

## HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

PRELIMINARY DATA

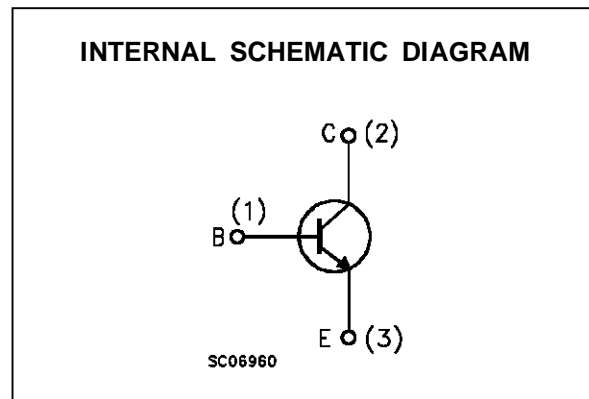
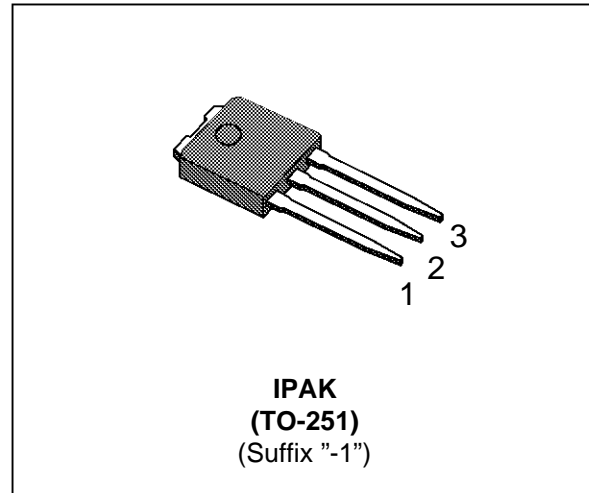
- SGS-THOMSON PREFERRED SALESTYPE
- HIGH VOLTAGE CAPABILITY
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- FULLY CHARACTERISED AT 125°C
- THROUGH-HOLE IPAK (TO-251) POWER PACKAGE IN TUBE (SUFFIX "-1")

### APPLICATIONS

- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES

### DESCRIPTION

The BULD38 is manufactured using high voltage Multipitaxial Mesa technology for cost-effective high performance. It uses a Hollow Emitter structure to enhance switching speeds. The BUL series is designed for use in lighting applications and low cost switch-mode power supplies.



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

# BULD38

## THERMAL DATA

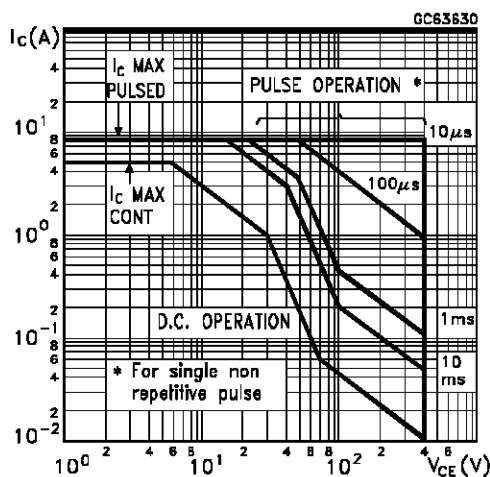
$R_{thj-case}$	Thermal Resistance Junction-case	Max	4.16	$^{\circ}C/W$
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	100	$^{\circ}C/W$

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

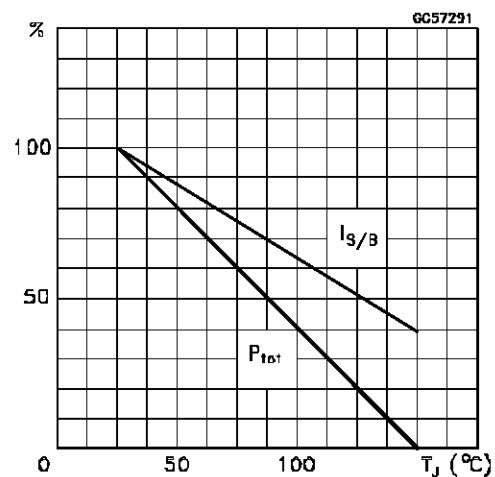
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CES}$	Collector Cut-off Current ( $V_{BE} = 0$ )	$V_{CE} = 800 V$			100	$\mu A$
		$V_{CE} = 800 V \quad T_j = 125^{\circ}C$			500	$\mu A$
$I_{CEO}$	Collector Cut-off Current ( $I_B = 0$ )	$V_{CE} = 400 V$			250	$\mu A$
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage	$I_C = 100 mA \quad L = 25 mH$	400			V
$V_{EBO}$	Emitter-Base Voltage	$I_E = 10 mA$	9			V
$V_{CE(sat)*}$	Collector-Emitter Saturation Voltage	$I_C = 1 A \quad I_B = 0.2 A$			0.5	V
		$I_C = 2 A \quad I_B = 0.4 A$			0.7	V
		$I_C = 3 A \quad I_B = 0.8 A$			1.1	V
$V_{BE(sat)*}$	Base-Emitter Saturation Voltage	$I_C = 1 A \quad I_B = 0.2 A$			1.1	V
		$I_C = 2 A \quad I_B = 0.4 A$			1.2	V
$h_{FE*}$	DC Current Gain	$I_C = 2 A \quad V_{CE} = 5 V$	8			
		$I_C = 10 mA \quad V_{CE} = 5 V$	10			
$t_s$ $t_f$	INDUCTIVE LOAD Storage Time Fall Time	$I_C = 2 A \quad I_{B1} = 0.4 A$ $V_{BE(off)} = -5 V \quad R_{BB} = 0 \Omega$ $V_{CL} = 250 V \quad L = 200 \mu H$		0.6 40	1.2 100	$\mu s$ ns
		$I_C = 2 A \quad I_{B1} = 0.4 A$ $V_{BE(off)} = -5 V \quad R_{BB} = 0 \Omega$ $V_{CL} = 250 V \quad L = 200 \mu H$ $T_j = 125^{\circ}C$		0.9 70		$\mu s$ ns

\* Pulsed: Pulse duration = 300  $\mu s$ , duty cycle 1.5 %

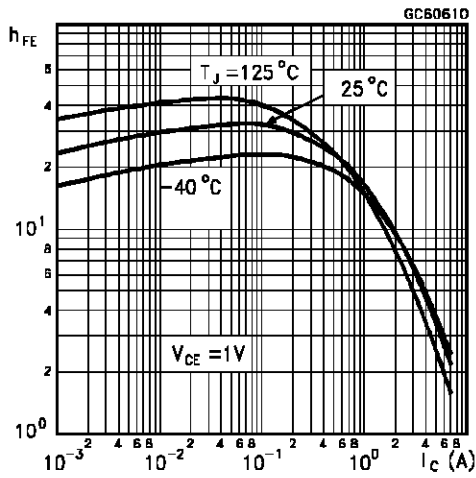
## Safe Operating Areas



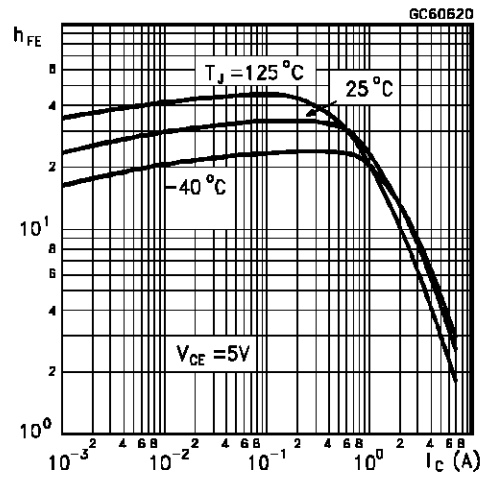
## Derating Curves



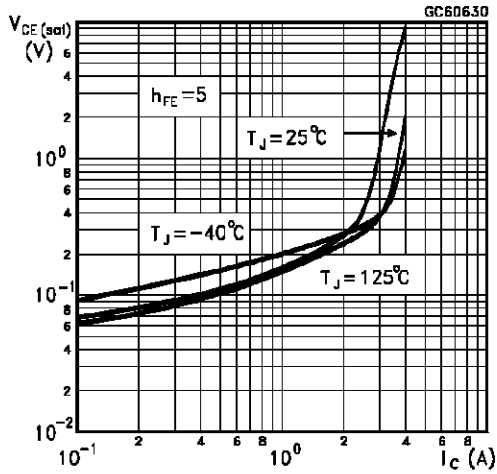
DC Current Gain



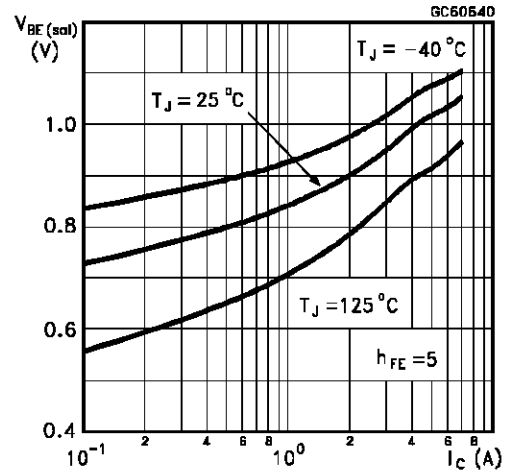
DC Current Gain



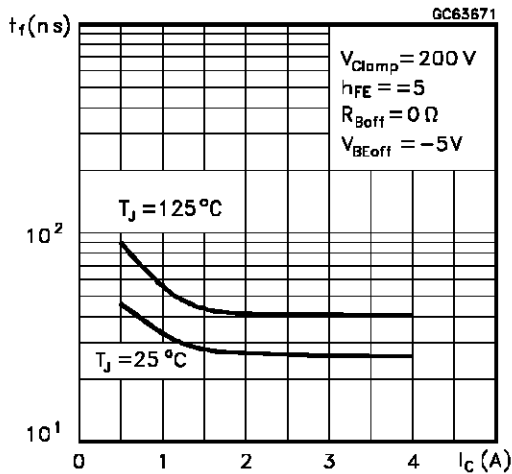
Collector-Emitter Saturation Voltage



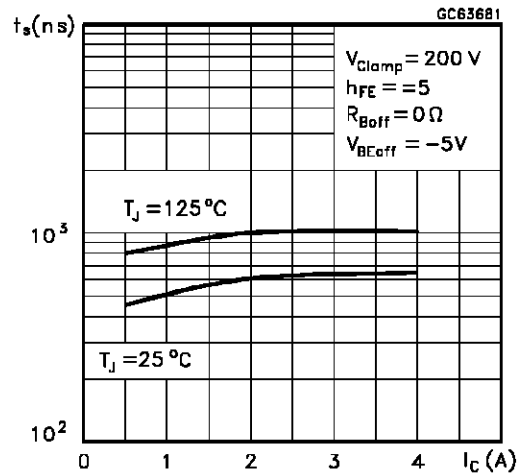
Base-Emitter Saturation Voltage



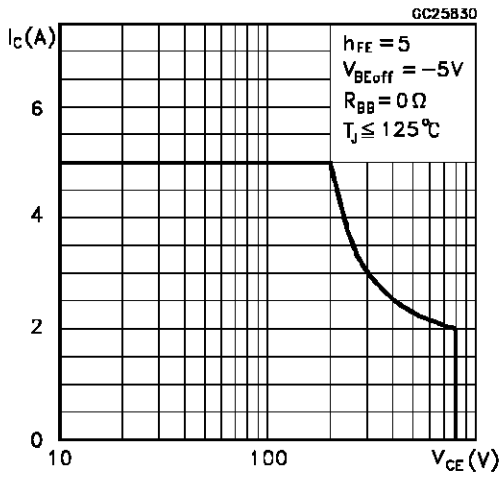
Inductive Fall Time



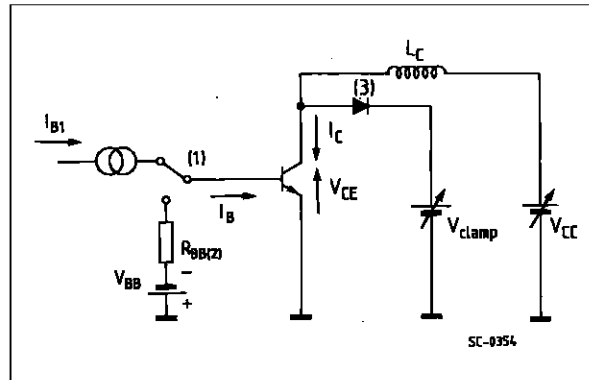
Inductive Storage Time



Reverse Biased SOA



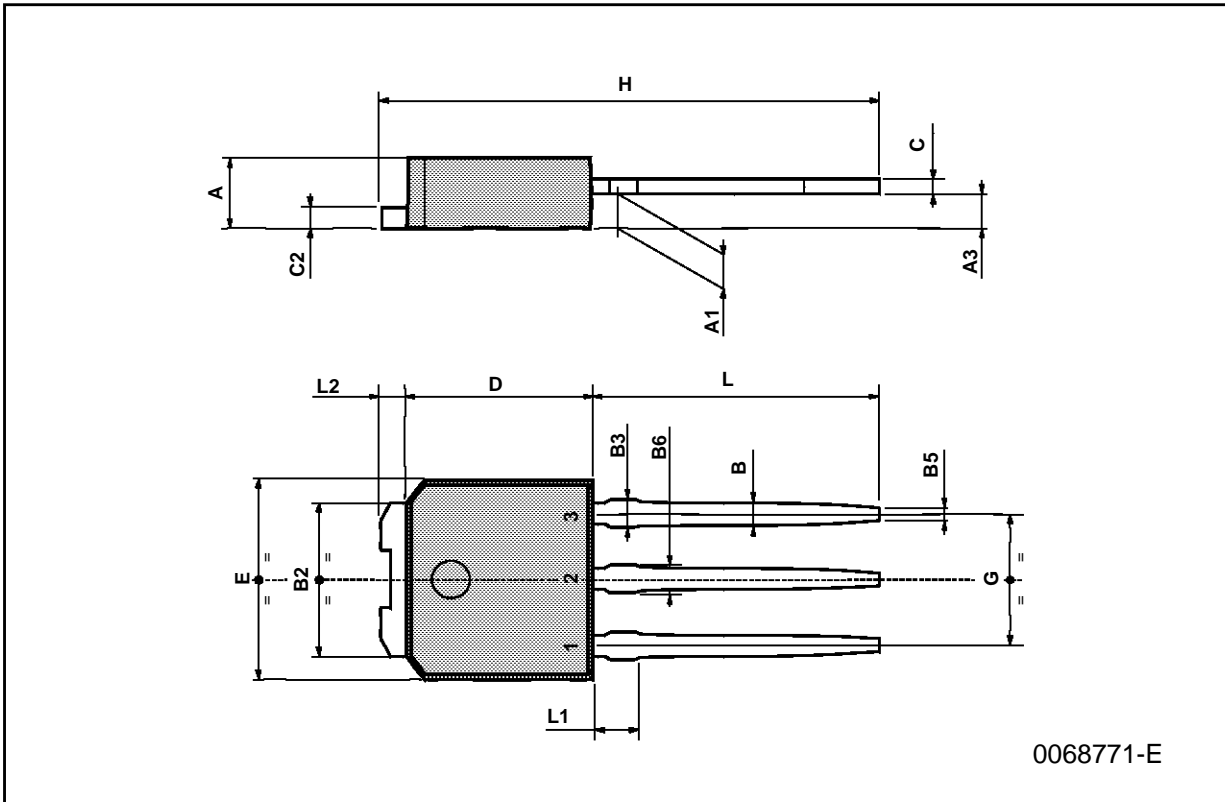
RBSOA and Inductive Load Switching Test Circuit



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

**TO-251 (IPAK) MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A3	0.7		1.3	0.027		0.051
B	0.64		0.9	0.025		0.031
B2	5.2		5.4	0.204		0.212
B3			0.85			0.033
B5		0.3			0.012	
B6			0.95			0.037
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
E	6.4		6.6	0.252		0.260
G	4.4		4.6	0.173		0.181
H	15.9		16.3	0.626		0.641
L	9		9.4	0.354		0.370
L1	0.8		1.2	0.031		0.047
L2		0.8	1		0.031	0.039



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