Suntac ELECTRONIC CORP

BUL128

High Voltage Fast-Switching NPN Power Transistor

- NPN TRANSISTOR
- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- VERY HIGH SWITCHING SPEED
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
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APPLICATIONS:

- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING

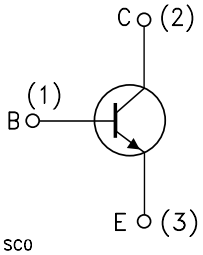
DESCRIPTION

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

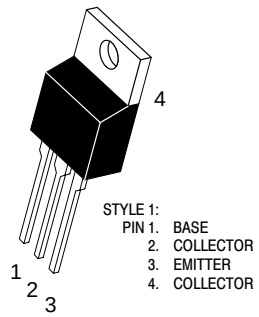
It uses a Cellular Emitter structure with planar edge termination to enhance switching speeds while maintaining the wide RBSOA.

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

INTERNAL SCHEMATIC DIAGR



SCO



TO-220

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

THERMAL DATA

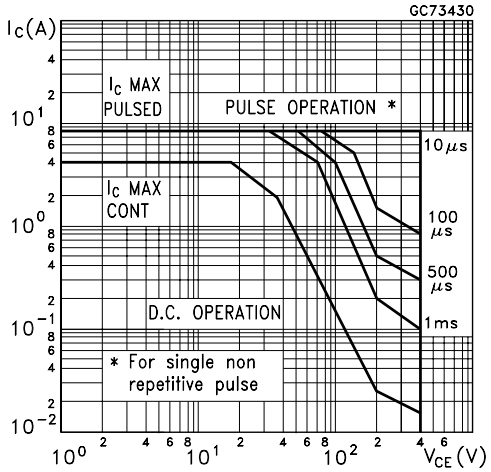
$R_{thj\text{-}case}$	Thermal Resistance Junction-Case Max	1.78	$^oC/W$
$R_{thj\text{-}amb}$	Thermal Resistance Junction-Ambient Max	62.5	$^oC/W$

ELECTRICAL CHARACTERISTICS (T_{case} = 25 ^oC unless otherwise specified)

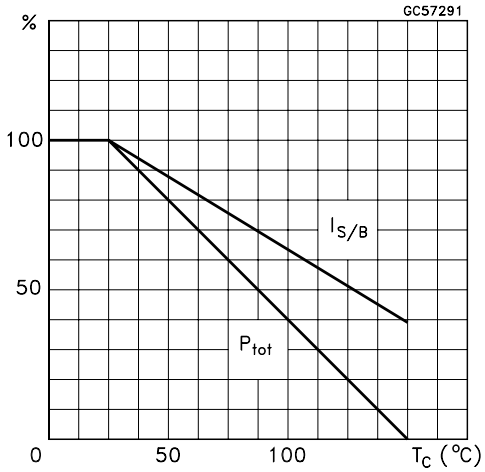
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current (V_{BE} = -1.5 V)	V_{CE} = 700 V V_{CE} = 700 V T_j = 125 ^oC			100 500	µA µA
V_{EBO}	Emitter-Base Voltage (I_C = 0)	I_E = 10 mA	9			V
$V_{CEO(sus)}$*	Collector-Emitter Sustaining Voltage (I_B = 0)	I_C = 100 mA L = 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 = 2 A V_{CE} = 5 V Group A Group B	10 14 25		 28 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)	 1.5	 0.2	 3 0.4	 µs µs
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_{clamp} = 200 V (see fig.1)		 0.6 0.1	 1 0.2	 µs µs

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

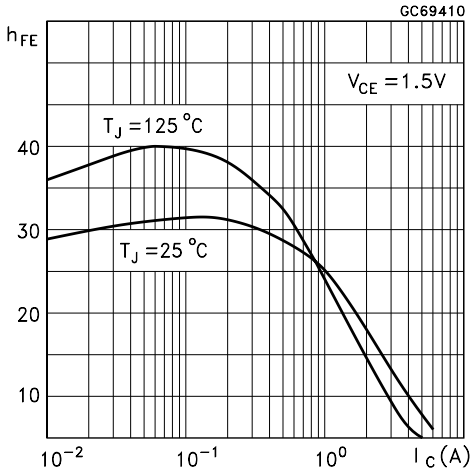
Safe Operating Areas



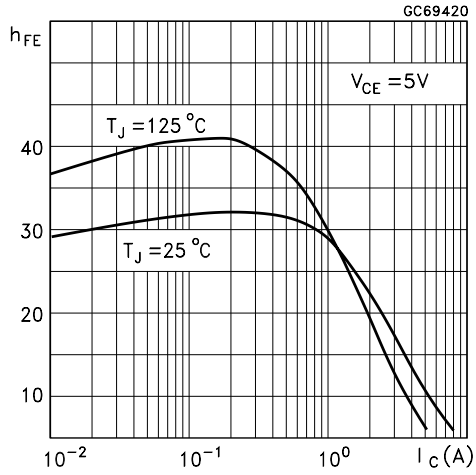
Derating Curve



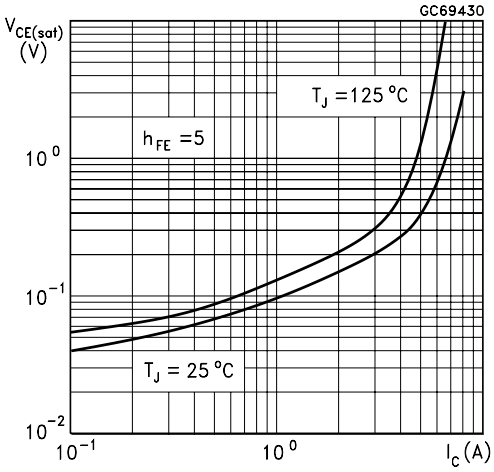
DC Current Gain



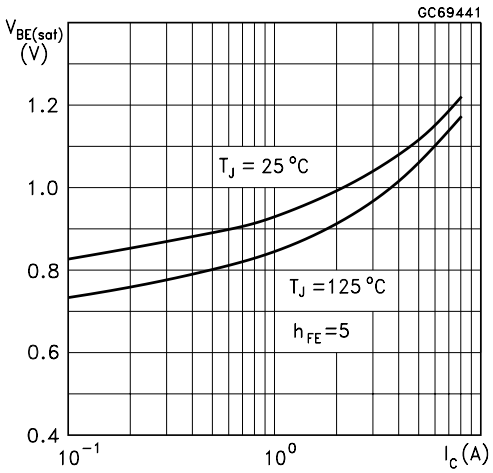
DC Current Gain



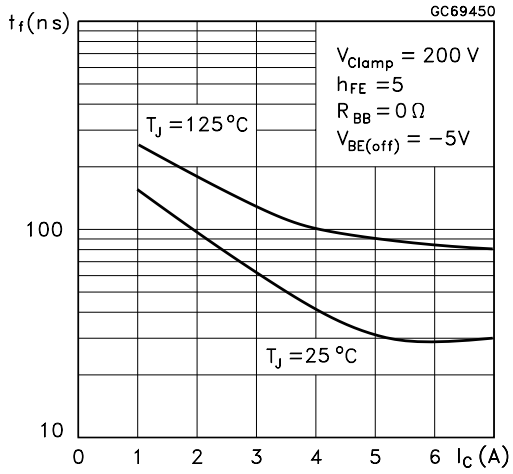
Collector Emitter Saturation Voltage



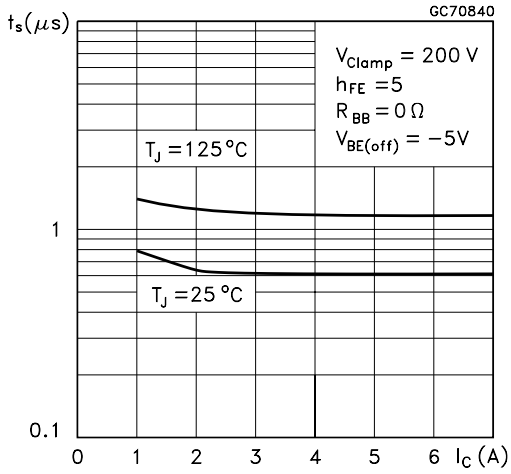
Base Emitter Saturation Voltage



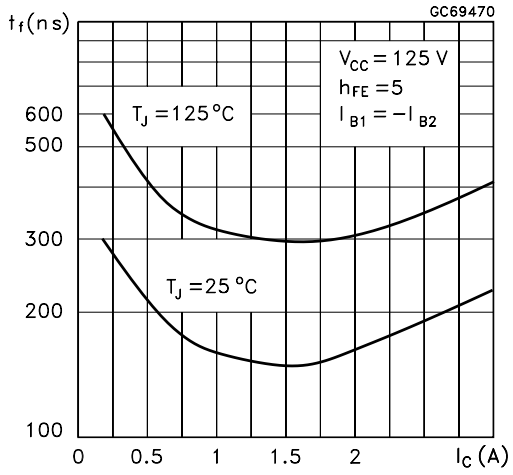
Inductive Load Fall Time



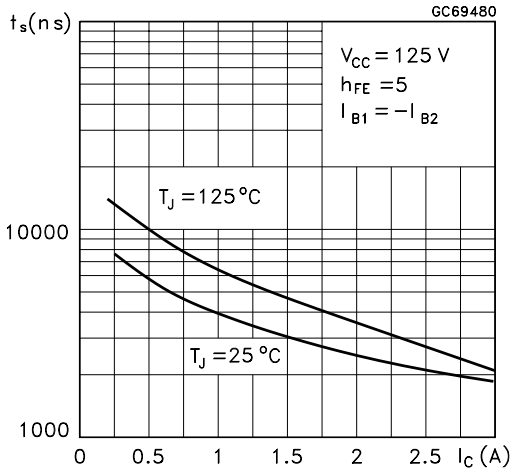
Inductive Load Storage Time



Resistive Load Fall Time



Resistive Load Storage Time



Reverse Biased SOA

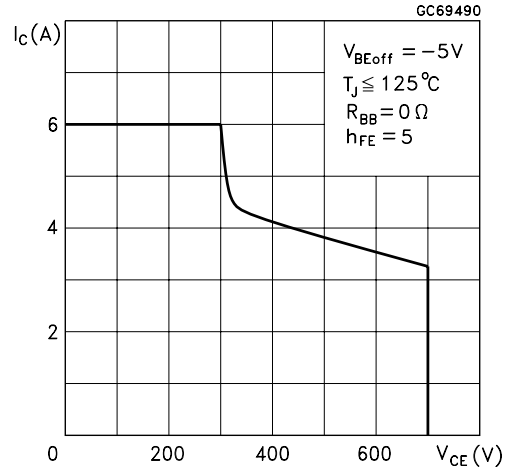


Figure 1: Inductive Load Switching Test Circuit.

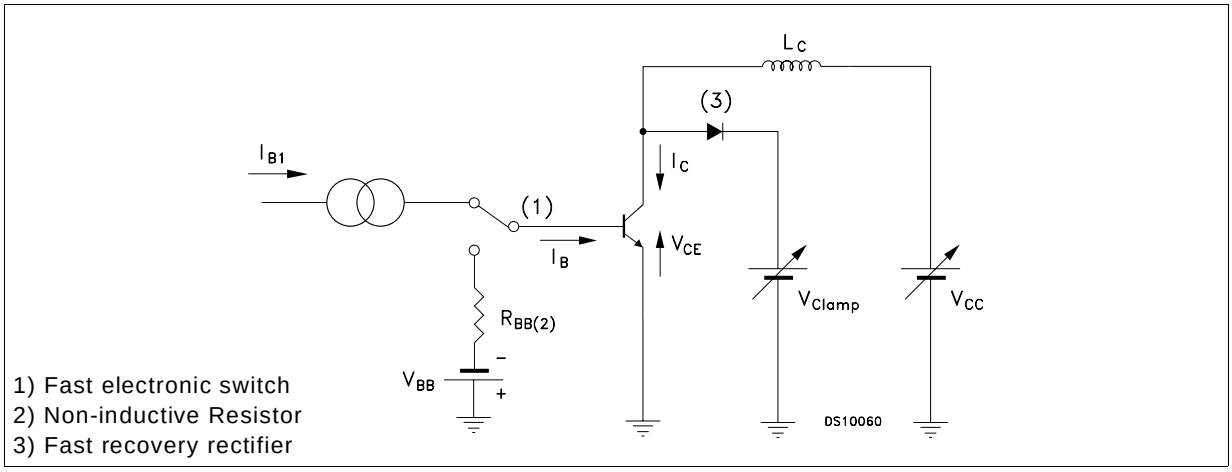


Figure 2: Resistive Load Switching Test Circuit.