



ST83003

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- MEDIUM VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED

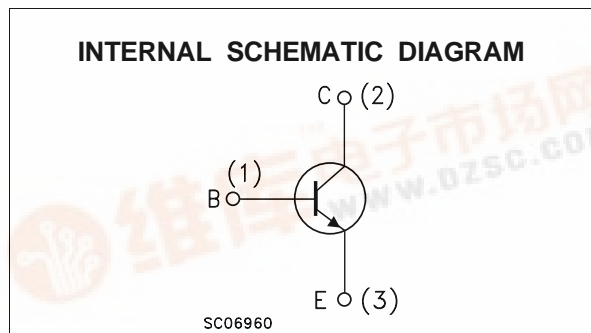
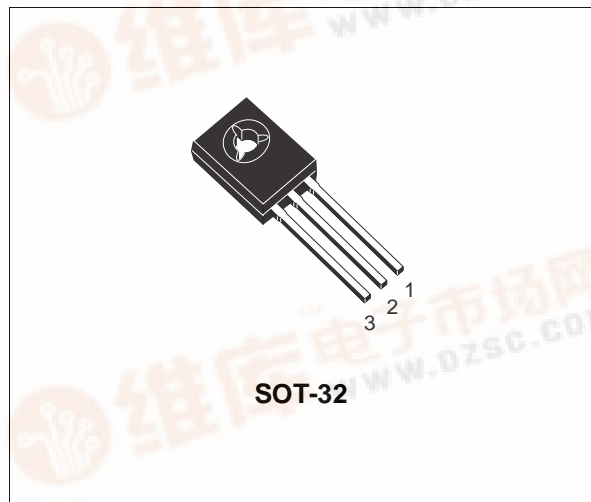
APPLICATIONS:

- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES

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 ST83003 is expressly designed for a new solution to be used in compact fluorescent lamps, where it is coupled with the ST93003, its complementary PNP transistor.



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 ($I_C = 0$, $I_B = 0.75$ A, $t_p < 10\mu s$, $T_j < 150^\circ C$)	$V_{(BR)EBO}$	V
I_C	Collector Current	1.5	A
I_{CM}	Collector Peak Current ($t_p < 5$ ms)	3	A
I_B	Base Current	0.75	A
I_{BM}	Base Peak Current ($t_p < 5$ ms)	1.5	A
P_{tot}	Total Dissipation at $T_c = 25^\circ C$	40	W
T_{stg}	Storage Temperature	-65 to 150	$^\circ C$
T_j	Max. Operating Junction Temperature	150	$^\circ C$

ST83003

THERMAL DATA

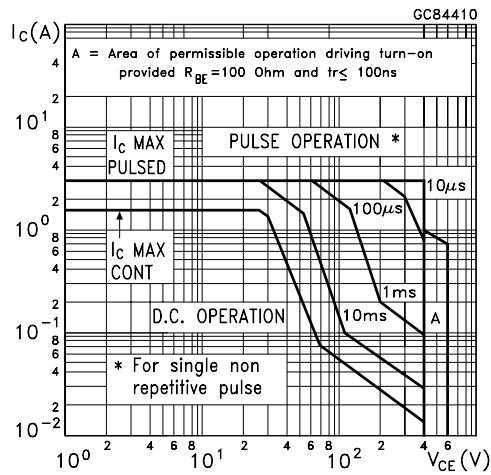
R _{thj-case}	Thermal Resistance Junction-case	Max	3.12	°C/W
R _{thj-amb}	Thermal Resistance Junction-ambient	Max	89	°C/W

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

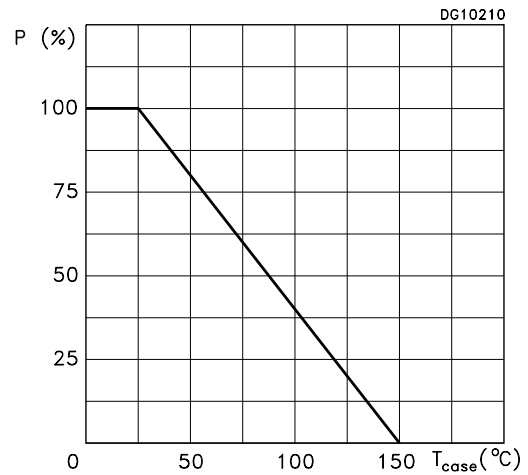
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I _{CEV}	Collector Cut-off Current (V _{BE} = -1.5V)	V _{CE} = 700V V _{CE} = 700V	T _j = 125°C			1 5	mA mA
V _{(BR)EBO}	Emitter-Base Breakdown Voltage (I _C = 0)	I _E = 10 mA		12		18	V
V _{CEO(sus)} *	Collector-Emitter Sustaining Voltage (I _B = 0)	I _C = 10 mA L = 25 mH		400			V
V _{CE(sat)} *	Collector-Emitter Saturation Voltage	I _C = 0.5 A I _C = 0.35 A	I _B = 0.1 A I _B = 50 mA			0.5 1	V V
V _{BE(sat)} *	Base-Emitter Saturation Voltage	I _C = 0.5 A	I _B = 0.1 A			1	V
h _{FE} *	DC Current Gain	I _C = 10 mA I _C = 0.35 A I _C = 1 A	V _{CE} = 5 V V _{CE} = 5 V V _{CE} = 5 V	10 16 4	25	32	
t _r t _s t _f	RESISTIVE LOAD Rise Time Storage Time Fall Time	I _C = 0.35 A I _{B1} = 70 mA T _p ≥ 25 μs	V _{CC} = 125 V I _{B2} = -70 mA (see figure 2)	1.5	100 2.2 0.2	2.9	ns μs μs
t _s t _f	INDUCTIVE LOAD Storage Time Fall Time	I _C = 0.5 A V _{BE(off)} = -5 V V _{clamp} = 300 V	I _{B1} = 0.1 A L = 10 mH (see figure 1)		450 90		ns ns

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

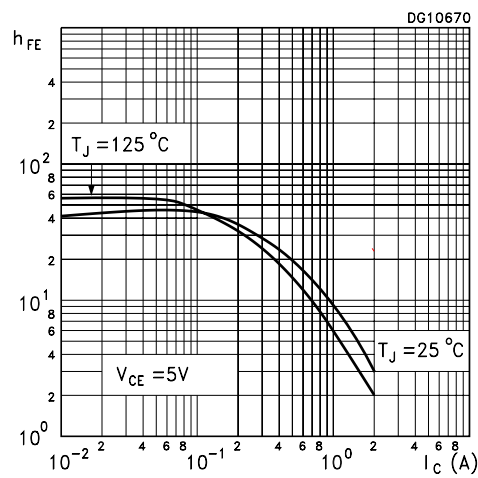
Safe Operating Areas



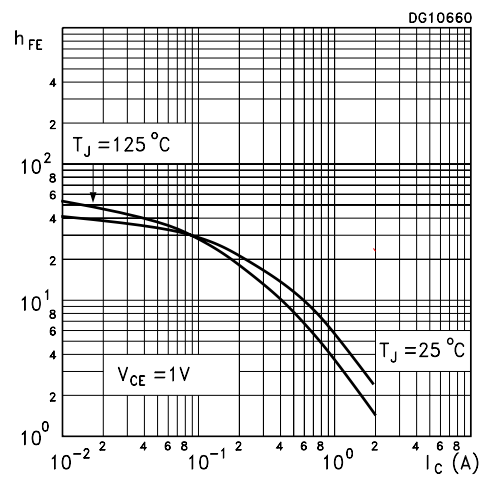
Derating Curve



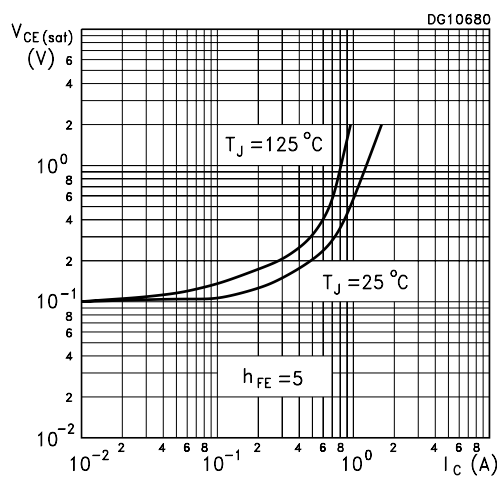
DC Current Gain



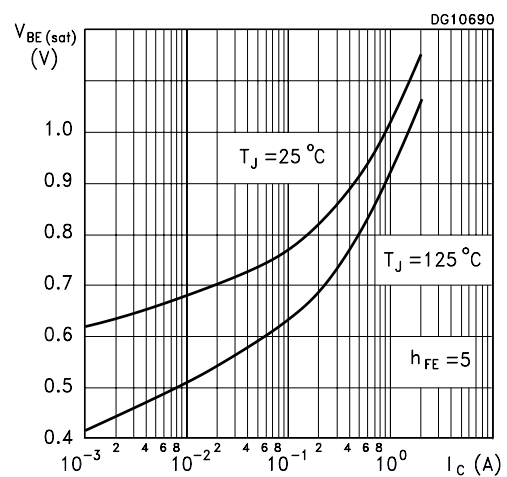
DC Current Gain



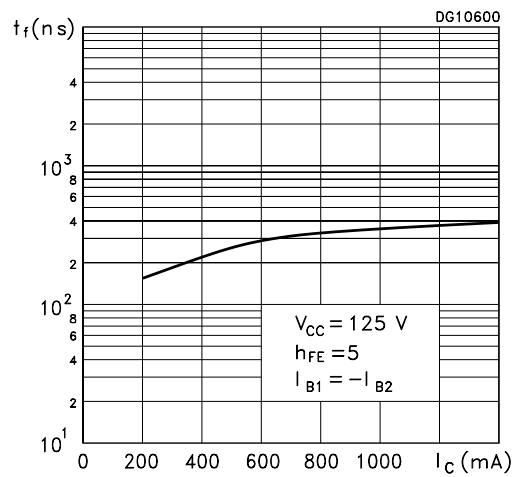
Collector Emitter Saturation Voltage



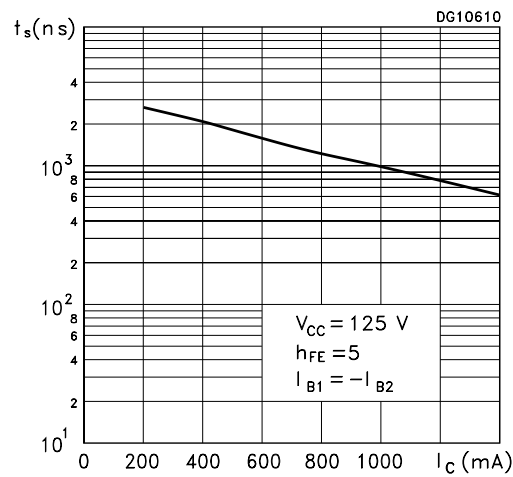
Base Emitter Saturation Voltage



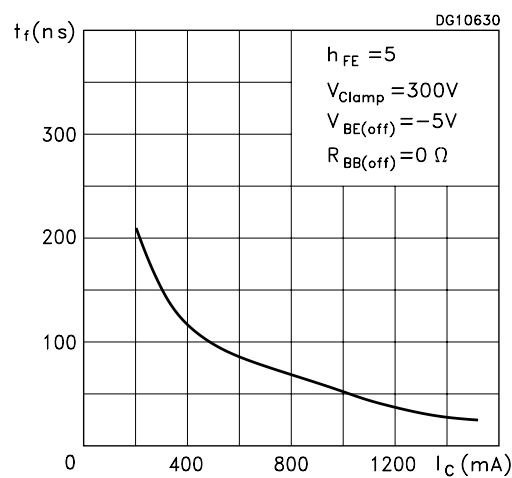
Resistive Load Fall Time



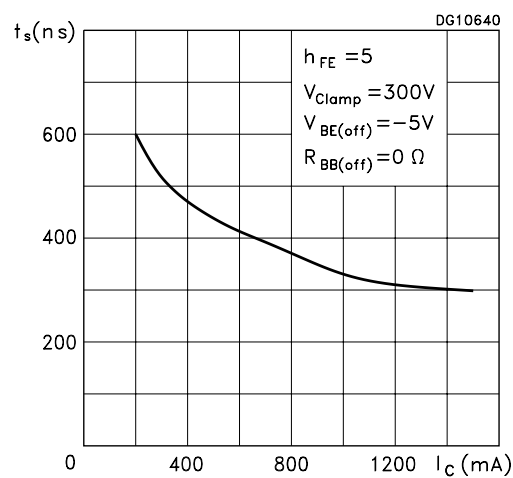
Resistive Load Storage Time



Inductive Load Fall Time



Inductive Load Storage Time



Reverse Biased SOA

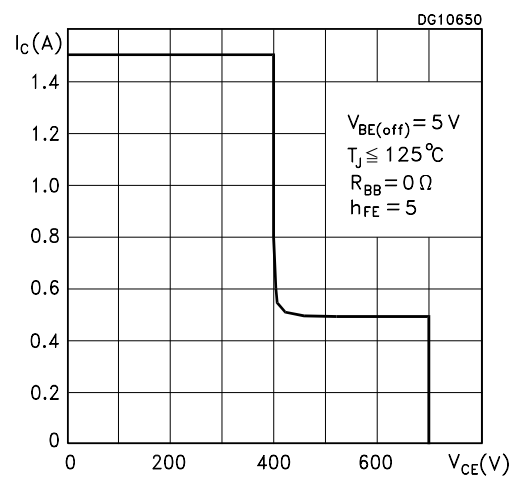


Figure 1: Inductive Load Switching Test Circuit.

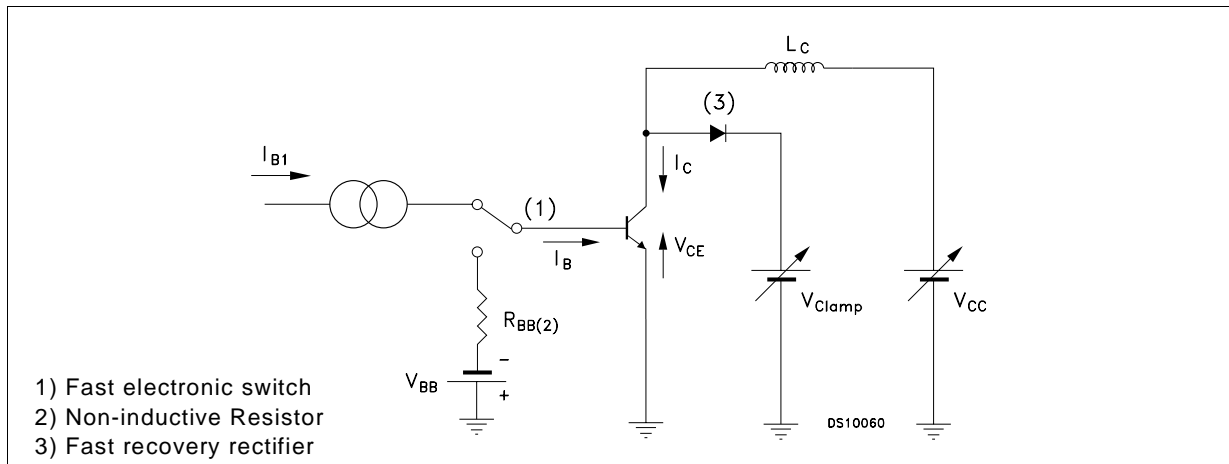
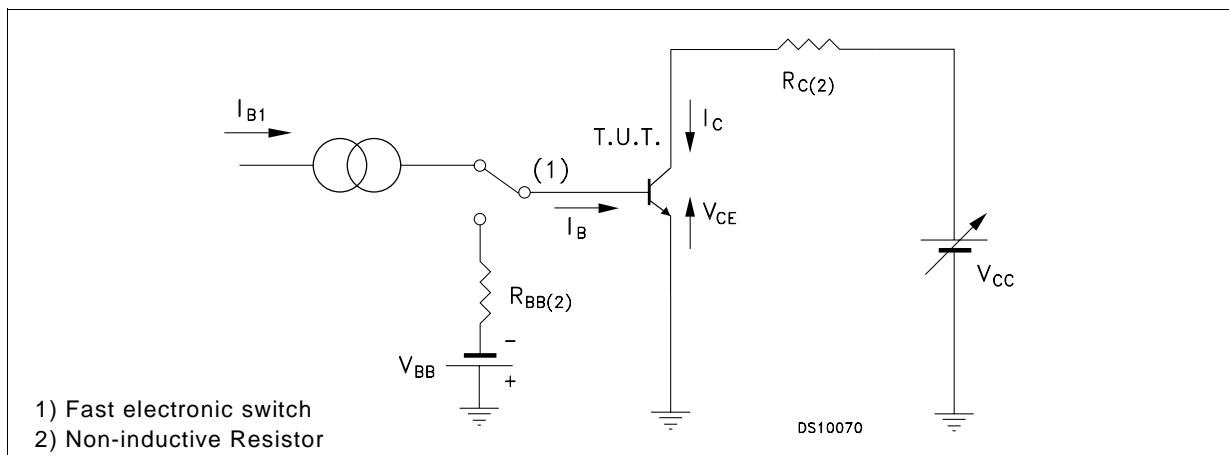
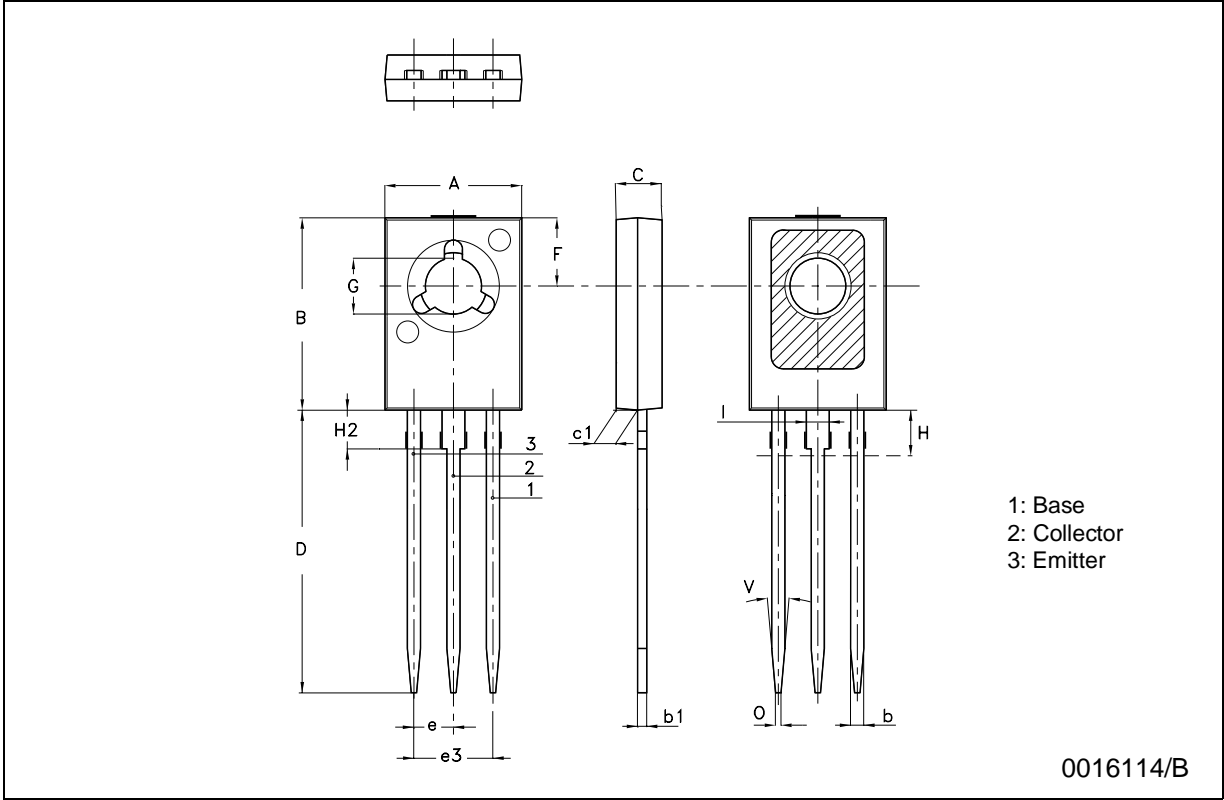


Figure 2: Resistive Load Switching Test Circuit.



SOT-32 (TO-126) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	7.4		7.8	0.291		0.307
B	10.5		10.8	0.413		0.425
b	0.7		0.9	0.028		0.035
b1	0.40		0.65	0.015		0.025
C	2.4		2.7	0.094		0.106
c1	1.0		1.3	0.039		0.051
D	15.4		16.0	0.606		0.630
e		2.2			0.087	
e3		4.4			0.173	
F		3.8			0.150	
G	3		3.2	0.118		0.126
H			2.54			0.100
H2		2.15			0.084	
I		1.27			0.05	
O		0.3			0.011	
V		10°			10°	



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