

# 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

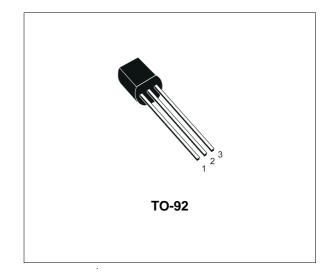
#### **APPLICATIONS:**

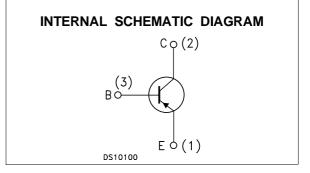
 ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING

#### 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.





#### **ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit	
V <sub>CES</sub>	Collector-Emitter Voltage (V <sub>BE</sub> = 0)	-500	V	
$V_{CEO}$	Collector-Emitter Voltage $(I_B = 0)$	-400	V	
Vebo	Emitter-Base Voltage (I <sub>C</sub> = 0) (I <sub>C</sub> = 0, I <sub>B</sub> = -0.5 A, $t_p < 10\mu s$ , $T_j < 150^{\circ}C$ )	$V_{(BR)EBO}$	V	
Ιc	Collector Current	-1	A	
Ісм	Collector Peak Current (t <sub>p</sub> < 5 ms)	-3	A	
Ι <sub>Β</sub>	Base Current	-0.5	A	
I <sub>BM</sub>	Base Peak Current (t <sub>p</sub> < 5 ms)	-1.5	A	
P <sub>tot</sub>	Total Dissipation at $T_C = 25 \ ^{\circ}C$	1.5	W	
T <sub>stg</sub>	Storage Temperature	-65 to 150	°C	
Tj	Max. Operating Junction Temperature	150	°C	

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#### THERMAL DATA

R <sub>thj-case</sub>	Thermal Resistance Junction-Case	Мах	83.3	°C/W
$R_{thj-Amb}$	Thermal Resistance Junction-Ambient	Max	200	°C/W

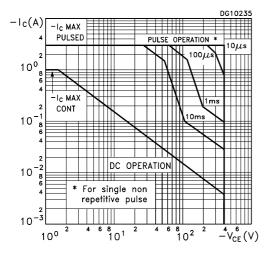
### **ELECTRICAL CHARACTERISTICS** ( $T_{case} = 25 \ ^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Test	Min.	Тур.	Max.	Unit	
ICES	Collector Cut-off Current (V <sub>BE</sub> = 0)	V <sub>CE</sub> = -500V V <sub>CE</sub> = -500V	T <sub>j</sub> = 125 <sup>o</sup> C			-1 -5	mA mA
V <sub>(BR)EBO</sub>	Emitter Base Breakdown Voltage (I <sub>C</sub> = 0)	I <sub>E</sub> = -10 mA		-5		-10	V
V <sub>CEO(sus)</sub> *	Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = -10 mA L = 25 mH		-400			V
V <sub>CE(sat)</sub> *	Collector-Emitter Saturation Voltage	I <sub>C</sub> = -0.5 A I <sub>C</sub> = -0.35 A	I <sub>B</sub> = -0.1 A I <sub>B</sub> = -50 mA			-0.5 -0.5	V V
V <sub>BE(sat)</sub> *	Base-Emitter Saturation Voltage	I <sub>C</sub> = -0.5 A	I <sub>B</sub> = -0.1 A			-1	V
h <sub>FE</sub> *	DC Current Gain	I <sub>C</sub> = -10 mA I <sub>C</sub> = -0.35 A I <sub>C</sub> = -1 A	V <sub>CE</sub> = -5 V V <sub>CE</sub> = -5 V V <sub>CE</sub> = -5 V	10 16 4	25	32	
tr t <sub>s</sub> t <sub>f</sub>	RESISTIVE LOAD Rise Time Storage Time Fall Time	$I_{C} = -0.35 \text{ A}$ $I_{B1} = -70 \text{ mA}$ $T_{p} \ge 25 \mu \text{s}$	$V_{CC} = 125 V$ $I_{B2} = 70 mA$ (see Figure 2)	1.5	90 2.2 0.1	2.9	ns μs μs
t <sub>s</sub> tf	INDUCTIVE LOAD Storage Time Fall Time	$I_{C} = -0.5 A$ $V_{BE(off)} = 5 V$ $V_{clamp} = 300 V$	I <sub>B1</sub> = -0.1 A L = 10 mH (see Figure 1)		400 40		ns ns
Esb	Avalanche Energy	L = 4 mH I <sub>BR</sub> ≤ 2.5 A	C = 1.8 nF 25°C < T <sub>C</sub> < 125°C	12			mJ

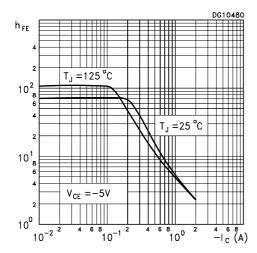
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\* Pulsed: Pulse duration = 300μs, duty cycle = 1.5 %.

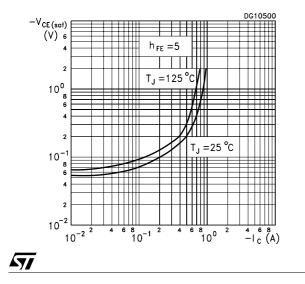
#### Safe Operating Area



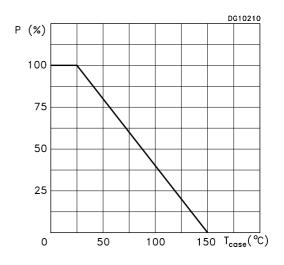
#### DC Current Gain



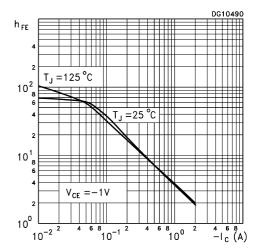
#### Collector Emitter Saturation Voltage



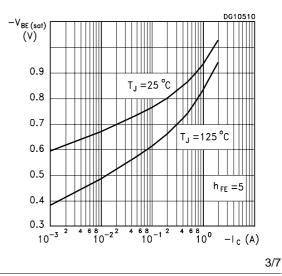
#### **Derating Curve**



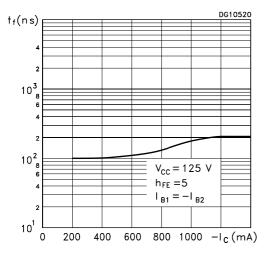
#### DC Current Gain



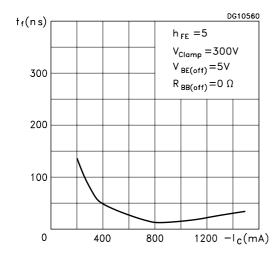




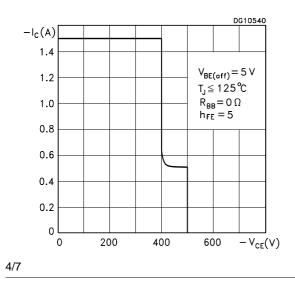
#### Resistive Load Fall Time



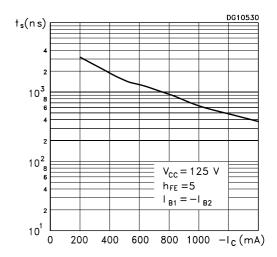
#### Inductive Load Fall Time



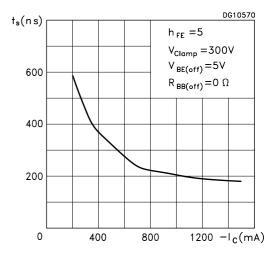
**Reverse Biased SOA** 



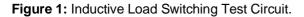
#### **Resistive Load Storage Time**



#### Inductive Load Storage Time



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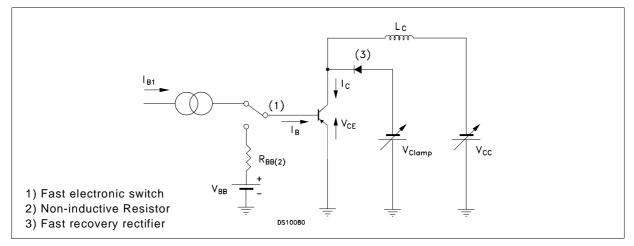
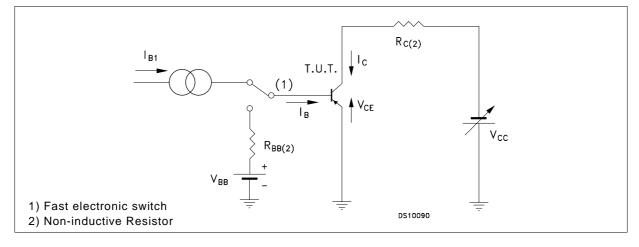


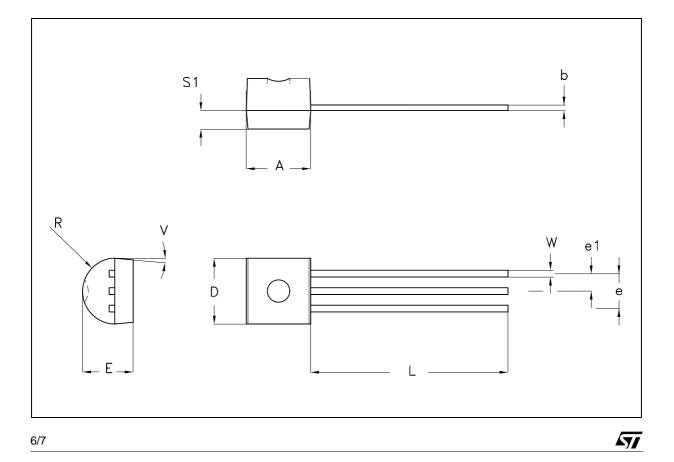
Figure 2: Resistive Load Switching Test Circuit.





DIM.	mm		inch			
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
А	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
е	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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