



## BULT118D

### HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

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

#### APPLICATIONS:

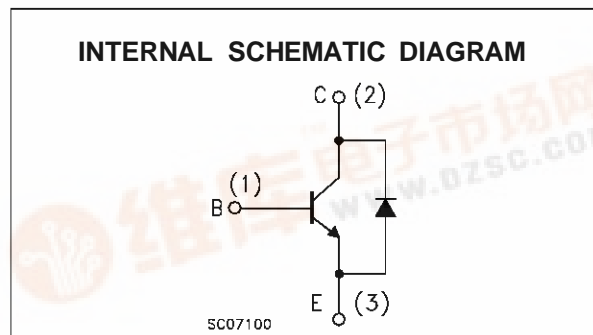
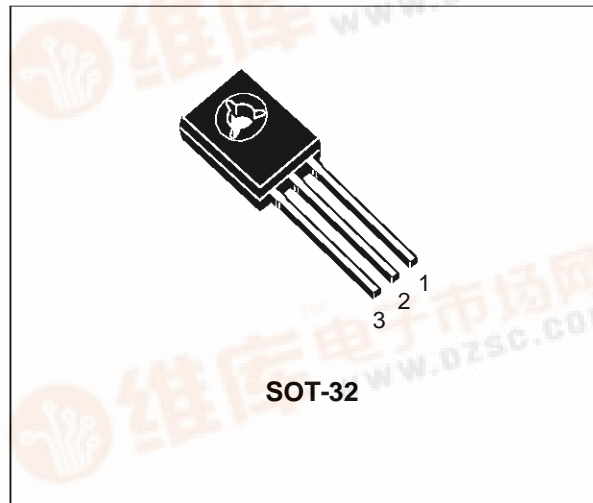
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- FLYBACK AND FORWARD SINGLE TRANSISTOR LOW POWER CONVERTERS

#### 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.



#### 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 ( $I_C = 0$ )	9	V
$I_C$	Collector Current	2	A
$I_{CM}$	Collector Peak Current ( $t_p < 5$ ms)	4	A
$I_B$	Base Current	1	A
$I_{BM}$	Base Peak Current ( $t_p < 5$ ms)	2	A
$P_{tot}$	Total Dissipation at $T_c = 25$ °C	45	W
$T_{stg}$	Storage Temperature	-65 to 150	°C
$T_j$	Max. Operating Junction Temperature	150	°C

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### THERMAL DATA

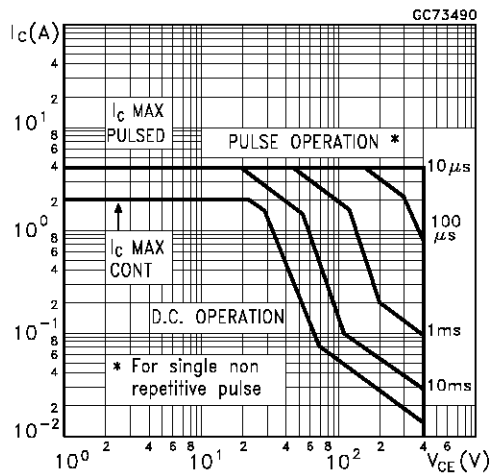
R <sub>thj-case</sub>	Thermal Resistance Junction-Case	Max	2.77	°C/W
R <sub>thj-amb</sub>	Thermal Resistance Junction-Ambient	Max	80	°C/W

### ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

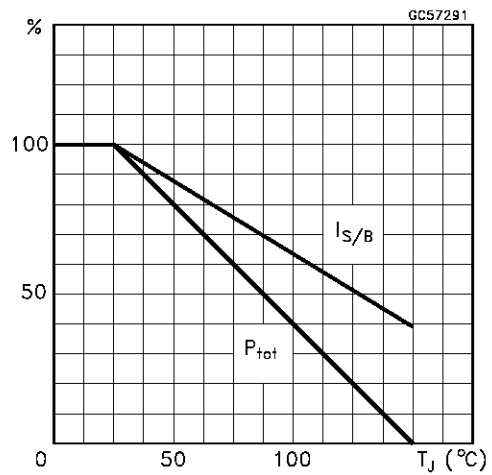
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I <sub>CES</sub>	Collector Cut-off Current (V <sub>BE</sub> = 0)	V <sub>CE</sub> = 700 V V <sub>CE</sub> = 700 V	T <sub>j</sub> = 125 °C			100 500	μA μA
V <sub>EBO</sub>	Emitter-Base Voltage	I <sub>E</sub> = 10 mA		9			V
V <sub>CEO(sus)</sub>	Collector-Emitter Sustaining Voltage	I <sub>C</sub> = 100 mA	L = 25 mH	400			V
I <sub>CEO</sub>	Collector-Emitter Leakage Current	V <sub>CE</sub> = 400 V				250	μA
V <sub>CE(sat)*</sub>	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 0.5 A I <sub>C</sub> = 1 A I <sub>C</sub> = 2 A	I <sub>B</sub> = 0.1 A I <sub>B</sub> = 0.2 A I <sub>B</sub> = 0.4 A			0.5 1 1.5	V V V
V <sub>BE(sat)*</sub>	Base-Emitter Saturation Voltage	I <sub>C</sub> = 0.5 A I <sub>C</sub> = 1 A I <sub>C</sub> = 2 A	I <sub>B</sub> = 0.1 A I <sub>B</sub> = 0.2 A I <sub>B</sub> = 0.4 A			1.0 1.2 1.3	V V V
h <sub>FE*</sub>	DC Current Gain	I <sub>C</sub> = 10 mA I <sub>C</sub> = 0.5 A I <sub>C</sub> = 2 A	V <sub>CE</sub> = 5 V V <sub>CE</sub> = 5 V V <sub>CE</sub> = 5 V	10 10 8		50	
t <sub>r</sub> t <sub>s</sub> t <sub>f</sub>	RESISTIVE LOAD Rise Time Storage Time Fall Time	V <sub>CC</sub> = 125 V I <sub>B1</sub> = 0.2 A	I <sub>C</sub> = 1 A I <sub>B2</sub> = -0.2 A		0.4 3.2 0.25	0.7 4.5 0.4	μs μs μs
t <sub>s</sub> t <sub>f</sub>	INDUCTIVE LOAD Storage Time Fall Time	I <sub>C</sub> = 1 A V <sub>BE</sub> = -5 V V <sub>clamp</sub> = 300 V	I <sub>B1</sub> = 0.2 A L = 50 mH		0.8 0.16		μs μs

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

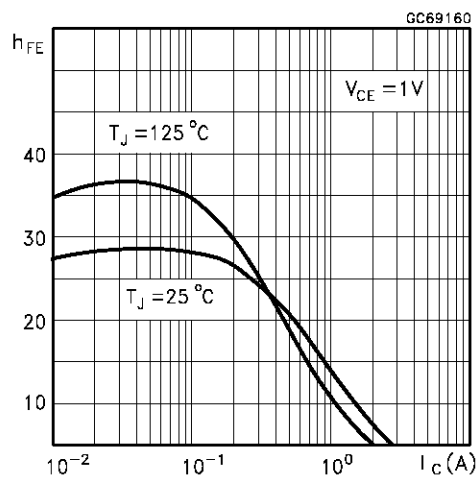
Safe Operating Areas



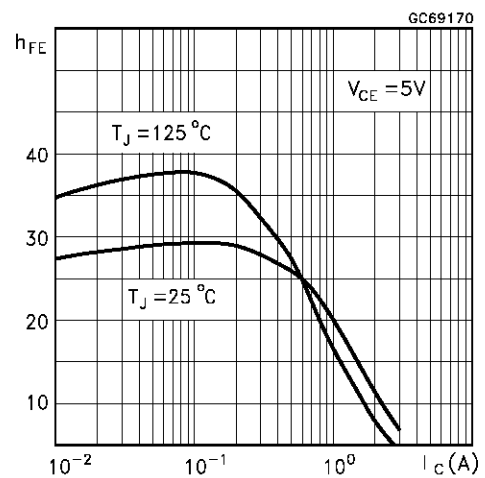
Derating Curve



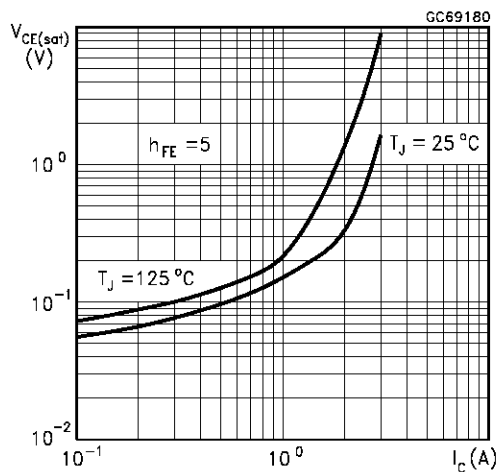
DC Current Gain



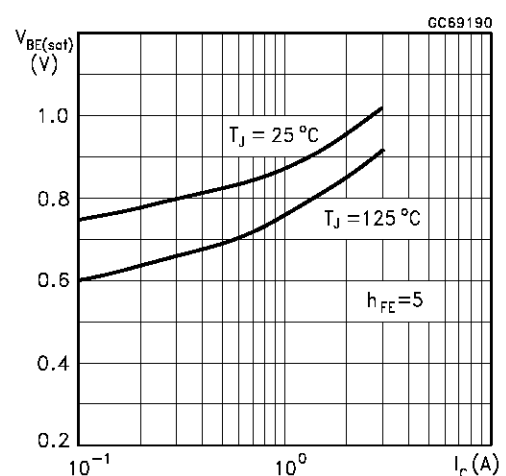
DC Current Gain



Collector Emitter Saturation Voltage

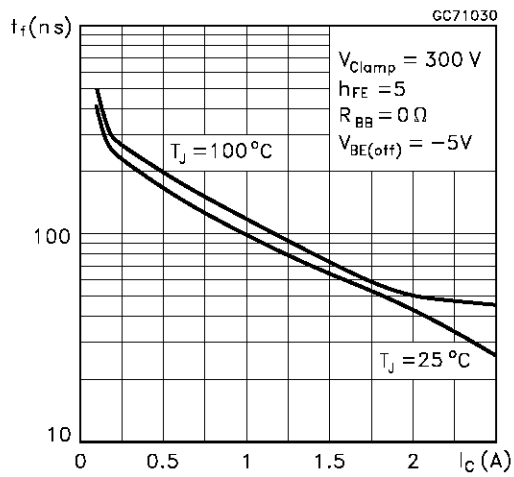


Base Emitter Saturation Voltage

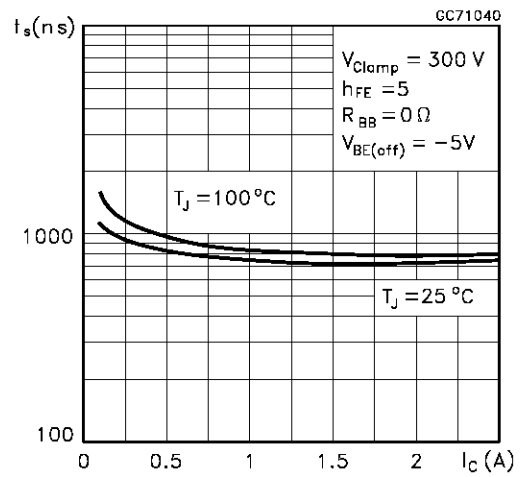


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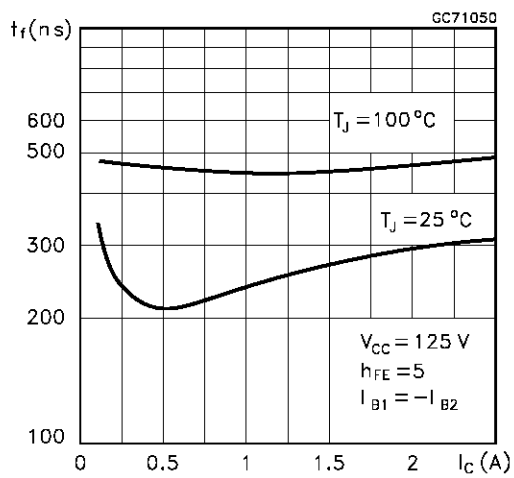
## Inductive Fall Time



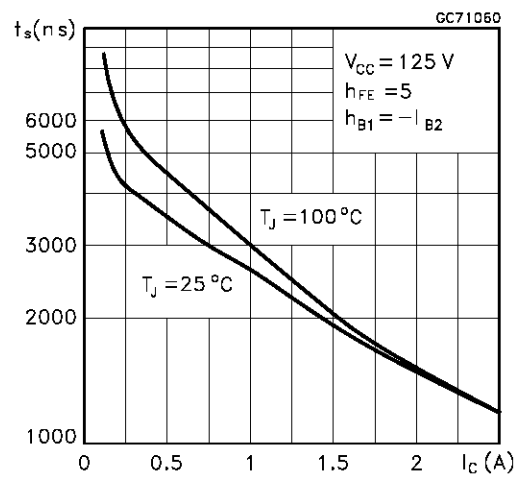
## Inductive Storage Time



## Resistive Fall Time



## Resistive Load Storage Time



## Reverse Biased SOA

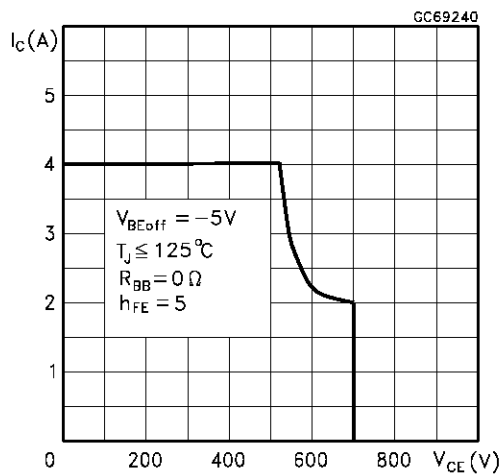


Figure 1: Inductive Load Switching Test Circuits.

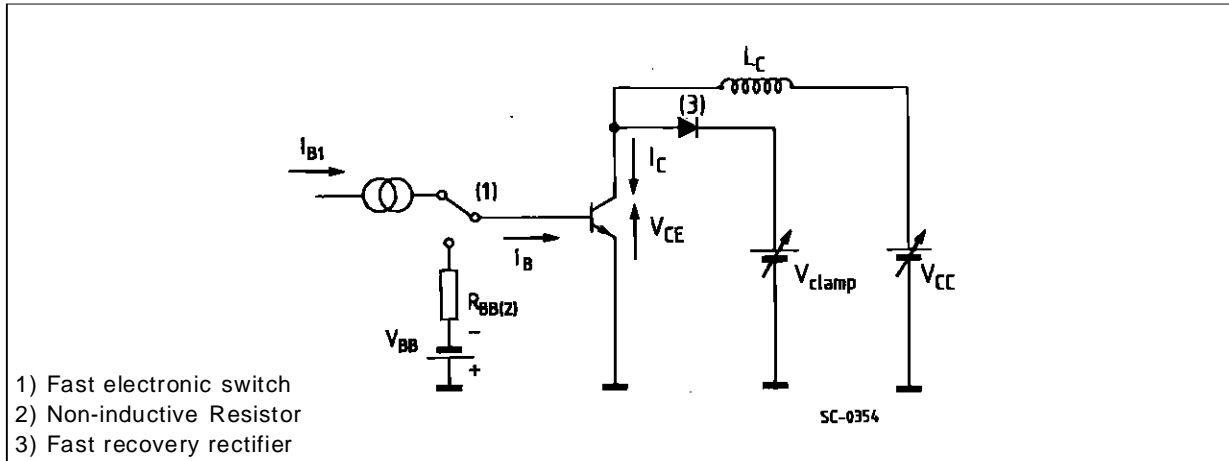
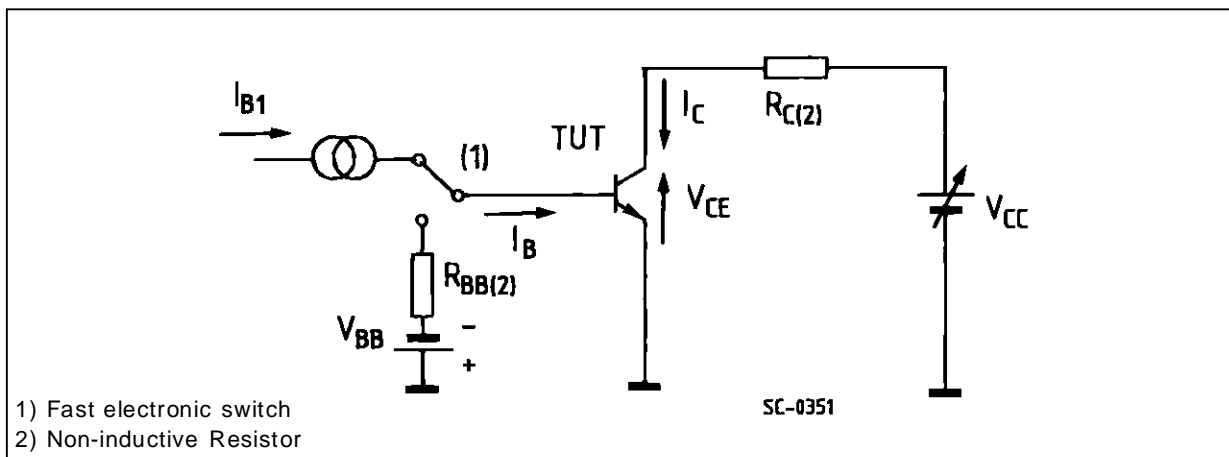
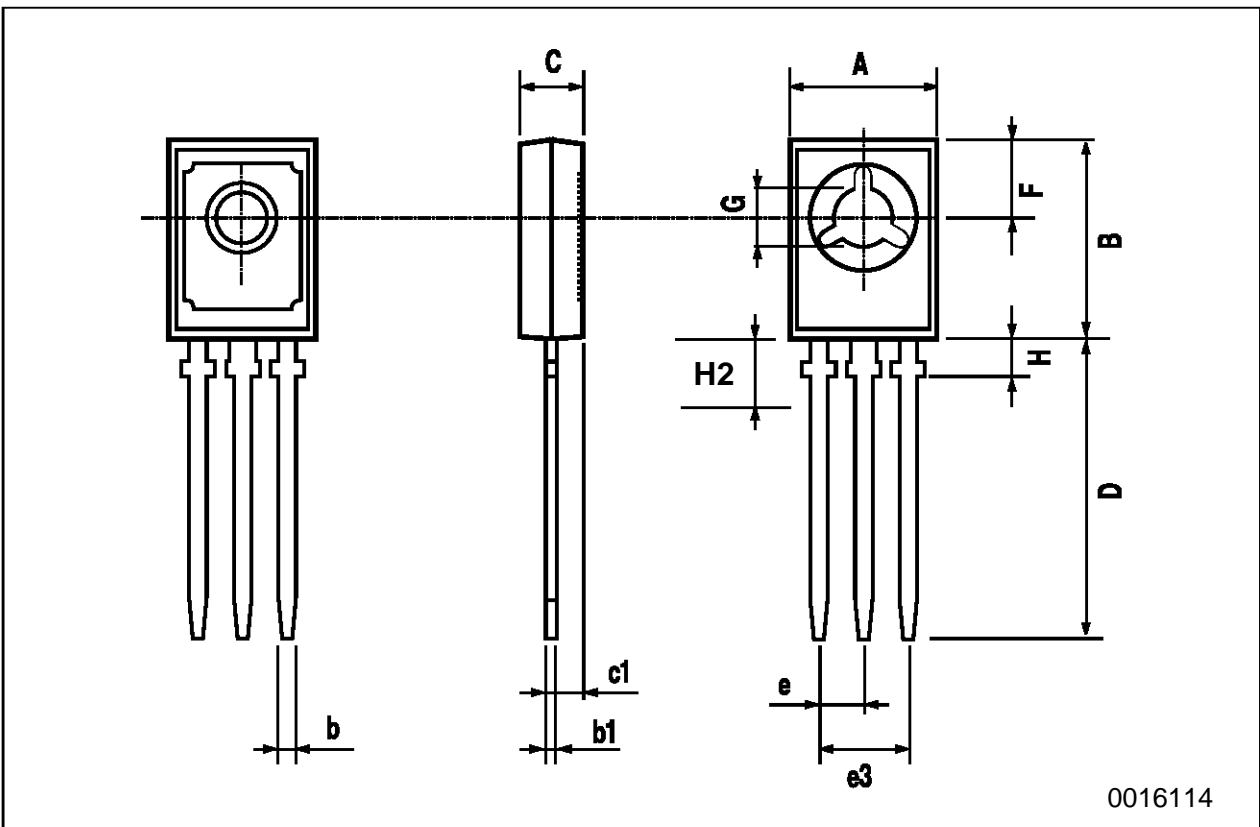


Figure 2: Resistive Load Switching Test Circuits.



**SOT-32 (TO-126) 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		0.445
b	0.7		0.9	0.028		0.035
b1	0.49		0.75	0.019		0.030
C	2.4		2.7	0.040		0.106
c1	1.0		1.3	0.039		0.050
D	15.4		16.0	0.606		0.629
e		2.2			0.087	
e3	4.15		4.65	0.163		0.183
F		3.8			0.150	
G	3		3.2	0.118		0.126
H			2.54			0.100
H2		2.15			0.084	



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