

ALPHANUMERIC INDEX — CROSS-REFERENCE (Continued)

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MJ13100		MJ16016	3-774	MJ2841		2N5878	3-120
MJ13101		MJ16016	3-774	MJ2901		MJ15016	3-9
MJ13330	MJ13330		3-694	MJ2940		2N5875	3-120
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MJ15002	MJ15002		3-710	MJ3055A	2N3055A		3-9
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MJ15004	MJ15004		3-713	MJ3238	MJE15031		3-972
MJ15011	MJ15011		3-716	MJ3247	MJE15030		3-972
MJ15012	MJ15012		3-716	MJ3248	MJE15030		3-972
MJ15015	MJ15015		3-9	MJ400		2N3739	3-37
MJ15016	MJ15016		3-9	MJ4030	2N6285		3-172
MJ15018	MJ15018		3-718	MJ4031	2N6286		3-172
MJ15019	MJ15019		3-718	MJ4032	2N6287		3-172
MJ15020	MJ15020		3-718	MJ4033	2N6282		3-172
MJ15021	MJ15021		3-718	MJ4034	2N6283		3-172
MJ15022	MJ15022		3-720	MJ4035	2N6284		3-172
MJ15023	MJ15023		3-723	MJ410	MJ410		3-522
MJ15024	MJ15024		3-720	MJ411	MJ411		3-522
MJ15025	MJ15025		3-723	MJ413	MJ413		3-524
MJ15026		MJ15024	3-720	MJ423	MJ423		3-524
MJ15027		MJ15025	3-723	MJ4237		MJ15012	3-716
MJ16002	MJ16002		3-726	MJ4238		MJ15012	3-716
MJ16002A	MJ16002A		3-734	MJ424		2N6308	3-181
MJ16004	MJ16004		3-726	MJ4247		MJ15011	3-716
MJ16006	MJ16006		3-742	MJ4248		MJ15011	3-716
MJ16006A	MJ16006A		3-750	MJ425		2N6545	3-221
MJ16008	MJ16008		3-742	MJ431	MJ431		3-524
MJ16010	MJ16010		3-758	MJ4360		MJE130C2	3-938
MJ16010A	MJ16010A		3-766	MJ4361		MJE130C3	3-938
MJ16012	MJ16012		3-758	MJ4380		MJE130C4	3-944
MJ16014	MJ16014		3-774	MJ4381		MJE130C5	3-944
MJ16016	MJ16016		3-774	MJ4400		MJE130C4	3-944
MJ16018	MJ16018		3-782	MJ4401		MJE130C5	3-944
MJ16020	MJ16020		—	MJ450		2N4398	3-68
MJ16022	MJ16022		—	MJ4502	MJ4502		3-536
MJ205		MJ12003	3-642	MJ4645	MJ4646		3-538
MJ2249		2N3766	3-44	MJ4646	MJ4646		3-538
MJ2250		2N3767	3-44	MJ4647	MJ4647		3-538
MJ2251		2N3738	3-37	MJ480		2N3055	3-6
MJ2252		2N3739	3-37	MJ481		2N3055	3-6
MJ2253		2N3740	3-41	MJ490		2N3789	3-56
MJ2254		2N3741	3-41	MJ491		2N3789	3-56
MJ2267		MJ15016	3-9	MJ6502	MJ6503		3-540
MJ2268		MJ2955	3-6	MJ6503	MJ6503		3-540
MJ2300		MJE270	3-874	MJ6700		2N6193	3-158
MJ2305		MJE271	3-874	MJ701		MJ12002	3-637
MJ2500	MJ2500		3-530	MJ702		MJ12002	3-637
MJ2501	MJ2501		3-530	MJ704		MJ12002	3-637
MJ2801		2N3055	3-6	MJ721		MJ12002	3-637

*Consult Motorola if a direct replacement is necessary.

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

I _C Cont Amps Max	V _{CEO(sus)} Volts Min	Device Type		h _{FE} Min/Max	@ I _C Amp	Resistive Switching			f _T MHz Min	P _D (Case) Watts @ 25°C
		NPN	PNP			t _s μs Max	t _f μs Max	@ I _C Amp		
15		MJ16012 2N6836		7 min 10/30	15 10	0.9 typ 3	0.15 typ 0.35	10 10	10	175 175
	500	MJ16010A		5 min	15	3	0.4	10		175
	850*	MJ12022		5 min	15		0.1 typ	10		175
16	100	2N5629	BD318 2N6029	25 min 25/100	5 8	1.2 typ	1.2 typ	8	1 1	200 200
	120	2N5630	2N6030	20/80	8	1.2 typ	1.2 typ	8	1	200
	140	2N3773 2N5631	2N6609 2N6031	15/60 15/60	8 8	1.1 typ 1.2 typ	1.5 typ 1.2 typ	8 8	4 1	150 200
	200	MJ15022	MJ15023	15/60	8				5	250
	250	MJ15024	MJ15025	15/60	8				5	250
18	160	BUX41N		8 min	12	1.2	0.25	12	8	120
20	60	2N3772 2N6282##	2N6285##	15/60 750/18k	10 10	2.5 typ	2.5 typ	10	2 4#	150 160
	75	2N5039		20/100	10	1.5	0.5	10	60	140
	80	2N5303 2N6283##	2N5745 2N6286##	15/60 750/18k	10 10	2 2.5 typ	1 2.5 typ	10 10	2 4#	200 160
	90	2N5038		20/100	12	1.5	0.5	12	60	140
	100	2N6284##	2N6287##	750/18k	10	2.5 typ	2.5 typ	10	4#	160
	125	BUX40		8 min	15	1	0.25	15	8	120
	140	MJ15003	MJ15004	25/150	5				2	250
	160	BUV11N		10 min	15	1.2	0.25	15	8	150
	200	BUV11 MJ13330		10 min 8/40	12 10	1.8 3.5	0.4 0.7	12 10	8 5 to 40	150 175
	250	BUV12 MJ13331		10 min 8/40	10 10	1.5 3.5	0.5 0.7	10 10	8 5 to 40	150 175
	350	MJ10000## MJ10004##		40/400 40/400	10 10	3 1.5	1.8 0.5	10 10	10# 10#	175 175
	400	MJ10001## MJ10005## MJ13333		40/400 40/400 10/60	10 10 5	3 1.5 4	1.8 0.5 0.7	10 10 10	10# 10# 10#	175 175 175
	450	MJ10008## MJ16014 MJ16016 2N6837		30/300 5 min 7 min 10/30	10 20 20 15	2 2.7 2.2 2.5	0.6 0.35 0.25 0.25	10 20 20 15	8#	175 250 250 250
	500	MJ10009## MJ13335		30/300 10/60	10 5	2 4	0.6 0.7	10 10	8#	175 175
	700	BUT15##		15 min	12	2.5	0.8	12		175
	750	MJ10024##		50/600	20	5	1.8	10		250
	850	MJ10025##		50/600	20	5	1.8	10		250

* V_{I(BR)CEX}, # I_{hfeI} (@ 1 MHz, ## Darlington

(continued)

 JAN, JTX, JTXV Available

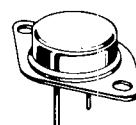
SILICON POWER TRANSISTORS

The MJ15023 and MJ15025 are PowerBase power transistors designed for high power audio, disk head positioners and other linear applications.

- High Safe Operating Area (100% Tested) –
2 A @ 80 V
- High DC Current Gain –
 $h_{FE} = 15$ (Min) @ $I_C = 8$ Adc

16 AMPERE **SILICON** **POWER TRANSISTORS**

200 and 250 VOLTS
250 WATTS



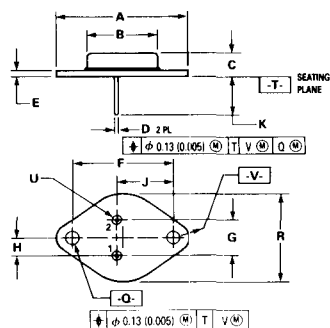
MAXIMUM RATINGS

Rating	Symbol	MJ15023	MJ15025	Unit
Collector-Emitter Voltage	V_{CEO}	200	250	Vdc
Collector-Base Voltage	V_{CBO}	350	400	Vdc
Emitter-Base Voltage	V_{EBO}	5		Vdc
Collector-Emitter Voltage	V_{CEX}	400		Vdc
Collector Current – Continuous	I_C	16		Adc
Collector Current – Peak (1)		30		
Base Current – Continuous	I_B	5		Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	P_D	250		Watts
Derate above 25°C		1.43		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	$R_{\theta JC}$	0.70	$^\circ\text{C/W}$

(1) Pulse Test: Pulse Width = 5 ms, Duty Cycle = 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

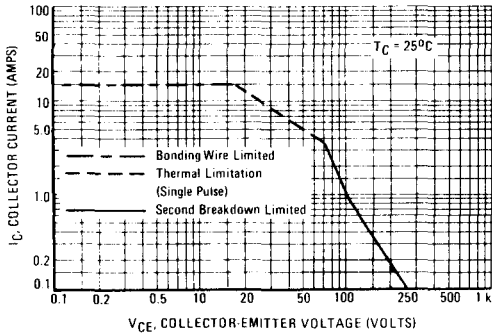
CASE 1-06
TO-204AA
(TO-3)

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Sustaining Voltage (1) (I _C = 100 mAdc, I _B = 0)	MJ15023 MJ15025	V _{CEO(sus)}	200 250	— —	
Collector Cutoff Current (V _{CE} = 200 Vdc, V _{BE(off)} = 1.5 Vdc) (V _{CE} = 250 Vdc, V _{BE(off)} = 1.5 Vdc)	MJ15023 MJ15025	I _{CEX}	— —	250 250	μAdc
Collector Cutoff Current (V _{CE} = 150 Vdc, I _B = 0) (V _{CE} = 200 Vdc, I _B = 0)	MJ15023 MJ15025	I _{CEO}	— —	500 500	μAdc
Emitter Cutoff Current (V _{CE} = 5 Vdc, I _B = 0)	Both	I _{EBO}	—	500	μAdc
SECOND BREAKDOWN					
Second Breakdown Collector Current with Base Forward Biased (V _{CE} = 50 Vdc, t = 0.5 s (non-repetitive)) (V _{CE} = 80 Vdc, t = 0.5 s (non-repetitive))		I _{S/b}	5 2	— —	Adc
ON CHARACTERISTICS					
DC Current Gain (I _C = 8 Adc, V _{CE} = 4 Vdc) (I _C = 16 Adc, V _{CE} = 4 Vdc)		h _{FE}	15 5	60 —	—
Collector-Emitter Saturation Voltage (I _C = 8 Adc, I _B = 0.8 Adc) (I _C = 16 Adc, I _B = 3.2 Adc)		V _{CE(sat)}	— —	1.4 4.0	Vdc
Base-Emitter On Voltage (I _C = 8 Adc, V _{CE} = 4 Vdc)		V _{BE(on)}	—	2.2	Vdc
DYNAMIC CHARACTERISTICS					
Current-Gain – Bandwidth Product (I _C = 1 Adc, V _{CE} = 10 Vdc, f _{test} = 1 MHz)		f _T	4	—	MHz
Output Capacitance (V _{CB} = 10 Vdc, I _E = 0, f _{test} = 1 MHz)		C _{ob}	—	600	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.

MJ15023, MJ15025

TYPICAL CHARACTERISTICS

FIGURE 2 – CAPACITANCES

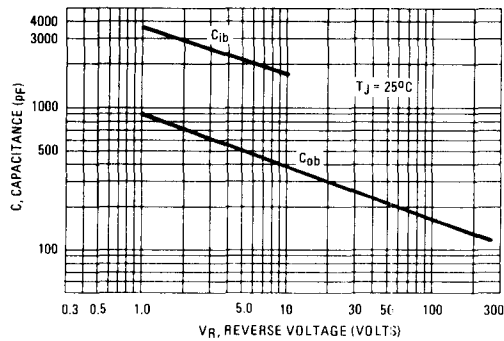


FIGURE 3 – CURRENT-GAIN-BANDWIDTH PRODUCT

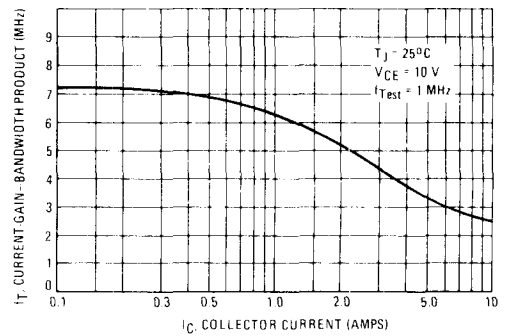


FIGURE 4 – DC CURRENT GAIN

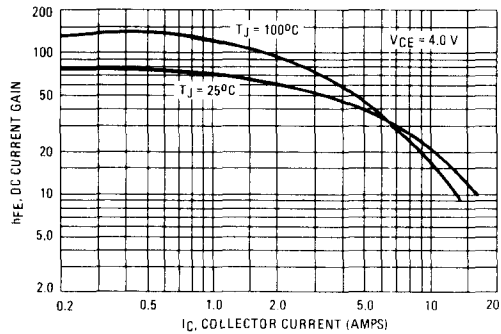


FIGURE 5 – "ON" VOLTAGE

