



BUL312FP

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

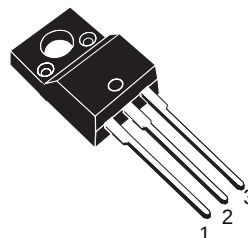
- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- FULLY CHARACTERIZED AT 125°C
- LARGE RBSOA
- FULLY INSULATED PACKAGE (U.L. COMPLIANT) FOR EASY MOUNTING

APPLICATIONS

- HORIZONTAL DEFLECTION FOR TV
- SMPS
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING

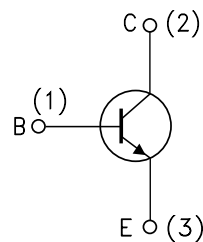
DESCRIPTION

The BUL312FP 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.



TO-220FP

INTERNAL SCHEMATIC DIAGRAM



SC06960

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	1500	V
T_{stg}	Storage Temperature	-65 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C

THERMAL DATA

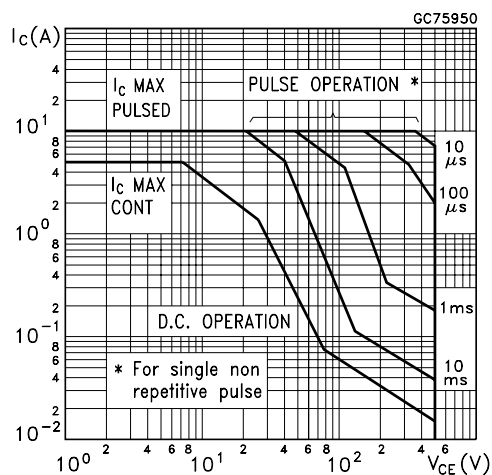
$R_{thj-case}$	Thermal Resistance Junction-Case	Max	3.5	$^{\circ}C/W$
$R_{thj-amb}$	Thermal Resistance Junction-Ambient	Max	62.5	$^{\circ}C/W$

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ unless otherwise specified)

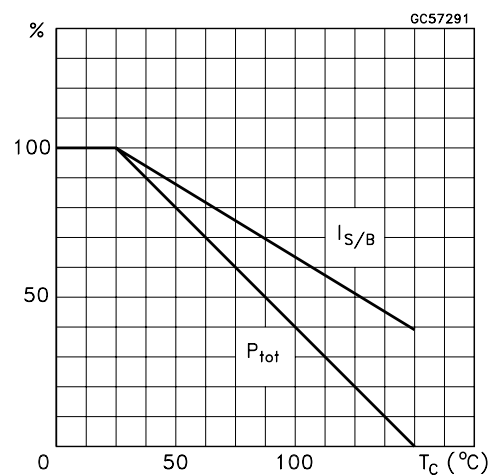
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current ($V_{BE} = 0$)	$V_{CE} = 1150 V$ $V_{CE} = 1150 V \quad T_j = 125^{\circ}C$			1 2	mA mA
I_{CEO}	Collector Cut-off Current ($I_B = 0$)	$V_{CE} = 500 V$			250	μA
$V_{CEO(sus)}^*$	Collector-Emitter Sustaining Voltage ($I_B = 0$)	$I_C = 100 mA \quad L = 25 mH$	500			V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	$I_E = 10 mA$	10			V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 1 A \quad I_B = 0.2 A$ $I_C = 2 A \quad I_B = 0.4 A$ $I_C = 3 A \quad I_B = 0.6 A$			0.5 0.7 1.1	V V V
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 1 A \quad I_B = 0.2 A$ $I_C = 2 A \quad I_B = 0.4 A$ $I_C = 3 A \quad I_B = 0.6 A$			1 1.1 1.2	V V V
h_{FE}^*	DC Current Gain	$I_C = 10 mA \quad V_{CE} = 5 V$ $I_C = 3 A \quad V_{CE} = 2.5 V$	8 8		13.5	
t_s t_f	INDUCTIVE LOAD Storage Time Fall Time	$I_C = 2 A \quad I_{B1} = 0.4 A$ $V_{BE(off)} = -5 V \quad R_{BB} = 0 \Omega$ $V_{CL} = 250 V \quad L = 200 \mu H$ (see fig. 1)		1.2 80	1.9 160	μs ns
t_s t_f	INDUCTIVE LOAD Storage Time Fall Time	$I_C = 2 A \quad I_{B1} = 0.4 A$ $V_{BE(off)} = -5 V \quad R_{BB} = 0 \Omega$ $V_{CL} = 250 V \quad L = 200 \mu H$ $T_j = 125^{\circ}C$ (see fig. 1)		1.8 150		μs ns

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

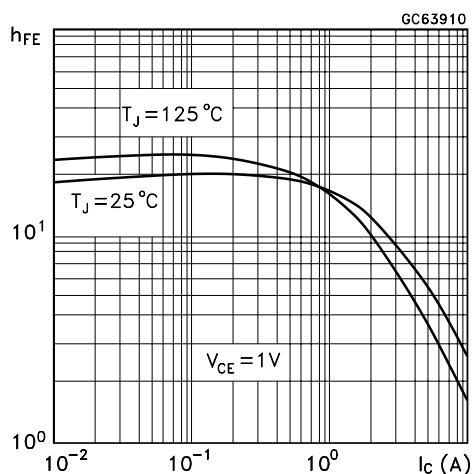
Safe Operating Areas



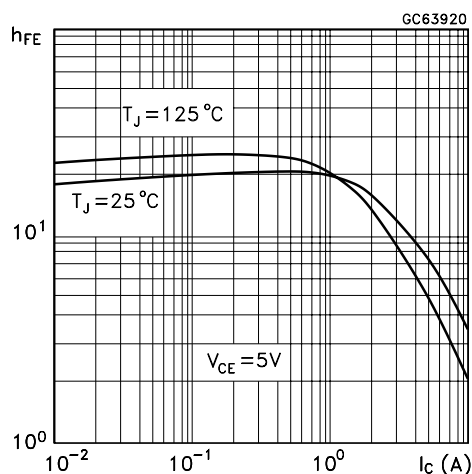
Derating Curve



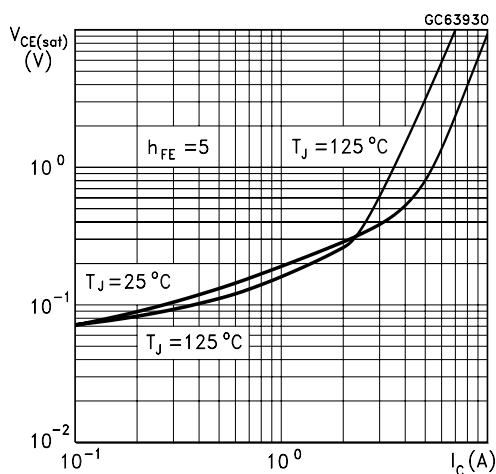
DC Current Gain



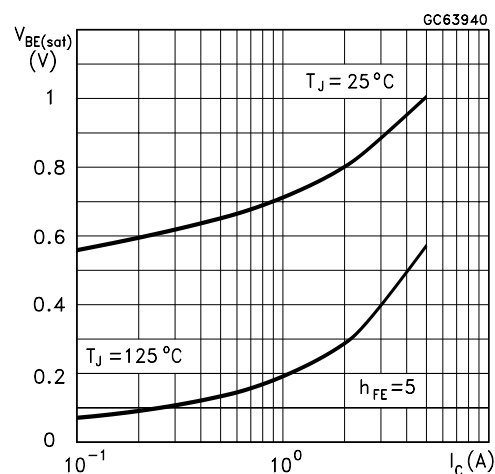
DC Current Gain



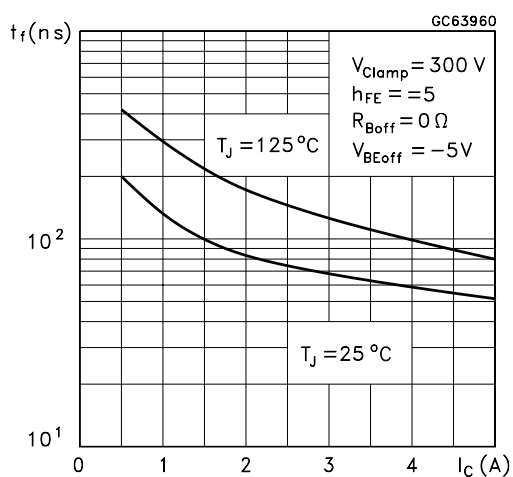
Collector Emitter Saturation Voltage



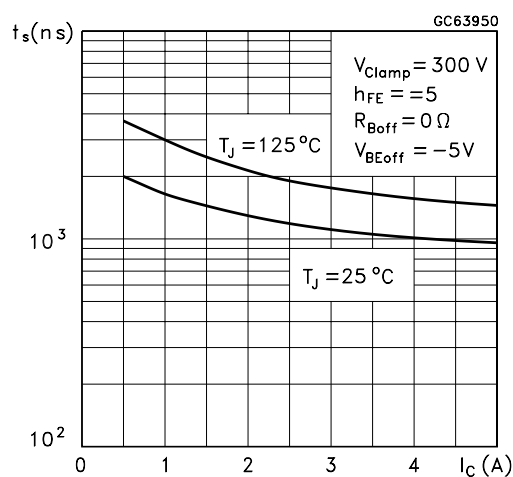
Base Emitter Saturation Voltage



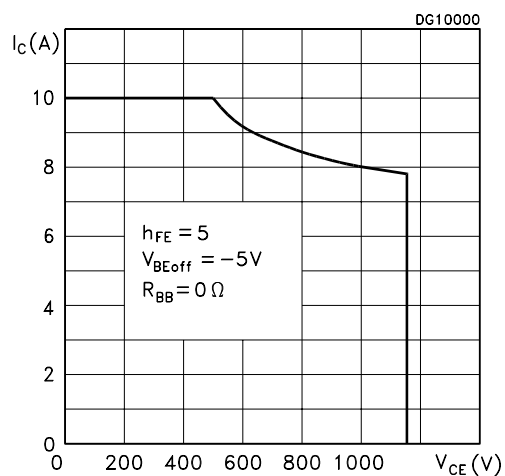
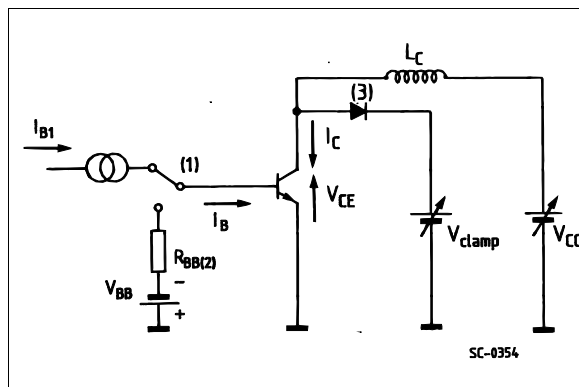
Inductive Fall Time



Inductive Storage Time



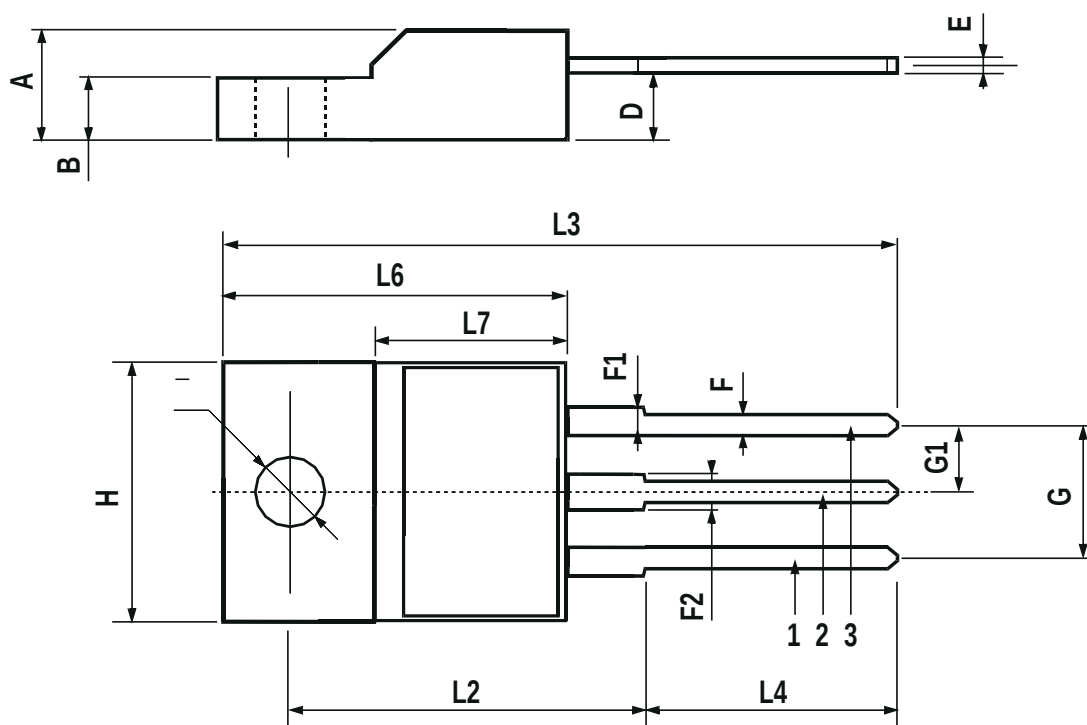
Reverse Biased SOA

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

- (1) Fast electronic switch
- (2) Non-inductive Resistor
- (3) Fast recovery rectifier

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



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