

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°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	$^\circ\text{C/W}$

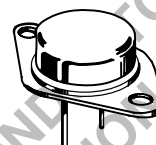
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.



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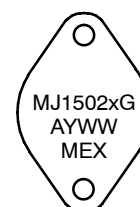
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**4.0 AMPERES
COMPLEMENTARY SILICON-
POWER TRANSISTORS
200 – 250 VOLTS, 150 WATTS**



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.

MJ15020 – NPN MJ15021 – PNP

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

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Sustaining Voltage (Note 1) ($I_C = 100\text{ mAdc}$, $I_B = 0$)	MJ15020, MJ15021	$V_{CEO(sus)}$	250	–	Vdc
Collector Cutoff Current ($V_{CE} = 200\text{ Vdc}$, $I_B = 0$)	MJ15020, MJ15021	I_{CEO}	–	500	μAdc
Emitter Cutoff Current ($V_{EB} = 7.0\text{ Vdc}$, $I_C = 0$)		I_{EBO}	–	500	μAdc

SECOND BREAKDOWN

Second Breakdown Collector Current with Base Forward–Biased ($V_{CE} = 50\text{ Vdc}$, $t = 0.5\text{ s}$ (non–repetitive))	$I_{S/b}$	3.0	–	Adc
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ON CHARACTERISTICS (Note 1)

DC Current Gain ($I_C = 1.0\text{ Adc}$, $V_{CE} = 4.0\text{ V}$) ($I_C = 3.0\text{ Adc}$, $V_{CE} = 4.0\text{ V}$)	h_{FE}	30 10	– –	–
Collector–Emitter Saturation Voltage ($I_C = 1.0\text{ Adc}$, $I_B = 0.1\text{ Adc}$)	$V_{CE(sat)}$	–	1.0	Vdc
Base–Emitter on Voltage ($I_C = 1.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$)	$V_{BE(on)}$	–	2.0	Vdc

DYNAMIC CHARACTERISTICS

Current–Gain – Bandwidth Product ($I_C = 0.5\text{ Adc}$, $V_{CE} = 10\text{ Vdc}$, $f_{test} = 1.0\text{ MHz}$)	f_T	20	–	MHz
Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $F_{test} = 1.0\text{ MHz}$)	C_{ob}	–	500	pF

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

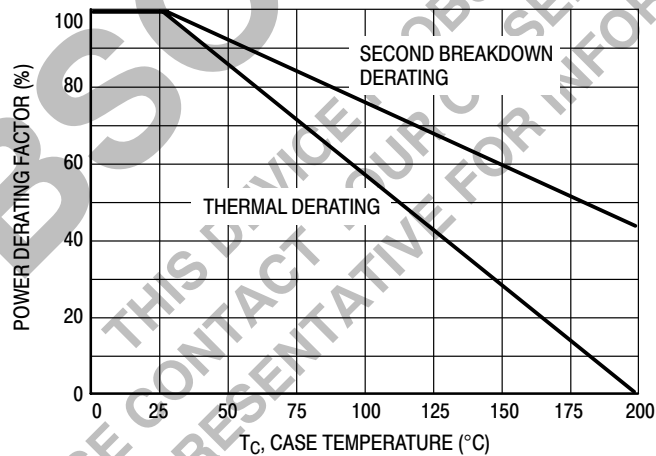


Figure 1. Power Derating

TYPICAL DYNAMIC CHARACTERISTICS

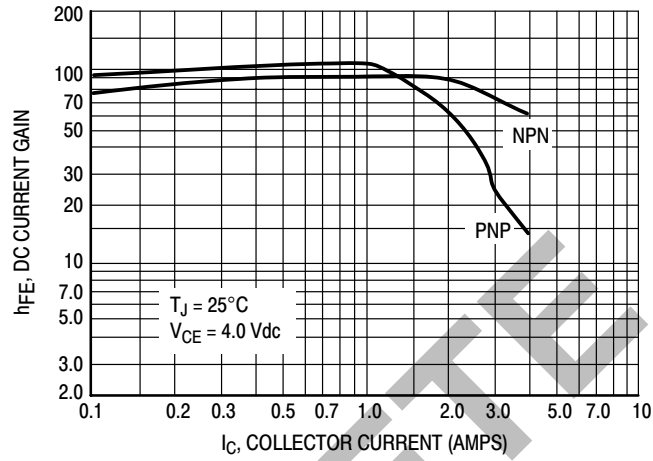


Figure 2. DC Current Gain

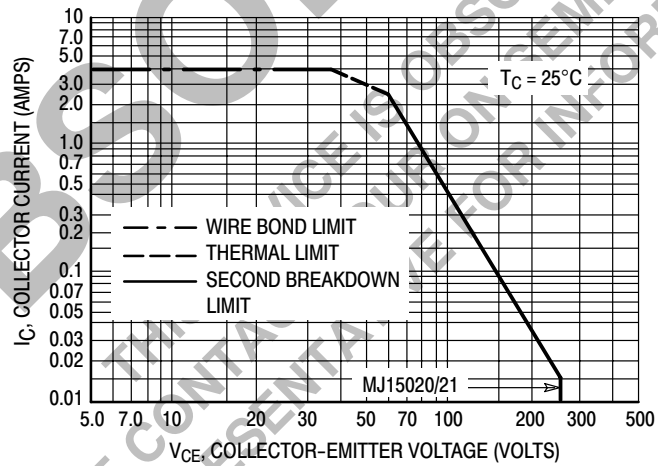
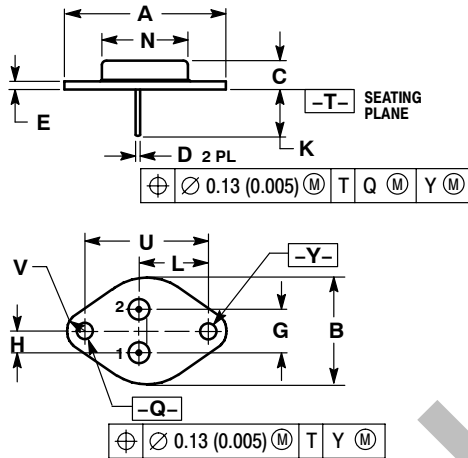


Figure 3. Maximum Rated Forward Biased Safe Operating Area

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.


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

2: EMITTER

CASE: COLLECTOR

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