SGS-THOMSON MICROELECTRONICS

BUL128FP

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- SGS-THOMSON PREFERRED SALESTYPE
- NPN TRANSISTOR
- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED

APPLICATIONS:

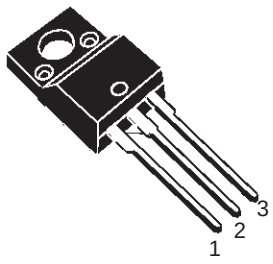
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING

DESCRIPTION

The device is manufactured using high voltage Multi Epitaxial Planar technology for high switching speeds and medium voltage capability.

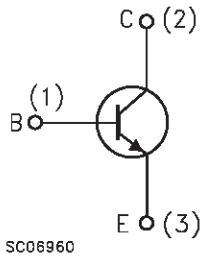
It uses a Cellular Emitter structure with planar edge termination to enhance switching speeds while maintaining the wide RBSOA.

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



TO-220FP

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CES}	Collector-Emitter Voltage (V_{BE} = 0)	700	V
V_{CEO}	Collector-Emitter Voltage (I_B = 0)	400	V
V_{EBO}	Emitter-Base Voltage (I_C = 0)	9	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	31	W
T_{stg}	Storage Temperature	-65 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C

THERMAL DATA

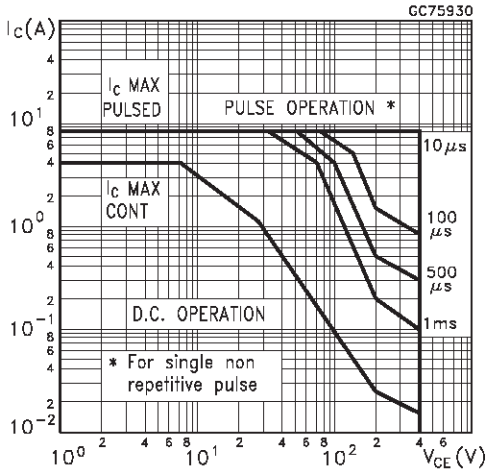
$R_{thj\text{-}case}$	Thermal Resistance Junction-Case Max	4.1	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-Ambient Max	62.5	°C/W

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

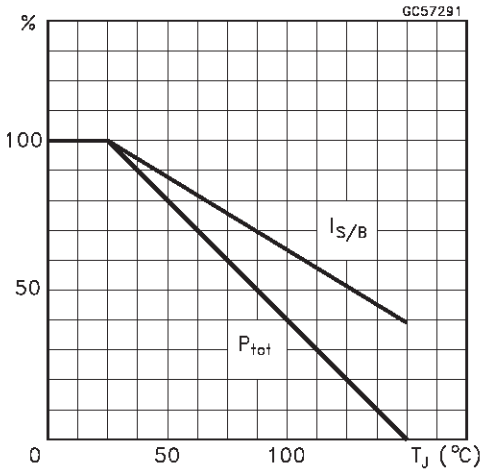
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current (V_{BE} = -1.5 V)	V_{CE} = 700 V V_{CE} = 700 V T_j = 125 °C			100 500	µA µA
V_{EBO}	Emitter-Base Voltage	I_E = 10 mA	9			V
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage	I_C = 100 mA L = 25 mH	400			V
I_{CEO}	Collector Cut-Off Current (I_B = 0)	V_{CE} = 400 V			250	µA
$V_{CE(sat)}$*	Collector-Emitter Saturation Voltage	I_C = 0.5 A I_B = 0.1 A I_C = 1 A I_B = 0.2 A I_C = 2.5 A I_B = 0.5 A I_C = 4 A I_B = 1 A		 0.5	0.7 1 1.5 	V V V V
$V_{BE(sat)}$*	Base-Emitter Saturation Voltage	I_C = 0.5 A I_B = 0.1 A I_C = 1 A I_B = 0.2 A I_C = 2.5 A I_B = 0.5 A			1.1 1.2 1.3	V V V
h_{FE}*	DC Current Gain	I_C = 10 mA V_{CE} = 5 V I_C = 1 A V_{CE} = 5 V I_C = 2 A V_{CE} = 5 V	10 15 14		 45 40	
t_s t_f	RESISTIVE LOAD Storage Time Fall Time	V_{CC} = 125 V I_C = 2 A I_{B1} = 0.4 A I_{B2} = -0.4 A T_p = 30 µs (see fig.2)	 1.9	 0.2	 2.9 0.4	 µs µs
t_s t_f	INDUCTIVE LOAD Storage Time Fall Time	I_C = 2 A I_{B1} = 0.4 A V_{BEoff} = -5 V R_{BB} = 0 Ω V_{clamp} = 200 V (see fig.1)		 0.6 0.1	 1 0.2	 µs µs

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

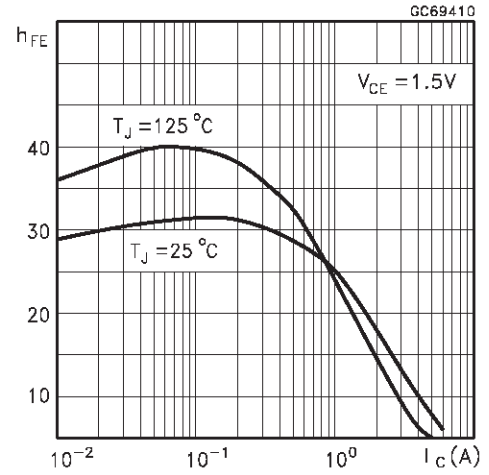
Safe Operating Areas



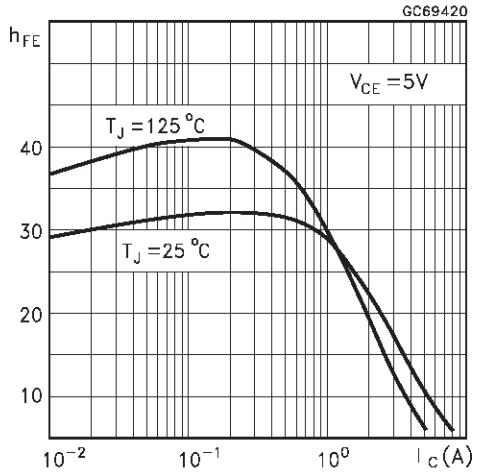
Derating Curve



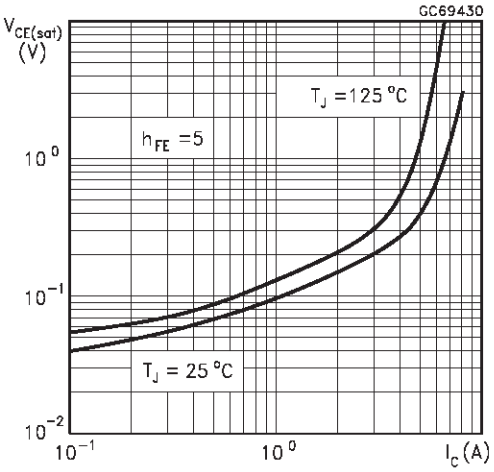
DC Current Gain



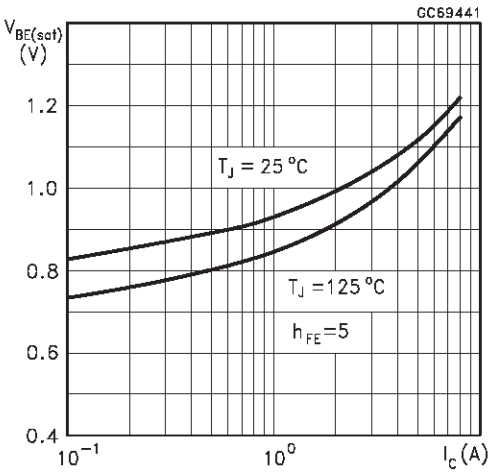
DC Current Gain



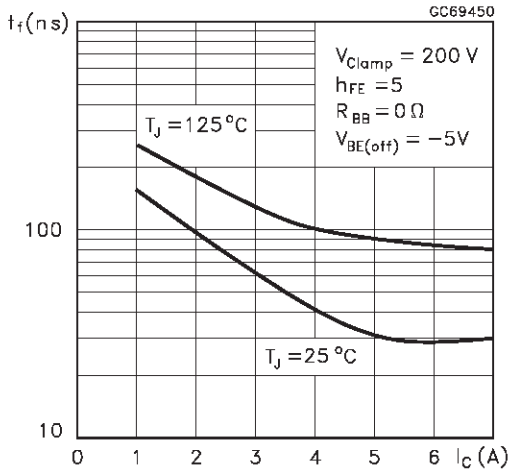
Collector Emitter Saturation Voltage



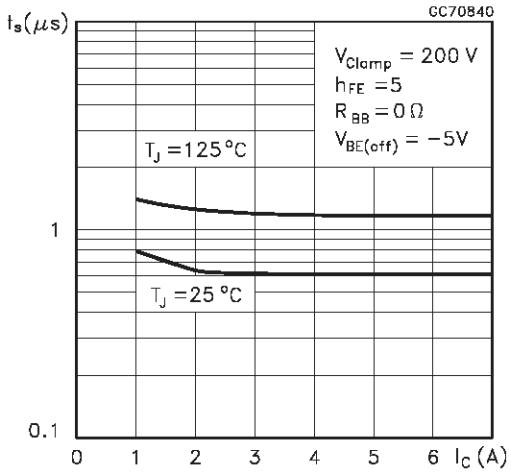
Base Emitter Saturation Voltage



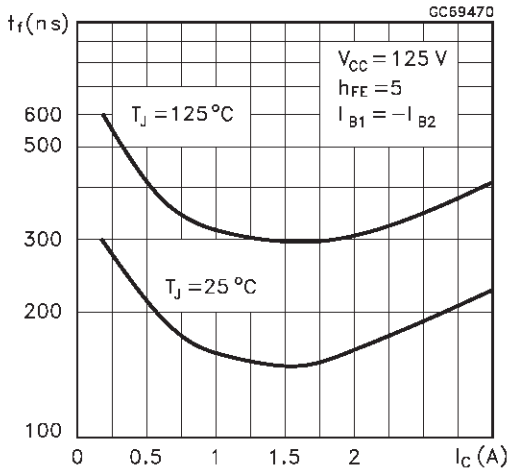
Inductive Fall Time



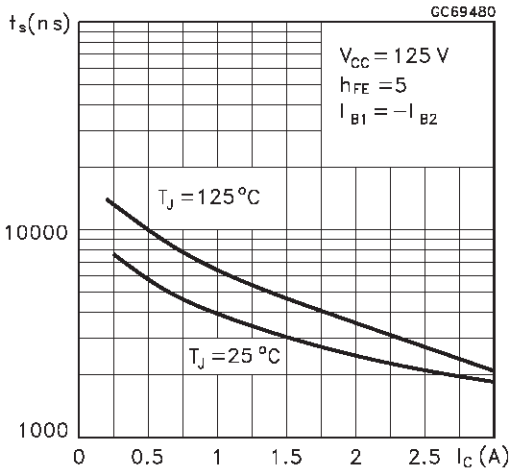
Inductive Storage Time



Resistive Fall Time



Resistive Load Storage Time



Reverse Biased SOA

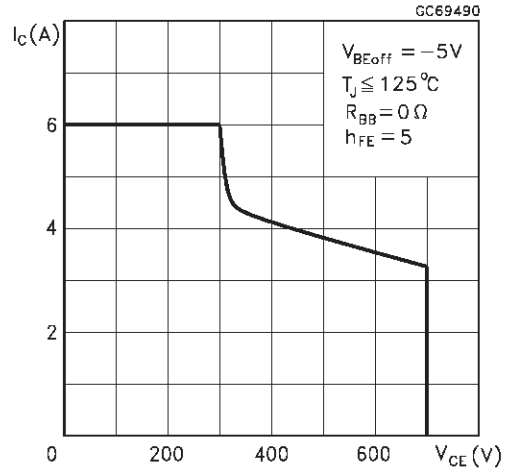
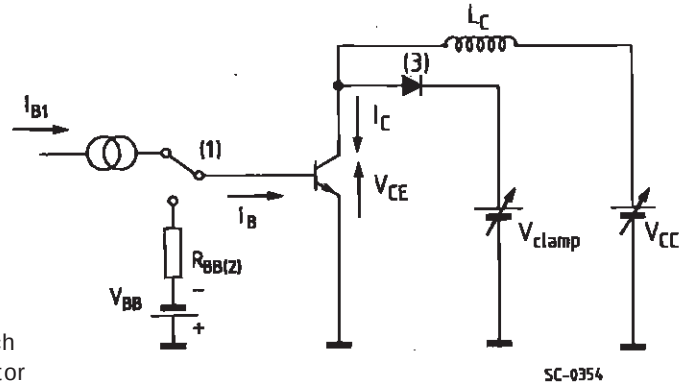
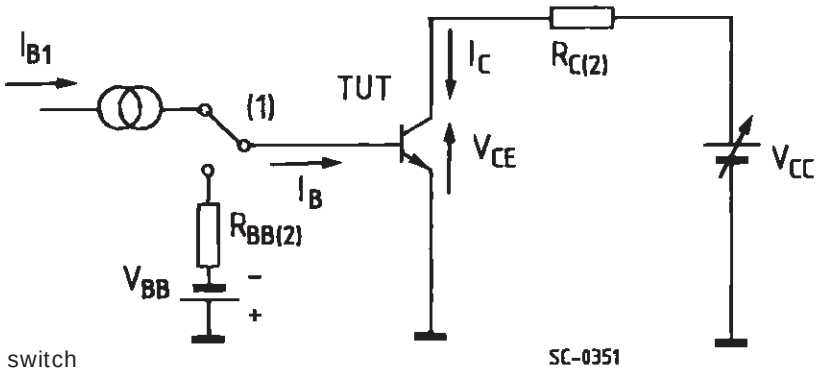


Figure 1: Inductive Load Switching Test Circuit.



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

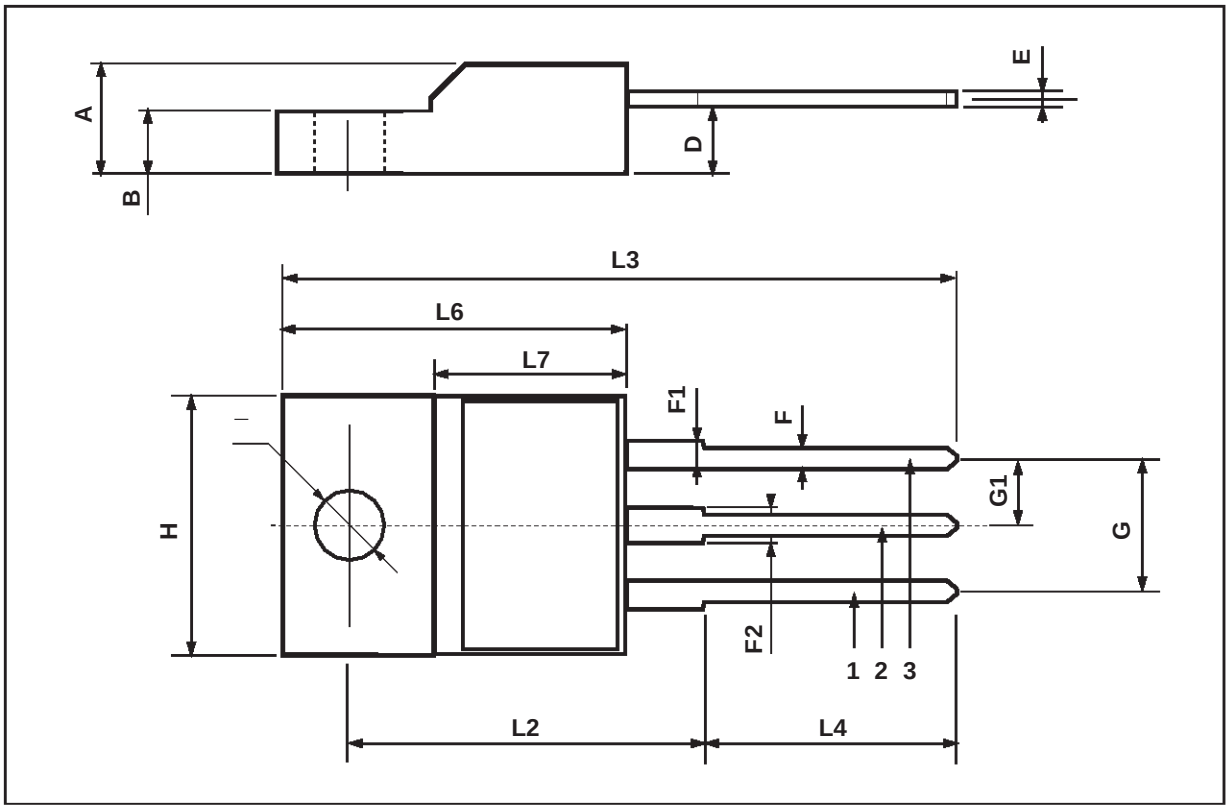
Figure 2: Resistive Load Switching Test Circuit.



1) Fast electronic switch
2) Non-inductive Resistor

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



. . .