

High voltage fast-switching NPN power transistor

Preliminary data

Features

- High voltage capability
- Low spread of dynamic parameters
- Very high switching speed
- Integrated free-wheeling diode

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.

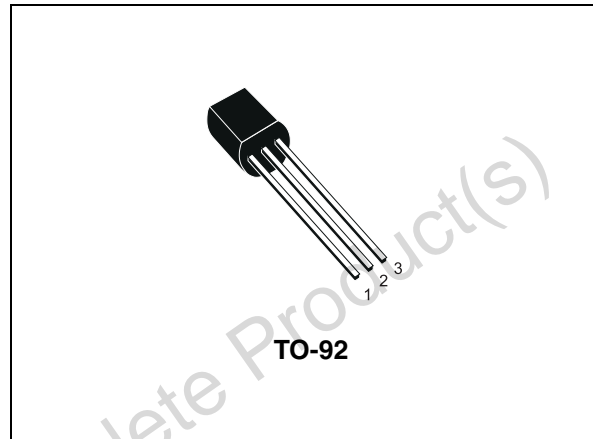


Figure 1. Internal schematic diagram

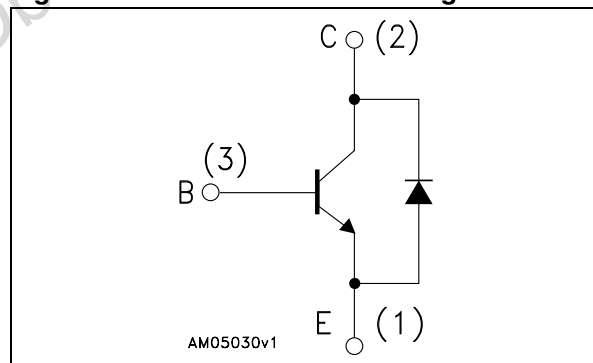


Table 1. Device summary

Order code	Marking	Package	Packaging
STBV42D	BV42D	TO-92	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	1	W
T_{STG}	Storage temperature	- 65 to 150	°C
T_J	Max. operating junction temperature	150	

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance junction-case	125	°C/W

2 Electrical characteristics

$T_{\text{case}} = 25\text{ }^{\circ}\text{C}$; unless otherwise specified.

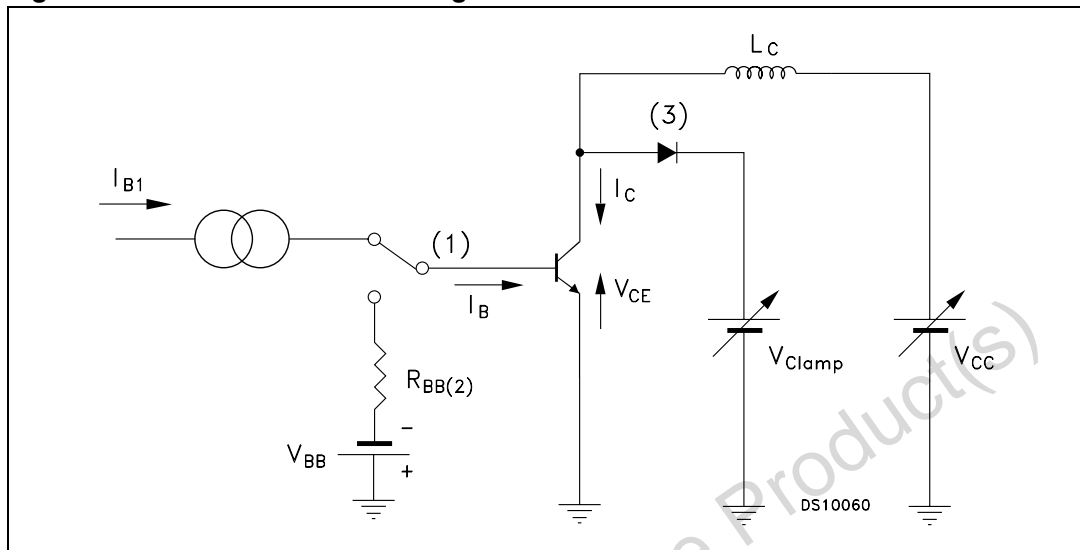
Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current ($V_{\text{BE}} = 0$)	$V_{\text{CE}} = 700\text{ V}$ $V_{\text{CE}} = 700\text{ V}$ $T_{\text{C}} = 125\text{ }^{\circ}\text{C}$			1 5	mA mA
I_{EBO}	Emitter cut-off current ($I_{\text{C}} = 0$)	$V_{\text{EB}} = 9\text{ V}$			1	mA
$V_{\text{CEO(sus)}}^{(1)}$	Collector-emitter sustaining voltage ($I_{\text{B}} = 0$)	$I_{\text{C}} = 1\text{ mA}$	400			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 0.25\text{ A}$ $I_{\text{B}} = 50\text{ mA}$ $I_{\text{C}} = 0.5\text{ A}$ $I_{\text{B}} = 125\text{ mA}$ $I_{\text{C}} = 0.75\text{ A}$ $I_{\text{B}} = 250\text{ mA}$		0.2 0.3 0.4	0.5 1 1.5	V V V
$V_{\text{BE(sat)}}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = 0.25\text{ A}$ $I_{\text{B}} = 50\text{ mA}$ $I_{\text{C}} = 0.5\text{ A}$ $I_{\text{B}} = 125\text{ mA}$			1 1.2	V V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = 5\text{ mA}$, $V_{\text{CE}} = 2\text{ V}$ $I_{\text{C}} = 0.4\text{ A}$, $V_{\text{CE}} = 5\text{ V}$ $I_{\text{C}} = 0.8\text{ A}$, $V_{\text{CE}} = 5\text{ V}$	12 10 5		30 20	
t_{f}	Inductive Load Fall time	$I_{\text{C}} = 0.25\text{ A}$ $V_{\text{clamp}} = 300\text{ V}$ $I_{\text{B(on)}} = -I_{\text{B(off)}} = 50\text{ mA}$ $L = 3\text{ mH}$ <i>Figure 2</i>		0.3		μs
V_{F}	Diode forward voltage	$I_{\text{F}} = 350\text{ mA}$			1.7	V

1. Pulse test: pulse duration $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

2.1 Test circuit

Figure 2. Inductive load switching test circuit



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

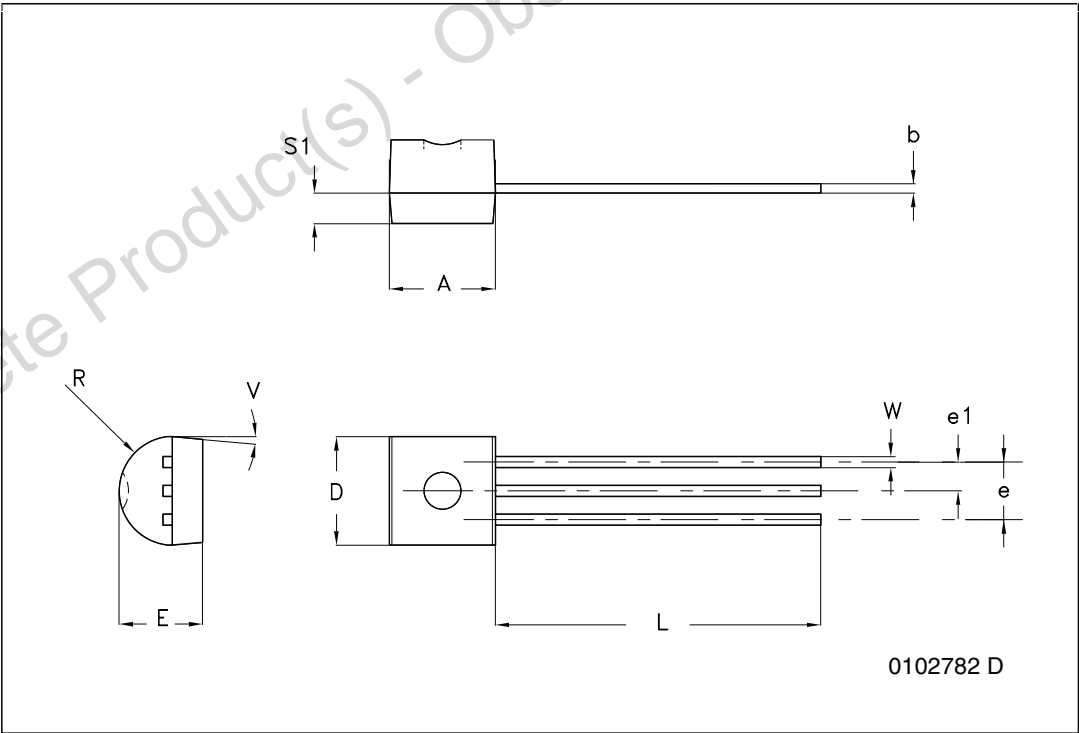
3 Package mechanical data

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Obsolete Product(s) - Obsolete Product(s)

TO-92 bulk shipment mechanical data

DIM.	mm.		
	MIN.	TYP	MAX.
A	4.32		4.95
b	0.36		0.51
D	4.45		4.95
E	3.30		3.94
e	2.41		2.67
e1	1.14		1.40
L	12.70		15.49
R	2.16		2.41
S1	0.92		1.52
W	0.41		0.56
V		5°	



4 Revision history

Table 5. Document revision history

Date	Revision	Changes
08-Mar-2010	1	First release.
28-Apr-2010	2	Inserted V_F maximum value Table 4 on page 3 .

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