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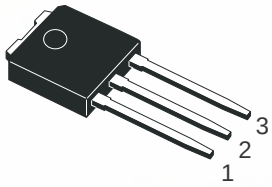
BULD116D

MEDIUM VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- INTEGRATED ANTIPARALLEL COLLECTOR- EMITTER DIODE
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- THROUGH-HOLE IPAK (TO-251) POWER PACKAGE IN TUBE (SUFFIX "-1")

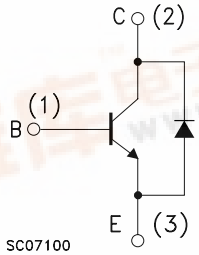
APPLICATIONS:

- COMPACT FLUORESCENT LAMPS UP TO 23 W AT 110 V A.C. MAINS
- FLYBACK AND FORWARD SINGLE TRANSISTOR LOW POWER CONVERTERS AT 110 V A.C. MAINS



IPAK
TO-251
("Suffix "-1")

INTERNAL SCHEMATIC DIAGRAM



DESCRIPTION

The device is manufactured using 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)	400	V
V_{CEO}	Collector-Emitter Voltage (I_B = 0)	200	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)	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	20	W
T_{stg}	Storage Temperature	-65 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C

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THERMAL DATA

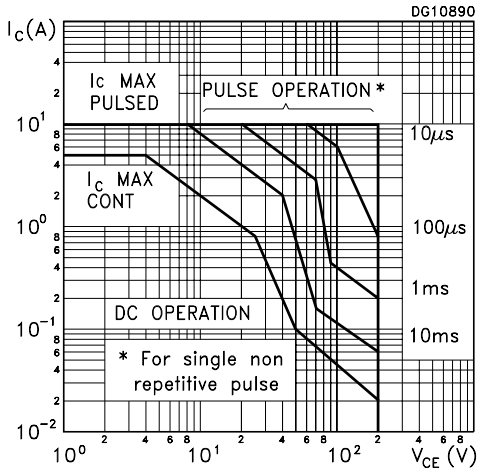
$R_{thj\text{-}case}$	Thermal Resistance Junction-Case	Max	6.25	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-Ambient	Max	100	°C/W

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

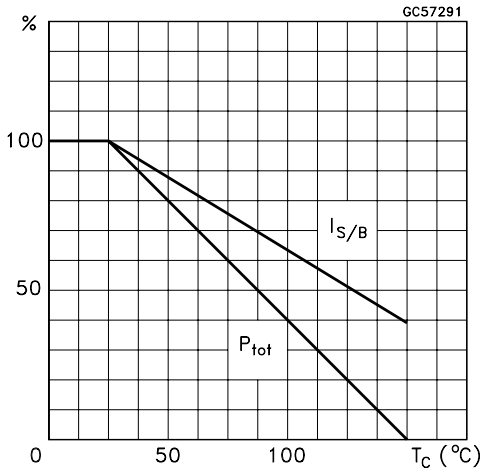
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current (V_{BE} = 0)	V_{CE} = 400 V V_{CE} = 400 V	 T_j = 125 °C			100 500	µA µA
V_{EBO}	Emitter-Base Voltage (I_C = 0)	I_E = 10 mA		9			V
$V_{CEO(sus)}$*	Collector-Emitter Sustaining Voltage (I_B = 0)	I_C = 100 mA	L = 25 mH	200			V
I_{CEO}	Collector-Emitter Leakage Current	V_{CE} = 200 V				250	µA
$V_{CE(sat)}$*	Collector-Emitter Saturation Voltage	I_C = 0.5 A I_C = 1 A I_C = 3 A I_C = 5 A	I_B = 50 mA I_B = 0.1 A I_B = 0.6 A I_B = 1 A			0.25 0.4 0.7 1.2	V V V V
$V_{BE(sat)}$*	Base-Emitter Saturation Voltage	I_C = 1 A I_C = 5 A	I_B = 0.1 A I_B = 1 A			1.1 1.5	V V
h_{FE}*	DC Current Gain	I_C = 10 mA I_C = 5 A	V_{CE} = 5 V V_{CE} = 5 V	10 8		 20	
 t_r t_f t_s	RESISTIVE LOAD Rise Time Fall Time Storage Time	V_{CC} = 125 V I_{B1} = 0.4 A t_p = 30 µs	I_C = 2 A I_{B2} = -0.4 A (see figure 2)		 0.2 0.2 1.4	 0.4	 µs µs µs
 t_s t_f	INDUCTIVE LOAD Storage Time Fall Time	I_C = 2 A V_{BE} = -5 V V_{clamp} = 180 V	I_{B1} = 0.4 A L = 500 µH (see figure 1)		 0.5 0.10	 	 µs µs
V_F	Diode Forward Voltage	I_C = 2 A				1.5	V

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

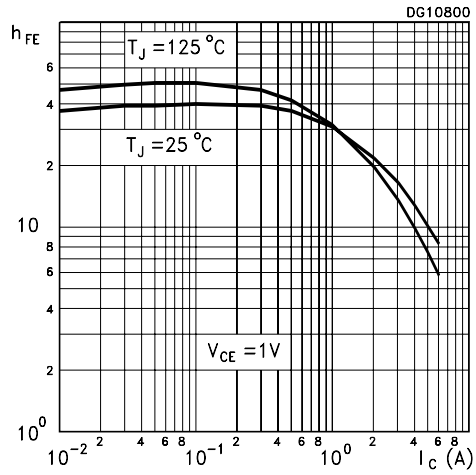
Safe Operating Area



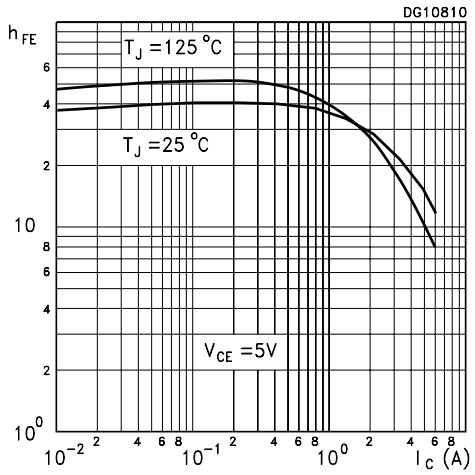
Derating Curve



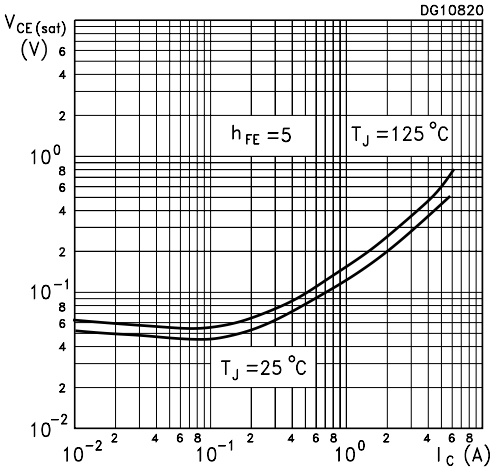
DC Current Gain



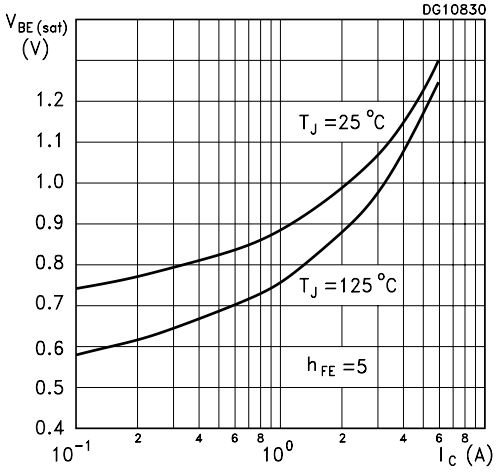
DC Current Gain



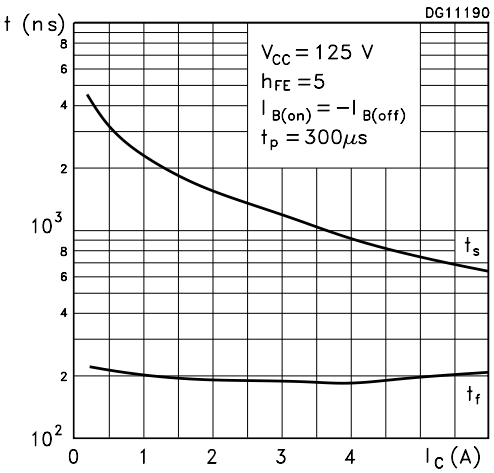
Collector-Emitter Saturation Voltage



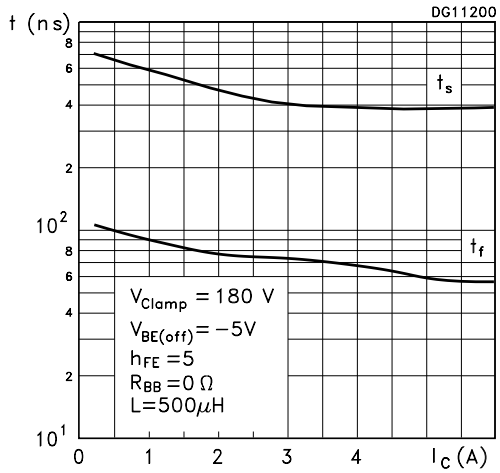
Base-Emitter Saturation Voltage



Switching Time Resistive Load



Switching Time Inductive Load



Reverse Biased SOA

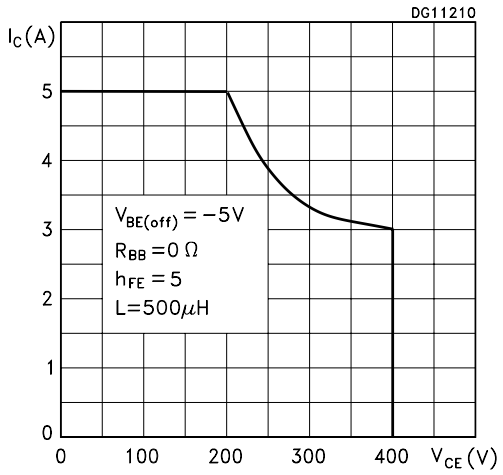


Figure 1: Inductive Load Switching Test Circuit.

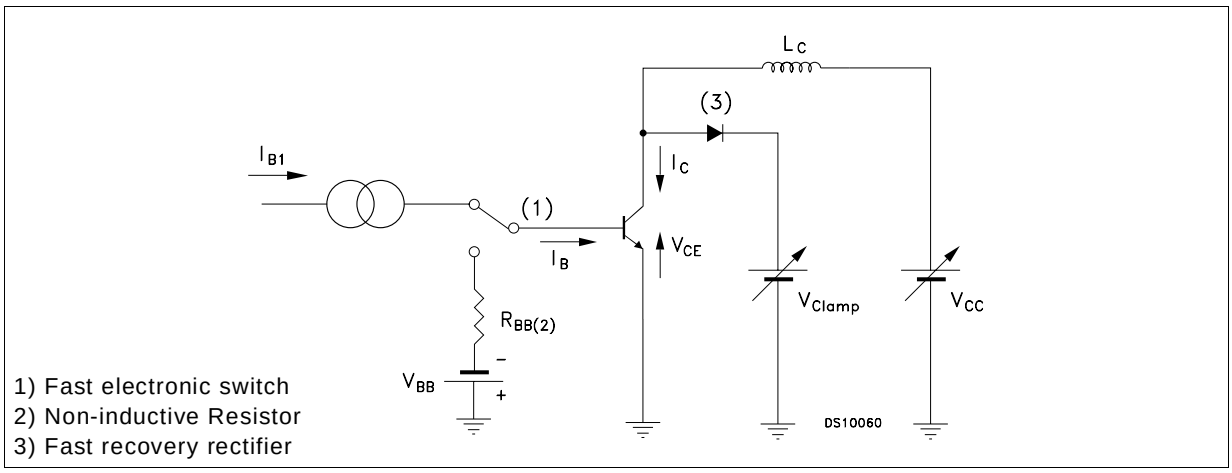
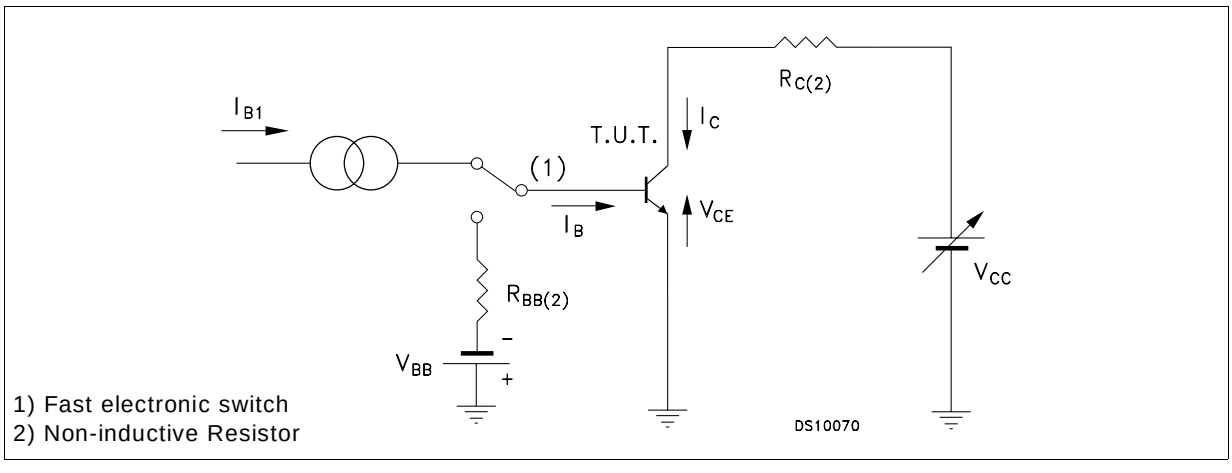
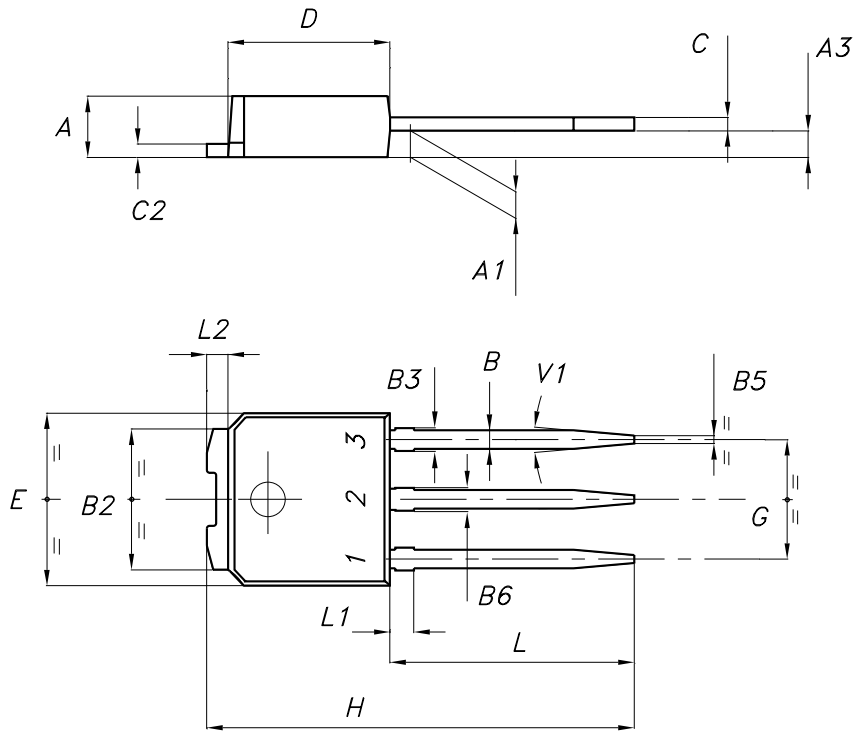


Figure 2: Resistive Load Switching Test Circuit.



TO-251 (IPAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.20		2.40	0.087		0.094
A1	0.90		1.10	0.035		0.043
A3	0.70		1.30	0.028		0.051
B	0.64		0.90	0.025		0.035
B2	5.20		5.40	0.204		0.213
B3			0.85			0.033
B5		0.30			0.012	
B6			0.95			0.037
C	0.45		0.60	0.018		0.024
C2	0.48		0.60	0.019		0.024
D	6.00		6.20	0.237		0.244
E	6.40		6.60	0.252		0.260
G	4.40		4.60	0.173		0.181
H	15.90		16.30	0.626		0.642
L	9.00		9.40	0.354		0.370
L1	0.80		1.20	0.031		0.047
L2		0.80	1.00		0.031	0.039
V1		10^o			10^o	



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