



STX83003

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- ST83003 SILICON IN TO-92 PACKAGE
- MEDIUM VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED

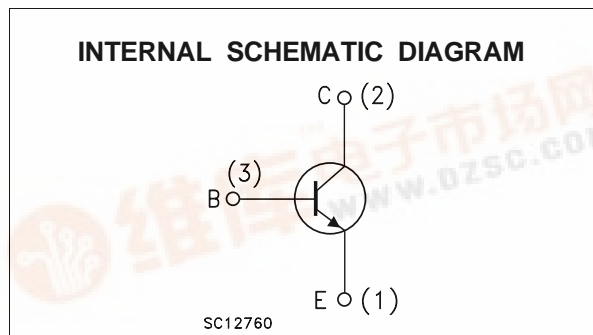
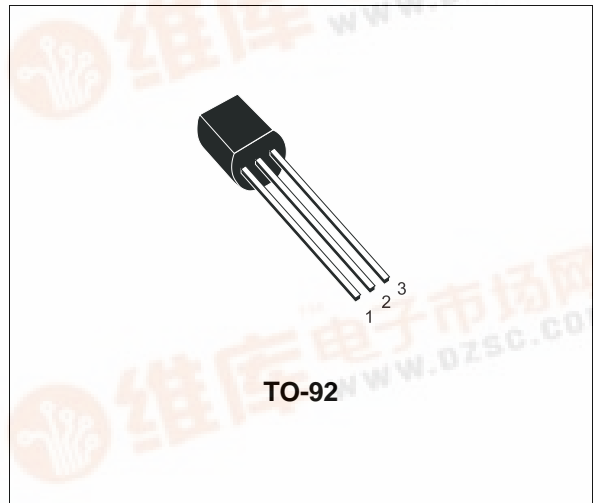
APPLICATIONS:

- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING

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 STX83003 is expressly designed for a new solution to be used in compact fluorescent lamps, where it is coupled with the STX93003, 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 ($I_C = 0, I_B = 0.5 \text{ A}, t_p < 10 \mu\text{s}, T_j < 150^\circ\text{C}$)	$V_{(BR)EBO}$	V
I_C	Collector Current	1	A
I_{CM}	Collector Peak Current ($t_p < 5 \text{ ms}$)	3	A
I_B	Base Current	0.5	A
I_{BM}	Base Peak Current ($t_p < 5 \text{ ms}$)	1.5	A
P_{tot}	Total Dissipation at $T_C = 25^\circ\text{C}$	1.5	W
T_{stg}	Storage Temperature	-65 to 150	$^\circ\text{C}$
T_j	Max. Operating Junction Temperature	150	$^\circ\text{C}$

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THERMAL DATA

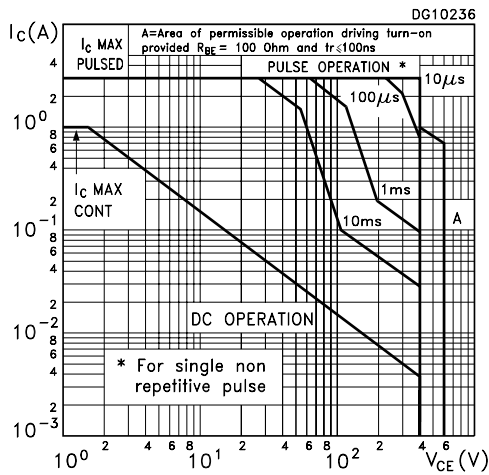
R _{thj-case}	Thermal Resistance Junction-Case	Max	83.3	°C/W
R _{thj-amb}	Thermal Resistance Junction-Ambient	Max	200	°C/W

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

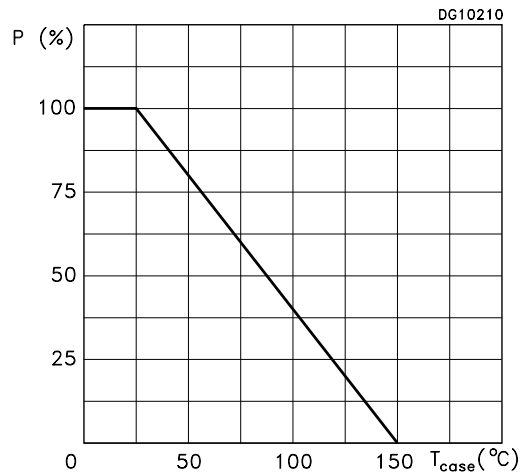
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I _{CES}	Collector Cut-off Current (V _{BE} = 0)	V _{CE} = 700V V _{CE} = 700V	T _j = 125°C			1 5	mA mA
V _{(BR)EBO}	Emitter-Base Breakdown Voltage (I _C = 0)	I _E = 10 mA		12		18	V
V _{CEO(sus)*}	Collector-Emitter Sustaining Voltage (I _B = 0)	I _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 %.

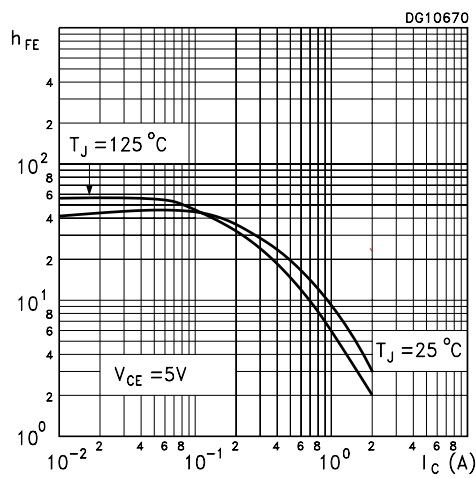
Safe Operating Area



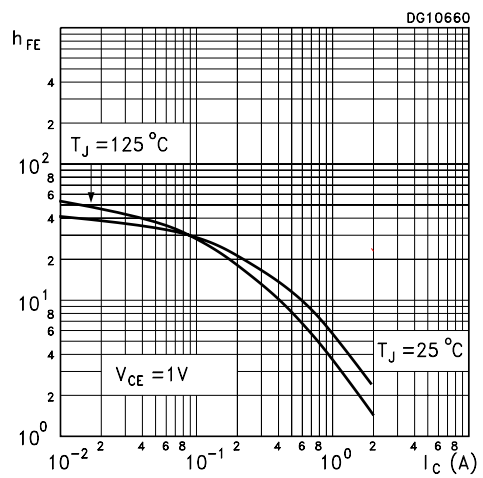
Derating Curve



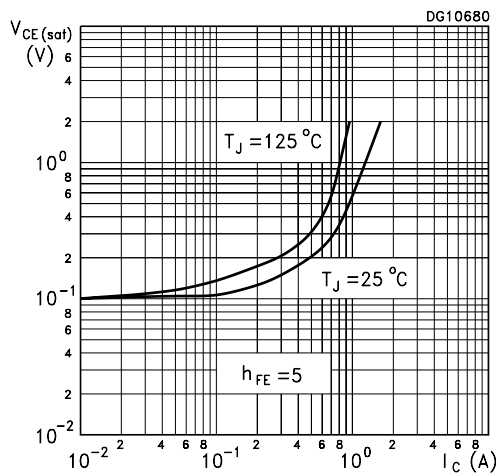
DC Current Gain



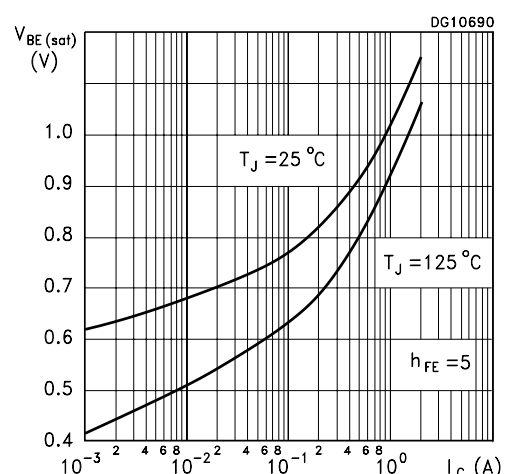
DC Current Gain



Collector Emitter Saturation Voltage

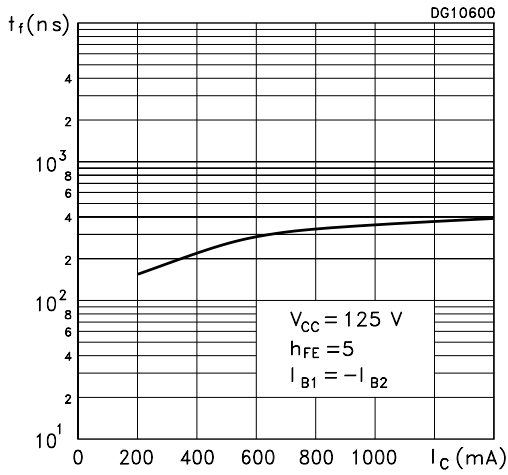


Base Emitter Saturation Voltage

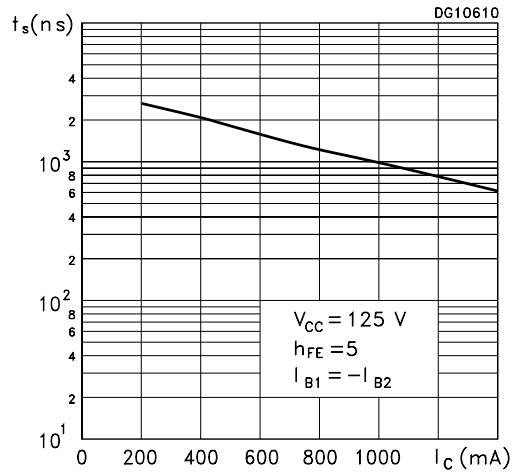


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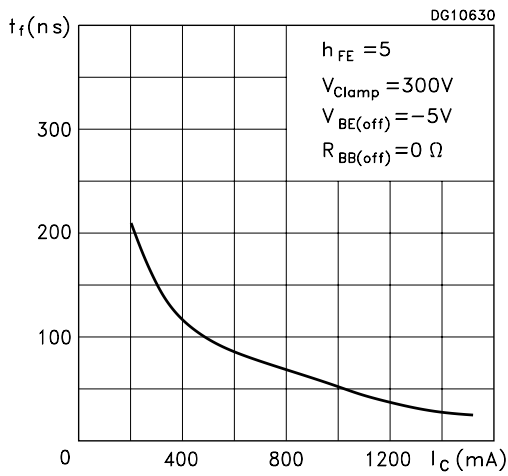
Resistive Load Fall Time



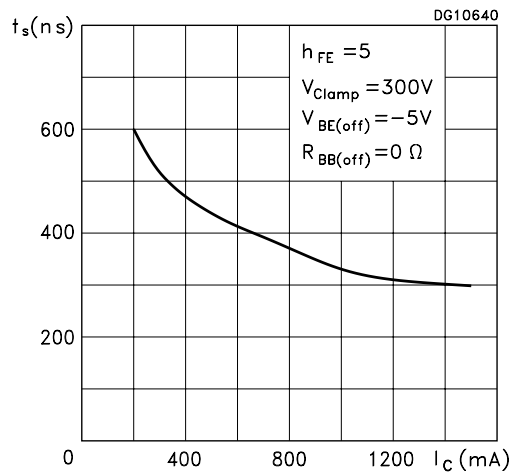
Resistive Load Storage Time



Inductive Load Fall Time



Inductive Load Storage Time



Reverse Biased SOA

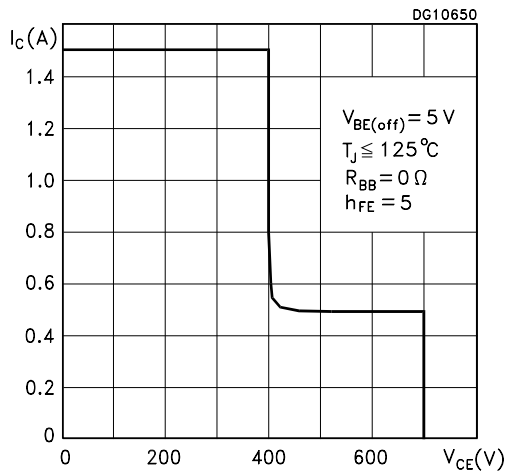
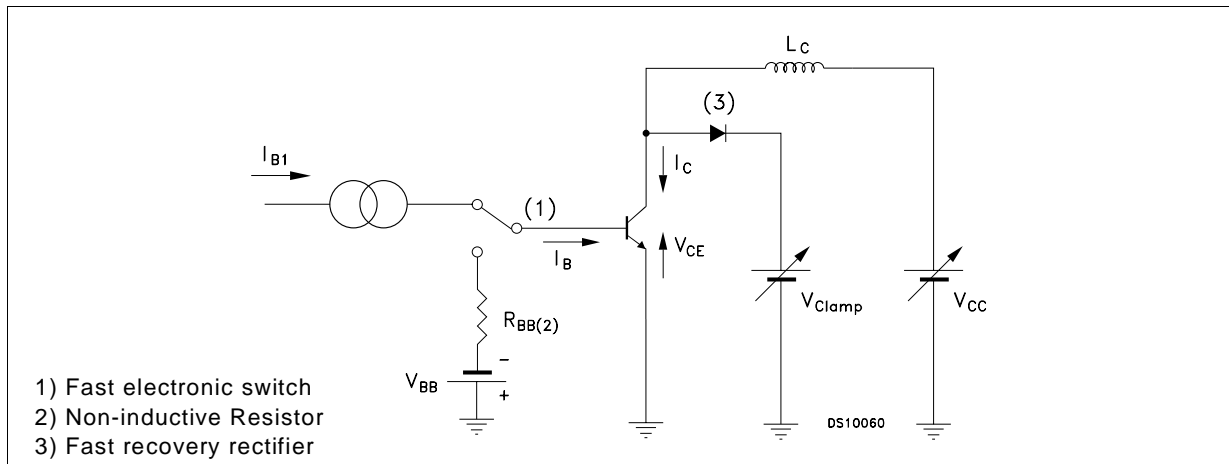
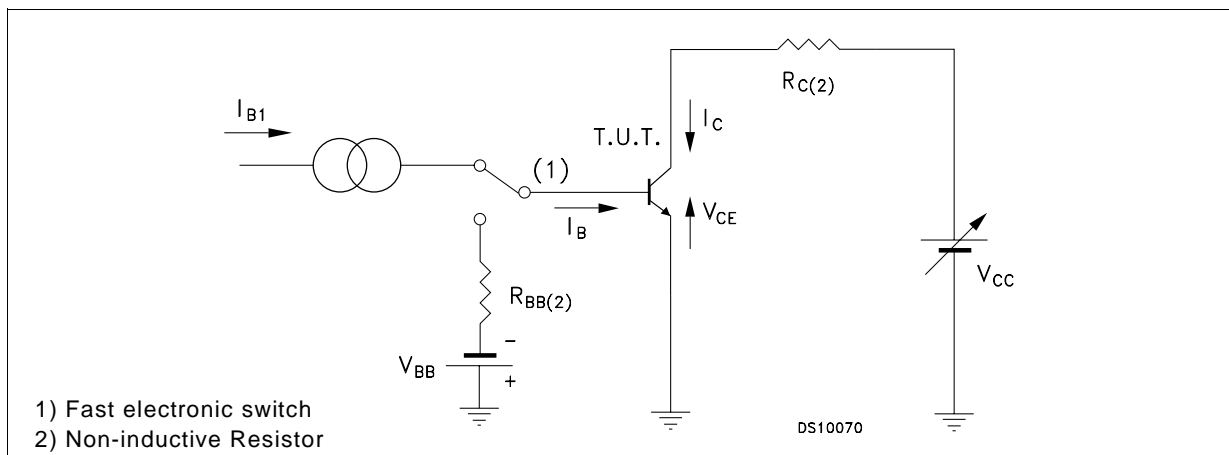
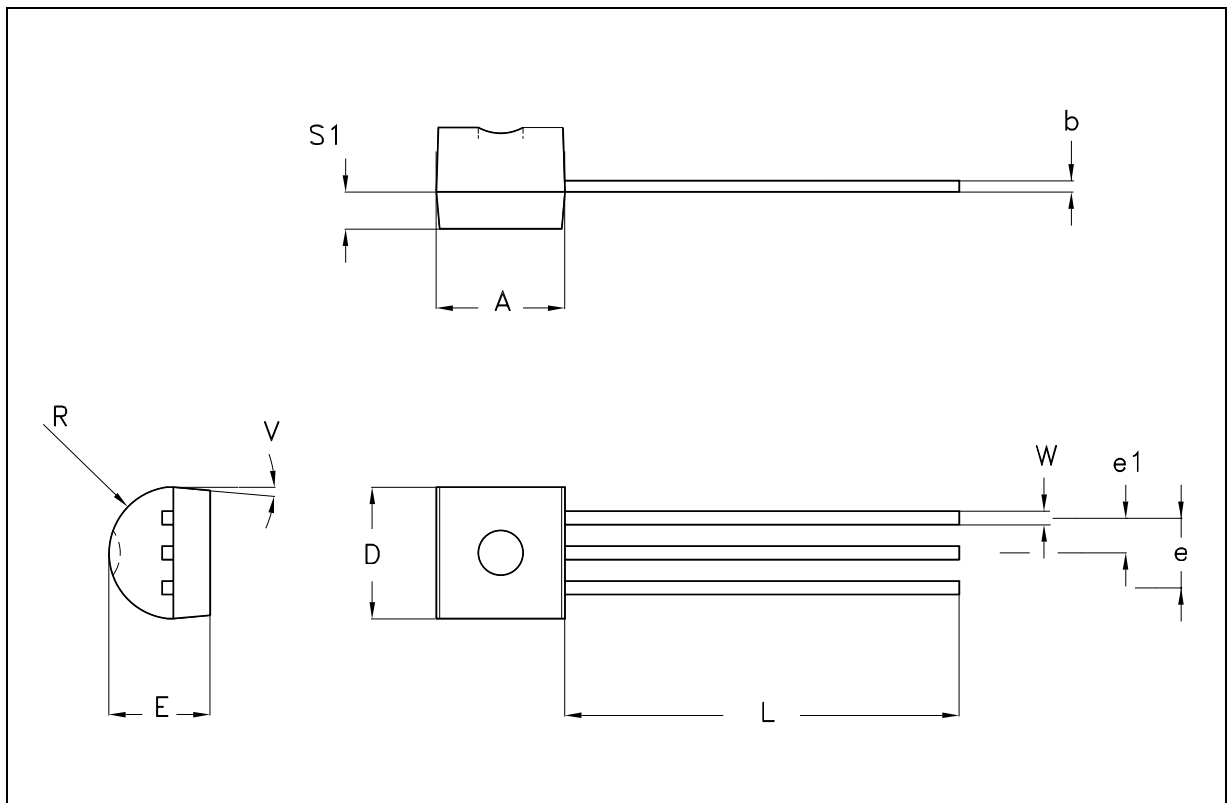


Figure 1: Inductive Load Switching Test Circuit.**Figure 2:** Resistive Load Switching Test Circuit.

TO-92 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.32		4.95	0.170		0.195
b	0.36		0.51	0.014		0.020
D	4.45		4.95	0.175		0.194
E	3.30		3.94	0.130		0.155
e	2.41		2.67	0.095		0.105
e1	1.14		1.40	0.045		0.055
L	12.70		15.49	0.500		0.609
R	2.16		2.41	0.085		0.094
S1	1.14		1.52	0.045		0.059
W	0.41		0.56	0.016		0.022
V	4 degree		6 degree	4 degree		6 degree



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