

**MJE3439**

**0.3 AMPERE  
 POWER TRANSISTOR  
 NPN SILICON  
 350 VOLTS  
 15 WATTS**

**NPN Silicon High-Voltage Power Transistors**

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

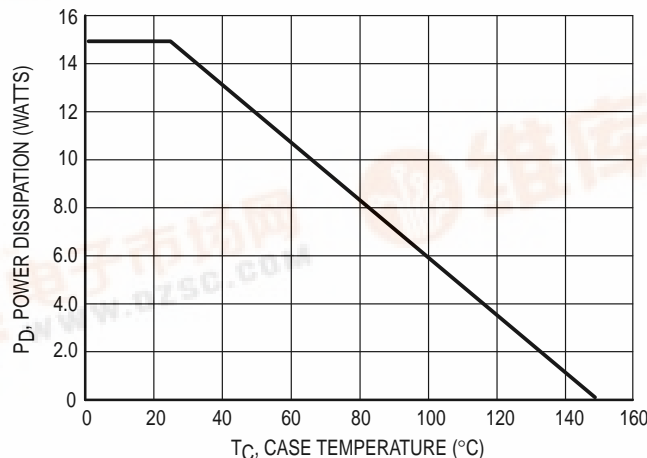
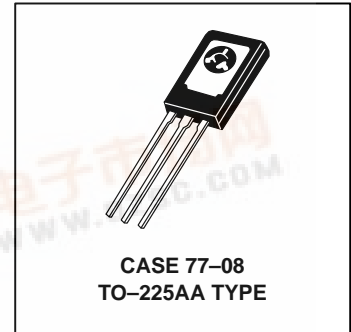
- High DC Current Gain  
 $h_{FE} = 40 - 160 @ I_C = 20 \text{ mAdc}$
- Current Gain Bandwidth Product —  
 $f_T = 15 \text{ MHz (Min) @ } I_C = 10 \text{ mAdc}$
- Low Output Capacitance  
 $C_{ob} = 10 \text{ pF (Max) @ } f = 1.0 \text{ MHz}$

**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**

# MJE3439

## ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector–Emitter Sustaining Voltage (I <sub>C</sub> = 5.0 mA <sub>d</sub> c, I <sub>B</sub> = 0)	V <sub>CEO(sus)</sub>	350	—	V <sub>d</sub> c
Collector Cutoff Current (V <sub>CE</sub> = 300 V <sub>d</sub> c, I <sub>B</sub> = 0)	I <sub>CEO</sub>	—	20	μA <sub>d</sub> c
Collector Cutoff Current (V <sub>CE</sub> = 450 V <sub>d</sub> c, V <sub>EB(off)</sub> = 1.5 V <sub>d</sub> c)	I <sub>CEX</sub>	—	500	μA <sub>d</sub> c
Collector Cutoff Current (V <sub>CB</sub> = 350 V <sub>d</sub> c, I <sub>E</sub> = 0)	I <sub>CBO</sub>	—	20	μA <sub>d</sub> c
Emitter Cutoff Current (V <sub>BE</sub> = 5.0 V <sub>d</sub> c, I <sub>C</sub> = 0)	I <sub>EBO</sub>	—	20	μA <sub>d</sub> c

## ON CHARACTERISTICS

DC Current Gain (I <sub>C</sub> = 2.0 mA <sub>d</sub> c, V <sub>CE</sub> = 10 V <sub>d</sub> c) (I <sub>C</sub> = 20 mA <sub>d</sub> c, V <sub>CE</sub> = 10 V <sub>d</sub> c)	h <sub>FE</sub>	30 15	— 200	—
Collector–Emitter Saturation Voltage (I <sub>C</sub> = 50 mA <sub>d</sub> c, I <sub>B</sub> = 4.0 mA <sub>d</sub> c)	V <sub>CE(sat)</sub>	—	0.5	V <sub>d</sub> c
Base–Emitter Saturation Voltage (I <sub>C</sub> = 50 mA <sub>d</sub> c, I <sub>B</sub> = 4.0 mA <sub>d</sub> c)	V <sub>BE(sat)</sub>	—	1.3	V <sub>d</sub> c
Base–Emitter On Voltage (I <sub>C</sub> = 50 mA <sub>d</sub> c, V <sub>CE</sub> = 10 V <sub>d</sub> c)	V <sub>BE(on)</sub>	—	0.8	V <sub>d</sub> c

## DYNAMIC CHARACTERISTICS

Current–Gain — Bandwidth Product (I <sub>C</sub> = 10 mA <sub>d</sub> c, V <sub>CE</sub> = 10 V <sub>d</sub> c, f = 5.0 MHz)	f <sub>T</sub>	15	—	MHz
Output Capacitance (V <sub>CB</sub> = 10 V <sub>d</sub> c, I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>ob</sub>	—	10	pF
Small–Signal Current Gain (I <sub>C</sub> = 5.0 mA <sub>d</sub> c, V <sub>CE</sub> = 10 V <sub>d</sub> c, f = 1.0 kHz)	h <sub>fe</sub>	25	—	—

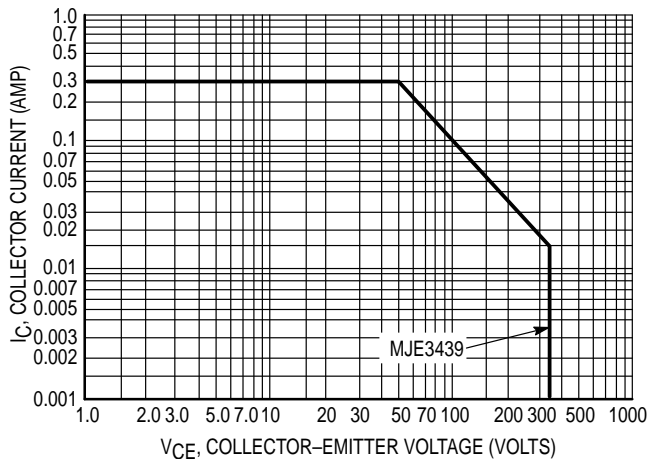
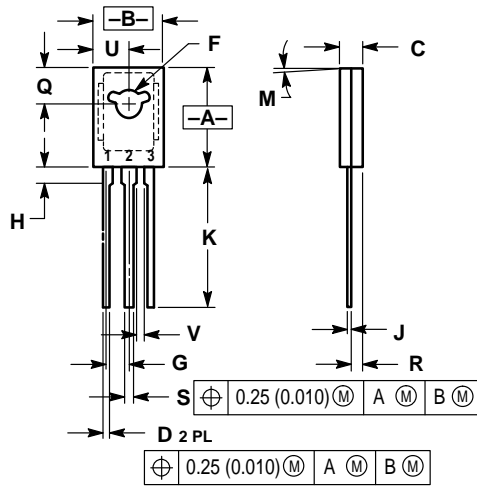


Figure 2. Active–Region Safe Operating Area

The Safe Operating Area Curves indicate I<sub>C</sub> – V<sub>CE</sub> 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<sub>J</sub>, 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:  
 PIN 1. EMITTER  
 2. COLLECTOR  
 3. BASE

CASE 77-08  
 TO-225AA TYPE  
 ISSUE V

## MJE3439

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters can and do vary in different applications. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

### How to reach us:

**USA / EUROPE:** Motorola Literature Distribution;  
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447

**MFAX:** RMFAX0@email.sps.mot.com – TOUCHTONE (602) 244-6609  
**INTERNET:** <http://Design-NET.com>

**JAPAN:** Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, Toshikatsu Otsuki,  
6F Seibu-Butsuryu-Center, 3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-3521-8315

**HONG KONG:** Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,  
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

