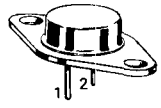
ALPHANUMERIC INDEX — CROSS-REFERENCE

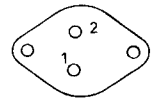
The following table represents an index and cross-reference guide for all low-frequency power transistors which are either manufactured directly by Motorola or for which Motorola manufactures a suitable equivalent. Where the Motorola part number differs from the industry part number, the Motorola device is a "form, fit and function" replacement for the industry type number — however, subtle differences in characteristics and/or specifications may exist.

Industry Part Number	Motorola Direct Replacement	Motorola Similar Replacement	Page Number
1SI10A-100		MJ16018	3-782
2N1487		2N5877	3-120
2N1488		2N5878	3-120
2N1489		2N5877	3-120
2N1490		2N5878	3-120
2N1702		2N5877	3-120
2N3016		2N5337	3-97
2N3021		2N3789	3-56
2N3022		2N3789	3-56
2N3023		2N3789	3-56
2N3024		2N3791	3-56
2N3025		2N3791	3-56
2N3026		2N3791	3-56
2N3054	2N3054		3-2
2N3054A	2N3054A		3-2
2N3055	2N3055		3-6
2N3055A	2N3055A		3-9
2N3055H		2N3055A	3-9
2N3055JAN		2N5302JAN	3-93
2N3055SD		2N3055A	3-9
2N3055UB		2N3055A	3-9
2N3076		2N6249	3-164
2N3079		2N6308	3-181
2N3080		2N6543	3-215
2N3171		2N3789	3-56
2N3172		2N3789	3-56
2N3173		2N3790	3-56
2N3174		MJ15016	3-9
2N3183		2N3789	3-56
2N3184		2N3789	3-56
2N3185		2N3790	3-56
2N3186		MJ15016	3-9
2N3195		2N3789	3-56
2N3196		2N3790	3-56
2N3198		MJ15016	3-9
2N3202		2N3719	3-32
2N3203		2N3720	3-32
2N3204		2N6303	3-32
2N3232		2N5877	3-120
2N3233		2N5882	3-123
2N3234		2N5760	3-116
2N3235		2N3055	3-6
2N3236		2N5882	3-123
2N3237		2N5302	3-93
2N3238		2N5882	3-123
2N3239		2N5882	3-123
2N3240		2N5882	3-123
2N3419		2N5336	3-97
2N3420		2N5336	3-97
2N3421		2N5336	3-97

Industry Part Number	Motorola Direct Replacement	Motorola Similar Replacement	Page Number
2N3441	2N3441		3-13
2N3442	2N3442		3-15
2N3445	2N3447		3-18
2N3446	2N3448		3-18
2N3447	2N3447		3-18
2N3448	2N3448		3-18
2N3583	2N3583		3-20
2N3584	2N3584		3-20
2N3585	2N3585		3-20
2N3667		2N5881	3-123
2N3713		2N5881	3-123
2N3714	2N3714		3-26
2N3715	2N3715		3-26
2N3715JAN	2N3715JAN		3-26
2N3715JTX	2N3715JTX		3-26
2N3715JTXV	2N3715JTXV		3-26
2N3716	2N3716		3-26
2N3716JAN	2N3716JAN		3-26
2N3716JTX	2N3716JTX		3-26
2N3716JTXV	2N3716JTXV		3-26
2N3719	2N3719		3-32
2N3720	2N3720		3-32
2N3738	2N3738		3-37
2N3739	2N3739		3-37
2N3739JAN	2N3739JAN		3-37
2N3739JTX	2N3739JTX		3-37
2N3739JTXV	2N3739JTXV		3-37
2N3740	2N3740		3-41
2N3740A		2N3740	3-41
2N3740JAN	2N3740JAN		3-41
2N3740JTX	2N3740JTX		3-41
2N3740JTXV	2N3740JTXV		3-41
2N3741	2N3741		3-41
2N3741A	2N3741A		3-41
2N3741JAN	2N3741JAN		3-41
2N3741JTX	2N3741JTX		3-41
2N3741JTXV	2N3741JTXV		3-41
2N3766	2N3766		3-44
2N3766JAN	2N3766JAN		3-44
2N3766JTX	2N3766JTX		3-44
2N3766JTXV	2N3766JTXV		3-44
2N3767	2N3767		3-44
2N3767JAN	2N3767JAN		3-44
2N3767JTX	2N3767JTX		3-44
2N3767JTXV	2N3767JTXV		3-44
2N3771	2N3771		3-48
2N3772	2N3772		3-48
2N3773	2N3773		3-52
2N3788		2N6543	3-215
2N3789	2N3789		3-56

TABLE 3 — METAL TO-213 (Formerly TO-66)





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

CASE 80-02 (TO-213AA)

I_CCont Amps Max	$V_{CEO(sus)}$ Volts Min	Device Type NPN	Device Type PNP	h_{FE} Min/Max	@ I_C Amp	Resistive Switching t_s μs Max	Resistive Switching t_f μs Max	Resistive Switching @ I_C Amp	f_T MHz Min	P_D (Case) Watts @ 25°C
1	80	2N4912		20/100	0.5	0.6 typ	0.3 typ	0.5	3	25
	175	2N3583	2N6420	40/200	0.5	2 typ	0.23 typ	0.5	10	35
	225	2N3738		40/200	0.1	3 typ	0.3 typ	0.1	10	20
	300	2N3739		40/200	0.1	3 typ	0.3 typ	0.1	10	20
2	225		2N6211	10/100	1	2.5	0.6	1	20	35
	250	2N3584	2N6421	25/100	1	4	3	1	10	35
	300		2N6212	10/100	1	2.5	0.6	1	20	35
		2N3585	2N6422	25/100	1	4	3	1	10	35
		2N4240		30/150	0.75	6	3	0.75	15	35
	350		2N6213	10/100	1	2.5	0.6	1	20	35
3	140	2N3441		25/100	0.5				0.2	25
4	60		2N3740	30/100	0.25	1.3 typ	0.27 typ	0.25	4	25
		2N3054,A		25/100	0.5	1 typ	0.3 typ	0.5	3	75
		2N3766		40/160	0.5	0.9 typ	0.09 typ	0.5	10	20
		2N6294##	2N6296##	750/18k	2	0.9 typ	0.7 typ	2	4#	50
	80		2N3741	30/100	0.25	1.3 typ	0.27 typ	0.25	4	25
		2N3767		40/160	0.5	0.9 typ	0.09 typ	0.5	10	20
		2N6295##	2N6297##	750/18k	2	0.9 typ	0.7 typ	2	4	50
5	80	2N4233A		25/100	1.5	0.5 typ	0.2 typ	1.5	4	75
7	60		2N6317	20/100	2.5	1	0.8	2.5	4	90
	80	2N5428		60/240	2	2	0.2	2	30	40
			2N6318	20/100	2.5	1	0.8	2.5	4	90
	100	2N5429		30/120	2	2	0.2	2	30	40
		2N5430		60/240	2	2	0.2	2	30	40
8	60	2N6300##	2N6298##	750/18k	4	1.5 typ	1.5 typ	4	4#	75
	80	2N6301##	2N6299##	750/18k	4	1.5 typ	1.5 typ	4	4#	75

$|h_{fe}|$ @ 1 MHz, ## Darlington

JAN, JTX, JTXV Available

2N3766
2N3767

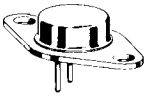
MEDIUM-POWER NPN SILICON TRANSISTORS

. . . for use in driver circuits, switching, and medium-power-amplifiers applications. These high performance devices feature:

- Low Saturation Voltage — 1.0 $V_{CE(sat)}$ @ I_C = 500 mA
- High Gain Characteristics — h_{FE} = 40–160 @ I_C = 500 mA
- Packaged in the Compact, High-Efficiency TO-213AA Package
- Complementary to PNP 2N3740 (2N3766) and 2N3741 (2N3767)

4 AMPERE POWER TRANSISTORS

NPN SILICON
60-80 VOLTS
20 WATTS



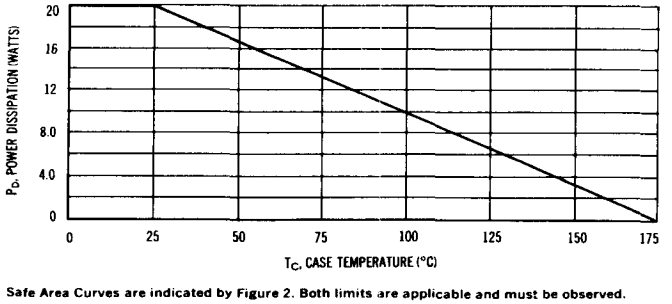
MAXIMUM RATINGS

Rating	Symbol	2N3766	2N3767	Unit
Collector-Emitter Voltage	V_{CEO}	60	80	Vdc
Collector-Base Voltage	V_{CB}	80	100	Vdc
Emitter-Base Voltage	V_{EB}	6.0		Vdc
Collector Current	I_C	4.0		Adc
Base Current	I_B	2.0		Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	20 0.133		Watts W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +200		°C

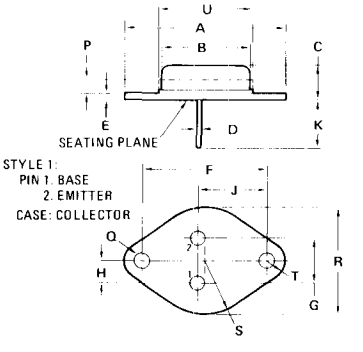
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	7.5	°C/W

FIGURE 1 – POWER-TEMPERATURE DERATING CURVE



Safe Area Curves are indicated by Figure 2. Both limits are applicable and must be observed.



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
B	11.94	12.70	0.470	0.500
C	6.35	8.64	0.250	0.340
D	0.71	0.86	0.028	0.034
E	1.27	1.91	0.050	0.075
F	24.33	24.43	0.958	0.962
G	4.83	5.33	0.190	0.210
H	2.41	2.67	0.095	0.105
J	14.48	14.99	0.570	0.590
K	9.14	–	0.360	–
P	–	1.27	–	0.050
Q	3.61	3.86	0.142	0.152
S	–	8.89	–	0.350
T	–	3.68	–	0.145
U	–	15.75	–	0.620

All JEDEC Dimensions and and Notes Apply.

CASE 80-02
TO-213AA
(TO-66)

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Voltage [1] (I_C = 100 mAdc, I_B = 0)	2N3766	$V_{(BR)CEO}$	60	—	Vdc
	2N3767		80	—	
Emitter-Base Cutoff Current (V_{EB} = 6.0 Vdc)		I_{EBO}	—	0.75	mAdc
Collector Cutoff Current		I_{CEX}			mAdc
(V_{CE} = 80 Vdc, V_{BE} = 1.5 Vdc)	2N3766		—	0.1	
(V_{CE} = 100 Vdc, V_{BE} = 1.5 Vdc)	2N3767		—	0.1	
(V_{CE} = 50 Vdc, V_{BE} = 1.5 Vdc, T_C = 150°C)	2N3766		—	1.0	
(V_{CE} = 70 Vdc, V_{BE} = 1.5 Vdc, T_C = 150°C)	2N3767		—	1.0	
Collector-Emitter Cutoff Current		I_{CEO}			mAdc
(V_{CE} = 60 Vdc, I_B = 0)	2N3766		—	0.7	
(V_{CE} = 80 Vdc, I_B = 0)	2N3767		—	0.7	
Collector-Base Cutoff Current		I_{CBO}			mAdc
(V_{CB} = 80 Vdc, I_E = 0)	2N3766		—	0.1	
(V_{CB} = 100 Vdc, I_E = 0)	2N3767		—	0.1	
ON CHARACTERISTICS					
DC Current Gain		h_{FE}			—
(I_C = 50 mAdc, V_{CE} = 5.0 Vdc)			30	—	
(I_C = 500 mAdc, V_{CE} = 5.0 Vdc)			40	160	
(I_C = 1.0 Adc, V_{CE} = 10 Vdc)			20	—	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			Vdc
(I_C = 1.0 Adc, I_B = 0.1 Adc)			—	2.5	
(I_C = 500 mAdc, I_B = 50 mAdc)			—	1.0	
Base-Emitter Voltage (I_C = 1.0 Adc, V_{CE} = 10 Vdc)		V_{BE}	—	1.5	Vdc
TRANSIENT CHARACTERISTICS					
Current-Gain - Bandwidth Product (I_C = 500 mAdc, V_{CE} = 10 Vdc, f = 10 MHz)		f_T	10	—	MHz
Common-Base Output Capacitance (V_{CB} = 10 Vdc, I_C = 0 Adc, f = 100 kHz)		C_{ob}	—	50	pF
Small-Signal Current Gain (I_C = 100 mAdc, V_{CE} = 10 Vdc, f = 1.0 kHz)		h_{fe}	40	—	—

[1] Pulse Test: Pulse Width ≤300μs, Duty Cycle ≤2.0%.

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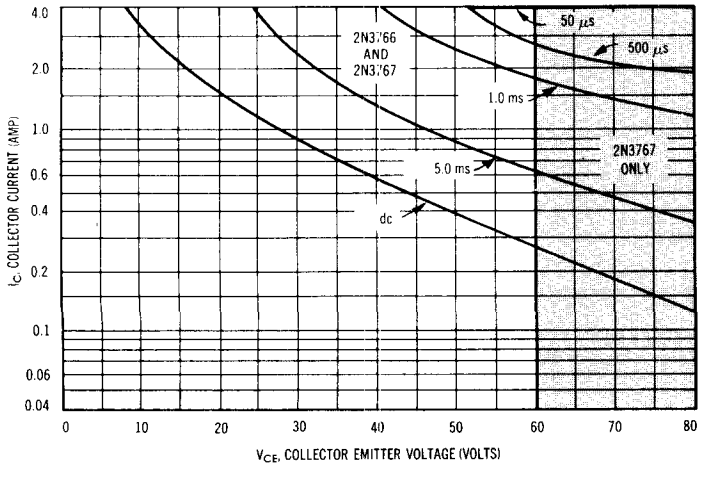
FIGURE 2 – ACTIVE REGION SAFE AREAS



The Safe Operating Area Curves indicate I_C-V_{CE} limits below which the device will not go into secondary breakdown. Collector load lines for specific circuits must fall within the applicable Safe Area to avoid causing a collector-emitter short. (Case temperature and duty cycle of the excursions make no significant change in these safe areas.) The load line may exceed the BV_{CEO} voltage limit only if the collector current has been reduced to 20 mA or less before or at the BV_{CES} limit; then and only then may the load line be extended to the absolute maximum voltage rating of BV_{CBO}. To insure operation below the maximum T_J, the power-temperature derating curve must be observed for both steady state and pulse power conditions.

LARGE SIGNAL CHARACTERISTICS

FIGURE 3 – TRANSCONDUCTANCE

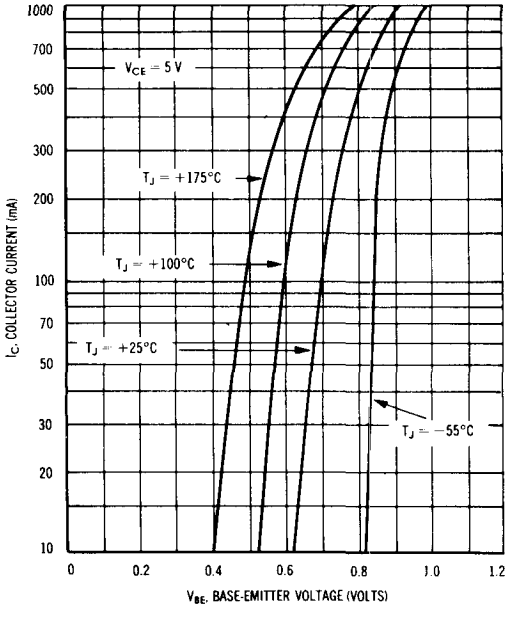
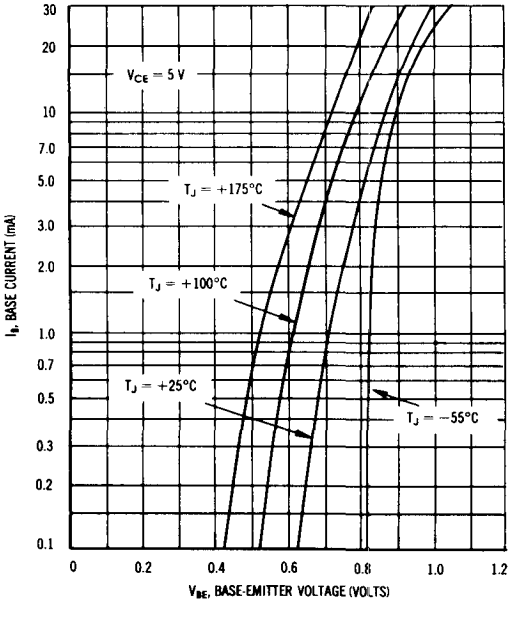


FIGURE 5 – INPUT ADMITTANCE



CUT-OFF CHARACTERISTICS

FIGURE 4 – TRANSCONDUCTANCE

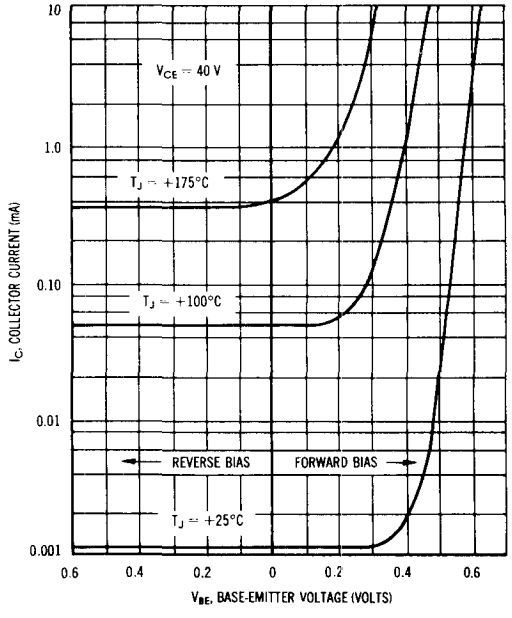


FIGURE 6 – EFFECT OF BASE-EMITTER RESISTANCE

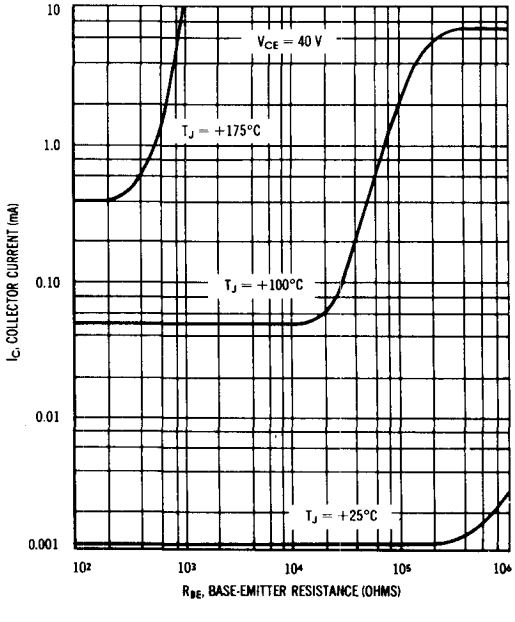


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FIGURE 7 – CURRENT GAIN

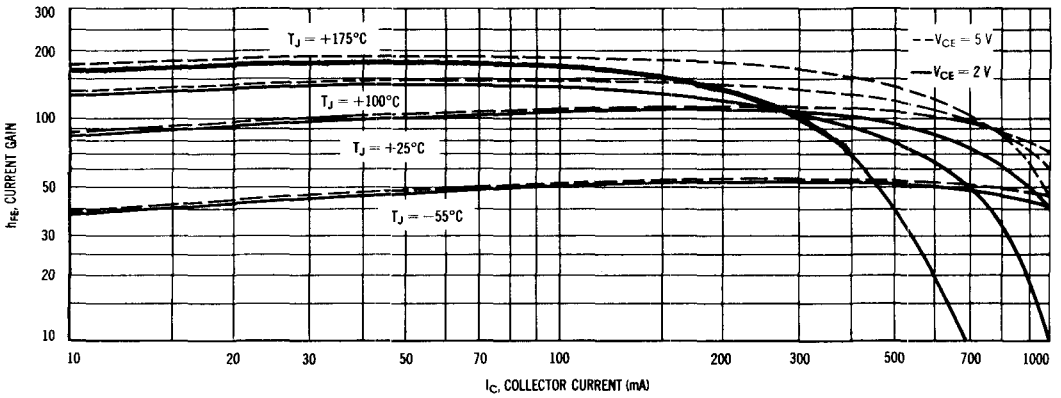

FIGURE 8 – COLLECTOR SATURATION REGION

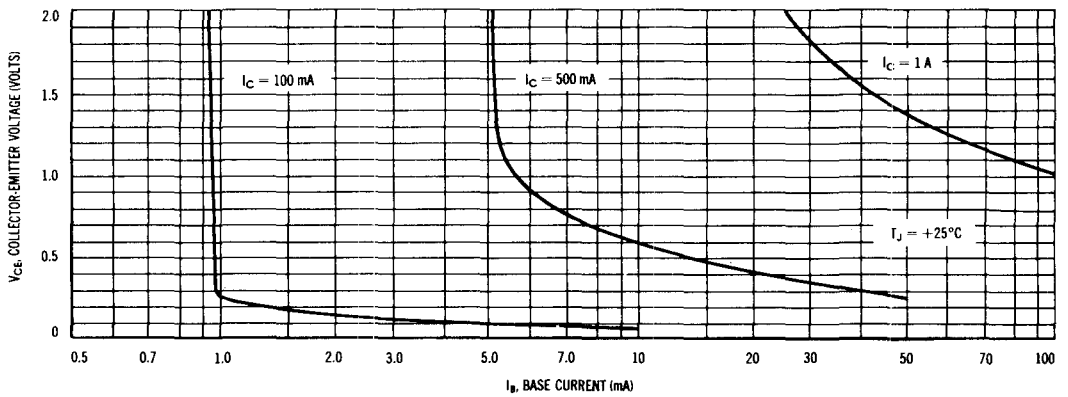

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FIGURE 9 – "ON" VOLTAGES

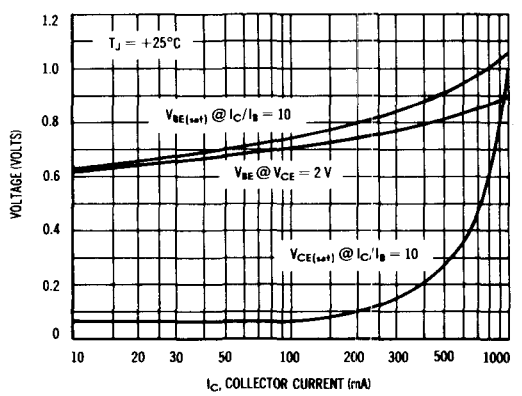

FIGURE 10 – TEMPERATURE COEFFICIENTS