

**MOTOROLA**  
**SEMICONDUCTOR**  
TECHNICAL DATA

T-33-21  
**MJE105**

**MEDIUM POWER PNP SILICON TRANSISTOR**

Use as an output device in complementary audio amplifiers to provide music power per channel.

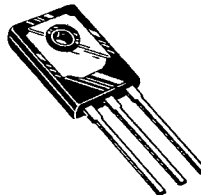
High DC Current Gain -  $h_{FE} = 25-100$  @  $I_C = 2.0$  A

- Thermopad High-Efficiency Compact Package
- Complementary to NPN MJE205

**NOT RECOMMENDED FOR NEW DESIGNS**

**5 AMPERE**  
**POWER TRANSISTOR**  
**PNP SILICON**

**50 VOLTS**  
**65 WATTS**



**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	50	Vdc
Collector-Base Voltage	$V_{CB}$	50	Vdc
Emitter-Base Voltage	$V_{EB}$	4.0	Vdc
Collector Current	$I_C$	5.0	Adc
Base Current	$I_B$	2.5	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D(1)$	65 0.522	Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$\theta_{JC}$	1.92	$^\circ\text{C}/\text{W}$

(1) Safe Area Curves are indicated by Figure 1. Both limits are applicable and must be observed.

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

Characteristic	Symbol	Min	Max	Unit
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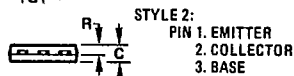
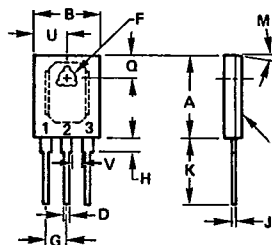
**OFF CHARACTERISTICS**

Collector-Emitter Breakdown Voltage (2) ( $I_C = 100$ mAdc, $I_B = 0$ )	$BV_{CEO}$	50	-	Vdc
Collector Cutoff Current ( $V_{CB} = 50$ Vdc, $I_E = 0$ ) ( $V_{CB} = 50$ Vdc, $I_E = 0$ , $T_C = 150^\circ\text{C}$ )	$I_{CBO}$	-	0.1 2.0	mAdc
Emitter Cutoff Current ( $V_{BE} = 4.0$ Vdc, $I_C = 0$ )	$I_{EBO}$	-	1.0	mAdc

**ON CHARACTERISTICS**

DC Current Gain ( $I_C = 2.0$ Adc, $V_{CE} = 2.0$ Vdc)	$h_{FE}$	25	100	-
Base-Emitter Voltage ( $I_C = 2.0$ Adc, $V_{CE} = 2.0$ Vdc)	$V_{BE}$	-	1.2	Vdc

(2) Pulse Test: Pulse Width  $\leq 300$   $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .



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

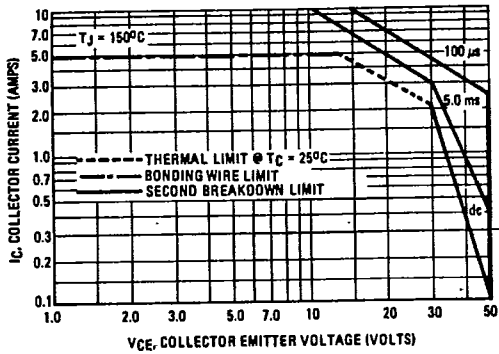
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	16.13	16.38	0.635	0.645
B	12.57	12.83	0.495	0.505
C	3.18	3.43	0.125	0.135
D	1.09	1.24	0.043	0.049
F	3.51	3.76	0.138	0.148
G	4.22 BSC		0.166 BSC	
H	2.67	2.92	0.105	0.115
J	0.813	0.864	0.032	0.034
K	15.11	16.38	0.595	0.645
M	90 TYP		90 TYP	
Q	4.70	4.95	0.185	0.195
R	1.91	2.16	0.075	0.085
U	6.22	6.48	0.245	0.255
V	2.03	-	0.080	-

CASE 90-05  
TO-225AB TYPE  
(TO-127 TYPE)

MJE105

T-33-21

FIGURE 1 - ACTIVE-REGION SAFE OPERATING AREA



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. The data of Figure 1 is 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.

FIGURE 2 - "ON" VOLTAGES

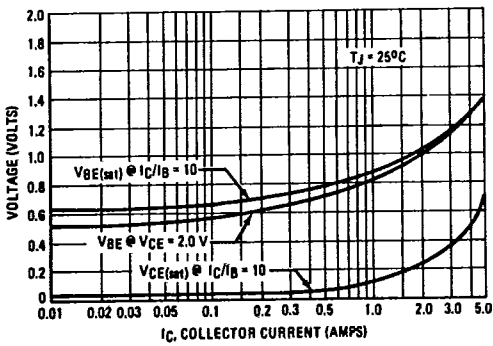
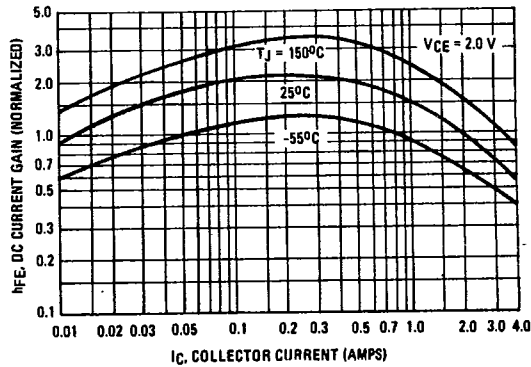


FIGURE 3 - DC CURRENT GAIN



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FIGURE 4 - POWER DERATING

