

# ALPHANUMERIC INDEX — CROSS-REFERENCE (Continued)

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\*Consult Motorola if a direct replacement is necessary.

**TABLE 1 — METAL TO-204, TO-204AE (continued)**

I <sub>C</sub> Cont Amps Max	V <sub>CEO(sus)</sub> Volts Min	Device Type		h <sub>FE</sub> Min/Max	@ I <sub>C</sub> Amp	Resistive Switching			f <sub>T</sub> MHz Min	P <sub>D</sub> (Case) Watts @ 25°C	
		NPN	PNP			t <sub>s</sub> μs Max	t <sub>f</sub> μs Max	@ I <sub>C</sub> Amp			
10	250	MJ15011	MJ15012	20/100	2					200	
	300	MJ3041##		250 min	2.5					175	
	325	MJ413 MJ423 MJ431			20/80	0.5				2.5	125
					30/90	1				2.5	125
					15/35	2.5				2.5	125
	350	BU323## MJ3042## MJ13014 MJ10002## MJ10006##			150 min	6	7.5 typ	5.2 typ	6		175
					250 min	2.5					175
					8/20	5	2	0.5	5		150
					3/300	5	2.5	1	5	10#	150
	400	BU323A## MJ10007## MJ10012## MJ13015			30/300	5	7.5 typ	5.2 typ	6		175
100/2k					6	15	15	6	10#	150	
8/20					5	2	0.5	5		175	
30/300					5	1.5	0.5	5		150	
600	MJ10014##			10/250	10	2.5	0.8	10		175	
700	MJ8504			7.5 min	1.5	4	2	5		175	
800	MJ8505 MJ16018			7.5 min	1.5	4	2	5		175	
				4 min	5	4.5 typ	0.2 typ	5		150	
950*	MJ12010			4.2 min	5		1	5		100	
12	60	2N6057##	2N6050##	750/18k	6	1.6 typ	1.5 typ	6	4#	150	
	80	2N6058##	2N6051##	750/18k	6	1.6 typ	1.5 typ	6	4#	150	
	100	2N6059##	2N6052##	750/18k	6	1.6 typ	1.5 typ	6	4#	150	
15	60	2N3055 2N3055A 2N6576## 2N5881	MJ2955 MJ2955A  2N5879	20/70	4	0.7 typ	0.3 typ	4	2.5	115	
				20/70	4			0.8	115		
				2k/20k	4	2	7	10	10-200#	120	
				20/100	6	1	0.8	6	4	160	
	80	2N5882	2N5880	20/100	6	1	0.8	6	4	160	
	90	2N6577##			2k/20k	4	2	7	10	10-200#	120
					2k/20k	4	2	7	10	10-200#	120
	140	MJ15001	MJ15002	25/150	4				2	200	
	150	MJ11018##	MJ11017##	100 min	15				3#	175	
	200	BUX41 2N6249 MJ11020##	MJ11019##		8 min	8	1.5	0.4	8	8	120
					10/50	10	3.5	1	10	2.5	175
					100 min	15				3#	175
	250	MJ11022##	MJ11021##	100 min	15				3#	175	
	275	2N6250		8/50	10	3.5	1	10	2.5	175	
	300	2N6546		6/30	10	4	0.7	10	6 to 24	175	
325	BUX13		8 min	8	2.5	0.8	8	8	150		
400	BUX48 2N6547 MJ13090 MJ16110			8 min	10	2	0.4	10		175	
				6/30	10	4	0.7	10	6 to 24	175	
				8 min	10	2.5	0.5	10		175	
				6/20	15	0.8 typ	0.1 typ	10		175	
450	BUX48A MJ16010			8 min	8	2	0.4	10		175	
				5 min	15	1.2 typ	0.2 typ	10		175	

\* V<sub>BR</sub>/I<sub>C</sub>EX. # |h<sub>FE</sub>| @ 1 MHz, ## Darlington

(continued)

JAN, JTX, JTXV Available

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**NPN**  
**MJ15011**  
**PNP**  
**MJ15012**

**Advance Information**

**COMPLEMENTARY SILICON POWER TRANSISTORS**

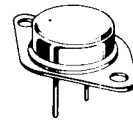
The MJ15011 and MJ15012 are PowerBase power transistors designed for high-power audio, disk head positioners, and other linear applications. These devices can also be used in power switching circuits such as relay or solenoid drivers, dc-to-dc converters or inverters.

- 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

**10 AMPERE**

**COMPLEMENTARY**  
**POWER TRANSISTORS**

**250 VOLTS**  
**200 WATTS**



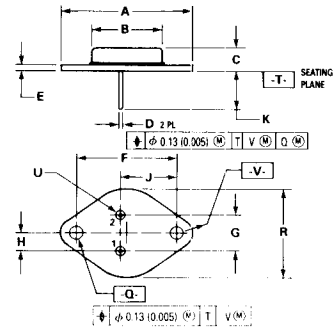
**MAXIMUM RATINGS**

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	$I_C$	10	A dc
-- Peak (1)	$I_{CM}$	15	
Base Current -- Continuous	$I_B$	2	A dc
-- Peak (1)	$I_{BM}$	5	
Emitter Current -- Continuous	$I_E$	12	A dc
-- Peak (1)	$I_{EM}$	20	
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	200	Watts
1.14			$W/^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200	$^\circ\text{C}$

**THERMAL CHARACTERISTICS**

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

(1) Pulse Test: Pulse Width = 5 ms, Duty Cycle  $\leq$  10%.



- 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	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	—	39.37	—	1.550
B	—	21.08	—	0.830
C	6.35	8.25	0.250	0.325
D	0.97	1.09	0.038	0.043
E	1.40	1.77	0.055	0.070
F	30.15 BSC	—	1.187 BSC	—
G	10.92 BSC	—	0.430 BSC	—
H	5.46 BSC	—	0.215 BSC	—
J	16.89 BSC	—	0.665 BSC	—
K	11.18	12.19	0.440	0.480
Q	3.84	4.19	0.151	0.165
R	—	26.67	—	1.050
U	4.83	5.33	0.190	0.210
V	3.84	4.19	0.151	0.165

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

**CASE 1-06**  
**TO-204AA**  
**(TO-3)**

This is advance information and specifications are subject to change without notice.

# NPN MJ15011, PNP MJ15012

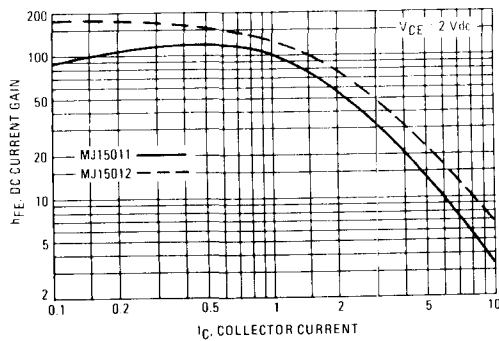
## ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector-Emitter Breakdown Voltage (1) (I <sub>C</sub> = 100 mA)	V <sub>(BR)CEO</sub>	250	—	Vdc
Collector Cutoff Current (V <sub>CE</sub> = 200 Vdc)	I <sub>CEO</sub>	—	1	mA <sub>dc</sub>
Collector Cutoff Current (V <sub>CE</sub> = 250 Vdc, V <sub>BE(off)</sub> = 1.5 Vdc)	I <sub>CEX</sub>	—	500	μA <sub>dc</sub>
Emitter Cutoff Current (V <sub>BE</sub> = 5 Vdc)	I <sub>EBO</sub>	—	500	μA <sub>dc</sub>
<b>ON CHARACTERISTICS (1)</b>				
DC Current Gain (I <sub>C</sub> = 2 A <sub>dc</sub> , V <sub>CE</sub> = 2 Vdc) (I <sub>C</sub> = 4 A <sub>dc</sub> , V <sub>CE</sub> = 2 Vdc)	h <sub>FE</sub>	20 5	100 —	—
Collector-Emitter Saturation Voltage (I <sub>C</sub> = 2 A <sub>dc</sub> , I <sub>B</sub> = 0.2 A <sub>dc</sub> ) (I <sub>C</sub> = 4 A <sub>dc</sub> , I <sub>B</sub> = 0.4 A <sub>dc</sub> )	V <sub>CE(sat)</sub>	—	0.8 2.5	Vdc
Base-Emitter On Voltage (I <sub>C</sub> = 4 A <sub>dc</sub> , V <sub>CE</sub> = 2 Vdc)	V <sub>BE(on)</sub>	—	2	Vdc
<b>DYNAMIC CHARACTERISTICS</b>				
Output Capacitance (V <sub>CB</sub> = 10 Vdc, f = 1 MHz)	C <sub>ob</sub>	—	750	pF
<b>SECOND BREAKDOWN</b>				
Second Breakdown Collector Current with Base Forward Biased (V <sub>CE</sub> = 40 Vdc, t = 0.5 s) (V <sub>CE</sub> = 100 Vdc, t = 0.5 s)	I <sub>S/b</sub>	5 1.4	— —	A <sub>dc</sub>

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

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**FIGURE 1 — DC CURRENT GAIN**



**FIGURE 2 — ACTIVE REGION SAFE OPERATING AREA**

