

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

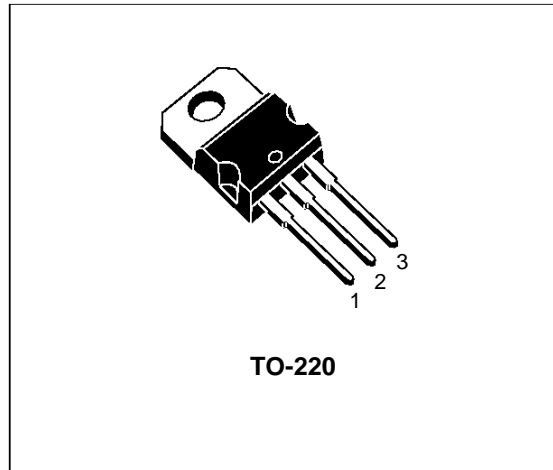
APPLICATIONS

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

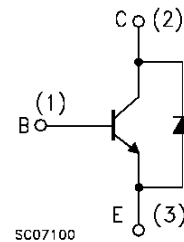
DESCRIPTION

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

BUL381D / BUL382D

THERMAL DATA

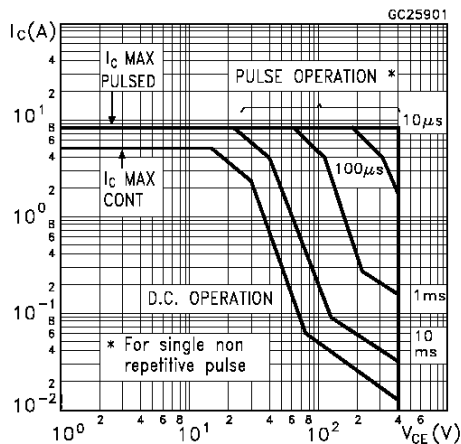
$R_{thj-case}$	Thermal Resistance Junction-Case	Max	1.78	$^{\circ}\text{C}/\text{W}$
$R_{thj-amb}$	Thermal Resistance Junction-Ambient	Max	62.5	$^{\circ}\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}\text{C}$ unless otherwise specified)

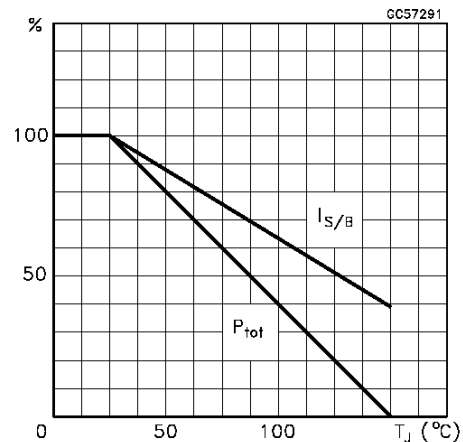
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current ($V_{BE} = 0$)	$V_{CE} = 800\text{ V}$ $V_{CE} = 800\text{ V}$ $T_j = 125^{\circ}\text{C}$			100 500	μA μA
I_{CEO}	Collector Cut-off Current ($I_B = 0$)	$V_{CE} = 400\text{ V}$			250	μA
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage	$I_C = 100\text{ mA}$ $L = 25\text{ mH}$	400			V
V_{EBO}	Emitter-Base Voltage ($I_C = 0$)	$I_E = 10\text{ mA}$	9			V
$V_{CE(sat)*}$	Collector-Emitter Saturation Voltage	$I_C = 1\text{ A}$ $I_B = 0.2\text{ A}$ $I_C = 2\text{ A}$ $I_B = 0.4\text{ A}$ $I_C = 3\text{ A}$ $I_B = 0.75\text{ A}$			0.5 0.7 1.1	V V V
$V_{BE(sat)*}$	Base-Emitter Saturation Voltage	$I_C = 1\text{ A}$ $I_B = 0.2\text{ A}$ $I_C = 2\text{ A}$ $I_B = 0.4\text{ A}$			1.1 1.2	V V
h_{FE*}	DC Current Gain	$I_C = 2\text{ A}$ $V_{CE} = 5\text{ V}$ $I_C = 10\text{ mA}$ $V_{CE} = 5\text{ V}$	8 10			
t_s t_s t_f	RESISTIVE LOAD Storage Time Storage Time Fall Time	$I_C = 2\text{ A}$ $V_{CC} = 250\text{ V}$ $t_p = 30\text{ }\mu\text{s}$ $I_{B1} = 0.4\text{ A}$ $I_{B2} = -0.4\text{ V}$ for BUL381D for BUL382D for all	1.5 2		2.5 3 0.8	μs μs μs
t_s t_f	INDUCTIVE LOAD Storage Time Fall Time	$I_C = 2\text{ A}$ $I_{B1} = 0.4\text{ A}$ $V_{BE(off)} = -5\text{ V}$ $R_{BB} = 0\text{ }\Omega$ $V_{CL} = 250\text{ V}$ $L = 200\text{ }\mu\text{H}$ $T_j = 125^{\circ}\text{C}$		1.3 100		μs μs
V_f	Diode Forward Voltage	$I_C = 2\text{ A}$			2.5	V

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

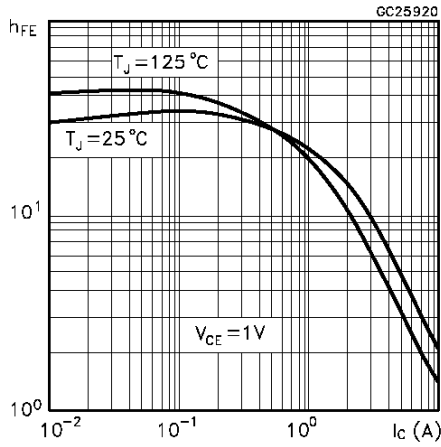
Safe Operating Areas



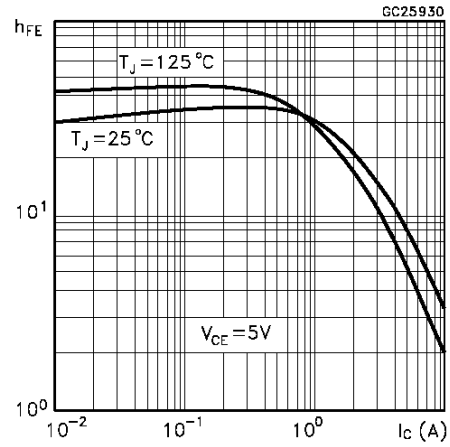
Derating Curve



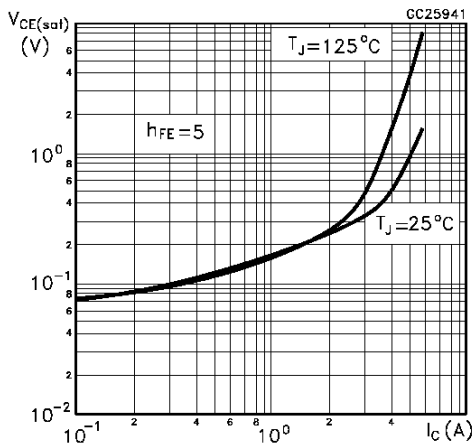
DC Current Gain



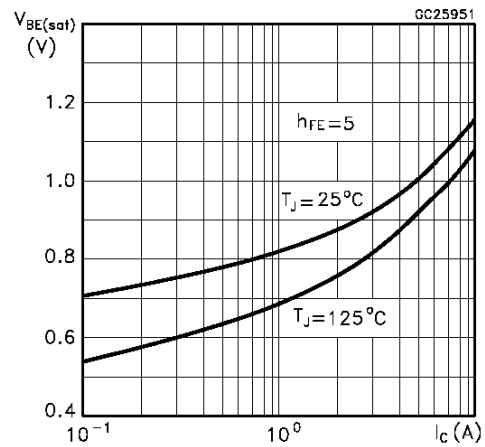
DC Current Gain



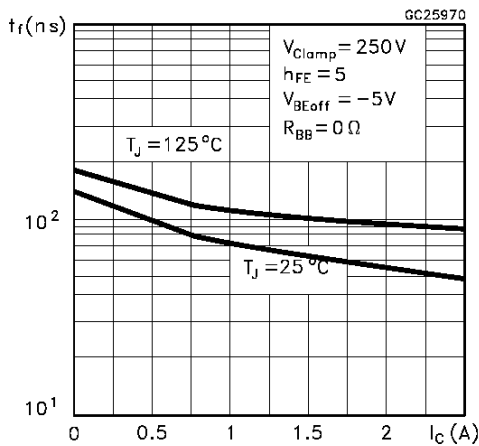
Collector Emitter Saturation Voltage



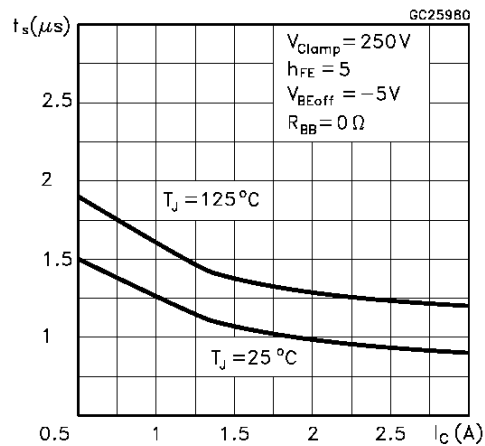
Base Emitter Saturation Voltage



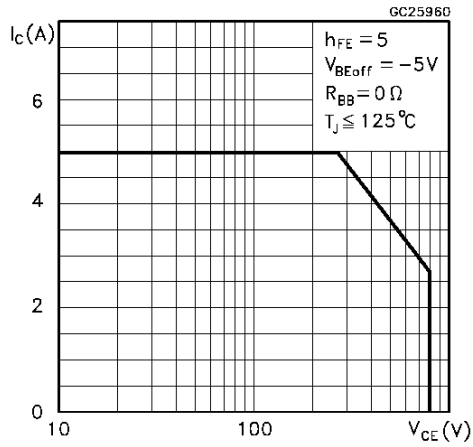
Inductive Fall Time



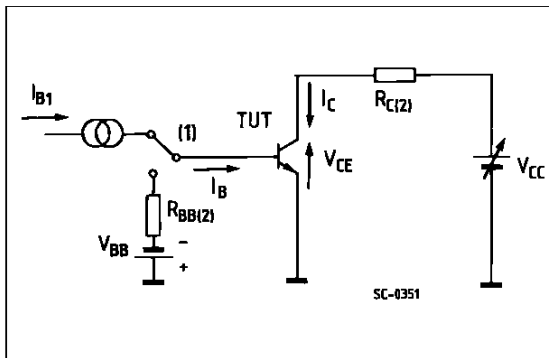
Inductive Storage Time



Reverse Biased SOA

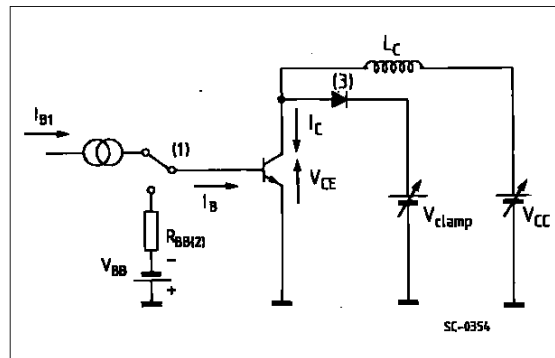


Resistive Load Switching Test Circuit



- 1) Fast electronic switch
- 2) Non-inductive Resistor

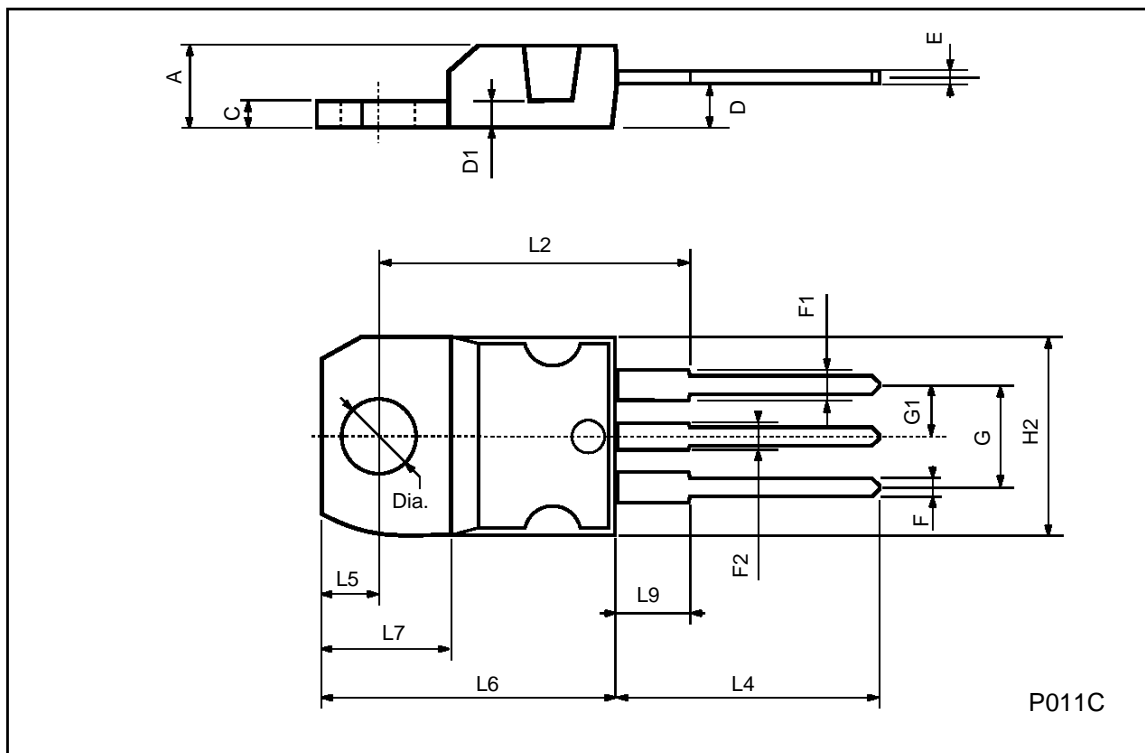
RBSOA and Inductive Load Switching Test Circuits



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

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		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
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		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



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