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*Consult Motorola if a direct replacement is necessary.

TABLE 5 — PLASTIC TO-220 (continued)

I _C Cont Amps Max	V _{CE0(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
450	BU522B##		250 min	2.5				7.5	75	
8	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
		TIP102##	TIP107##	1k/20k	3	1.5 typ	1.5 typ	3	4#	80
	120	BDX53D##	BDX54D##	750 min	3				4#	60
		MJE15028	MJE15029	20 min	4				30	50
150	MJE15030	MJE15031	20 min	4				30	50	
	BU807##		100 min	5	0.55 typ	0.2 typ	5	60	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##	MJE5850	200 min 15 min	4 2	8 typ 2	2 typ 0.5	6 4	80 80	80	
350	MJE5741##		200 min 15 min	4 2	8 typ 2	2 typ 0.5	6 4	80 80	80	
	MJE5742##	MJE5851	200 min 15 min	4 2	8 typ 2	2 typ 0.5	6 4	80 80	80	
400	MJE13007		200 min 5/30	4 5	8 typ 3	2 typ 0.7	6 5	4	80 80	
	MJE16080	MJE5852	15 min 5 min	2 8	2 2	0.5 0.5	4 5	80 80	80	
	MJE16106		6/25	8	2 typ	0.1 typ	5	80	100	
	450	MJE16081		5 min	8	2	0.5	5	80	
10	30		D45H1 D45H2	20 min 40 min	4 4				50 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
		D44H5	D45H4 D45H5	20 min 40 min	4 4				50 50	
60	BDX33A##	BDX34A##	750 min	4				3	70	
	BD807	BD808	15 min	4				1.5	90	

I_{hfe} @ 1 MHz, ## Darlington

(continued)

NPN Power Transistors

These devices are high voltage, high speed transistors for horizontal deflection output stages of TV's and CRT's.

- High Voltage: $V_{CEV} = 330$ or 400 V
- Fast Switching Speed: $t_f = 750$ ns (max)
- Low Saturation Voltage: $V_{CE(sat)} = 1$ V (max) @ 5 A
- Packaged in Compact JEDEC TO-220AB
- "D" Suffix w/Integral Damper Diode

BU406,D
BU407,D

7 AMPERES
NPN SILICON
POWER TRANSISTORS
60 WATTS
150 and 200 VOLTS

MAXIMUM RATINGS

Rating	Symbol	BU406,D	BU407,D	Unit
Collector-Emitter Voltage	V_{CEO}	200	150	Vdc
Collector-Emitter Voltage	V_{CEV}	400	330	Vdc
Collector-Base Voltage	V_{CBO}	400	330	Vdc
Emitter Base Voltage	V_{EBO}	6		Vdc
Collector Current — Continuous	I_C	7		Adc
Peak Repetitive		10		
Peak (10 ms)		15		
Base Current	I_B	4		Adc
Total Device Dissipation, $T_C = 25^\circ\text{C}$ Derate above $T_C = 25^\circ\text{C}$	P_D	60	0.48	Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to 150		$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.08	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	70	$^\circ\text{C}/\text{W}$
Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds	T_L	275	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

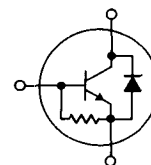
Collector-Emitter Sustaining Voltage ⁽¹⁾ ($I_C = 100$ mAdc, $I_B = 0$)	BU406,D BU407,D	$V_{CEO(sus)}$	200 150	— —	— —	Vdc
Collector Cutoff Current ($V_{CE} = \text{Rated } V_{CEV}, V_{BE} = 0$) ($V_{CE} = \text{Rated } V_{CEO} + 50$ Vdc, $V_{BE} = 0$) ($V_{CE} = \text{Rated } V_{CEO} + 50$ Vdc, $V_{BE} = 0, T_C = 150^\circ\text{C}$)		I_{CES}	— — —	— — —	5 0.1 1	mAdc
Emitter Cutoff Current ($V_{EB} = 6$ Vdc, $I_C = 0$)	BU406, BU407 BU406D, BU407D	I_{EBO}	— —	— —	1 400	mAdc

ON CHARACTERISTICS⁽¹⁾

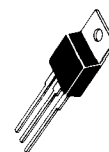
Collector-Emitter Saturation Voltage ($I_C = 5$ Adc, $I_B = 0.5$ Adc)	$V_{CE(sat)}$	—	—	1	Vdc
Base-Emitter Saturation Voltage ($I_C = 5$ Adc, $I_B = 0.5$ Adc)	$V_{BE(sat)}$	—	—	1.2	Vdc
Forward Diode Voltage ($I_{EC} = 5$ Adc) "D" only	V_{EC}	—	—	2	Volts

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

(continued)



"D" SUFFIX ONLY



CASE 221A-04
TO-220AB

BU406,D • BU407,D

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

Characteristic	Symbol	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS					
Current-Gain — Bandwidth Product ($I_C = 0.5 \text{ Adc}$, $V_{CE} = 10 \text{ Vdc}$, $f_{\text{test}} = 20 \text{ MHz}$)	f_T	10	—	—	MHz
Output Capacitance ($V_{CB} = 10 \text{ Vdc}$, $I_E = 0$, $f = 1 \text{ MHz}$)	C_{ob}	—	80	—	pF
SWITCHING CHARACTERISTICS					
Inductive Load Crossover Time ($V_{CC} = 40 \text{ Vdc}$, $I_C = 5 \text{ Adc}$, $I_{B1} = I_{B2} = 0.5 \text{ Adc}$, $L = 150 \mu\text{H}$)	t_c	—	—	0.75	μs

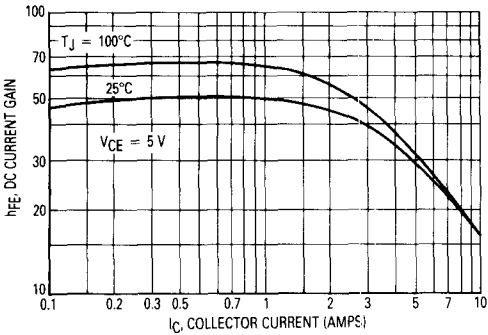


Figure 1. DC Current Gain

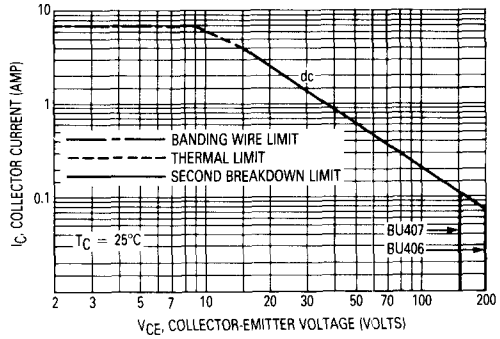


Figure 2. Maximum Rated Forward Bias Safe Operating Area

OUTLINE DIMENSIONS

NOTES:

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

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

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	0.86	0.025	0.035
F	3.61	3.73	0.142	0.147
G	2.42	2.66	0.096	0.105
H	2.80	3.83	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	1.38	0.045	0.055
M	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	6.93	6.47	0.275	0.255
U	0.90	1.27	0.030	0.050
V	1.15	—	0.045	—
Z	—	2.04	—	0.080

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