



## 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")

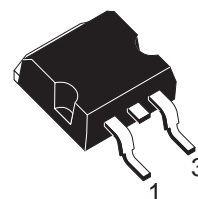
### APPLICATIONS:

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

### DESCRIPTION

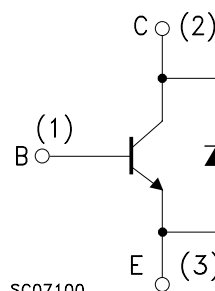
The device is manufactured using High Voltage Multi Epitaxial Planar technology for high switching speeds and high voltage capability.

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
$V_{CES}$	Collector-Emitter Voltage ( $V_{BE} = 0$ )	850	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	450	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ , $I_B < 2$ A, $t_p < 10$ ms)	$V_{(BR)EBO}$	V
$I_C$	Collector Current	5	A
$I_{CM}$	Collector Peak Current ( $t_p < 5$ ms)	10	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	80	W
$T_{stg}$	Storage Temperature	-65 to 150	°C
$T_j$	Max. Operating Junction Temperature	150	°C

## BULB49D

### THERMAL DATA

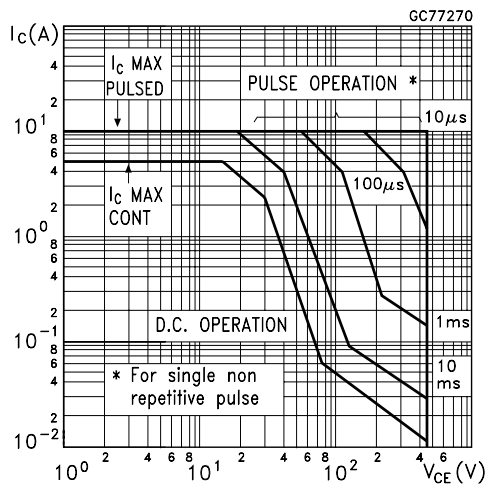
R <sub>thj-case</sub>	Thermal Resistance Junction-case	Max	1.56	°C/W
R <sub>thj-amb</sub>	Thermal Resistance Junction-ambient	Max	62.5	°C/W

### ELECTRICAL CHARACTERISTICS (T<sub>j</sub> = 25 °C unless otherwise specified)

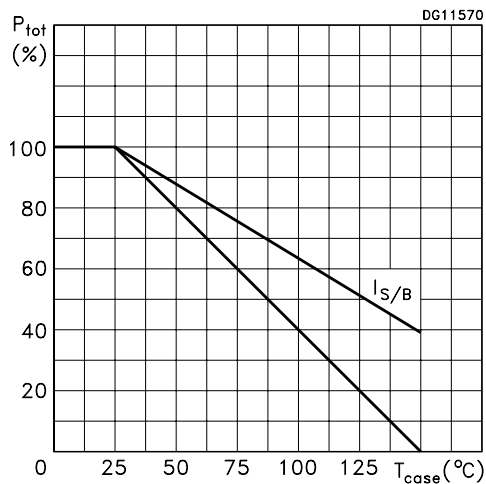
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CES</sub>	Collector Cut-off Current (V <sub>BE</sub> = 0)	V <sub>CE</sub> = 850 V V <sub>CE</sub> = 850 V T <sub>j</sub> = 125 °C			100 500	μA μA
I <sub>EBO</sub>	Emitter Cut-off Current (I <sub>C</sub> = 0)	V <sub>EB</sub> = 9 V			100	μA
V <sub>(BR)EBO</sub>	Emitter-Base Breakdown Voltage (I <sub>C</sub> = 0)	I <sub>E</sub> = 10 mA	10		18	V
V <sub>CEO(sus)</sub> *	Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = 10 mA	450			V
V <sub>CE(sat)</sub> *	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 1 A I <sub>C</sub> = 2 A I <sub>C</sub> = 4 A I <sub>B</sub> = 0.2 A I <sub>B</sub> = 0.4 A I <sub>B</sub> = 0.8 A		0.1	0.3 0.6 1.2	V V V
V <sub>BE(sat)</sub> *	Base-Emitter Saturation Voltage	I <sub>C</sub> = 1 A I <sub>C</sub> = 4 A I <sub>B</sub> = 0.2 A I <sub>B</sub> = 0.8 A			1 1.3	V V
h <sub>FE</sub> *	DC Current Gain	I <sub>C</sub> = 10 mA I <sub>C</sub> = 500 mA I <sub>C</sub> = 7 A V <sub>CE</sub> = 5 V V <sub>CE</sub> = 5 V V <sub>CE</sub> = 10 V	10 4		60 10	
V <sub>CEW</sub> *	Maximum Collector-Emitter Voltage Without Snubber	I <sub>C</sub> = 8 A L = 50 μH t <sub>p</sub> = 10 μs V <sub>BB</sub> = -2.5 V R <sub>BB</sub> = 0	450			V
t <sub>s</sub> t <sub>f</sub>	RESISTIVE LOAD Storage Time Fall Time	I <sub>C</sub> = 2 A I <sub>B1</sub> = -I <sub>B2</sub> = 400 mA (See Figure 1) V <sub>CC</sub> = 250 V	2		3 0.8	μs ns
t <sub>s</sub> t <sub>f</sub>	INDUCTIVE LOAD Storage Time Fall Time	I <sub>C</sub> = 4 A I <sub>B(on)</sub> = 800 mA V <sub>BE(off)</sub> = -5 V (See Figure 2) V <sub>CL</sub> = 300 V R <sub>BB(off)</sub> = 0 L = 1 mH		0.6 50	1.3 100	μs ns
V <sub>f</sub>	Diode Forward Voltage	I <sub>C</sub> = 3 A			1.5	V

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

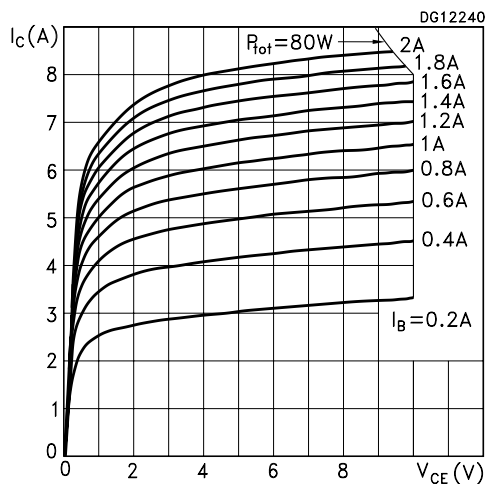
Safe Operating Area



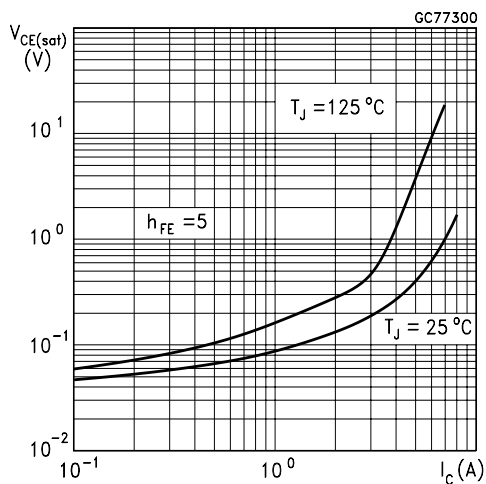
Derating Curve



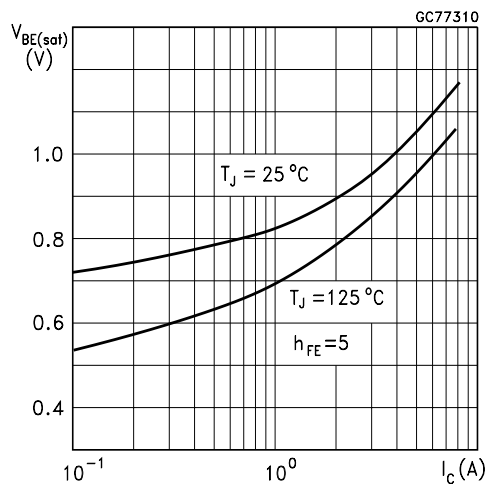
Output Characteristics



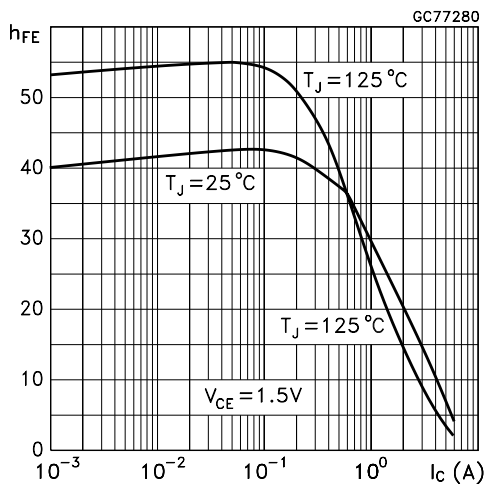
Collector-Emitter Saturation Voltage



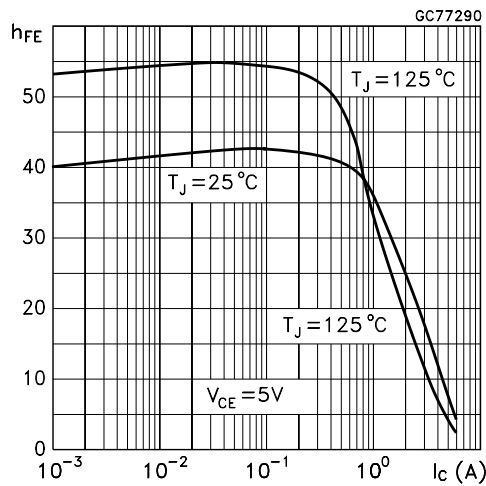
Base-Emitter Saturation Voltage



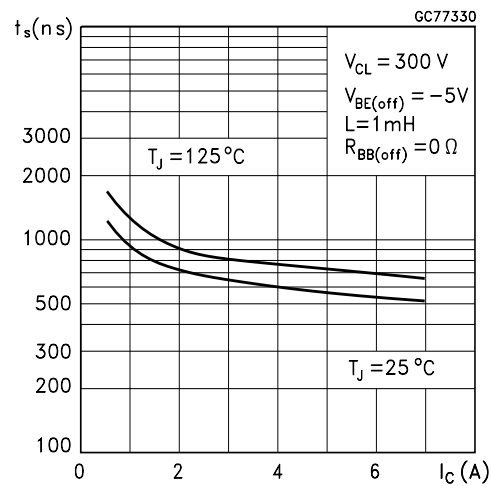
DC Current Gain



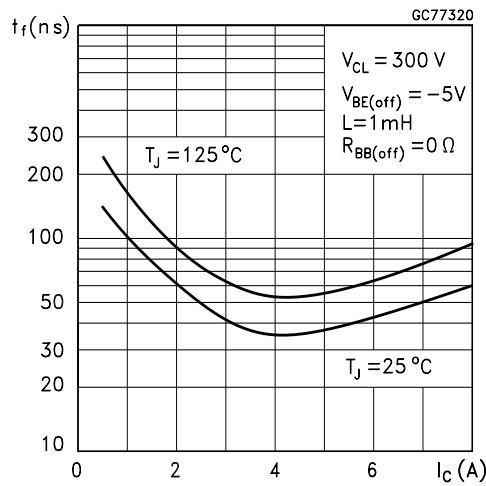
DC Current Gain



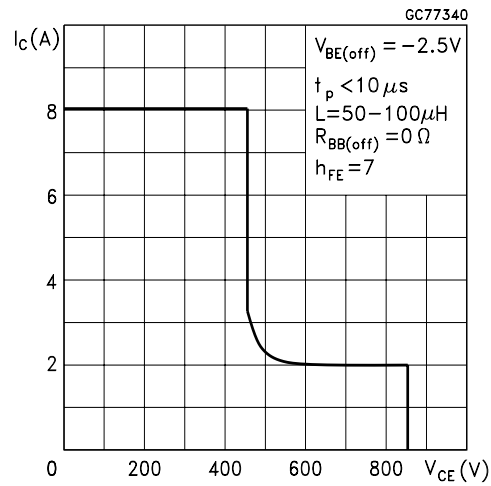
Inductive Load Storage Time

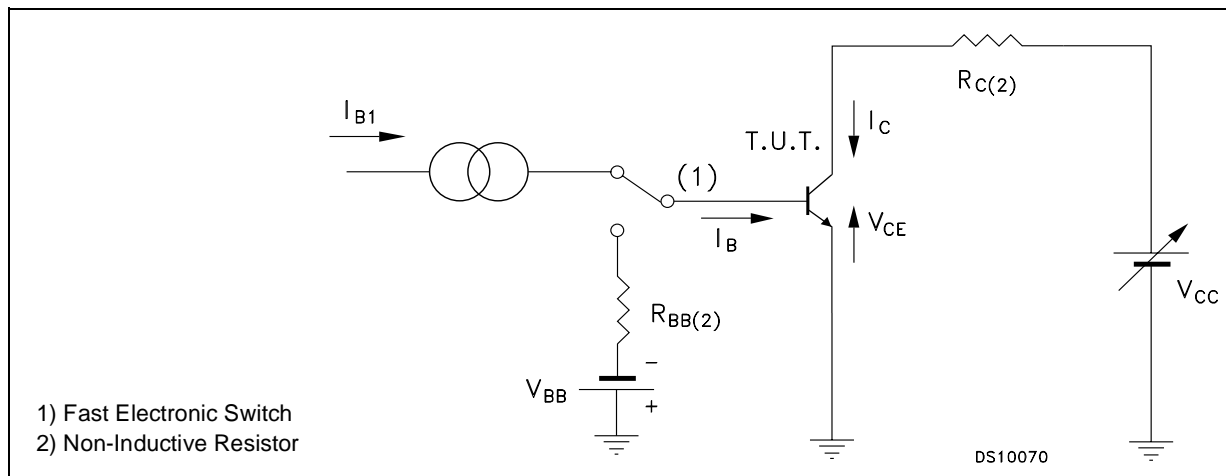
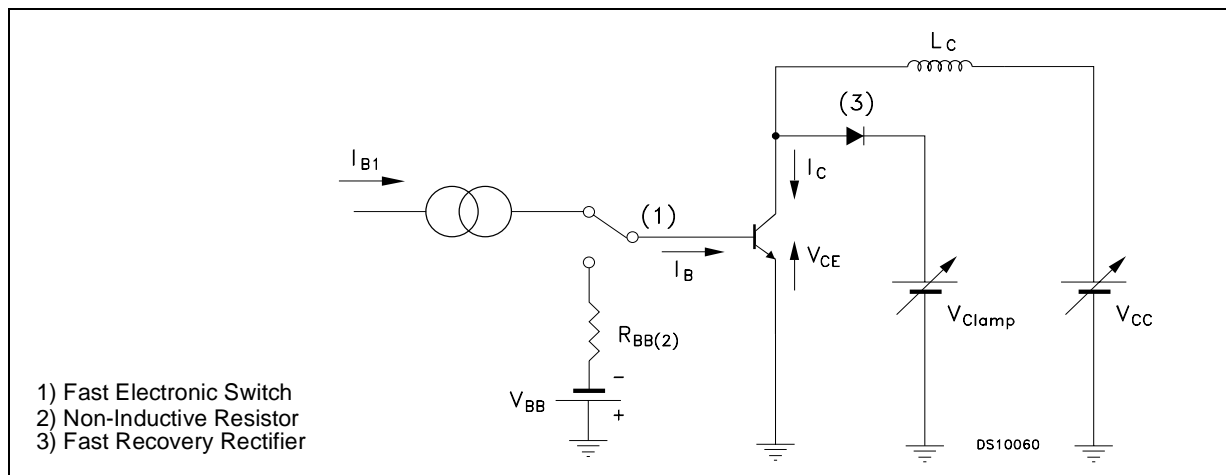


Inductive Load Fall Time



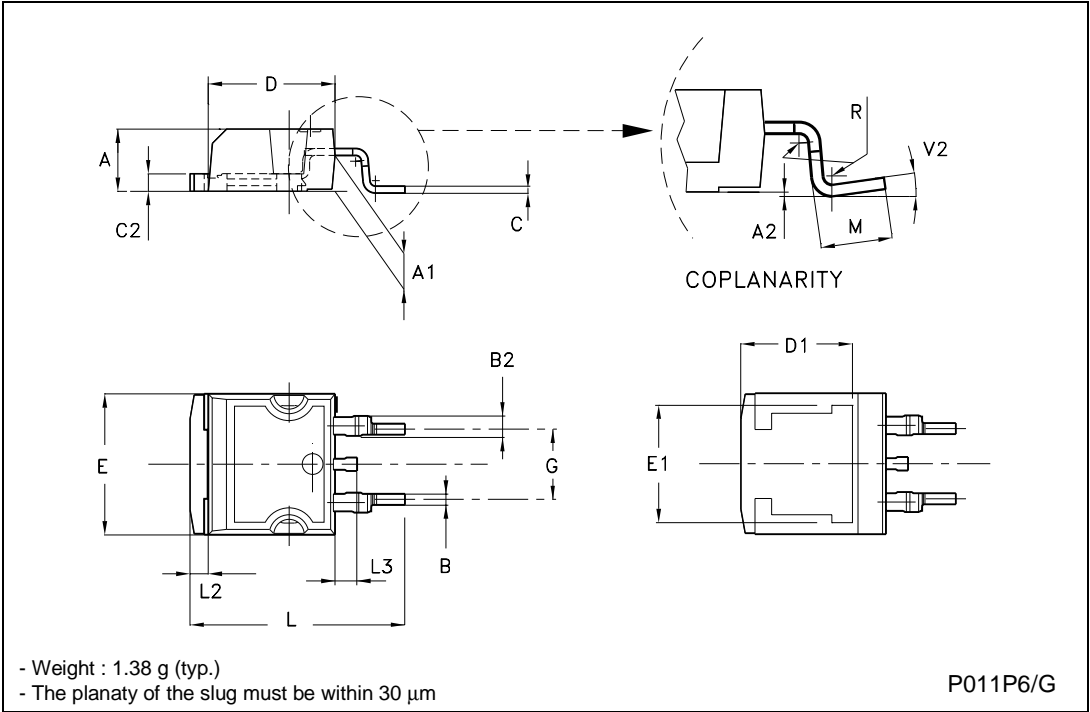
Reverse Biased Safe Operating Area



**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°



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