



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

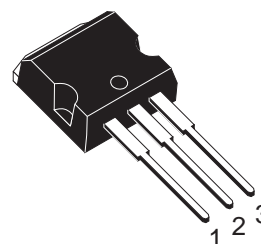
The device is manufactured using high voltage Multi Epitaxial Planar technology for high switching speeds and medium voltage capability.

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.

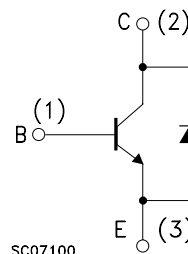
ABSOLUTE MAXIMUM RATINGS

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 ($I_C = 0$, $I_B = 2$ A, $t_p < 10\mu s$, $T_j < 150^\circ C$)	$V_{(BR)EBO}$	V
I_C	Collector Current	4	A
I_{CM}	Collector Peak Current ($t_p < 5$ ms)	8	A
I_B	Base Current	2	A
I_{BM}	Base Peak Current ($t_p < 5$ ms)	4	A
P_{tot}	Total Dissipation at $T_c = 25^\circ C$	70	W
T_{stg}	Storage Temperature	-65 to 150	$^\circ C$
T_j	Max. Operating Junction Temperature	150	$^\circ C$



**I²PAK
(TO-262)**

INTERNAL SCHEMATIC DIAGRAM



SC07100

BULB128D-1

THERMAL DATA

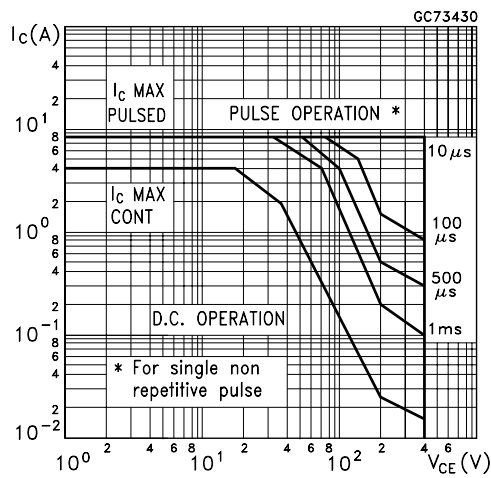
R _{thj-case}	Thermal Resistance Junction-Case	Max	1.78	°C/W
R _{thj-amb}	Thermal Resistance Junction-Ambient	Max	62.5	°C/W

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

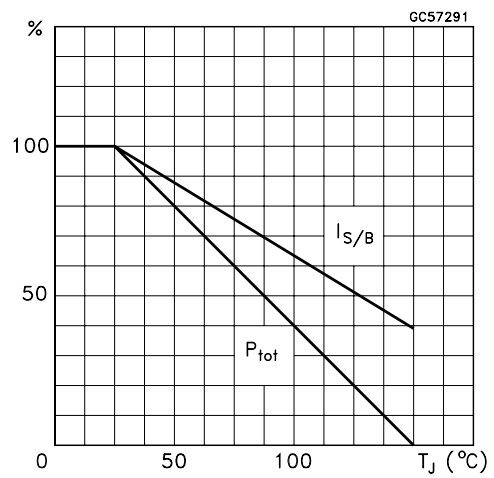
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CES}	Collector Cut-off Current (V _{BE} = 0 V)	V _{CE} = 700 V V _{CE} = 700 V T _C = 125 °C			100 500	μA μA
I _{CEO}	Collector Cut-off Current (I _B = 0)	V _{CE} = 400 V			250	μA
V _{(BR)EBO}	Emitter-Base Breakdown Voltage (I _C = 0)	I _E = 10 mA	9		18	V
V _{CEO(sus)*}	Collector-Emitter Sustaining Voltage (I _B = 0)	I _C = 100 mA L = 25 mH	400			V
V _{CE(sat)*}	Collector-Emitter Saturation Voltage	I _C = 0.5 A I _B = 0.1 A I _C = 1 A I _B = 0.2 A I _C = 2.5 A I _B = 0.5 A I _C = 4 A I _B = 1 A		0.5	0.7 1 1.5 V	V V V V
V _{BE(sat)*}	Base-Emitter Saturation Voltage	I _C = 0.5 A I _B = 0.1 A I _C = 1 A I _B = 0.2 A I _C = 2.5 A I _B = 0.5 A			1.1 1.2 1.3	V V V
h _{FE*}	DC Current Gain	I _C = 10 mA V _{CE} = 5 V I _C = 2 A V _{CE} = 5 V	10 12		32	
V _f	Forward Voltage Drop	I _f = 2 A			2.5	V
t _s t _f	INDUCTIVE LOAD Storage Time Fall Time	V _{CC} = 200 V I _C = 2 A I _{B1} = 0.4 A V _{BE(off)} = -5 V R _{BB} = 0 Ω L = 200 μH (see fig.1)		0.6 0.1		μs μs
t _s t _f	RESISTIVE LOAD Storage Time Fall Time	V _{CC} = 250 V I _C = 2 A I _{B1} = 0.4 A I _{B2} = -0.4 A T _p = 300 μs (see fig.2)	2	0.2	2.9	μs μs

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

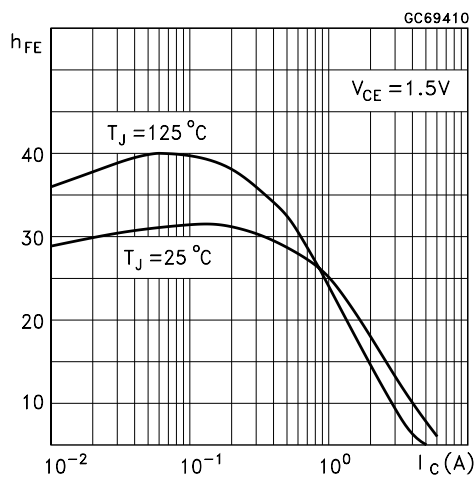
Safe Operating Areas



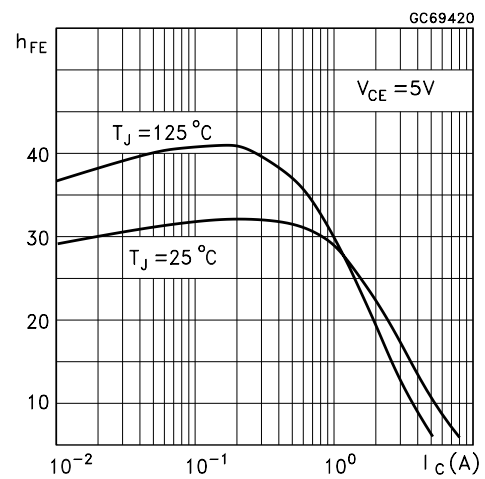
Derating Curve



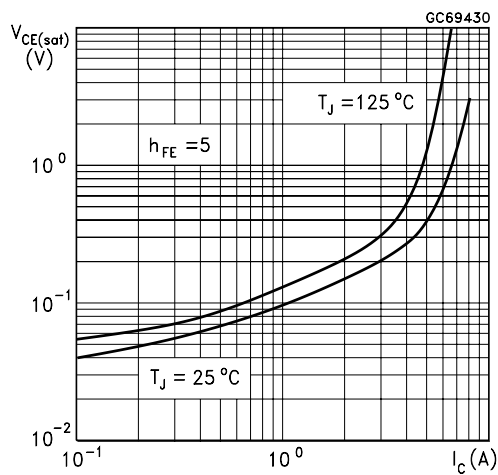
DC Current Gain



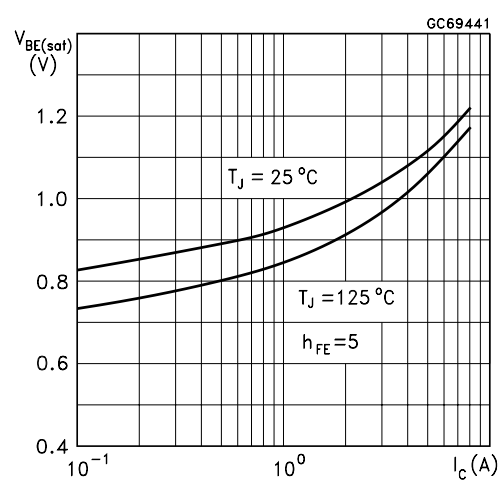
DC Current Gain



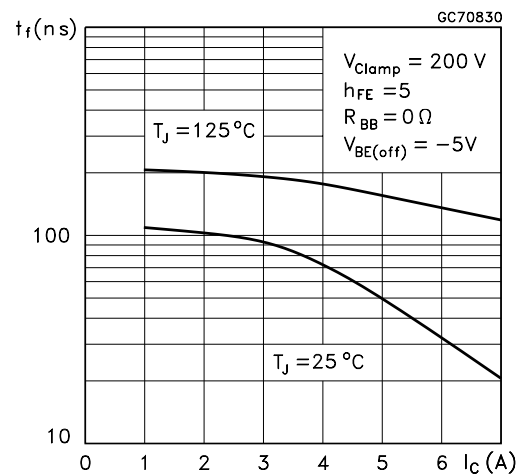
Collector Emitter Saturation Voltage



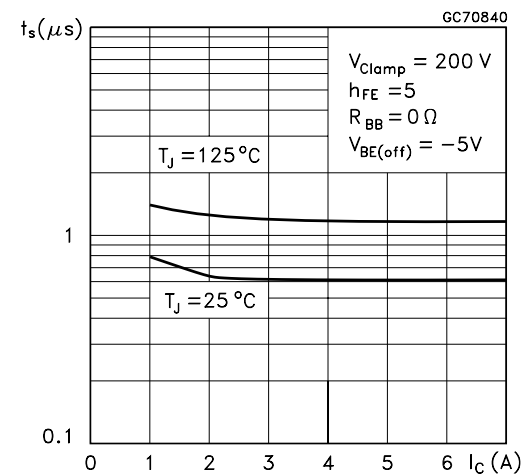
Base Emitter Saturation Voltage



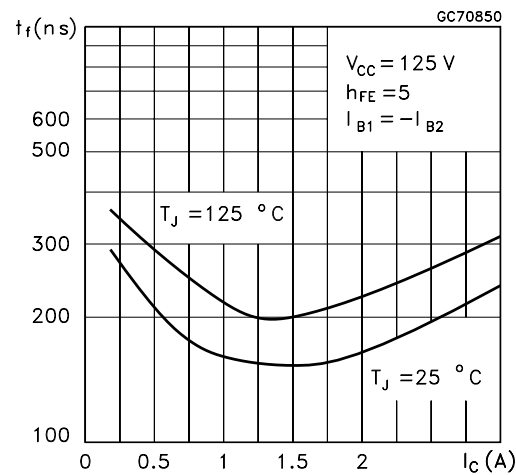
Inductive Fall Time



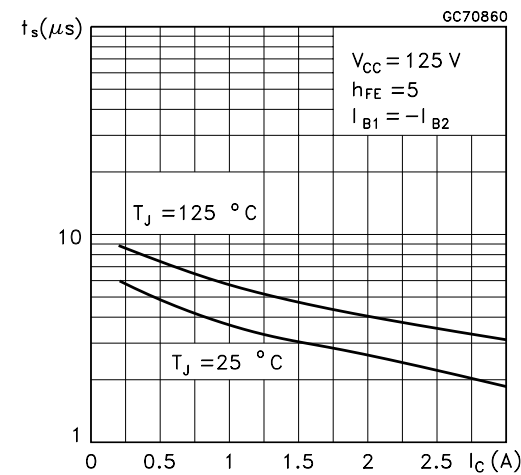
Inductive Storage Time



Resistive Load Fall Time



Resistive Load Storage Time



Reverse Biased SOA

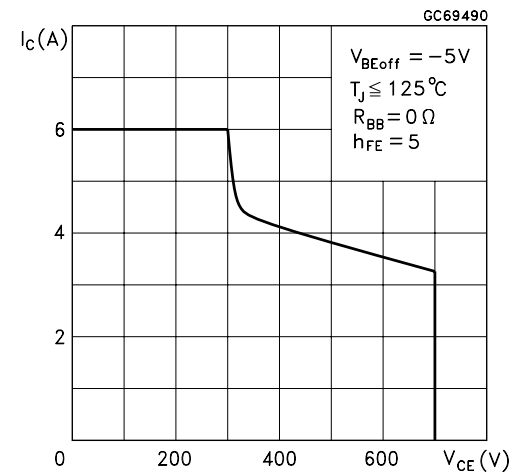
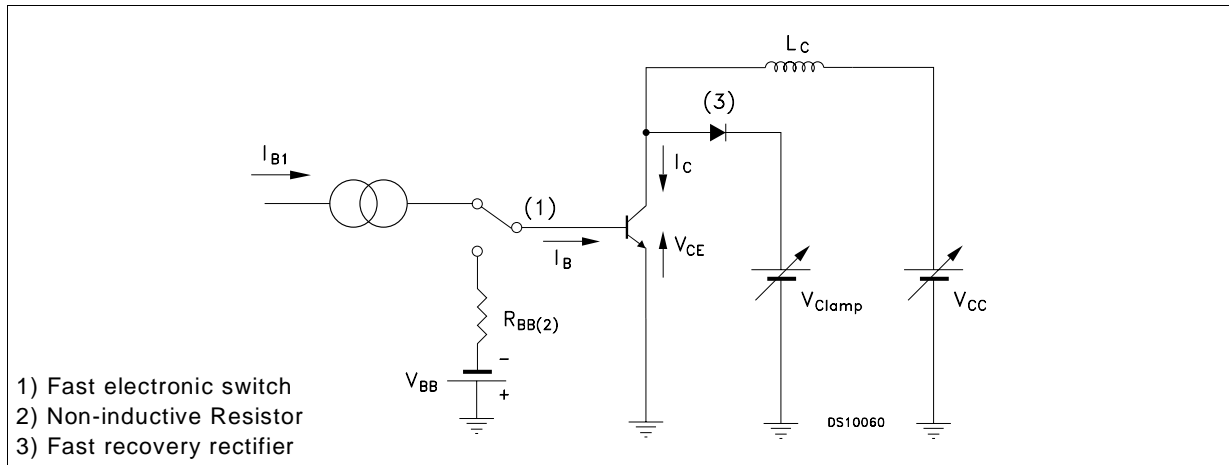
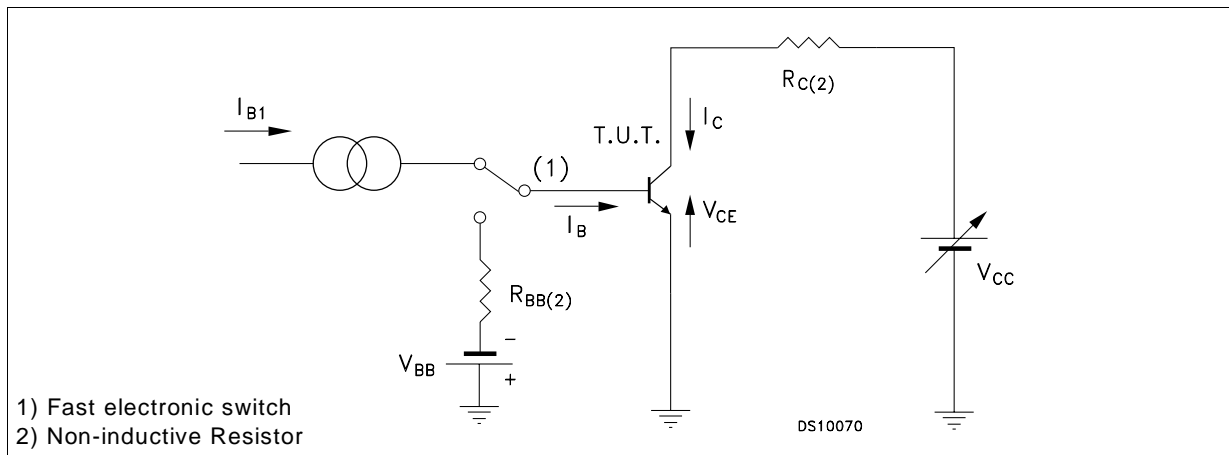
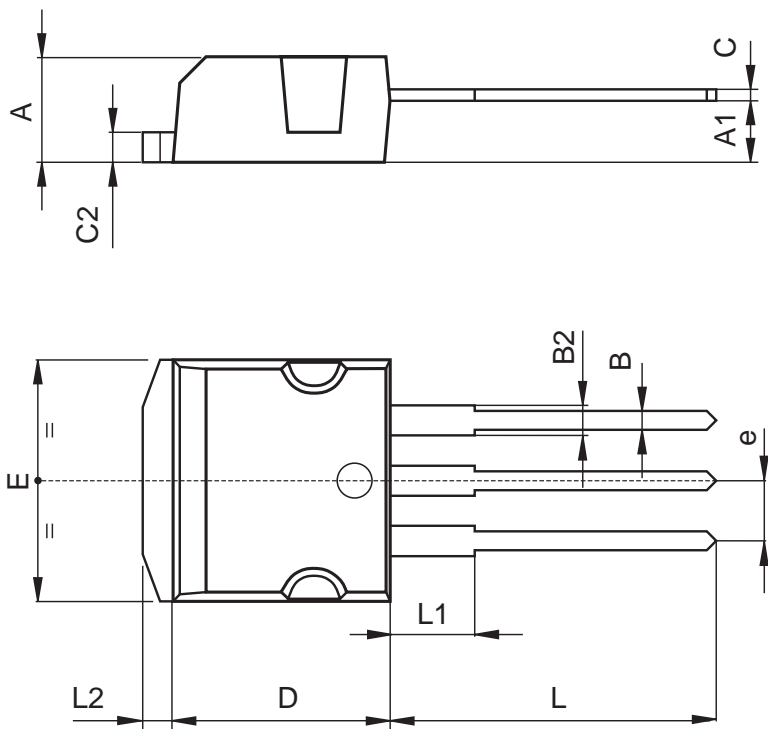


Figure 1: Inductive Load Switching Test Circuits.**Figure 2: Resistive Load Switching Test Circuits.**

TO-262 (I²PAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.4		4.6	0.173		0.181
A1	2.49		2.69	0.098		0.106
B	0.7		0.93	0.027		0.036
B2	1.14		1.7	0.044		0.067
C	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
e	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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