

## 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
BD243A	BD243A		3-286	BD312	2N3791		3-56
BD243B	BD243B		3-286	BD315	2N5629		3-105
BD243C	BD243C		3-286	BD316	BD318		3-290
BD244	BD244		3-286	BD317	2N5629		3-105
BD244A	BD244A		3-286	BD318	BD318		3-290
BD244B	BD244B		3-286	BD329	MJE200		3-866
BD244C	BD244C		3-286	BD330	MJE210		3-866
BD249	BD249		—	BD331	BD897		3-320
BD249A	BD249B		—	BD332	BD898		3-322
BD249B	BD249B		—	BD333	BD899		3-320
BD249C	BD249C		—	BD333	BD902		3-322
BD250	BD250		—	BD334	BD900		3-322
BD250A	BD250B		—	BD335	BD901		3-320
BD250B	BD250B		—	BD337	BDX33D		3-334
BD250C	BD250C		—	BD338	BDX34D		3-334
BD253	2N6543		3-215	BD342	2N3055		3-6
BD253A	2N6543		3-215	BD343	MJE2955		3-904
BD253B	2N6543		3-215	BD344	BD138		3-260
BD253C	BU326A		3-363	BD345	BD137		3-258
BD262	BD678		3-300	BD346	BD798		3-314
BD262A	BD680		3-300	BD347	BD797		3-312
BD262B	BD682		3-300	BD348	BD140		3-260
BD263	BD677		3-298	BD349	BD139		3-258
BD263A	BD679		3-298	BD361	MJE200		3-866
BD263B	BF681		—	BD361A	MJE200		3-866
BD266	BD898		3-322	BD362	MJE210		3-866
BD266A	BD900		3-322	BD362A	MJE210		3-866
BD266B	BD902		3-322	BD375	BD785		3-304
BD267	BD897		3-320	BD376	BD786		3-304
BD267A	BD899		3-320	BD377	BD787		3-304
BD267B	BD901		3-320	BD378	BD788		3-304
BD268	BDW45		3-328	BD379	BD789		3-308
BD268A	BDW46		3-328	BD380	BD790		3-308
BD269	BDW40		3-328	BD385		MJE181	3-862
BD269A	BDW41		3-328	BD385-1		MJE181	3-862
BD271		2N6121	3-154	BD385-2		MJE181	3-862
BD272		2N6124	3-154	BD385-5		MJE181	3-862
BD273		2N6122	3-154	BD385-8		MJE181	3-862
BD274		2N6125	3-154	BD386		MJE171	3-862
BD275		2N6123	3-154	BD386-1		MJE171	3-862
BD276		2N6125	3-154	BD386-2		MJE171	3-862
BD278	MJE3055T		3-904	BD386-5		MJE171	3-862
BD278A	MJE3055T		3-904	BD386-8		MJE171	3-862
BD279		2N6034	3-135	BD387		MJE182	3-862
BD280		2N6034	3-135	BD387-1		MJE182	3-862
BD291	BD243		3-286	BD387-2		MJE182	3-862
BD292	BD244		3-286	BD387-5		MJE182	3-862
BD293	BD243A		3-286	BD387-8		MJE182	3-862
BD294	BD244A		3-286	BD388		MJE172	3-862
BD295	BD243B		3-286	BD388-1		MJE172	3-862
BD296	BD244B		3-286	BD388-2		MJE172	3-862
BD301	BD795		3-312	BD388-5		MJE172	3-862
BD302	BD796		3-314	BD388-8		MJE172	3-862
BD303	BD797		3-312	BD389		MJE243	3-870
BD304	BD798		3-314	BD389-1		MJE243	3-870
BD306A	BD785		3-304	BD389-2		MJE243	3-870
BD306B	BD785		3-304	BD389-5		MJE243	3-870
BD307A	BD787		3-304	BD389-8		MJE243	3-870
BD307B	BD787		3-304	BD390		MJE253	3-870
BD311	2N3715		3-26	BD390-1		MJE253	3-870

\*Consult Motorola if a direct replacement is necessary.

**TABLE 5 — PLASTIC TO-220 (Continued)**

I <sub>C</sub> Cont Amps Max	V <sub>CEO(sus)</sub> Volts Min	Device Type		hFE 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		
		2	45			BD239	BD240	15 min		
	60	BD239A TIP110##	BD240A TIP115##	15 min 500 min	1 2	1.7 typ	1.3 typ	2	3 25#	30 50
	80	BD239B TIP111##	BD240B TIP116##	15 min 500 min	1 2	1.7 typ	1.3 typ	2	3 25#	30 50
	100	BD239C TIP112##	BD240C TIP117##	25 min 500 min	1 2	1.7 typ	1.3 typ	2	3 25#	30 50
	400	BUX84		30 min	0.1	3.5	1.4	1	4	50
	450	BUX85		30 min	0.1	3.5	1.4	1	4	50
	900	MJE1320		3 min	1	4 typ	0.8 typ	1		80
2.5	700	MJE8500		7.5 min	0.5	4	2	1		65
	750	MJE12007		1.1 min	2		1	2	4 typ	65
	800	MJE8501		7.5 min	0.5	4	2	1		65
3	40	TIP31	TIP32	25 min	1	0.6 typ	0.3 typ	1	3	40
	45	BD241	BD242	25 min	1				3	40
	60	BD241A TIP31A	BD242A TIP32A	25 min 25 min	1 1	0.6 typ	0.3 typ	1	3 3	40 40
	80	BD241B TIP31B	BD242B TIP32B	25 min 25 min	1 1	0.6 typ	0.3 typ	1	3 3	40 40
	100	BD241C TIP31C	BD242C TIP32C	25 min 25 min	1 1	0.6 typ	0.3 typ	1	3 3	40 40
	750	MJE16032		4 min	3	2	1.5	2		80
	850	MJE16034		4 min	3	2	1.5	2		80
4	45	2N6121	2N6124	25/100	1.5	0.4 typ	0.3 typ	1.5	2.5	40
	60	2N6122 BD535 MJE800T##	2N6125 MJE700T##	25/100 25 min 750 min	1.5 2 1.5	0.4 typ	0.3 typ	1.5	2.5 3 1#	40 50 40
	80	2N6123		20/80	1.5	0.4 typ	0.3 typ	1.5	2.5	40
	300	MJE13004		6/30	3	3	0.7	3	4	60
	400	MJE13005		6/30	3	3	0.7	3	4	60
5	60	TIP120##	TIP125##	1k min	3	1.5 typ	1.5 typ	3	4#	65
	80	TIP121##	TIP126##	1k min	3	1.5 typ	1.5 typ	3	4#	65
	100	TIP122##	TIP127##	1k min	3	1.5 typ	1.5 typ	4	4#	75
	250	2N6497		10/75	2.5	1.8	0.8	2.5	5	80
	300	2N6498		10/75	2.5	1.8	0.8	2.5	5	80
	400	MJE13070		8 min	3	1.5	0.5	3		80
	450	MJE16002 MJE16004		5 min 7 min	5 5	3 2.7	0.3 0.35	3 3		80 80
	700	MJE8502		7.5 min	1	4	2	2.5		80
	800	MJE8503		7.5 min	1	4	2	2.5		80
6	40	TIP41	TIP42	15/75	3	0.4 typ	0.15 typ	3	3	65
	45	BD243	BD244	15 min	3				3	65
	60	BD243A TIP41A	BD244A TIP42A	15 min 15/75	3 3	0.4 typ	0.15 typ	3	3 3	65 65
	80	BD243B TIP41B	BD244B TIP42B	15 min 15/75	3 3	0.4 typ	0.15 typ	3	3 3	65 65
	100	BD243C TIP41C	BD244C TIP42C	15 min 15/75	3 3	0.4 typ	0.15 typ	3	3 3	65 65
7	30	2N6288	2N6111	30/150	3	0.4 typ	0.15 typ	3	4	40

# [h<sub>FE</sub>] @ 1 MHz, ## Darlington

(continued)

**MOTOROLA**  
**SEMICONDUCTOR**  
**TECHNICAL DATA**

**BD243**  
**BD243A**  
**BD243B**  
**BD243C**

**BD244**  
**BD244A**  
**BD244B**  
**BD244C**

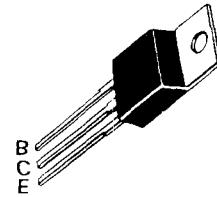
**COMPLEMENTARY SILICON PLASTIC  
 POWER TRANSISTORS**

... designed for use in general purpose amplifier and switching applications.

- Collector-Emitter Saturation Voltage —  
 $V_{CE(sat)} = 1.5 \text{ Vdc (Max) @ } I_C = 6.0 \text{ Adc}$
- Collector-Emitter Sustaining Voltage —  
 $V_{CEO(sus)} \dots 45 \text{ Vdc (Min) — BD243, BD244}$   
 $\dots 60 \text{ Vdc (Min) — BD243A, BD244A}$   
 $\dots 80 \text{ Vdc (Min) — BD243B, BD244B}$   
 $\dots 100 \text{ Vdc (Min) — BD243C, BD244C}$
- High Current Gain — Bandwidth Product  
 $f_T = 3.0 \text{ MHz (Min) @ } I_C = 500 \text{ mAdc}$
- Compact TO-220 AB Package

**6 AMPERE  
 POWER TRANSISTORS  
 COMPLEMENTARY SILICON**

**45-60-80-100 VOLTS  
 65 WATTS**



**\*MAXIMUM RATINGS**

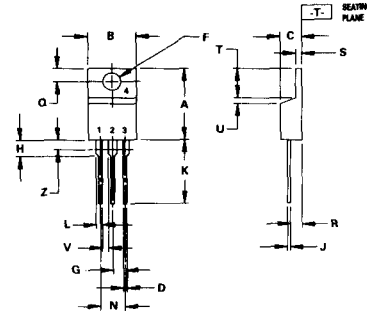
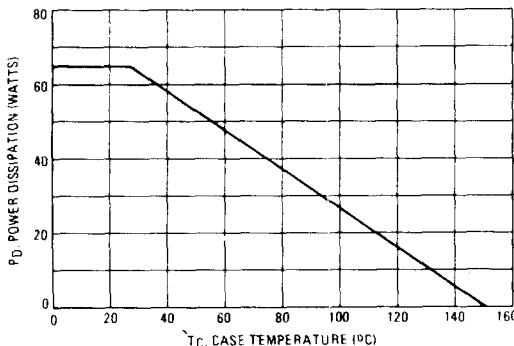
Rating	Symbol	BD243 BD244	BD243A BD244A	BD243B BD244B	BD243C BD244C	Unit
Collector-Emitter Voltage	$V_{CEO}$	45	60	80	100	Vdc
Collector-Base Voltage	$V_{CB}$	45	60	80	100	Vdc
Emitter-Base Voltage	$V_{EB}$	5.0				Vdc
Collector Current — Continuous	$I_C$	6				Adc
Peak		10				
Base Current	$I_B$	2.0				Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$	$P_D$	65				Watts
Derate above $25^\circ\text{C}$		0.52				W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +150				$^\circ\text{C}$

3

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.92	$^\circ\text{C/W}$

**FIGURE 1 — POWER DERATING**



NOTES:  
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
 2. CONTROLLING DIMENSION: INCH.  
 3. DIM Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	14.48	15.75	0.570	0.620
B	3.56	10.28	0.380	0.405
C	4.07	4.82	0.160	0.190
D	0.64	0.88	0.025	0.035
F	3.61	3.73	0.142	0.147
G	2.42	2.66	0.095	0.105
H	2.80	3.30	0.110	0.155
J	0.48	0.71	0.018	0.028
K	12.70	14.27	0.500	0.562
L	1.15	1.38	0.045	0.055
N	4.83	5.33	0.190	0.210
Q	2.54	3.04	0.100	0.120
R	2.04	2.79	0.080	0.110
S	1.15	1.38	0.045	0.055
T	5.97	6.47	0.235	0.255
U	0.00	1.27	0.000	0.050
V	1.15	—	0.045	—
Z	—	2.04	—	0.080

STYLE 1:  
 PIN 1. BASE  
 2. COLLECTOR  
 3. EMITTER  
 4. COLLECTOR

**CASE 221A-04  
 TO-220AB**

FIGURE 4 - THERMAL RESPONSE

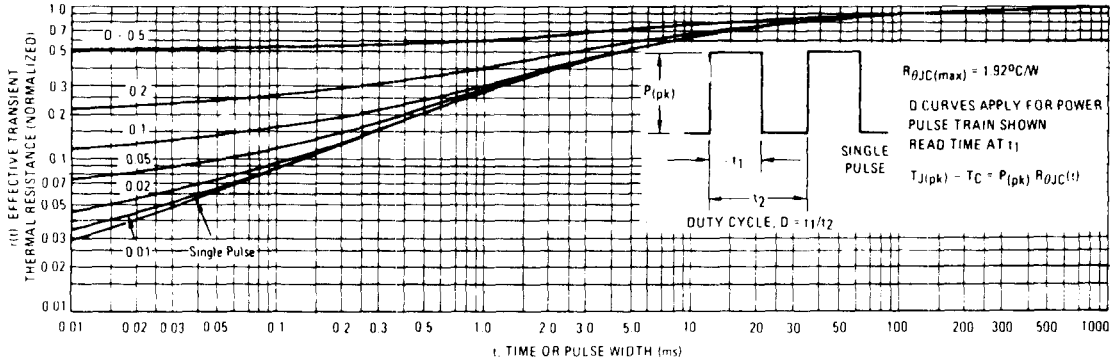
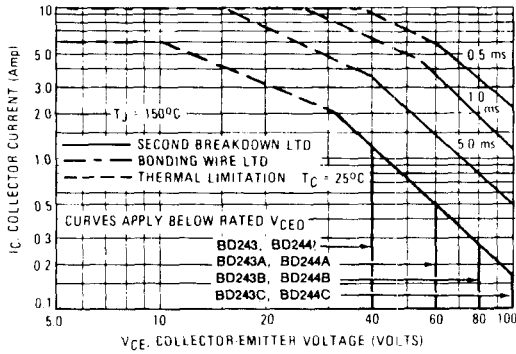


FIGURE 5 - ACTIVE-REGION SAFE OPERATING AREA



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 5 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  $T_{J(pk)} \leq 150^\circ\text{C}$ .  $T_{J(pk)}$  may be calculated from the data in Figure 4. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown. (See AN-415A).

FIGURE 6 - TURN-OFF TIME

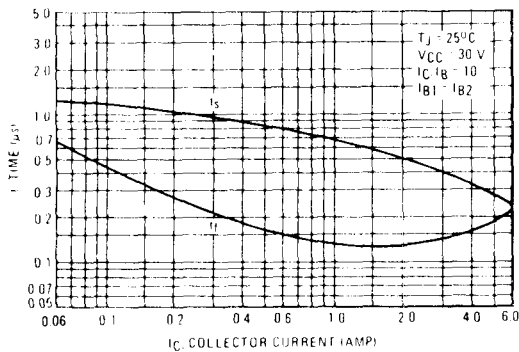
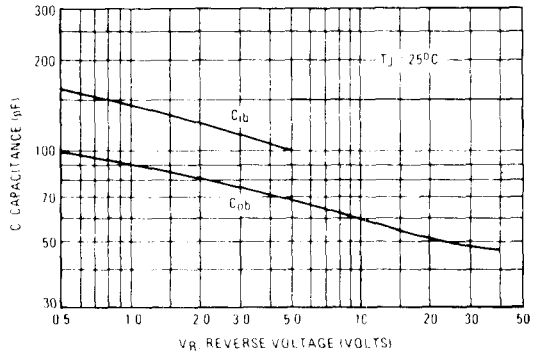


FIGURE 7 - CAPACITANCE



3