MJ15003 (NPN), MJ15004 (PNP)

Preferred Device

Complementary Silicon Power Transistors

The MJ15003 and MJ15004 are PowerBase™ power transistors designed for high power audio, disk head positioners and other linear applications.

- High Safe Operating Area (100% Tested) – 5.0 A @ 50 V
- For Low Distortion Complementary Designs
- High DC Current Gain – h_{FE} = 25 (Min) @ I_C = 5 Adc

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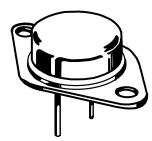
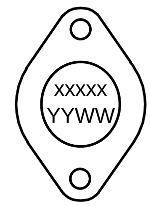
20 AMPERE POWER TRANSISTORS COMPLEMENTARY SILICON 140 V 250 W



TO–204AA (TO–3)
CASE 1–07

MARKING DIAGRAM



xx = Specific Device Code
A = Assembly Location
WL, L = Wafer Lot
YY, Y = Year
WW, W = Work Week

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	140	Vdc
Collector–Base Voltage	V_{CBO}	140	Vdc
Emitter–Base Voltage	V_{EBO}	5	Vdc
Collector Current – Continuous	I_C	20	Adc
Base Current – Continuous	I_B	5	Adc
Emitter Current – Continuous	I_E	25	Adc
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	250 1.43	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	$R_{\theta JC}$	0.70	°C/W
Maximum Lead Temperature for Soldering Purposes: 1/16″ from Case for ≤ 10 seconds	T_L	265	°C

ORDERING INFORMATION

Device	Package	Shipping
MJ15003	TO–204AA (TO–3)	100 Foams
MJ15004	TO–204AA (TO–3)	100 Foams

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 = 200 mAdc, I_B = 0)	$V_{CEO(sus)}$	140	–	Vdc
Collector Cutoff Current (V_{CE} = 140 Vdc, $V_{BE(off)}$ = 1.5 Vdc) (V_{CE} = 140 Vdc, $V_{BE(off)}$ = 1.5 Vdc, T_C = 150°C)	I_{CEX}	– –	100 2	μAdc mAdc
Collector Cutoff Current (V_{CE} = 140 Vdc, I_B = 0)	I_{CEO}	–	250	μAdc
Emitter Cutoff Current (V_{EB} = 5 Vdc, I_C = 0)	I_{EBO}	–	100	μAdc
SECOND BREAKDOWN				
Second Breakdown Collector Current with Base Forward Baised (V_{CE} = 50 Vdc, t = 1 s (non repetitive)) (V_{CE} = 100 Vdc, t = 1 s (non repetitive))	$I_{S/b}$	5.0 1.0	– –	Adc
ON CHARACTERISTICS				
DC Current Gain (I_C = 5 Adc, V_{CE} = 2 Vdc)	h_{FE}	25	150	
Collector Emitter Saturation Voltage (I_C = 5 Adc, I_B = 0.5 Adc)	$V_{CE(sat)}$	–	1.0	Vdc
Base Emitter On Voltage (I_C = 5 Adc, V_{CE} = 2 Vdc)	$V_{BE(on)}$	–	2.0	Vdc
DYNAMIC CHARACTERISTICS				
Current Gain — Bandwidth Product (I_C = 0.5 Adc, V_{CE} = 10 Vdc, f_{test} = 0.5 MHz)	f_T	2.0	–	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f_{test} = 1 MHz)	c_{ob}	–	1000	pF

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

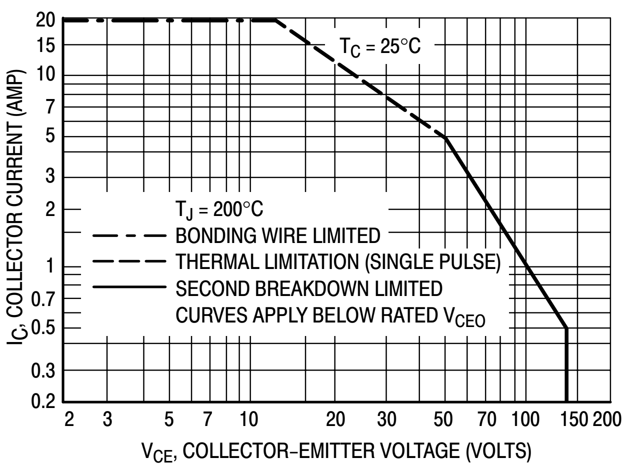


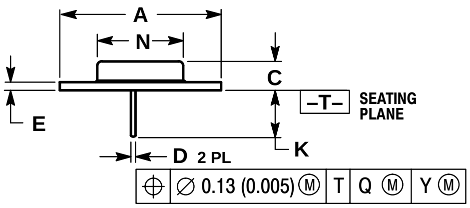
Figure 1. Active–Region Safe Operating Area

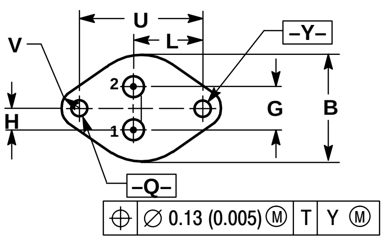
There are two limitations on the powerhandling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate I_C – V_{CE} limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 1 is based on $T_{J(pk)}$ = 200°C; T_C is variable depending on conditions. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

PACKAGE DIMENSIONS

CASE 1–07
TO–204AA (TO–3)
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

Literature Fulfillment:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303–675–2175 or 800–344–3860 Toll Free USA/Canada
Fax: 303–675–2176 or 800–344–3867 Toll Free USA/Canada
Email: ONlit@hibbertco.com

N. American Technical Support: 800–282–9855 Toll Free USA/Canada

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For additional information, please contact your local Sales Representative.