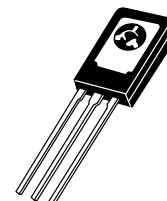


## MJE3439

0.3 AMPERE  
POWER TRANSISTOR  
NPN SILICON  
350 VOLTS  
15 WATTS



CASE 77-08  
TO-225AA TYPE

# NPN Silicon High-Voltage Power Transistors

... designed for use in line-operated equipment requiring high  $f_T$ .

- High DC Current Gain  
 $h_{FE} = 40-160$  @  $I_C = 20$  mAdc
- Current Gain Bandwidth Product —  
 $f_T = 15$  MHz (Min) @  $I_C = 10$  mAdc
- Low Output Capacitance  
 $C_{ob} = 10$  pF (Max) @  $f = 1.0$  MHz

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	350	Vdc
Collector-Base Voltage	$V_{CB}$	450	Vdc
Emitter-Base Voltage	$V_{EB}$	5.0	Vdc
Collector Current — Continuous	$I_C$	0.3	Adc
Base Current	$I_B$	150	mAdc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	15 0.12	Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +150	$^\circ\text{C}$

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$\theta_{JC}$	8.33	$^\circ\text{C/W}$

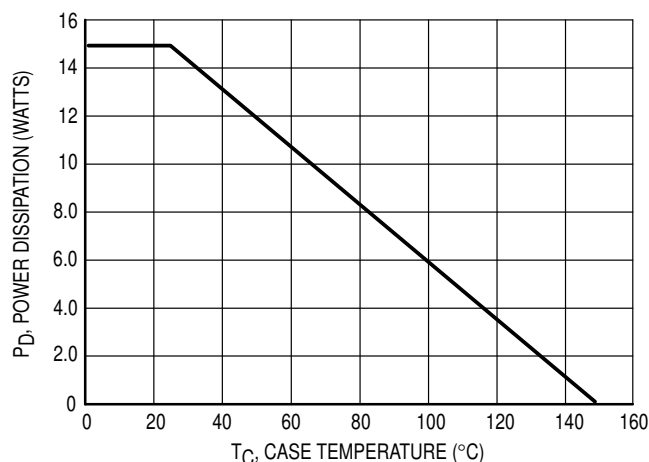
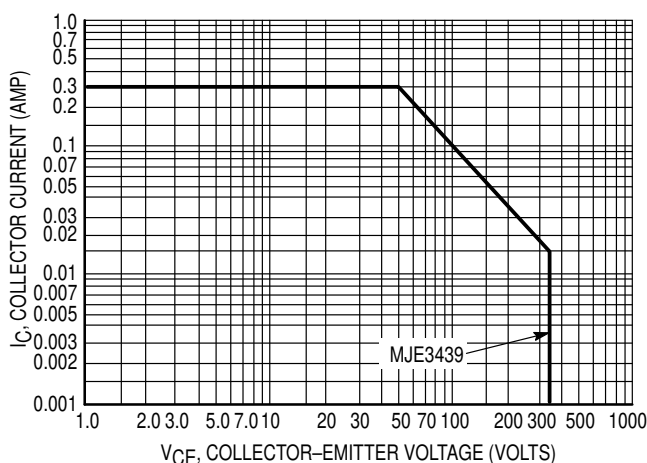


Figure 1. Power-Temperature Derating Curve

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

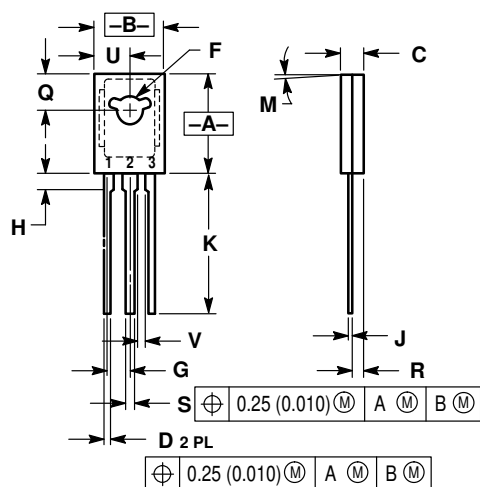
Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector–Emitter Sustaining Voltage ( $I_C = 5.0\text{ mAdc}$ , $I_B = 0$ )	$V_{CEO(sus)}$	350	—	Vdc
Collector Cutoff Current ( $V_{CE} = 300\text{ Vdc}$ , $I_B = 0$ )	$I_{CEO}$	—	20	$\mu\text{Adc}$
Collector Cutoff Current ( $V_{CE} = 450\text{ Vdc}$ , $V_{EB(off)} = 1.5\text{ Vdc}$ )	$I_{CEX}$	—	500	$\mu\text{Adc}$
Collector Cutoff Current ( $V_{CB} = 350\text{ Vdc}$ , $I_E = 0$ )	$I_{CBO}$	—	20	$\mu\text{Adc}$
Emitter Cutoff Current ( $V_{BE} = 5.0\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$	—	20	$\mu\text{Adc}$
<b>ON CHARACTERISTICS</b>				
DC Current Gain ( $I_C = 2.0\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ ) ( $I_C = 20\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )	$h_{FE}$	30 15	— 200	—
Collector–Emitter Saturation Voltage ( $I_C = 50\text{ mAdc}$ , $I_B = 4.0\text{ mAdc}$ )	$V_{CE(sat)}$	—	0.5	Vdc
Base–Emitter Saturation Voltage ( $I_C = 50\text{ mAdc}$ , $I_B = 4.0\text{ mAdc}$ )	$V_{BE(sat)}$	—	1.3	Vdc
Base–Emitter On Voltage ( $I_C = 50\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ )	$V_{BE(on)}$	—	0.8	Vdc
<b>DYNAMIC CHARACTERISTICS</b>				
Current–Gain — Bandwidth Product ( $I_C = 10\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 5.0\text{ MHz}$ )	$f_T$	15	—	MHz
Output Capacitance ( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ob}$	—	10	pF
Small–Signal Current Gain ( $I_C = 5.0\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1.0\text{ kHz}$ )	$h_{fe}$	25	—	—



**Figure 2. Active–Region Safe Operating Area**

The Safe Operating Area Curves indicate  $I_C - V_{CE}$  limits below which the device will not enter secondary breakdown. Collector load lines for specific circuits must fall within the applicable Safe Area to avoid causing a catastrophic failure. To insure operation below the maximum  $T_J$ , power–temperature derating must be observed for both steady state and pulse power conditions.

## PACKAGE DIMENSIONS




- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.425	0.435	10.80	11.04
B	0.295	0.305	7.50	7.74
C	0.095	0.105	2.42	2.66
D	0.020	0.026	0.51	0.66
F	0.115	0.130	2.93	3.30
G	0.094 BSC		2.39 BSC	
H	0.050	0.095	1.27	2.41
J	0.015	0.025	0.39	0.63
K	0.575	0.655	14.61	16.63
M	5° TYP		5° TYP	
Q	0.148	0.158	3.76	4.01
R	0.045	0.055	1.15	1.39
S	0.025	0.035	0.64	0.88
U	0.145	0.155	3.69	3.93
V	0.040	—	1.02	—

- STYLE 1:
1. EMITTER
  2. COLLECTOR
  3. BASE

**CASE 77-08**  
**TO-225AA TYPE**  
**ISSUE V**

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