

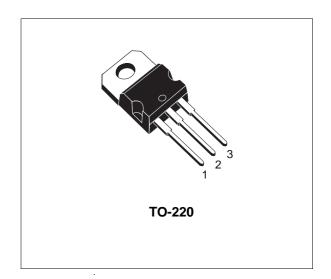
BUL128D-B

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- STMicroelectronics PREFERRED SALESTYPE
- NPN TRANSISTOR
- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- INTEGRATED ANTIPARALLEL COLLECTOR-EMITTER DIODE

APPLICATIONS:

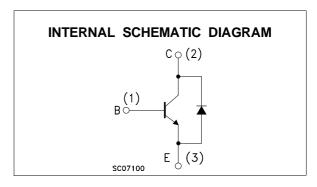
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- FLYBACK AND FORWARD SINGLE TRANSISTOR LOW POWER CONVERTERS



DESCRIPTION

The device is manufactured using high voltage Multi Epitaxial Planar technology for high switching speeds and medium voltage capability. It uses a Cellular Emitter structure with planar edge termination to enhance switching speeds while maintaining the wide RBSOA.

The device is designed for use in lighting applications and low cost switch-mode power supplies.



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{CES}	Collector-Emitter Voltage (V _{BE} = 0)	700	V
V _{CEO}	Collector-Emitter Voltage (I _B = 0)	400	V
V_{EBO}	Emitter-Base Voltage	BV _{EBO}	V
	$(I_C = 0, I_B = 2 A, t_p < 10\mu s, T_j < 150^{\circ}C)$		
Ic	Collector Current	4	Α
I _{CM}	Collector Peak Current (tp < 5 ms)	8	Α
I_{B}	Base Current	2	Α
I _{BM}	Base Peak Current (t _p < 5 ms)	4	Α
P _{tot}	Total Dissipation at T _c = 25 °C	70	W
T _{stg}	Storage Temperature	-65 to 150	°C
Tj	Max. Operating Junction Temperature	150	°C

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THERMAL DATA

R _{thj-case}	Thermal Resistance Junction	on-Case Max	1.78	°C/W
$R_{thj-amb}$	Thermal Resistance Junction	on-Ambient Max	62.5	°C/W

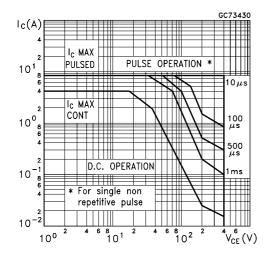
ELECTRICAL CHARACTERISTICS ($T_{case} = 25$ $^{\circ}C$ unless otherwise specified)

Symbol	Parameter			Min.	Тур.	Max.	Unit
Ices	Collector Cut-off Current (V _{BE} = -1.5 V)	V _{CE} = 700 V V _{CE} = 700 V	T _C = 125 °C			100 500	μA μA
I _{CEO}	Collector Cut-off Current (I _B = 0)	V _{CE} = 400 V				250	μΑ
BV _{EBO}	Emitter-Base Breakdown Voltage (I _C = 0)	I _E = 10 mA		9		18	V
V _{CEO(sus)*}	Collector-Emitter Sustaining Voltage (I _B = 0)	I _C = 100 mA	L = 25 mH	400			V
V _{CE(sat)} *	Collector-Emitter Saturation Voltage	I _C = 0.5 A I _C = 1 A I _C = 2.5 A I _C = 4 A	$I_B = 0.1 A$ $I_B = 0.2 A$ $I_B = 0.5 A$ $I_B = 1 A$		0.5	0.7 1 1.5	V V V
V _{BE(sat)} *	Base-Emitter Saturation Voltage	I _C = 0.5 A I _C = 1 A I _C = 2.5 A	$I_B = 0.1 A$ $I_B = 0.2 A$ $I_B = 0.5 A$			1.1 1.2 1.3	V V V
h _{FE} *	DC Current Gain	I _C = 10 mA I _C = 2 A	V _{CE} = 5 V V _{CE} = 5 V	10 12		32	
V_{f}	Forward Voltage Drop	I _f = 2 A				2.5	V
t _s	INDUCTIVE LOAD Storage Time Fall Time	$V_{CC} = 200 \text{ V}$ $I_{B1} = 0.4 \text{ A}$ $R_{BB} = 0 \Omega$ (see fig.1)	I _C = 2 A V _{BE(off)} = -5 V L = 200 μH		0.6 0.1		μs μs
t _s	RESISTIVE LOAD Storage Time Fall Time	$V_{CC} = 250 \text{ V}$ $I_{B1} = 0.4 \text{ A}$ $T_p = 30 \mu\text{s}$	$I_C = 2 A$ $I_{B2} = -0.4 A$ (see fig.2)	2	0.2	2.9	μs μs

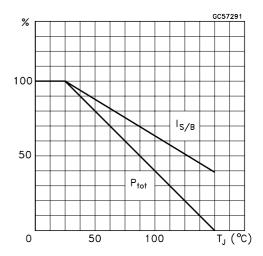
^{*} Pulsed: Pulse duration = 300 μs, duty cycle 1.5 %

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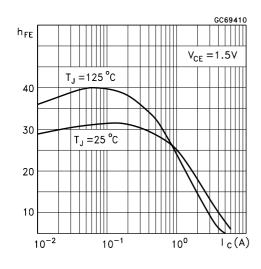
Safe Operating Areas



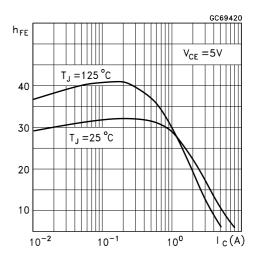
Derating Curve



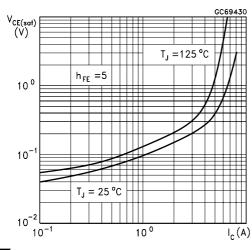
DC Current Gain



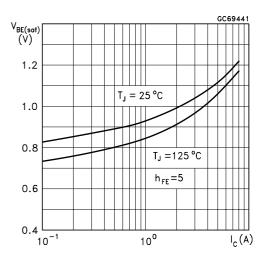
DC Current Gain



Collector Emitter Saturation Voltage



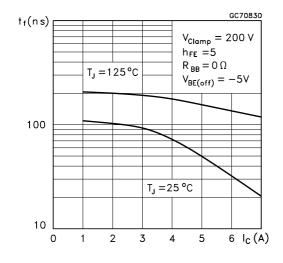
Base Emitter Saturation Voltage



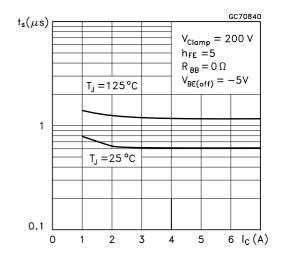
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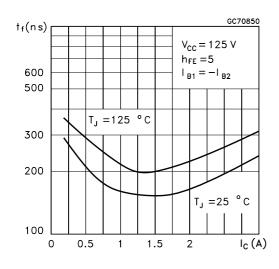
Inductive Fall Time



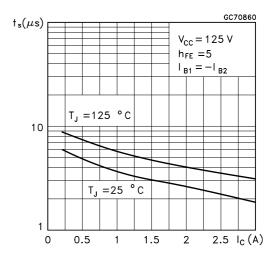
Inductive Storage Time



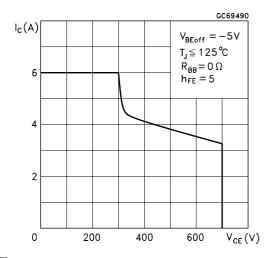
Resistive Load Fall Time



Resistive Load Storage Time



Reverse Biased SOA



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Figure 1: Inductive Load Switching Test Circuits.

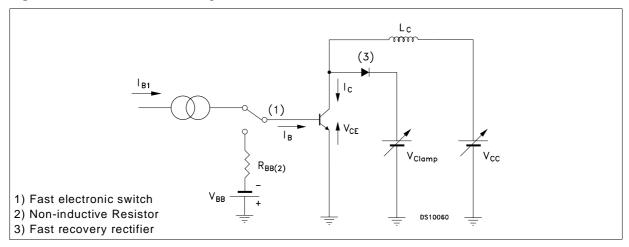
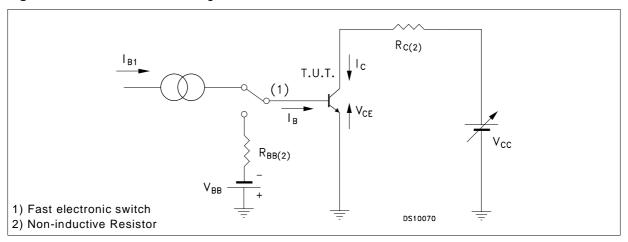
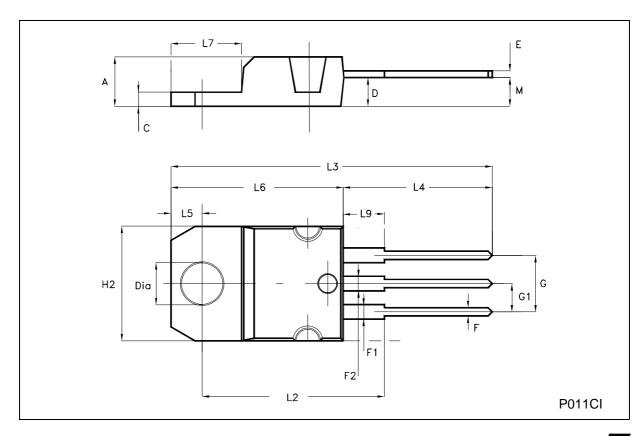


Figure 2: Resistive Load Switching Test Circuits.



TO-220 MECHANICAL DATA

DIM	mm			inch			
DIM.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Α	4.40		4.60	0.173		0.181	
С	1.23		1.32	0.048		0.052	
D	2.40		2.72	0.094		0.107	
E	0.49		0.70	0.019		0.027	
F	0.61		0.88	0.024		0.034	
F1	1.14		1.70	0.044		0.067	
F2	1.14		1.70	0.044		0.067	
G	4.95		5.15	0.194		0.202	
G1	2.40		2.70	0.094		0.106	
H2	10.00		10.40	0.394		0.409	
L2		16.40			0.645		
L4	13.00		14.00	0.511		0.551	
L5	2.65		2.95	0.104		0.116	
L6	15.25		15.75	0.600		0.620	
L7	6.20		6.60	0.244		0.260	
L9	3.50		3.93	0.137		0.154	
М		2.60			0.102		
DIA.	3.75		3.85	0.147		0.151	



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