BULT118

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTORS

- 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

APPLICATIONS:

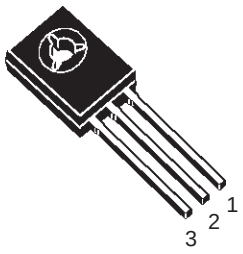
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- FLYBACK AND FORWARD SINGLE TRANSISTOR LOW POWER CONVERTERS

DESCRIPTION

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

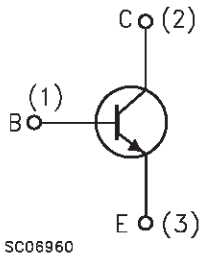
It uses a Cellular Emitter structure with planar edge termination to enhance switching speeds while maintaining the wide RBSOA.

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



SOT-32

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)	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

THERMAL DATA

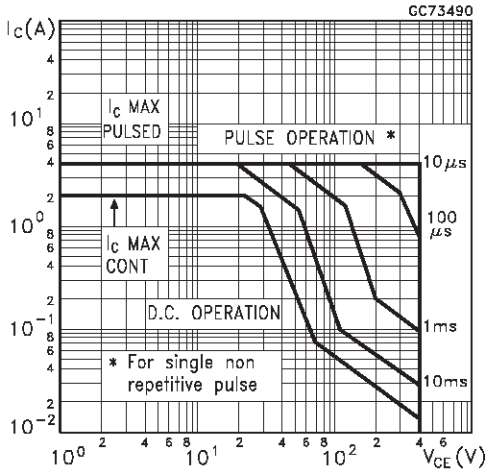
$R_{thj\text{-}case}$	Thermal Resistance Junction-Case Max	2.77	$^oC/W$
$R_{thj\text{-}amb}$	Thermal Resistance Junction-Ambient Max	80	$^oC/W$

ELECTRICAL CHARACTERISTICS (T_{case} = 25 ^oC unless otherwise specified)

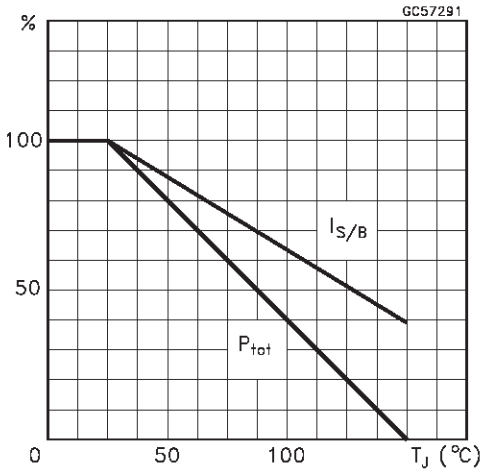
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current (V_{BE} = 0)	V_{CE} = 700 V V_{CE} = 700 V T_j = 125 ^oC			100 500	µA µA
V_{EBO}	Emitter-Base Voltage	I_E = 10 mA	9			V
$V_{CEO(sus)}$*	Collector-Emitter Sustaining Voltage (I_B = 0)	I_C = 100 mA L = 25 mH	400			V
I_{CEO}	Collector-Emitter Leakage Current	V_{CE} = 400 V			250	µA
$V_{CE(sat)}$*	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 A I_B = 0.4 A			0.5 1 1.5	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 A I_B = 0.4 A			1.0 1.2 1.3	V V V
h_{FE}*	DC Current Gain	I_C = 10 mA V_{CE} = 5 V I_C = 0.5 A V_{CE} = 5 V I_C = 2 A V_{CE} = 5 V	10 10 8		 50	
	RESISTIVE LOAD					
t_r	Rise Time	V_{CC} = 125 V I_C = 1 A		0.4	0.7	µs
t_s	Storage Time	I_{B1} = 0.2 A I_{B2} = -0.2 A		3.2	4.5	µs
t_f	Fall Time			0.25	0.4	µs
	INDUCTIVE LOAD	I_C = 1 A I_{B1} = 0.2 A				
t_s	Storage Time	V_{BE} = -5 V L = 50 mH		0.8		µs
t_f	Fall Time	V_{clamp} = 300 V		0.16		µs

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

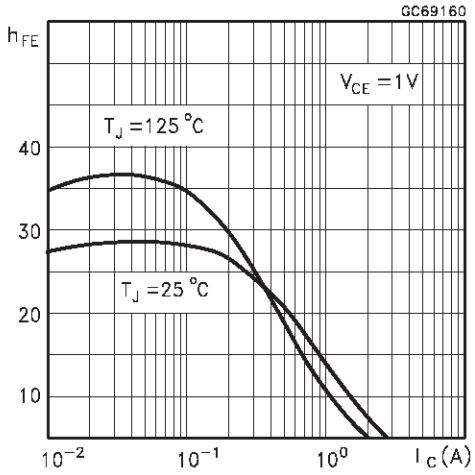
Safe Operating Areas



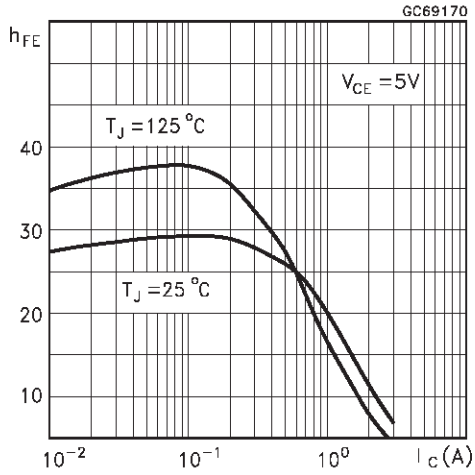
Derating Curve



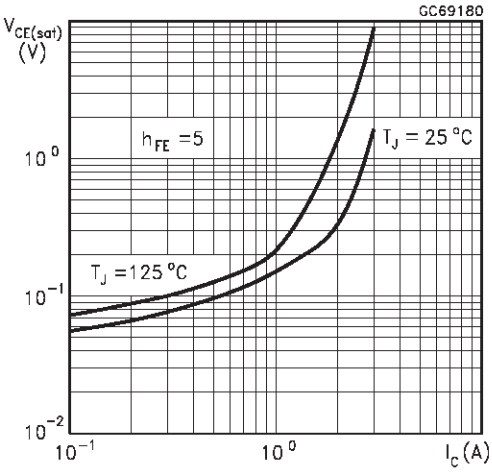
DC Current Gain



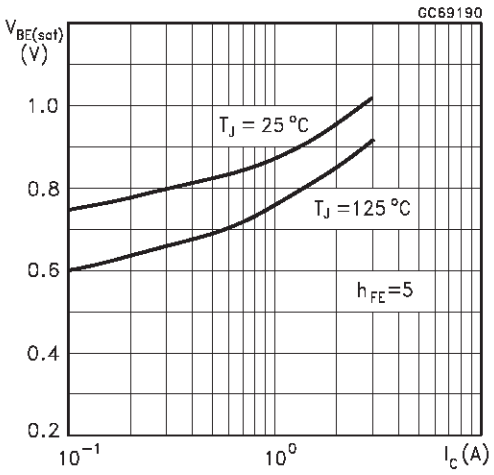
DC Current Gain



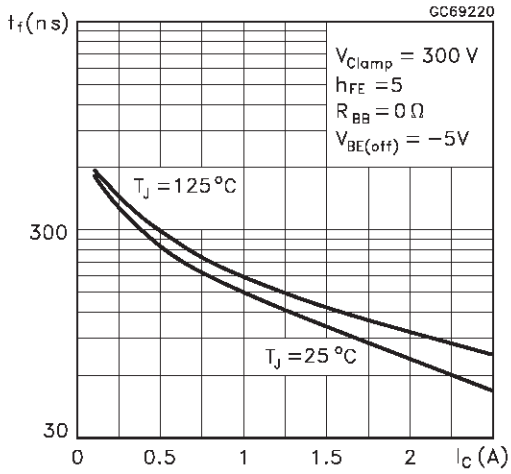
Collector Emitter Saturation Voltage



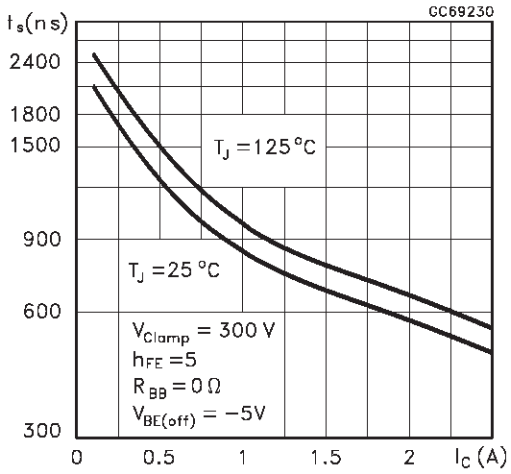
Base Emitter Saturation Voltage



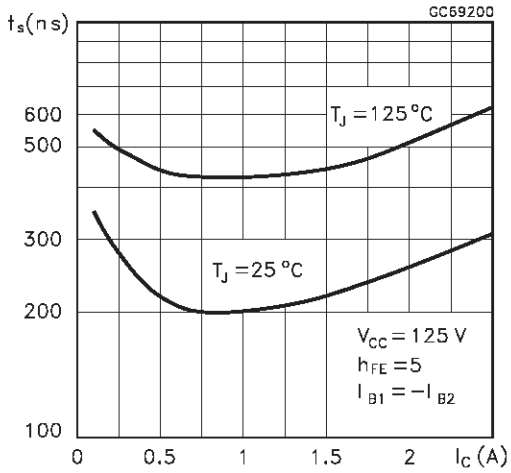
Inductive Fall Time



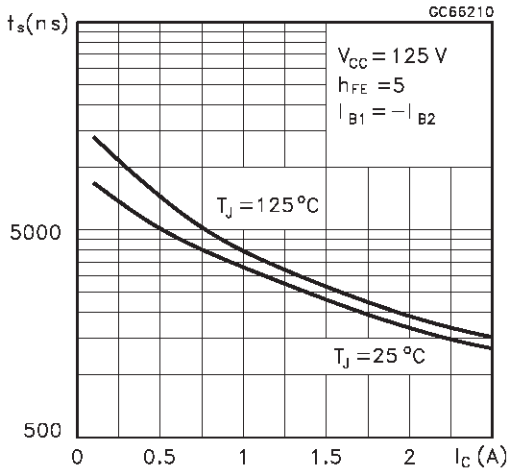
Inductive Storage Time



Resistive Fall Time



Resistive Load Storage Time



Reverse Biased SOA

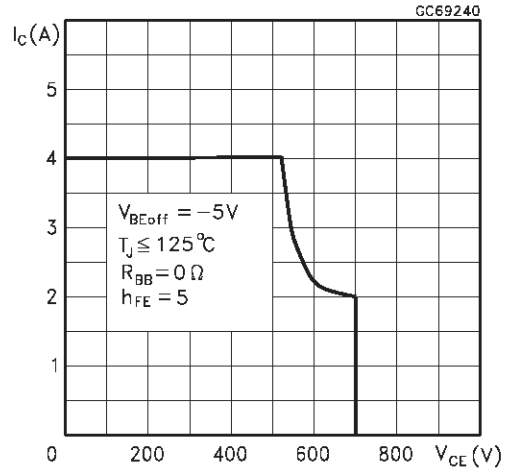
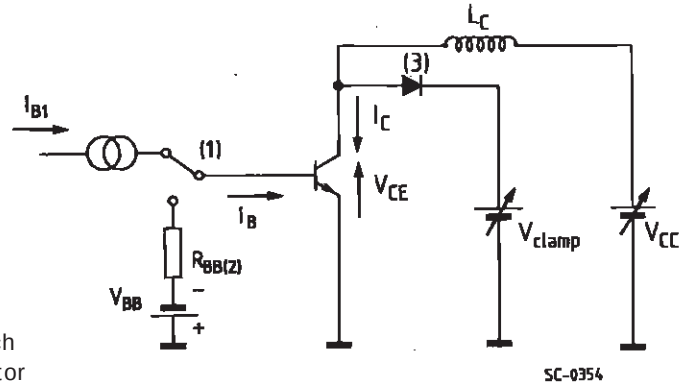
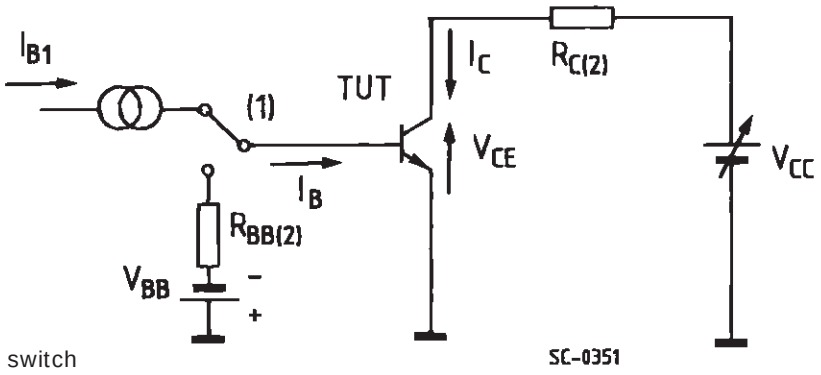


Figure 1: Inductive Load Switching Test Circuits.



1) Fast electronic switch
2) Non-inductive Resistor
3) Fast recovery rectifier

Figure 2: Resistive Load Switching Test Circuits.



1) Fast electronic switch
2) Non-inductive Resistor

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