

## HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- SGS-THOMSON PREFERRED SALESTYPE
- ORDERING CODES : BULK128D-A AND BULK128D-B
- NPN TRANSISTOR
- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED

### APPLICATIONS:

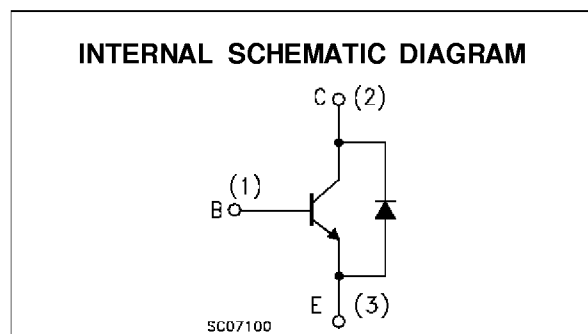
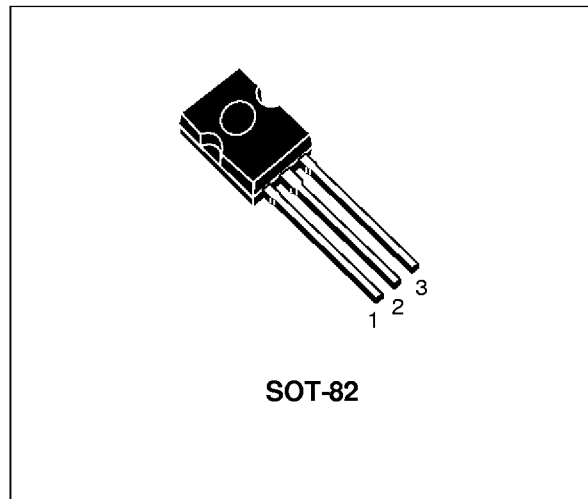
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- FLYBACK AND FORWARD SINGLE TRANSISTOR LOW POWER CONVERTERS

### 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.



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

# BULK128D

## THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-Case	Max	2.27	$^{\circ}C/W$
$R_{thj-amb}$	Thermal Resistance Junction-Ambient	Max	80	$^{\circ}C/W$

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CES}$	Collector Cut-off Current ( $V_{BE} = -1.5 V$ )	$V_{CE} = 700 V$ $V_{CE} = 700 V$ $T_j = 125^{\circ}C$			100 500	$\mu A$ $\mu A$
$I_{CEO}$	Collector-Emitter Leakage Current ( $I_B = 0$ )	$V_{CE} = 400 V$			250	$\mu A$
$V_{EBO}$	Emitter-Base Voltage	$I_E = 10 mA$	9			V
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage	$I_C = 100 mA$ $L = 25 mH$	400			V
$V_{CE(sat)*}$	Collector-Emitter Saturation Voltage	$I_C = 0.5 A$ $I_B = 0.1 A$ $I_C = 1 A$ $I_B = 0.2 A$ $I_C = 2.5 A$ $I_B = 0.5 A$			0.7 1.0 1.5	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	$I_C = 10 mA$ $V_{CE} = 5 V$ $I_C = 2 A$ $V_{CE} = 5 V$	10 8			
$V_f$	Forward Voltage Drop	$I_f = 2 A$			2.5	V
$t_s$	RESISTIVE LOAD Storage Time	$V_{CC} = 250 V$ $I_C = 2 A$ $I_{B1} = 0.4 A$ $I_{B2} = -0.4 A$ $T_p = 30 \mu s$ (see fig. 2)	1.7 2.0		2.5 2.9	$\mu s$ $\mu s$
$t_f$	Fall Time			0.2		$\mu s$
$t_s$	INDUCTIVE LOAD Storage Time	$V_{C1} = 200 V$ $I_C = 2 A$ $I_{B1} = 0.4 A$ $V_{BE(off)} = -5 V$ $R_{BB} = 0 \Omega$ $L = 200 \mu H$ (see fig. 1)			0.6	$\mu s$
$t_f$	Fall Time			0.1		$\mu s$

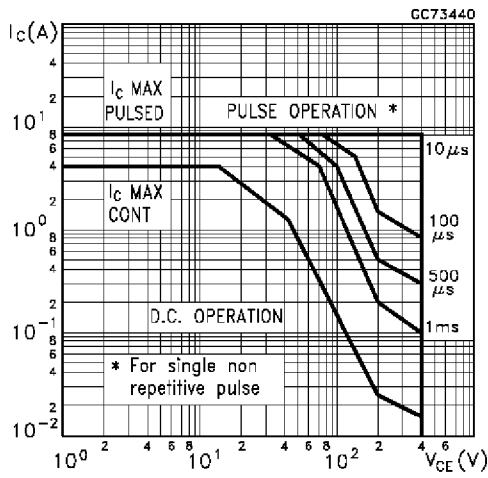
\* Pulsed: Pulse duration = 300  $\mu s$ , duty cycle 1.5 %

Note: Ordering codes:

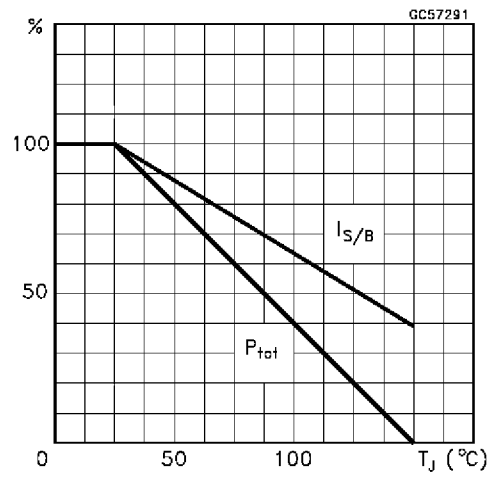
- BULK128D-A
- BULK128D-B.

Please contact your nearest ST Microelectronics sales office for delivery details.

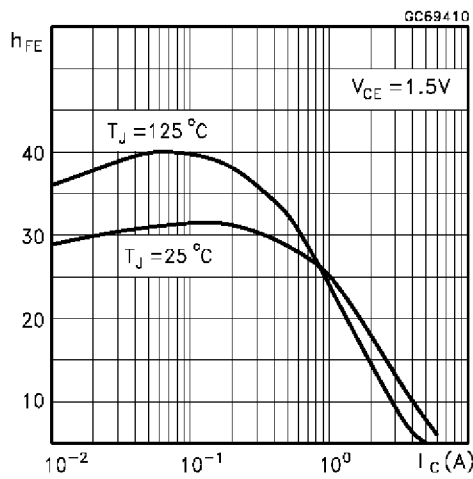
Safe Operating Areas



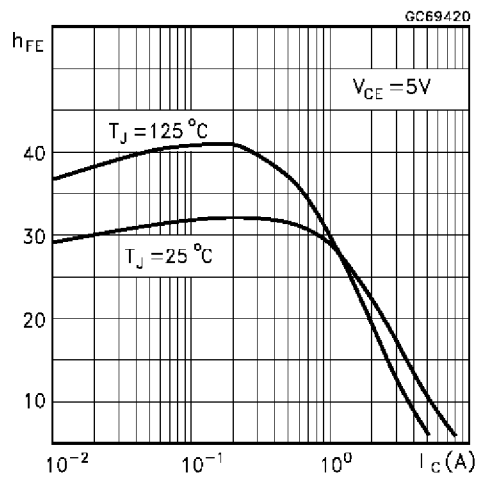
Derating Curve



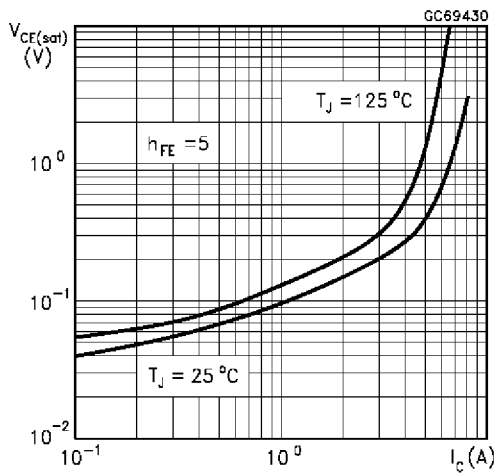
DC Current Gain



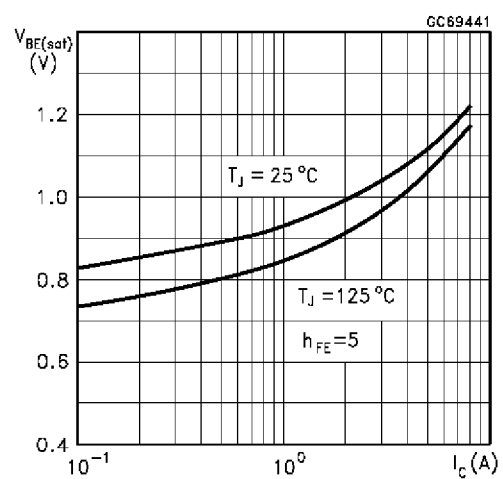
DC Current Gain



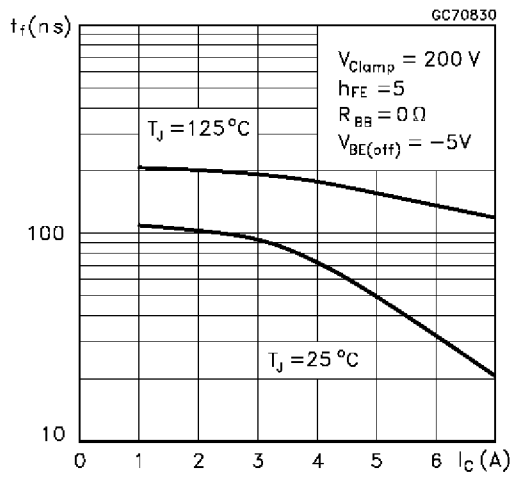
Collector Emitter Saturation Voltage



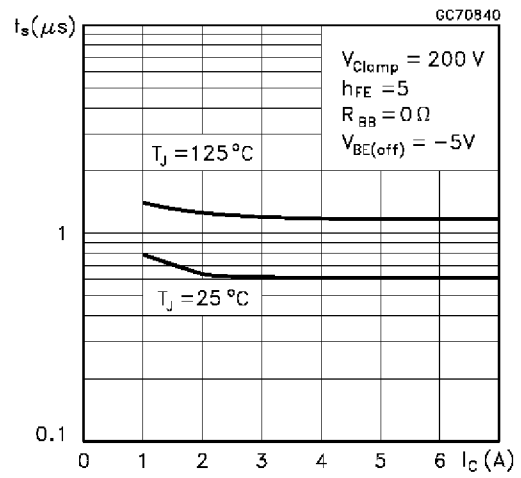
Base Emitter Saturation Voltage



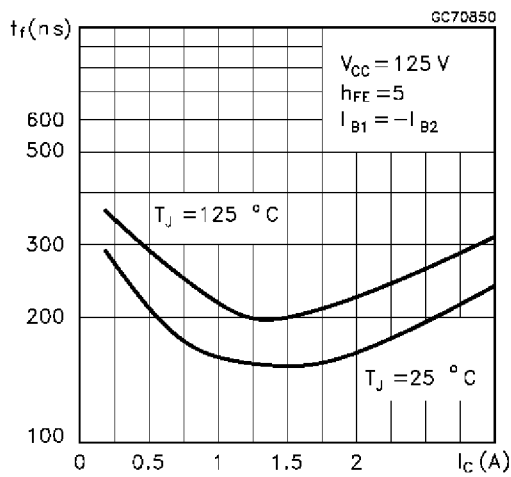
Inductive Fall Time



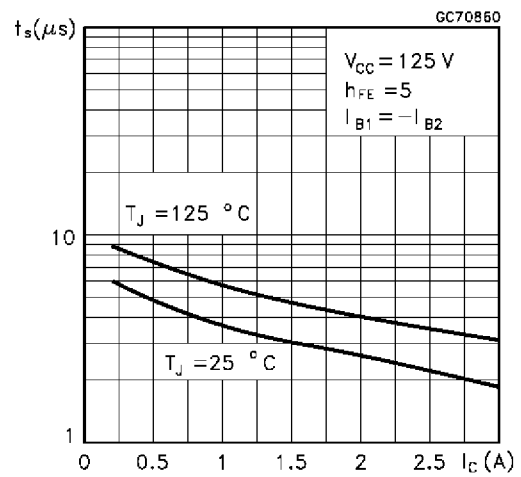
Inductive Storage Time



Resistive Load Fall Time



Resistive Load Storage Time



Reverse Biased SOA

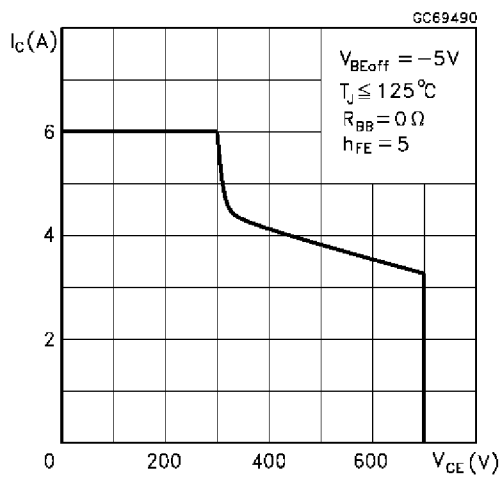


Figure 1: Inductive Load Switching Test Circuit.

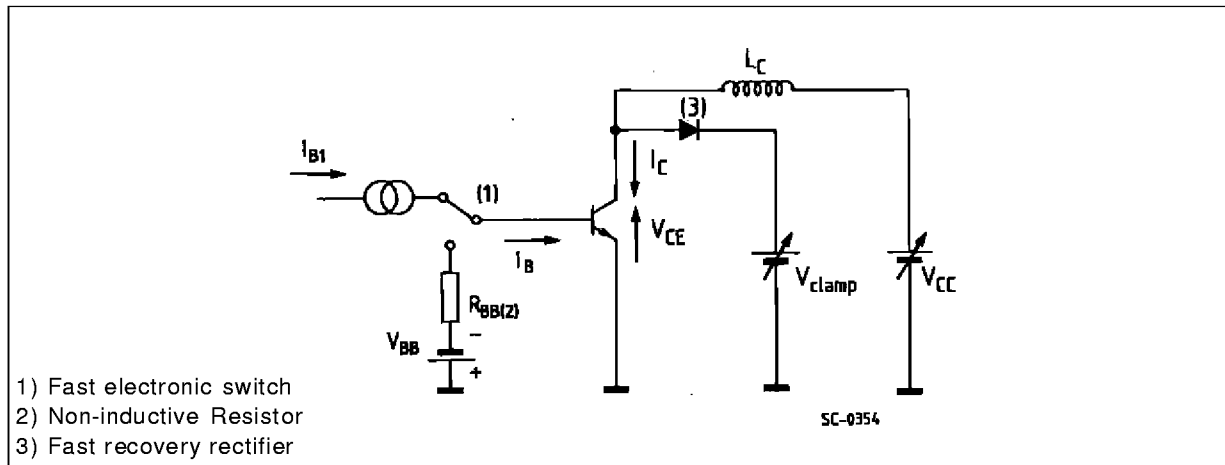
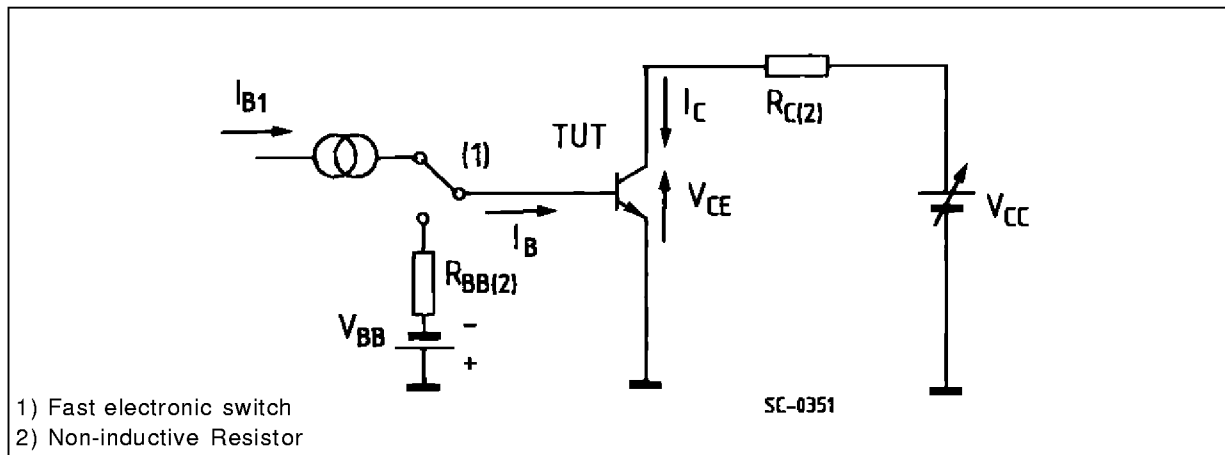
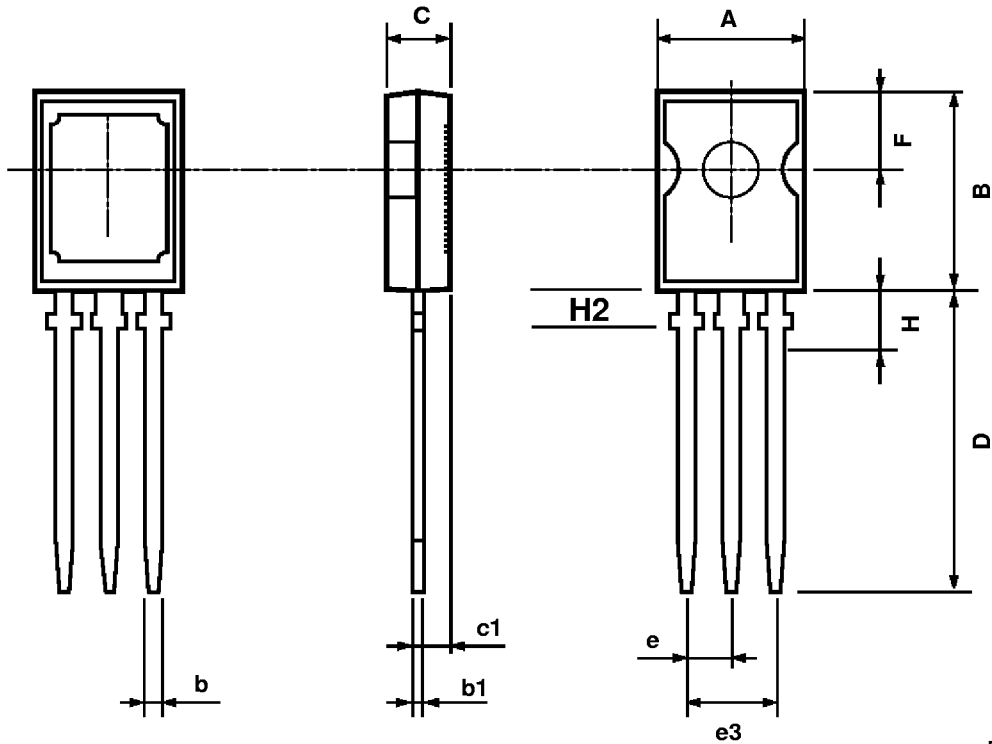


Figure 2: Resistive Load Switching Test Circuit.



SOT-82 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	7.4		7.8	0.291		0.307
B	10.5		10.8	0.413		0.444
b	0.7		0.9	0.028		0.035
b1	0.49		0.75	0.019		0.030
C	2.4		2.7	0.04		0.106
c1	1.0		1.3	0.039		0.05
D	15.4		16	0.606		0.629
e		2.2			0.087	
e3	4.15		4.65	0.163		0.183
F		3.8			0.150	
H			2.54		0.100	
H2		2.15			0.084	



P032A