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:

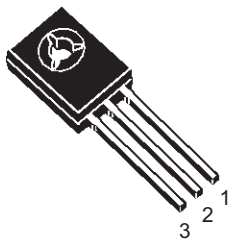
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES

DESCRIPTION

The device is manufactured using high voltage Multi Epitaxial Planar technology for high switching speeds and medium voltage capability.

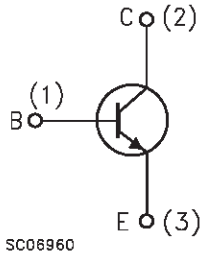
It uses a Cellular Emitter structure with planar edge termination to enhance switching speeds while maintaining the wide RBSOA.

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 < 10µs, T_j < 150°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 °C	40	W
T_{stg}	Storage Temperature	-65 to 150	°C

THERMAL DATA

$R_{thj\text{-}case}$	Thermal Resistance Junction-case Max	3.12	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-ambient Max	89	°C/W

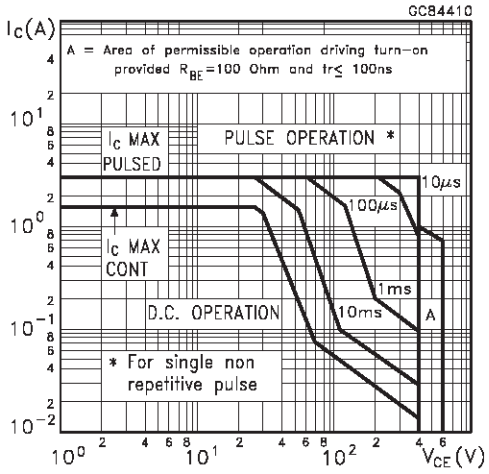
ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

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 = 25mH	400			V
$V_{CE(sat)}$*	Collector-Emitter Saturation Voltage	I_C = 0.5 A I_B = 0.1 A I_C = 1 A I_B = 0.25 A I_C = 1.5 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_B = 0.1 A I_C = 1 A I_B = 0.25 A			1.0 1.2	V V
h_{FE}	DC Current Gain	I_C = 0.5 A V_{CE} = 2 V Group A Group B I_C = 1 A 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 V_{CC} = 125 V I_{B1} = 0.2 A I_{B2} = -0.2 A T_p= 25 µs			1.0 4.0 0.7	µs µs µs
t_s	INDUCTIVE LOAD Storage Time	I_C = 1 A I_{B1} = 0.2 A V_{BE} = -5 V L = 50 mH V_{clamp} = 300 V		0.8		µs

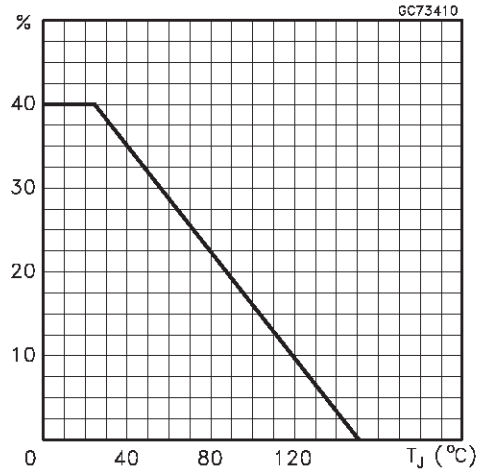
* Pulsed: Pulse duration = 300µs, duty cycle = 1.5 %

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.

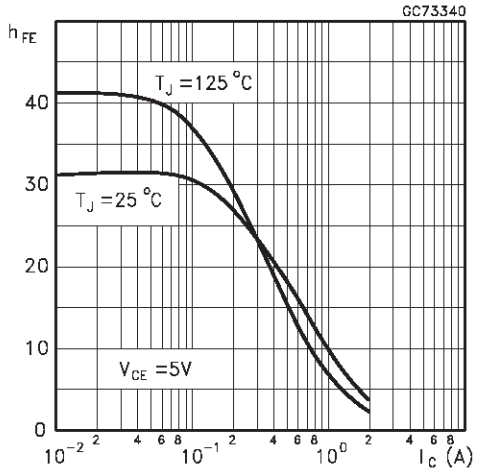
Safe Operating Areas



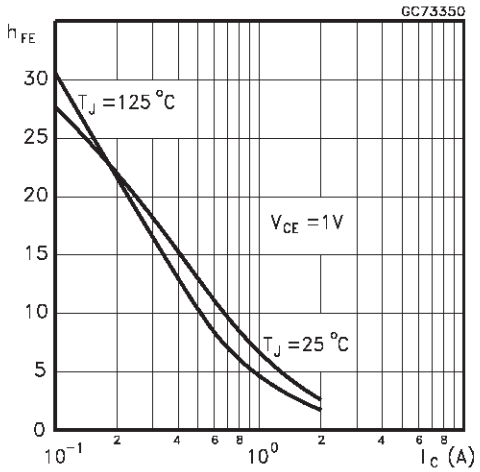
Derating Curve



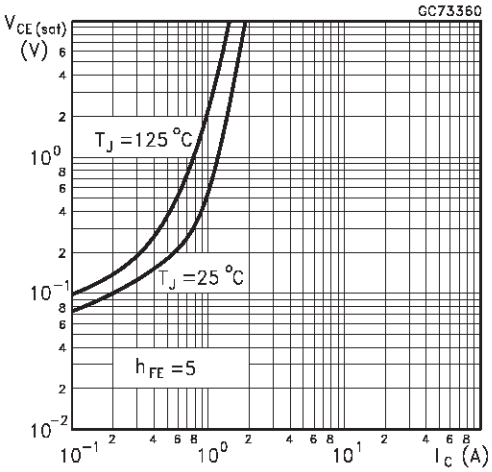
DC Current Gain



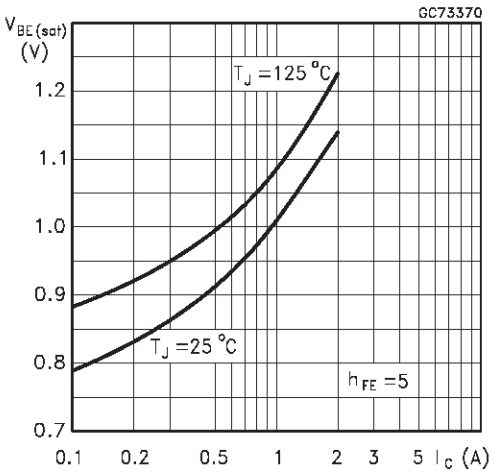
DC Current Gain



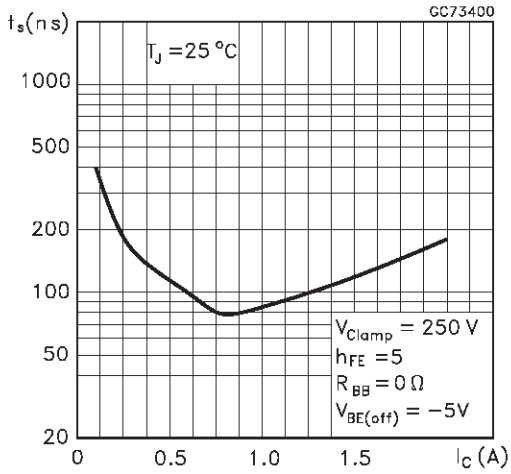
Collector Emitter Saturation Voltage



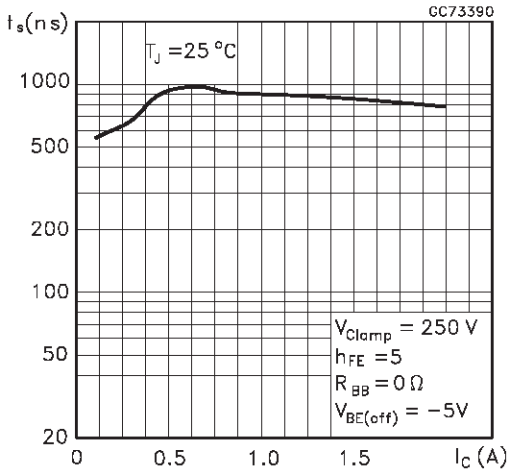
Base Emitter Saturation Voltage



Inductive Fall Time



Inductive Storage Time



Reverse Biased SOA

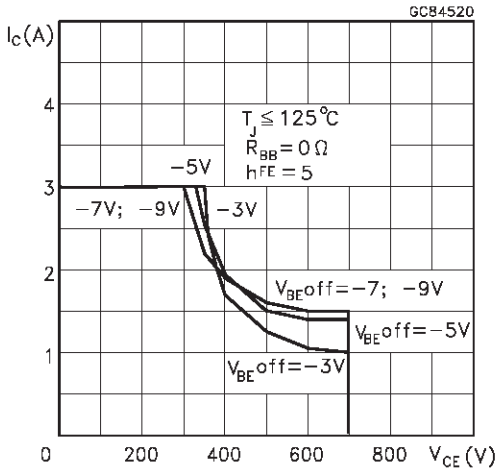


Figure 1: Inductive Load Switching Test Circuits.

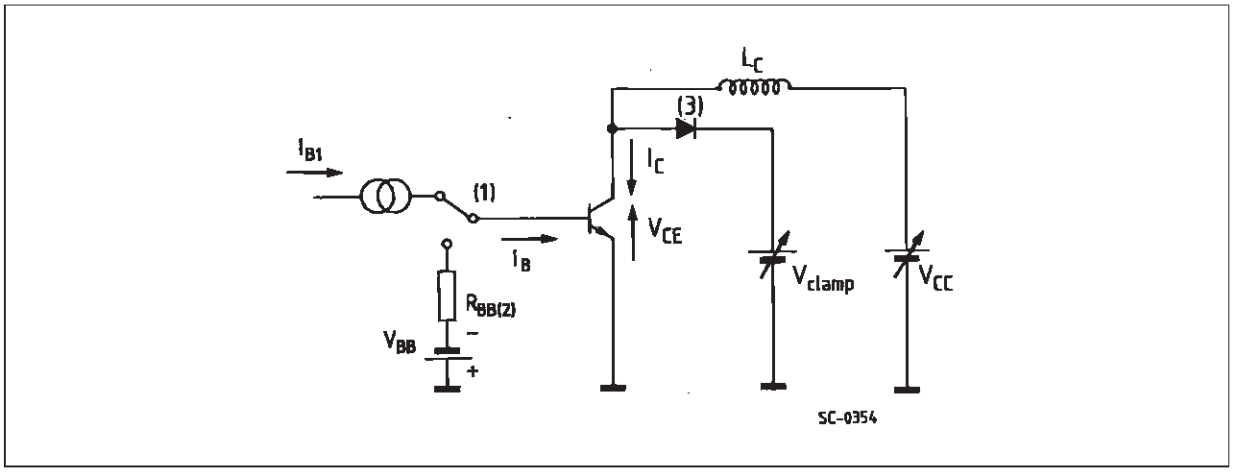
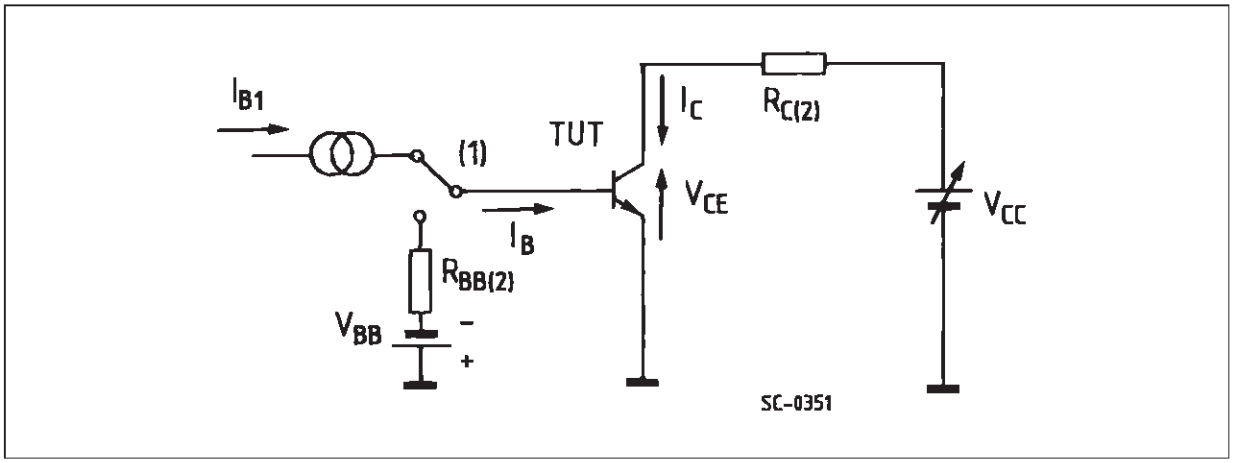


Figure 2: Resistive Load Switching Test Circuits.



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		0.445
b	0.7		0.9	0.028		0.035
b1	0.49		0.75	0.019		0.030
C	2.4		2.7	0.040		0.106
c1	1.0		1.3	0.039		0.050
D	15.4		16.0	0.606		0.629
e		2.2			0.087	
e3	4.15		4.65	0.163		0.183
F		3.8			0.150	
G	3		3.2	0.118		0.126
H			2.54			0.100