BUL116D

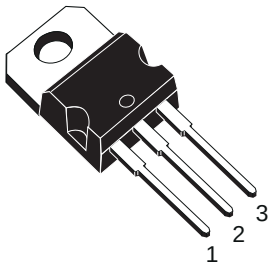
MEDIUM VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

PRELIMINARY DATA

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

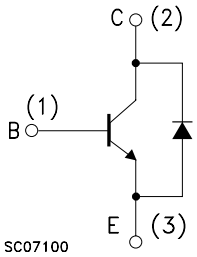
APPLICATIONS:

- 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



TO-220

INTERNAL SCHEMATIC DIAGRAM



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.

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	60	W
T_{stg}	Storage Temperature	-65 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C

THERMAL DATA

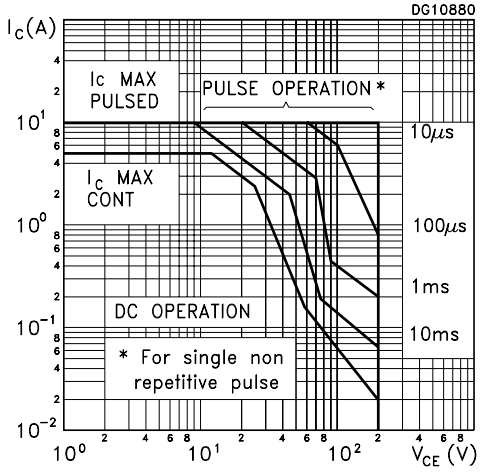
$R_{thj\text{-}case}$	Thermal Resistance Junction-Case	Max	2.08	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-Ambient	Max	62.5	°C/W

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

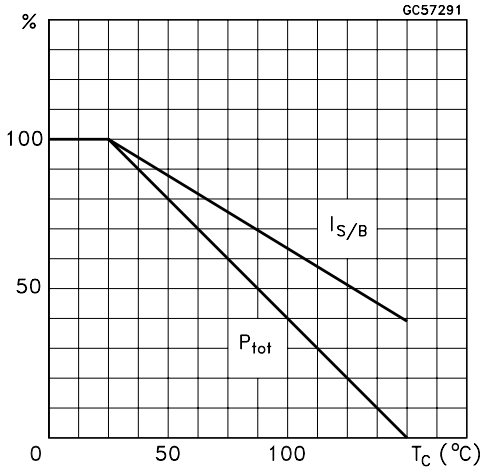
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current (V_{BE} = 0)	V_{CE} = 400 V V_{CE} = 400 V	 T_c = 125 °C			100 500	µA µA
V_{EBO}	Emitter-Base Voltage (I_C = 0)	I_E = 10 mA		9			V
$V_{CEO(sus)}$*	Collector-Emitter Sustaining Voltage (I_B = 0)	I_C = 100 mA		200			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 %

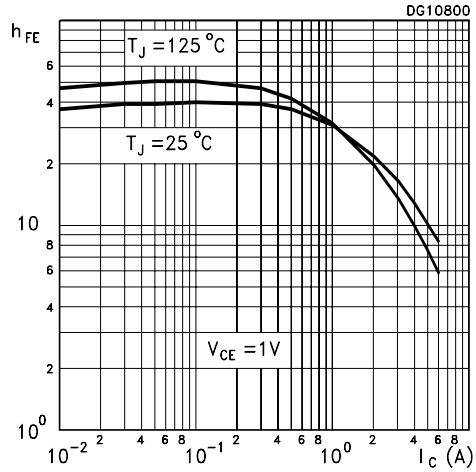
Safe Operating Area



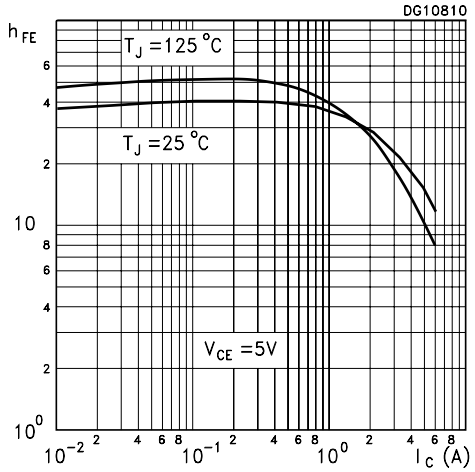
Derating Curve



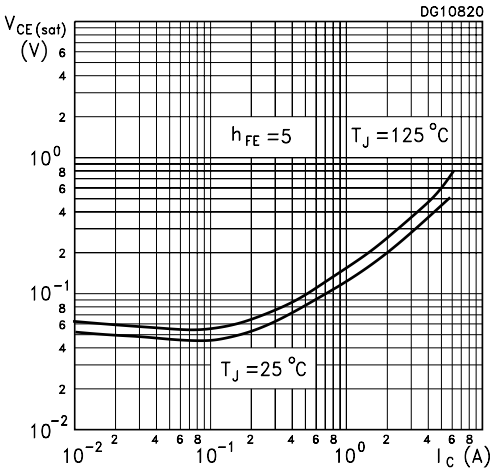
DC Current Gain



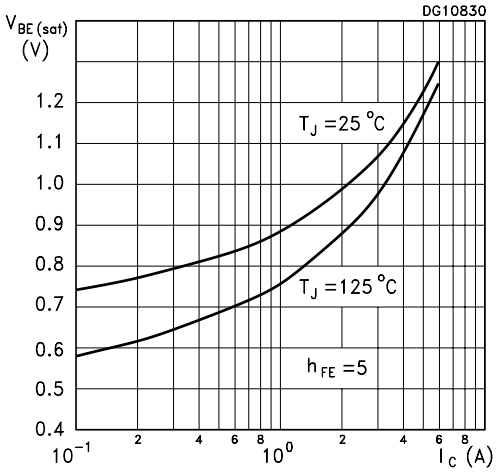
DC Current Gain



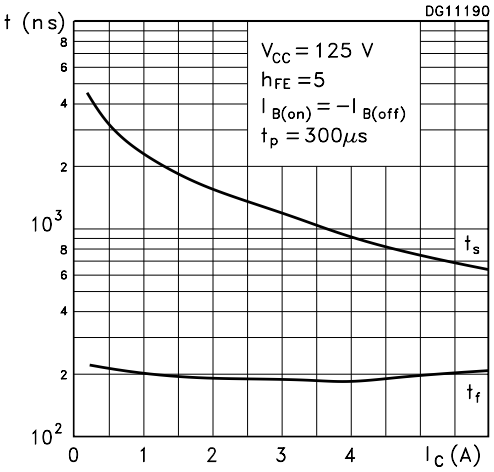
Collector-Emitter Saturation Voltage



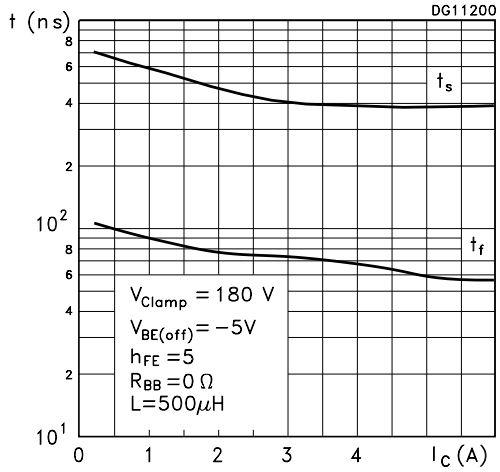
Base-Emitter Saturation Voltage



Switching Time Resistive Load



Switching Time Inductive Load



Reverse Biased SOA

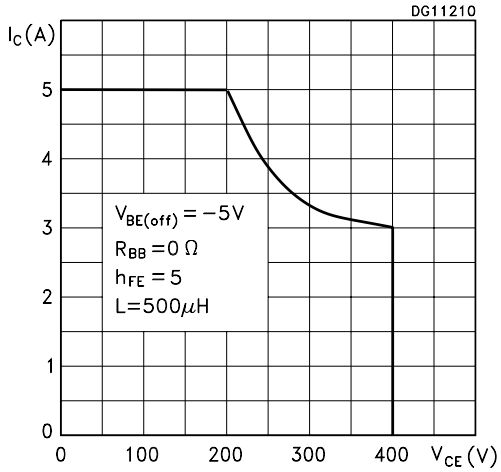


Figure 1: Inductive Load Switching Test Circuit.

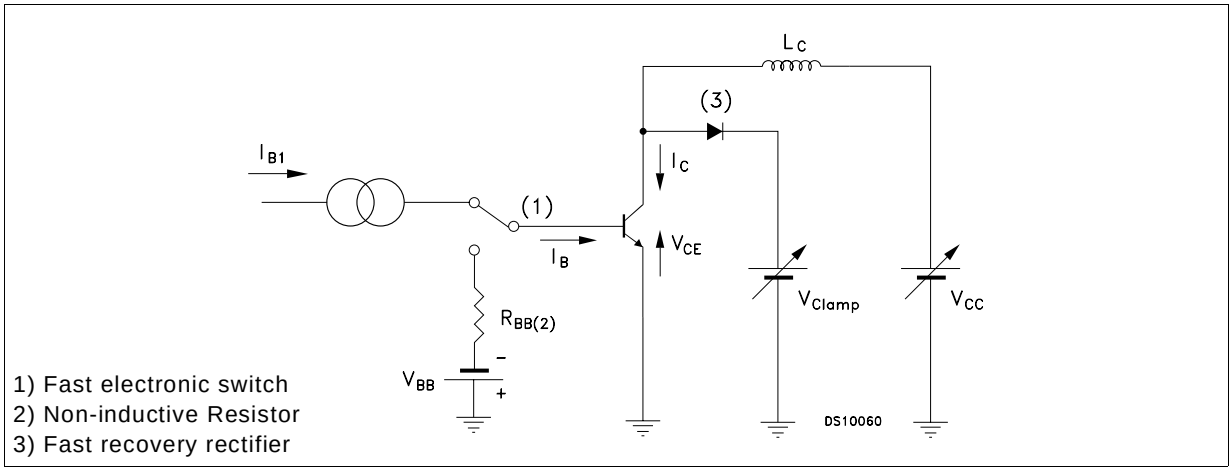
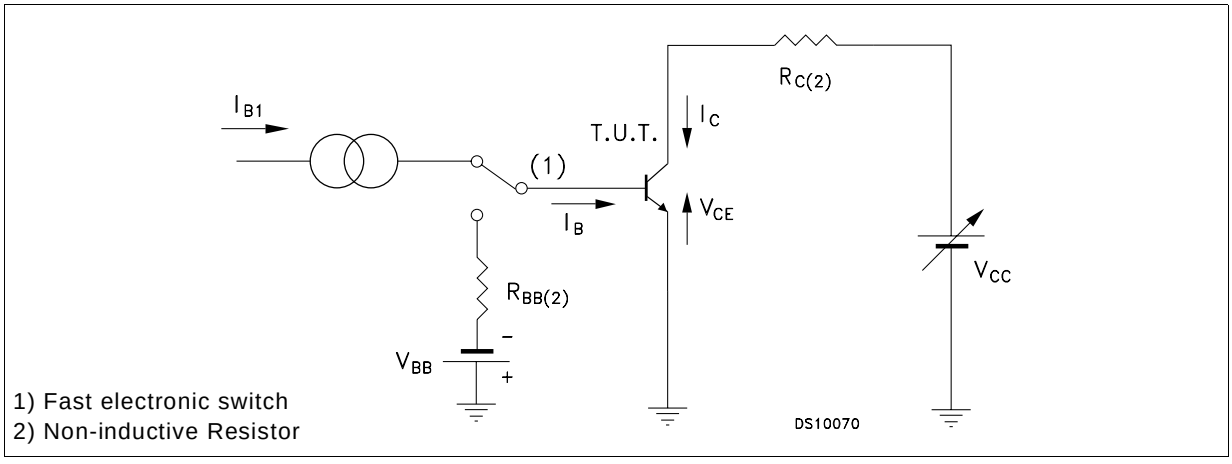
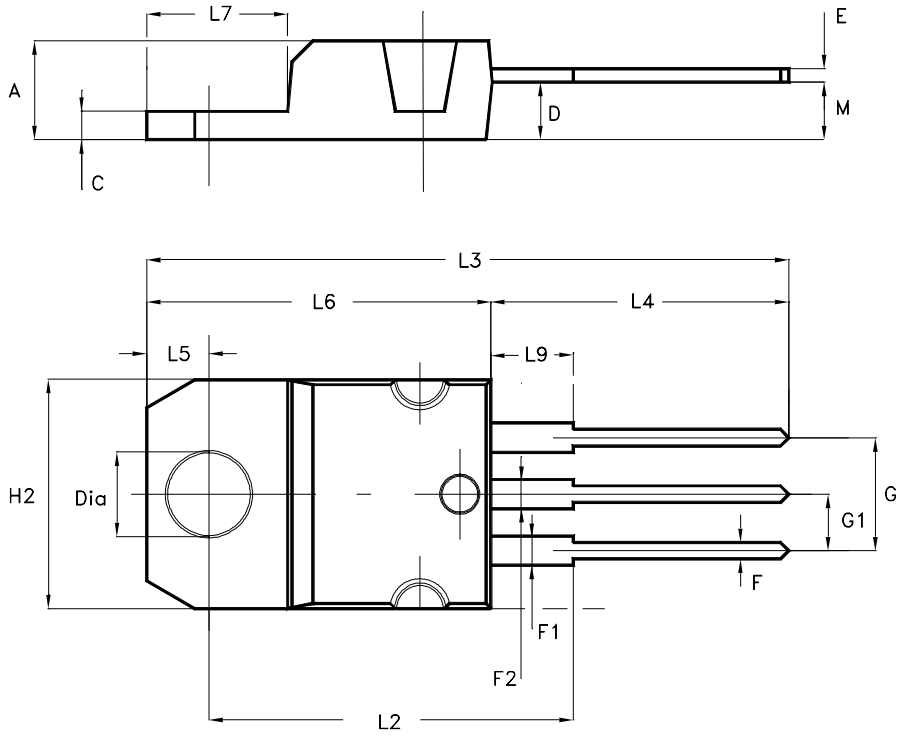


Figure 2: Resistive Load Switching Test Circuit.



TO-220 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.052
D	2.40		2.72	0.094		0.107
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.202
G1	2.40		2.70	0.094		0.106
H2	10.00		10.40	0.394		0.409
L2		16.40			0.645	
L4	13.00		14.00	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.20		6.60	0.244		0.260
L9	3.50		3.93	0.137		0.154
M		2.60			0.102	
DIA.	3.75		3.85	0.147		0.151



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