BULT118

High voltage fast-switching NPN power transistor

Features

- High voltage capability
- Minimum lot-to-lot spread for reliable operation
- Very high switching speed

Applications

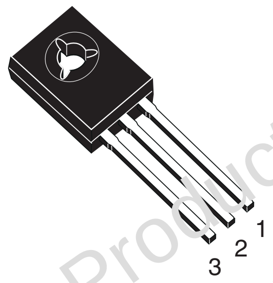
- Electronic ballast for fluorescent lighting
- Flyback and forward single transistor low power converters

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

Figure 1. Internal schematic diagram

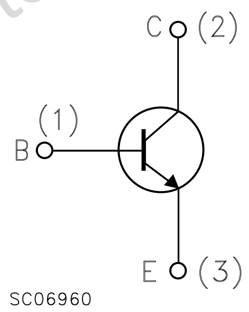


Table 1. Device summary

Order code	Marking	Package	Packaging
BULT118	BULT118	SOT-32	Tube

1 Electrical ratings

Table 2. Absolute maximum rating

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

2 Electrical characteristics

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

Table 3. Electrical characteristics

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_C = 125 °C			100 500	µA µA
I_{CEO}	Collector-emitter leakage current	V_{CE} = 400 V			250	µA
V_{EBO}	Emitter-base voltage	I_E = 10 mA	9			V
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage (I_B = 0)	I_C = 10 mA	400			V
$V_{CE(sat)}$ (1)	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
$V_{BE(sat)}$ (1)	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 1.2 1.3	V V V
h_{FE} (1)	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	
 t_r t_s t_f	Resistive load Rise time Storage time Fall time	I_C = 1 A V_{CC}= 125 V I_{B1} =-I_{B2} = 0.2 A		 0.4 3.2 0.25	 0.7 4.5 0.4	 µs µs µs
 t_s t_f	Inductive load Storage time Fall time	I_C = 1 A I_{B1} = 0.2 A $V_{BE(off)}$ = -5 V L= 50 mH V_{Clamp} = 300 V		 0.8 0.16		 µs µs

1. Pulsed duration = 300 µs, duty cycle ≤1.5 %

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

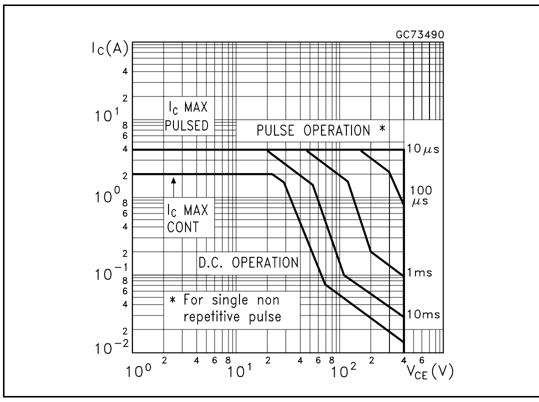


Figure 3. Derating curve

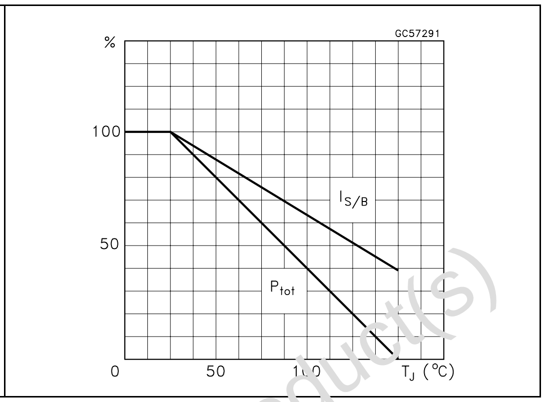


Figure 4. DC current gain

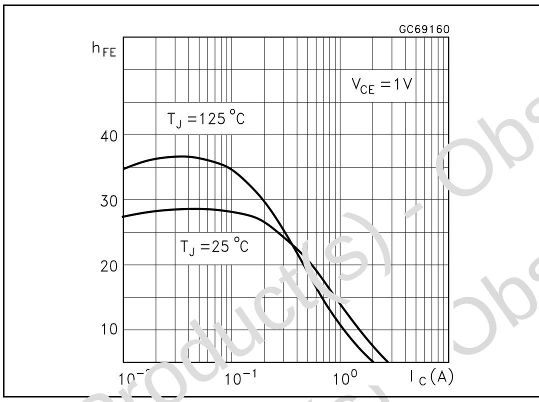


Figure 5. DC current gain

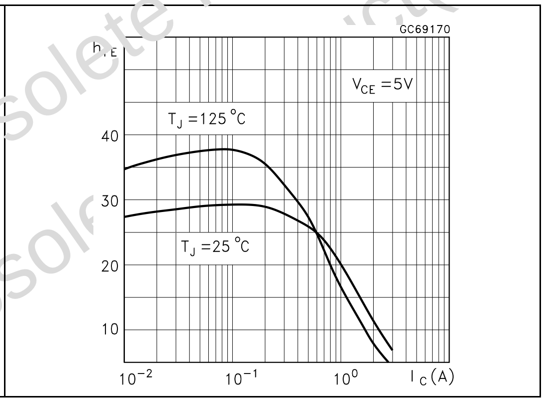


Figure 6. Collector-emitter saturation voltage

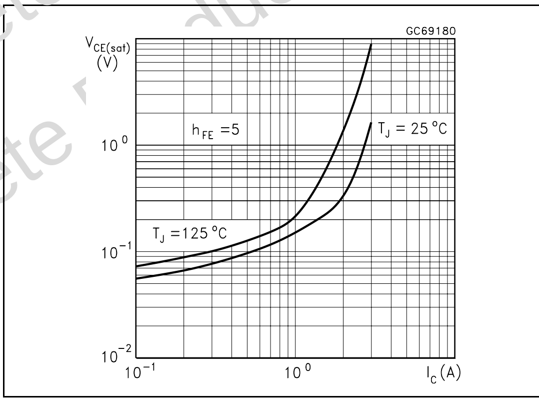


Figure 7. Base-emitter saturation voltage

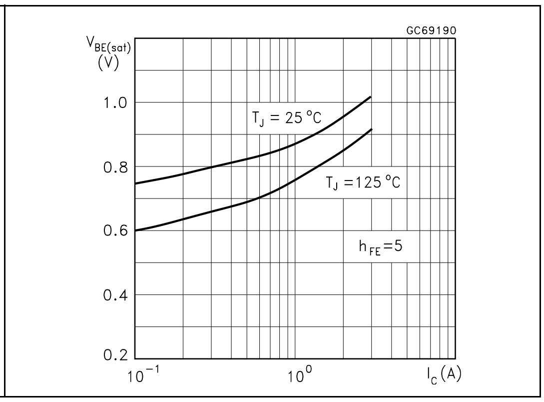


Figure 8. Inductive load fall time

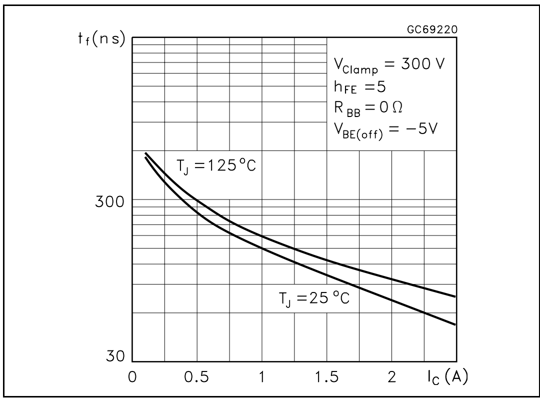


Figure 9. Inductive load storage time

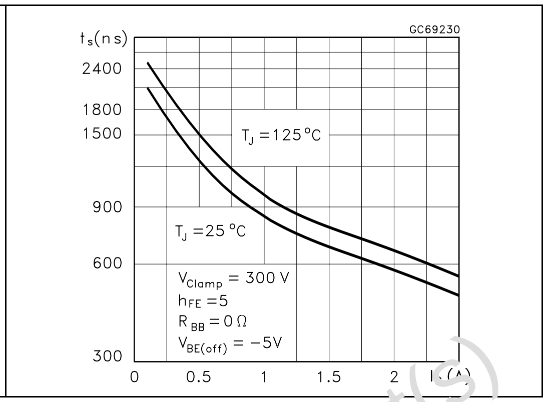


Figure 10. Resistive load fall time

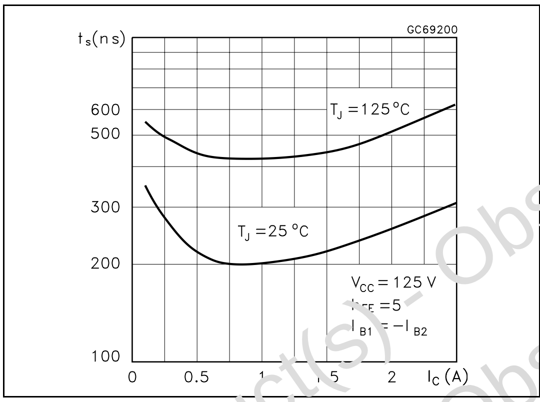


Figure 11. Resistive load storage time

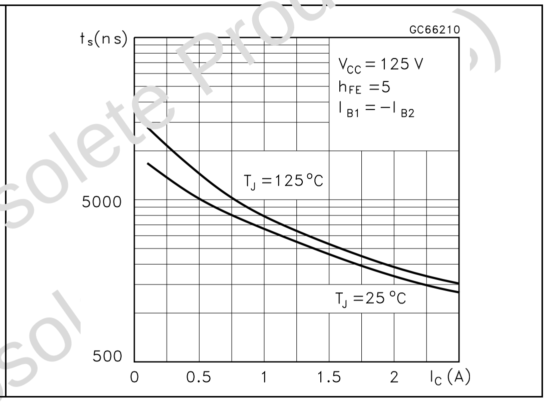
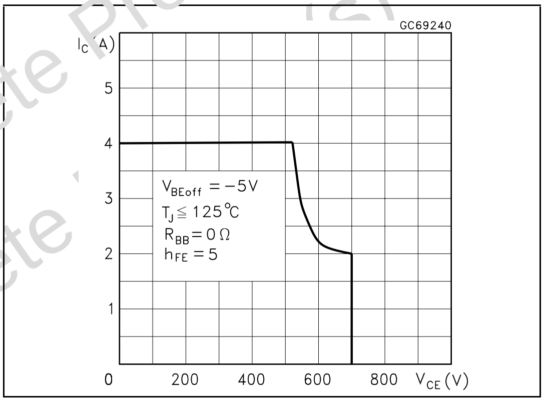


Figure 12. Reverse biased SOA



2.2 Test circuits

Figure 13. Resistive load switching test circuit

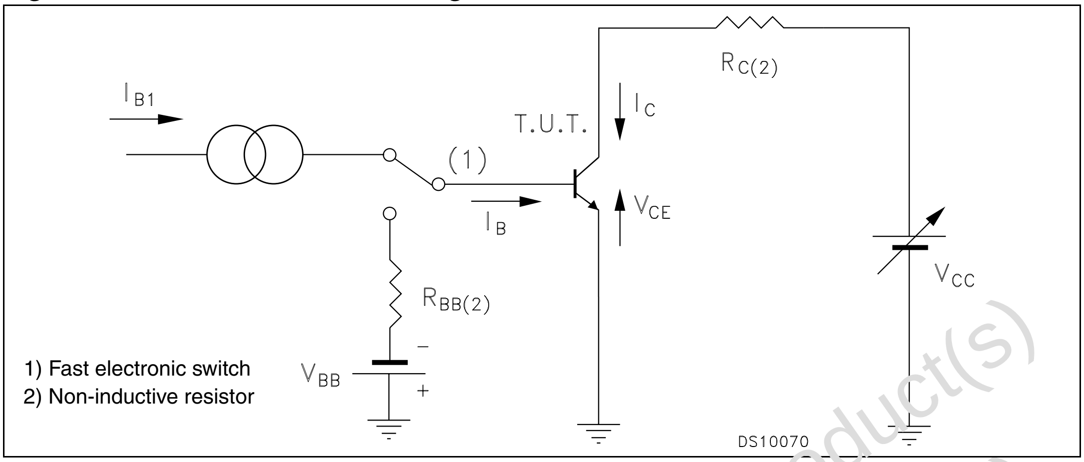
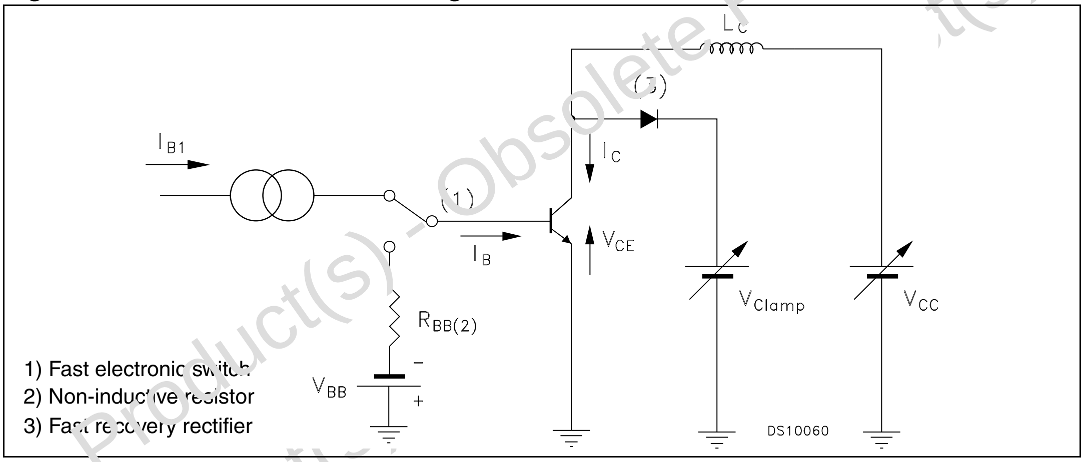


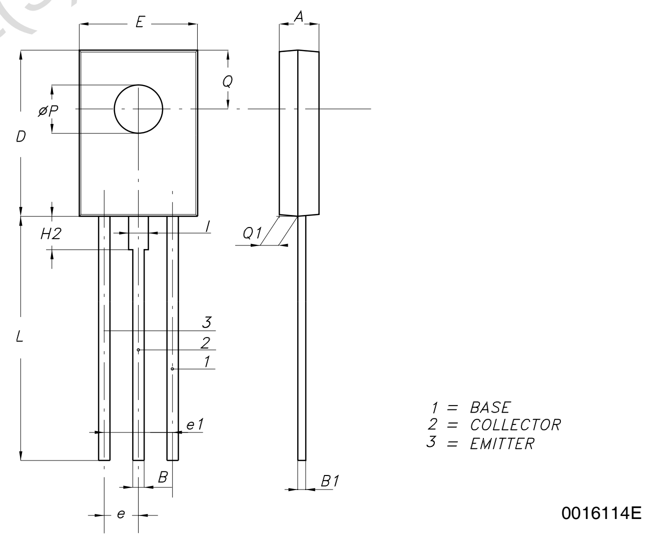
Figure 14. Inductive load switching test circuit



3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

SOT-32 (TO-126) MECHANICAL DATA			
DIM.	mm.		
	MIN.	TYP	MAX.
A	2.4		2.9
B	0.64		0.88
B1	0.39		0.63
D	10.5		11.05
E	7.4		7.8
e	2.04	2.29	2.54
e1	4.07	4.58	5.08
L	15.3		16
P	2.9		3.2
Q		3.8	
Q1	1		1.52
H2		2.15	
I		1.27	



4 Revision history

Table 4. Document revision history

Date	Revision	Changes
29-Sep-2003	1	Initial release.
10-Jul-2008	2	Updated: $V_{CEO(sus)}$ condition in *Table 3 on page 3*, SOT-32 mechanical data, cover page