

**ST13007D**

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

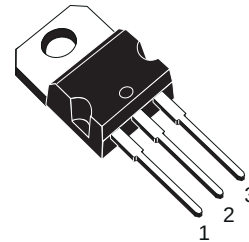
- IMPROVED SPECIFICATION:
 - LOWER LEAKAGE CURRENT
 - TIGHTER GAIN RANGE
 - DC CURRENT GAIN PRESELECTION
 - TIGHTER STORAGE TIME RANGE
- HIGH VOLTAGE CAPABILITY
- INTEGRATED FREE-WHEELING DIODE
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- FULLY CHARACTERIZED AT 125 °C
- LARGE RBSOA

APPLICATIONS

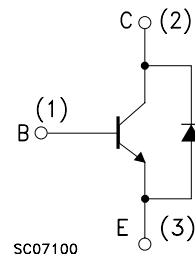
- UP TO 120W ELECTRONIC TRANSFORMERS FOR HALOGEN LAMPS
- SWITCH MODE POWER SUPPLIES

DESCRIPTION

The device is manufactured using high voltage Multi Epitaxial Planar technology for high switching speeds and high voltage capability. It uses a Cellular Emitter structure to enhance switching speeds.

**TO-220**

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CEV}	Collector-Emitter Voltage ($V_{BE} = -1.5V$)	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	8	A
I_{CM}	Collector Peak Current	16	A
I_B	Base Current	4	A
I_{BM}	Base Peak Current	8	A
P_{tot}	Total Dissipation at $T_c \leq 25\text{ }^{\circ}\text{C}$	80	W
T_{stg}	Storage Temperature	-65 to 150	$^{\circ}\text{C}$
T_j	Max. Operating Junction Temperature	150	$^{\circ}\text{C}$

THERMAL DATA

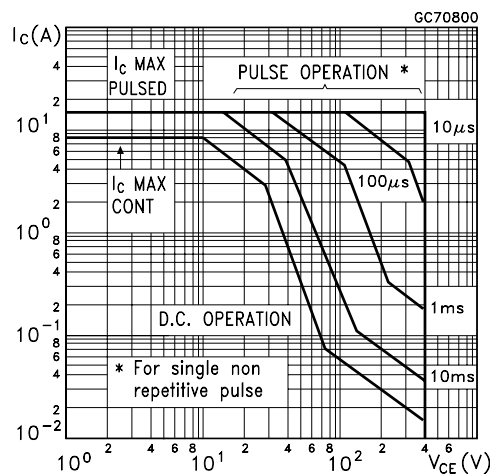
R _{thj-case}	Thermal Resistance Junction-case	Max	1.56	°C/W
R _{thj-amb}	Thermal Resistance Junction-ambient	Max	62.5	°C/W

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

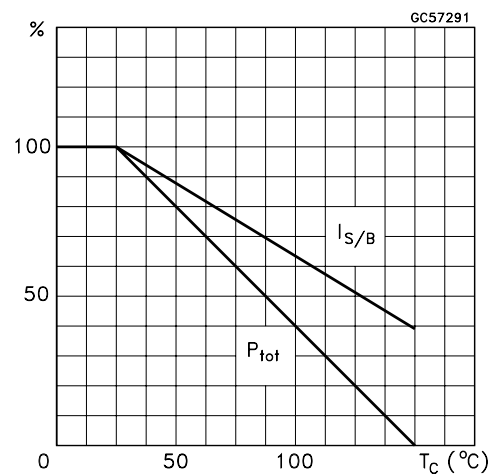
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CES}	Collector Cut-off Current (V _{BE} = 0)	V _{CE} = 700 V V _{CE} = 700 V T _c = 100 °C			10 0.5	μA mA
I _{CEO}	Collector Cut-off Current (I _B = 0)	V _{CE} = 400 V			100	μA
I _{EBO}	Emitter Cut-off Current (I _C = 0)	V _{EB} = 9 V			100	μA
V _{CEO(sus)} *	Collector-Emitter Sustaining Voltage (I _B = 0)	I _C = 10 mA	400			V
V _{CE(sat)} *	Collector-Emitter Saturation Voltage	I _C = 2 A I _B = 0.4 A I _C = 5 A I _B = 1 A I _C = 8 A I _B = 2 A I _C = 5 A I _B = 1 A T _c = 100 °C			0.8 1.5 2 3	V V V V
V _{BE(sat)} *	Base-Emitter Saturation Voltage	I _C = 2 A I _B = 0.4 A I _C = 5 A I _B = 1 A I _C = 5 A I _B = 1 A T _c = 100 °C			1.2 1.6 1.5	V V V
h _{FE} *	DC Current Gain	I _C = 2 A V _{CE} = 5 V I _C = 5 A V _{CE} = 5 V	18 8		40 25	
V _f	Diode Forward Voltage	I _C = 3 A			2.5	V
t _s t _f	INDUCTIVE LOAD Storage Time Fall Time	I _C = 5 A V _{CL} = 250 V R _{BB} = 0 Ω I _{B1} = 1 A V _{BE(off)} = -5 V L = 200 μH (see figure 1)		0.8 40	1.6 100	μs ns
t _s t _f	INDUCTIVE LOAD Storage Time Fall Time	I _C = 5 A V _{CL} = 250 V R _{BB} = 0 Ω I _{B1} = 1 A V _{BE(off)} = -5 V L = 200 μH T _C = 125 °C (see figure 1)		1.1 80		μs ns

* Pulsed: Pulse duration = 300 μs, duty cycle 2 %.

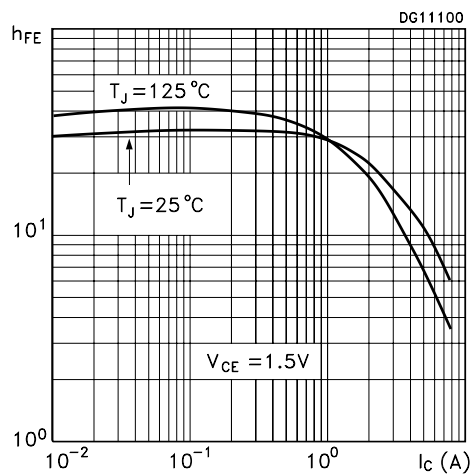
Safe Operating Area



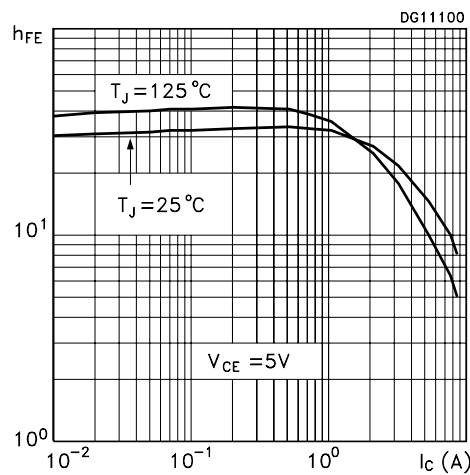
Derating Curve



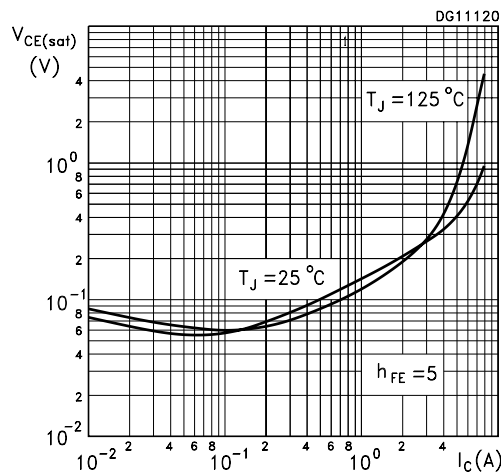
DC Current Gain



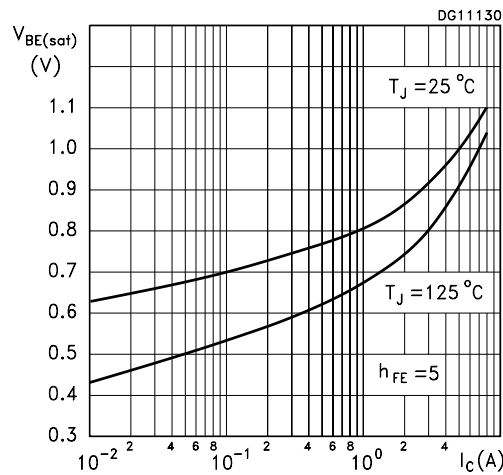
DC Current Gain



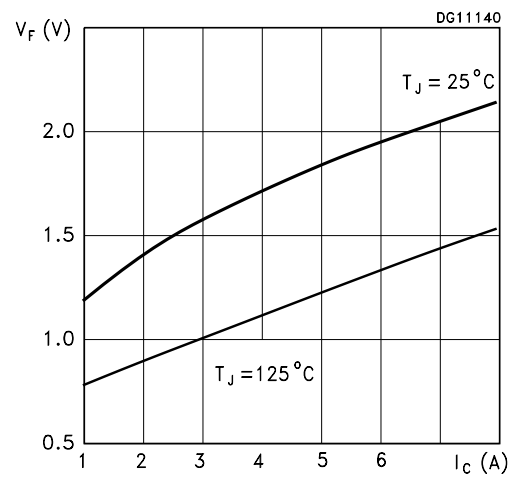
Collector Emitter Saturation Voltage



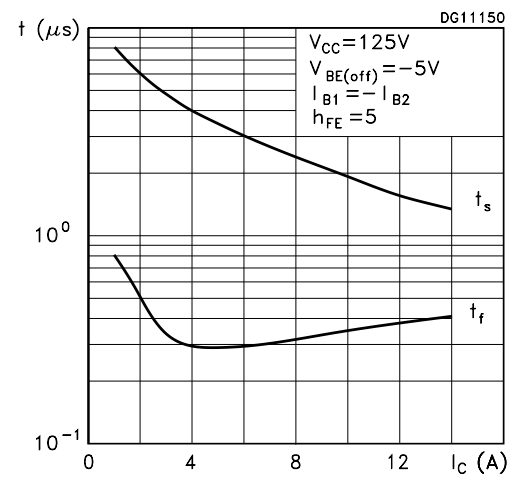
Base Emitter Saturation Voltage



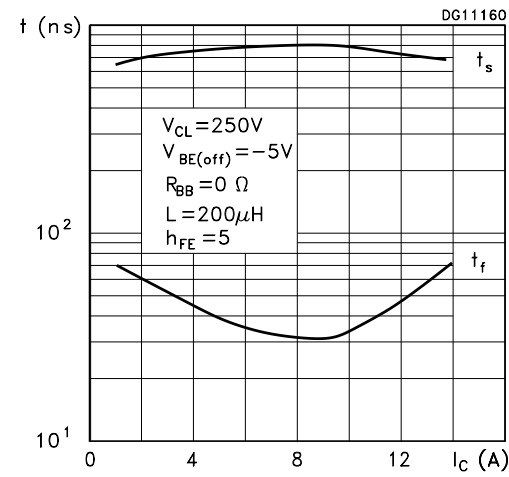
Diode Forward Voltage



Switching Time Resistive Load



Switching Time Inductive Load



Reverse Biased SOA

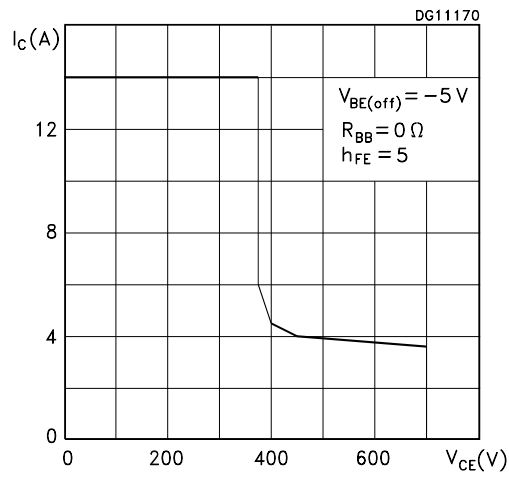
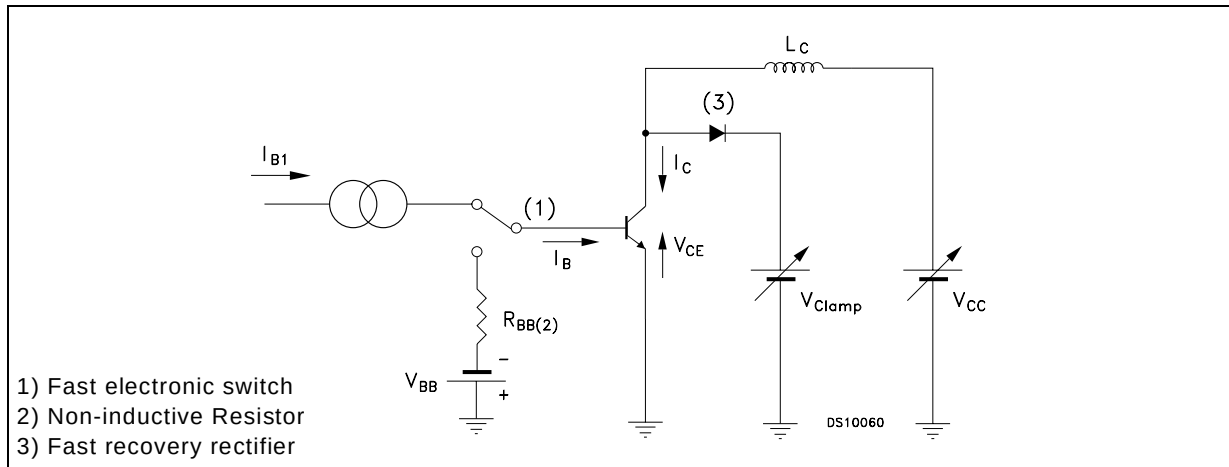
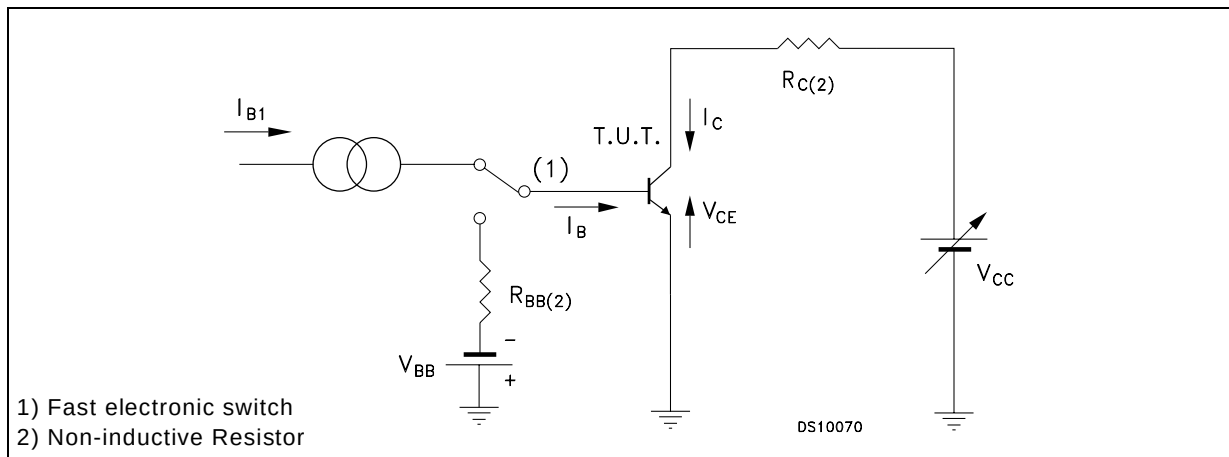
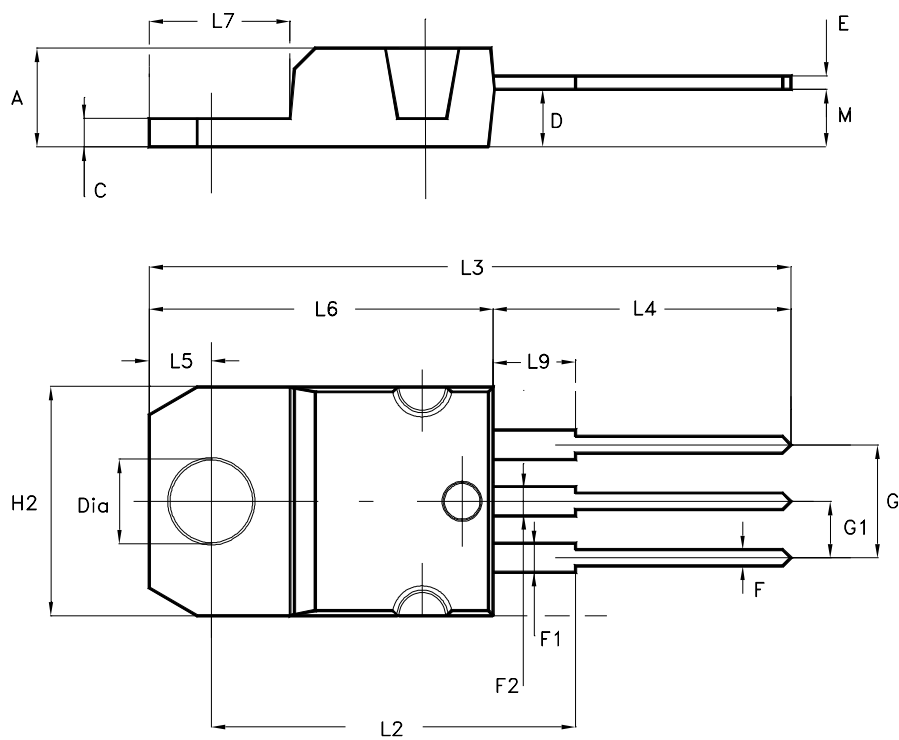


Figure 1: Inductive Load Switching Test Circuit.**Figure 2:** Resistive Load Switching Test Circuit.

TO-220 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.052
D	2.40		2.72	0.094		0.107
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.202
G1	2.40		2.70	0.094		0.106
H2	10.00		10.40	0.394		0.409
L2		16.40			0.645	
L4	13.00		14.00	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.20		6.60	0.244		0.260
L9	3.50		3.93	0.137		0.154
M		2.60			0.102	
DIA.	3.75		3.85	0.147		0.151



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