



BUL1102E

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED

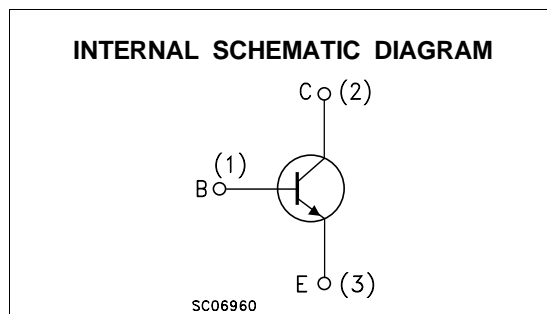
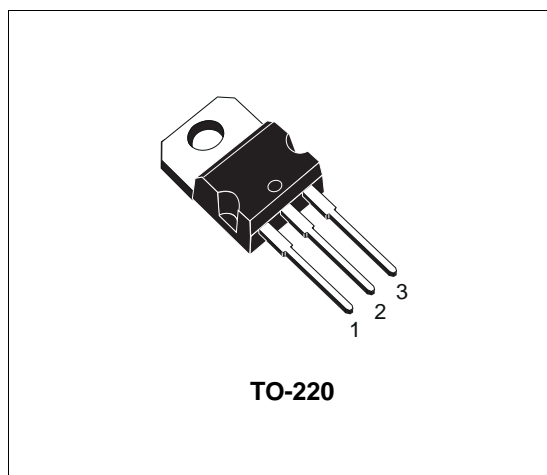
APPLICATIONS

- FOUR LAMP ELECTRONIC BALLAST FOR:
120 V MAINS IN PUSH-PULL CONFIGURATION;
277 V MAINS IN HALF BRIDGE CURRENT FEED CONFIGURATION.

DESCRIPTION

The device is manufactured using high voltage Multi Epitaxial Planar technology for high switching speeds and high voltage capability. It uses a Cellular Emitter structure with planar edge termination to enhance switching speeds while maintaining a wide RBSOA.

Thanks to an increased intermediate layer, it has an intrinsic ruggedness which enables the transistor to withstand a high collector current level during Breakdown condition, without using the transil protection usually necessary in typical converters for lamp ballast.



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CES}	Collector-Emitter Voltage ($V_{BE} = 0$)	1100	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)	450	V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	12	V
I_C	Collector Current	4	A
I_{CM}	Collector Peak Current ($t_p < 5$ ms)	8	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	70	W
T_{stg}	Storage Temperature	-65 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C

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THERMAL DATA

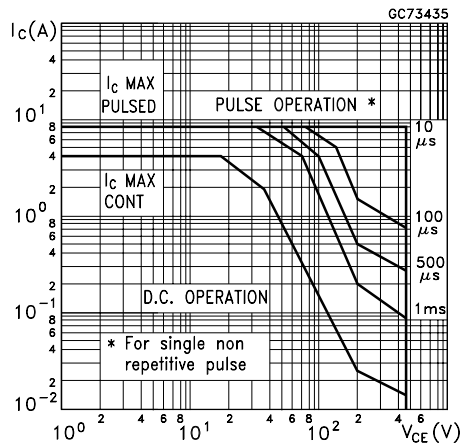
$R_{thj-case}$	Thermal Resistance Junction-Case	Max	1.78	$^{\circ}C/W$
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ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ unless otherwise specified)

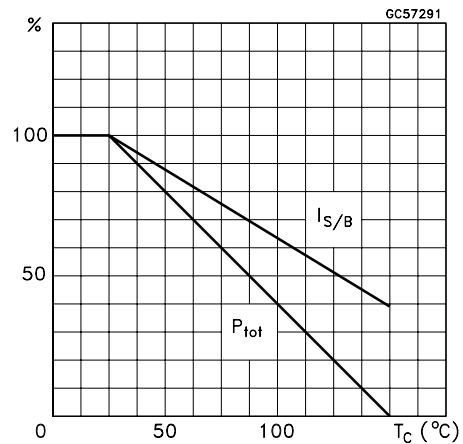
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current ($V_{BE} = 0$)	$V_{CE} = 1100 V$			100	μA
I_{EBO}	Emitter Cut-off Current ($I_B = 0$)	$V_{EB} = 12 V$			1	mA
$V_{CEO(sus)*}$	Collector-Emitter Sustaining Voltage ($I_B = 0$)	$I_C = 100 mA$	450			V
$V_{CE(sat)*}$	Collector-Emitter Saturation Voltage	$I_C = 2 A$ $I_B = 400 mA$			1.5	V
$V_{BE(sat)*}$	Base-Emitter Saturation Voltage	$I_C = 2 A$ $I_B = 400 mA$			1.5	V
$h_{FE}*$	DC Current Gain	$I_C = 250 mA$ $V_{CE} = 5 V$ $I_C = 2 A$ $V_{CE} = 5 V$	35 12		70 20	
t_s t_f	RESISTIVE LOAD Storage Time Fall Time	$I_C = 2.5 A$ $V_{CC} = 250 V$ $I_{B1} = 0.5 A$ $I_{B2} = 1 A$ $T_P = 30 \mu s$ (see figure 2)			2.5 300	μs ns
E_{ar}	Avalanche Energy	$L = 2 mH$ $C = 1.8 nF$ $I_{BR} \leq 2.5 A$ $25^{\circ}C < T_C < 125^{\circ}C$ (see figure 1)	6			mJ

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

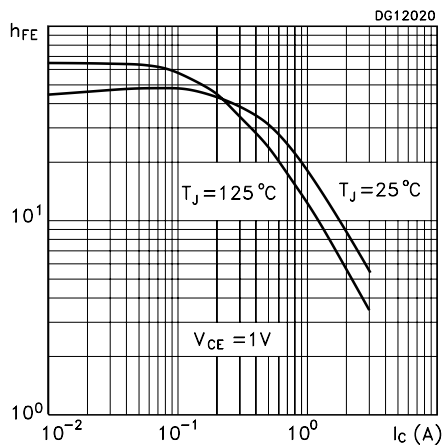
Safe Operating Areas



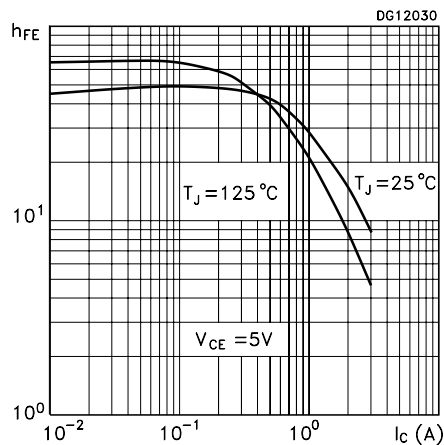
Derating Curve



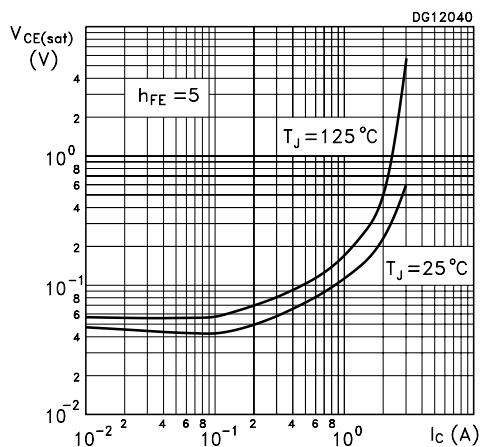
DC Current Gain



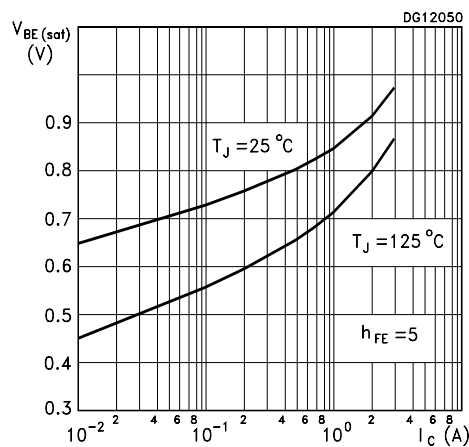
DC Current Gain



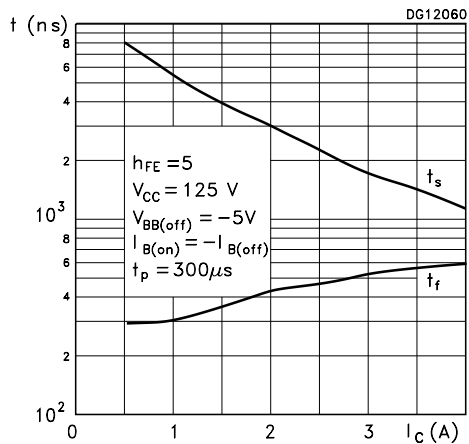
Collector Emitter Saturation Voltage



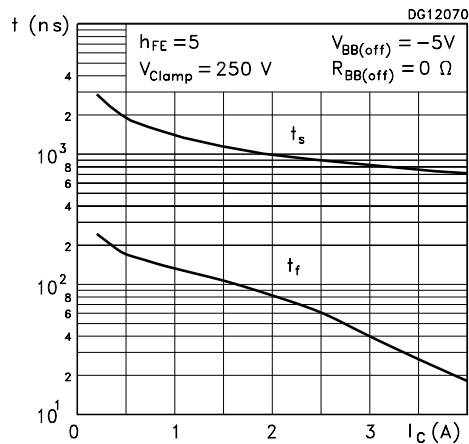
Base Emitter Saturation Voltage



Switching Time Resistive Load



Switching Time Inductive Load



Reverse Biased SOA

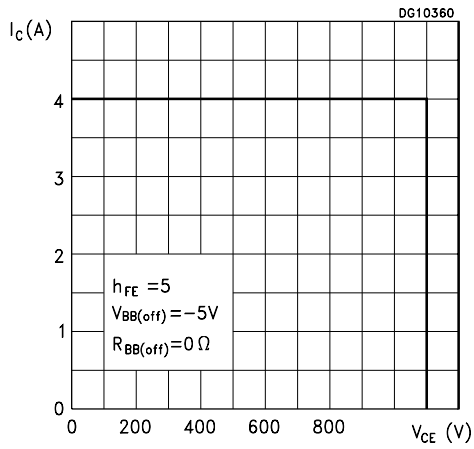


Figure 1: Energy Rating Test Circuit

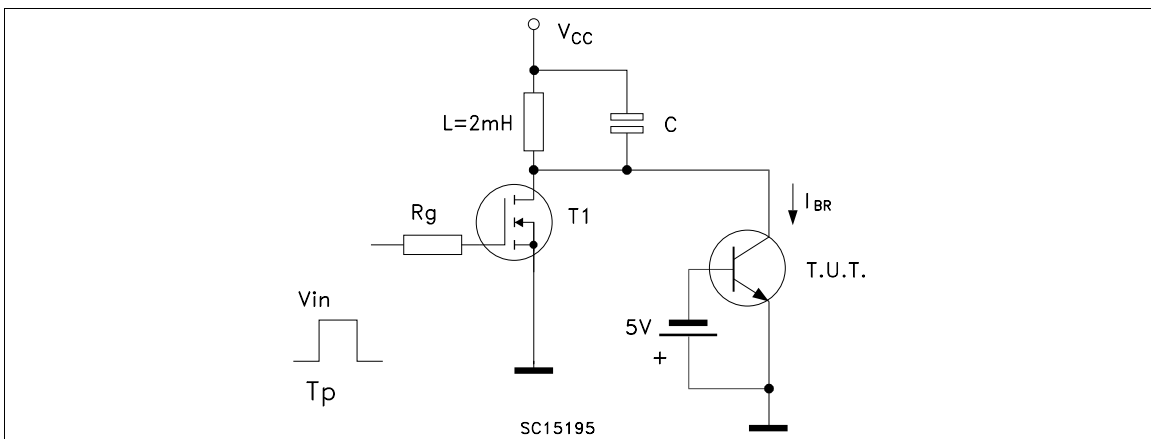
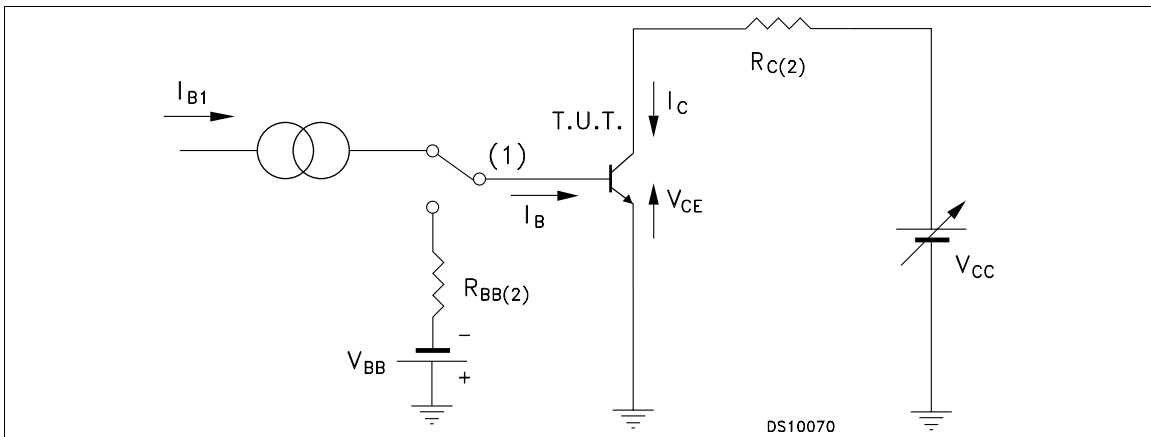
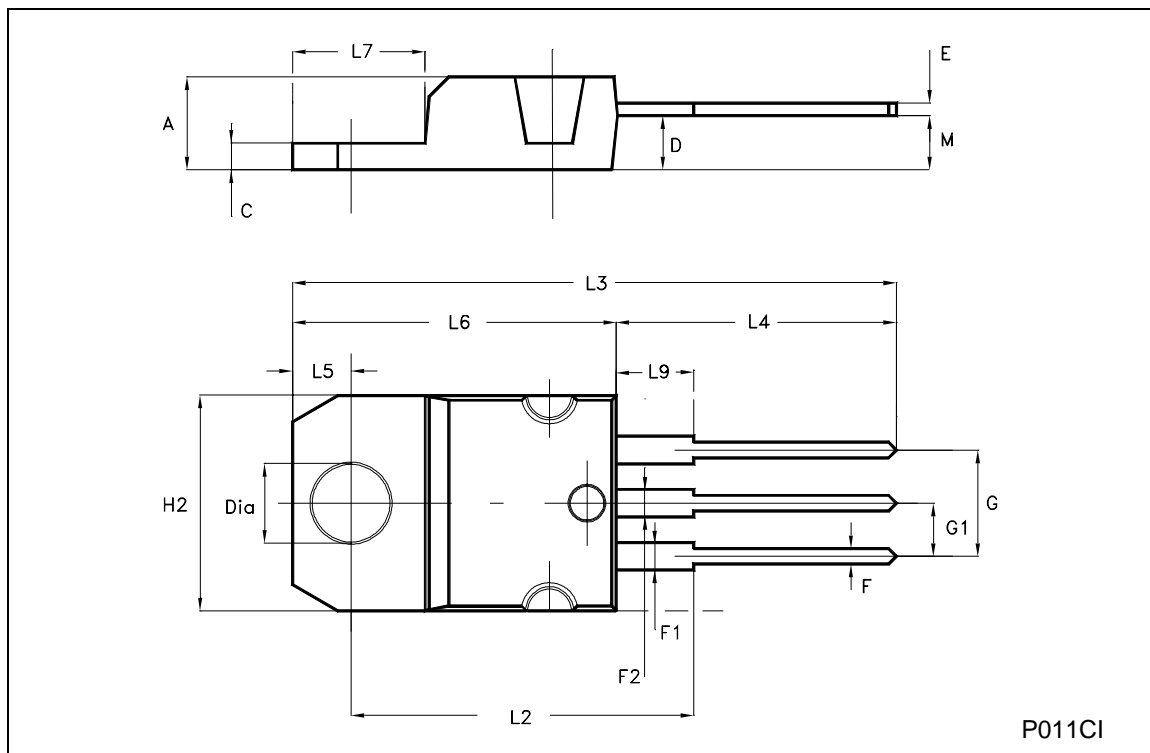


Figure 2: Resistive Load Switching Test Circuit



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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