

BULB128D-1

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

Ordering Code	Marking	Shipment		
BULB128D-1	BULB128D	Tube		

- 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

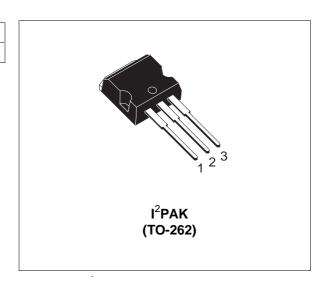
APPLICATIONS:

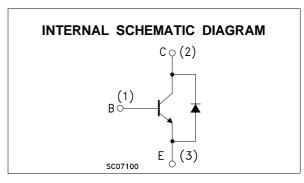
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- FLYBACK AND FORWARD SINGLE TRANSISTOR LOW POWER CONVERTERS

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	V _{(BR)EBO}	V
	$(I_C = 0, I_B = 2 A, t_p < 10 \mu s, T_j < 150 ^{\circ}C)$		
Ic	Collector Current	4	Α
Ісм	Collector Peak Current (t _p < 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-Case	Max	1.78	°C/W
$R_{thj-amb}$	Thermal Resistance Junction-Ambient	Max	62.5	°C/W

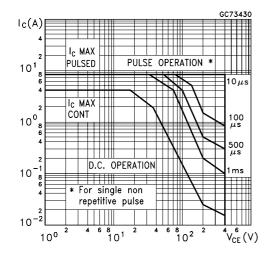
ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Тур.	Max.	Unit
I _{CES}	Collector Cut-off Current (V _{BE} = 0 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	μА
V _{(BR)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
VCE(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	$V_{CC} = 250 \text{ V}$ $I_{B1} = 0.4 \text{ A}$ $T_p = 300 \mu\text{s}$	$I_C = 2 A$ $I_{B2} = -0.4 A$ (see fig.2)	2	0.2	2.9	μs μs

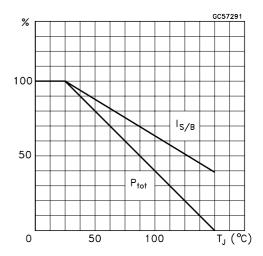
^{*} Pulsed: Pulse duration = 300 μs, duty cycle 1.5 %

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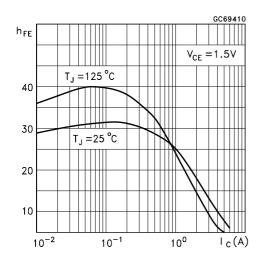
Safe Operating Areas



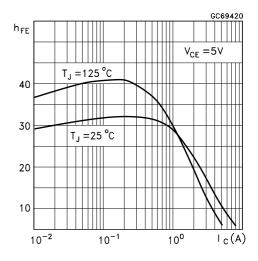
Derating Curve



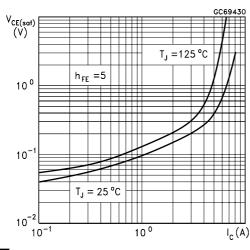
DC Current Gain



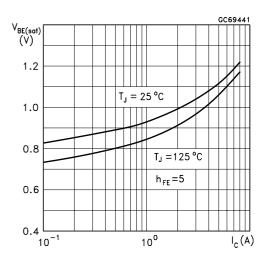
DC Current Gain



Collector Emitter Saturation Voltage



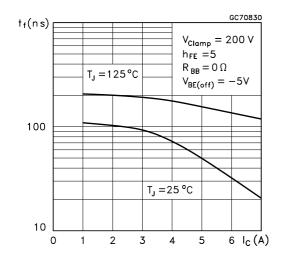
Base Emitter Saturation Voltage



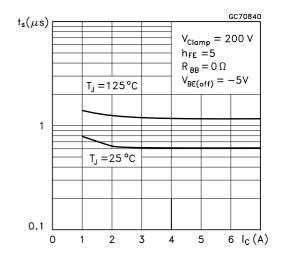
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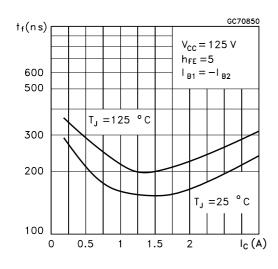
Inductive Fall Time



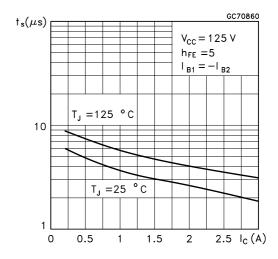
Inductive Storage Time



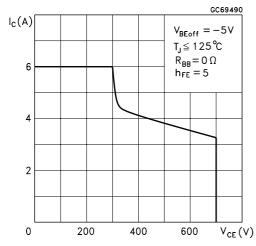
Resistive Load Fall Time



Resistive Load Storage Time



Reverse Biased SOA



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Figure 1: Inductive Load Switching Test Circuits.

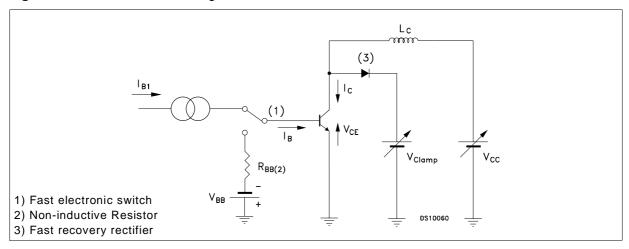
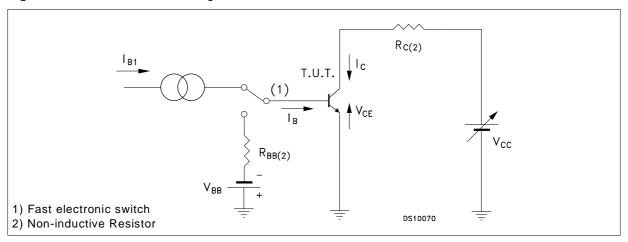
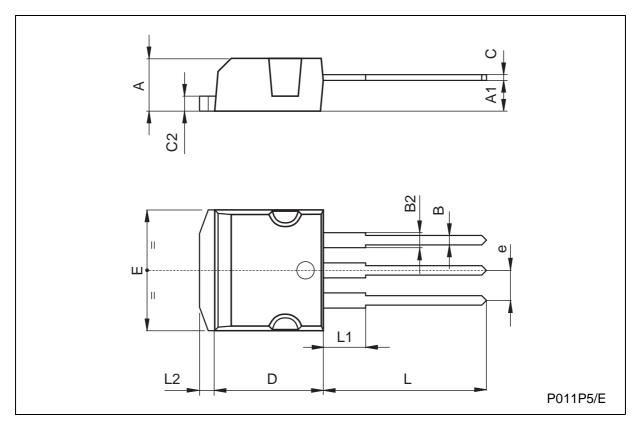


Figure 2: Resistive Load Switching Test Circuits.



TO-262 (I²PAK) MECHANICAL DATA

DIM.	mm			inch		
Diiii.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
А	4.4		4.6	0.173		0.181
A1	2.49		2.69	0.098		0.106
В	0.7		0.93	0.027		0.036
B2	1.14		1.7	0.044		0.067
С	0.45		0.6	0.017		0.023
C2	1.23		1.36	0.048		0.053
D	8.95		9.35	0.352		0.368
е	2.4		2.7	0.094		0.106
E	10		10.4	0.393		0.409
L	13.1		13.6	0.515		0.531
L1	3.48		3.78	0.137		0.149
L2	1.27		1.4	0.050		0.055



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