



STN83003

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

PRELIMINARY DATA

- MEDIUM VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- SOT-223 PLASTIC PACKAGE FOR SURFACE MOUNTING CIRCUITS
- TAPE AND REEL PACKING

APPLICATIONS:

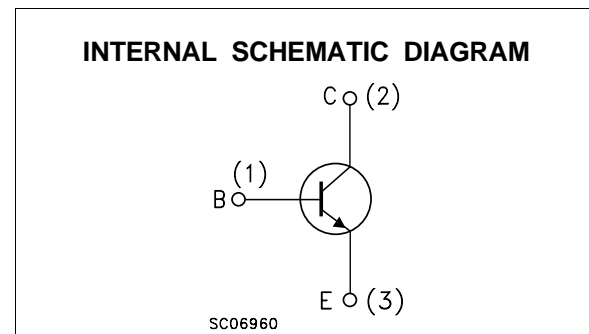
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES

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 STN83003 is expressly designed for a new solution to be used in compact fluorescent lamps, where it is coupled with the STN93003, 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 ($I_C = 0, I_B = 0.75 \text{ A}, t_p < 10\mu\text{s}, T_j < 150^\circ\text{C}$)	$V_{(BR)EBO}$	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 $T_c = 25^\circ\text{C}$	1.6	W
T_{stg}	Storage Temperature	-65 to 150	$^\circ\text{C}$
T_j	Max. Operating Junction Temperature	150	$^\circ\text{C}$

THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-ambient	Max	78	°C/W
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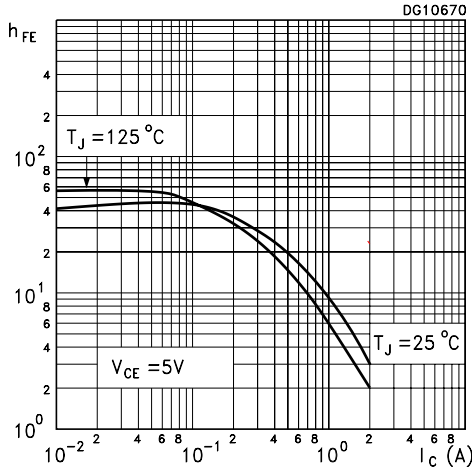
* Device mounted on a PCB area of 1 cm².

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

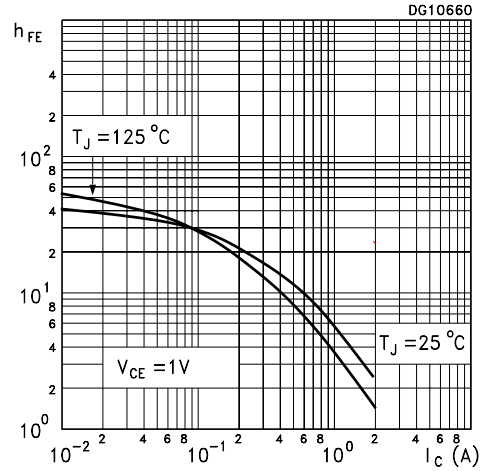
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CEV}	Collector Cut-off Current ($V_{BE} = -1.5\text{V}$)	$V_{CE} = 700\text{V}$ $V_{CE} = 700\text{V}$ $T_j = 125^{\circ}\text{C}$			1 5	mA mA
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage ($I_C = 0$)	$I_E = 10\text{ mA}$	12		18	V
$V_{CEO(sus)}^*$	Collector-Emitter Sustaining Voltage ($I_B = 0$)	$I_C = 10\text{ mA}$ $L = 25\text{ mH}$	400			V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 0.5\text{ A}$ $I_B = 0.1\text{ A}$ $I_C = 0.35\text{ A}$ $I_B = 50\text{ mA}$			0.5 1	V V
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 0.5\text{ A}$ $I_B = 0.1\text{ A}$			1	V
h_{FE}^*	DC Current Gain	$I_C = 10\text{ mA}$ $V_{CE} = 5\text{ V}$ $I_C = 0.35\text{ A}$ $V_{CE} = 5\text{ V}$ $I_C = 1\text{ A}$ $V_{CE} = 5\text{ V}$	10 16 4	25	32	
t_r t_s t_f	RESISTIVE LOAD Rise Time Storage Time Fall Time	$I_C = 0.35\text{ A}$ $V_{CC} = 125\text{ V}$ $I_{B1} = 70\text{ mA}$ $I_{B2} = -70\text{ mA}$ $T_p \geq 25\text{ }\mu\text{s}$ (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	$I_C = 0.5\text{ A}$ $I_{B1} = 0.1\text{ A}$ $V_{BE(off)} = -5\text{ V}$ $L = 10\text{ mH}$ $V_{clamp} = 300\text{ V}$ (see figure 1)		450 90		ns ns

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

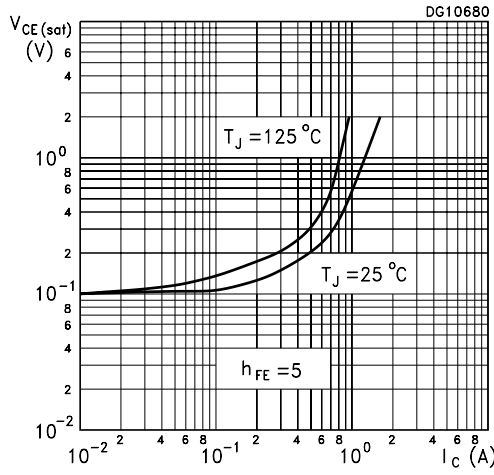
DC Current Gain



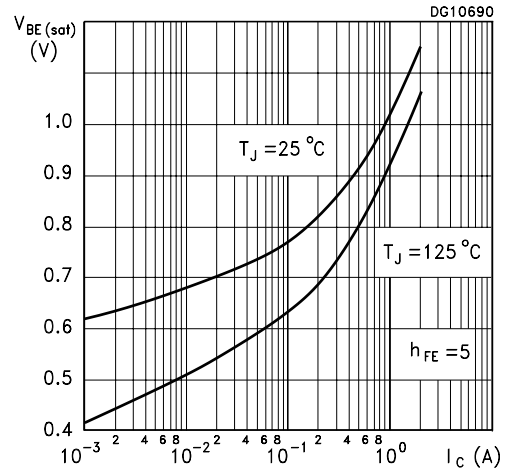
DC Current Gain



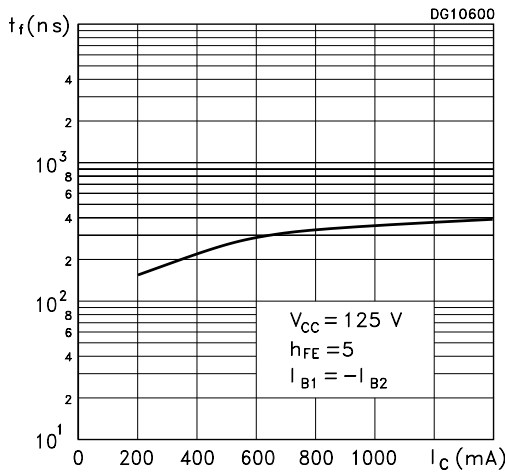
Collector Emitter Saturation Voltage



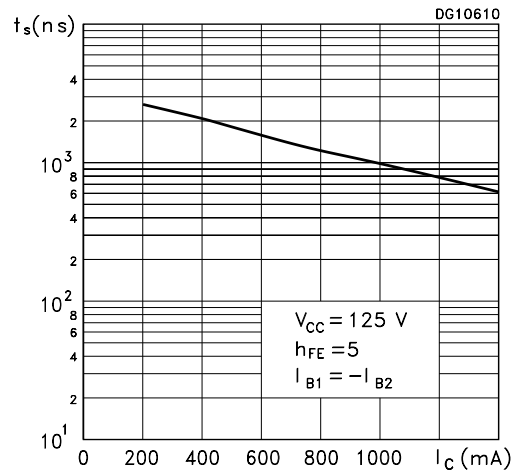
Base Emitter Saturation Voltage



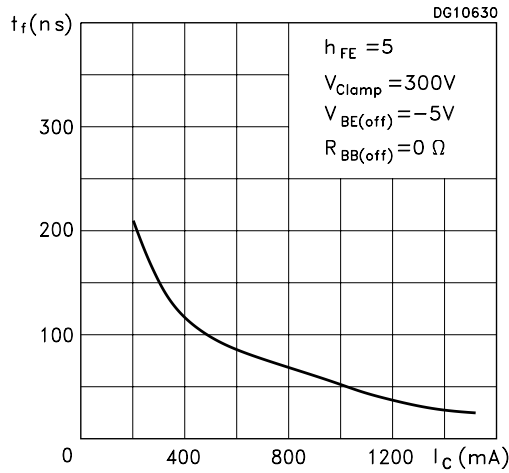
Resistive Load Fall Time



Resistive Load Storage Time



Inductive Load Fall Time



Inductive Load Storage Time

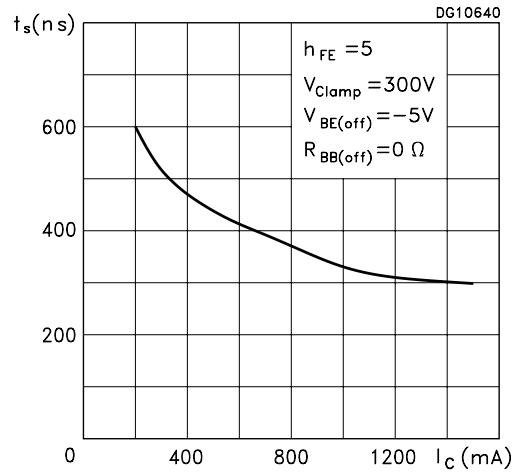


Figure 1: Inductive Load Switching Test Circuit.

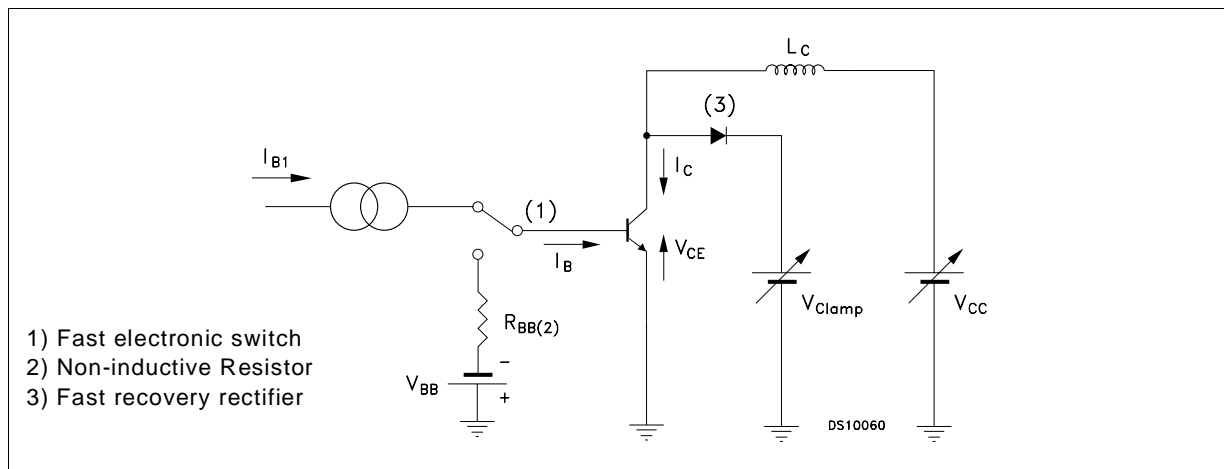
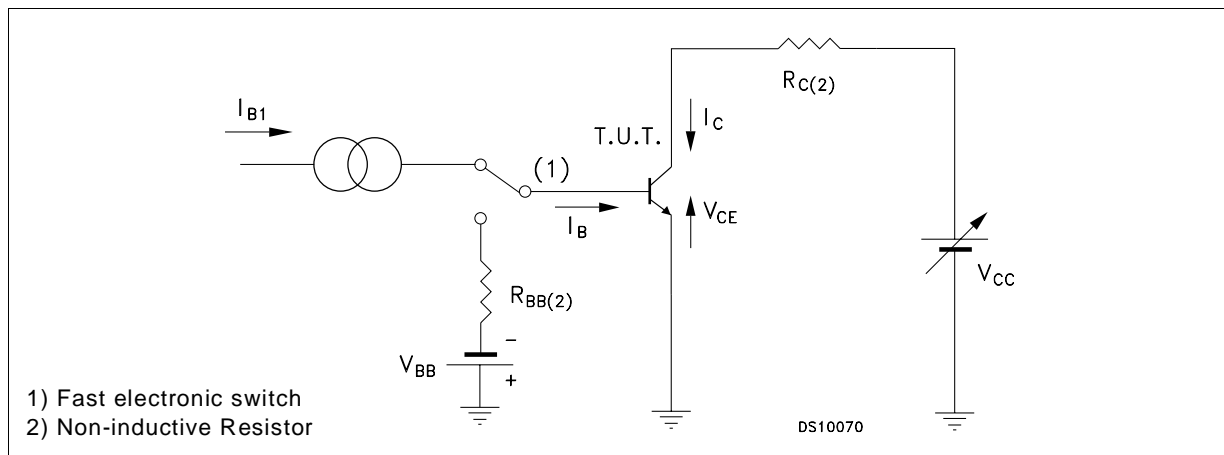
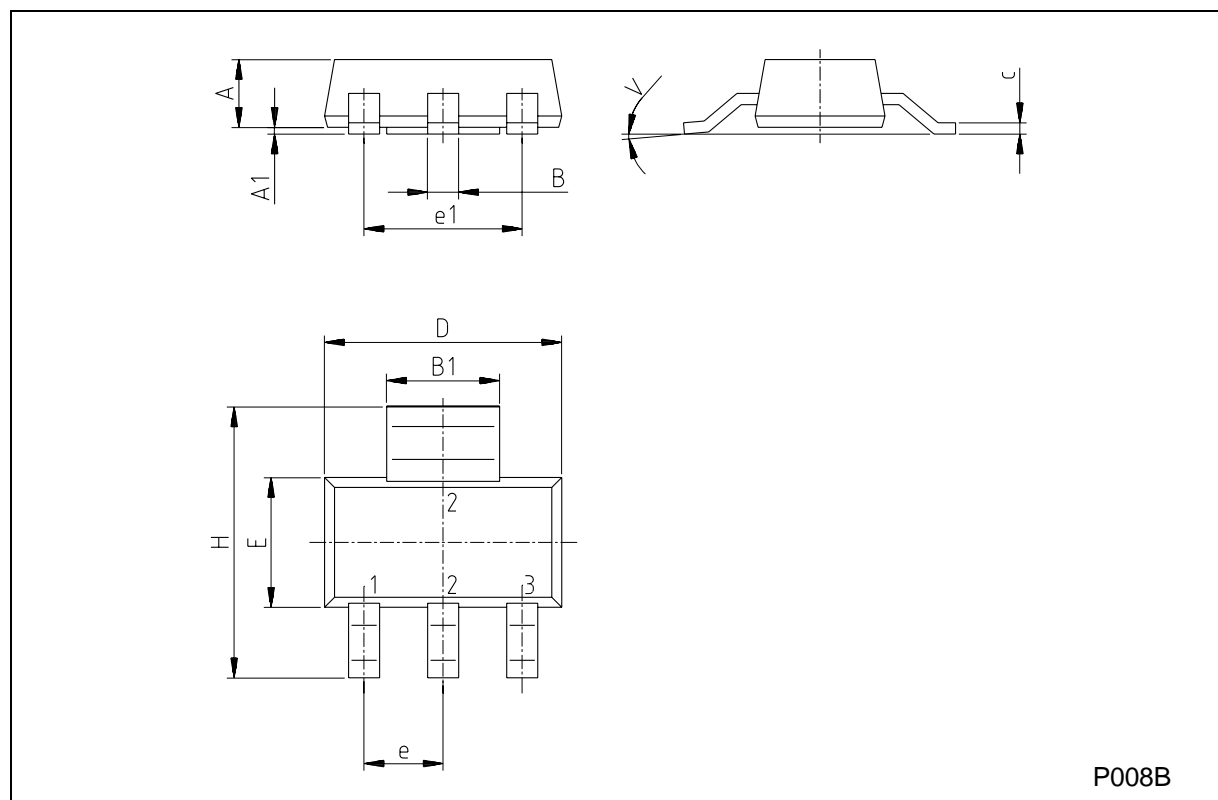


Figure 2: Resistive Load Switching Test Circuit.



SOT-223 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.80			0.071
B	0.60	0.70	0.80	0.024	0.027	0.031
B1	2.90	3.00	3.10	0.114	0.118	0.122
c	0.24	0.26	0.32	0.009	0.010	0.013
D	6.30	6.50	6.70	0.248	0.256	0.264
e		2.30			0.090	
e1		4.60			0.181	
E	3.30	3.50	3.70	0.130	0.138	0.146
H	6.70	7.00	7.30	0.264	0.276	0.287
V			10°			10°
A1		0.02				



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