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:

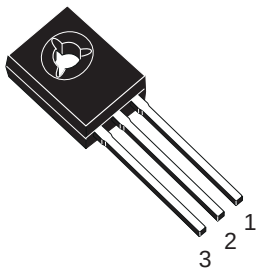
- COMPACT FLUORESCENT LAMPS UP TO 23 W AT 110 V A.C. MAINS
- FLYBACK AND FORWARD SINGLE TRANSISTOR LOW POWER CONVERTERS AT 110 V A.C. MAINS

DESCRIPTION

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

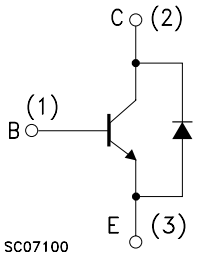
It uses a Cellular Emitter structure with planar edge termination to enhance switching speeds while maintaining the wide RBSOA.

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



SOT-32

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

THERMAL DATA

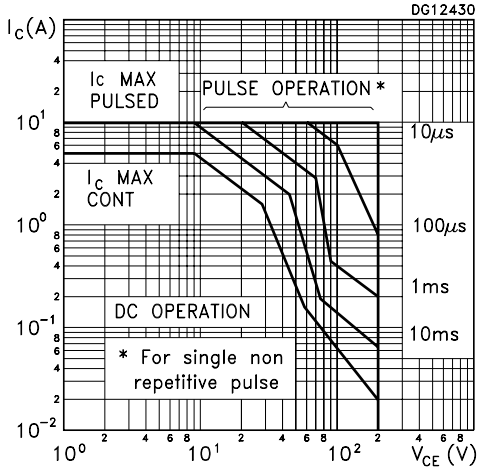
$R_{thj\text{-}case}$	Thermal Resistance Junction-Case	Max	2.78	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-Ambient	Max	80	°C/W

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

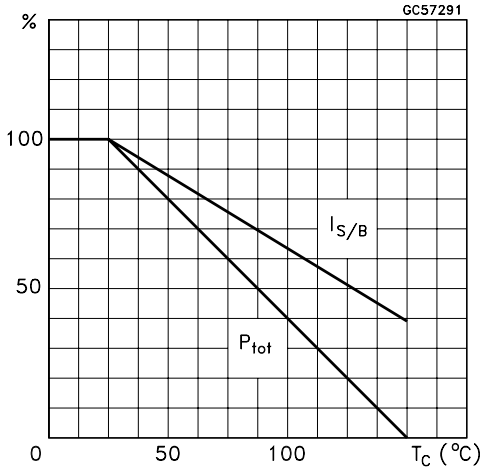
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current (V_{BE} = 0)	V_{CE} = 400 V V_{CE} = 400 V	 T_c = 125 °C			100 500	µA µA
V_{EBO}	Emitter-Base Voltage (I_C = 0)	I_E = 10 mA		9			V
$V_{CEO(sus)}$*	Collector-Emitter Sustaining Voltage (I_B = 0)	I_C = 100 mA		200			V
I_{CEO}	Collector Cut-off Current (I_B = 0)	V_{CE} = 200 V				250	µA
$V_{CE(sat)}$*	Collector-Emitter Saturation Voltage	I_C = 0.5 A I_C = 1 A I_C = 3 A I_C = 5 A	I_B = 50 mA I_B = 0.1 A I_B = 0.6 A I_B = 1 A			0.25 0.4 0.7 1.2	V V V V
$V_{BE(sat)}$*	Base-Emitter Saturation Voltage	I_C = 1 A I_C = 5 A	I_B = 0.1 A I_B = 1 A			1.1 1.5	V V
h_{FE}*	DC Current Gain	I_C = 10 mA I_C = 5 A	V_{CE} = 5 V V_{CE} = 5 V	10 8		 20	
 t_r t_f t_s	RESISTIVE LOAD Rise Time Fall Time Storage Time	V_{CC} = 125 V I_{B1} = 0.4 A t_p = 30 µs	I_C = 2 A I_{B2} = -0.4 A (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_C = 2 A V_{BE} = -5 V V_{clamp} = 180 V	I_{B1} = 0.4 A L = 500 µH (see figure 1)		 0.5 0.1	 	 µs µs
V_F	Diode Forward Voltage	I_C = 2 A				1.5	V

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

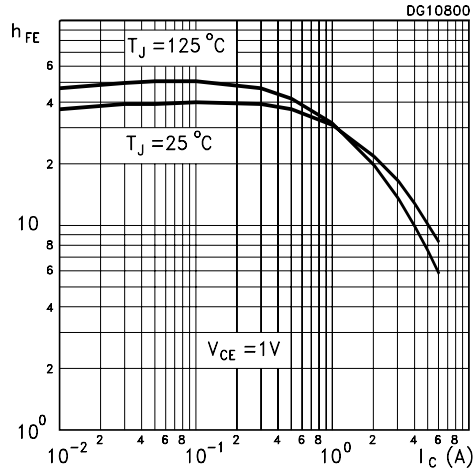
Safe Operating Area



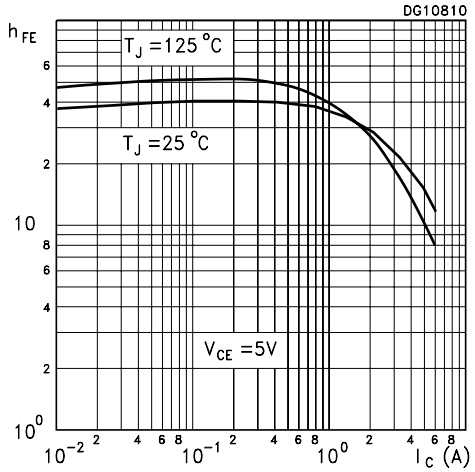
Derating Curve



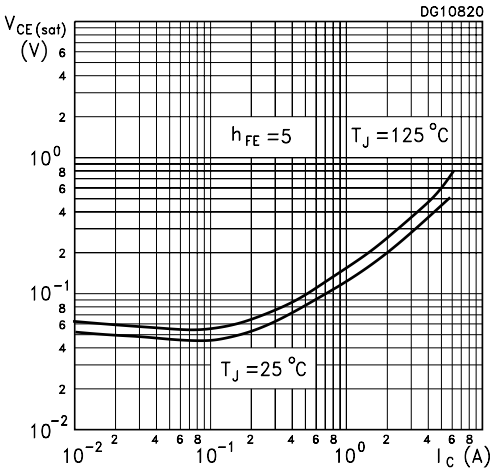
DC Current Gain



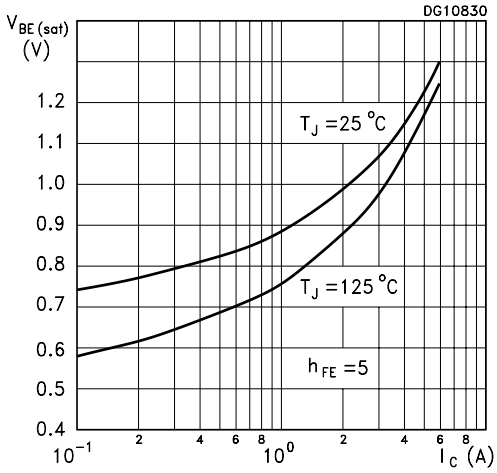
DC Current Gain



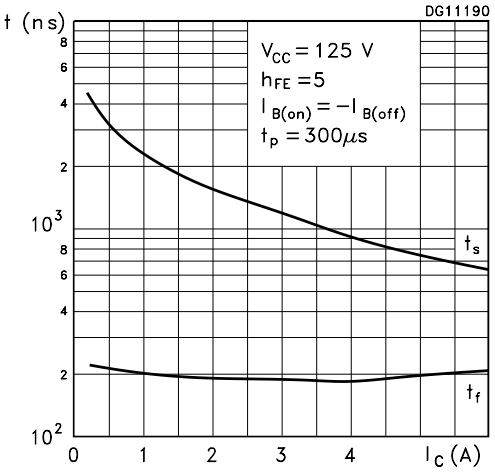
Collector-Emitter Saturation Voltage



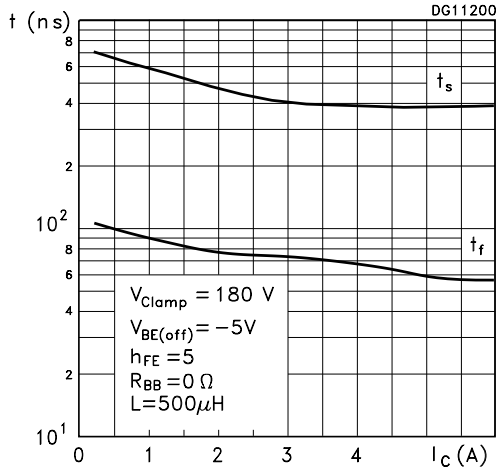
Base-Emitter Saturation Voltage



Switching Time Resistive Load



Switching Time Inductive Load



Reverse Biased SOA

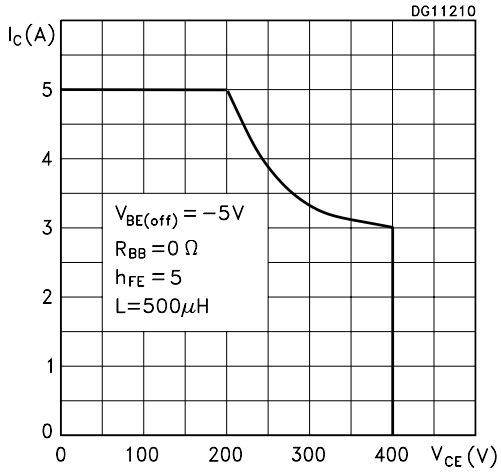


Figure 1: Inductive Load Switching Test Circuit.

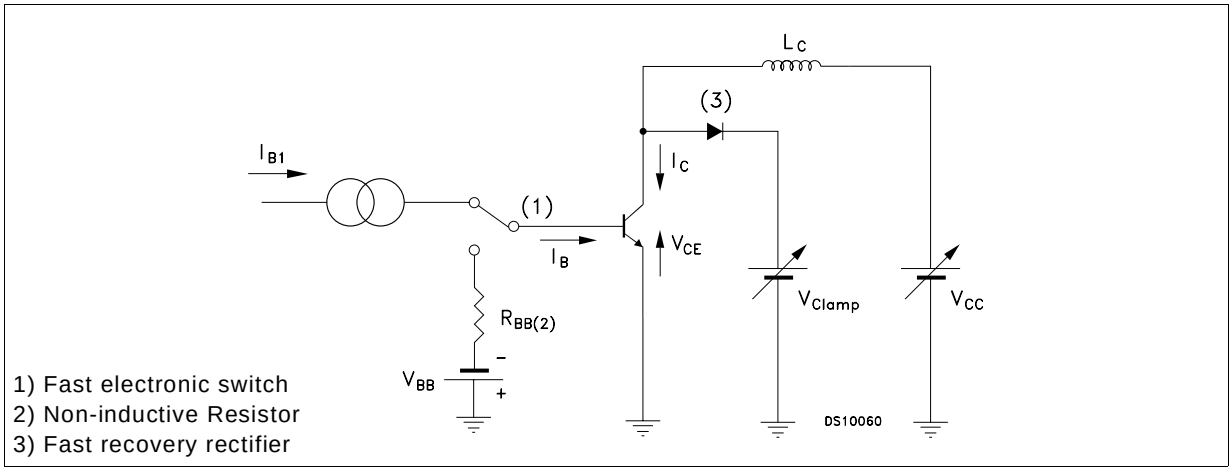
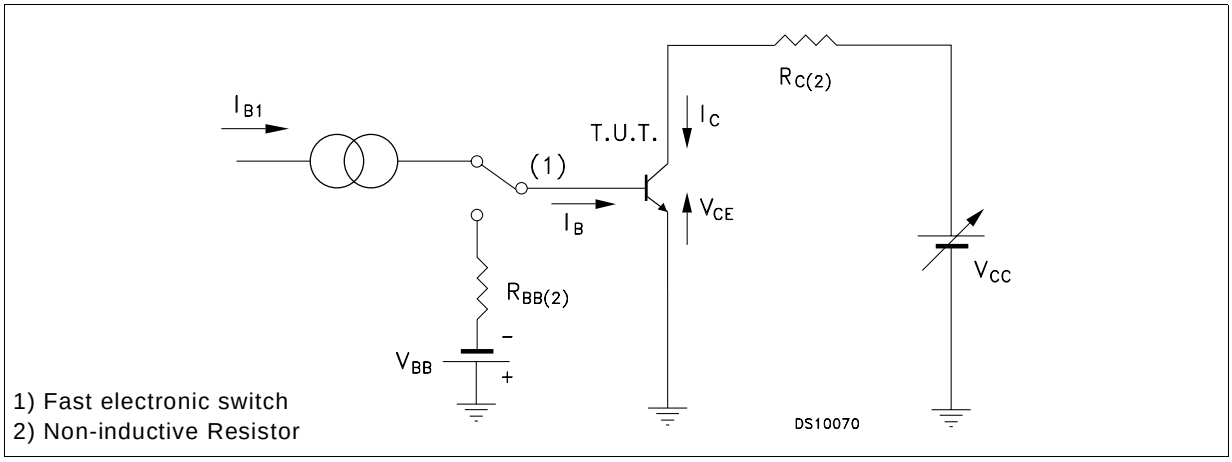
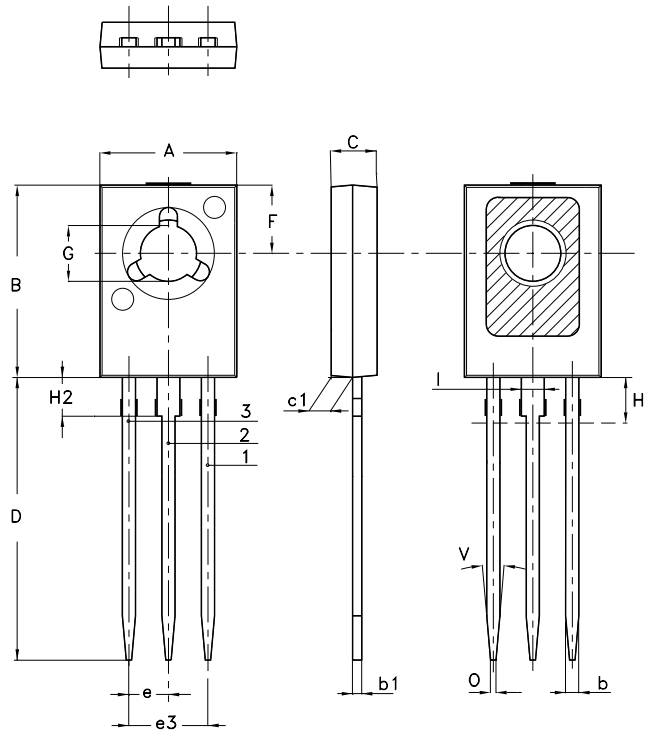


Figure 2: Resistive Load Switching Test Circuit.



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^o			10^o	



1: Base
2: Collector
3: Emitter

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