



## BULB49D

# HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

Ordering Code	Marking	Package / Shipment
BULB49DT4	BULB49D	D <sup>2</sup> PAK / Tape & Reel

- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- HIGH RUGGEDNESS
- SURFACE MOUNTING TO-263 (D<sup>2</sup>PAK) POWER PACKAGE IN TAPE & REEL (SUFFIX "T4")

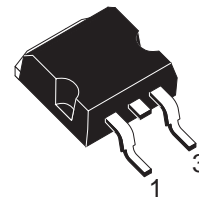
### APPLICATIONS:

- ELECTRONIC TRANSFORMERS FOR HALOGEN LAMPS
- FLYBACK AND FORWARD SINGLE TRANSISTOR LOW POWER CONVERTERS

### DESCRIPTION

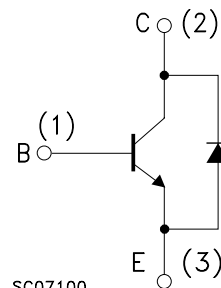
The device is manufactured using High Voltage Multi Epitaxial Planar technology for high switching speeds and high voltage capability.

The BULB49D is designed for use in electronic transformers for halogen lamps.



TO-263  
D<sup>2</sup>PAK  
(Suffix "T4")

### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V <sub>CES</sub>	Collector-Emitter Voltage (V <sub>BE</sub> = 0)	850	V
V <sub>CEO</sub>	Collector-Emitter Voltage (I <sub>B</sub> = 0)	450	V
V <sub>EBO</sub>	Emitter-Base Voltage (I <sub>C</sub> = 0, I <sub>B</sub> < 2 A, t <sub>p</sub> < 10 ms)	V <sub>(BR)EBO</sub>	V
I <sub>C</sub>	Collector Current	5	A
I <sub>CM</sub>	Collector Peak Current (t <sub>p</sub> < 5 ms)	10	A
I <sub>B</sub>	Base Current	2	A
I <sub>BM</sub>	Base Peak Current (t <sub>p</sub> < 5 ms)	4	A
P <sub>tot</sub>	Total Dissipation at T <sub>c</sub> = 25 °C	80	W
T <sub>stg</sub>	Storage Temperature	-65 to 150	°C
T <sub>j</sub>	Max. Operating Junction Temperature	150	°C

## BULB49D

### THERMAL DATA

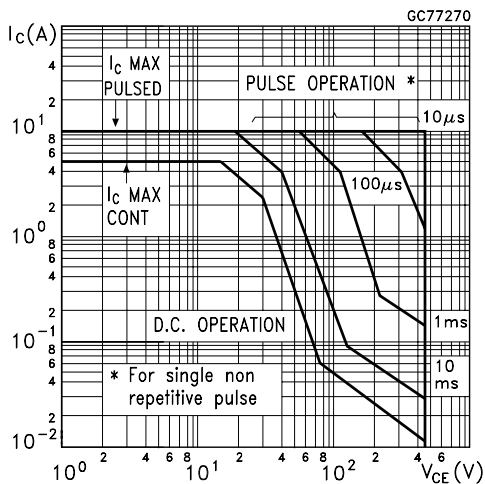
$R_{thj-case}$	Thermal Resistance Junction-case	Max	1.56	°C/W
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	62.5	°C/W

### ELECTRICAL CHARACTERISTICS ( $T_j = 25\text{ °C}$ unless otherwise specified)

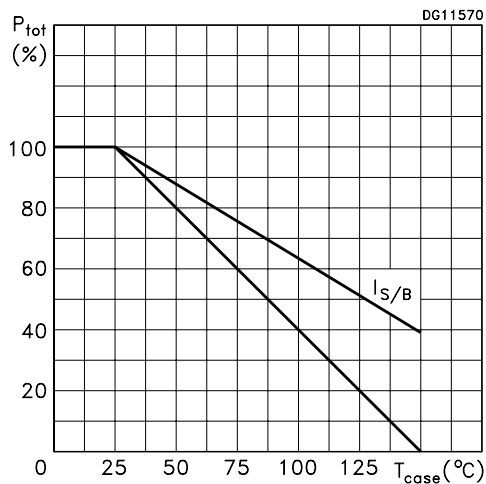
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CES}$	Collector Cut-off Current ( $V_{BE} = 0$ )	$V_{CE} = 850\text{ V}$ $V_{CE} = 850\text{ V}$ $T_j = 125\text{ °C}$			100 500	$\mu\text{A}$ $\mu\text{A}$
$I_{EBO}$	Emitter Cut-off Current ( $I_C = 0$ )	$V_{EB} = 9\text{ V}$			100	$\mu\text{A}$
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage ( $I_C = 0$ )	$I_E = 10\text{ mA}$	10		18	V
$V_{CEO(sus)}^*$	Collector-Emitter Sustaining Voltage ( $I_B = 0$ )	$I_C = 10\text{ mA}$	450			V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 1\text{ A}$ $I_B = 0.2\text{ A}$ $I_C = 2\text{ A}$ $I_B = 0.4\text{ A}$ $I_C = 4\text{ A}$ $I_B = 0.8\text{ A}$		0.1	0.3 0.6 1.2	V V V
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 1\text{ A}$ $I_B = 0.2\text{ A}$ $I_C = 4\text{ A}$ $I_B = 0.8\text{ A}$			1 1.3	V V
$h_{FE}^*$	DC Current Gain	$I_C = 10\text{ mA}$ $V_{CE} = 5\text{ V}$ $I_C = 500\text{ mA}$ $V_{CE} = 5\text{ V}$ $I_C = 7\text{ A}$ $V_{CE} = 10\text{ V}$	10 4		60 10	
$V_{CEW}^*$	Maximum Collector-Emitter Voltage Without Snubber	$I_C = 8\text{ A}$ $V_{BB} = -2.5\text{ V}$ $L = 50\text{ }\mu\text{H}$ $R_{BB} = 0$ $t_p = 10\text{ }\mu\text{s}$	450			V
$t_s$ $t_f$	RESISTIVE LOAD Storage Time Fall Time	$I_C = 2\text{ A}$ $V_{CC} = 250\text{ V}$ $I_{B1} = -I_{B2} = 400\text{ mA}$ (See Figure 1)	2		3 0.8	$\mu\text{s}$ ns
$t_s$ $t_f$	INDUCTIVE LOAD Storage Time Fall Time	$I_C = 4\text{ A}$ $V_{CL} = 300\text{ V}$ $I_{B(on)} = 800\text{ mA}$ $R_{BB(off)} = 0$ $V_{BE(off)} = -5\text{ V}$ $L = 1\text{ mH}$ (See Figure 2)		0.6 50	1.3 100	$\mu\text{s}$ ns
$V_f$	Diode Forward Voltage	$I_C = 3\text{ A}$			1.5	V

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

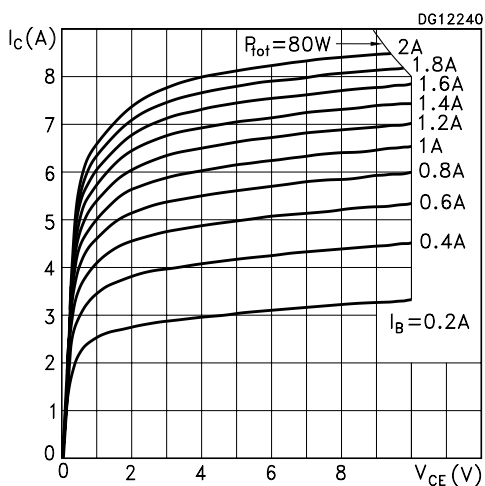
Safe Operating Area



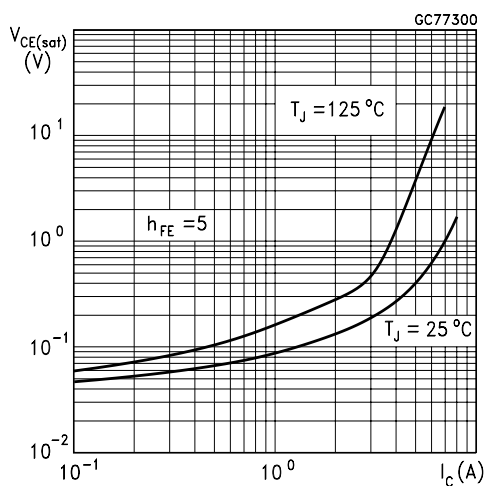
Derating Curve



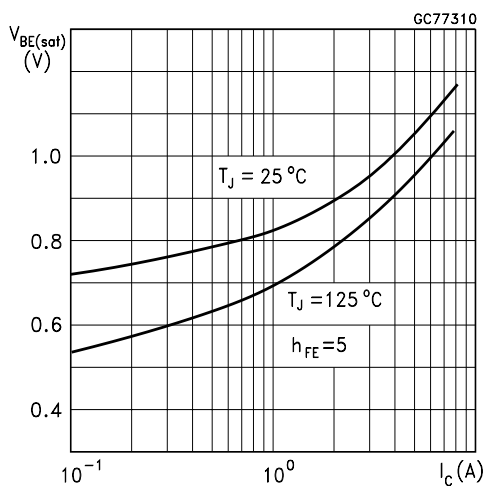
Output Characteristics



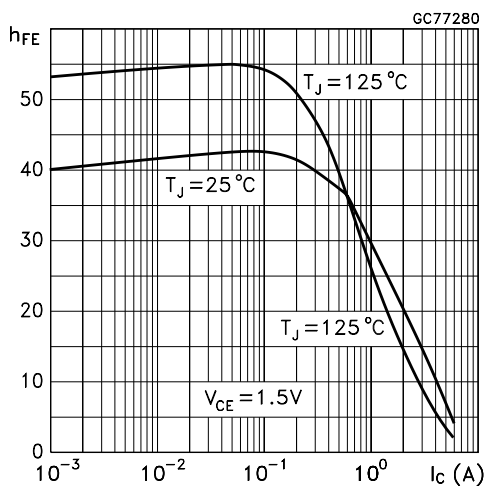
Collector-Emitter Saturation Voltage



Base-Emitter Saturation Voltage

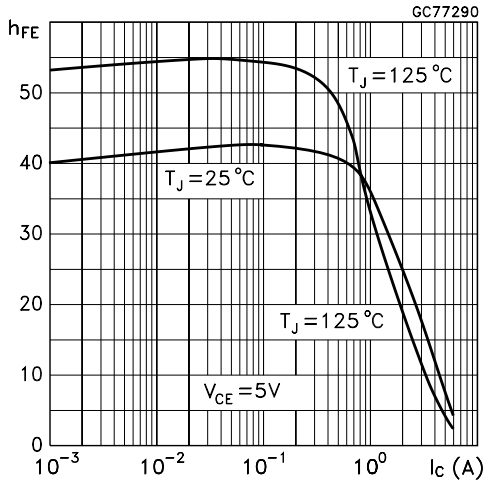


DC Current Gain

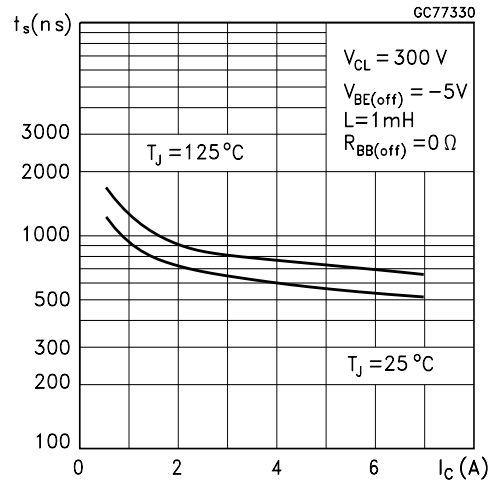


# BULB49D

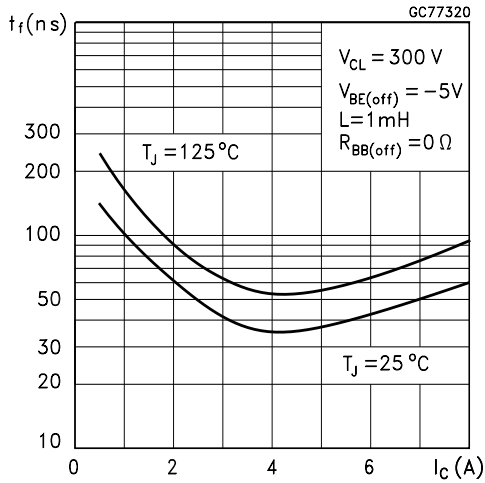
## DC Current Gain



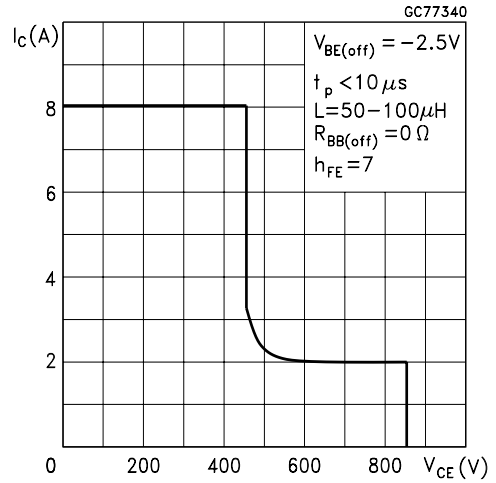
## Inductive Load Storage Time



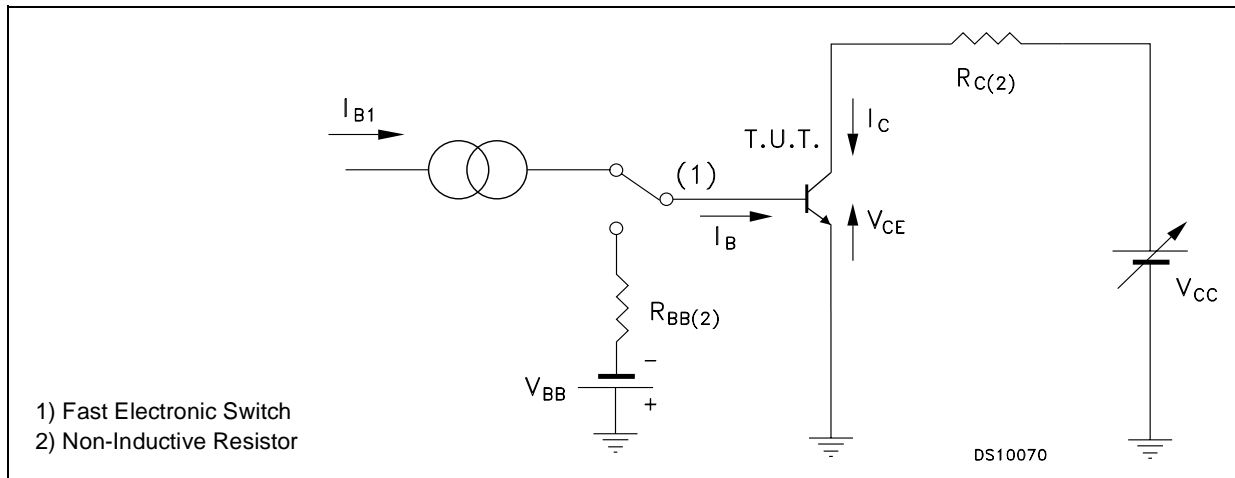
## Inductive Load Fall Time



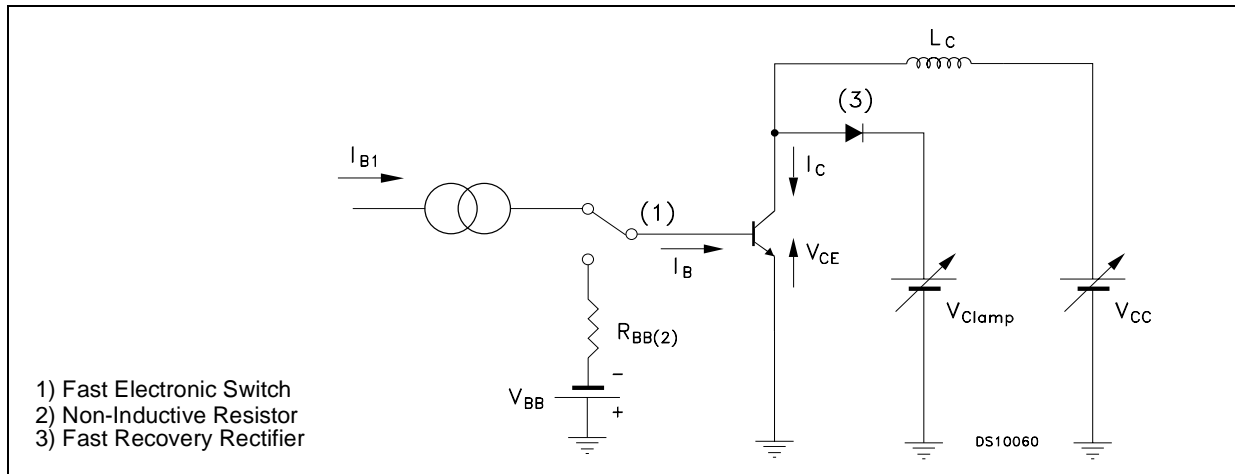
## Reverse Biased Safe Operating Area



**Figure 1: Resistive Load Switching Test Circuit**

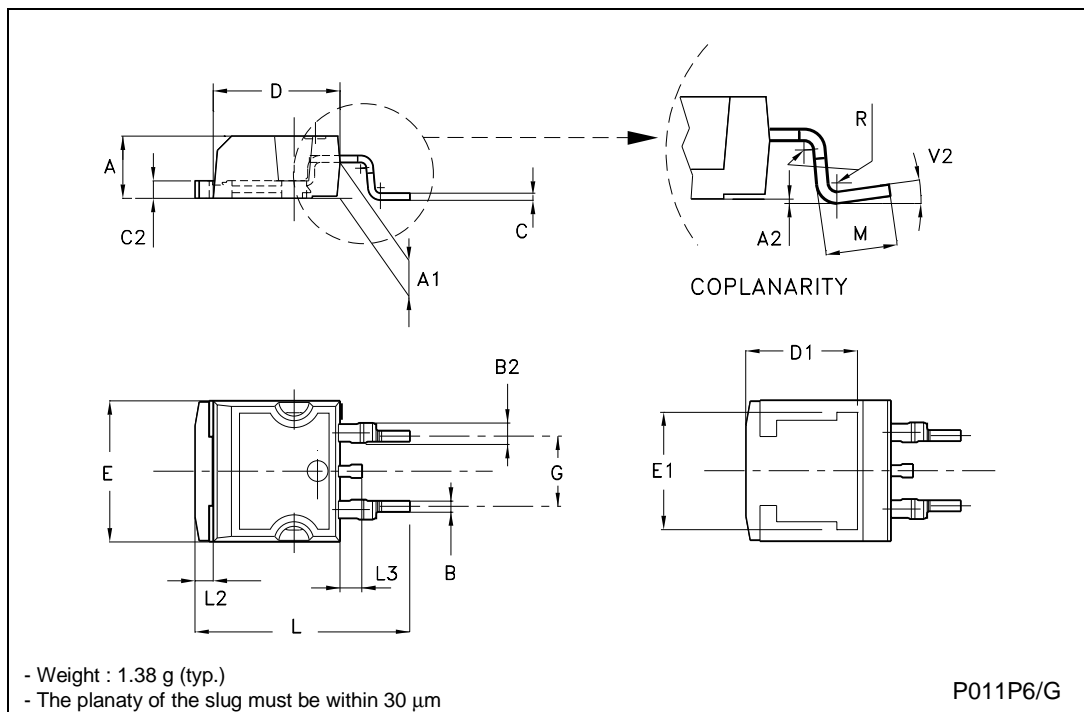


**Figure 2: Inductive Load Switching Test Circuit**



TO-263 (D<sup>2</sup>PAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
A1	2.49		2.69	0.098		0.106
A2	0.03		0.23	0.001		0.009
B	0.70		0.93	0.027		0.036
B2	1.14		1.70	0.044		0.067
C	0.45		0.60	0.017		0.023
C2	1.23		1.36	0.048		0.053
D	8.95		9.35	0.352		0.368
D1		8.00			0.315	
E	10.00		10.40	0.393		0.409
E1		8.50			0.334	
G	4.88		5.28	0.192		0.208
L	15.00		15.85	0.590		0.624
L2	1.27		1.4	0.050		0.055
L3	1.40		1.75	0.055		0.068
M	2.40		3.2	0.094		0.126
R		0.40			0.016	
V2	0°		8°	0°		8°



Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

© The ST logo is a registered trademark of STMicroelectronics

© 2003 STMicroelectronics - Printed in Italy - All Rights Reserved  
STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco  
Singapore - Spain - Sweden - Switzerland - United Kingdom - United States.

© <http://www.st.com>



LittleDiode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

[LittleDiode.com](http://LittleDiode.com)

Looking forward to providing you with the best possible service.