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# MJE521

## Plastic Medium-Power NPN Silicon Transistor

These devices are designed for use in general-purpose amplifier and switching circuits. Recommended for use in 5 to 10 Watt audio amplifiers utilizing complementary symmetry circuitry.

### Features

- DC Current Gain –  $h_{FE} = 40$  (Min) @  $I_C = 1.0$  Adc
- Complementary to PNP MJE371
- Pb-Free Package is Available\*

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	40	Vdc
Collector-Base Voltage	$V_{CB}$	40	Vdc
Emitter Base Voltage	$V_{EB}$	4.0	Vdc
Collector Current – Continuous	$I_C$	4.0	Adc
– Peak		8.0	
Base Current – Continuous	$I_B$	2.0	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	40	W
		0.32	
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	$\theta_{JC}$	3.12	$^\circ\text{C/W}$

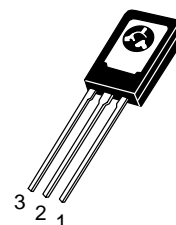
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.



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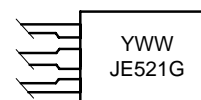
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**4 AMPERES  
 POWER TRANSISTORS  
 NPN SILICON  
 40 VOLTS, 40 WATTS**



TO-225  
 CASE 77  
 STYLE 1

### MARKING DIAGRAM



Y = Year  
 WW = Work Week  
 JE521 = Device Code  
 G = Pb-Free Package

### ORDERING INFORMATION

Device	Package	Shipping
MJE521	TO-225	500 Units/Box
MJE521G	TO-225 (Pb-Free)	500 Units/Box

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

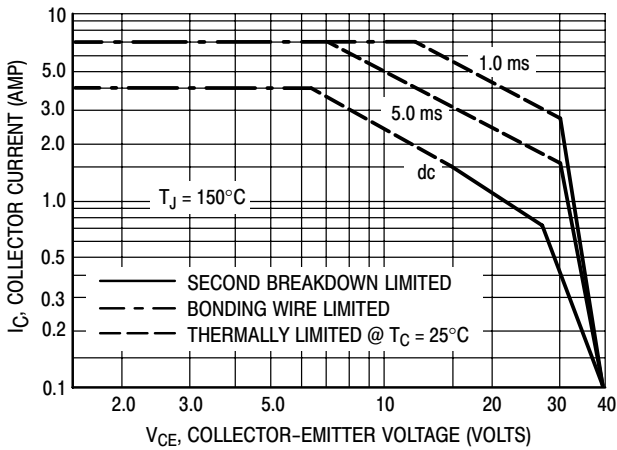
## MJE521

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

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector–Emitter Sustaining Voltage (Note 1) (I <sub>C</sub> = 100 mA <sub>dc</sub> , I <sub>B</sub> = 0)	V <sub>CEO(sus)</sub>	40	–	V <sub>dc</sub>
Collector–Base Cutoff Current (V <sub>CB</sub> = 30 V <sub>dc</sub> , I <sub>E</sub> = 0)	I <sub>CBO</sub>	–	100	μA <sub>dc</sub>
Emitter–Base Cutoff Current (V <sub>EB</sub> = 4.0 V <sub>dc</sub> , I <sub>C</sub> = 0)	I <sub>EBO</sub>	–	100	μA <sub>dc</sub>
<b>ON CHARACTERISTICS</b>				
DC Current Gain (Note 1) (I <sub>C</sub> = 1.0 A <sub>dc</sub> , V <sub>CE</sub> = 1.0 V <sub>dc</sub> )	h <sub>FE</sub>	40	–	–

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

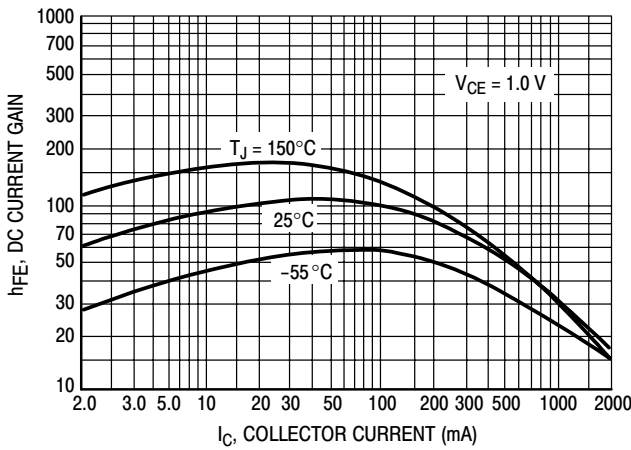
**MJE521**



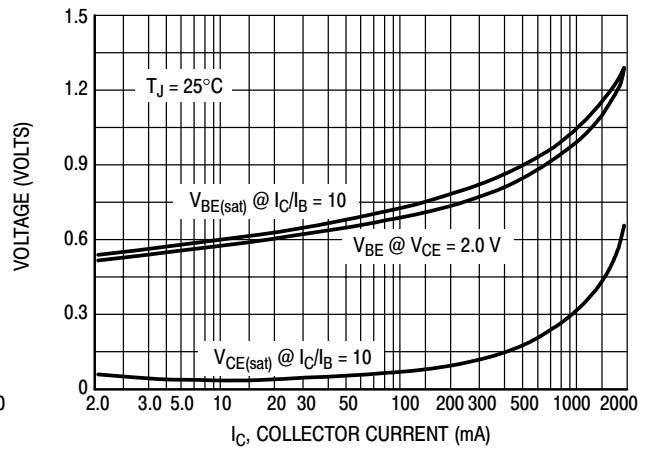
**Figure 1. Active-Region Safe Operating Area**

The data of Figure 1 based on  $T_{J(pk)} = 150^{\circ}\text{C}$ ;  $T_C$  is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided  $(T_{J(pk)} \leq 150^{\circ}\text{C})$ . At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

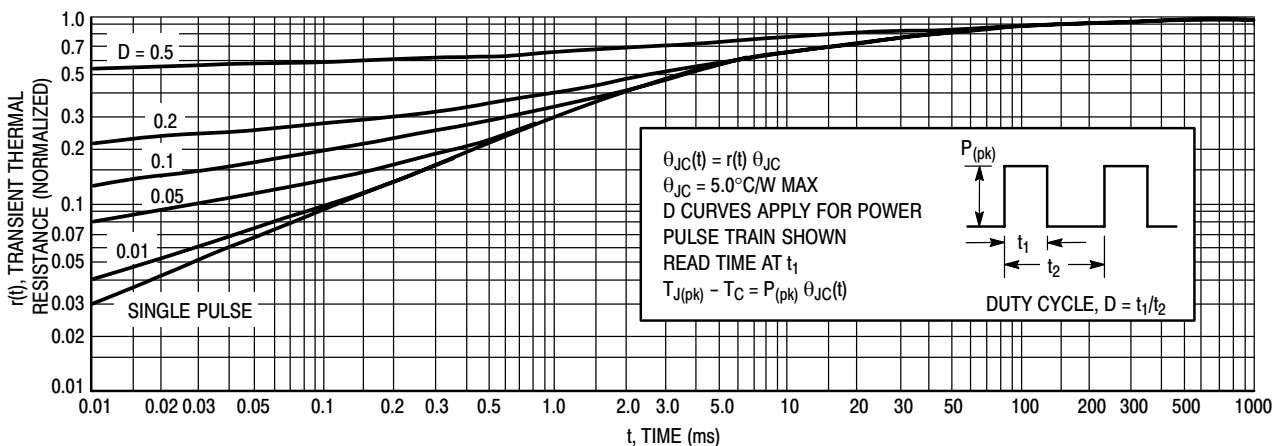
There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate  $I_C - V_{CE}$  limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.



**Figure 2. DC Current Gain**



**Figure 3. "On" Voltage**

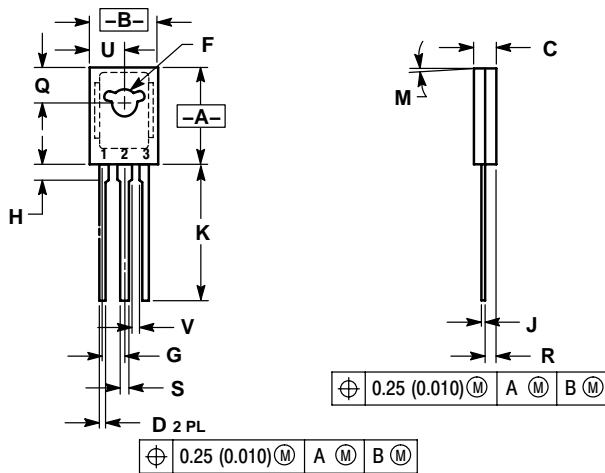


**Figure 4. Thermal Response**

## MJE521

### PACKAGE DIMENSIONS

TO-225  
CASE 77-09  
ISSUE Z




NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 077-01 THRU -08 OBSOLETE, NEW STANDARD 077-09.

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	0.065	1.15	1.65
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

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