SGS-THOMSON MICROELECTRONICS

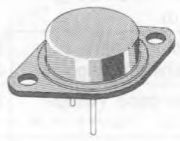
BUX348

FAST SWITCHING POWER TRANSISTOR

- HIGH VOLTAGE
- FAST SWITCHING
- OFF-LINE APPLICATIONS TO 380V

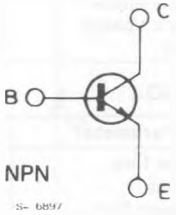
INDUSTRIAL APPLICATIONS :

- SWITCH MODE POWER SUPPLY
- UNINTERRUPTABLE POWER SUPPLY
- DC AND AC MOTOR CONTROL



TO-3

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CEV}	Collector-emitter Voltage (V_{BE} = – 1.5V)	850	V
V_{CEO}	Collector-emitter Voltage (I_B = 0)	450	V
V_{EBO}	Emitter-base Voltage (I_C = 0)	7	V
I_C	Collector Current	45	A
I_{CM}	Collector Peak Current	60	A
I_B	Base Current	9	A
I_{BM}	Base Peak Current	15	A
P_{tot}	Total Dissipation at T_c < 25°C	300	W
T_{stg}	Storage Temperature	– 65 to 200	°C
T_j	Max. Operating Junction Temperature	200	°C

THERMAL DATA

$R_{thj\text{-}case}$	Thermal Resistance Junction-case	Max	0.58	°C/W

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CER}	Collector Cutoff Current (R_{BE} = 5Ω)	$V_{CE} = V_{CEV}$ $V_{CE} = V_{CEV}$ T_c = 100°C			0.4 2	mA mA
I_{CEV}	Collector Cutoff Current	$V_{CE} = V_{CEV}$ V_{BE} = − 1.5V $V_{CE} = V_{CEV}$ V_{BE} = − 1.5V T_c = 100°C			0.4 2	mA mA
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EB} = 5V			2	mA
$V_{CEO(sus)}$*	Collector Emitter Sustaining Voltage	I_C = 0.2A L = 25mH	450			V
V_{EBO}	Emitter-base Voltage (I_C = 0)	I_E = 100mA	7			V
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	I_C = 30A I_B = 6A I_C = 30A I_B = 6A T_j = 100°C		0.7 1.35	0.9 2	V V
$V_{BE(sat)}$*	Base-emitter Saturation Voltage	I_C = 30A I_B = 6A I_C = 30A I_B = 6A T_j = 100°C		1.12 1.1	1.5 1.5	V V
di_C/dt	Rated of Rise of on-state Collector Current	V_{CC} = 300V R_C = 0 I_{B1} = 9A t_p = 3µs T_j = 100°C See fig.1	150	250		A/µs
$V_{CE(3\mu s)}$	Collector-emitter Dynamic Voltage Current	V_{CC} = 300V I_{B1} = 9A R_C = 10Ω T_j = 100°C See fig.1		4.4	8	V
$V_{CE(5\mu s)}$	Collector-emitter Dynamic Voltage Current	V_{CC} = 300V I_{B1} = 9A R_C = 10Ω T_j = 100°C See fig.1		2.3	4	V

INDUCTIVE LOAD

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_s t_f t_c	Storage Time Fall Time Crossover Time	V_{CC} = 50V V_{clamp} = 450V I_C = 30A I_B = 6A V_{BB} = - 5V R_{BB} = 0.4Ω L_C = 80µH T_j = 100°C See fig.2		2.75 0.12 0.44	4.5 0.4 0.7	µs µs µs
V_{CEW}	Maximum Collector Emitter Voltage without Snubber	V_{CC} = 50V I_{CWoff} = 45A V_{BB} = - 5V I_{B1} = 6A L_C = 55µH R_{BB} = 0.4Ω T_j = 125°C See fig.2	450			V

Figure 1 : Turn-on Switching Characteristics.

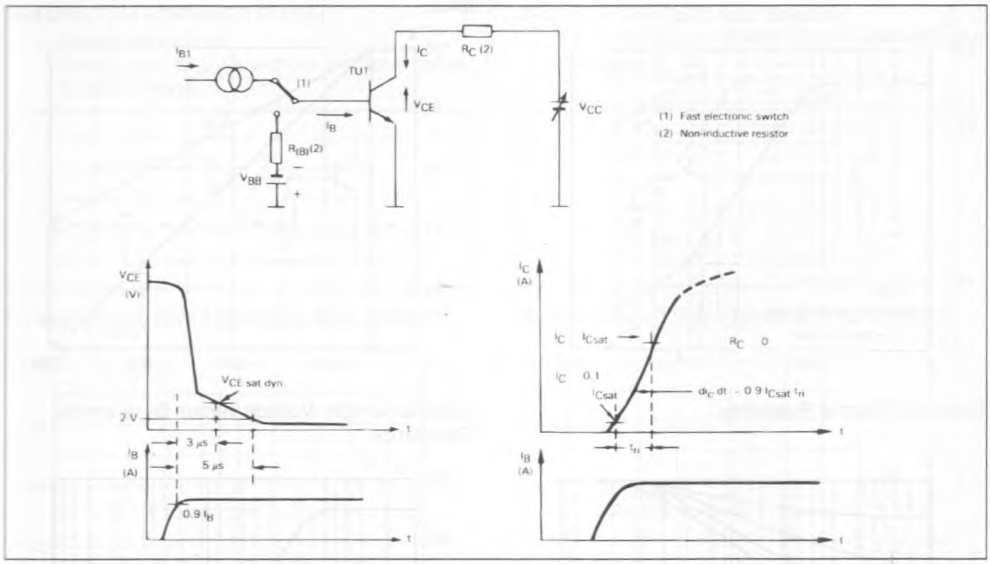


Figure 2a : Turn-off Switching Test Circuit.

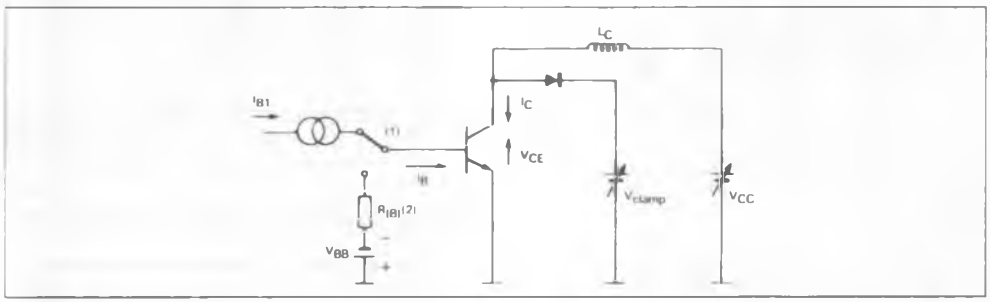
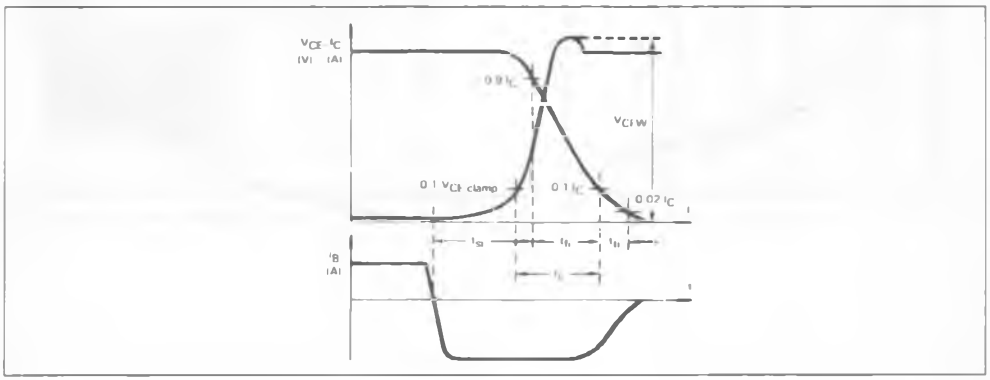
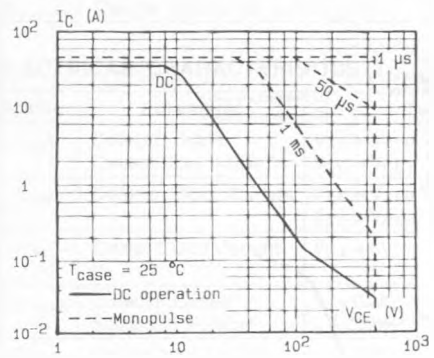


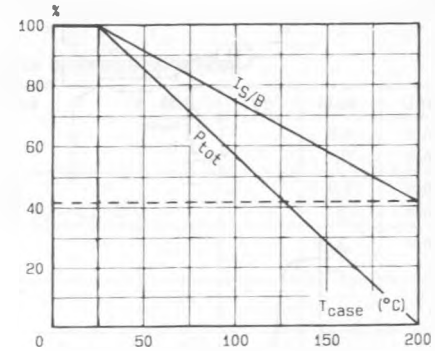
Figure 2b : Turn-off Switching Waveforms (inductive load).



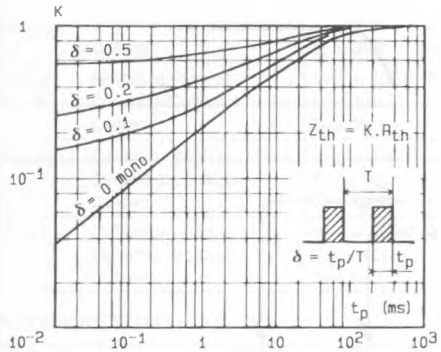
DC and AC Pulse Area.



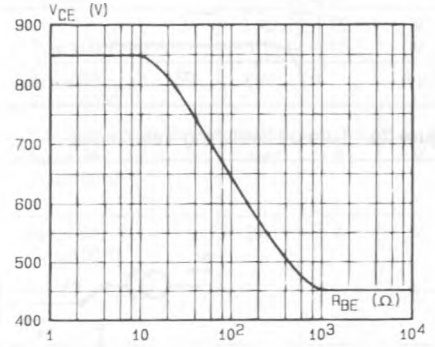
Power and $I_{S/B}$ Derating versus Case Temperature.



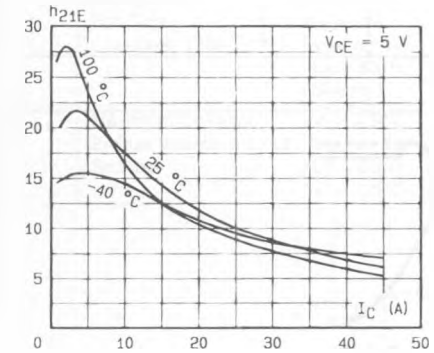
Transient Thermal Response.



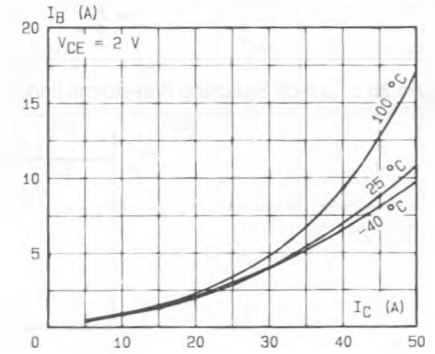
Collector-emitter Voltage versus Base-emitter Resistance.



DC Current Gain.



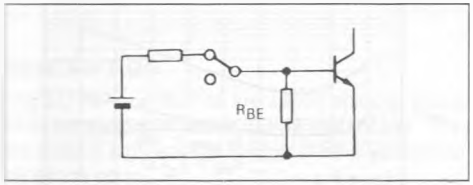
Minimum Base Current to Saturate the Transistor.



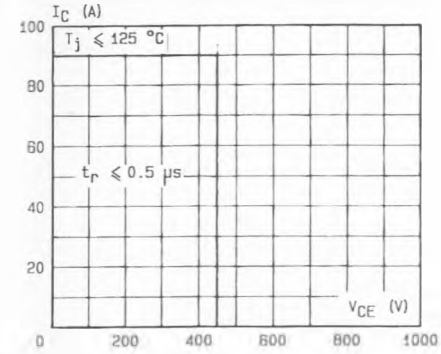
SWITCHING OPERATING AND OVERLOAD AREAS

TRANSISTOR FORWARD BIASED

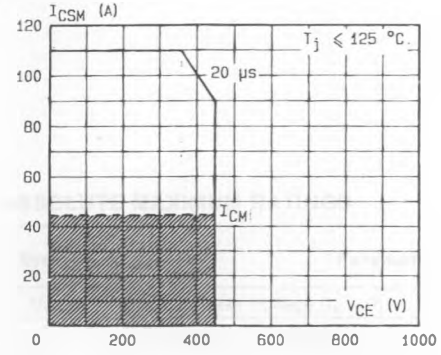
- During the turn-on
- During the turn-off without negative base-emitter voltage.



Forward Biased Safe Operationg Area (FBSOA).

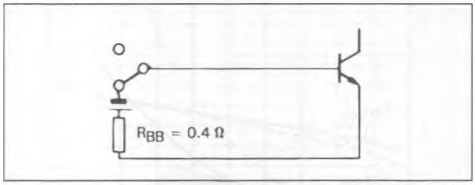


Forward Biased Accidental Overload Area (FBAOA).

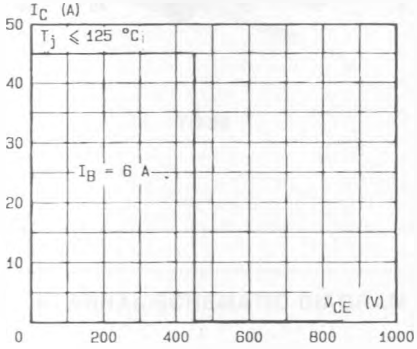


TRANSISTOR REVERSE BIASED

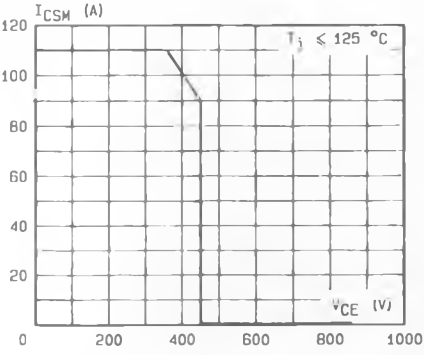
- During the turn-off with negative base-emitter voltage.



Reverse Biased Safe Operating Area (RBSOA).

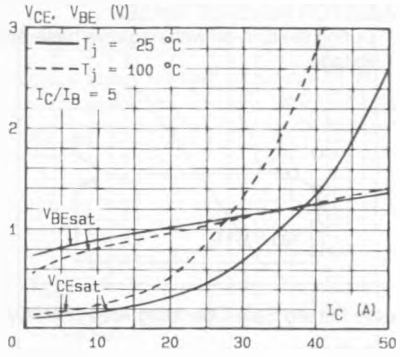


Reverse Biased Accidental Overload Area (RBAOA).



High accidental surge currents ($I > I_{CM}$) are allowed if they are non repetitive and applied less than 3000 times during the component life.

Saturation Voltage.



Switching Times versus Collector Current.