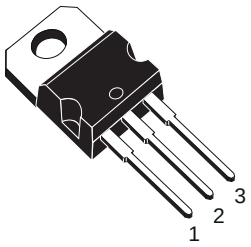
BUL310

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 CHARACTERISED AT 125°C
- LARGE RBSOA



TO-220

APPLICATIONS

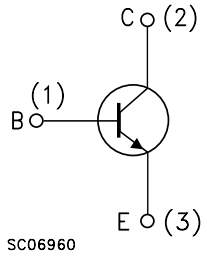
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- FLYBACK AND FORWARD SINGLE TRANSISTOR LOW POWER CONVERTERS

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.

The BUL series is designed for use in lighting applications and low cost switch-mode power supplies.

INTERNAL SCHEMATIC DIAGRAM



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	V
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 Tc = 25 °C	75	W
T_{stg}	Storage Temperature	-65 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C

THERMAL DATA

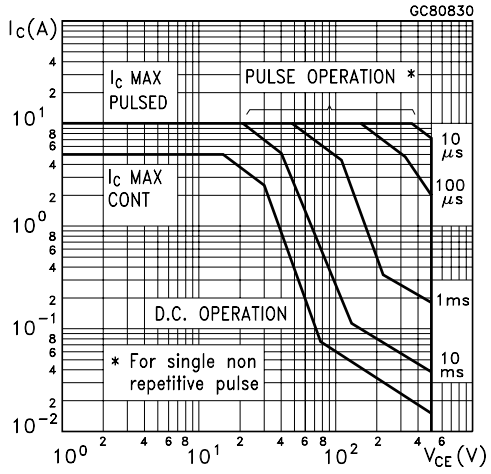
$R_{thj\text{-}case}$	Thermal Resistance Junction-Case	Max	1.65	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-Ambient	Max	62.5	°C/W

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

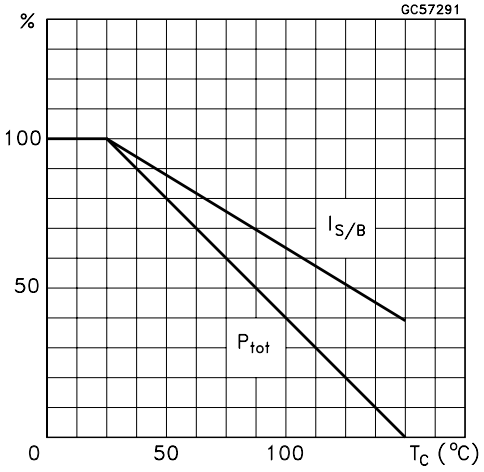
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current (V_{BE} = 0)	V_{CE} = 1000 V V_{CE} = 1000 V T_j = 125 °C			100 500	µA µA
I_{CEO}	Collector Cut-off Current (I_B = 0)	V_{CE} = 500 V			250	µA
$V_{CEO(sus)}$*	Collector-Emitter Sustaining Voltage (I_B = 0)	I_C = 100 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 Ω V_{CL} = 250 V L = 200 µH (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 $V_{BE(off)}$ = -5V R_{BB} = 0 Ω V_{CL} = 250 V L = 200 µH T_j = 125 °C (see figure 1)		 1.8 150		 µs ns

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

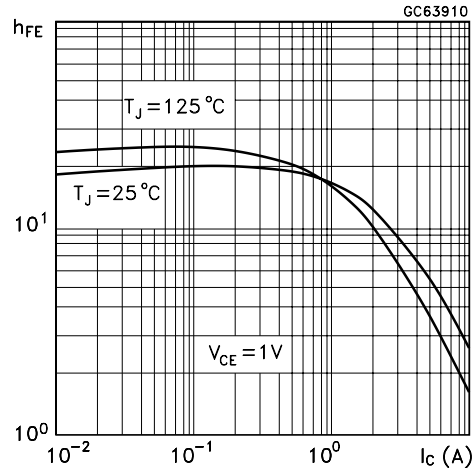
Safe Operating Areas



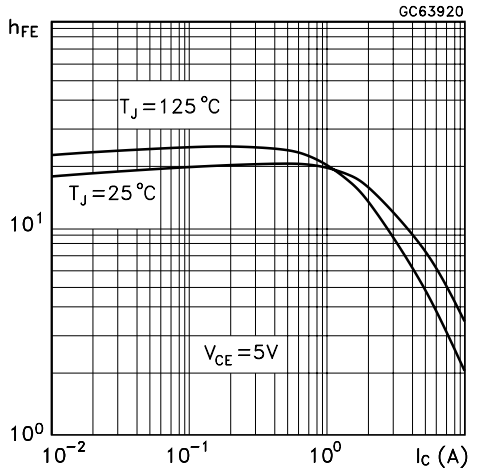
Derating Curve



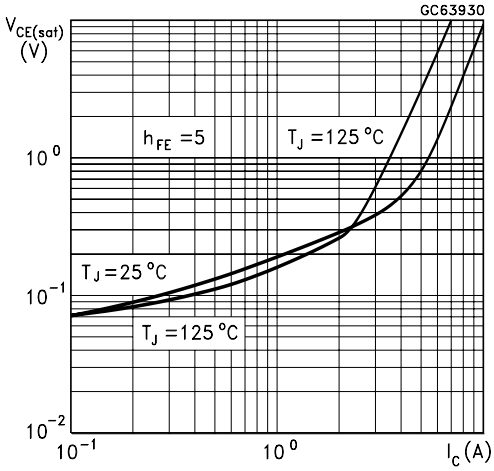
DC Current Gain



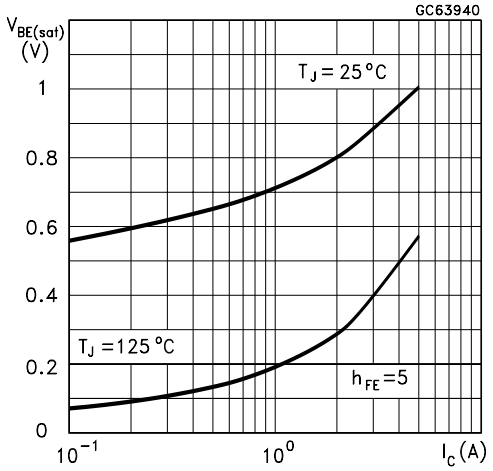
DC Current Gain



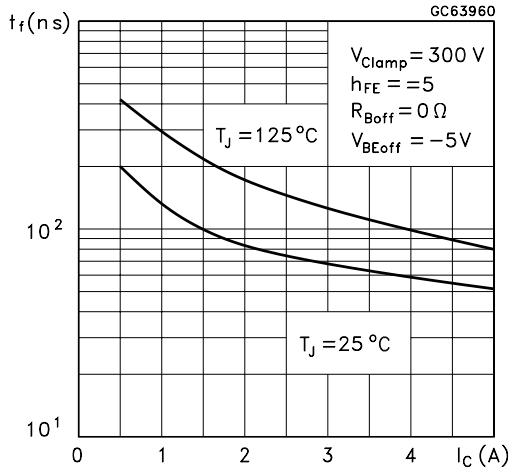
Collector Emitter Saturation Voltage



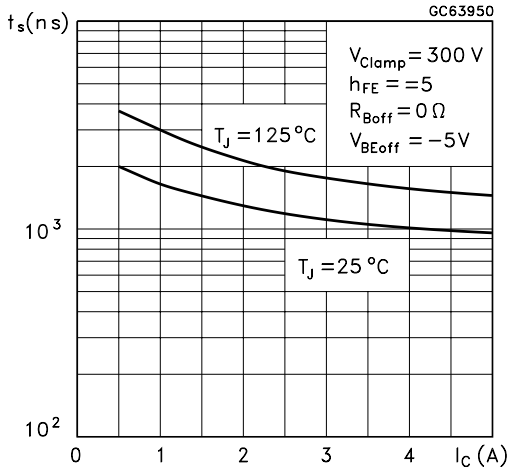
Base Emitter Saturation Voltage



Inductive Load Fall Time



Inductive Load Storage Time



Reverse Biased SOA

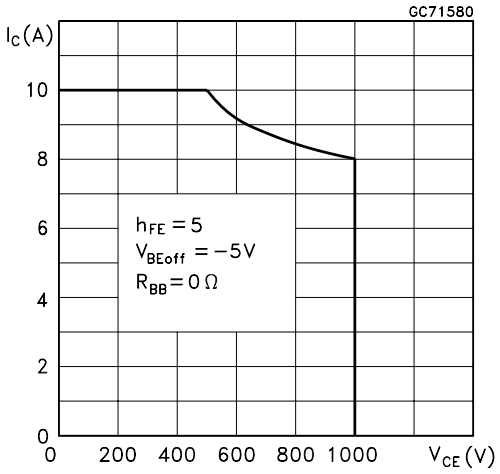
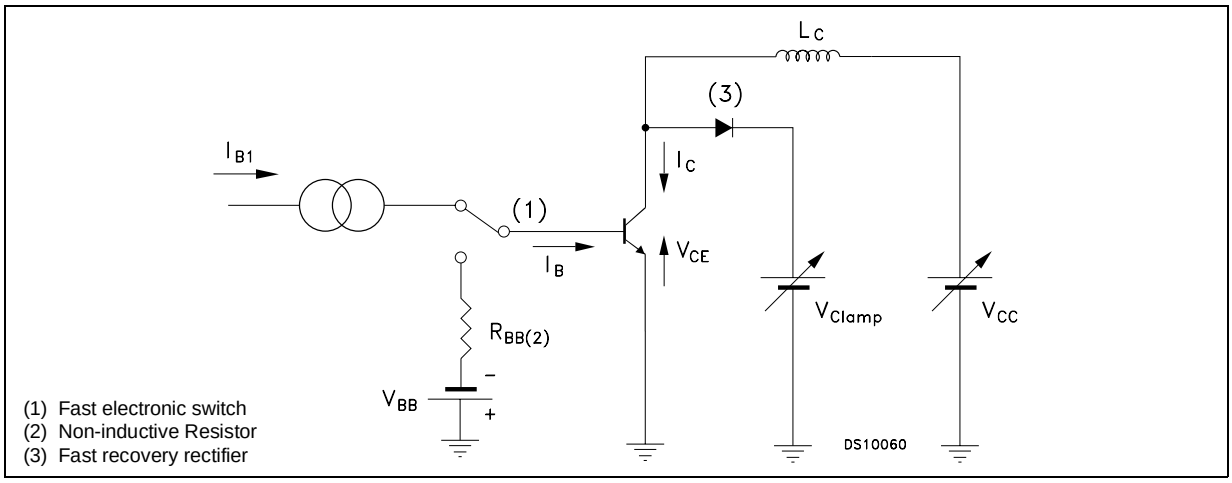
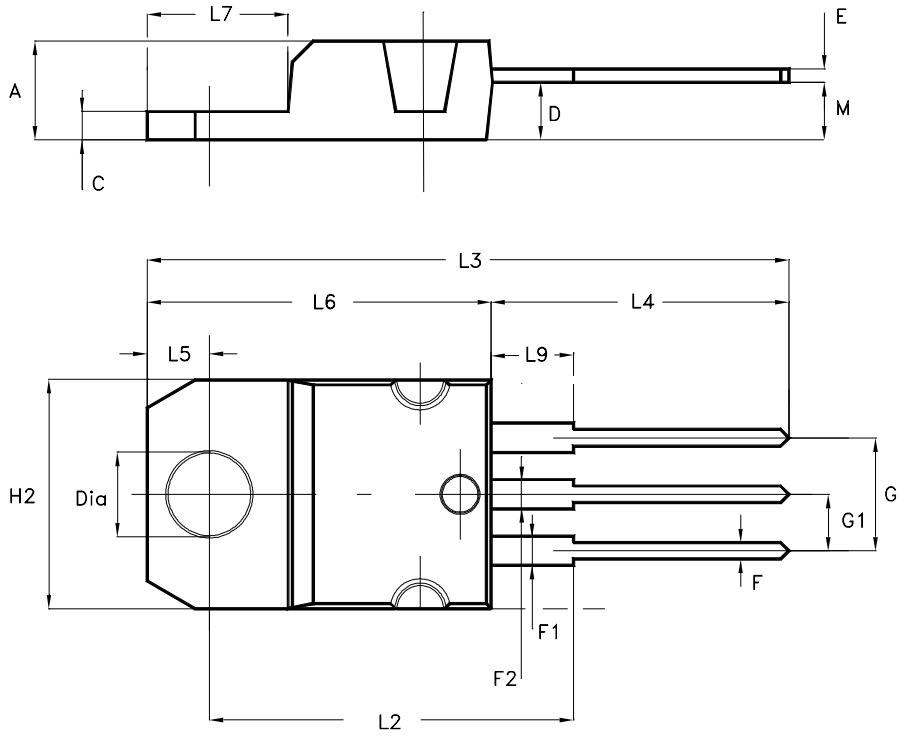


Figure 1: Inductive Load Switching Test Circuit



TO-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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