

# MJ802

## High-Power NPN Silicon Transistor

This transistor is for use as an output device in complementary audio amplifiers to 100-Watts music power per channel.

### Features

- High DC Current Gain –  $h_{FE} = 25-100 @ I_C = 7.5 A$
- Excellent Safe Operating Area
- Complement to the PNP MJ4502
- Pb-Free Package is Available\*

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CER}$	100	Vdc
Collector-Base Voltage	$V_{CB}$	100	Vdc
Collector-Emitter Voltage	$V_{CEO}$	90	Vdc
Emitter-Base Voltage	$V_{EB}$	4.0	Vdc
Collector Current	$I_C$	30	Adc
Base Current	$I_B$	7.5	Adc
Total Device Dissipation @ $T_C = 25^\circ C$ Derate above $25^\circ C$	$P_D$	200 1.14	W W/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200	$^\circ C$

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$\theta_{JC}$	0.875	$^\circ C/W$

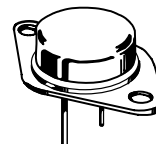
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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



ON Semiconductor®

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**30 AMPERE  
POWER TRANSISTOR  
NPN SILICON  
100 VOLTS – 200 WATTS**



**TO-204AA (TO-3)  
CASE 1-07  
STYLE 1**

### MARKING DIAGRAM



MJ802 = Device Code  
G = Pb-Free Package  
A = Assembly Location  
YY = Year  
WW = Work Week  
MEX = Country of Origin

### ORDERING INFORMATION

Device	Package	Shipping
MJ802	TO-204	100 Units / Tray
MJ802G	TO-204 (Pb-Free)	100 Units / Tray

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

# MJ802

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

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector–Emitter Breakdown Voltage ( $I_C = 200\text{ mAdc}$ , $R_{BE} = 100\ \Omega$ )	$BV_{CER}$	100	–	Vdc
Collector–Emitter Sustaining Voltage (Note 1) ( $I_C = 200\text{ mAdc}$ )	$V_{CEO(sus)}$	90	–	Vdc
Collector–Base Cutoff Current ( $V_{CB} = 100\text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = 100\text{ Vdc}$ , $I_E = 0$ , $T_C = 150^\circ\text{C}$ )	$I_{CBO}$	– –	1.0 5.0	mAdc
Emitter–Base Cutoff Current ( $V_{BE} = 4.0\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$	–	1.0	mAdc

## ON CHARACTERISTICS<sup>(1)</sup>

DC Current Gain (Note 1) ( $I_C = 7.5\text{ Adc}$ , $V_{CE} = 2.0\text{ Vdc}$ )	$h_{FE}$	25	100	–
Base–Emitter “On” Voltage ( $I_C = 7.5\text{ Adc}$ , $V_{CE} = 2.0\text{ Vdc}$ )	$V_{BE(on)}$	–	1.3	Vdc
Collector–Emitter Saturation Voltage ( $I_C = 7.5\text{ Adc}$ , $I_B = 0.75\text{ Adc}$ )	$V_{CE(sat)}$	–	0.8	Vdc
Base–Emitter Saturation Voltage ( $I_C = 7.5\text{ Adc}$ , $I_B = 0.75\text{ Adc}$ )	$V_{BE(sat)}$	–	1.3	Vdc

## DYNAMIC CHARACTERISTICS

Current Gain – Bandwidth Product ( $I_C = 1.0\text{ Adc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1.0\text{ MHz}$ )	$f_T$	2.0	–	MHz
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1. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

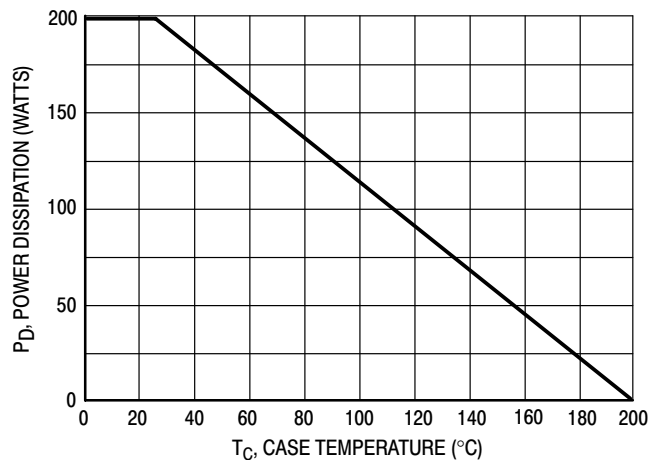


Figure 1. Power–Temperature Derating Curve

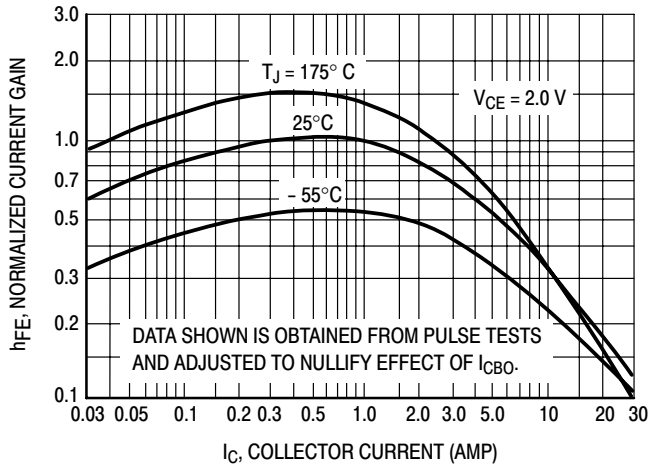


Figure 2. DC Current Gain

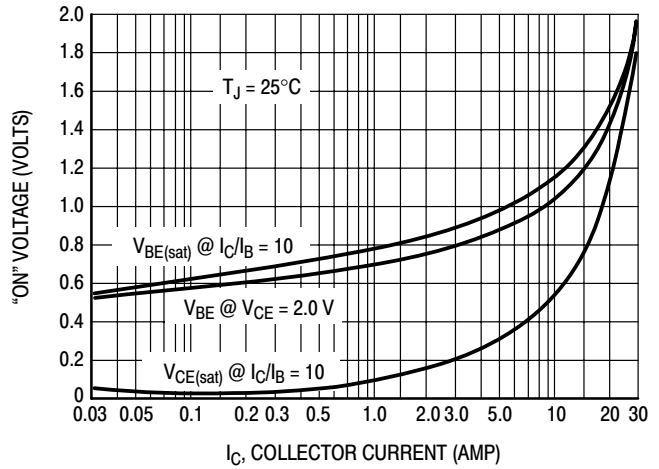


Figure 3. "On" Voltages

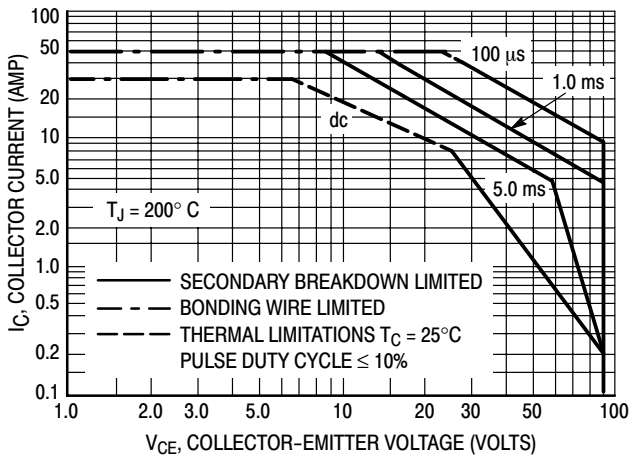


Figure 4. Active Region Safe Operating Area

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.

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

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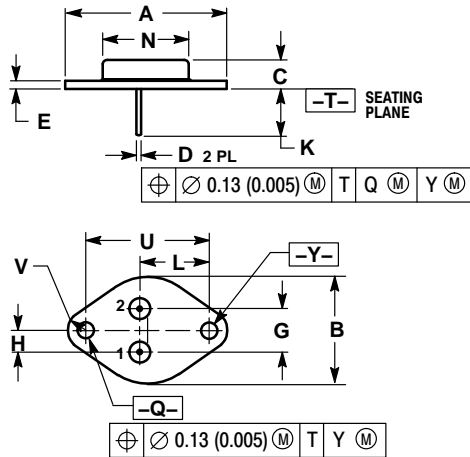


TO-204 (TO-3)  
CASE 1-07  
ISSUE Z

DATE 05/18/1988



SCALE 1:1



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. ALL RULES AND NOTES ASSOCIATED WITH REFERENCED TO-204AA OUTLINE SHALL APPLY.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.550 REF	---	39.37 REF	---
B	---	1.050	---	26.67
C	0.250	0.335	6.35	8.51
D	0.038	0.043	0.97	1.09
E	0.055	0.070	1.40	1.77
G	0.430 BSC	---	10.92 BSC	---
H	0.215 BSC	---	5.46 BSC	---
K	0.440	0.480	11.18	12.19
L	---	0.665 BSC	---	16.89 BSC
N	---	0.830	---	21.08
Q	0.151	0.165	3.84	4.19
U	1.187 BSC	---	30.15 BSC	---
V	0.131	0.188	3.33	4.77

- |  |  |   |   |   |
|--|--|---|---|---|
| <p>STYLE 1:<br/>PIN 1. BASE<br/>2. EMITTER<br/>CASE: COLLECTOR</p> | <p>STYLE 2:<br/>PIN 1. BASE<br/>2. COLLECTOR<br/>CASE: EMITTER</p> | <p>STYLE 3:<br/>PIN 1. GATE<br/>2. SOURCE<br/>CASE: DRAIN</p>           | <p>STYLE 4:<br/>PIN 1. GROUND<br/>2. INPUT<br/>CASE: OUTPUT</p>       | <p>STYLE 5:<br/>PIN 1. CATHODE<br/>2. EXTERNAL TRIP/DELAY<br/>CASE: ANODE</p> |
| <p>STYLE 6:<br/>PIN 1. GATE<br/>2. EMITTER<br/>CASE: COLLECTOR</p> | <p>STYLE 7:<br/>PIN 1. ANODE<br/>2. OPEN<br/>CASE: CATHODE</p>     | <p>STYLE 8:<br/>PIN 1. CATHODE #1<br/>2. CATHODE #2<br/>CASE: ANODE</p> | <p>STYLE 9:<br/>PIN 1. ANODE #1<br/>2. ANODE #2<br/>CASE: CATHODE</p> |   |

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