# MJ15020 - NPN
# MJ15021 - PNP

**Preferred Devices**

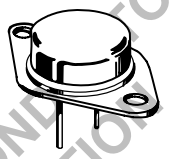
# Complementary Silicon Power Transistors

These transistors are designed for use as high frequency drivers in Audio Amplifiers.

**ON Semiconductor®**

**http://onsemi.com**

**4.0 AMPERES**
**COMPLEMENTARY SILICON-**
**POWER TRANSISTORS**
**200 – 250 VOLTS, 150 WATTS**



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

### Features

- High Gain Complementary Silicon Power Transistors
- Safe Operating Area 100% Tested 50 V, 3.0 A, 1.0 Sec
- Excellent Frequency Response $-f_T$ = 20 MHz min
- Pb−Free Packages are Available*

### MAXIMUM RATINGS

| Rating | Symbol | MJ15020 MJ15021 | Unit |
|---|---|---|---|
| Collector−Emitter Voltage | $V_{CEO}$ | 250 | Vdc |
| Collector−Base Voltage | $V_{CBO}$ | 250 | Vdc |
| Emitter−Base Voltage | $V_{EBO}$ | 7.0 | Vdc |
| Collector Current − Continuous | $I_C$ | 4.0 | Adc |
| Base Current − Continuous | $I_B$ | 2.0 | Adc |
| Emitter Current − Continuous | $I_E$ | 6.0 | Adc |
| Total Device Dissipation @ $T_C$ = 25°C<br>Derate above 25°C | $P_D$ | 150<br>0.86 | W<br>W/°C |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{stg}$ | −65 to +200 | °C |

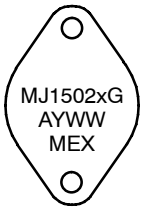
### THERMAL CHARACTERISTICS

| Characteristics | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance, Junction−to−Case | $R_{\theta JC}$ | 1.17 | °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.

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

### MARKING DIAGRAM




MJ1502x = Device Code
x = 0 or 1
G = Pb−Free Package
A = Assembly Location
Y = Year
WW = Work Week
MEX = Country of Origin

### ORDERING INFORMATION

| Device | Package | Shipping |
|---|---|---|
| MJ15020 | TO−204 | 100 Units / Tray |
| MJ15020G | TO−204 (Pb−Free) | 100 Units / Tray |
| MJ15021 | TO−204 | 100 Units / Tray |
| MJ15021G | TO−204 (Pb−Free) | 100 Units / Tray |

**Preferred** devices are recommended choices for future use and best overall value.

**ELECTRICAL CHARACTERISTICS** ($T_C$ = 25°C unless otherwise noted)

| Characteristic | | Symbol | Min | Max | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| Collector–Emitter Sustaining Voltage (Note 1) ($I_C$ = 100 mAdc, $I_B$ = 0) | MJ15020, MJ15021 | $V_{CEO(sus)}$ | 250 | – | Vdc |
| Collector Cutoff Current ($V_{CE}$ = 200 Vdc, $I_B$ = 0) | MJ15020, MJ15021 | $I_{CEO}$ | – | 500 | μAdc |
| Emitter Cutoff Current ($V_{EB}$ = 7.0 Vdc, $I_C$ = 0) | | $I_{EBO}$ | – | 500 | μAdc |
| **SECOND BREAKDOWN** | | | | | |
| Second Breakdown Collector Current with Base Forward–Biased ($V_{CE}$ = 50 Vdc, t = 0.5 s (non–repetitive) | | $I_{S/b}$ | 3.0 | – | Adc |
| **ON CHARACTERISTICS** (Note 1) | | | | | |
| DC Current Gain ($I_C$ = 1.0 Adc, $V_{CE}$ = 4.0 V) ($I_C$ = 3.0 Adc, $V_{CE}$ = 4.0 V) | | $h_{FE}$ | 30 10 | – – | – |
| Collector–Emitter Saturation Voltage ($I_C$ = 1.0 Adc, $I_B$ = 0.1 Adc) | | $V_{CE(sat)}$ | – | 1.0 | Vdc |
| Base–Emitter on Voltage ($I_C$ = 1.0 Adc, $V_{CE}$ = 4.0 Vdc) | | $V_{BE(on)}$ | – | 2.0 | Vdc |
| **DYNAMIC CHARACTERISTICS** | | | | | |
| Current–Gain – Bandwidth Product ($I_C$ = 0.5 Adc, $V_{CE}$ = 10 Vdc, $f_{test}$ = 1.0 MHz) | | $f_T$ | 20 | – | MHz |
| Output Capacitance ($V_{CB}$ = 10 Vdc, $I_E$ = 0, $F_{test}$ = 1.0 MHz) | | $C_{ob}$ | – | 500 | pF |

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%



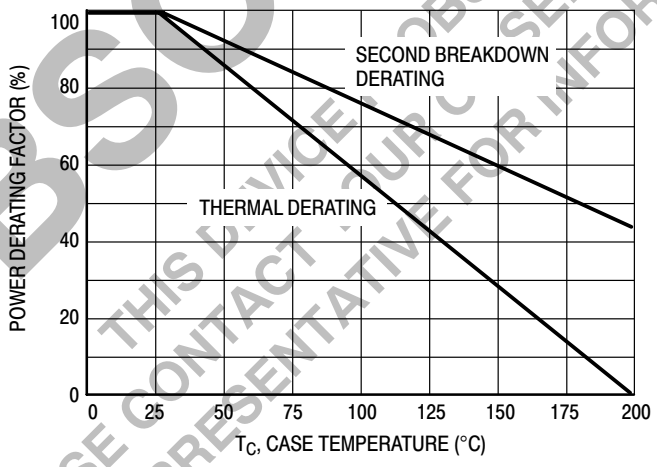



**Figure 1. Power Derating**

## TYPICAL DYNAMIC CHARACTERISTICS

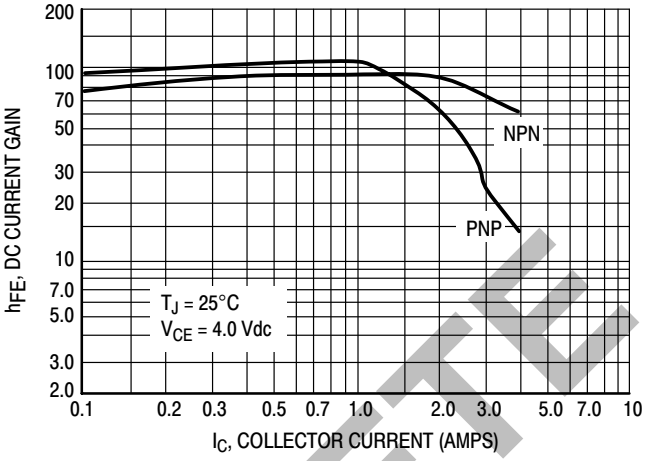



**Figure 2. DC Current Gain**

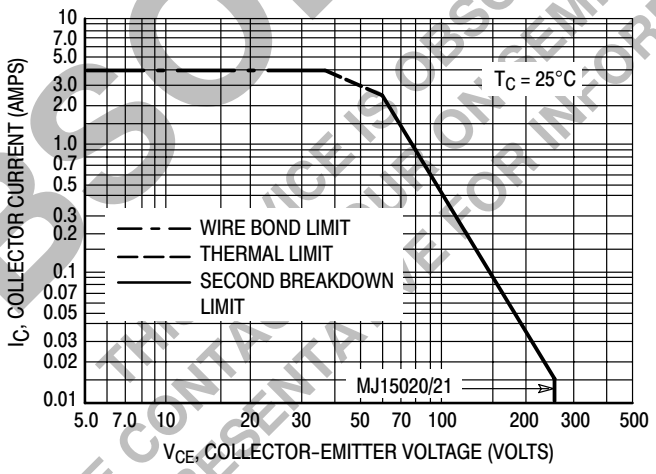
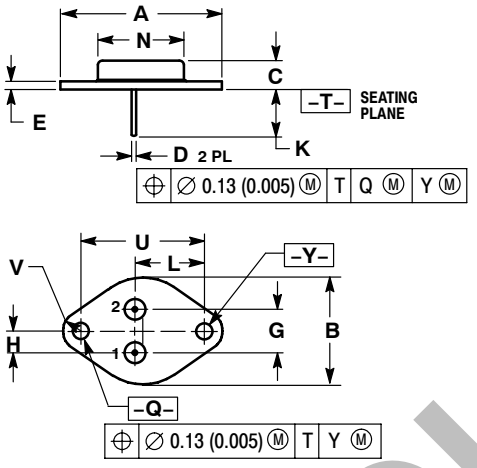



**Figure 3. Maximum Rated Forward Biased Safe Operating Area**

## 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.

| | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| DIM | 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
2. EMITTER
CASE: COLLECTOR





**PUBLICATION ORDERING INFORMATION**

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