ST13003D-K

High voltage fast-switching NPN power transistor

Features

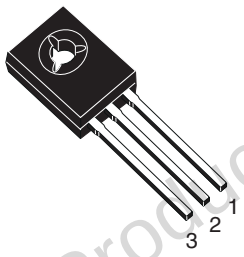
- High voltage capability
- Low spread of dynamic parameters
- Minimum lot-to-lot spread for reliable operation
- Very high switching speed
- Integrated antiparallel collector-emitter diode

Applications

- Electronic ballast for fluorescent lighting

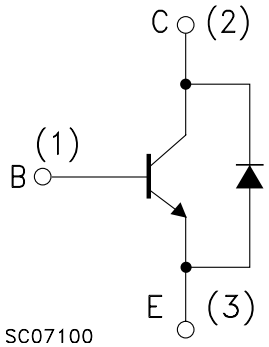
Description

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.



SOT-32

Figure 1. Internal schematic diagram



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Table 1. Device summary

Order code	Marking	Package	Packaging
ST13003D-K	13003D	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}	Emitter-base voltage (I_C = 0, I_B = 0.75 A, t_P < 10 µs)	$V_{(BR)EBO}$	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	-55 to 150	°C
T_J	Max. operating junction temperature	150	°C

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2 Electrical characteristics

T_{case} = 25 °C unless otherwise specified

Table 3. Electrical characteristics

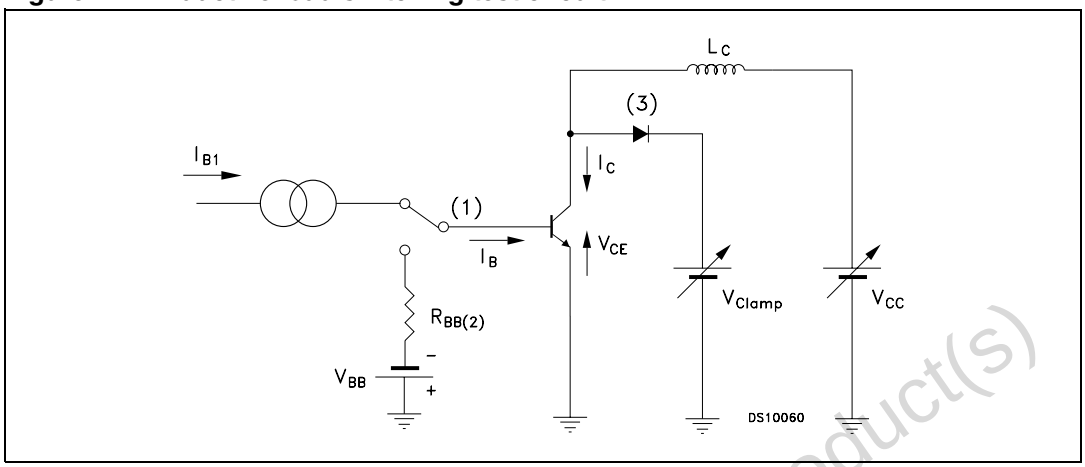
Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current (V_{BE} = 0)	V_{CE} = 700 V V_{CE} = 700 V T_c = 125 °C			1 5	mA mA
$V_{(BR)EBO}$	Emitter-Base breakdown voltage (I_C = 0)	I_E = 10 mA	9		18	V
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage (I_B = 0)	I_C = 10 mA	400			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 0.5 A I_B = 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
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 0.5 A I_B = 0.1 A I_C = 1 A I_B = 0.25 A			1 1.2	V V
h_{FE}	DC current gain	I_C = 0.5 A V_{CE} = 2 V I_C = 1 A V_{CE} = 2 V	8 5		20 25	
t_r t_s t_f	Resistive load Rise time Storage time Fall time	V_{CC} = 125 V I_C = 1 A I_{B1} = 0.2 A I_{B2} = -0.2 A T_p = 25 µs			1 4 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
V_F	Diode forward voltage	I_F = 0.5 A			1.5	V

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

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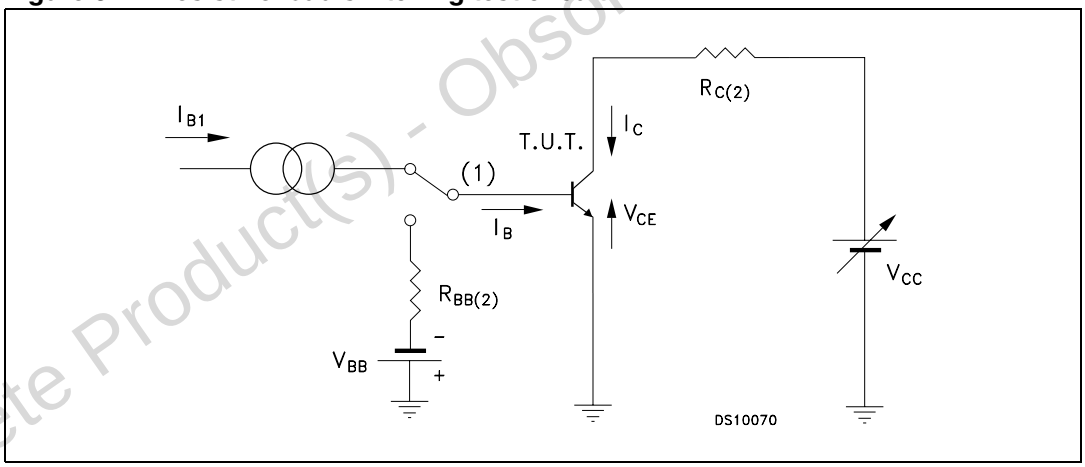
2.1 Test circuits

Figure 2. Inductive load switching test circuit



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

Figure 3. Resistive load switching test circuit



1. Fast electronic switch
2. Non-inductive resistor

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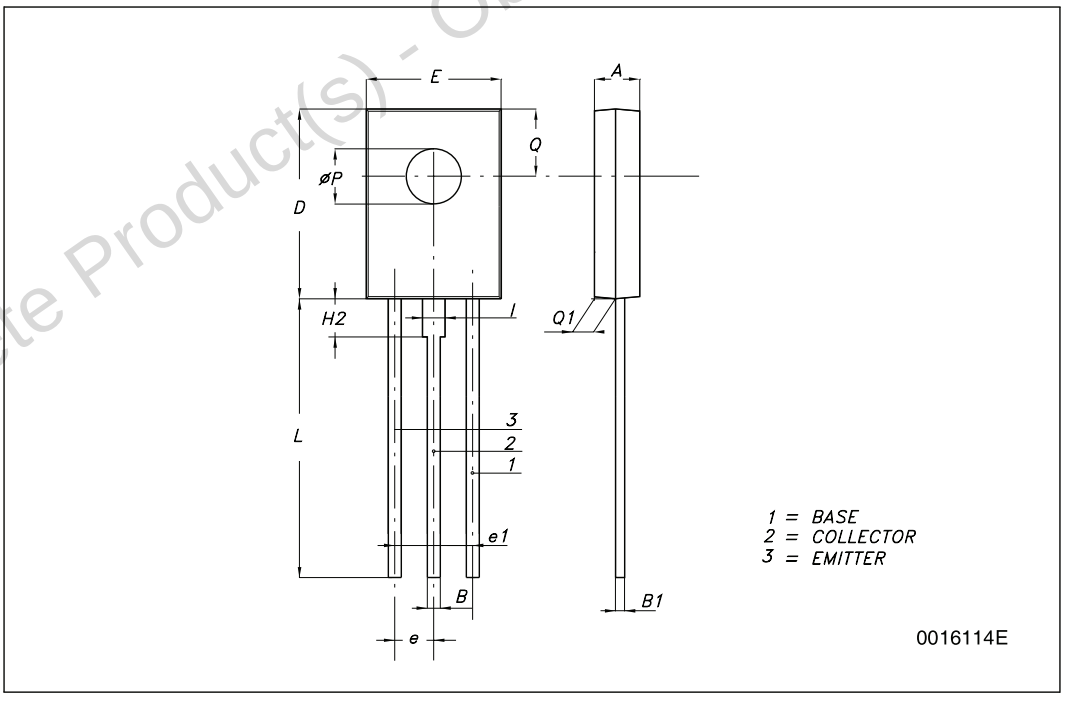
3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

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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	



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4 Revision history

Table 4. Document revision history

Date	Revision	Changes
15-Nov-2007	1	Initial release.
08-Sep-2009	2	Updated packaging information *Table 1 on page 1*.

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