

**ST13003**

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

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

APPLICATIONS:

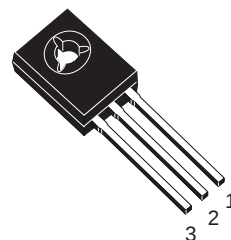
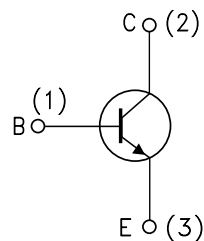
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES

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 device is designed for use in lighting applications and low cost switch-mode power supplies.

**SOT-32****INTERNAL SCHEMATIC DIAGRAM****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 ($I_C = 0$, $I_B = 0.75$ A, $t_p < 10\mu s$, $T_j < 150^\circ C$)	BV_{EBO}	V
I_C	Collector Current	1.5	A
I_{CM}	Collector Peak Current ($t_p < 5$ ms)	3	A
I_B	Base Current	0.75	A
I_{BM}	Base Peak Current ($t_p < 5$ ms)	1.5	A
P_{tot}	Total Dissipation at $T_c = 25^\circ C$	40	W
T_{stg}	Storage Temperature	-65 to 150	$^\circ C$
T_j	Max. Operating Junction Temperature	150	$^\circ C$

THERMAL DATA

R _{thj-case}	Thermal Resistance Junction-case	Max	3.12	°C/W
R _{thj-amb}	Thermal Resistance Junction-ambient	Max	89	°C/W

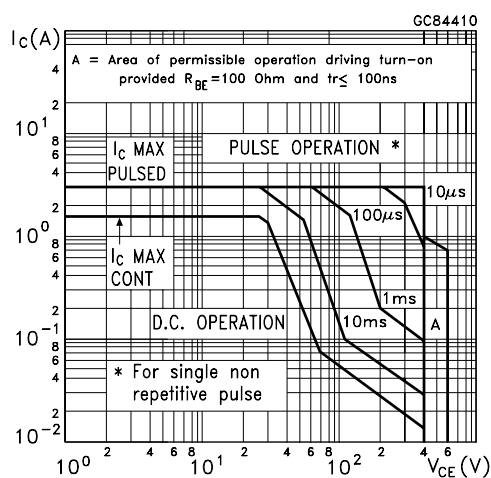
ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CEV}	Collector Cut-off Current (V _{BE} = -1.5V)	V _{CE} = 700V V _{CE} = 700V T _j = 125°C			1 5	mA mA
BV _{EBO}	Emitter-Base Breakdown Voltage (I _C = 0)	I _E = 10 mA	9		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 = 1 A I _C = 1.5 A I _B = 0.1 A I _B = 0.25 A I _B = 0.5 A			0.5 1 3	V V V
V _{BE(sat)} *	Base-Emitter Saturation Voltage	I _C = 0.5 A I _C = 1 A I _B = 0.1 A I _B = 0.25 A			1 1.2	V V
h _{FE} *	DC Current Gain	I _C = 0.5 A Group A Group B I _C = 1 A V _{CE} = 2 V V _{CE} = 2 V	8 15 5		20 35 25	
t _r t _s t _f	RESISTIVE LOAD Rise Time Storage Time Fall Time	I _C = 1 A I _{B1} = 0.2 A T _p = 25 μs V _{CC} = 125 V I _{B2} = -0.2 A			1 4 0.7	μs μs μs
t _s	INDUCTIVE LOAD Storage Time	I _C = 1 A V _{BE} = -5 V V _{clamp} = 300 V I _{B1} = 0.2 A L = 50 mH		0.8		μs

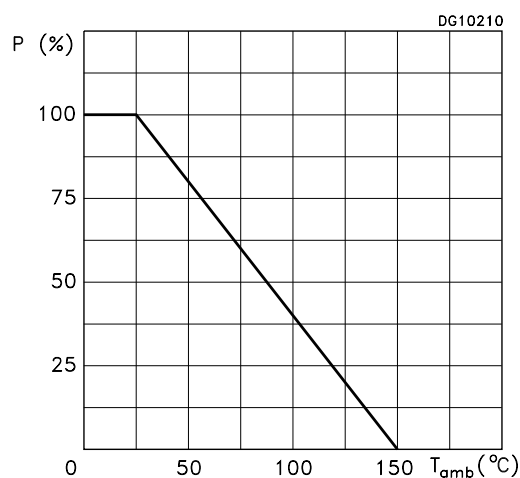
* Pulsed: Pulse duration = 300μs, duty cycle = 1.5 %

Note: Product is pre-selected in DC current gain (GROUP A and GROUP B). STMicroelectronics reserves the right to ship either groups according to production availability. Please contact your nearest STMicroelectronics sales office for delivery details.

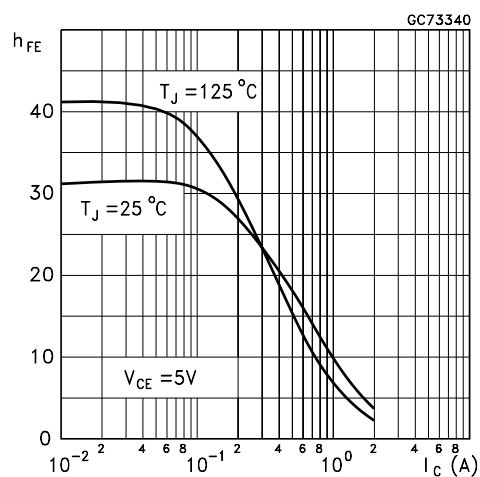
Safe Operating Areas



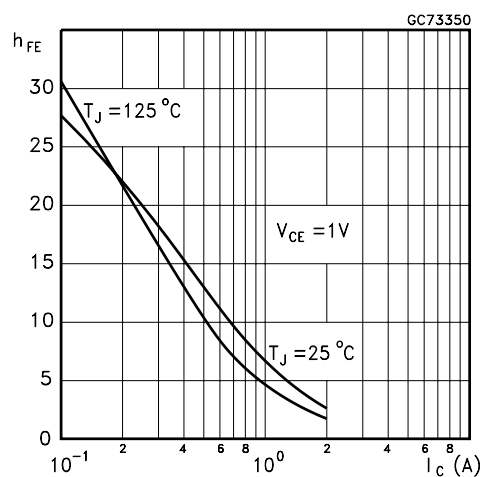
Derating Curve



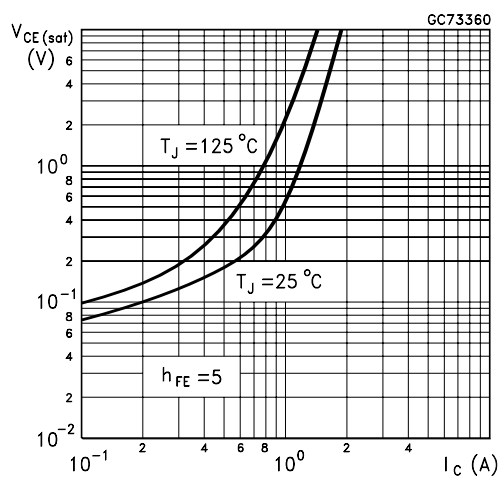
DC Current Gain



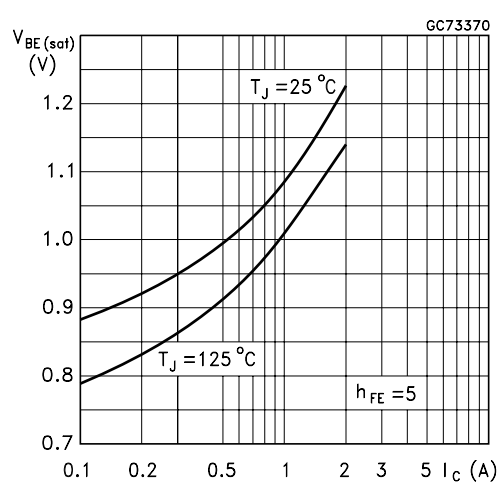
DC Current Gain



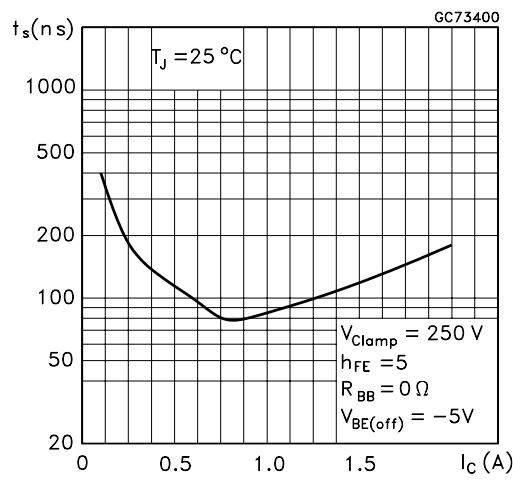
Collector Emitter Saturation Voltage



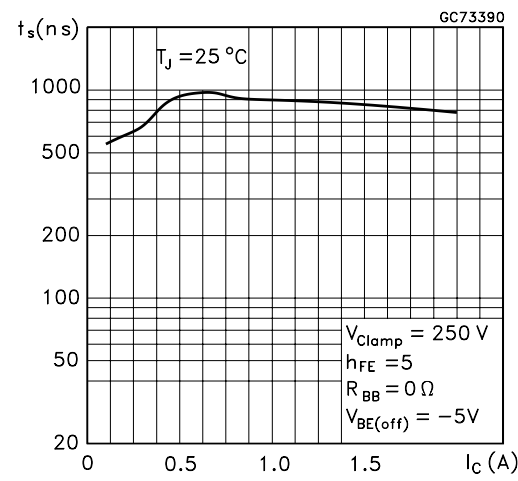
Base Emitter Saturation Voltage



Inductive Fall Time



Inductive Storage Time



Reverse Biased SOA

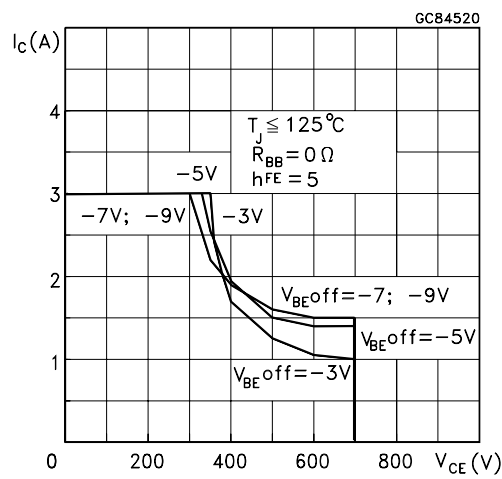
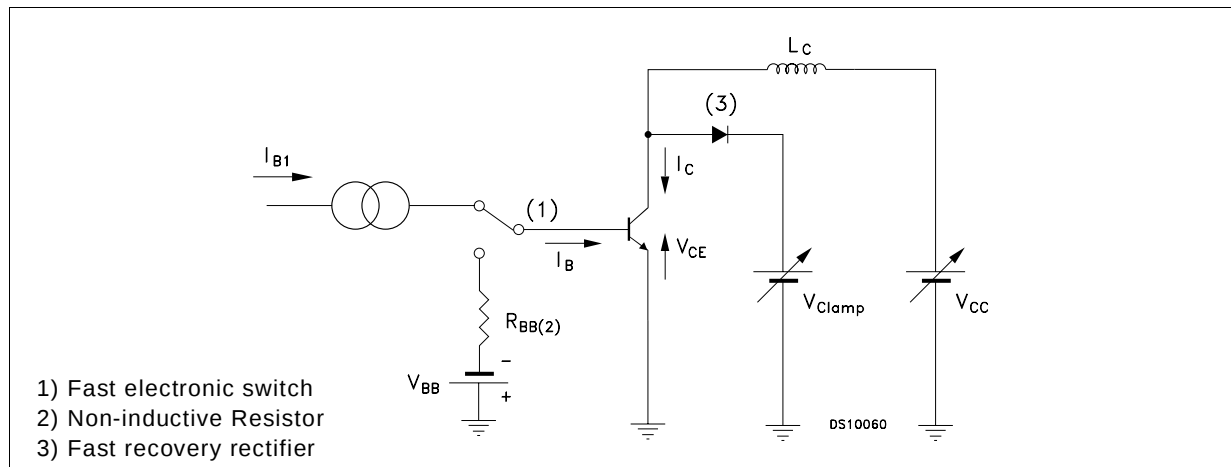
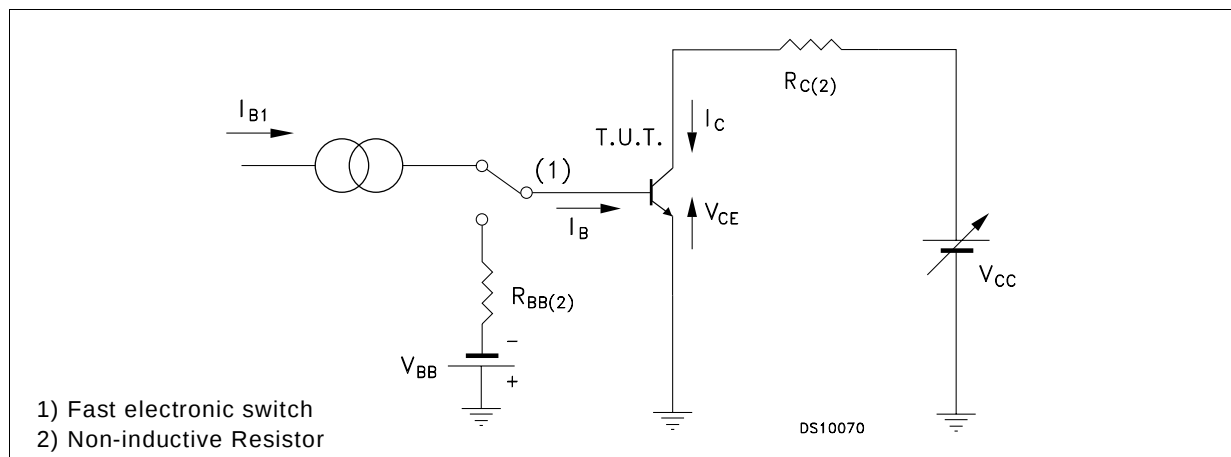
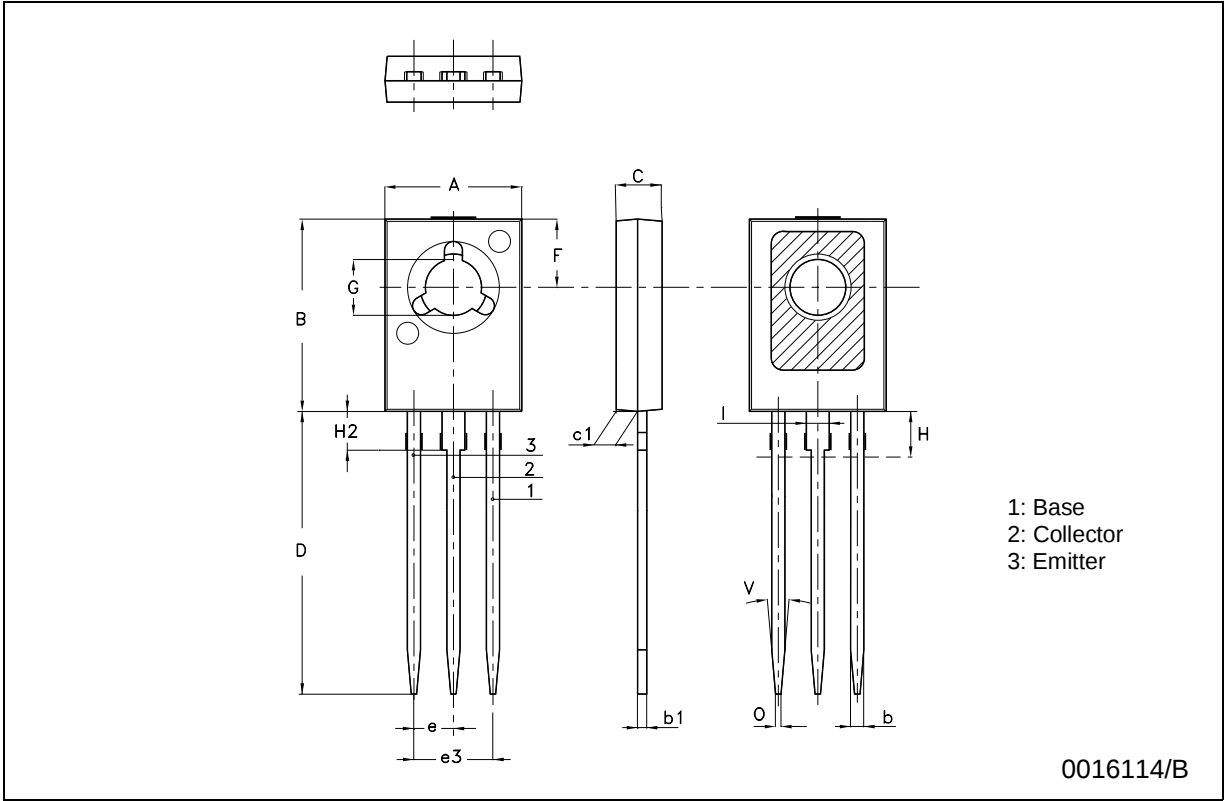


Figure 1: Inductive Load Switching Test Circuits.**Figure 2:** Resistive Load Switching Test Circuits.

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 ⁰			10 ⁰	



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