



BUL1102EFP

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
- FULLY INSULATED PACKAGE (U.L. COMPLIANT) FOR EASY MOUNTING

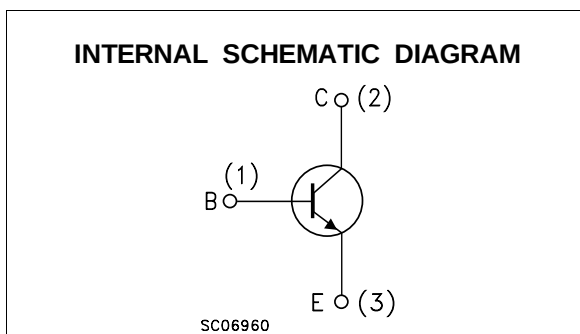
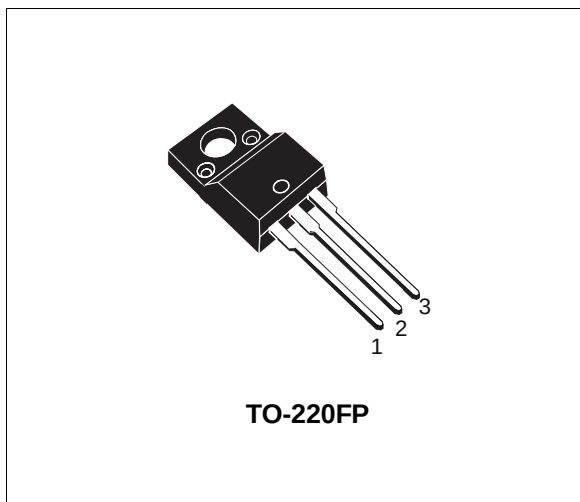
APPLICATIONS

- 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	30	W
V_{isol}	Insulation Withstand Voltage (RMS) from All Three Leads to External Heatsink	1500	
T_{stg}	Storage Temperature	-65 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C

BUL1102EFP

THERMAL DATA

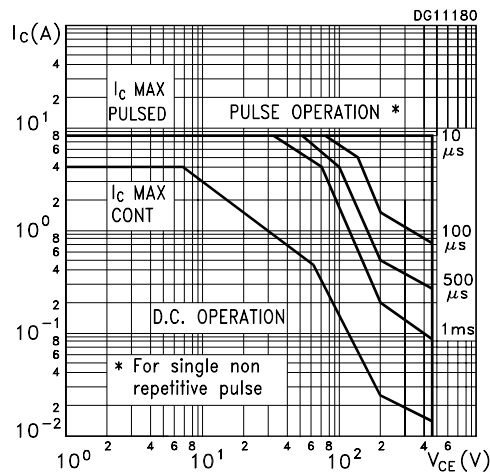
R _{thj-case}	Thermal Resistance Junction-Case	Max	4.17	°C/W
-----------------------	----------------------------------	-----	------	------

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

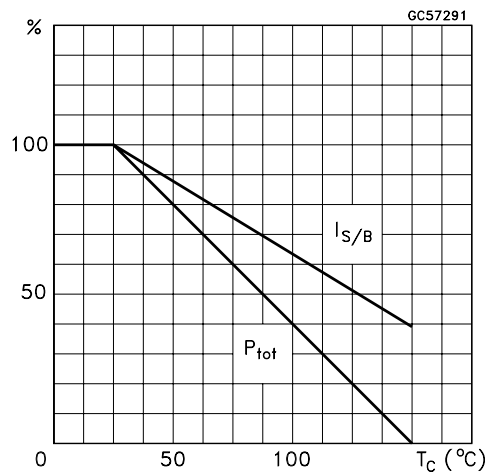
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CES}	Collector Cut-off Current (V _{BE} = 0)	V _{CE} = 1100 V			100	μA
I _{EBO}	Emitter Cut-off Current (I _B = 0)	V _{EB} = 12 V			1	mA
V _{CEO(sus)*}	Collector-Emitter Sustaining Voltage (I _B = 0)	I _C = 100 mA	450			V
V _{CE(sat)*}	Collector-Emitter 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	40 12		70 23	
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 μs (see figure 2)			2.5 300	μs ns
E _{ar}	Repetitive Avalanche Energy	L = 2 mH C = 1.8 nF I _{BR} ≤ 2.5A 25°C < T _C < 125°C (see figure 1)	6			mJ

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

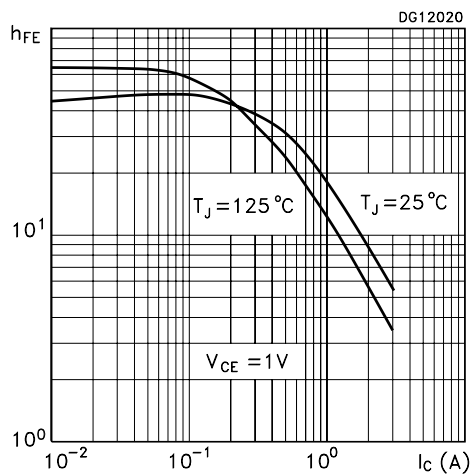
Safe Operating Areas



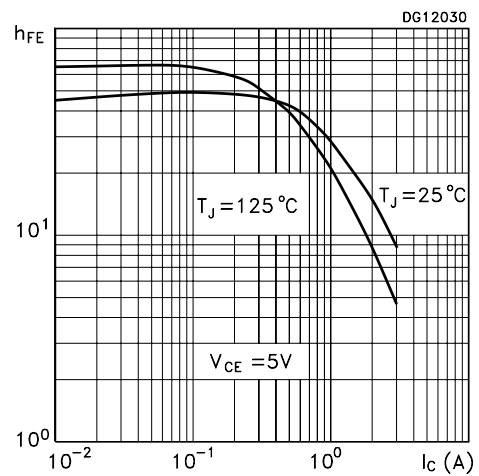
Derating Curve



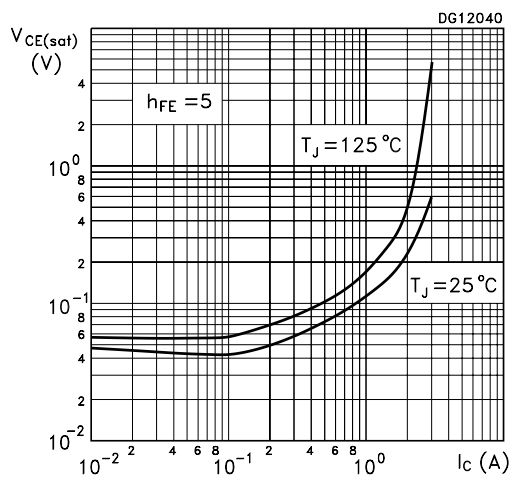
DC Current Gain



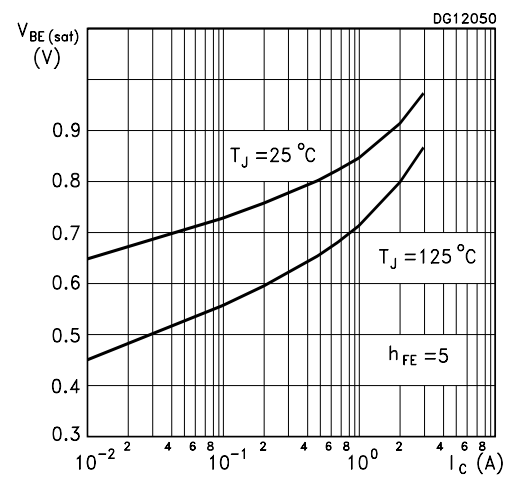
DC Current Gain



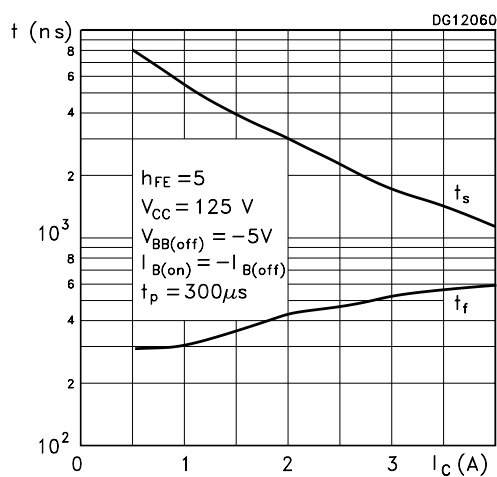
Collector Emitter Saturation Voltage



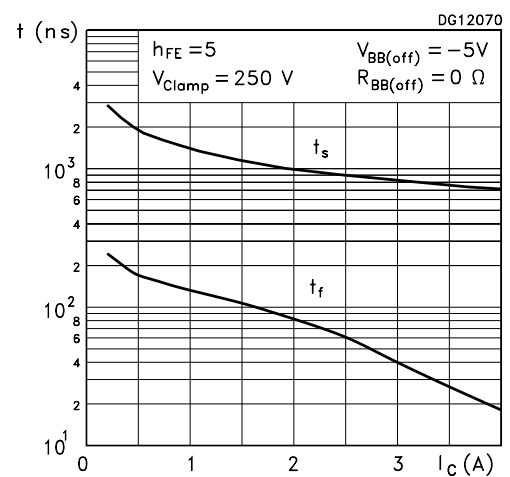
Base Emitter Saturation Voltage



Switching Time Resistive Load



Switching Time Inductive Load



Reverse Biased SOA

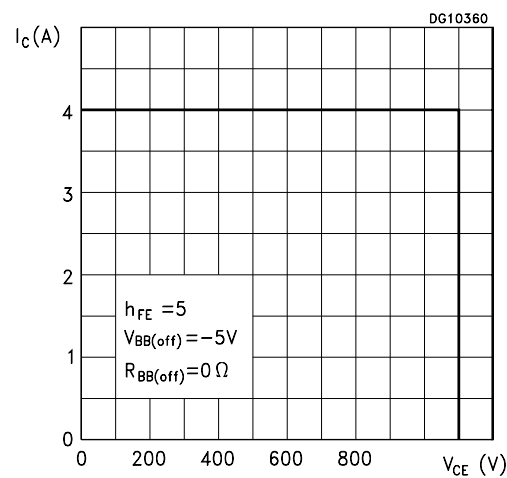


Figure 1: Energy Rating Test Circuit

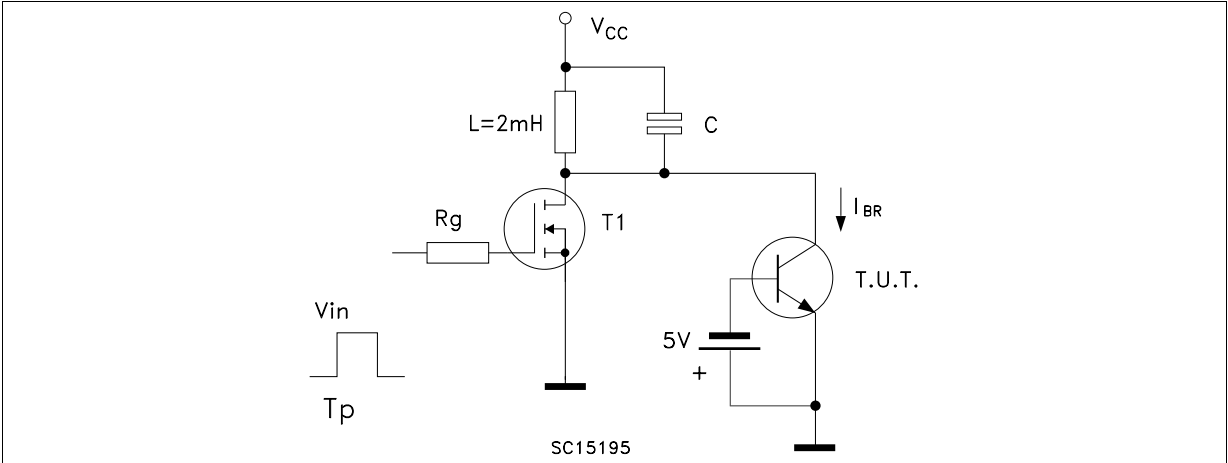
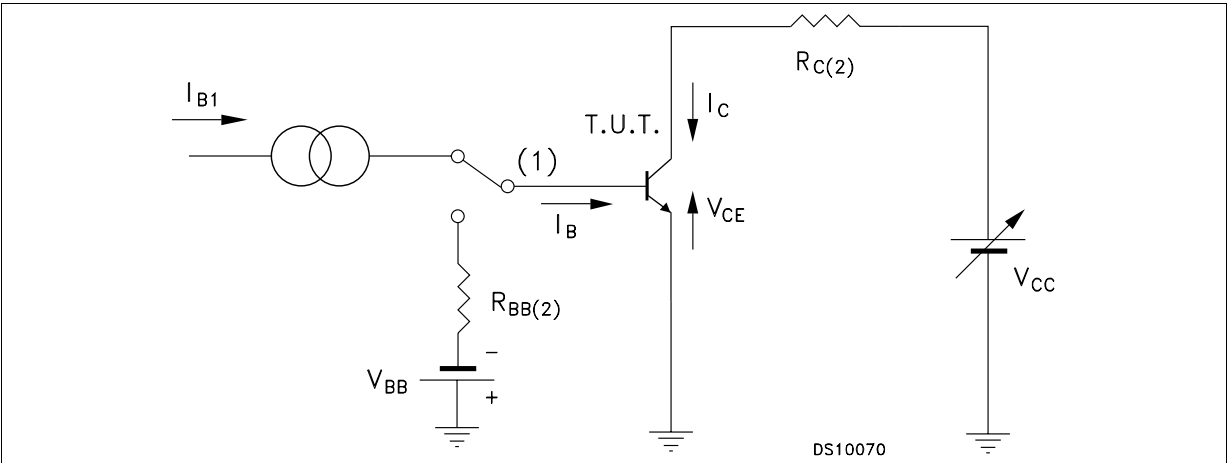
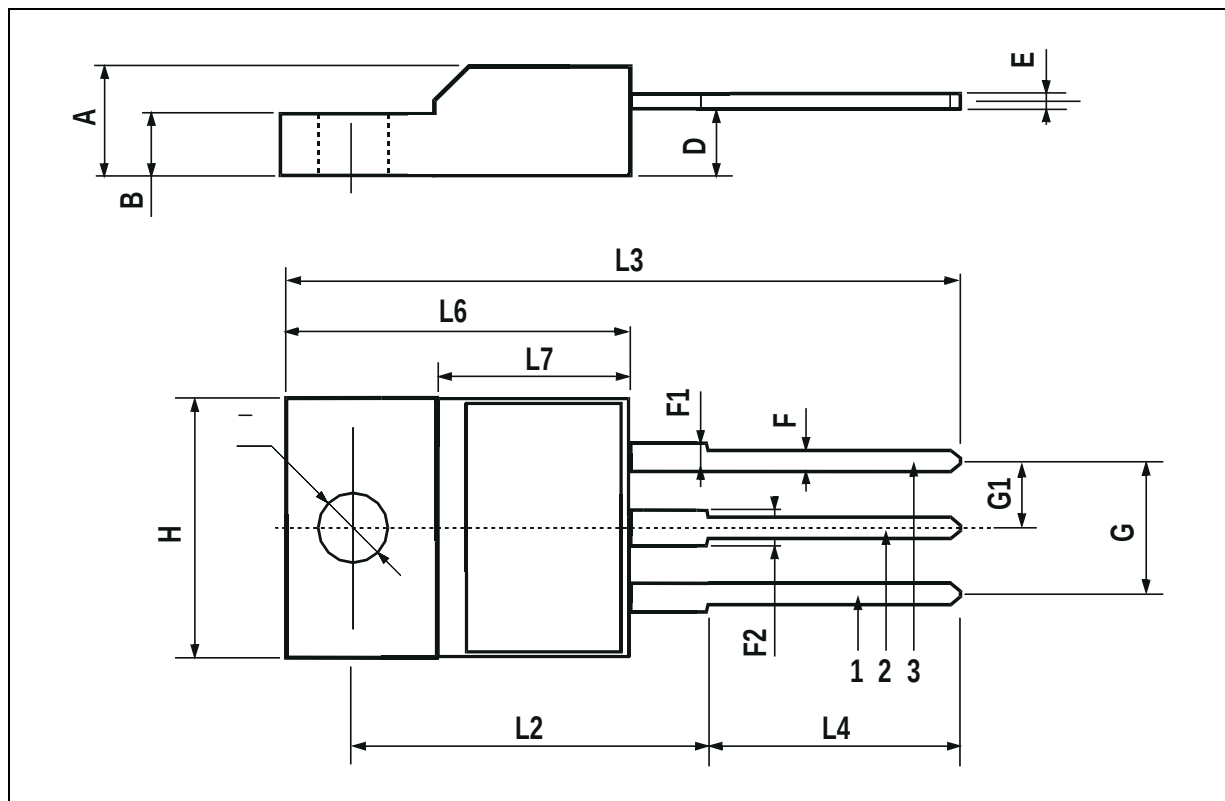


Figure 2: Resistive Load Switching Test Circuit



TO-220FP MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.4		4.6	0.173		0.181
B	2.5		2.7	0.098		0.106
D	2.5		2.75	0.098		0.108
E	0.45		0.7	0.017		0.027
F	0.75		1	0.030		0.039
F1	1.15		1.7	0.045		0.067
F2	1.15		1.7	0.045		0.067
G	4.95		5.2	0.195		0.204
G1	2.4		2.7	0.094		0.106
H	10		10.4	0.393		0.409
L2		16			0.630	
L3	28.6		30.6	1.126		1.204
L4	9.8		10.6	0.385		0.417
L6	15.9		16.4	0.626		0.645
L7	9		9.3	0.354		0.366
Ø	3		3.2	0.118		0.126



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.

All other names are the property of their respective owners.

© 2003 STMicroelectronics – All Rights reserved

STMicroelectronics GROUP OF COMPANIES

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

<http://www.st.com>