

# MJ15020 - NPN

# MJ15021 - PNP

Preferred Devices

## Complementary Silicon Power Transistors

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

### 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 @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	150 0.86	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.17	$^\circ\text{C/W}$

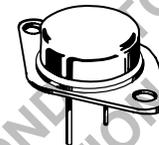
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.



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

### 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.

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

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## 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>CE(sus)</sub>	250	–	V <sub>dc</sub>
Collector Cutoff Current (V <sub>CE</sub> = 200 V <sub>dc</sub> , I <sub>B</sub> = 0)	I <sub>CEO</sub>	–	500	μA <sub>dc</sub>
Emitter Cutoff Current (V <sub>EB</sub> = 7.0 V <sub>dc</sub> , I <sub>C</sub> = 0)	I <sub>EBO</sub>	–	500	μA <sub>dc</sub>
<b>SECOND BREAKDOWN</b>				
Second Breakdown Collector Current with Base Forward–Biased (V <sub>CE</sub> = 50 V <sub>dc</sub> , t = 0.5 s (non–repetitive))	I <sub>S/b</sub>	3.0	–	A <sub>dc</sub>
<b>ON CHARACTERISTICS (Note 1)</b>				
DC Current Gain (I <sub>C</sub> = 1.0 A <sub>dc</sub> , V <sub>CE</sub> = 4.0 V) (I <sub>C</sub> = 3.0 A <sub>dc</sub> , V <sub>CE</sub> = 4.0 V)	h <sub>FE</sub>	30 10	– –	–
Collector–Emitter Saturation Voltage (I <sub>C</sub> = 1.0 A <sub>dc</sub> , I <sub>B</sub> = 0.1 A <sub>dc</sub> )	V <sub>CE(sat)</sub>	–	1.0	V <sub>dc</sub>
Base–Emitter on Voltage (I <sub>C</sub> = 1.0 A <sub>dc</sub> , V <sub>CE</sub> = 4.0 V <sub>dc</sub> )	V <sub>BE(on)</sub>	–	2.0	V <sub>dc</sub>
<b>DYNAMIC CHARACTERISTICS</b>				
Current–Gain – Bandwidth Product (I <sub>C</sub> = 0.5 A <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f <sub>test</sub> = 1.0 MHz)	f <sub>T</sub>	20	–	MHz
Output Capacitance (V <sub>CB</sub> = 10 V <sub>dc</sub> , I <sub>E</sub> = 0, F <sub>test</sub> = 1.0 MHz)	C <sub>ob</sub>	–	500	pF

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

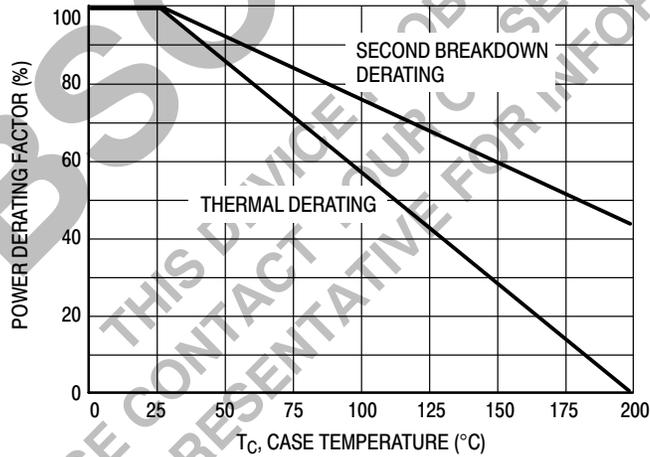


Figure 1. Power Derating

TYPICAL DYNAMIC CHARACTERISTICS

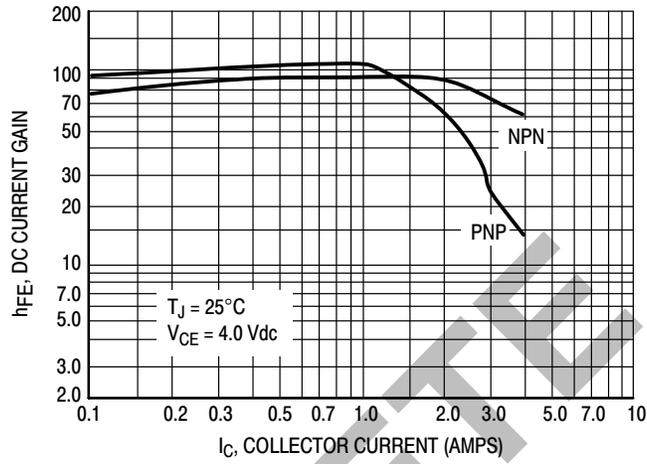


Figure 2. DC Current Gain

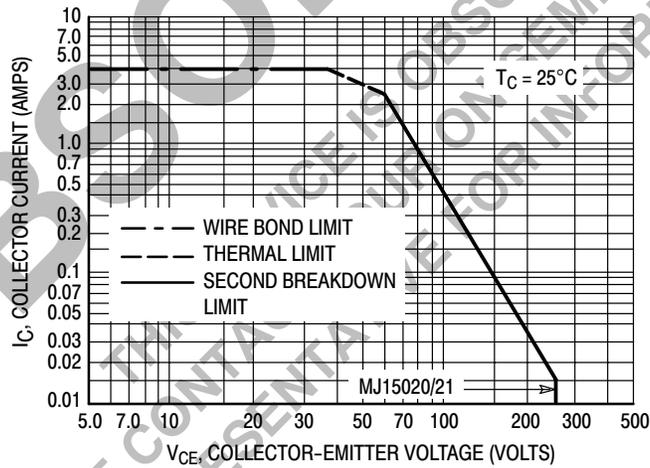


Figure 3. Maximum Rated Forward Biased Safe Operating Area

