

ALPHANUMERIC INDEX — CROSS-REFERENCE (Continued)

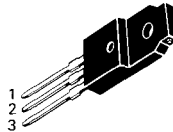
Industry Part Number	Motorola Direct Replacement	Motorola Similar Replacement	Page Number	Industry Part Number	Motorola Direct Replacement	Motorola Similar Replacement	Page Number
MJE202	MJE210	MJE3055	3-904	MJE2801	MJE2801		3-902
MJE2020		TIP41	3-1083	MJE2801K		MJE2801 T	3-902
MJE2021		TIP41A	3-1083	MJE2801T	MJE2801T		3-902
MJE203		MJE3055	3-904	MJE29		TIP29	3-1071
MJE204		MJE3055	3-904	MJE2901	MJE2901		3-902
MJE205		MJE3055	3-904	MJE2901K		MJE2955T	3-904
MJE2050		MJE200	3-866	MJE2901T		MJE2955T	3-904
MJE2055		MJE3055	3-904	MJE2955	MJE2955		3-904
MJE205K		TIP41A	3-1083	MJE2955K		MJE2955T	3-904
MJE2090		TIP125	3-1098	MJE2955T	MJE2955T		3-904
MJE2091		TIP125	3-1098	MJE29A		TIP29A	3-1071
MJE2092		TIP126	3-1098	MJE29B		TIP29B	3-1071
MJE2093		TIP126	3-1098	MJE29C		TIP29C	3-1071
MJE210			3-866	MJE30		TIP30	3-1071
MJE2100		TIP120	3-1098	MJE3055	MJE3055		3-904
MJE2101		TIP120	3-1098	MJE3055K		MJE3055T	3-904
MJE2102		TIP121	3-1098	MJE3055T	MJE3055T		3-904
MJE2103		TIP121	3-1098	MJE30A		TIP30A	3-1071
MJE2150		MJE210	3-866	MJE30B		TIP30B	3-1071
MJE2160		TIP48	3-1087	MJE30C		TIP30C	3-1071
MJE220	MJE2360T	MJE181	3-862	MJE31		TIP31	3-1073
MJE221		MJE181	3-862	MJE31A		TIP31A	3-1073
MJE222		MJE181	3-862	MJE31B		TIP31B	3-1073
MJE223		MJE182	3-862	MJE31C		TIP31C	3-1073
MJE224		MJE182	3-862	MJE32		TIP32	3-1073
MJE225		MJE182	3-862	MJE32A		TIP32A	3-1073
MJE230		MJE171	3-862	MJE32B		TIP32B	3-1073
MJE231		MJE171	3-862	MJE32C		TIP32C	3-1073
MJE232		MJE171	3-862	MJE33		TIP41	3-1083
MJE233		MJE172	3-862	MJE3300		2N6037	3-135
MJE234		MJE172	3-862	MJE3301		2N6038	3-135
MJE235		MJE172	3-862	MJE3302		2N6039	3-135
MJE2360		MJE2360T	3-900	MJE3310		2N6034	3-135
MJE2360T			3-900	MJE3311		2N6035	3-135
MJE2361		MJE2361T	3-900	MJE3312		2N6036	3-135
MJE2361T	MJE2361T		3-900	MJE3370		MJE3370	3-882
MJE2370		TIP32	3-1073	MJE3371		2N5193	3-89
MJE2371		TIP32A	3-1073	MJE33A		TIP41A	3-1083
MJE240	MJE240		3-870	MJE33B		TIP41B	3-1083
MJE241	MJE241		3-870	MJE33C		TIP41C	3-1083
MJE242	MJE243		3-870	MJE34		TIP42	3-1083
MJE243			3-870	MJE340	MJE340		3-876
MJE244	MJE244		3-870	MJE340K		TIP48	3-1087
MJE2480		TIP31	3-1073	MJE341	MJE341		3-878
MJE2481		TIP31A	3-1073	MJE341K		TIP47	3-1087
MJE2482		2N6121	3-154	MJE3439	MJE3439		3-908
MJE2483		2N6122	3-154	MJE344	MJE344		3-878
MJE2490		TIP32	3-1073	MJE3440	MJE3440		3-908
MJE2491		TIP32A	3-1073	MJE344K		TIP47	3-1087
MJE250	MJE250		3-870	MJE345		MJE3439	3-908
MJE251	MJE251		3-870	MJE34A		TIP42A	3-1083
MJE252			3-870	MJE34B		TIP42B	3-1083
MJE2520		TIP31	3-1073	MJE34C		TIP42C	3-1083
MJE2521		TIP31A	3-1073	MJE350	MJE350		3-880
MJE2522		TIP31	3-1073	MJE3520		MJE520	3-886
MJE2523		TIP31A	3-1073	MJE3521		2N5190	3-85
MJE253	MJE253		3-870	MJE370	MJE370		3-882
MJE254		MJE253	3-870	MJE370K		TIP32	3-1073
MJE270	MJE270		3-874	MJE371	MJE371		3-884
MJE271	MJE271		3-874	MJE371K		TIP32	3-1073

*Consult Motorola if a direct replacement is necessary.

TABLE 5 — PLASTIC TO-220 (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		
10	60	D44H7	D45H7	20 min	4					50
		D44H8	D45H8	40 min	4					50
			D45H9	40 min	4					50
		MJE2801T		25/100	3					75
		MJE3055T	MJE2955T	20/70	4					75
		2N6387##	2N6667##	1k/20k	5				20#	65
		SE9300##	SE9400##	1k min	4				1#	70
	80	BDX33B##	BDX34B##	750 min	3				3	70
		BD809	BD810	15 min	4				1.5	90
		D44E3##		1000 min	5	2 typ	0.5 typ	10		50
			D45H12	40 min	4					50
		2N6388##	2N6668##	1k/20k	5				20#	65
		D44H10	D45H10	20 min	4	0.5 typ	0.14 typ	5	50 typ	50
12	300	D44H11	D45H11	40 min	4	0.5 typ	0.14 typ	5	50 typ	50
		SE9301##	SE9401##	1k min	4				1#	70
		BDX33C##	BDX34C##	750 min	3				3	70
		SE9302##	SE9402##	1k min	4				1#	70
		MJE13008		6/30	8	3	0.7	8	4	100
		MJE13009		6/30	8	3	0.7	8	4	100
	400	D44VH1	D45VH1	20 min	4	0.7	0.09	8	50 typ	83
		2N6486	2N6489	20/150	5	0.6 typ	0.3 typ	5	5	75
		BDW39	BDW44	1 k min	5	1 typ	1.5 typ	5	4	85
		D44VH4	D45VH4	20 min	4	0.5	0.09	8	50 typ	83
		2N6487	2N6490	20/150	5	0.6 typ	0.3 typ	5	5	75
		BDW40	BDW45	1 k min	5	1 typ	1.5 typ	5	4	85
15	30	D44VH7		20 min	4	0.5	0.09	8	50 typ	85
		2N6488	2N6491	20/150	5	0.6 typ	0.3 typ	5	5	75
		BDW41	BDW46	1 k min	5	1 typ	1.5 typ	5	4	85
		D44VH10	D45VH10	20 min	4	0.5	0.09	8	50 typ	83
		BDW42	BDW47	1 k min	5	1 typ	1.5 typ	5	4	85
		BDW43	BDW48	1 k min	5	1 typ	1.5 typ	5	4	85

|h_{FE}| @ 1 MHz, ## Darlington

TABLE 6 — PLASTIC Full Pak (TO-220 Type)

CASE 221C-02

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		
1	250	MJF47		30/150	0.3	2 typ	0.17 typ	0.3	10	28
5	100	MJF122##	MJF127##	2000 min	3	1.5 typ	1.5 typ	3	4#	28
8	80		MJF6107	30/90	2	0.5 typ	0.13 typ	2	4	35
	100	MJF102##	MJF107##	3000 min	3	1.5 typ	1.5 typ	3	4#	35
	150	MJF15030	MJF15031	40 min	3	1 typ	0.15 typ	3	30	35
10	60	MJF3055	MJF2955	20/100	4				2	40

|h_{FE}| @ 1 MHz, ## Darlington

MOTOROLA SEMICONDUCTOR TECHNICAL DATA

NPN MJE2801, MJE2801T PNP MJE2901

COMPLEMENTARY SILICON PLASTIC POWER TRANSISTORS

... for use as an output device in complementary audio amplifiers
up to 35-Watts music power per channel.

- High DC Current Gain — $h_{FE} = 25-100$ @ $I_C = 3.0$ A
- Choice of Packages — MJE2801, 2901 — TO-225AB
MJE2801T — TO-220AB

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	60	Vdc
Collector-Base Voltage	V_{CB}	60	Vdc
Emitter-Base Voltage	V_{EB}	4.0	Vdc
Collector Current	I_C	10	Adc
Base Current	I_B	5.0	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ MJE2801, 2901 MJE2801T	P_{DT}	90 75	Watts
Derate above 25°C MJE2801, 2901 MJE2801T		0.72 0.6	W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case MJE2801, 2901 MJE2801T	θ_{JC}	1.39 1.67	$^\circ\text{C/W}$

† Safe Area Curves are indicated by Figure 1. Both limits are applicable and must be observed.

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

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage (1) ($I_C = 200$ mAdc, $I_B = 0$)	$V_{(BR)CEO}$	60		Vdc
Collector-Cutoff Current ($V_{CB} = 60$ Vdc, $I_E = 0$) ($V_{CB} = 60$ Vdc, $I_E = 0$, $T_C = 150^\circ\text{C}$)	I_{CBO}		0.1 2.0	mAdc
Emitter Cutoff Current ($V_{BE} = 4.0$ Vdc, $I_C = 0$)	I_{EBO}		1.0	mAdc

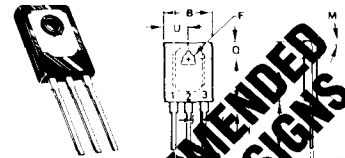
ON CHARACTERISTICS

DC Current Gain ($I_C = 3.0$ Adc, $V_{CE} = 2.0$ Vdc)	h_{FE}	25	100	
Base-Emitter Voltage ($I_C = 3.0$ Adc, $V_{CE} = 2.0$ Vdc)	V_{BE}		1.4	Vdc

(1) Pulse Test: Pulse Width ≤ 300 μs , Duty Cycle $\leq 2.0\%$.

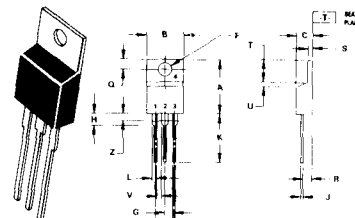
10 AMPERE COMPLEMENTARY SILICON POWER TRANSISTORS

60 VOLTS
75, 90 WATTS



MILIMETERS		INCHES	
MIN	MAX	MIN	MAX
A	14.48	0.570	0.570
B	9.14	0.360	0.360
C	4.07	0.160	0.160
D	0.94	0.037	0.037
E	2.54	0.100	0.100
F	7.62	0.300	0.300
G	1.27	0.050	0.050
H	1.27	0.050	0.050
I	1.27	0.050	0.050
J	1.27	0.050	0.050
K	1.27	0.050	0.050
L	1.27	0.050	0.050
M	1.27	0.050	0.050
N	1.27	0.050	0.050
O	1.27	0.050	0.050
P	1.27	0.050	0.050
Q	1.27	0.050	0.050
R	1.27	0.050	0.050
S	1.27	0.050	0.050
T	1.27	0.050	0.050
U	1.27	0.050	0.050
V	1.27	0.050	0.050

MJE2801
MJE2901
CASE 90-05
TO-225AB TYPE
(TO-127 TYPE)



MILIMETERS		INCHES	
MIN	MAX	MIN	MAX
A	14.48	0.570	0.570
B	9.14	0.360	0.360
C	4.07	0.160	0.160
D	0.94	0.037	0.037
E	2.54	0.100	0.100
F	7.62	0.300	0.300
G	1.27	0.050	0.050
H	1.27	0.050	0.050
I	1.27	0.050	0.050
J	1.27	0.050	0.050
K	1.27	0.050	0.050
L	1.27	0.050	0.050
M	1.27	0.050	0.050
N	1.27	0.050	0.050
O	1.27	0.050	0.050
P	1.27	0.050	0.050
Q	1.27	0.050	0.050
R	1.27	0.050	0.050
S	1.27	0.050	0.050
T	1.27	0.050	0.050
U	1.27	0.050	0.050
V	1.27	0.050	0.050
W	1.27	0.050	0.050
X	1.27	0.050	0.050
Y	1.27	0.050	0.050
Z	1.27	0.050	0.050

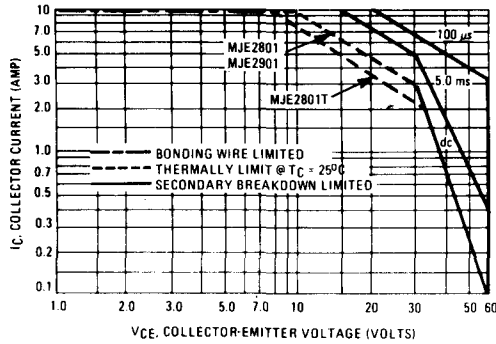
STYLE 1
PIN 1 BASE
2 COLLECTOR
3 EMITTER
4 COLLECTOR

NOTES
1. DIMENSIONS AND TOLERANCING PER ANSI
Y14.5M-1982
2. DIMENSIONING DIMENSION INCH
3. DIM / DEFINES A ZONE WHERE ALL BODY AND
LEAD IRREGULARITIES ARE ALLOWED

CASE 221A-04
TO-220AB

MJE2801/MJE2801T NPN, MJE2901 PNP

**FIGURE 1 – ACTIVE REGION
SAFE OPERATING AREA**



There are two limitations on the power handling 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 $T_{J(pk)} = 150^\circ\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^\circ\text{C}$. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

FIGURE 2 – DC CURRENT GAIN

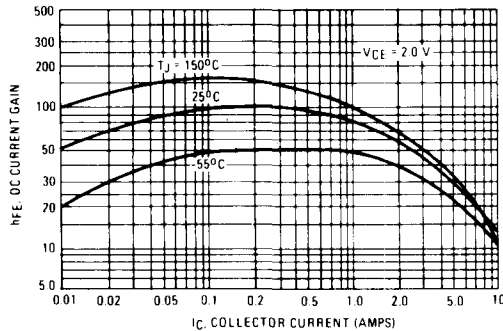


FIGURE 3 – POWER DERATING

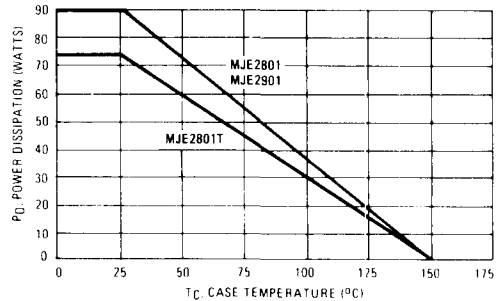


FIGURE 4 – "ON" VOLTAGES

