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BULK128D-B

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

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

APPLICATIONS:

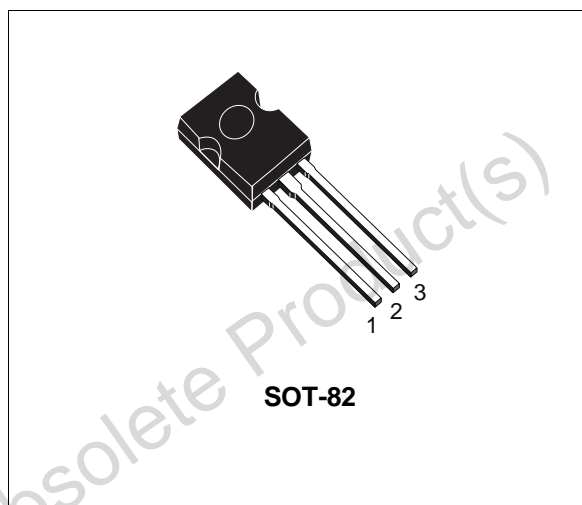
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- FLYBACK AND FORWARD SINGLE TRANSISTOR LOW POWER CONVERTERS

DESCRIPTION

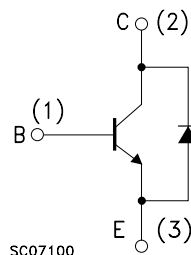
The device is manufactured using high voltage Multi Epitaxial Planar technology for high switching speeds and medium voltage capability.

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.



INTERNAL SCHEMATIC DIAGRAM



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 ($I_C = 0, I_B = 2\text{ A}, t_p < 10\mu\text{s}, T_j < 150^\circ\text{C}$)	BV_{EBO}	V
I_C	Collector Current	4	A
I_{CM}	Collector Peak Current ($t_p < 5\text{ ms}$)	8	A
I_B	Base Current	2	A
I_{BM}	Base Peak Current ($t_p < 5\text{ ms}$)	4	A
P_{tot}	Total Dissipation at $T_c = 25^\circ\text{C}$	55	W
T_{stg}	Storage Temperature	-65 to 150	$^\circ\text{C}$
T_j	Max. Operating Junction Temperature	150	$^\circ\text{C}$

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THERMAL DATA

R _{thj-case}	Thermal Resistance Junction-Case	Max	2.27	°C/W
R _{thj-amb}	Thermal Resistance Junction-Ambient	Max	80	°C/W

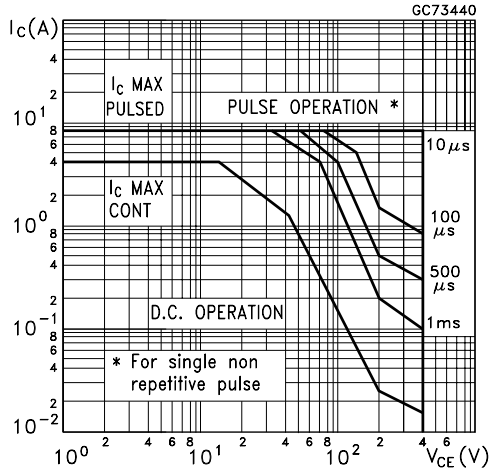
ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CES}	Collector Cut-off Current (V _{BE} = -1.5 V)	V _{CE} = 700 V V _{CE} = 700 V T _C = 125 °C			100 500	μA μA
I _{CEO}	Collector-Emitter Leakage Current (I _B = 0)	V _{CE} = 400 V			250	μA
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			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			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 8		40
V _f	Forward Voltage Drop	I _f = 2 A			2.5	V
t _s t _f	RESISTIVE LOAD Storage Time Fall Time	V _{CC} = 250 V I _{B1} = 0.4 A T _p = 30 μs	I _C = 2 A I _{B2} = -0.4 A (see fig. 2)	2	0.2	2.9 μs μs
t _s t _f	INDUCTIVE LOAD Storage Time Fall Time	V _{CC} = 200 V I _{B1} = 0.4 A R _{BB} = 0 Ω (see fig. 1)	I _C = 2 A V _{BE(off)} = -5 V L = 200 μH		0.6 0.1	μs μs

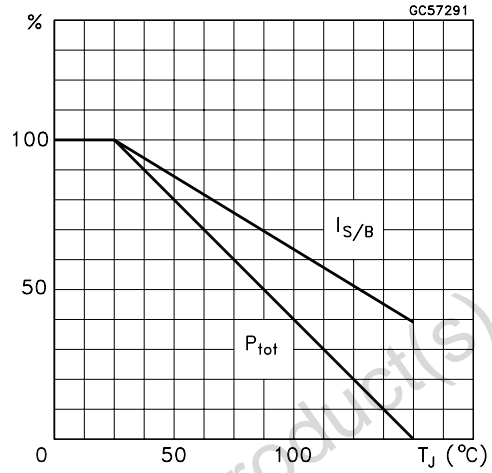
* Pulsed: Pulse duration = 300 μs, duty cycle 1.5 %

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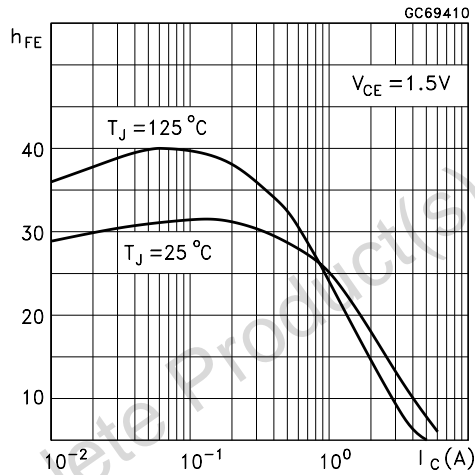
Safe Operating Areas



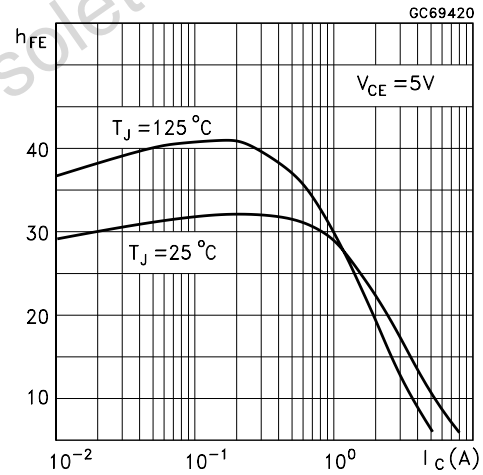
Derating Curve



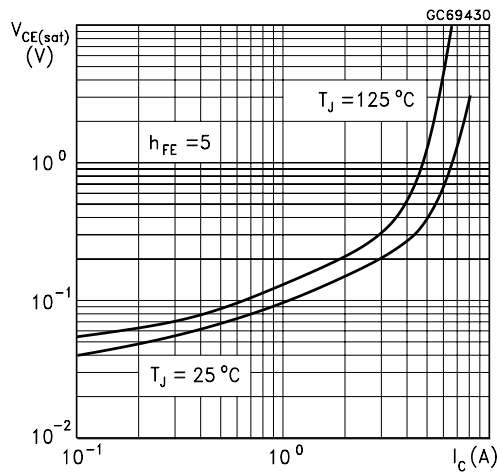
DC Current Gain



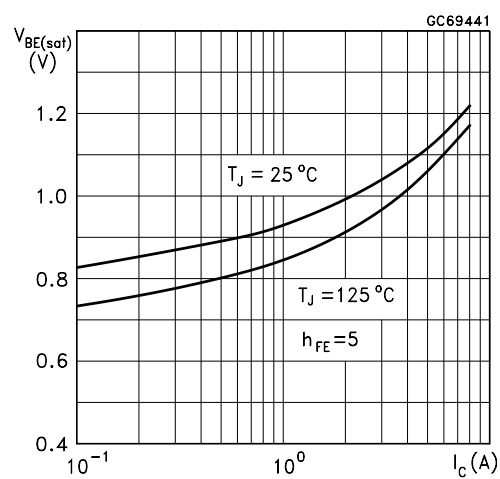
DC Current Gain



Collector Emitter Saturation Voltage

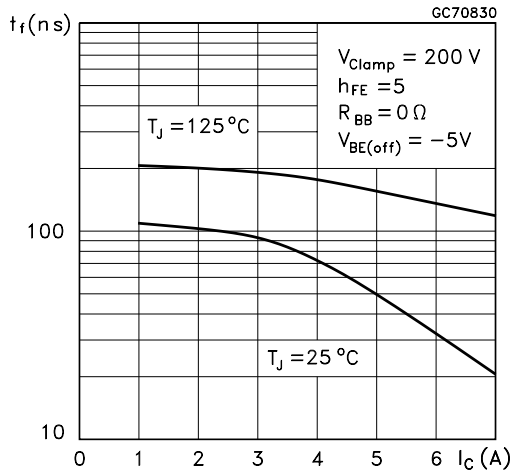


Base Emitter Saturation Voltage

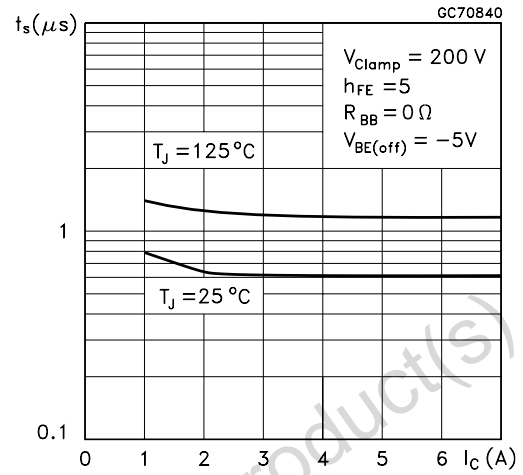


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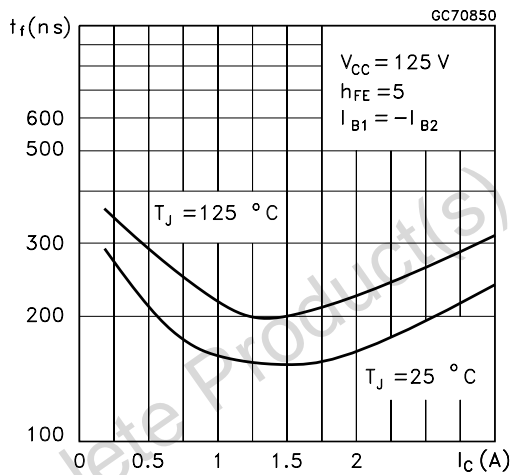
Inductive Fall Time



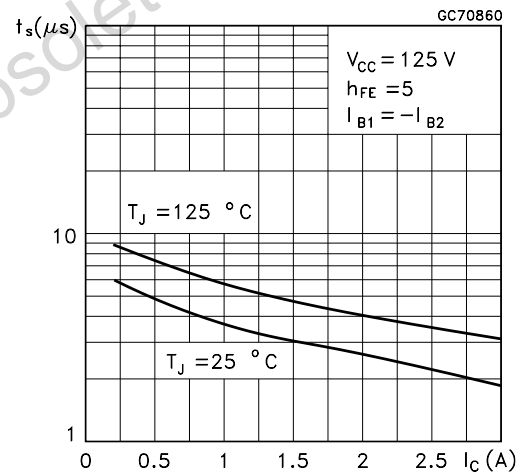
Inductive Storage Time



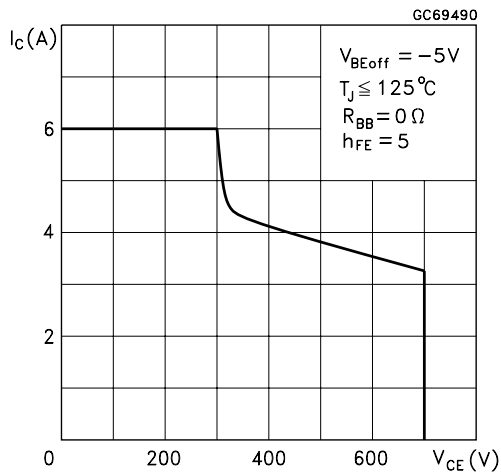
Resistive Load Fall Time



Resistive Load Storage Time



Reverse Biased SOA



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Figure 1: Inductive Load Switching Test Circuit.

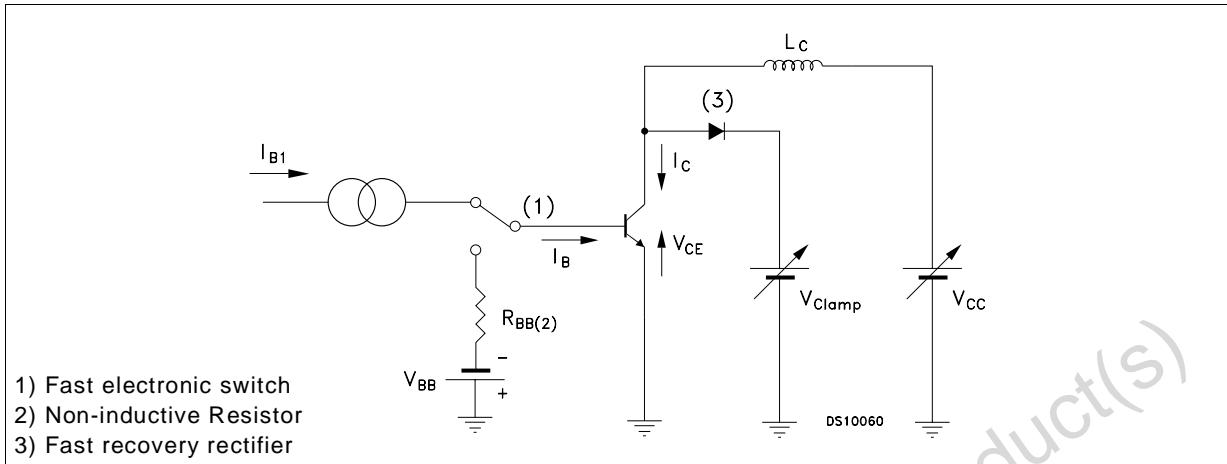
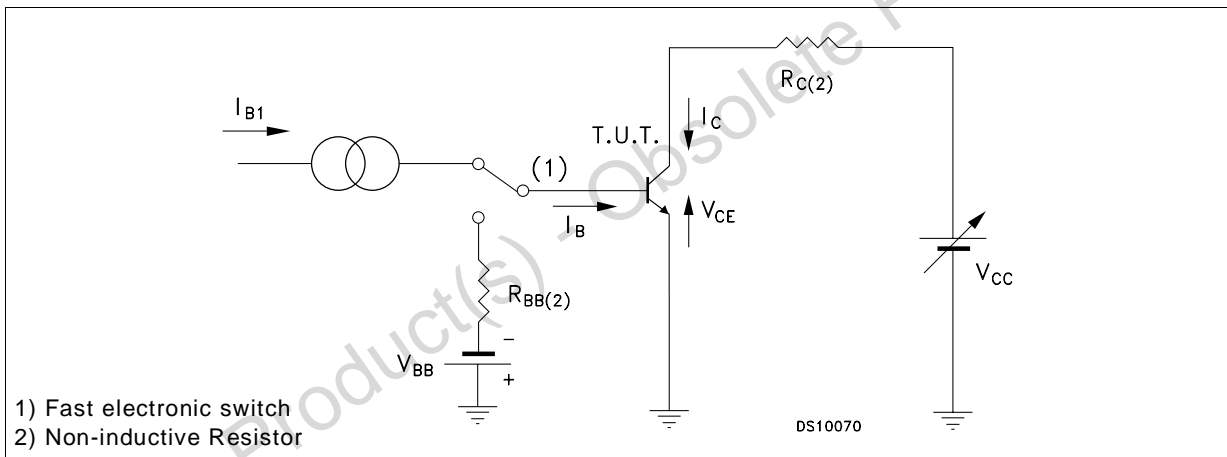


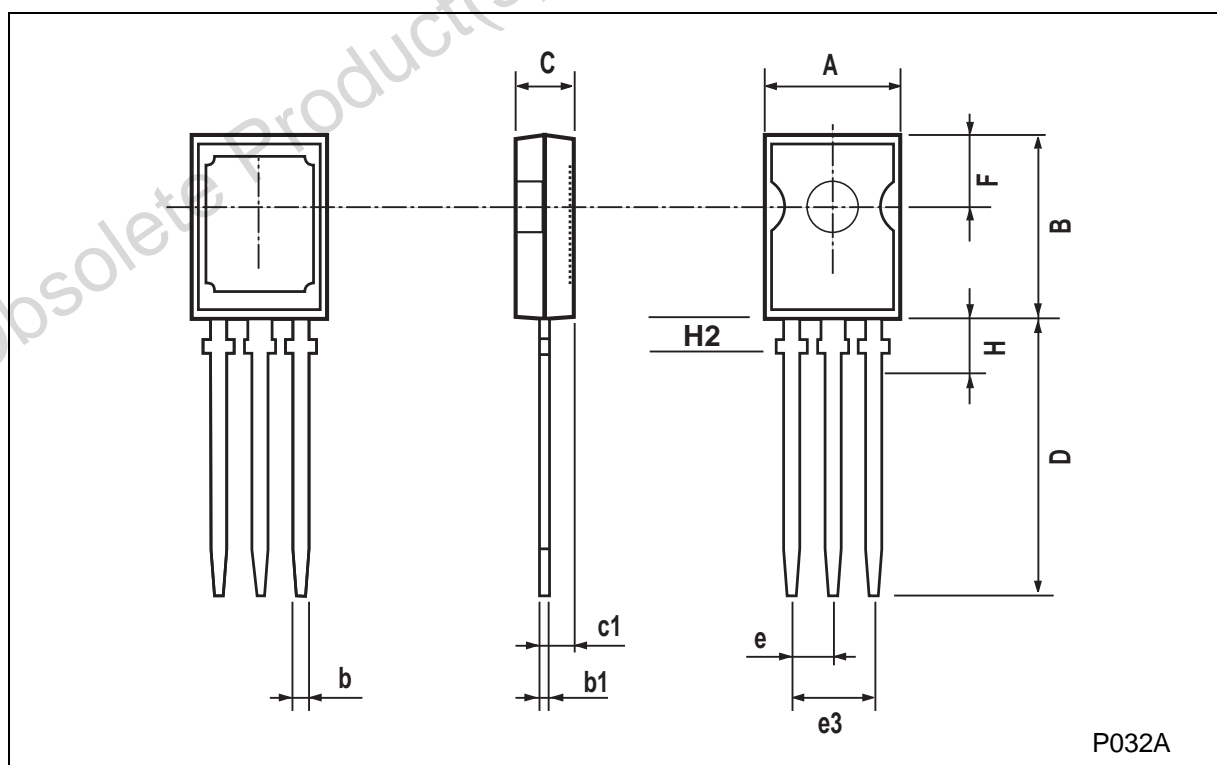
Figure 2: Resistive Load Switching Test Circuit.



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SOT-82 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	7.4		7.8	0.291		0.307
B	10.5		10.8	0.413		0.444
b	0.7		0.9	0.028		0.035
b1	0.49		0.75	0.019		0.030
C	2.4		2.7	0.04		0.106
c1	1.0		1.3	0.039		0.05
D	15.4		16	0.606		0.629
e		2.2			0.087	
e3	4.15		4.65	0.163		0.183
F		3.8			0.150	
H			2.54		0.100	
H2		2.15			0.084	



P032A

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