STX93003

HIGH VOLTAGE FAST-SWITCHING PNP POWER TRANSISTOR

- ST93003 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

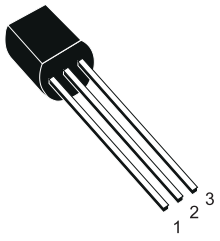
APPLICATIONS:

- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING

DESCRIPTION

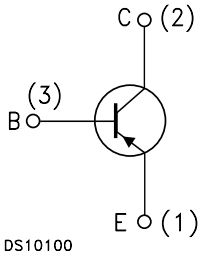
The device is manufactured using high voltage Multi-Epitaxial Planar technology for high switching speeds and medium voltage capability. It uses a Cellular Emitter structure with planar edge termination to enhance switching speeds while maintaining the wide RBSOA.

The STX93003 is expressly designed for a new solution to be used in compact fluorescent lamps, where it is coupled with the STX83003, its complementary NPN transistor.



TO-92

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CES}	Collector-Emitter Voltage (V_{BE} = 0)	-500	V
V_{CEO}	Collector-Emitter Voltage (I_B = 0)	-400	V
V_{EBO}	Emitter-Base Voltage (I_C = 0) (I_C = 0, I_B = -0.5 A, t_p < 10µs, T_j < 150°C)	$V_{(BR)EBO}$	V
I_C	Collector Current	-1	A
I_{CM}	Collector Peak Current (t_p < 5 ms)	-3	A
I_B	Base Current	-0.5	A
I_{BM}	Base Peak Current (t_p < 5 ms)	-1.5	A
P_{tot}	Total Dissipation at T_C = 25 °C	1.5	W
T_{stg}	Storage Temperature	-65 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C

THERMAL DATA

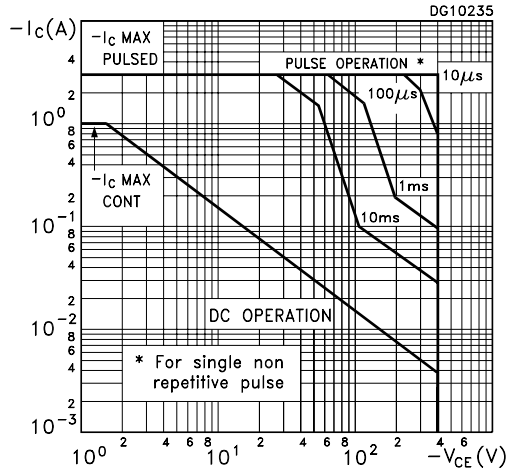
$R_{thj\text{-}case}$	Thermal Resistance Junction-Case	Max	83.3	$^oC/W$
$R_{thj\text{-}Amb}$	Thermal Resistance Junction-Ambient	Max	200	$^oC/W$

ELECTRICAL CHARACTERISTICS (T_{case} = 25 ^oC unless otherwise specified)

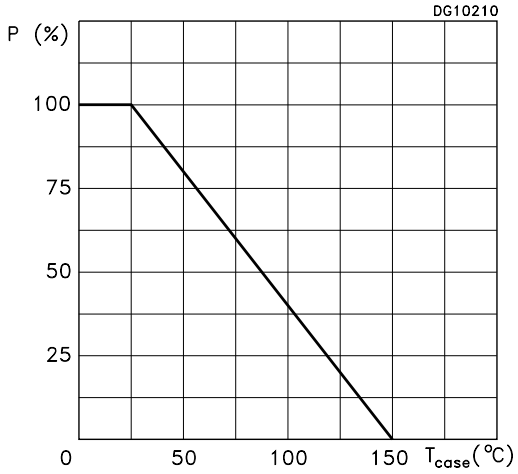
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current (V_{BE} = 0)	V_{CE} = -500V V_{CE} = -500V T_j = 125^oC			-1 -5	mA mA
$V_{(BR)EBO}$	Emitter Base Breakdown Voltage (I_C = 0)	I_E = -10 mA	-5		-10	V
$V_{CEO(sus)}$*	Collector-Emitter Sustaining Voltage (I_B = 0)	I_C = -10 mA L = 25 mH	-400			V
$V_{CE(sat)}$*	Collector-Emitter Saturation Voltage	I_C = -0.5 A I_B = -0.1 A I_C = -0.35 A I_B = -50 mA			-0.5 -0.5	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 V_{CE} = -5 V I_C = -0.35 A V_{CE} = -5 V I_C = -1 A 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 V_{CC} = 125 V I_{B1} = -70 mA I_{B2} = 70 mA $T_p \geq$ 25 µs (see Figure 2)	 1.5	 90 2.2 0.1	 2.9	 ns µs µs
t_s t_f	INDUCTIVE LOAD Storage Time Fall Time	I_C = -0.5 A I_{B1} = -0.1 A $V_{BE(off)}$ = 5 V L = 10 mH V_{clamp} = 300 V (see Figure 1)		 400 40		 ns ns
E_{sb}	Avalanche Energy	L = 4 mH C = 1.8 nF $I_{BR} \leq$ 2.5 A 25^oC < T_C < 125^oC	12			mJ

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

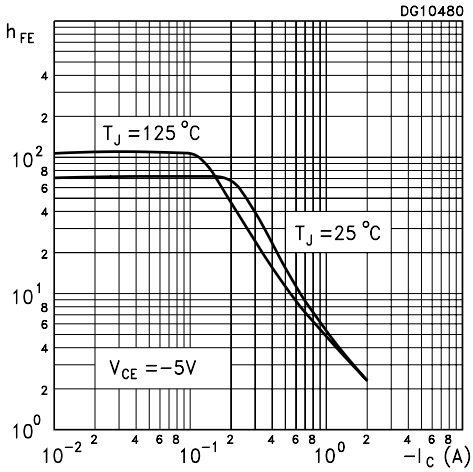
Safe Operating Area



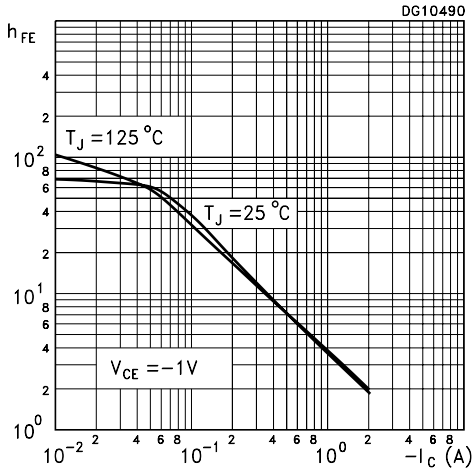
Derating Curve



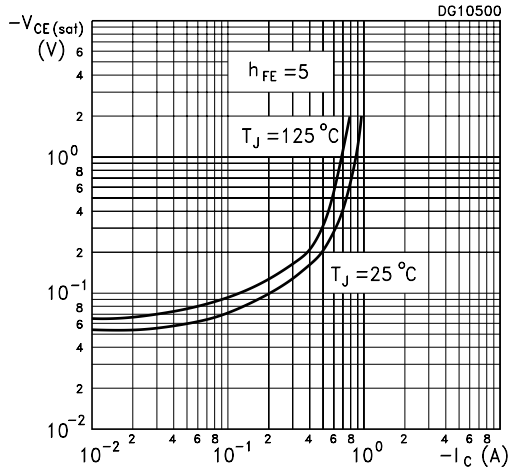
DC Current Gain



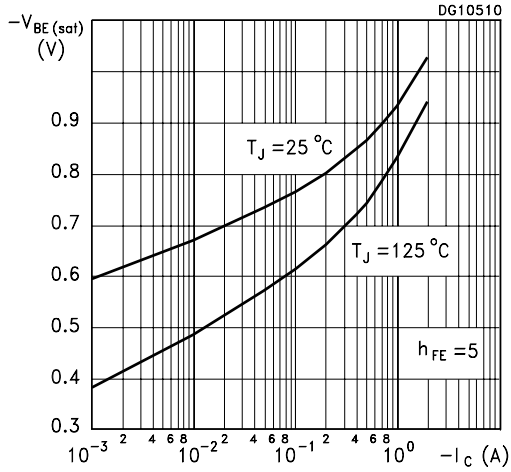
DC Current Gain



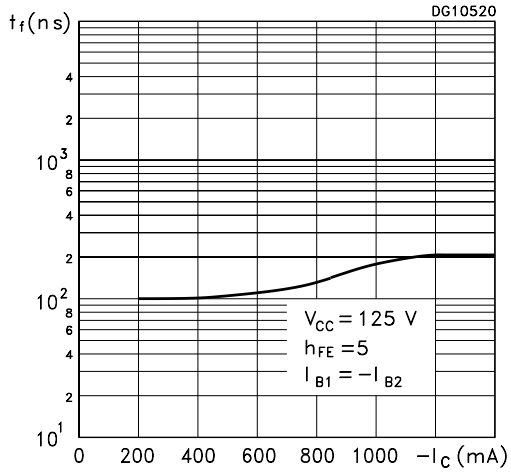
Collector Emitter Saturation Voltage



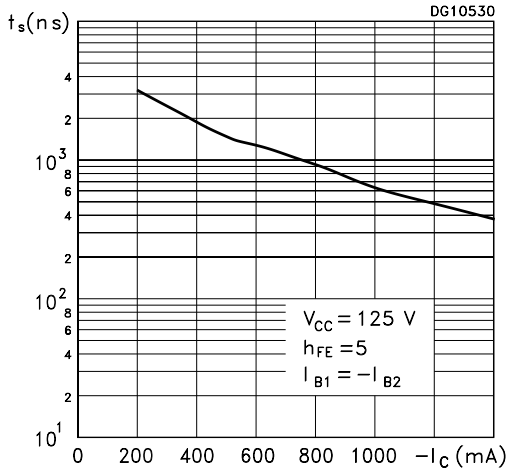
Base Emitter Saturation Voltage



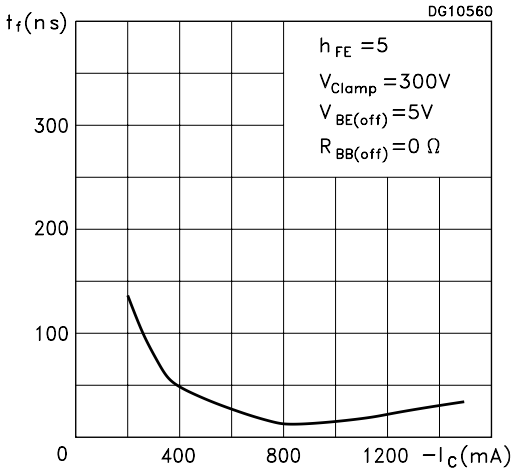
Resistive Load Fall Time



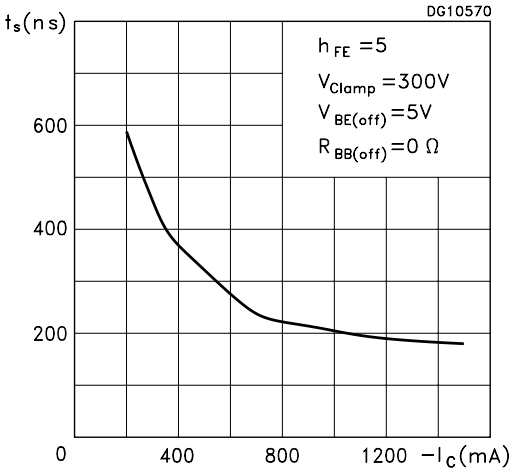
Resistive Load Storage Time



Inductive Load Fall Time



Inductive Load Storage Time



Reverse Biased SOA

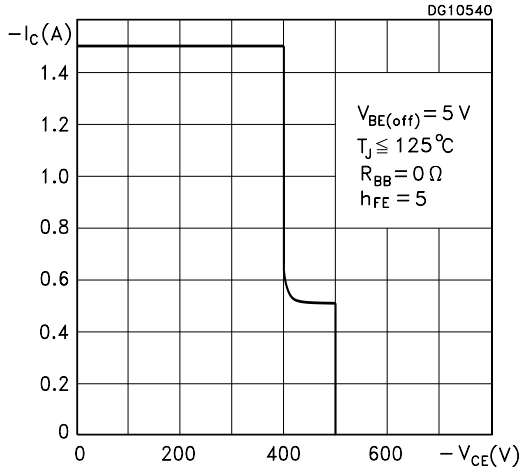


Figure 1: Inductive Load Switching Test Circuit.

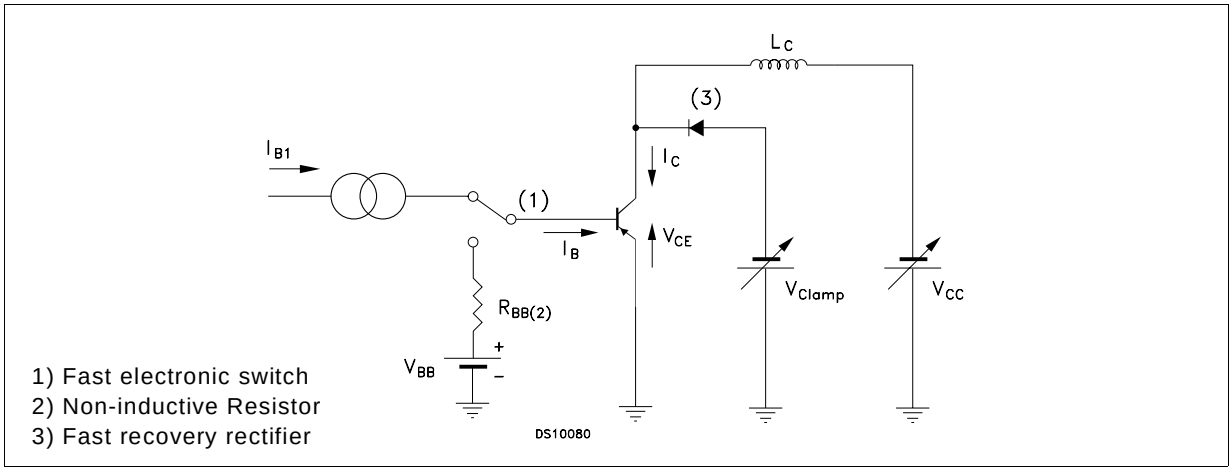
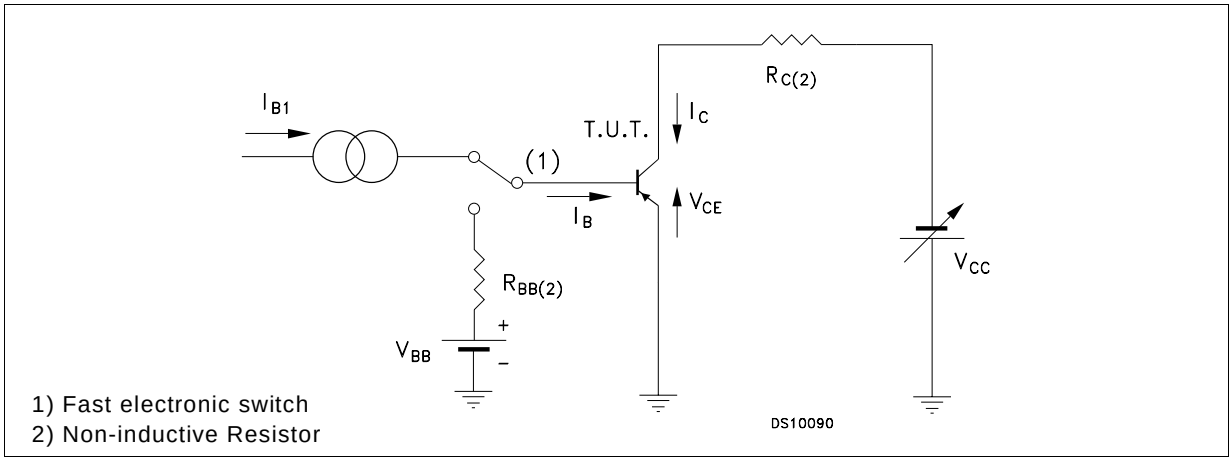
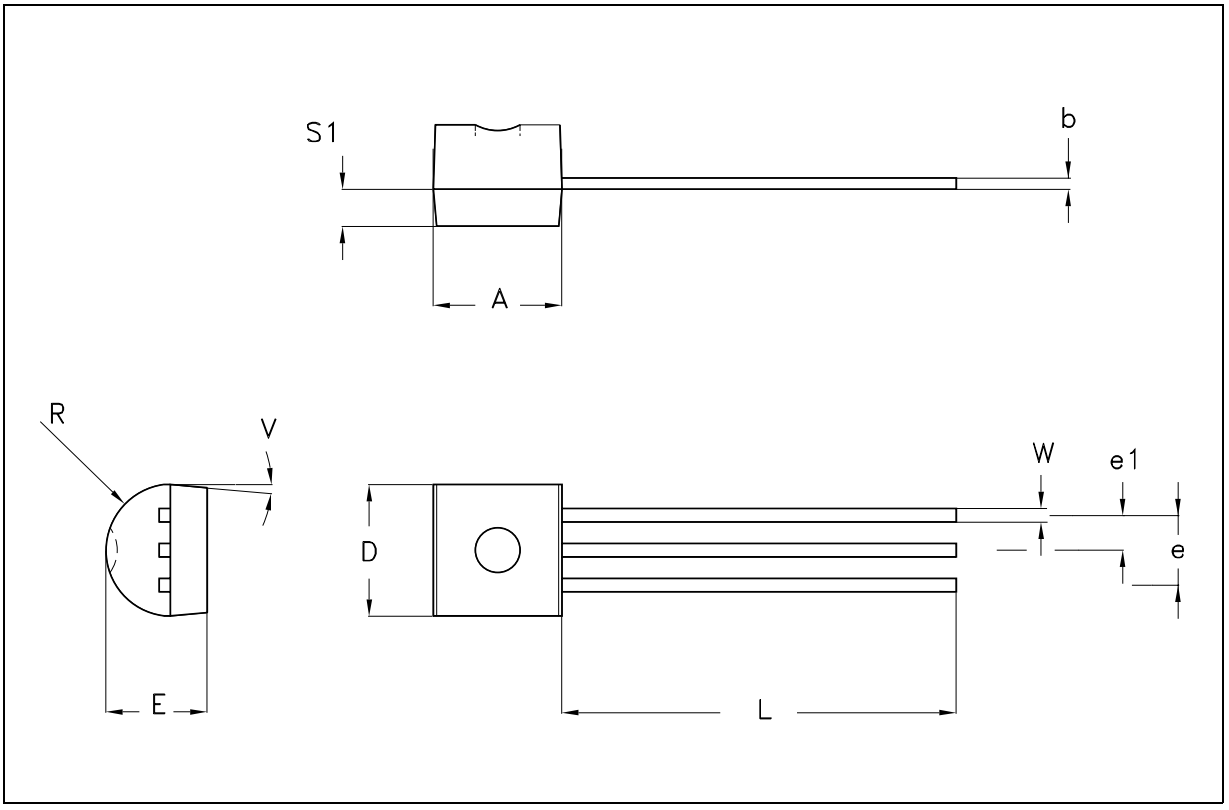


Figure 2: Resistive Load Switching Test Circuit.



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



Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specification mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a trademark of STMicroelectronics

© 2002 STMicroelectronics – Printed in Italy – All Rights Reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States.

http://www.st.com