ST13003N

High voltage fast-switching NPN power transistor

Features

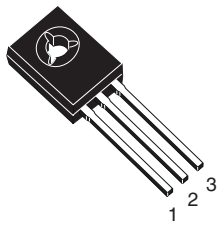
- High voltage capability
- Low spread of dynamic parameters
- Very high switching speed

Application

- Compact fluorescent lamps (CFLs)

Description

The device is manufactured using high voltage multi epitaxial planar technology for high switching speeds and high voltage capability. It uses a cellular emitter structure with planar edge termination to enhance switching speeds while maintaining the wide RBSOA.



SOT-32

Figure 1. Internal schematic diagram

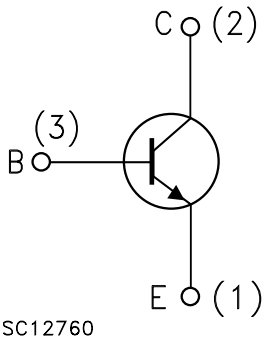


Table 1. Device summary

Order code	Marking	Package	Packaging
ST13003N	13003N	SOT-32	BAG

1 Electrical ratings

Table 2. 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}	Collector-base voltage (I_C = 0)	9	V
I_C	Collector current	1	A
I_{CM}	Collector peak current (t_P < 5 ms)	2	A
I_B	Base current	0.5	A
I_{BM}	Base peak current (t_P < 5 ms)	1	A
P_{TOT}	Total dissipation at T_c = 25 °C	20	W
T_{STG}	Storage temperature	-55 to 150	°C
T_J	Max. operating junction temperature	150	

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance junction-case	6.25	°C/W

2 Electrical characteristics

T_{case} = 25 °C; unless otherwise specified.

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current (V_{BE} = 0)	V_{CE} = 700 V V_{CE} = 700 V T_C = 125 °C			1 5	mA mA
I_{EBO}	Emitter cut-off current (I_C = 0)	V_{EB} = 9 V			1	mA
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage (I_B = 0)	I_C = 10 mA	400			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 0.5 A I_B = 125 mA I_C = 1 A I_B = 330 mA			0.7 1.2	V V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 0.5 A I_B = 125 mA I_C = 1 A I_B = 330 mA			1.2 1.3	V V
h_{FE}	DC current gain	I_C = 0.5 A, V_{CE} = 2 V I_C = 1 A V_{CE} = 10 V	6 5		18 15	
t_s t_f	Inductive Load Storage time Fall time	I_C = 0.4 A V_{clamp} = 300 V $I_{B(on)}$ = -$I_{B(off)}$ = 80 mA $V_{BB(off)}$ = - 5 V *Figure 8*		2.5 180		µs ns

1. Pulse test: pulse duration ≤ 300 µs, duty cycle ≤ 2 %

2.1 Electrical characteristics (curves)

Figure 2. Derating curve

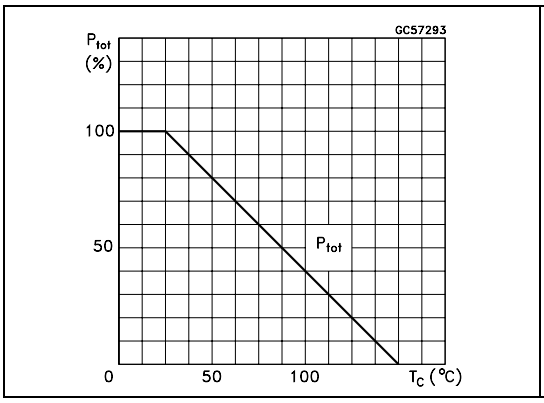


Figure 3. DC current gain (V_{CE} = 3 V)

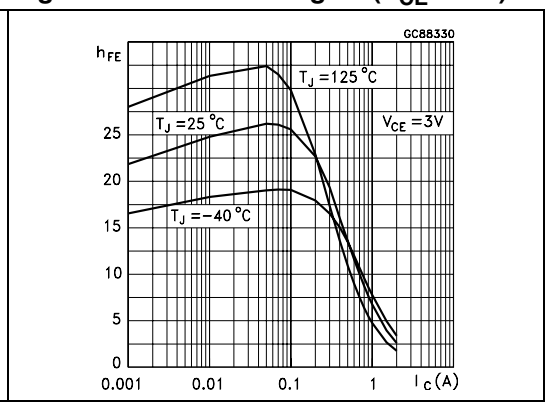


Figure 4. DC current gain (V_{CE} = 5 V)

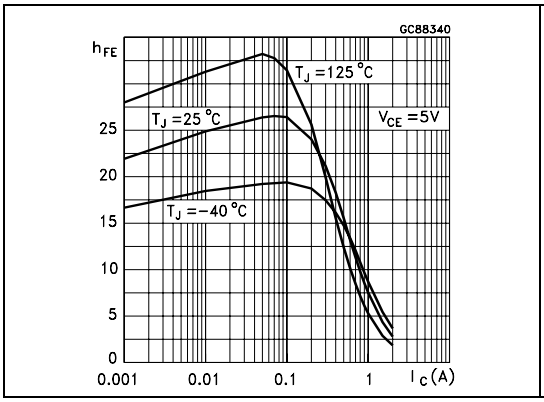


Figure 5. Collector-emitter saturation voltage

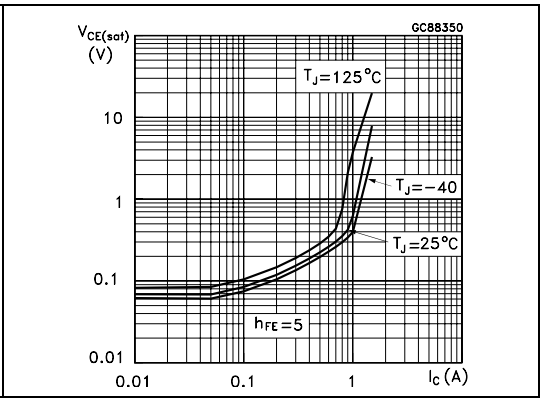


Figure 6. Base-emitter saturation voltage

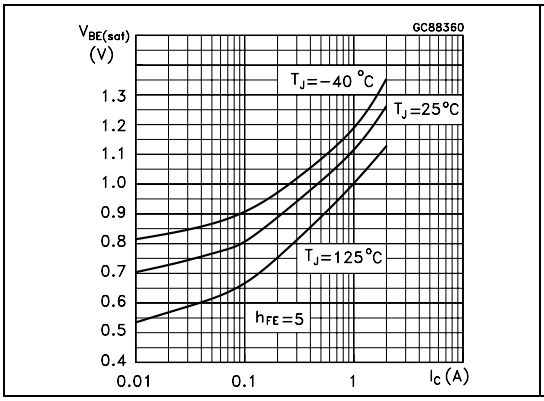
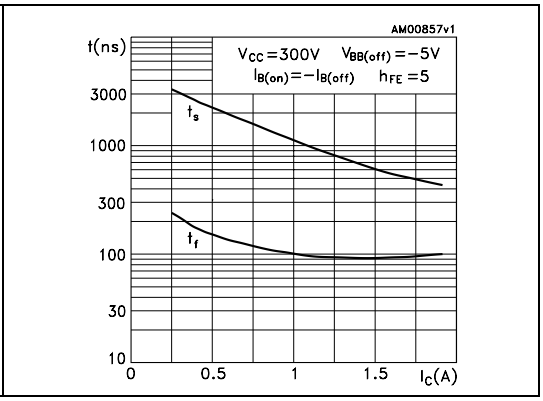
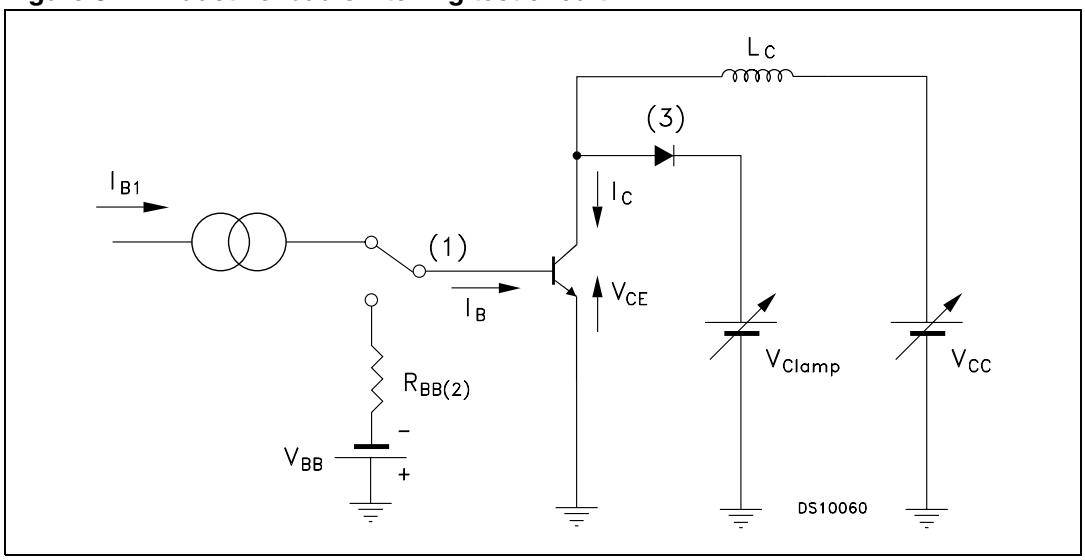


Figure 7. Switching time inductive load



2.2 Test circuit

Figure 8. Inductive load switching test circuit



1. Fast electronic switch
2. Non-inductive resistor
3. Fast recovery rectifier

3 Package mechanical data

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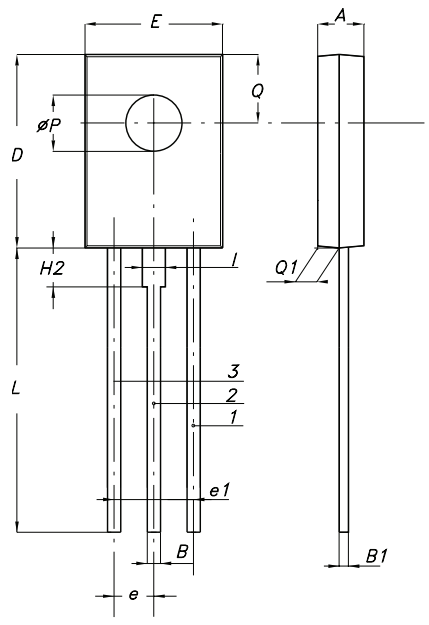
SOT-32 (TO-126) MECHANICAL DATA

DIM.	mm.		
	MIN.	TYP	MAX.
A	2.4		2.9
B	0.64		0.88
B1	0.39		0.63
D	10.5		11.05
E	7.4		7.8
e	2.04	2.29	2.54
e1	4.07	4.58	5.08
L	15.3		16
P	2.9		3.2
Q		3.8	
Q1	1		1.52
H2		2.15	
I		1.27	



4 Revision history

Table 5. Document revision history

Date	Revision	Changes
26-May-2009	1	First release.
25-Feb-2010	2	Updated *Figure 1 on page 1*.

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