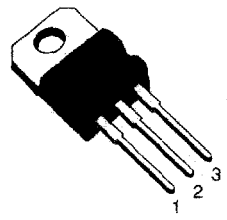
SGS-THOMSON MICROELECTRONICS

BUL381D
BUL382D

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTORS

- SGS-THOMSON PREFERRED SALESTYPES
- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- LARGE RBSOA
- INTEGRATED ANTIPARALLEL COLLECTOR-EMITTER DIODE



TO-220

APPLICATIONS

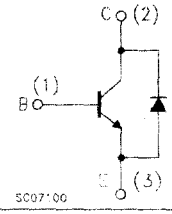
- ELECTRONIC TRANSFORMERS FOR HALOGEN LAMPS
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES

DESCRIPTION

The BUL381D and BUL382D are manufactured using high voltage Multi Epitaxial Planar technology for high switching speeds and high voltage capability.

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)	800	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	5	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

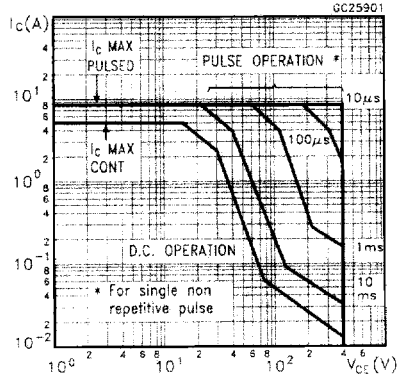
$R_{thj\text{-}case}$	Thermal Resistance Junction-Case	Max	1.78	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-Ambient	Max	62.5	°C/W

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

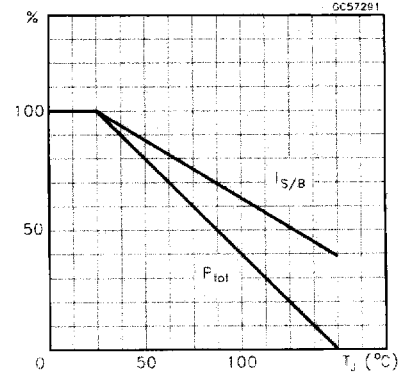
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current (V_{BE} = 0)	V_{CE} = 800 V V_{CE} = 800 V T_j = 125 °C			100 500	µA µA
I_{CEO}	Collector Cut-off Current (I_B = 0)	V_{CE} = 400 V			250	µA
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage	I_C = 100 mA L = 25 mH	400			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 = 0.75 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			1.1 1.2	V V
h_{FE}*	DC Current Gain	I_C = 2 A V_{CE} = 5 V I_C = 10 mA V_{CE} = 5 V	8 10			
	RESISTIVE LOAD	I_C = 2 A V_{CC} = 250 V t_p = 30 µs I_{B1} = 0.4 A I_{B2} = -0.4 V				
t_s	Storage Time	for **BUL381D**	1.5		2.5	µs
t_s	Storage Time	for **BUL382D**	2		3	µs
t_f	Fall Time	for **all**			0.8	µs
	INDUCTIVE LOAD	I_C = 2 A I_{B1} = 0.4 A				
t_s	Storage Time	$V_{BE(off)}$ = -5 V R_{BB} = 0 Ω		1.3		µs
t_f	Fall Time	V_{CL} = 250 V L = 200 µH T_j = 125 °C		100		µs
V_f	Diode Forward Voltage	I_C = 2 A			2.5	V

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

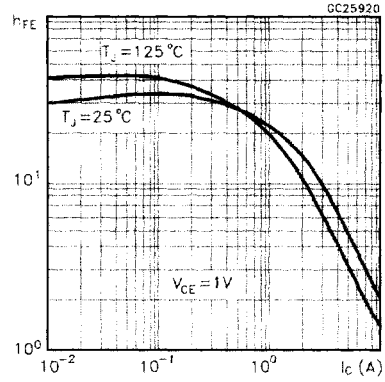
Safe Operating Areas



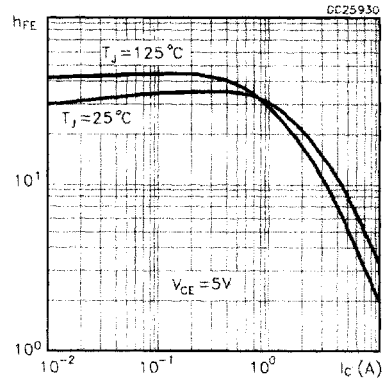
Derating Curve



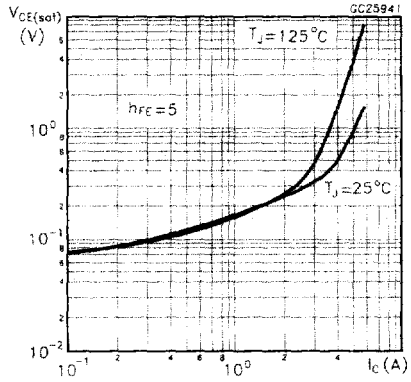
DC Current Gain



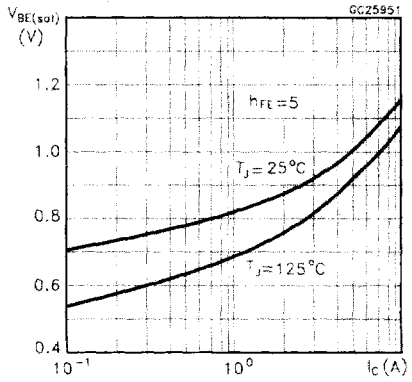
DC Current Gain



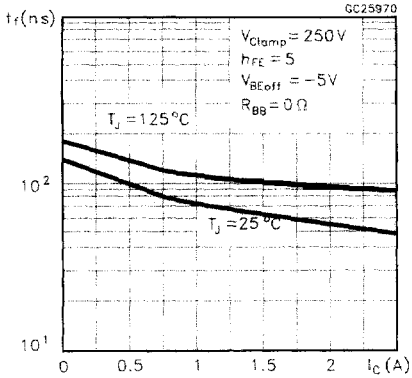
Collector Emitter Saturation Voltage



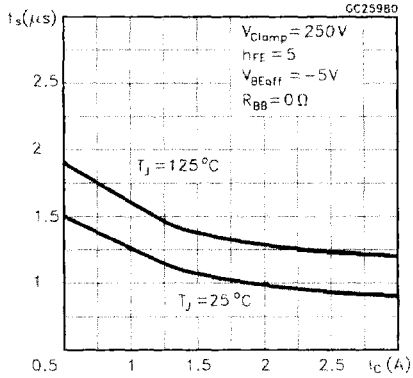
Base Emitter Saturation Voltage



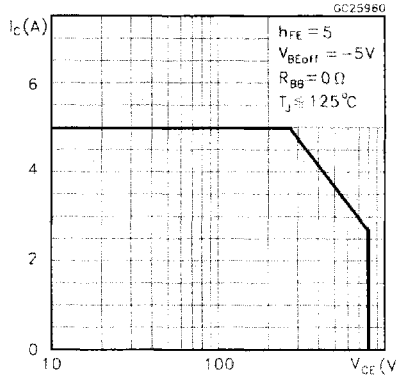
Inductive Fall Time



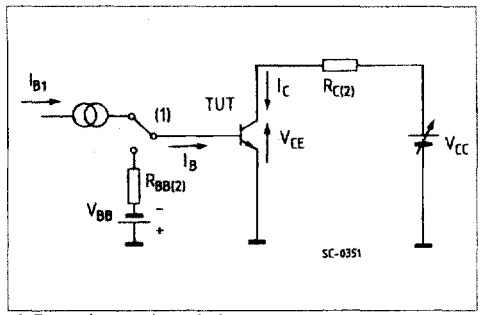
Inductive Storage Time



Reverse Biased SOA

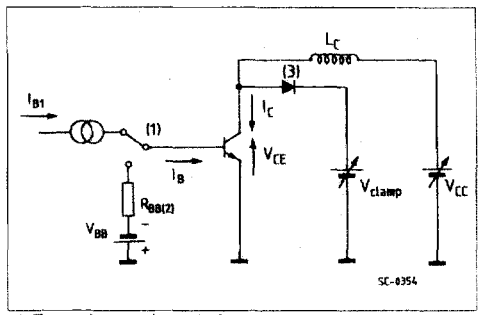


Resistive Load Switching Test Ciurcuit



1) Fast electronic switch
2) Non-inductive Resistor

RBSOA and Inductive Load Switching Test Circuits



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