MJ15011 (NPN), MJ15012 (PNP)

Preferred Devices

Complementary Silicon Power Transistors

The MJ15011 and MJ15012 are PowerBase power transistors designed for high−power audio, disk head positioners, and other linear applications. These devices can also be used in power switching circuits such as relay or solenoid drivers, dc−to−dc converters or inverters.

- High Safe Operating Area (100% Tested)
  1.2 A @ 100 V
- Completely Characterized for Linear Operation
- High DC Current Gain and Low Saturation Voltage
  h_{FE} = 20 (Min) @ 2 A, 2 V
  $V_{CE(sat)}$ = 2.5 V (Max) @ I_C = 4 A, I_B = 0.4 A
- For Low Distortion Complementary Designs
- Pb−Free Packages are Available*

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector−Emitter Voltage	V_{CEO}	250	Vdc
Collector−Emitter Voltage	V_{CEX}	250	Vdc
Emitter−Base Voltage	V_{EB}	5	Vdc
Collector Current − Continuous − Peak (Note 1)	I_C I_{CM}	10 15	Adc
Base Current − Continuous − Peak (Note 1)	I_B I_{BM}	2 5	Adc
Emitter Current − Continuous − Peak (Note 1)	I_E I_{EM}	12 20	Adc
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	200 1.14	Watts W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.875	°C/W
Maximum Lead Temperature for Soldering Purposes	T_L	265	°C

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.

1. Pulse Test: Pulse Width = 5 ms, Duty Cycle ≤ 10%.

*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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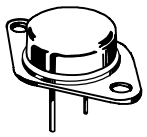
10 AMPERE COMPLEMENTARY POWER TRANSISTORS 250 VOLTS 200 WATTS



TO−204AA (TO−3)
CASE 1−07
STYLE 1

MARKING DIAGRAM

MJ1501x = Device Code
x = 1 or 2
G = Pb−Free Package
A = Location Code
YY = Year
WW = Work Week
MEX = Country of Orgin

ORDERING INFORMATION

Device	Package	Shipping
MJ15011	TO−204AA	100 Units/Tray
MJ15011G	TO−204AA (Pb−Free)	100 Units/Tray
MJ15012	TO−204AA	100 Units/Tray
MJ15012G	TO−204AA (Pb−Free)	100 Units/Tray

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

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector−Emitter Breakdown Voltage (Note 2) (I_C = 100 mA)	$V_{(BR)CEO}$	250	−	Vdc
Collector Cutoff Current (V_{CE} = 200 Vdc)	I_{CEO}	−	1	mAdc
Collector Cutoff Current (V_{CE} = 250 Vdc, $V_{BE(off)}$ = 15 Vdc)	I_{CEX}	−	100	μAdc
Emitter Cutoff Current (V_{BE} = 5 Vdc)	I_{EBO}	−	10	μAdc
ON CHARACTERISTICS (Note 2)				
DC Current Gain (I_C = 2 Adc, V_{CE} = 2 Vdc) (I_C = 4 Adc, V_{CE} = 2 Vdc)	h_{FE}	20 15	120 −	−
Collector−Emitter Saturation Voltage (I_C = 2 Adc, I_B = 0.2 Adc) (I_C = 4 Adc, I_B = 0.4 Adc)	$V_{CE(sat)}$	− −	0.6 1.0	Vdc
Base−Emitter On Voltage (I_C = 4 Adc, V_{CE} = 2 Vdc)	$V_{BE(on)}$	−	1.8	Vdc
DYNAMIC CHARACTERISTICS				
Output Capacitance (V_{CB} = 10 Vdc, f = 1 MHz)	C_{ob}	−	750	pF
SECOND BREAKDOWN				
Second Breakdown Collector Current with Base Forward Biased (V_{CE} = 40 Vdc, t = 0.5 s) (V_{CE} = 100 Vdc, t = 0.5 s)	$I_{S/b}$	5 1.4	− −	Adc

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

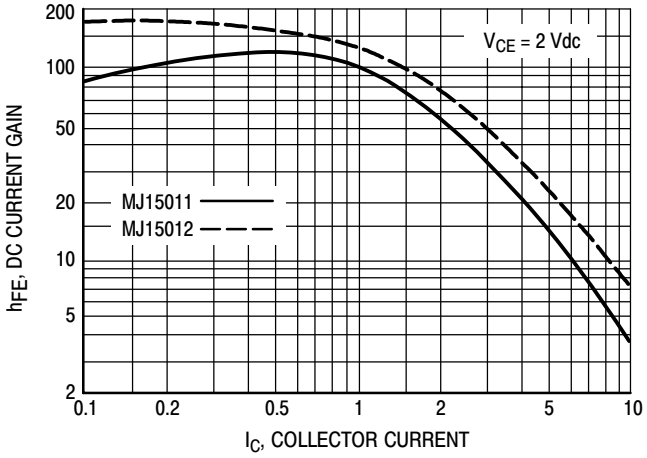


Figure 1. DC Current Gain

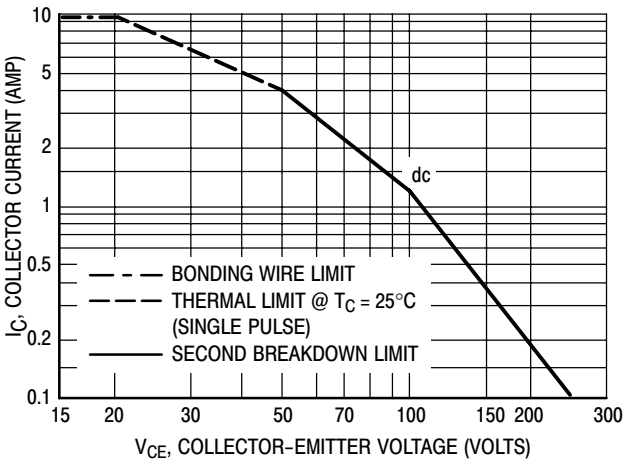
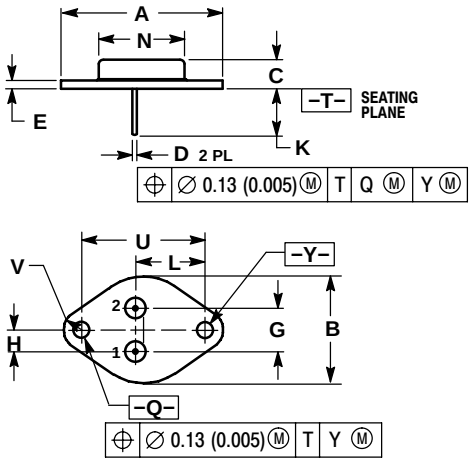


Figure 2. Active Region Safe Operating Area

PACKAGE DIMENSIONS

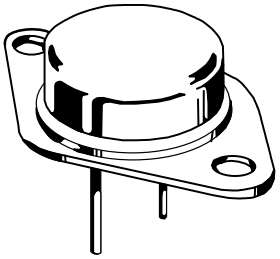
TO−204 (TO−3)
CASE 1−07
ISSUE Z



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

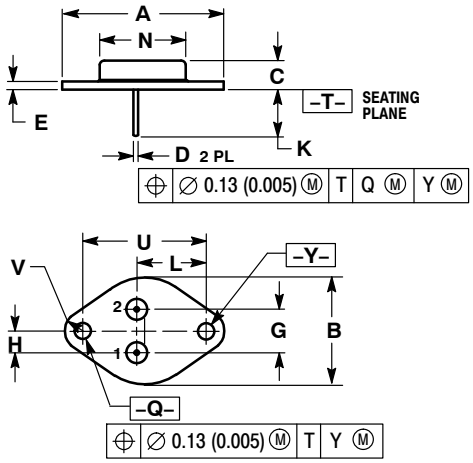
STYLE 1:
PIN 1. BASE
2. EMITTER
CASE: COLLECTOR



SCALE 1:1

TO−204 (TO−3)
CASE 1−07
ISSUE Z

DATE 10 MAR 2000



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STYLE 1:
PIN 1. BASE
2. EMITTER
CASE: COLLECTOR

STYLE 2:
PIN 1. BASE
2. COLLECTOR
CASE: EMITTER

STYLE 3:
PIN 1. GATE
2. SOURCE
CASE: DRAIN

STYLE 4:
PIN 1. GROUND
2. INPUT
CASE: OUTPUT

STYLE 5:
PIN 1. CATHODE
2. EXTERNAL TRIP/DELAY
CASE: ANODE

STYLE 6:
PIN 1. GATE
2. EMITTER
CASE: COLLECTOR

STYLE 7:
PIN 1. ANODE
2. OPEN
CASE: CATHODE

STYLE 8:
PIN 1. CATHODE #1
2. CATHODE #2
CASE: ANODE

STYLE 9:
PIN 1. ANODE #1
2. ANODE #2
CASE: CATHODE

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