



## BUL312FH

# HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

Ordering Code	Marking	Shipment
BUL312FH	BUL312FH	Tube

- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- FULLY CHARACTERIZED AT 125 °C
- LARGE R.B.S.O.A.
- FULLY INSULATED PACKAGE (U.L. COMPLIANT) FOR EASY MOUNTING

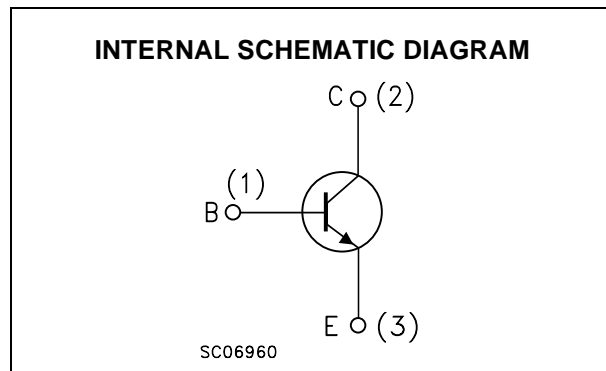
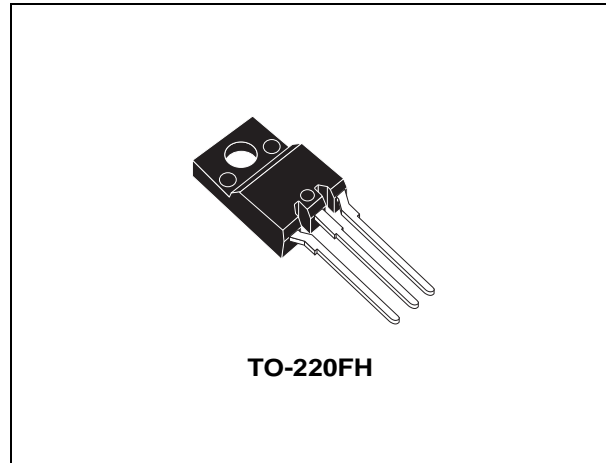
### APPLICATIONS:

- HORIZONTAL DEFLECTION FOR COLOR TV
- SWITCH MODE POWER SUPPLIES
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING

### 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 R.B.S.O.A.



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CES}$	Collector-Emitter Voltage ( $V_{BE} = 0$ )	1150	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	500	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	3	A
$I_{BM}$	Base Peak Current ( $t_p < 5$ ms)	4	A
$P_{tot}$	Total Dissipation at $T_c = 25$ °C	36	W
$V_{isol}$	Insulation Withstand Voltage (RMS) from All Three Leads to External Heatsink	2500	V
$T_{stg}$	Storage Temperature	-65 to 150	°C
$T_j$	Max. Operating Junction Temperature	150	°C

## BUL312FH

### THERMAL DATA

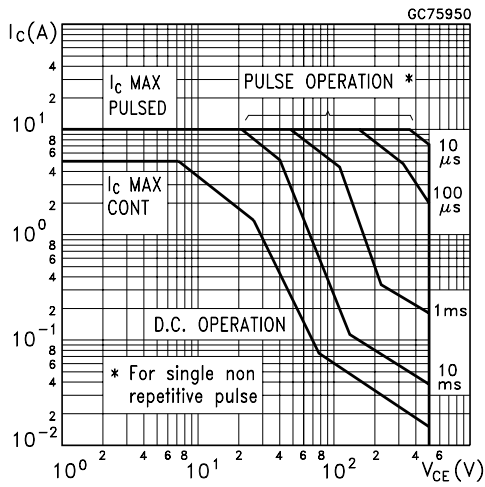
R <sub>thj-case</sub>	Thermal Resistance Junction-case	Max	3.47	°C/W
R <sub>thj-amb</sub>	Thermal Resistance Junction-ambient	Max	62.5	°C/W

### ELECTRICAL CHARACTERISTICS (T<sub>j</sub> = 25 °C unless otherwise specified)

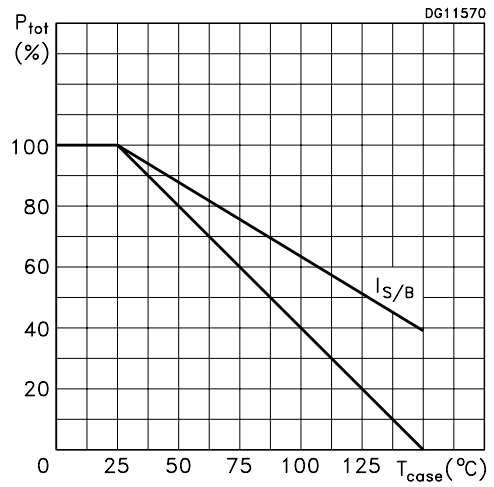
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CES</sub>	Collector Cut-off Current (V <sub>BE</sub> = 0)	V <sub>CE</sub> = 1150 V V <sub>CE</sub> = 1150 V T <sub>j</sub> = 125 °C			1 2	mA mA
I <sub>CEO</sub>	Collector Cut-off Current (I <sub>B</sub> = 0)	V <sub>CE</sub> = 500 V			250	μA
V <sub>EBO</sub>	Emitter-Base Voltage (I <sub>C</sub> = 0)	I <sub>E</sub> = 10 mA	9			V
V <sub>CEO(sus)</sub> *	Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = 100 mA	500			V
V <sub>CE(sat)</sub> *	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 1 A I <sub>C</sub> = 2 A I <sub>C</sub> = 3 A I <sub>B</sub> = 200 mA I <sub>B</sub> = 400 mA I <sub>B</sub> = 600 mA			0.5 0.7 1.1	V V V
V <sub>BE(sat)</sub> *	Base-Emitter Saturation Voltage	I <sub>C</sub> = 1 A I <sub>C</sub> = 2 A I <sub>C</sub> = 3 A I <sub>B</sub> = 200 mA I <sub>B</sub> = 400 mA I <sub>B</sub> = 600 mA			1 1.1 1.2	V V V
h <sub>FE</sub> *	DC Current Gain	I <sub>C</sub> = 10 mA I <sub>C</sub> = 3 A V <sub>CE</sub> = 5 V V <sub>CE</sub> = 2.5 V	8 8		16	
t <sub>s</sub> t <sub>f</sub>	INDUCTIVE LOAD Storage Time Fall Time	I <sub>C</sub> = 2 A I <sub>B1</sub> = 400 mA L = 200 μH (See Figure 1) V <sub>clamp</sub> = 250 V V <sub>BE(off)</sub> = -5 V R <sub>BB</sub> = 0		1.2 80	1.9 160	μs ns
t <sub>s</sub> t <sub>f</sub>	INDUCTIVE LOAD Storage Time Fall Time	I <sub>C</sub> = 2 A I <sub>B1</sub> = 400 mA L = 200 μH T <sub>j</sub> = 125 °C V <sub>clamp</sub> = 250 V V <sub>BE(off)</sub> = -5 V R <sub>BB</sub> = 0 (See Figure 1)		1.8 150		μs ns

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

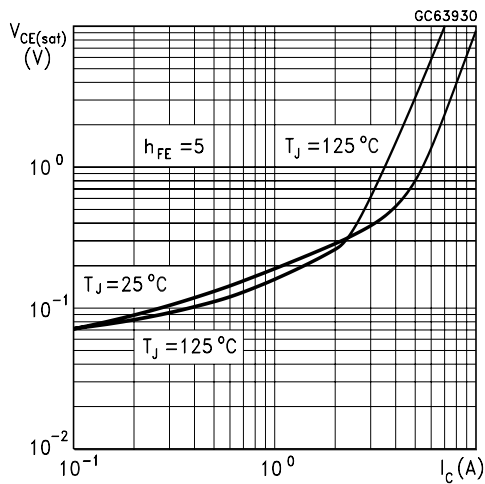
Safe Operating Area



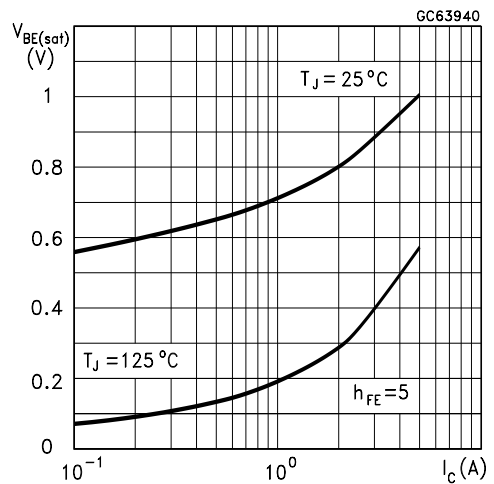
Derating Curve



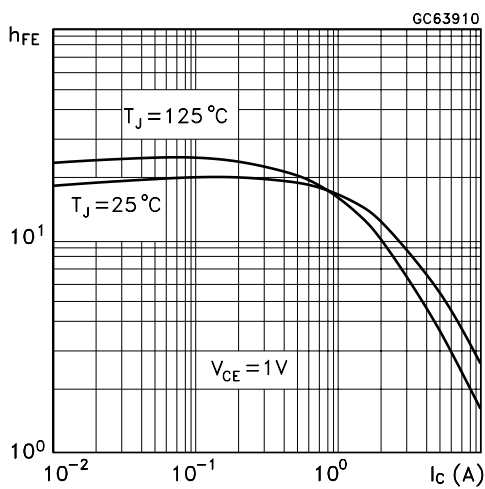
Collector-Emitter Saturation Voltage



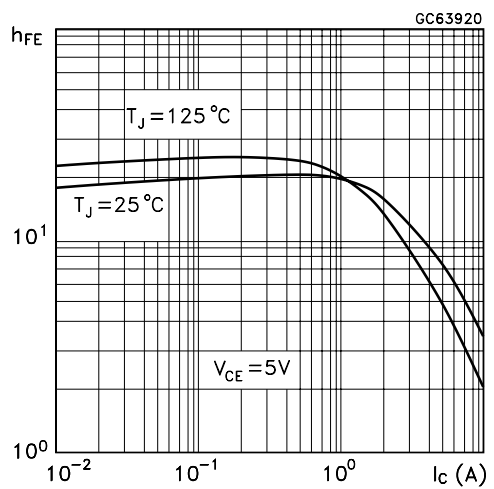
Base-Emitter Saturation Voltage



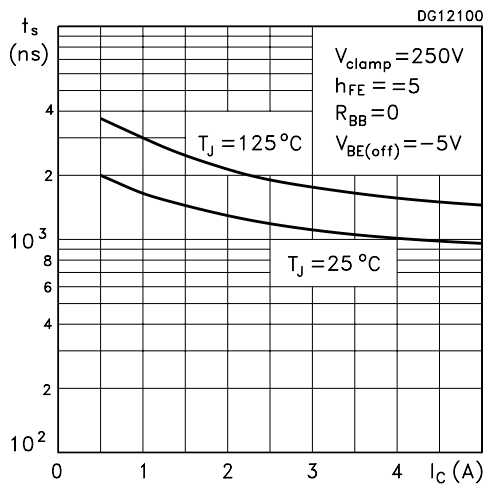
DC Current Gain



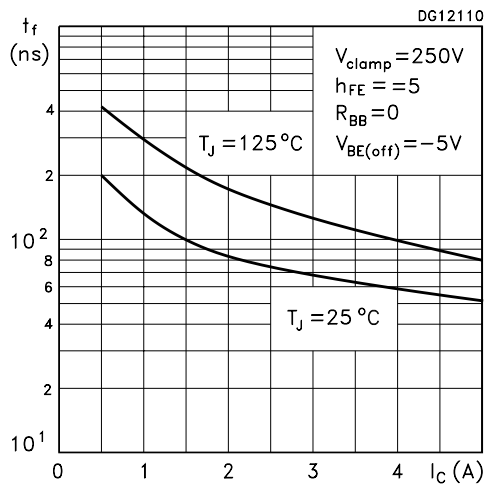
DC Current Gain



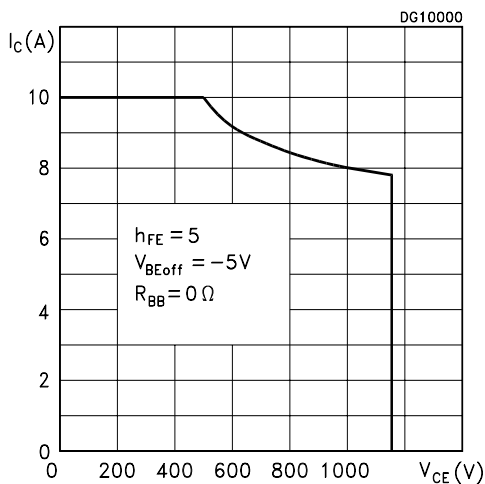
**Inductive Load Storage Time**



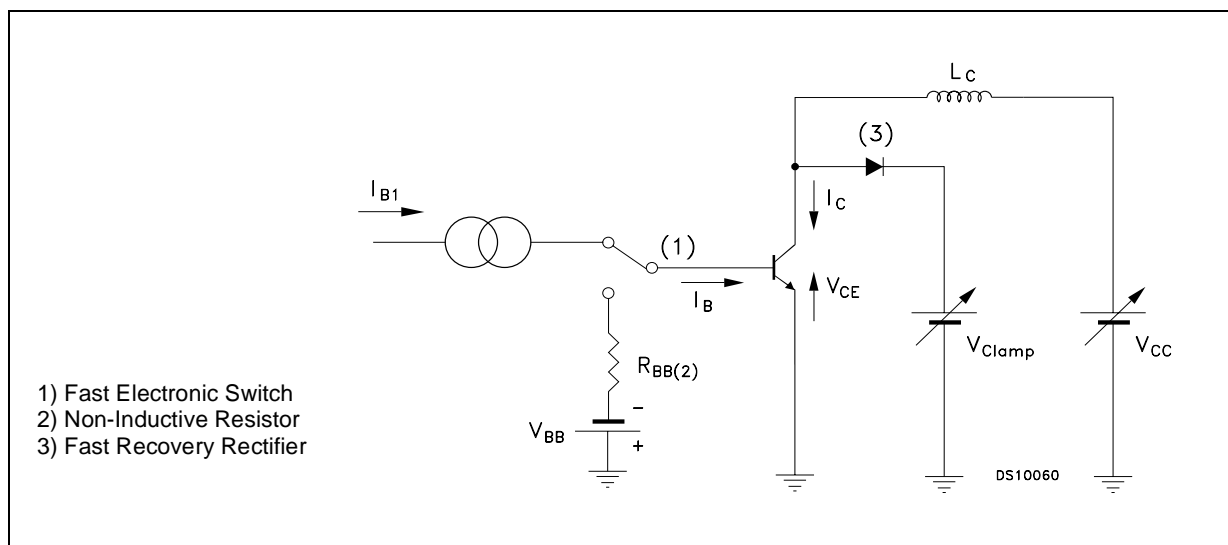
**Inductive Load Fall Time**



**Reverse Biased Safe Operating Area**

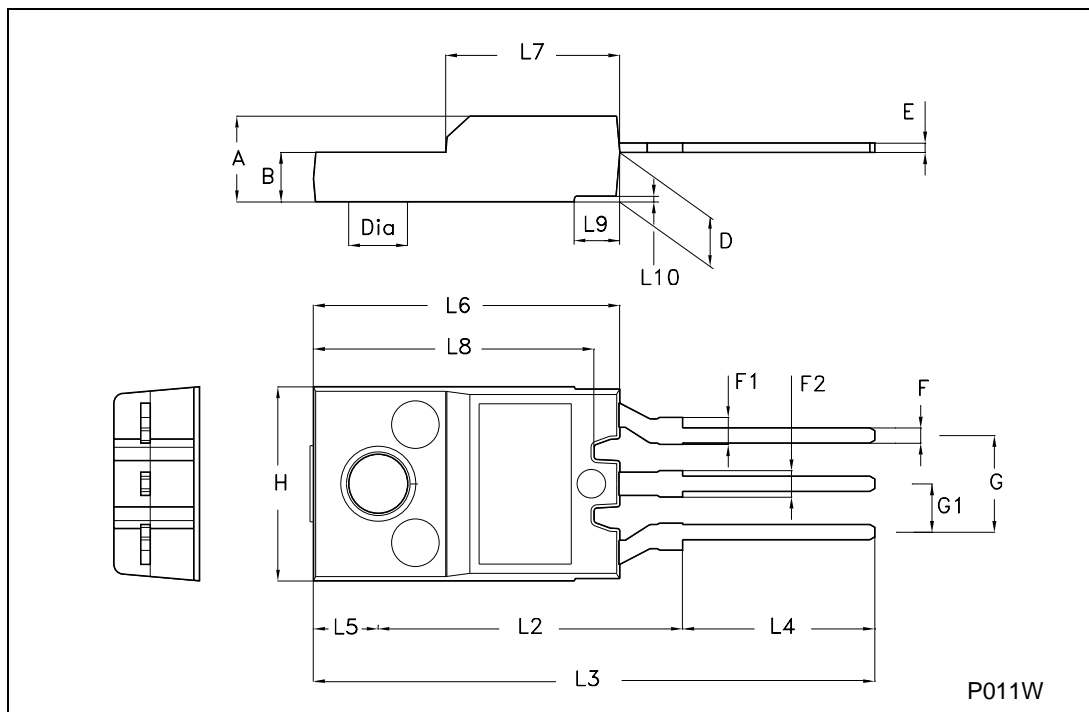


**Figure 1: Inductive Load Switching Test Circuit**



**TO-220FH (Fully plastic High voltage) 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	1.3		1.8	0.051		0.070
F2	1.3		1.8	0.051		0.070
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
L5		3.4			0.134	
L6	15.9		16.4	0.626		0.645
L7	9		9.3	0.354		0.366
L8	14.5		15	0.570		0.590
L9		2.4			0.094	



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