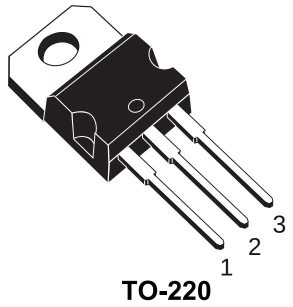
BUL128D-B

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- STMicroelectronics PREFERRED SALES TYPE
- NPN TRANSISTOR
- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- INTEGRATED ANTIPARALLEL COLLECTOR- EMITTER DIODE

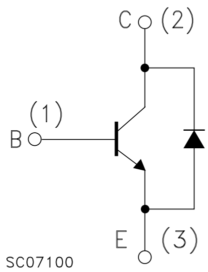
Figure 1: Package



APPLICATIONS

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

Figure 2: Internal Schematic Diagram



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.

Table 1: Order Codes

Part Number	Marking	Package	Packaging
BUL128D-B	BUL128D-B	TO-220	Tube

Table 2: 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, I_B = 2 A, t_p < 10 µs, T_J = 150 ^oC)	$V_{(BR)EBO}$	V
I_C	Collector Current	4	A
I_{CM}	Collector Peak Current (t_p < 5ms)	8	A
I_B	Base Current	2	A
I_{BM}	Base Peak Current (t_p < 5ms)	4	A

Symbol	Parameter	Value	Unit
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

Table 3: 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

Table 4: 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)	V_{CE} = 700 V V_{CE} =700 V T_j = 125 °C			100 500	μA μA
I_{CEO}	Collector Cut-off Current (I_B = 0)	V_{CE} = 400 V			250	μA
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage (I_C = 0)	I_E = 10 mA	9		18	V
$V_{CEO(sus)}$*	Collector-Emitter Sustaining Voltage (I_B = 0)	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 I_C = 4 A I_B = 1 A		 0.5	0.7 1 1.5 	V 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 12		 32	
 t_s t_f	RESISTIVE LOAD Storage Time Fall Time	V_{CC} =200 V I_C = 2 A I_{B1} = 0.4 A $V_{BE(off)}$ = -5 V R_{BB} = 0 Ω L = 200 μH (see figure 15)		 0.6 0.1		 μs μs
 t_s t_f	INDUCTIVE LOAD Storage Time Fall Time	V_{CC} =250 V I_C = 2 A I_{B1} = 0.4 A I_{B2} = -0.4 A Tp = 30 μs (see figure 14)	 2 	 0.2	 2.9 	 μs μs

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

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Figure 3: Safe Operating Area

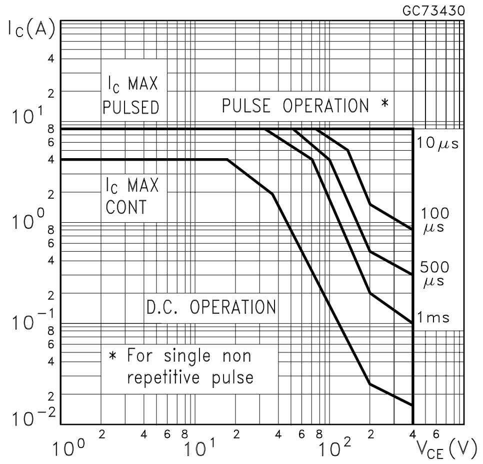


Figure 6: Derating Current

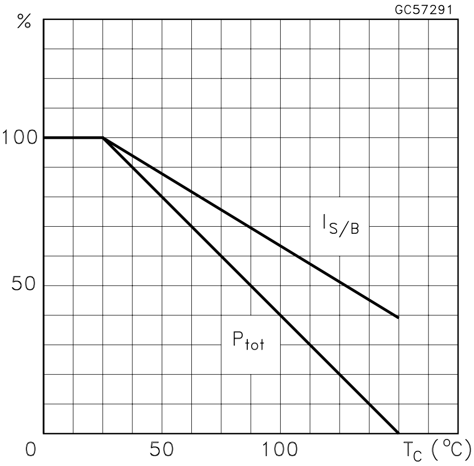


Figure 4: DC Current Gain

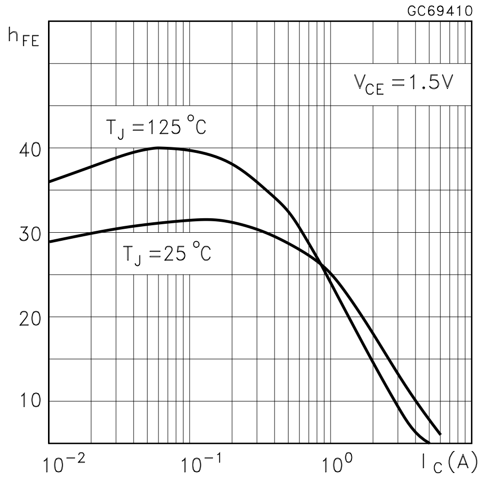


Figure 7: DC Current Gain

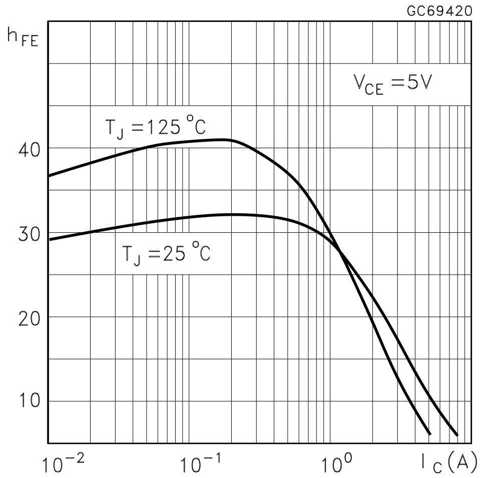


Figure 5: Collector-Emitter Saturation Voltage

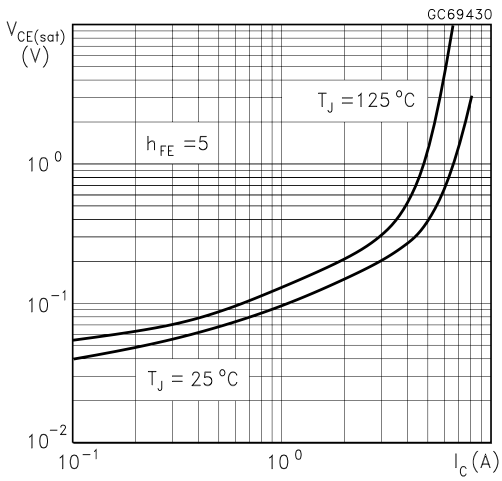


Figure 8: Base-Emitter Saturation Voltage

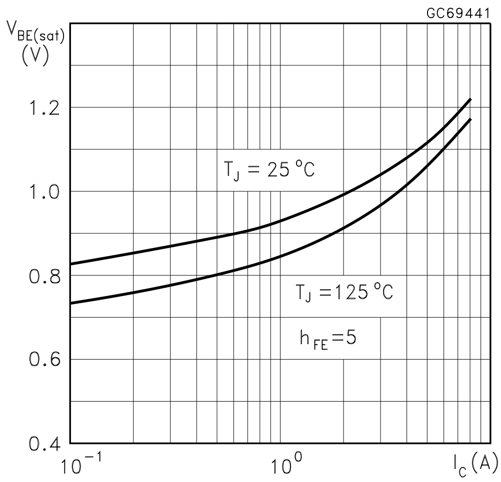


Figure 9: Inductive Load Fall Time

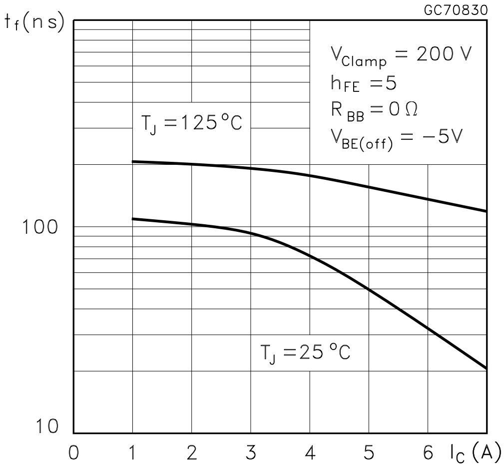


Figure 12: Inductive Load Stoarage Time

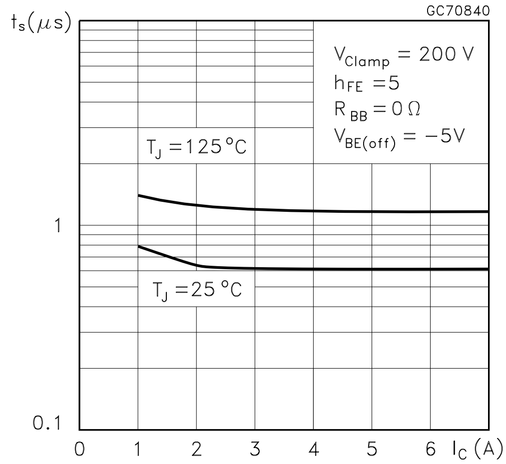


Figure 10: Resistive Load Fall Time

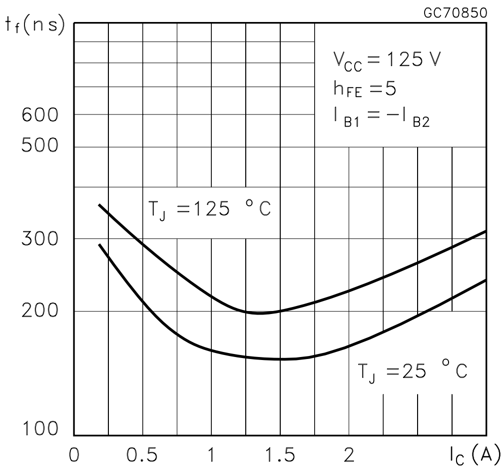


Figure 13: Resistive Load Stoarage Time

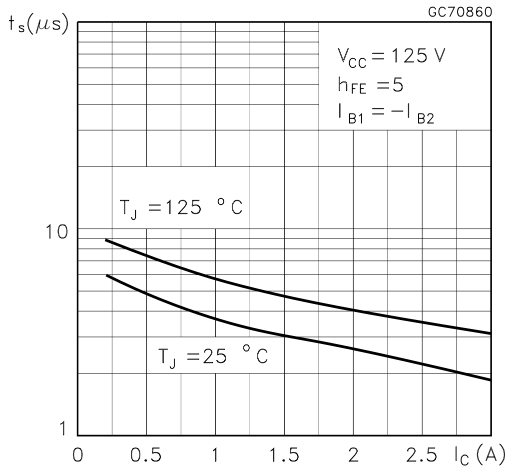


Figure 11: Reverse Biased Operating Area

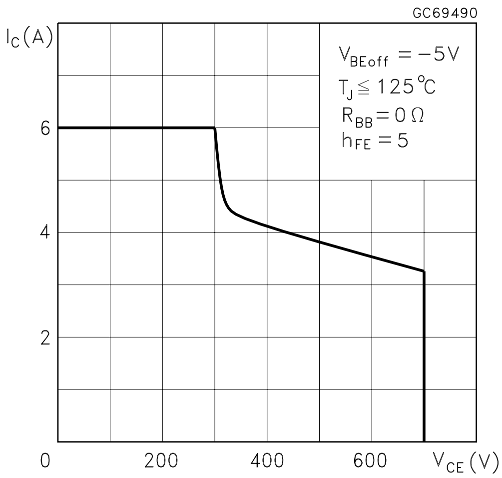


Figure 14: Inductive Load Switching Test Circuit

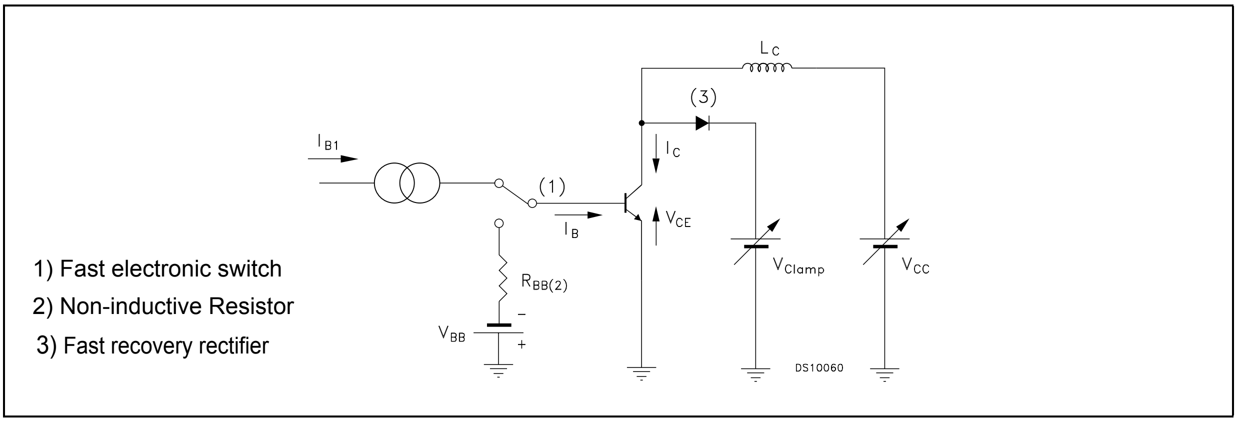
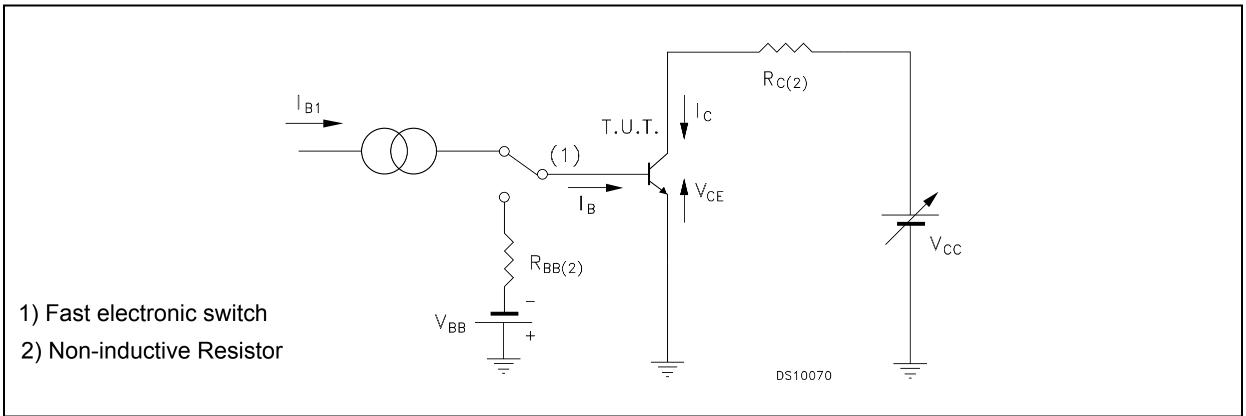


Table 15: Restistive Load Switching Test Circuit



TO-220 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
b	0.61		0.88	0.024		0.034
b1	1.15		1.70	0.045		0.066
c	0.49		0.70	0.019		0.027
D	15.25		15.75	0.60		0.620
E	10		10.40	0.393		0.409
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.194		0.202
F	1.23		1.32	0.048		0.052
H1	6.20		6.60	0.244		0.256
J1	2.40		2.72	0.094		0.107
L	13		14	0.511		0.551
L1	3.50		3.93	0.137		0.154
L20		16.40			0.645	
L30		28.90			1.137	
øP	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116

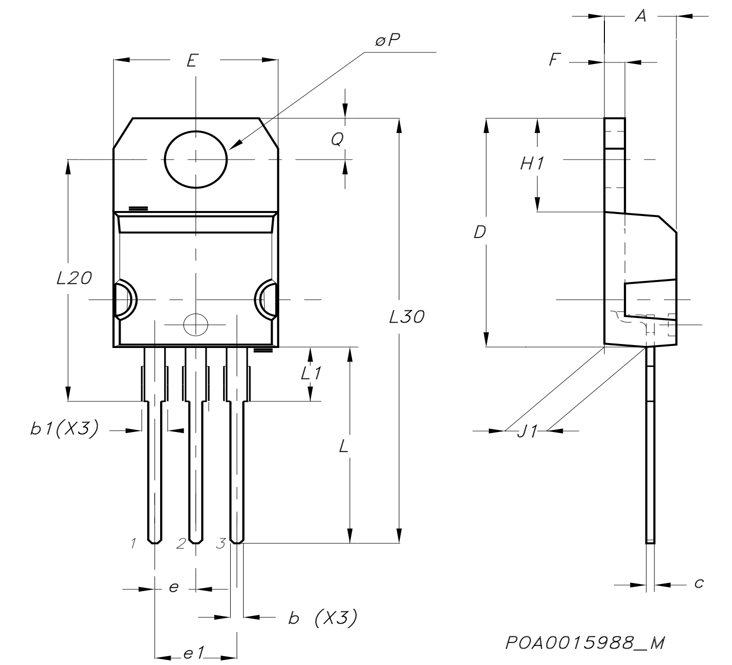


Table 5:

Version	Release Date	Change Designator
01-Oct-2002	1	First Release.
15-Feb-2005	1	Added table 1 on page 1.