

MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

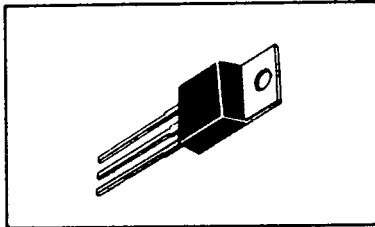
BU522
BU522A
BU522B

HIGH VOLTAGE SILICON POWER DARLINGTONS

Power Transistor mainly intended for use as ignition circuit output transistor.

- Specified minimum sustaining voltage:
 $V_{CE(sus)} = 350 \text{ V (BU522)}$
 at $I_C = 1 \text{ A}$ 400 V (BU522A)
 425 V (BU522B)
- High S.O.A. capability:
 $V_{CE} = 350 \text{ V (BU522) at } I_C = 5 \text{ A}$
 400 V (BU522A, BU522B)
- Low $V_{CE(sat)} = 2.0 \text{ V max. at } I_C = 4 \text{ A (BU522A, BU522B)}$

7 AMPERES
DARLINGTON
TRIPLE DIFFUSED
POWER TRANSISTORS
NPN SILICON
375, 425, 450 VOLTS
75 WATTS



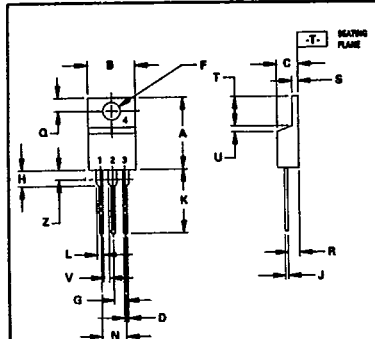
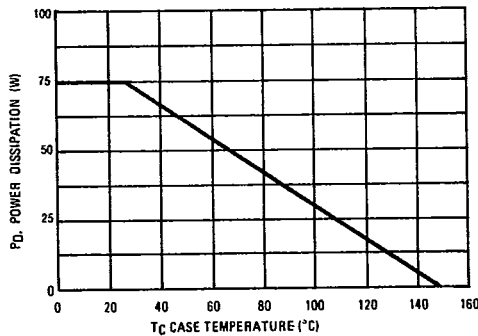
MAXIMUM RATINGS

Rating	Symbol	BU522	BU522A	BU522B	Unit
Collector-Emitter Voltage Sust.	$V_{CE(sus)}$	350	400	425	Vdc
Collector-Emitter Voltage	V_{CE}	375	425	450	Vdc
Collector-Base Voltage	V_{CB0}	400	450	475	Vdc
Emitter-Base Voltage	V_{EB0}	5.0			Vdc
Collector Current - Continuous	I_C	7.0			Adc
Base Current	I_B	2.0			Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	75			Watts
		0.60			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	θ_{JC}	1.67	$^\circ\text{C/W}$

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	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	0.095	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	1.39	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	1.39	0.045	0.055
T	6.37	6.47	0.250	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

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

Characteristic	Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS					
Collector-Emitter Sustaining Voltage (See Figure 2) ($I_C = 1.0 \text{ A}$) See Figure 2	$V_{CE(sus)}$	350 400 425			Vdc
Collector Cutoff Current (Rated V_{CE} , $R_{BE} = 270 \Omega$)	I_{CER}			1.0	mAdc
Collector Cutoff Current (Rated V_{CBO} , $I_E = 0$)	I_{CBO}			1.0	mAdc
Emitter Cutoff Current ($V_{EB} = 5.0 \text{ Vdc}$, $I_C = 0$)	I_{EBO}			40	mAdc

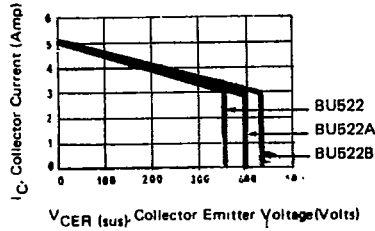
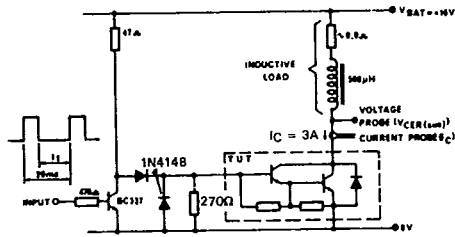
ON CHARACTERISTICS

DC Current Gain ($I_C = 2.5 \text{ Adc}$, $V_{CE} = 5 \text{ Vdc}$)	h_{FE}	250			
Collector-Emitter Saturation Voltage ($I_C = 4 \text{ Adc}$, $I_B = 80 \text{ mAdc}$)	$V_{CE(sat)}$			2.5 2	Vdc
Base-Emitter Saturation Voltage ($I_C = 4 \text{ Adc}$, $I_B = 80 \text{ mAdc}$)	$V_{BE(sat)}$			2.5	Vdc

DYNAMIC CHARACTERISTICS

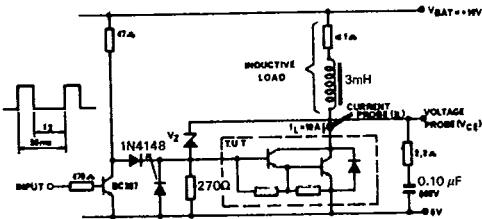
Current Gain - Bandwidth Product ($I_C = 0.3 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$, $f_{test} = 1.0 \text{ MHz}$)	f_T		7.5		MHz
Output Capacitance ($V_{CB} = 10 \text{ Vdc}$, $I_E = 0$, $f = 0.1 \text{ MHz}$)	C_{ob}		150		pF

FIGURE 2 - SUSTAINING VOLTAGE TEST V_{CER} (µs)



t_1 to be selected that I_C reaches 3 Adc before switch-off
Case temperature of the power transistor $T_C = 25^\circ\text{C}$

Test conditions of the Collector-Base Clamping Circuit:



Clamping device characteristics:

$V_Z = 350\text{ V (BU522)} \pm 1\% \text{ at } I_Z = 20\text{ mA}$
 400 V (BU522A/B)

Clamping duration is around $45\ \mu\text{sec (BU522)}$
 $40\ \mu\text{sec (BU522A/B)}$

t_2 to be selected that I_L reaches
5 Adc before switch-off

Case temperature of the power
transistor: $T_C = 25^\circ\text{C}$.

FIGURE 3 - S.O.A. TEST