



BULT116D

MEDIUM VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

PRELIMINARY DATA

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

APPLICATIONS:

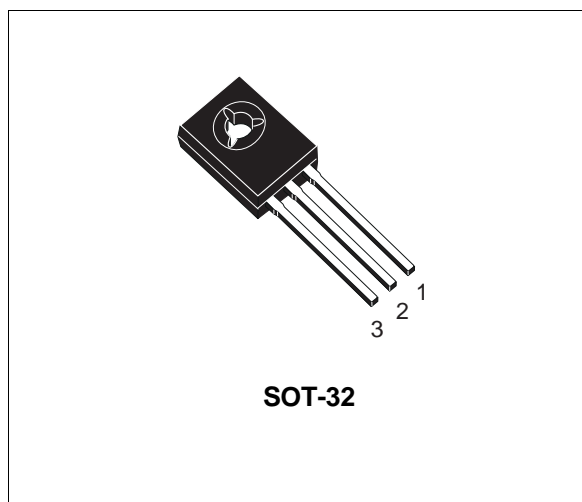
- COMPACT FLUORESCENT LAMPS UP TO 23 W AT 110 V A.C. MAINS
- FLYBACK AND FORWARD SINGLE TRANSISTOR LOW POWER CONVERTERS AT 110 V A.C. MAINS

DESCRIPTION

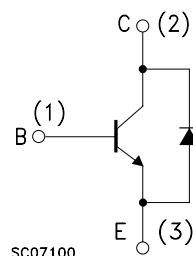
The device is manufactured using Multi Epitaxial Planar technology for high switching speeds and medium voltage capability.

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

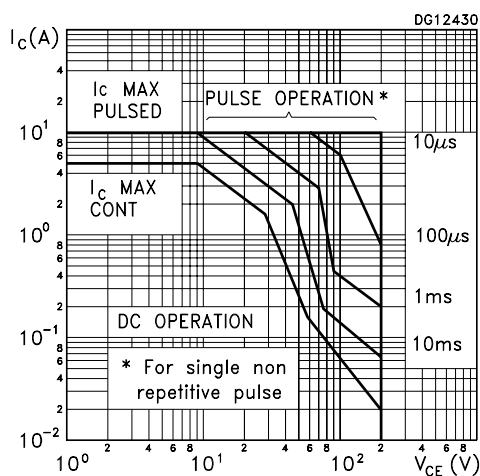
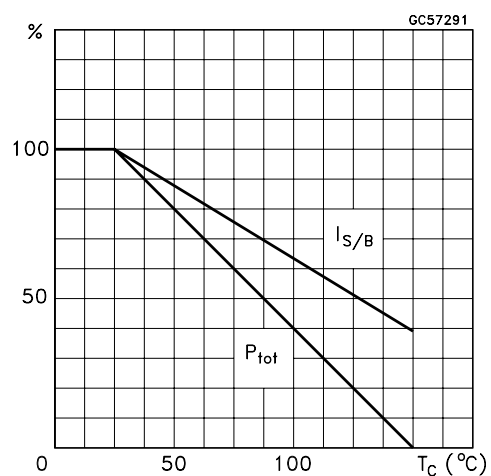
Symbol	Parameter	Value	Unit
V_{CES}	Collector-Emitter Voltage ($V_{BE} = 0$)	400	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)	200	V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	9	V
I_C	Collector Current	5	A
I_{CM}	Collector Peak Current ($t_p < 5$ ms)	10	A
I_B	Base Current	2	A
I_{BM}	Base Peak Current ($t_p < 5$ ms)	4	A
P_{tot}	Total Dissipation at $T_c = 25$ °C	45	W
T_{stg}	Storage Temperature	-65 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C

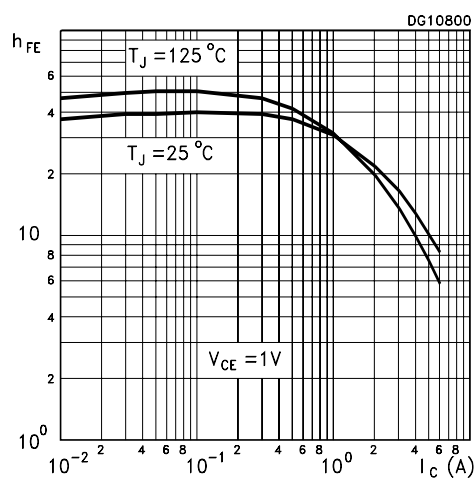
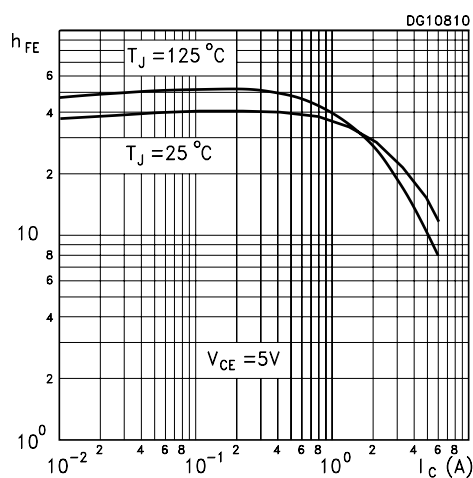
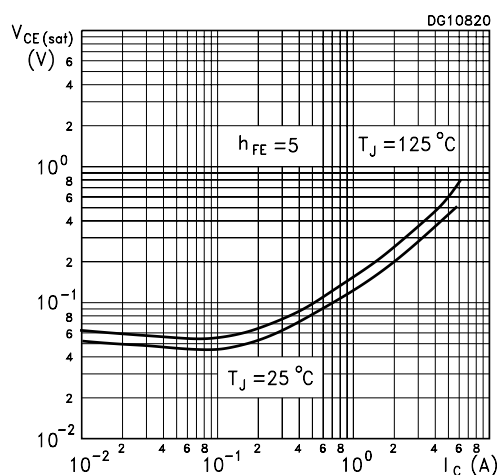
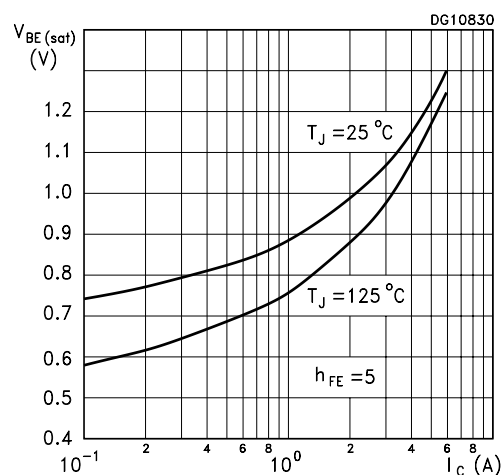
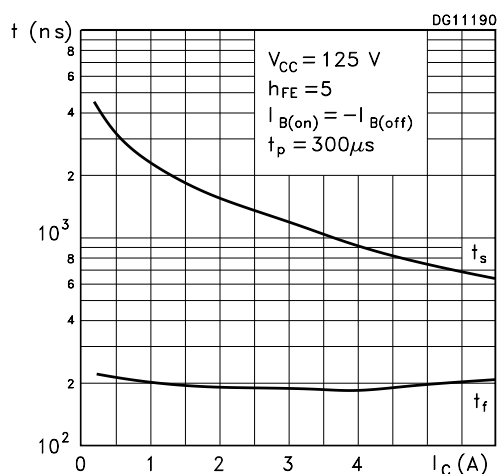
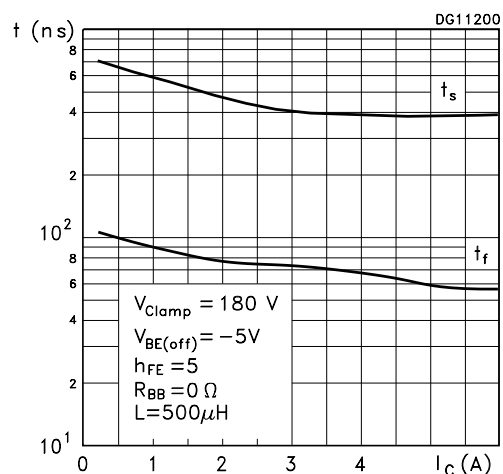
BULT116D**THERMAL DATA**

R _{thj-case}	Thermal Resistance Junction-Case	Max	2.78	°C/W
R _{thj-amb}	Thermal Resistance Junction-Ambient	Max	80	°C/W

ELECTRICAL CHARACTERISTICS ($T_{\text{case}} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current ($V_{\text{BE}} = 0$)	$V_{\text{CE}} = 400\text{ V}$ $V_{\text{CE}} = 400\text{ V}$ $T_{\text{c}} = 125\text{ }^{\circ}\text{C}$			100 500	μA μA
V_{EBO}	Emitter-Base Voltage ($I_{\text{C}} = 0$)	$I_{\text{E}} = 10\text{ mA}$	9			V
$V_{\text{CEO(sus)}}^*$	Collector-Emitter Sustaining Voltage ($I_{\text{B}} = 0$)	$I_{\text{C}} = 100\text{ mA}$	200			V
I_{CEO}	Collector Cut-off Current ($I_{\text{B}} = 0$)	$V_{\text{CE}} = 200\text{ V}$			250	μA
$V_{\text{CE(sat)}}^*$	Collector-Emitter Saturation Voltage	$I_{\text{C}} = 0.5\text{ A}$ $I_{\text{B}} = 50\text{ mA}$ $I_{\text{C}} = 1\text{ A}$ $I_{\text{B}} = 0.1\text{ A}$ $I_{\text{C}} = 3\text{ A}$ $I_{\text{B}} = 0.6\text{ A}$ $I_{\text{C}} = 5\text{ A}$ $I_{\text{B}} = 1\text{ A}$			0.25 0.4 0.7 1.2	V V V V
$V_{\text{BE(sat)}}^*$	Base-Emitter Saturation Voltage	$I_{\text{C}} = 1\text{ A}$ $I_{\text{B}} = 0.1\text{ A}$ $I_{\text{C}} = 5\text{ A}$ $I_{\text{B}} = 1\text{ A}$			1.1 1.5	V V
h_{FE}^*	DC Current Gain	$I_{\text{C}} = 10\text{ mA}$ $V_{\text{CE}} = 5\text{ V}$ $I_{\text{C}} = 5\text{ A}$ $V_{\text{CE}} = 5\text{ V}$	10 8		20	
t_{r} t_{f} t_{s}	RESISTIVE LOAD Rise Time Fall Time Storage Time	$V_{\text{CC}} = 125\text{ V}$ $I_{\text{C}} = 2\text{ A}$ $I_{\text{B1}} = 0.4\text{ A}$ $I_{\text{B2}} = -0.4\text{ A}$ $t_{\text{p}} = 30\text{ }\mu\text{s}$ (see figure 2)		0.2 0.2 1.4	0.4	μs μs μs
t_{s} t_{f}	INDUCTIVE LOAD Storage Time Fall Time	$I_{\text{C}} = 2\text{ A}$ $I_{\text{B1}} = 0.4\text{ A}$ $V_{\text{BE}} = -5\text{ V}$ $L = 500\text{ }\mu\text{H}$ $V_{\text{clamp}} = 180\text{ V}$ (see figure 1)		0.5 0.1		μs μs
V_{F}	Diode Forward Voltage	$I_{\text{C}} = 2\text{ A}$			1.5	V

* Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %**Safe Operating Area****Derating Curve**

DC Current Gain**DC Current Gain****Collector-Emitter Saturation Voltage****Base-Emitter Saturation Voltage****Switching Time Resistive Load****Switching Time Inductive Load**

BULT116D

Reverse Biased SOA

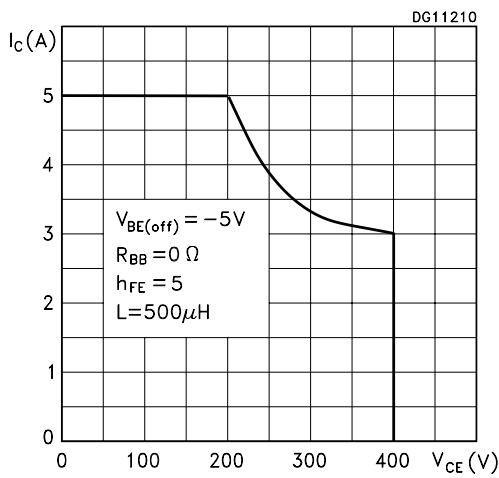


Figure 1: Inductive Load Switching Test Circuit.

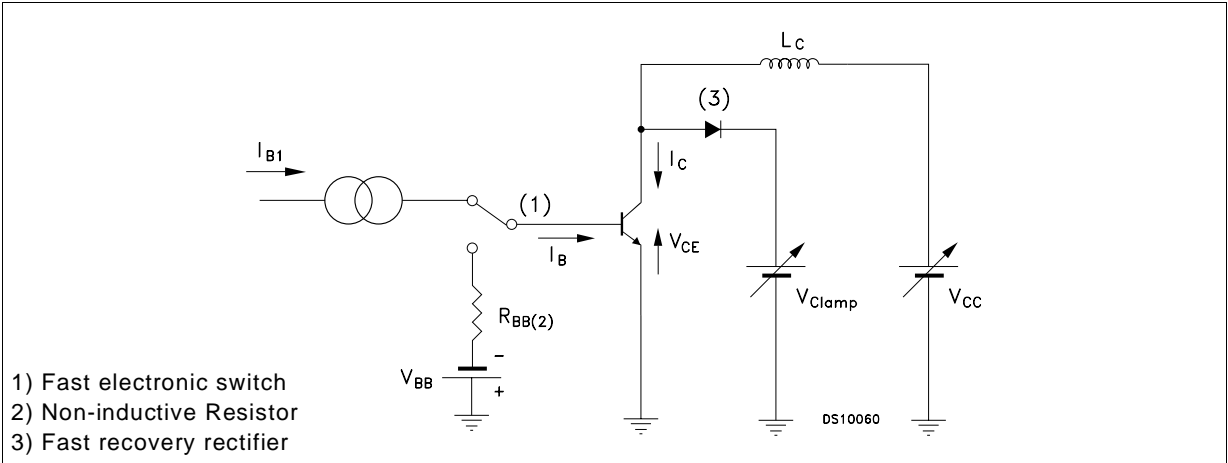
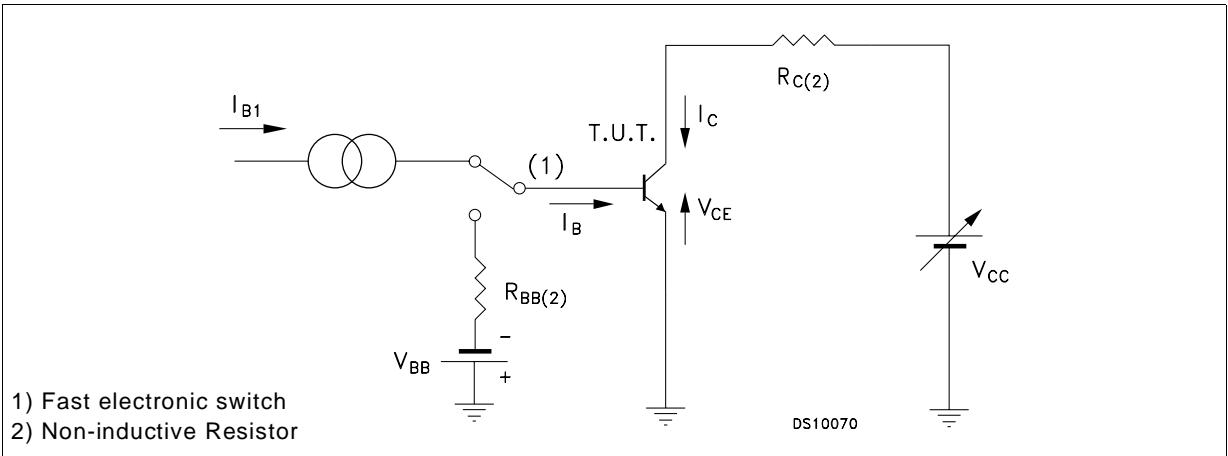
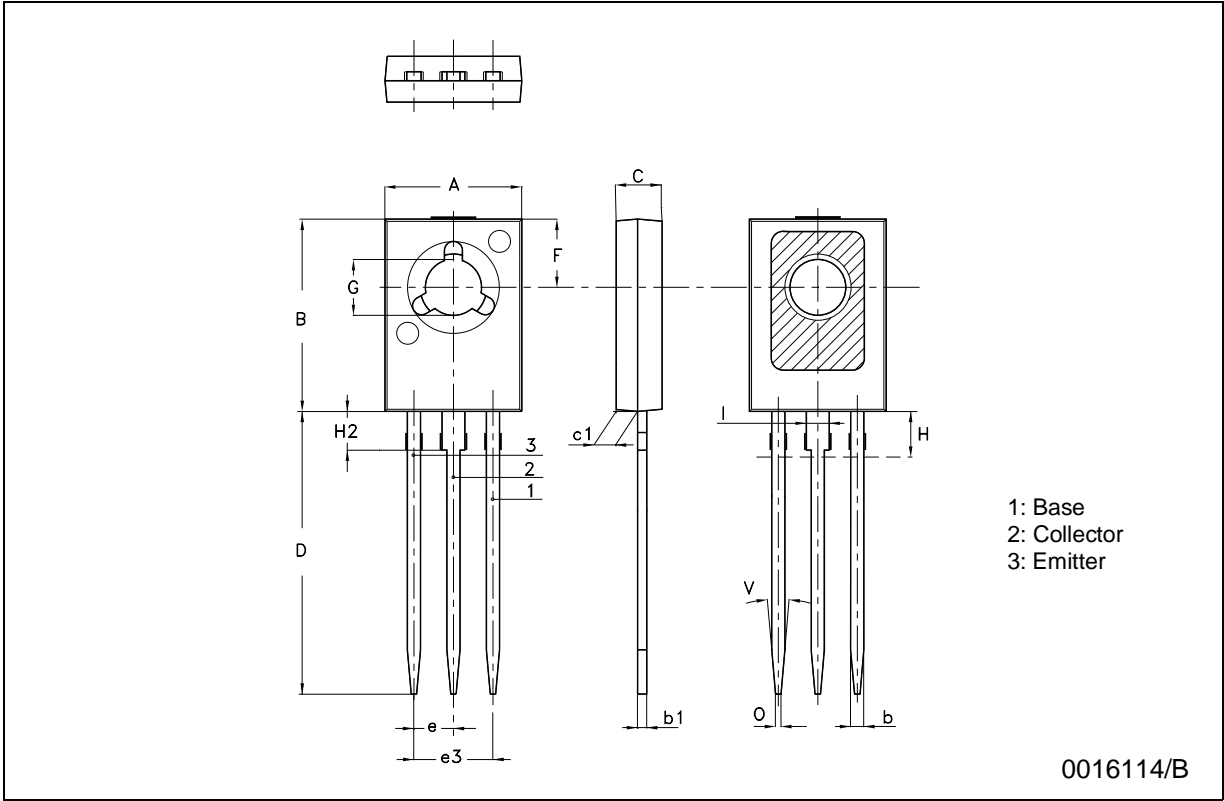


Figure 2: Resistive Load Switching Test Circuit.



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		0.425
b	0.7		0.9	0.028		0.035
b1	0.40		0.65	0.015		0.025
C	2.4		2.7	0.094		0.106
c1	1.0		1.3	0.039		0.051
D	15.4		16.0	0.606		0.630
e		2.2			0.087	
e3		4.4			0.173	
F		3.8			0.150	
G	3		3.2	0.118		0.126
H			2.54			0.100
H2		2.15			0.084	
I		1.27			0.05	
O		0.3			0.011	
V		10°			10°	



BULT116D

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specification mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a trademark of STMicroelectronics

© 2003 STMicroelectronics – Printed in Italy – All Rights Reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States.

<http://www.st.com>