

# MJ4502

## High-Power PNP 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 NPN MJ802
- Pb-Free Package is Available\*

### MAXIMUM RATINGS

| Rating                                                                                 | Symbol         | Value       | Unit                     |
|----------------------------------------------------------------------------------------|----------------|-------------|--------------------------|
| Collector-Emitter Voltage                                                              | $V_{CE}$       | 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 @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 200<br>1.14 | W<br>W/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                    | $T_J, T_{stg}$ | -65 to +200 | $^\circ\text{C}$         |

### THERMAL CHARACTERISTICS

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

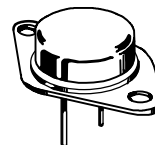
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.



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



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

### MARKING DIAGRAM



MJ4502 = Device Code  
G = Pb-Free Package  
A = Assembly Location  
YY = Year  
WW = Work Week  
MEX = Country of Origin

### ORDERING INFORMATION

| Device  | Package             | Shipping         |
|---------|---------------------|------------------|
| MJ4502  | TO-204              | 100 Units / Tray |
| MJ4502G | TO-204<br>(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.

# MJ4502

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

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

### OFF CHARACTERISTICS

|                                                                                                                                                     |                |        |            |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------|------------|-----|
| Collector-Emitter Breakdown Voltage (Note 1)<br>( $I_C = 200\text{ mA}$ , $R_{BE} = 100\ \Omega$ )                                                  | $V_{(BR)CER}$  | 100    | –          | Vdc |
| Collector-Emitter Sustaining Voltage (Note 1)<br>( $I_C = 200\text{ mA}$ )                                                                          | $V_{CEO(sus)}$ | 90     | –          | Vdc |
| Collector-Base Cutoff Current<br>( $V_{CB} = 100\text{ Vdc}$ , $I_E = 0$ )<br>( $V_{CB} = 100\text{ Vdc}$ , $I_E = 0$ , $T_C = 150^\circ\text{C}$ ) | $I_{CBO}$      | –<br>– | 1.0<br>5.0 | mA  |
| Emitter-Base Cutoff Current<br>( $V_{BE} = 4.0\text{ Vdc}$ , $I_C = 0$ )                                                                            | $I_{EBO}$      | –      | 1.0        | mA  |

### ON CHARACTERISTICS

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

### DYNAMIC CHARACTERISTICS

|                                                                                                                |       |     |   |     |
|----------------------------------------------------------------------------------------------------------------|-------|-----|---|-----|
| Current Gain – Bandwidth Product<br>( $I_C = 1.0\text{ A}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1.0\text{ MHz}$ ) | $f_T$ | 2.0 | – | MHz |
|----------------------------------------------------------------------------------------------------------------|-------|-----|---|-----|

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

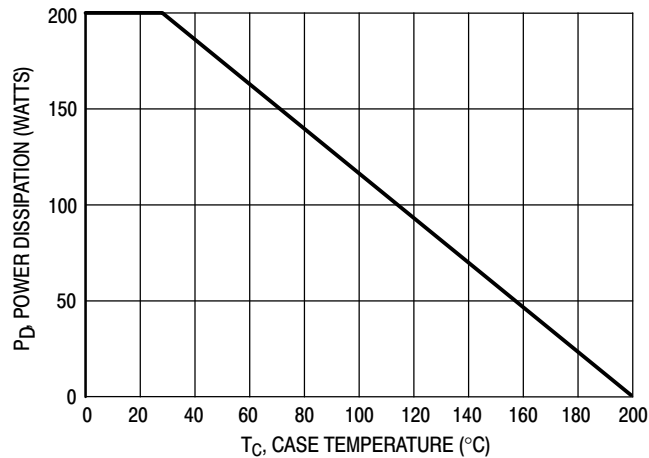


Figure 1. Power-Temperature Derating Curve

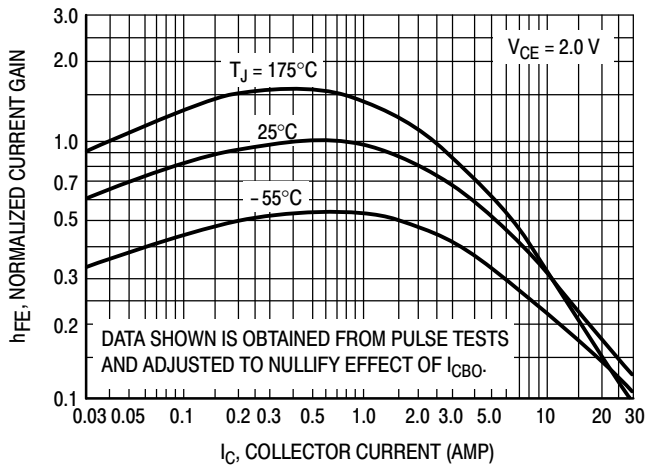


Figure 2. DC Current Gain

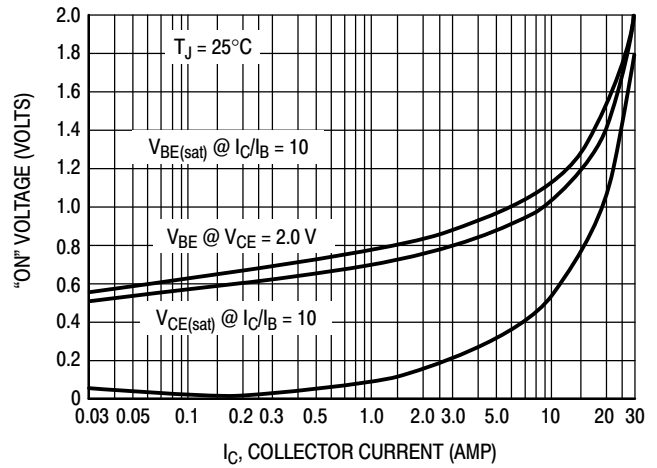


Figure 3. "On" Voltages

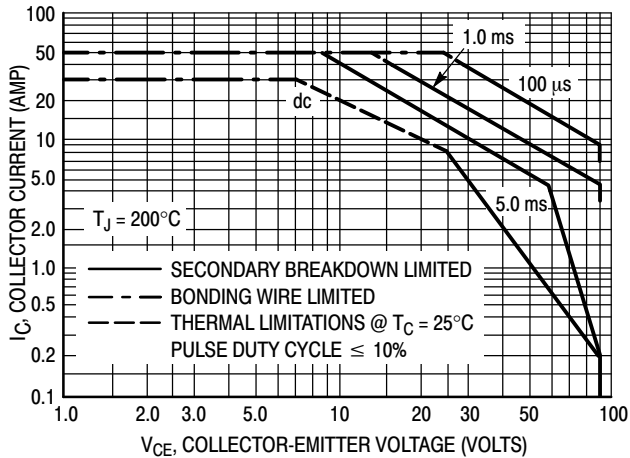


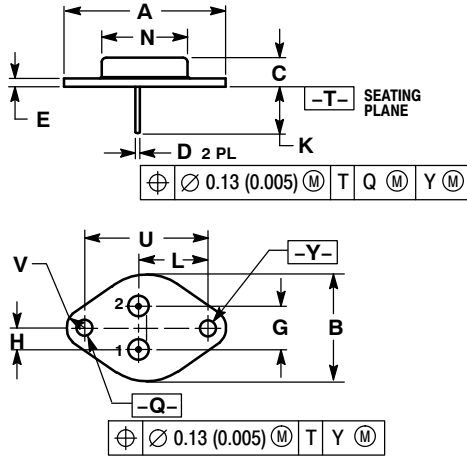
Figure 4. Active Region Safe Operating Area

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.

# MJ4502

## PACKAGE DIMENSIONS

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



#### 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  |

#### STYLE 1:

- PIN 1. BASE
  - EMITTER
- CASE: COLLECTOR

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### Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: [info@moschip.ru](mailto:info@moschip.ru)

Skype отдела продаж:

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