



**ST93003**

## HIGH VOLTAGE FAST-SWITCHING PNP POWER TRANSISTOR

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

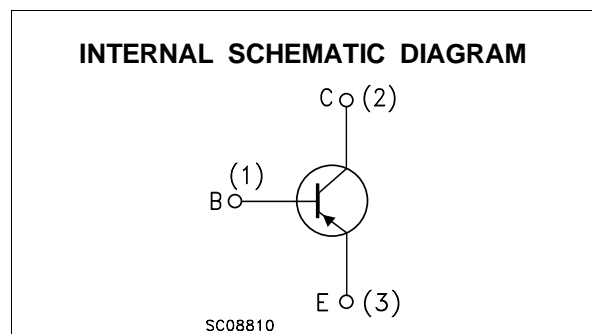
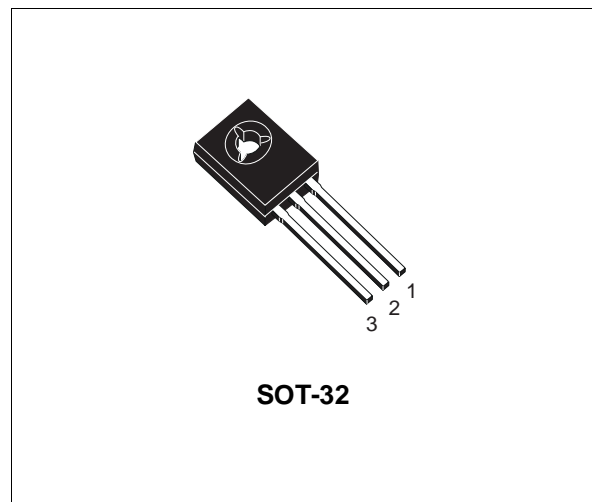
### APPLICATIONS:

- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING

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



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

**THERMAL DATA**

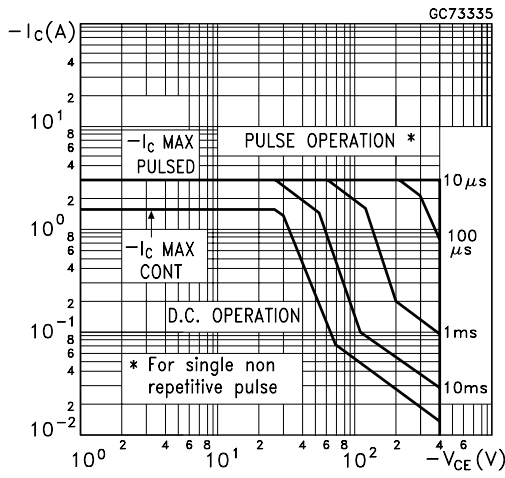
R <sub>thj-case</sub>	Thermal Resistance Junction-case	Max	3.12	°C/W
R <sub>thj-amb</sub>	Thermal Resistance Junction-ambient	Max	89	°C/W

**ELECTRICAL CHARACTERISTICS** (T<sub>case</sub> = 25 °C unless otherwise specified)

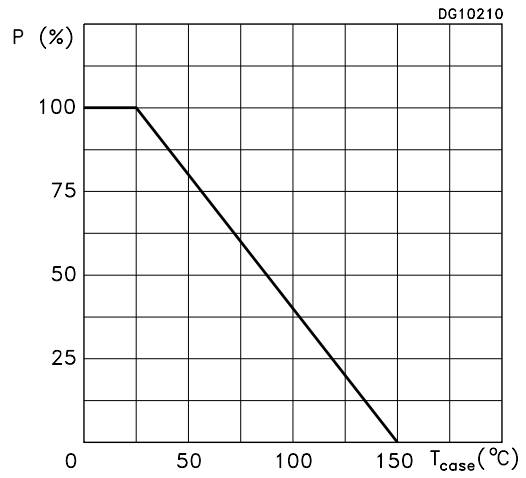
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CES</sub>	Collector Cut-off Current (V <sub>BE</sub> = 0)	V <sub>CE</sub> = -500V V <sub>CE</sub> = -500V T <sub>j</sub> = 125°C			-1 -5	mA mA
V <sub>(BR)EBO</sub>	Emitter Base Breakdown Voltage (I <sub>C</sub> = 0)	I <sub>E</sub> = -10 mA	-5		-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			-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	10 16 4	25	32	
t <sub>r</sub> t <sub>s</sub> t <sub>f</sub>	RESISTIVE LOAD Rise Time Storage Time Fall Time	I <sub>C</sub> = -0.35 A I <sub>B1</sub> = -70 mA T <sub>p</sub> ≥ 25 μs		90 2.2 0.1		ns μs μs
t <sub>s</sub> t <sub>f</sub>	INDUCTIVE LOAD Storage Time Fall Time	I <sub>C</sub> = -0.5 A V <sub>BE(off)</sub> = 5 V V <sub>clamp</sub> = 300 V		400 40		ns ns
E <sub>sb</sub>	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

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

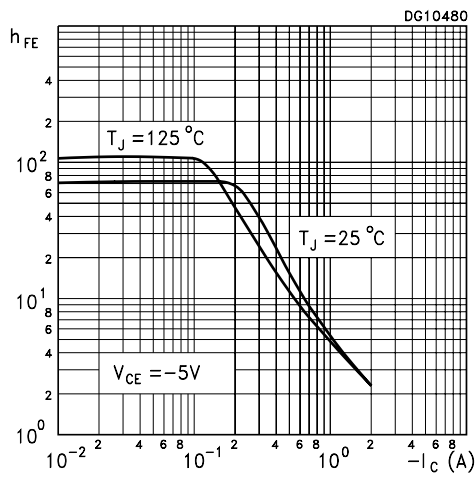
Safe Operating Area



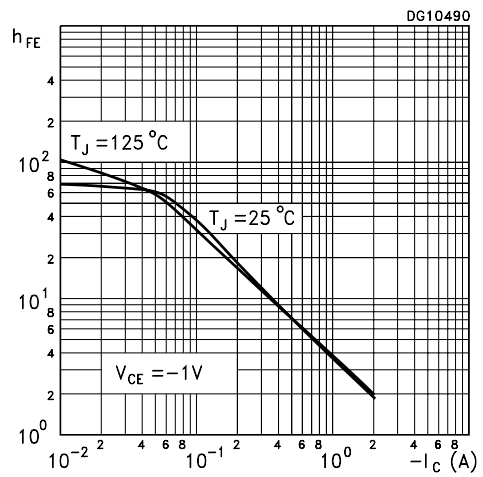
Derating Curve



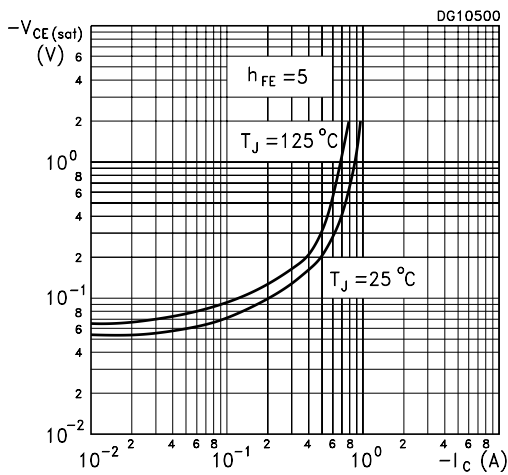
DC Current Gain



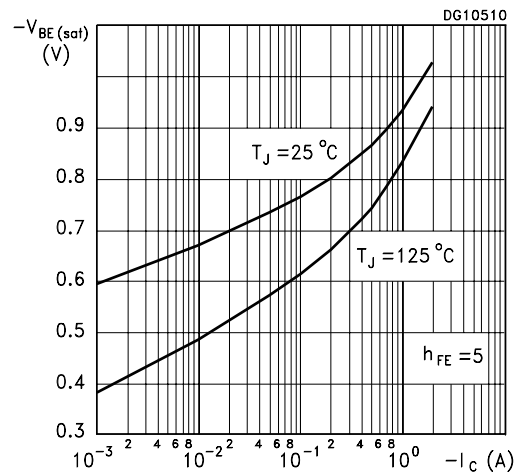
DC Current Gain



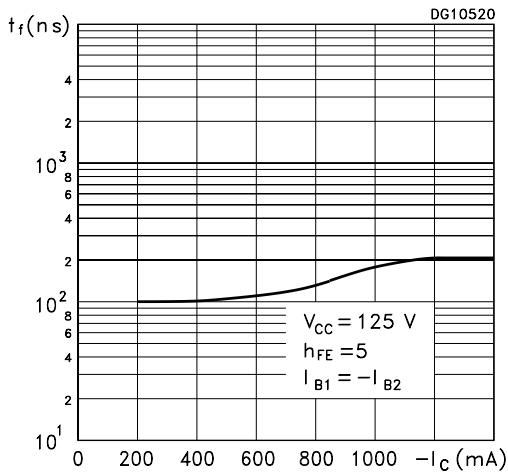
Collector Emitter Saturation Voltage



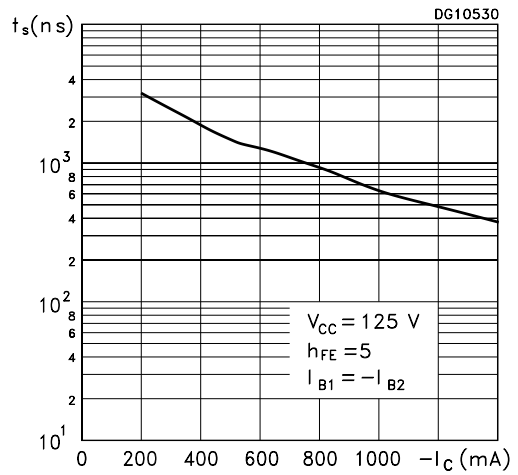
Base Emitter Saturation Voltage



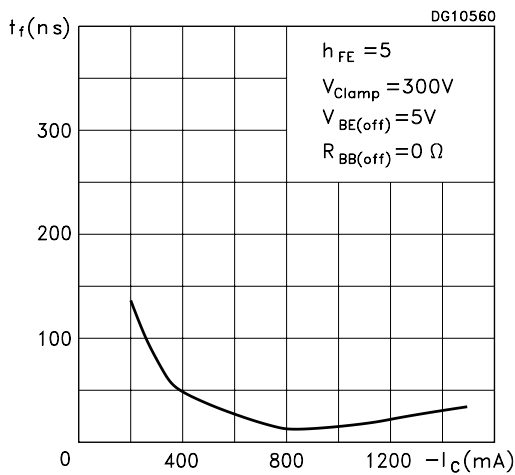
Resistive Fall Time



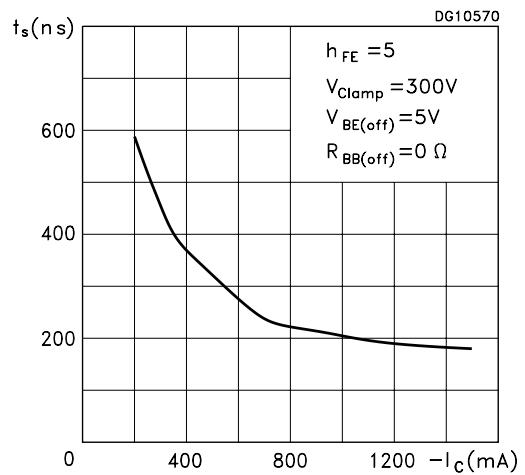
Resistive Storage Time



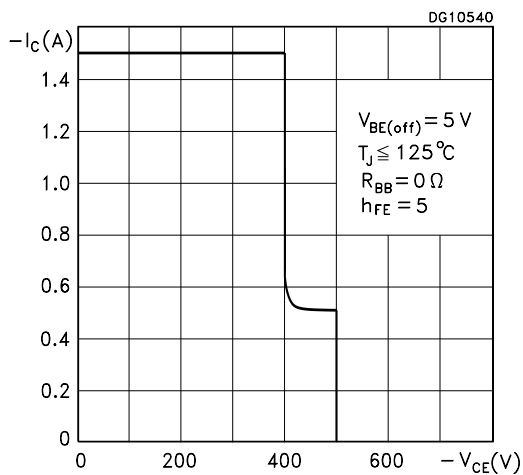
Inductive Fall Time



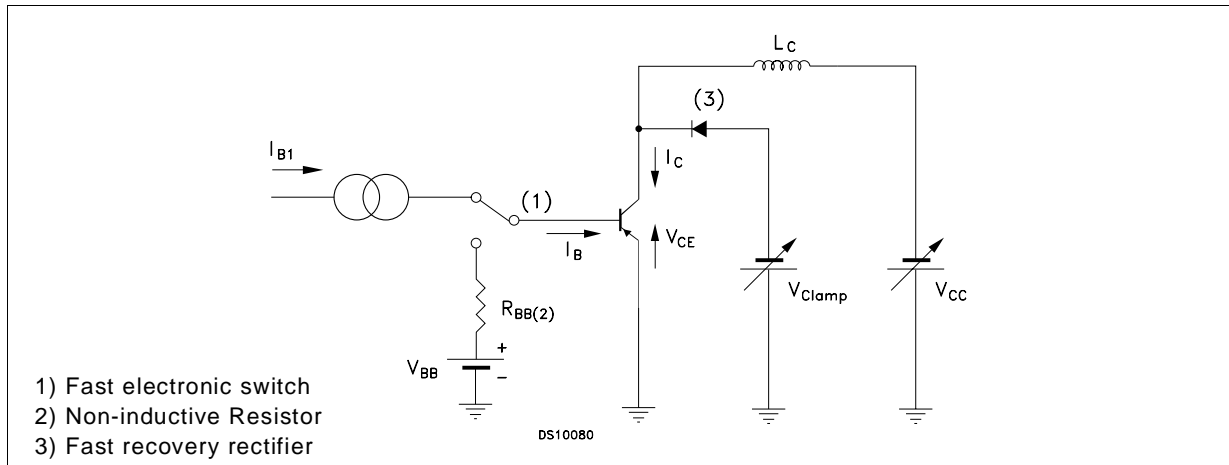
Inductive Storage Time



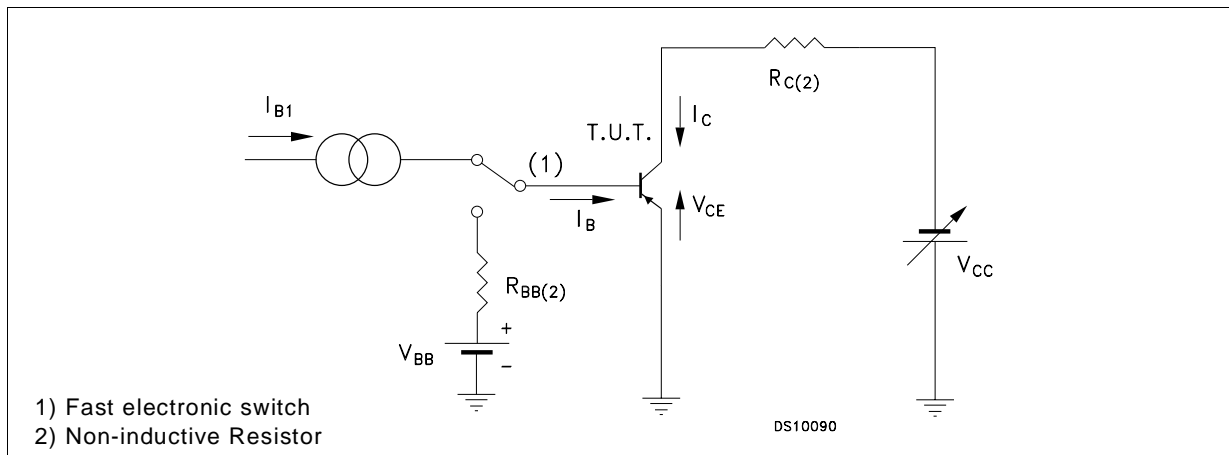
Reverse Biased SOA



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

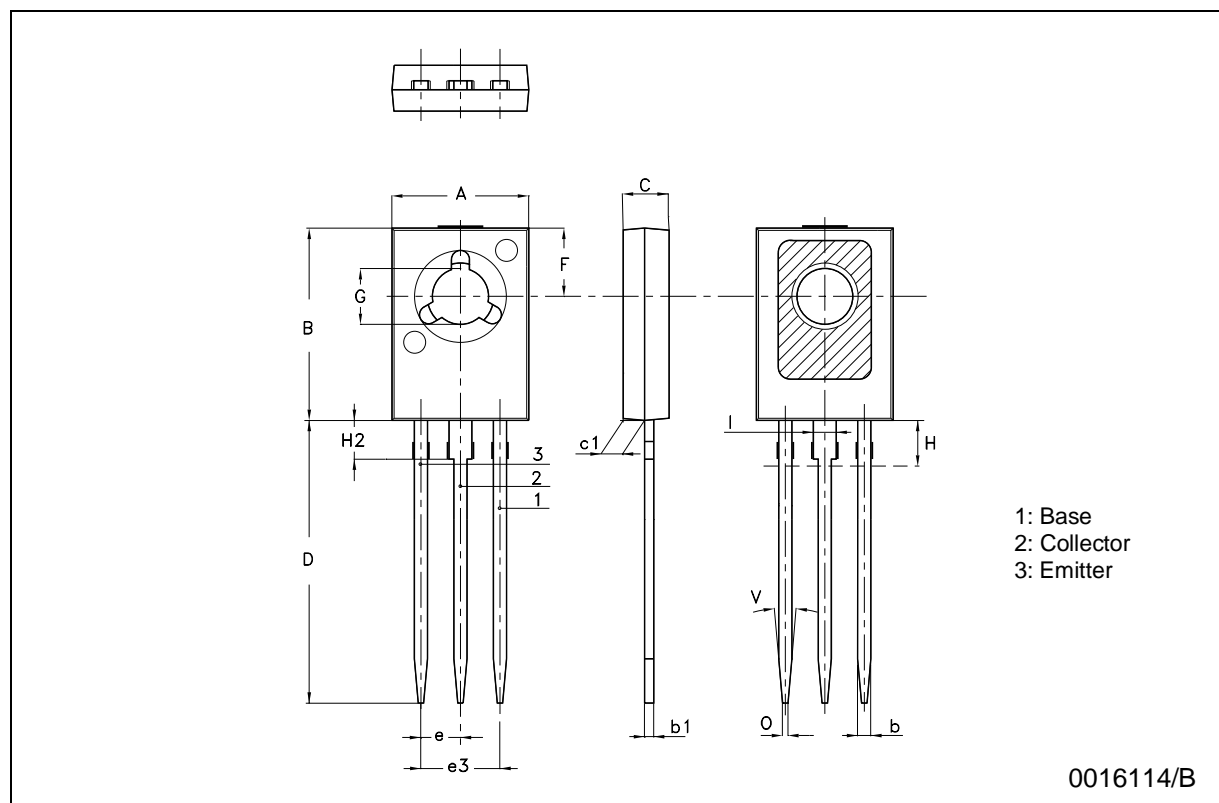


**Figure 2: Resistive Load Switching Test Circuit.**



**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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