

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
BDT63A	BDW41		3-328	BDW51C	2N5882		3-123
BDT63B	BDW42		3-328	BDW52	2N3791		3-56
BDT63C	BDW43		3-328	BDW52A	2N3792		3-56
BDT64	BDW44		3-328	BDW52B	2N3792		3-56
BDT64A	BDW45		3-328	BDW52C	2N5880		3-123
BDT64B	BDW46		3-328	BDW53	TIP120		3-1098
BDT64C	BDW47		3-328	BDW53A	TIP120		3-1098
BDT65	BDW40		3-328	BDW53B	TIP121		3-1098
BDT65A	BDW41		3-328	BDW53C	BDX53C		3-338
BDT65B	BDW42		3-328	BDW53D	BDX53D		3-338
BDT65C	BDW43		3-328	BDW54	TIP125		3-1098
BDT91	BD807		3-316	BDW54A	TIP125		3-1098
BDT92	BD808		3-318	BDW54B	TIP126		3-1098
BDT93	BD809		3-316	BDW54C	BDX54C		3-338
BDT94	BD810		3-318	BDW54D	BDX54D		3-338
BDV64	BDV64		3-324	BDW55	BD135		3-258
BDV64A	BDV64A		3-324	BDW56	BD136		3-260
BDV64B	BDV64B		3-324	BDW57	BD137		3-258
BDV64C		BDV64B	3-324	BDW58	BD138		3-260
BDV65	BDV65		3-324	BDW59	BD139		3-258
BDV65A	BDV65A		3-324	BDW60	BD140		3-260
BDV65B	BDV65B		3-324	BDW63	BDX53		3-338
BDV65C			3-324	BDW63A	BDX53A		3-338
BDV66C	MJH11018		3-1034	BDW63B	BDX53B		3-338
BDV66C	MJH11017		3-1034	BDW63C	BDX53C		3-338
BDV66D	MJH11019		3-1034	BDW63D	BDX53D		3-338
BDV67D	MJH11020		3-1034	BDW64	BDX54		3-338
BDV91	MJE3055T		3-904	BDW64A	BDX54A		3-338
BDV92	TIP34B		3-1077	BDW64B	BDX54B		3-338
BDV93	TIP34C		3-1077	BDW64C	BDX54C		3-338
BDV94	TIP2955		3-1108	BDW73	BD895		3-320
BDV95	TIP33B		3-1077	BDW73A	BD897		3-320
BDV96	TIP33C		3-1077	BDW73B	BD899		3-320
BDW21	2N3714		3-26	BDW73C	BD901		3-320
BDW21A	2N3714		3-26	BDW73D	BDX33D		3-334
BDW21B				BDW74	BD896		3-322
BDW21C	2N3714		3-26	BDW74A	BD898		3-322
BDW22	2N3789		3-56	BDW74B	BD900		3-322
BDW22A	2N3789		3-56	BDW74C	BD902		3-322
BDW22B	2N3790		3-56	BDW74D	BDX34D		3-334
BDW22C	2N5880		3-123	BDW83	BDV65		3-324
BDW23	BDX53		3-338	BDW83A	BDV65		3-324
BDW23A	BDX53A		3-338	BDW83B	BDV65A		3-324
BDW23B	BDX53B		3-338	BDW83C	BDV65B		3-324
BDW23C	BDX53C		3-338	BDW84	BDV64		3-324
BDW24	BDX54		3-338	BDW84A	BDV64		3-324
BDW24A	BDX54A		3-338	BDW84B	BDV64A		3-324
BDW24B	BDX54B		3-338	BDW84C	BDV64B		3-324
BDW24C	BDX54C		3-338	BDW93	BDW39		3-328
BDW39	BDW39		3-328	BDW93A	BDW40		3-328
BDW40	BDW40		3-328	BDW93B	BDW41		3-328
BDW41	BDW41		3-328	BDW93C	BDW42		3-328
BDW42	BDW42		3-328	BDW94	BDW44		3-328
BDW44	BDW44		3-328	BDW94A	BDW45		3-328
BDW45	BDW45		3-328	BDW94B	BDW46		3-328
BDW46	BDW46		3-328	BDW94C	BDW47		3-328
BDW47	BDW47		3-328	BDX10	2N3055A		3-9
BDW51	2N3715		3-26	BDX10-4	2N3055A		3-9
BDW51A	2N3715		3-26	BDX10-6	2N3055A		3-9
BDW51B	2N3716		3-26	BDX10-7	2N3055A		3-9

*Consult Motorola if a direct replacement is necessary.

1

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
BDX10C	2N3055A		3-9	BDY93	BU326A		3-363
BDX18	MJ2955		3-6	BDY93/01	BU326A		3-363
BDX33	BDX33		3-334	BDY94	BU326A		3-363
BDX33A	BDX33A		3-334	BDY94/01	BU326A		3-363
BDX33B	BDX33B		3-334	BDY96	BUX47		3-499
BDX33C	BDX33C		3-334	BDY96-1	BUX47		3-499
BDX33D	BDX33D		3-334	BDY96/01	BUX47		3-499
BDX34	BDX34		3-334	BDY97	BUX47		3-499
BDX34A	BDX34A		3-334	BDY97-1	BUX47		3-499
BDX34B	BDX34B		3-334	BF380	MPS-U10		3-1052
BDX34C	BDX34C		3-334	BF380-5	MPS-U10		3-1052
BDX34D	BDX34D		3-334	BF381	MPS-U10		3-1052
BDX35	TIP42C		3-1083	BF382	MPS-U10		3-1052
BDX36	TIP42D		3-1083	BF382-5	MPS-U10		3-1052
BDX37	TIP42D		3-1083	BU104P	BU406		3-366
BDX42	BD775		—	BU105		MJ12003	3-642
BDX43	BD777		3-302	BU108	BU208		3-343
BDX44	BD779		3-302	BU109P	BU407		3-366
BDX45	BD776		3-302	BU124	BU426		3-368
BDX46	BD778		3-302	BU126		MJE13005	3-944
BDX47	BD779		3-302	BU126A		MJE13005	3-944
BDX53	BDX53		3-338	BU134	MJ423		3-524
BDX53A	BDX53A		3-338	BU137		MJ10025	3-623
BDX53B	BDX53B		3-338	BU157		MJ10025	3-623
BDX53C	BDX53C		3-338	BU180		MJE5741	3-914
BDX53D	BDX53D		3-338	BU180A		MJE5742	3-914
BDX54	BDX54		3-338	BU204	BU207		3-343
BDX54A	BDX54A		3-338	BU205	BU208		3-343
BDX54B	BDX54B		3-338	BU205A		MJ12003	3-642
BDX54C	BDX54C		3-338	BU207	BU207		3-343
BDX54D	BDX54D		3-338	BU208	BU208		3-343
BDX70		2N6487	3-207	BU208A	BU208A		3-348
BDX71		2N6487	3-207	BU208D	BU208D		3-353
BDX72		2N6488	3-207	BU221	BU326A		3-363
BDX73		2N6488	3-207	BU222	BU326A		3-363
BDX74		2N6486	3-207	BU223	MJ431		3-524
BDX75		2N6486	3-207	BU223A	MJ431		3-524
BDX77	BD799		3-312	BU322	BU323		3-355
BDX78	BD800		3-314	BU322A	BU323A		3-355
BDX83	MJ3000		3-530	BU323	BU323A		3-355
BDX83A	MJ3000		3-530	BU323A	BU323A		3-355
BDX83B	MJ3001		3-530	BU323AP	BU323AP		3-359
BDX83C	2N6284		3-172	BU323P	BU323P		3-359
BDX84	MJ2500		3-530	BU326	BU326A		3-363
BDX84A	MJ2500		3-530	BU326A	BU326A		3-363
BDX84B	MJ2501		3-530	BU406	BU406		3-366
BDX84C	2N6287		3-172	BU406D	BU406D		3-366
BDX91	2N3715		3-26	BU407	BU407		3-366
BDX92	2N3791		3-56	BU407D	BU407D		3-366
BDX93	2N3716		3-26	BU426	BU426		3-368
BDX94	2N3792		3-56	BU426A	BU426A		3-368
BDX95		2N5882	3-123	BU433	BU426		3-368
BDX96	2N5880		3-123	BU500		MJ12005	3-650
BDY29	2N5303		3-93	BU508	BU508		3-372
BDY34	BD785		3-304	BU508A	BU508A		3-372
BDY37	2N3773		3-52	BU508AD	BU508AD		3-372
BDY80		2N6122	3-154	BU508D	BU508D		3-372
BDY81		2N6122	3-154	BU522	BU522		3-377
BDY82		2N6125	3-154	BU522A	BU522A		3-377
BDY83		2N6125	3-154	BU522B	BU522B		3-377

*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		
7	45	BD795	BD796	25 min	3				3	65
	50	2N6290	2N6109	30/150	2.5	0.4 typ	0.15 typ	3	4	40
	60	BD797	BD798	25 min	3				3	65
	70	2N6292	2N6107	30/150	3	0.4 typ	0.15 typ	3	4	40
	80	BD799	BD800	15 min	3				3	65
	100	BD801	BD802	15 min	3				3	65
	150	BU407,D		30 min	1.5		0.75	5	10	60
	200	BU406,D		30 min	1.5		0.75	5	10	60
	375	BU522##		250 min	2.5				7.5	75
	425	BU522A##		250 min	2.5				7.5	75
8	450	BU522B##		250 min	2.5				7.5	75
	40	2N6386##		1k/20k	3				20#	65
	45	BDX53##	BDX54##	750 min	3				4#	60
		BD895##	BD896##	750 min	3				1#	70
		BD895A##	BD896A##	750 min	4				1#	70
	60	2N6043##	2N6040##	1k/10k	4	1.5 typ	1.5 typ	3	4#	75
		BDX53A##	BDX54A##	750 min	3				4#	60
		BD897##	BD898##	750 min	3				1#	70
		BD897A##	BD898A##	750 min	4				1#	70
		TIP100##	TIP105##	1k/20k	3	1.5 typ	1.5 typ	3	4#	80
	80	2N6044##	2N6041##	1k/10k	4	1.5 typ	1.5 typ	3	4#	75
		BDX53B##	BDX54B##	750 min	3				4#	60
		BD899##	BD900##	750 min	3				1#	70
		BD899A##	BD900A##	750 min	4				1#	70
		TIP101##	TIP106##	1k/20k	3	1.5 typ	1.5 typ	3	4#	80
	100	2N6045##	2N6042##	1k/10k	3	1.5 typ	1.5 typ	3	4#	75
		BDX53C##	BDX54C##	750 min	3				4#	60
		BD901##	BD902##	750 min	3				1#	70
	120	TIP102##	TIP107##	1k/20k	3	1.5 typ	1.5 typ	3	4#	80
		BDX53D##	BDX54D##	750 min	3				4#	60
		MJE15028	MJE15029	20 min	4				30	50
	150	MJE15030	MJE15031	20 min	4					50
		BU807##		100 min	5	0.55 typ	0.2 typ	5	30	60
	200	BU806##		100 min	5	0.55 typ	0.2 typ	5		60
	300	MJE13006		5/30	5	3	0.7	5	4	80
		MJE5740##		200 min	4	8 typ	2 typ	6		80
	350		MJE5850	15 min	2	2	0.5	4		80
		MJE5741##		200 min	4	8 typ	2 typ	6		80
	400		MJE5851	15 min	2	2	0.5	4		80
		MJE5742W##		200 min	4	8 typ	2 typ	6		80
		MJE13007		5/30	5	3	0.7	5	4	80
			MJE5852	15 min	2	2	0.5	4		80
		MJE16080		5 min	8	2	0.5	5		80
10	30			6/25	8	2 typ	0.1 typ	5		100
		MJE16106								
	450	MJE16081		5 min	8	2	0.5	5		80
	30		D45H1	20 min	4					50
			D45H2	40 min	4					50
	40	D44E1##		1000 min	5	2 typ	0.5 typ	10		50
	45	BDX33##	BDX34##	750 min	4				3	70
		BD805	BD806	15 min	4				1.5	90
			D45H4	20 min	4					50
60			D45H5	40 min	4					50
		BDX33A##	BDX34A##	750 min	4				3	70
		BD807	BD808	15 min	4				1.5	90

h_{FE} @ 1 MHz, ## Darlington

(continued)

TABLE 12 — POWER DARLINGTONS (continued)

I _C Cont Amps Max	V _{CEO} (sus) Volts Min	Device Type		h _{FE} Min/Max	@ I _C Amp	Resistive Switching			h _{FE} @ 1 MHz Min	P _D (Case) Watts @ 25°C	Case JEDEC/MOT
		NPN	PNP			t _s μs Max	t _f μs Max	@ I _C Amp			
8	80	MJ1001	MJ901	1k min	3					90	TO-204/1
		TIP101	TIP106	1k/20k	3	1.5 typ	1.5 typ	3	4	80	TO-220/221A
		2N6044	2N6041	1k/10k	4	1.5 typ	1.5 typ	3	4	75	TO-220/221A
		2N6301	2N6299	750k/18k	4	1.5 typ	1.5 typ	4	4	75	TO-213A/80
		2N6056	2N6054	750k/18k	4	1.5 typ	1.5 typ	4	4	100	TO-204A/1
	100	MJE6044	MJE6041	1k/20k	4	1.5 typ	1.5 typ	4	2	75	TO-225AB/90
		BDX53C	BDX54C	750 min	3				4	60	TO-220/221A
		BD901	BD902	750 min	3				1	70	TO-220/221A
		MJE6045		1k/20k	4	1.5 typ	1.5 typ	4	2	75	TO-225AB/90
		MJD122	MJD127	1k/12k	4	1.5 typ	2 typ	4	4	20	TO-252/369A-04
		MJF102	MJF107	3k min	3	1.5 typ	1.5 typ	3	4	35	—/221C-02
		TIP102	TIP107	1k/20k	3	1.5 typ	1.5 typ	3	4	80	TO-220/221A
		2N6045	2N6042	1k/10k	4	1.5 typ	1.5 typ	3	4	75	TO-220/221A
	120	BDX53D	BDX54D	750 min	3				4	60	TO-220/221A
	150	BU807●		100 min	5	0.55 typ	0.2 typ	5		60	TO-220/221A
	200	BU806●		100 min	5	0.55 typ	0.2 typ	5		60	TO-220/221A
	300	MJE5740		200/400	4	8 typ	2 typ	6		80	TO-220/221A
	350	MJE5741		200/400	4	8 typ	2 typ	6		80	TO-220/221A
	400	MJE5742		200/400	4	8 typ	2 typ	6		80	TO-220/221A
	500	BUT50P●		30 min	2	0.75 typ	0.1 typ	5		100	TO-218/340D
	1400*	MJ10011		20 min	4			1	4	80	TO-204/1
10	40	2N6383	2N6648	1k/20k	5				20	100	TO-204/1
		D44E1		1000 min	5	2 typ	0.5 typ	10		50	TO-220/221A
	45	BDX33	BDX34	750 min	4				3	70	TO-220/221A
	60	BDV65	BDV64	1k min	5					125	TO-218/340D
		BDX33A	BDX34A	750 min	4				3	70	TO-220/221A
		MJ3000	MJ2500	1k min	5					150	TO-204/1
		2N6387	2N6667	1k/20k	5				20	65	TO-220/221A
		2N6384		1k/20k	5				20	100	TO-204/1
		D44E2		1000 min	5	2 typ	0.5 typ	10		50	TO-220/221A
	80	TIP140	TIP145	500 min	10	2.5 typ	2.5 typ	5	4	125	TO-218/340
		2N6388	2N6668	1k/20k	5				20	65	TO-220/221A
		2N6385		1k/20k	5				20	100	TO-204/1
		BDV65A	BDV64A	1k min	5					125	TO-218/340D
		BDX33B	BDX34B	750 min	3				3	70	TO-220/221A
		D44E3		1000 min	5	2 typ	0.5 typ	10		50	TO-220/221A
	100	MJD44E3		1k min	5	2 typ	0.5 typ	10		20	TO-252/369A-04
		TIP141	TIP146	500 min	10	2.5 typ	2.5 typ	5	4	125	TO-218/340
		BDV65B	BDV64B	1k min	5					125	TO-218/340D
		BDX33C	BDX34C	750 min	3				3	70	TO-220/221A
		TIP142	TIP147	500 min	10	2.5 typ	2.5 typ	5	4	125	TO-218/340
		BDV65C	BDV64C	1k min	5					125	TO-218/340D
	120	BDX33D	BDX34D	750 min	3				3	70	TO-220/221A
	200	BU323P		150 min	6	15	15	6		125	TO-218/340D
	250	BU323AP		150 min	6	15	15	6		125	TO-218/340D
	350	BU323		150 min	6	7.5 typ	5.2 typ	6		175	TO-204/1
		MJ10002		30/300	5	2.5	1	5	10	150	TO-204/1
	400	MJ10006●		30/300	5	1.5	0.5	5	10	150	TO-204/1
		BU323A		150 min	6	7.5 typ	5.2 typ	6		175	TO-204/1
		MJH10012		100/2k	6	15	15	6		118	TO-218/340
		MJ10007●		30/300	5	1.5	0.5	5	10	150	TO-204/1

● Darlington with speed-up diode.

(continued)

MOTOROLA SEMICONDUCTOR TECHNICAL DATA

NPN
BDX53
BDX53A
BDX53B
BDX53C

PNP
BDX54
BDX54A
BDX54B
BDX54C

PLASTIC MEDIUM-POWER COMPLEMENTARY SILICON TRANSISTORS

... designed for general-purpose amplifier and low-speed switching applications.

- High DC Current Gain —
 $h_{FE} = 2500$ (Typ) @ $I_C = 4.0$ Adc
- Collector-Emitter Sustaining Voltage — @ 100 mAdc
 $V_{CE(sus)} = 45$ Vdc (Min) — BDX53, 54
 $= 60$ Vdc (Min) — BDX53A, 54A
 $= 80$ Vdc (Min) — BDX53B, 54B
 $= 100$ Vdc (Min) — BDX53C, 54C
- Low Collector-Emitter Saturation Voltage —
 $V_{CE(sat)} = 2.0$ Vdc (Max) @ $I_C = 3.0$ Adc
 $= 4.0$ Vdc (Max) @ $I_C = 5.0$ Adc
- Monolithic Construction with Built-In Base-Emitter Shunt Resistors
- TO-220AB Compact Package

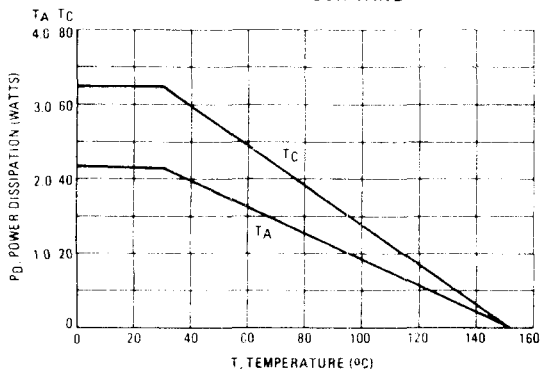
*MAXIMUM RATINGS

Rating	Symbol	BDX53 BDX54	BDX53A BDX54A	BDX53B BDX54B	BDX53C BDX54C	Unit
Collector-Emitter Voltage	V_{CE}	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 Peak	I_C	8				Adc
		12				
Base Current	I_B	0.2				Adc
Total Device Dissipation @ $T_C = 25^{\circ}\text{C}$ Derate above 25°C	P_D	60				Watts
		0.48				
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +150				$^{\circ}\text{C}$

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.08	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	70	$^\circ\text{C/W}$

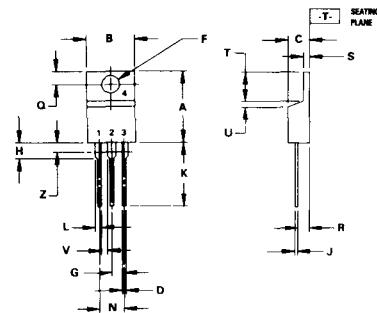
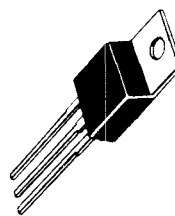
FIGURE 1 — POWER DERATING



DARLINGTON 8 AMPERE

COMPLEMENTARY SILICON POWER TRANSISTORS

60-80-100 VOLTS
65 WATTS



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	9.66	10.28	0.380	0.405
C	4.07	4.82	0.160	0.190
D	0.64	0.98	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	3.93	0.110	0.155
J	0.46	0.71	0.018	0.028
K	12.70	14.27	0.500	0.562
L	1.15	1.39	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	0.90	1.27	0.030	0.050
V	1.15	—	0.045	—
Z	—	2.04	—	0.080

STYLE 1

1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

CASE 221A-04
TO-220AB

BDX53, 53A, 53B, 53C NPN BDX54, 54A, 54B, 54C PNP

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Sustaining Voltage (1) ($I_C = 100\text{ mAdc}$, $I_B = 0$)	$V_{CE(sus)}$	45 60 80 100	— — — —	Vdc
Collector Cutoff Current ($V_{CE} = 22\text{ Vdc}$, $I_B = 0$) ($V_{CE} = 30\text{ Vdc}$, $I_B = 0$) ($V_{CE} = 40\text{ Vdc}$, $I_B = 0$) ($V_{CE} = 50\text{ Vdc}$, $I_B = 0$)	I_{CEO}	— — — —	0.5 0.5 0.5 0.5	mAdc
Collector Cutoff Current ($V_{CB} = 45\text{ Vdc}$, $I_E = 0$) ($V_{CB} = 60\text{ Vdc}$, $I_E = 0$) ($V_{CB} = 80\text{ Vdc}$, $I_E = 0$) ($V_{CB} = 100\text{ Vdc}$, $I_E = 0$)	I_{CBO}	— — — —	0.2 0.2 0.2 0.2	mAdc
Emitter Cutoff Current ($V_{BE} = 5.0\text{ Vdc}$, $I_C = 0$)	I_{EBO}	—	2.0	mAdc
ON CHARACTERISTICS (1)				
DC Current Gain ($I_C = 3.0\text{ Adc}$, $V_{CE} = 3.0\text{ Vdc}$)	h_{FE}	750	— —	—
Collector-Emitter Saturation Voltage ($I_C = 3.0\text{ Adc}$, $I_B = 12\text{ mAdc}$)	$V_{CE(sat)}$	— —	2.0 4.0	Vdc
Base-Emitter Saturation Voltage ($I_C = 3.0\text{ Adc}$, $I_B = 12\text{ mA}$)	$V_{BE(sat)}$	—	2.5	Vdc
DYNAMIC CHARACTERISTICS				
Small-Signal Current Gain ($I_C = 3.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$, $f = 1.0\text{ MHz}$)	$ h_{fe} $	4.0	—	—
Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 0.1\text{ MHz}$)	C_{ob}	— —	300 200	pF

(1) Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$.

FIGURE 2 – SWITCHING TIMES TEST CIRCUIT

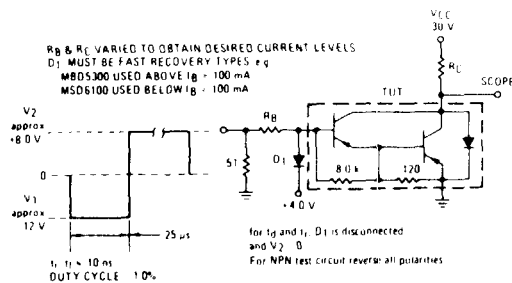
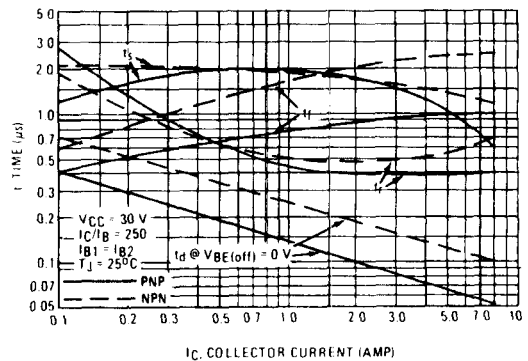


FIGURE 3 – SWITCHING TIMES



BDX53, 53A, 53B, 53C NPN BDX54, 54A, 54B, 54C PNP

FIGURE 4 – THERMAL RESPONSE

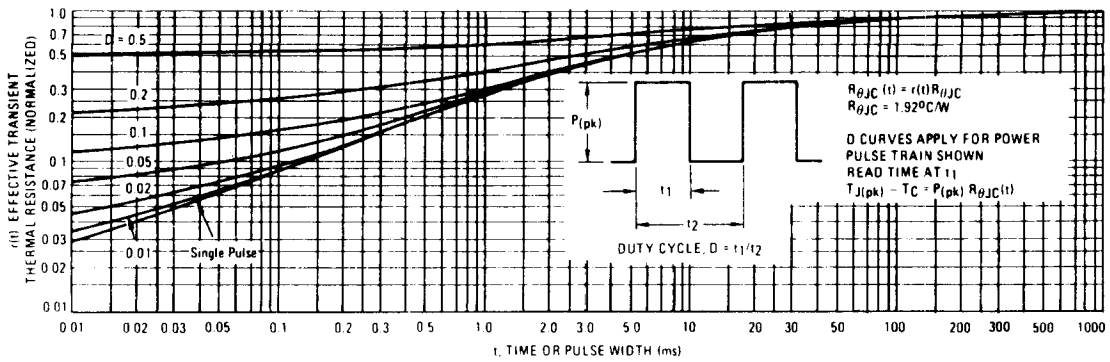
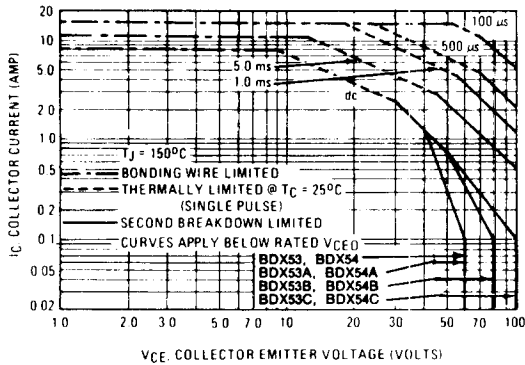


FIGURE 5 – ACTIVE-REGION SAFE OPERATING AREA



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 $T_{J(pk)} = 150^\circ C$. T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} < 150^\circ C$. $T_{J(pk)}$ 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 – SMALL-SIGNAL CURRENT GAIN

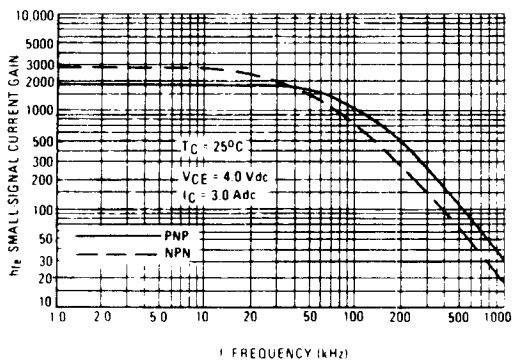
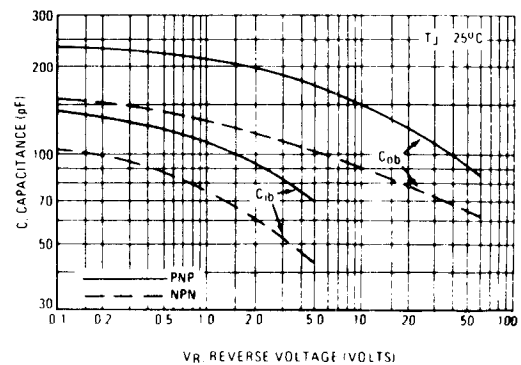
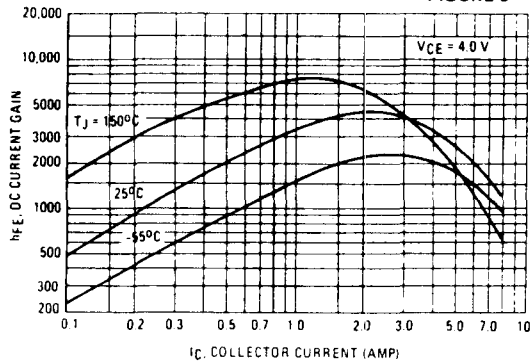


FIGURE 7 – CAPACITANCE



BDX53, 53A, 53B, 53C NPN **BDX54, 54A, 54B, 54C PNP**

NPN
BDX53, BDX53A, BDX53B, BDX53C



PNP
BDX54, BDX54A, BDX54B, BDX54C

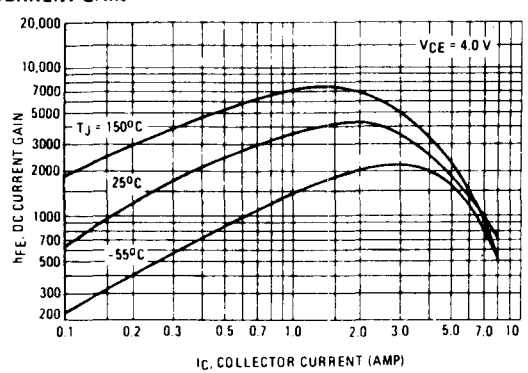


FIGURE 9 – COLLECTOR SATURATION REGION

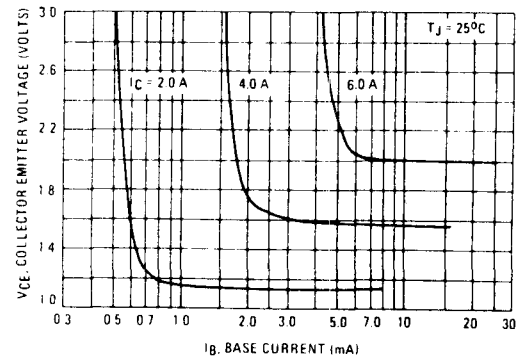
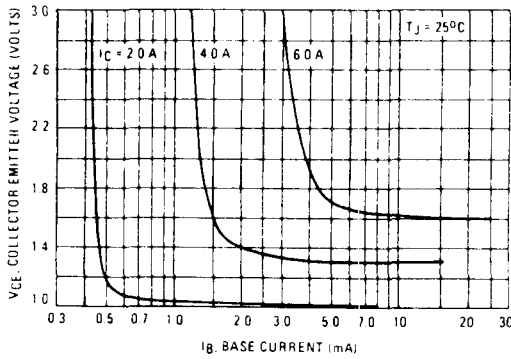
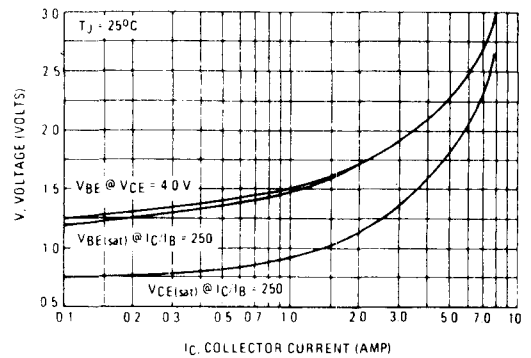
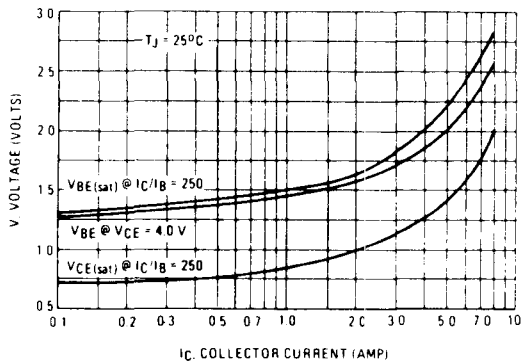


FIGURE 10 – "ON" VOLTAGES



BDX53, 53A, 53B, 53C NPN BDX54, 54A, 54B, 54C PNP

NPN

BDX53, BDX53A, BDX53B, BDX53C

PNP

BDX54, BDX54A, BDX54B, BDX54C

FIGURE 11 – TEMPERATURE COEFFICIENTS

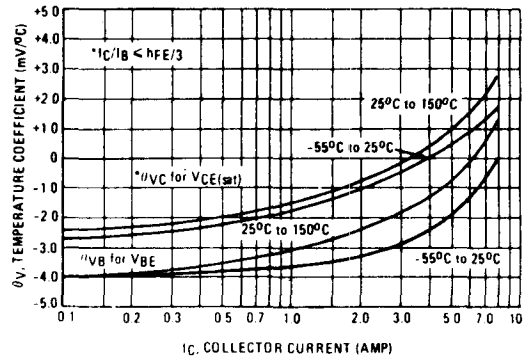
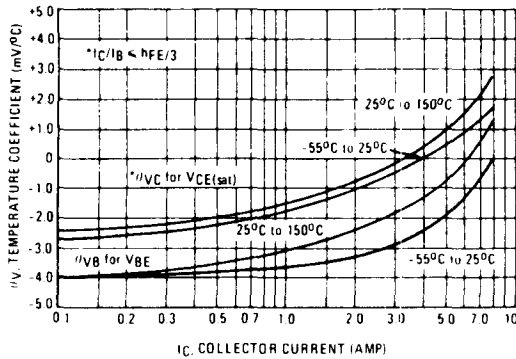


FIGURE 12 – COLLECTOR CUT-OFF REGION

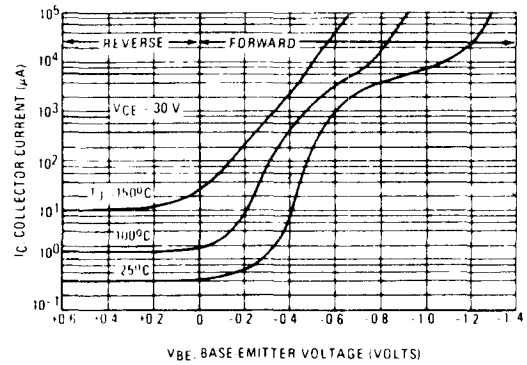
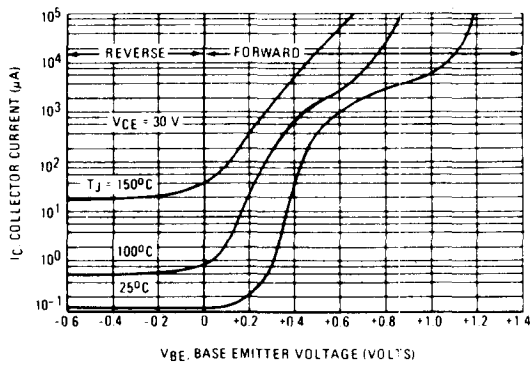


FIGURE 13 – DARLINGTON SCHEMATIC

