



BUL310FP

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- STMicroelectronics PREFERRED SALESTYPE
- NPN 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 MOLDED INSULATED PACKAGE
- 2000 V DC INSULATION (U.L. COMPLIANT)

APPLICATIONS

- HORIZONTAL DEFLECTION FOR COLOUR TV
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- FLYBACK AND FORWARD SINGLE TRANSISTOR LOW POWER CONVERTERS

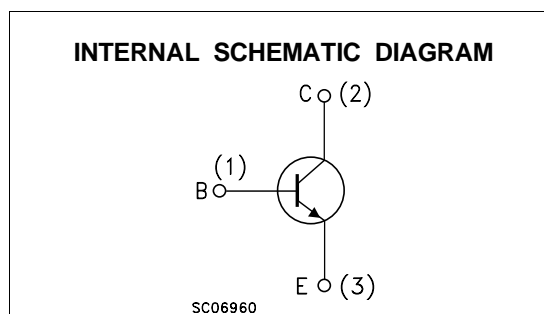
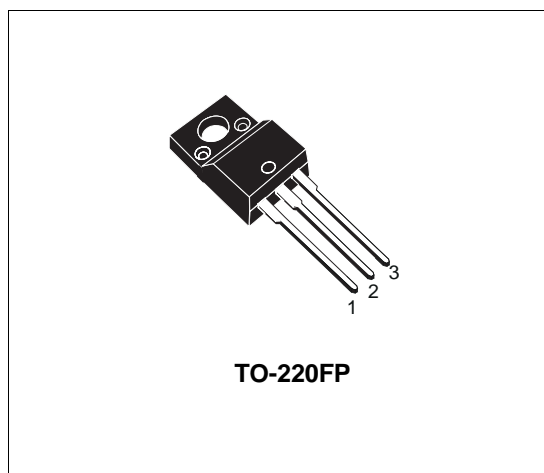
DESCRIPTION

The BUL310FP 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.

The BUL series 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 ($V_{BE} = 0$)	1000	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
T_{stg}	Storage Temperature	-65 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C



BUL310FP

THERMAL DATA

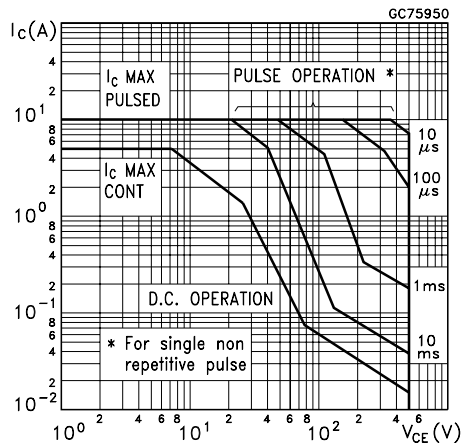
$R_{thj-case}$	Thermal Resistance Junction-Case	Max	3.5	$^{\circ}C/W$
$R_{thj-amb}$	Thermal Resistance Junction-Ambient	Max	62.5	$^{\circ}C/W$

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

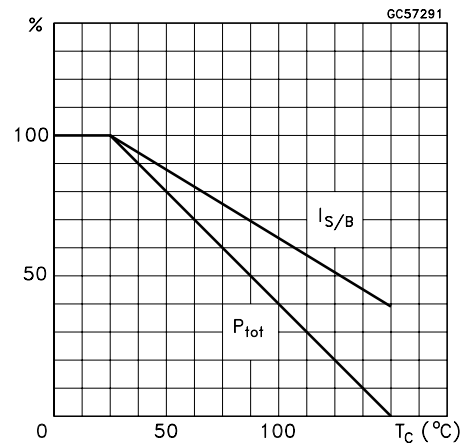
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current ($V_{BE} = 0$)	$V_{CE} = 1000 V$ $V_{CE} = 1000 V$ $T_j = 125^{\circ}C$			100 500	μA μA
I_{CEO}	Collector Cut-off Current ($I_B = 0$)	$V_{CE} = 500 V$			250	μA
$V_{CEO(sus)*}$	Collector-Emitter Sustaining Voltage ($I_B = 0$)	$I_C = 100 mA$ $L = 25 mH$	500			V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	$I_E = 10 mA$	9			V
$V_{CE(sat)*}$	Collector-Emitter Saturation Voltage	$I_C = 1 A$ $I_B = 0.2 A$ $I_C = 2 A$ $I_B = 0.4 A$ $I_C = 3 A$ $I_B = 0.6 A$			0.5 0.7 1.1	V V V
$V_{BE(sat)*}$	Base-Emitter Saturation Voltage	$I_C = 1 A$ $I_B = 0.2 A$ $I_C = 2 A$ $I_B = 0.4 A$ $I_C = 3 A$ $I_B = 0.6 A$			1 1.1 1.2	V V V
h_{FE*}	DC Current Gain	$I_C = 10 mA$ $V_{CE} = 5 V$ $I_C = 3 A$ $V_{CE} = 2.5 V$	10 6	10	14	
t_s t_f	INDUCTIVE LOAD Storage Time Fall Time	$I_C = 2 A$ $I_{B1} = 0.4 A$ $V_{BE(off)} = -5 V$ $R_{BB} = 0 \Omega$ $V_{CL} = 250 V$ $L = 200 \mu H$ (see figure 1)		1.2 80	1.9 160	μs ns
t_s t_f	INDUCTIVE LOAD Storage Time Fall Time	$I_C = 2 A$ $I_{B1} = 0.4 A$ $V_{BE(off)} = -5 V$ $R_{BB} = 0 \Omega$ $V_{CL} = 250 V$ $L = 200 \mu H$ $T_j = 125^{\circ}C$ (see figure 1)		1.8 150		μs ns

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

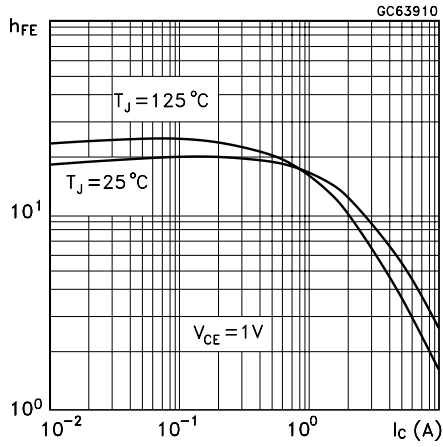
Safe Operating Areas



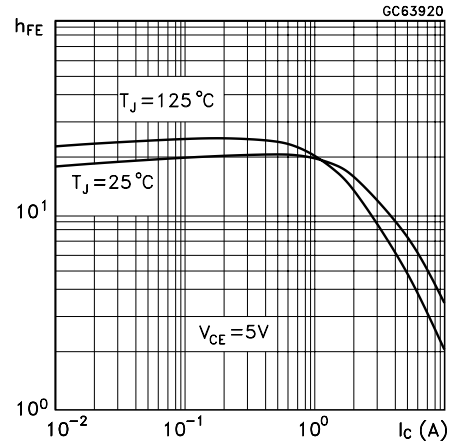
Derating Curve



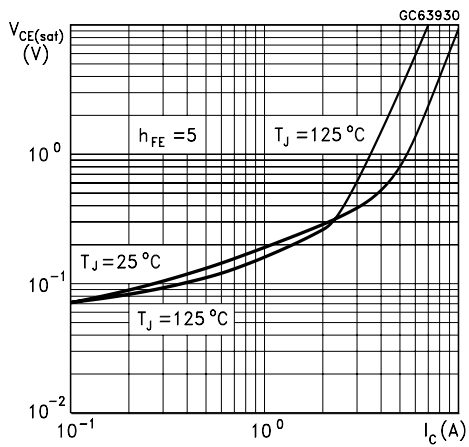
DC Current Gain



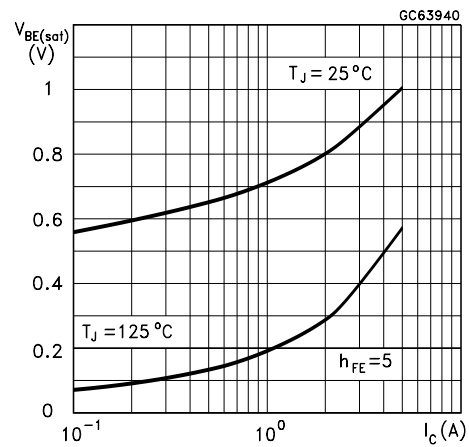
DC Current Gain



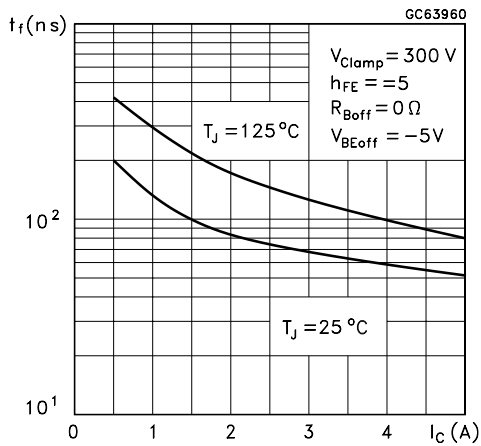
Collector Emitter Saturation Voltage



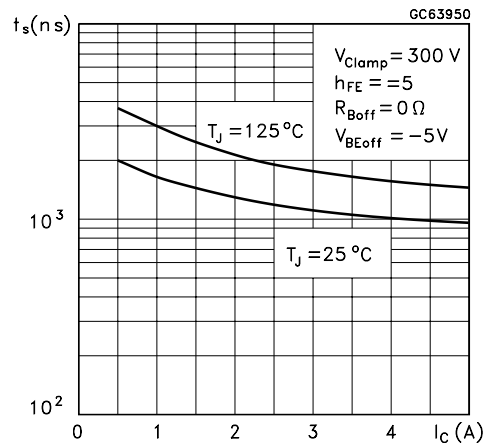
Base Emitter Saturation Voltage



Inductive Load Fall Time



Inductive Load Storage Time



Reverse Biased SOA

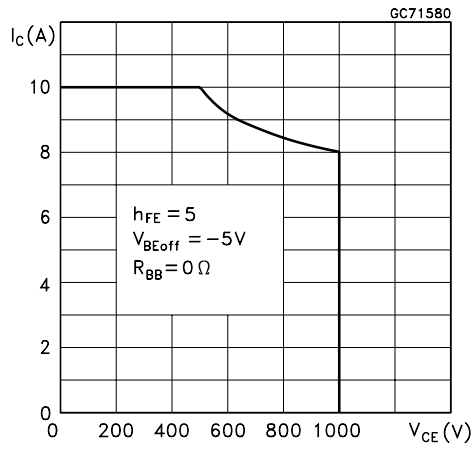
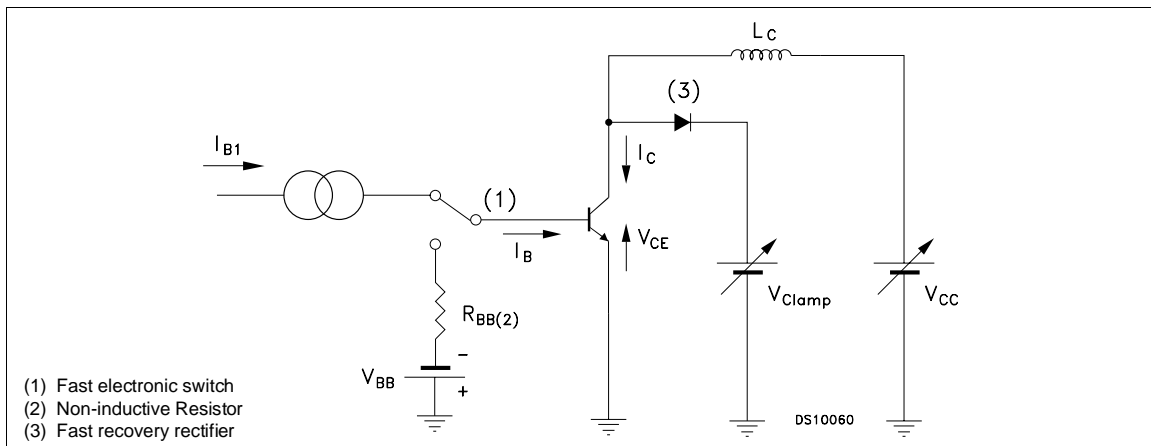
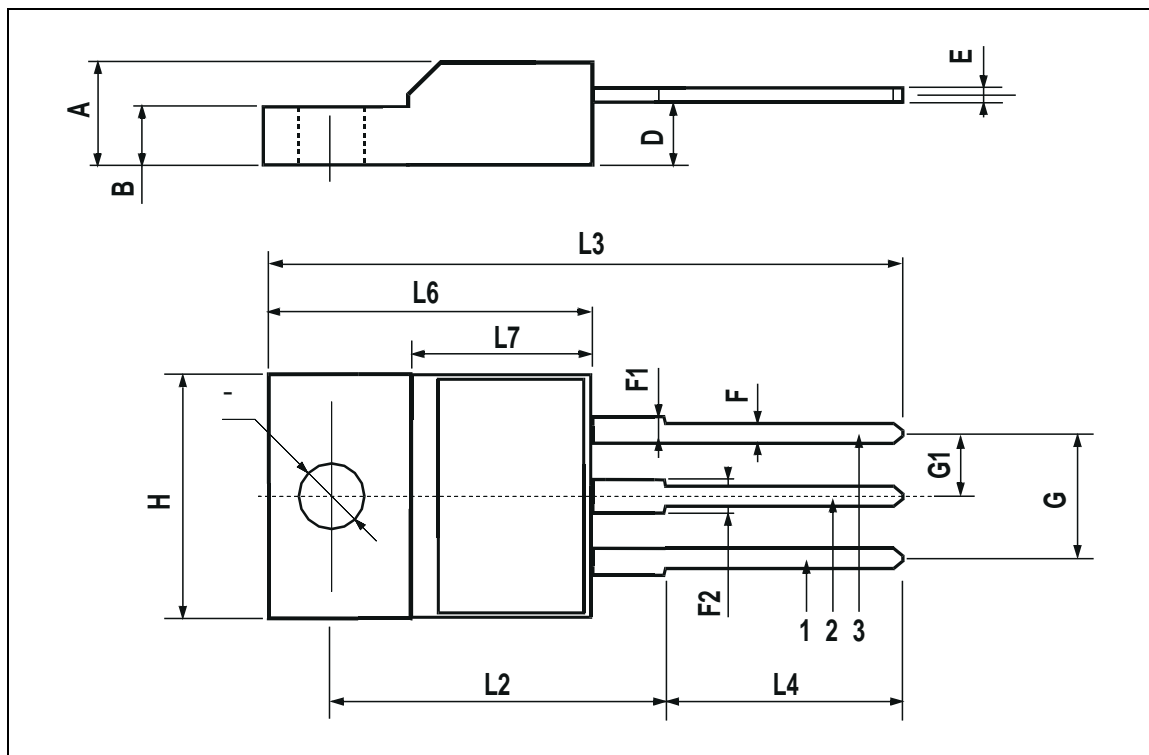


Figure 1: Inductive Load Switching Test Circuit



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
∅	3		3.2	0.118		0.126



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