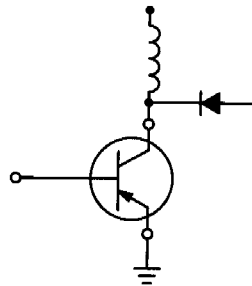
### Fast Turn-Off Times

100 ns Inductive Fall Time @ 25°C (Typ)  
 125 ns Inductive Crossover Time @ 25°C (Typ)

Operating Temperature Range -65 to +150°C

100°C Performance Specified for:

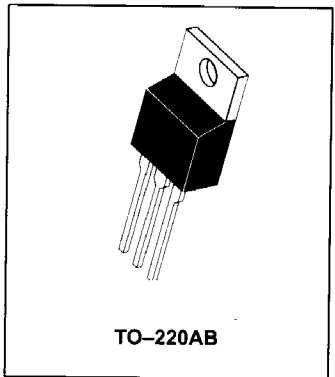
- Reversed Biased SOA with Inductive Loads
- Switching Times with Inductive Loads
- Saturation Voltages
- Leakage Currents



**MJE5850**  
**MJE5851\***  
**MJE5852\***

\*Motorola Preferred Device

**8 AMPERE**  
**PNP SILICON**  
**POWER TRANSISTORS**  
**300, 350, 400 VOLTS**  
**80 WATTS**



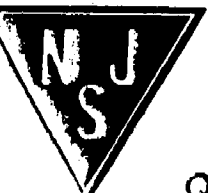
### MAXIMUM RATINGS

Rating	Symbol	MJE5850	MJE5851	MJE5852	Unit
Collector-Emitter Voltage	$V_{CEO(sus)}$	300	350	400	Vdc
Collector-Emitter Voltage	$V_{CEV}$	350	400	450	Vdc
Emitter Base Voltage	$V_{EB}$	6.0			Vdc
Collector Current — Continuous	$I_C$	8.0			Adc
Peak (1)	$I_{CM}$	16			
Base Current — Continuous	$I_B$	4.0			Adc
Peak (1)	$I_{BM}$	8.0			
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	$P_D$	80			Watts
Derate above 25°C		0.640			W/°C
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to 150			°C

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.25	°C/W
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds	$T_L$	275	°C

(1) Pulse Test: Pulse Width = 5 ms, Duty Cycle  $\leq$  10%.



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## MJE5850 MJE5851 MJE5852

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit	
<b>OFF CHARACTERISTICS</b>						
Collector-Emitter Sustaining Voltage ( $I_C = 10\text{ mA}$ , $I_B = 0$ )	MJE5850 MJE5851 MJE5852	$V_{CEO(sus)}$	300 350 400	— — —	— — —	Vdc
Collector Cutoff Current ( $V_{CEV} = \text{Rated Value}$ , $V_{BE(off)} = 1.5\text{ Vdc}$ ) ( $V_{CEV} = \text{Rated Value}$ , $V_{BE(off)} = 1.5\text{ Vdc}$ , $T_C = 100^\circ\text{C}$ )		$I_{CEV}$	— —	— —	0.5 2.5	mAdc
Collector Cutoff Current ( $V_{CE} = \text{Rated } V_{CEV}$ , $R_{BE} = 50\ \Omega$ , $T_C = 100^\circ\text{C}$ )		$I_{CER}$	—	—	3.0	mAdc
Emitter Cutoff Current ( $V_{EB} = 6.0\text{ Vdc}$ , $I_C = 0$ )		$I_{EBO}$	—	—	1.0	mAdc

### SECOND BREAKDOWN

Second Breakdown Collector Current with base forward biased	$I_{S/b}$	See Figure 12
Clamped Inductive SOA with base reverse biased	RBSOA	See Figure 13

### \*ON CHARACTERISTICS

DC Current Gain ( $I_C = 2.0\text{ Adc}$ , $V_{CE} = 5\text{ Vdc}$ ) ( $I_C = 5.0\text{ Adc}$ , $V_{CE} = 5\text{ Vdc}$ )	$h_{FE}$	15 5	— —	— —	—
Collector-Emitter Saturation Voltage ( $I_C = 4.0\text{ Adc}$ , $I_B = 1.0\text{ Adc}$ ) ( $I_C = 8.0\text{ Adc}$ , $I_B = 3.0\text{ Adc}$ ) ( $I_C = 4.0\text{ Adc}$ , $I_B = 1.0\text{ Adc}$ , $T_C = 100^\circ\text{C}$ )	$V_{CE(sat)}$	— — —	— — —	2.0 5.0 2.5	Vdc
Base-Emitter Saturation Voltage ( $I_C = 4.0\text{ Adc}$ , $I_B = 1.0\text{ Adc}$ ) ( $I_C = 4.0\text{ Adc}$ , $I_B = 1.0\text{ Adc}$ , $T_C = 100^\circ\text{C}$ )	$V_{BE(sat)}$	— —	— —	1.5 1.5	Vdc

### DYNAMIC CHARACTERISTICS

Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f_{test} = 1.0\text{ kHz}$ )	$C_{ob}$	—	270	—	pF
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### SWITCHING CHARACTERISTICS

Resistive Load (Table 1)						
Delay Time	(V <sub>CC</sub> = 250 Vdc, I <sub>C</sub> = 4.0 A, I <sub>B1</sub> = 1.0 A, t <sub>p</sub> = 50 μs, Duty Cycle ≤ 2%)	t <sub>d</sub>	—	0.025	0.1	μs
Rise Time		t <sub>r</sub>	—	0.100	0.5	μs
Storage Time	(V <sub>CC</sub> = 250 Vdc, I <sub>C</sub> = 4.0 A, I <sub>B1</sub> = 1.0 A, V <sub>BE(off)</sub> = 5 Vdc, t <sub>p</sub> = 50 μs, Duty Cycle ≤ 2%)	t <sub>s</sub>	—	0.60	2.0	μs
Fall Time		t <sub>f</sub>	—	0.11	0.5	μs
Inductive Load, Clamped (Table 1)						
Storage Time	(I <sub>CM</sub> = 4 A, V <sub>CEM</sub> = 250 V, I <sub>B1</sub> = 1.0 A, V <sub>BE(off)</sub> = 5 Vdc, T <sub>C</sub> = 100°C)	t <sub>sv</sub>	—	0.8	3.0	μs
Crossover Time		t <sub>c</sub>	—	0.4	1.5	μs
Fall Time		t <sub>fi</sub>	—	0.1	—	μs
Storage Time	(I <sub>CM</sub> = 4 A, V <sub>CEM</sub> = 250 V, I <sub>B1</sub> = 1.0 A, V <sub>BE(off)</sub> = 5 Vdc, T <sub>C</sub> = 25°C)	t <sub>sv</sub>	—	0.5	—	μs
Crossover Time		t <sub>c</sub>	—	0.125	—	μs
Fall Time		t <sub>fi</sub>	—	0.1	—	μs

\* Pulse Test: PW = 300 μs. Duty Cycle ≤ 2%

