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Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

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Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



Medium voltage fast-switching PNP power transistor

Features

- Low spread of dynamic parameters
- Minimum lot-to-lot spread for reliable operation
- Very high switching speed

Application

- 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.

The device is expressly designed for a new solution to be used in compact fluorescent lamps, where it is coupled with the BULT3N4, its complementary NPN transistor.

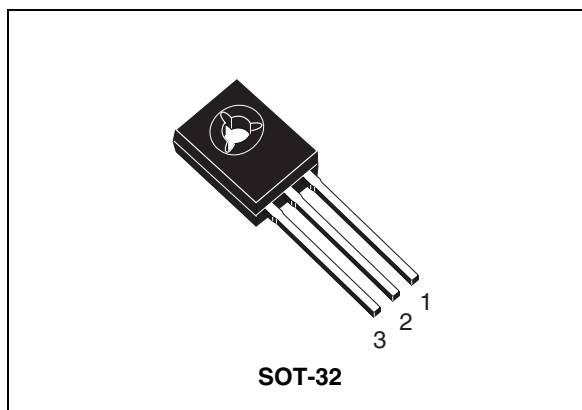


Figure 1. Internal schematic diagram

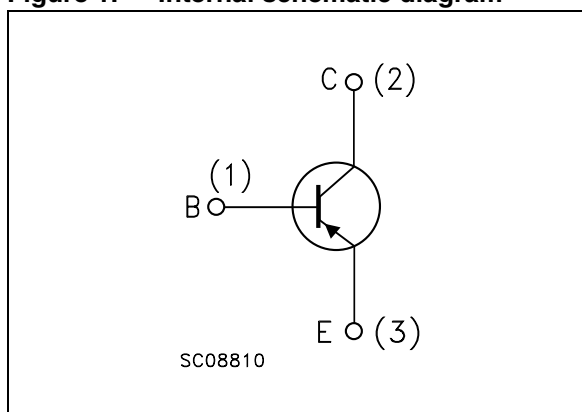


Table 1. Device summary

Order code	Marking	Package	Packing
BULT3P3	BULT3P3	SOT-32	Tube

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage ($V_{BE} = 0$)	-300	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	-200	V
V_{EBO}	Emitter-base voltage ($I_C = 0$, $I_B = -1.5$ A, $t_p < 100$ μ s, $T_J < 150$ °C)	$V_{(BR)EBO}$	V
I_C	Collector current	-3	A
I_{CM}	Collector peak current ($t_p < 5$ ms)	-6	A
I_B	Base current	-1.5	A
I_{BM}	Base peak current ($t_p < 5$ ms)	-3	A
P_{TOT}	Total dissipation at $T_C = 25$ °C	32	W
T_{STG}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance junction-case max	3.9	°C/W

2 Electrical characteristics

$T_{\text{case}} = 25\text{ °C}$ unless otherwise specified

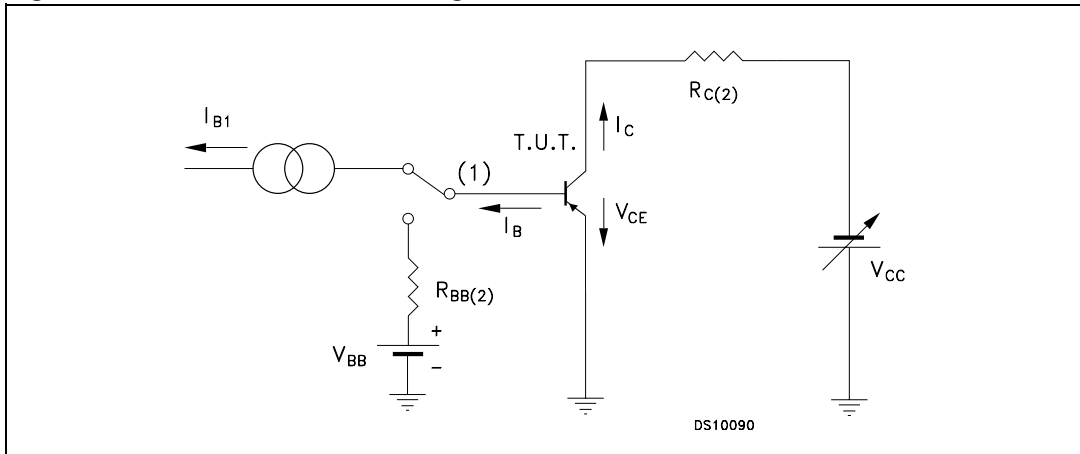
Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current ($V_{\text{BE}} = 0$)	$V_{\text{CE}} = -300\text{ V}$ $V_{\text{CE}} = -300\text{ V } T_{\text{C}} = 125\text{ °C}$			-0.1 -0.5	mA mA
$V_{(\text{BR})\text{EBO}}$	Emitter-base breakdown voltage ($I_{\text{C}} = 0$)	$I_{\text{E}} = -10\text{ mA}$	-6		-12	V
$V_{\text{CEO(sus)}}^{(1)}$	Collector-emitter sustaining voltage ($I_{\text{B}} = 0$)	$I_{\text{C}} = -10\text{ mA}$	-200			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = -0.7\text{ A } I_{\text{B}} = -0.1\text{ A}$ $I_{\text{C}} = -1\text{ A } I_{\text{B}} = -0.2\text{ A}$			-0.5 -0.5	V V
$V_{\text{BE(sat)}}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = -0.5\text{ A } I_{\text{B}} = -0.1\text{ A}$ $I_{\text{C}} = -1\text{ A } I_{\text{B}} = -0.2\text{ A}$ $I_{\text{C}} = -2\text{ A } I_{\text{B}} = -0.4\text{ A}$			-1.0 -1.1 -1.3	V V V
h_{FE}	DC current gain	$I_{\text{C}} = -10\text{ mA } V_{\text{CE}} = -5\text{ V}$ $I_{\text{C}} = -0.75\text{ A } V_{\text{CE}} = -5\text{ V}$ $I_{\text{C}} = -2\text{ A } V_{\text{CE}} = -5\text{ V}$	10 22 4	28	36	
t_{r} t_{s} t_{f}	Resistive load Rise time Storage time Fall time	$I_{\text{C}} = -0.7\text{ A } V_{\text{CC}} = -150\text{ V}$ $I_{\text{B(on)}} = -I_{\text{B(off)}} = 140\text{ mA}$ $T_{\text{p}} = 30\text{ }\mu\text{s}$		60 1.2 70		ns μs ns
t_{s} t_{f}	Inductive load Storage time Fall time	$I_{\text{C}} = -1\text{ A } I_{\text{B(on)}} = 100\text{ mA}$ $V_{\text{BE(off)}} = 5\text{ V } R_{\text{bb}} = 0$ $V_{\text{clamp}} = 150\text{ V } L = 1\text{ mH}$		110 35	180 70	ns ns

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

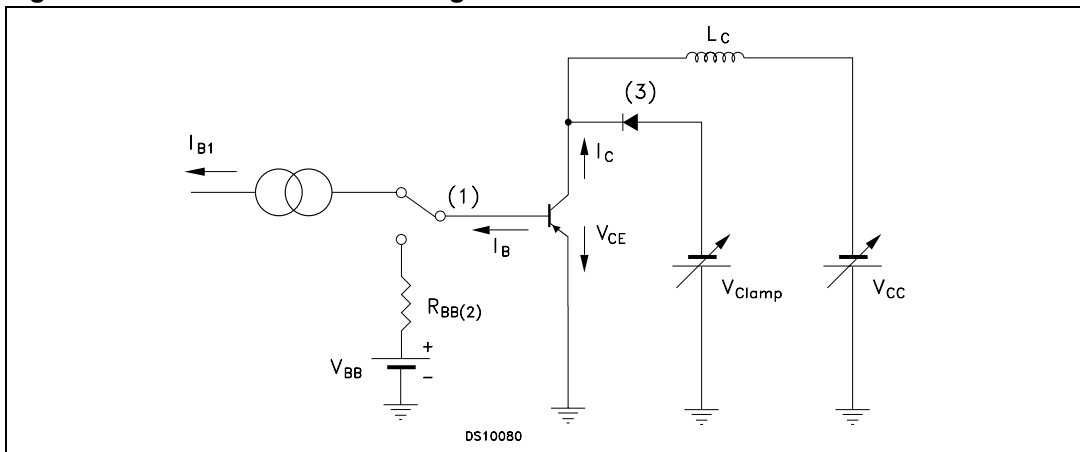
2.1 Test circuits

Figure 2. Resistive load switching test circuit



- 1. Fast electronic switch
- 2. Non-inductive resistor

Figure 3. Inductive load switching test circuit



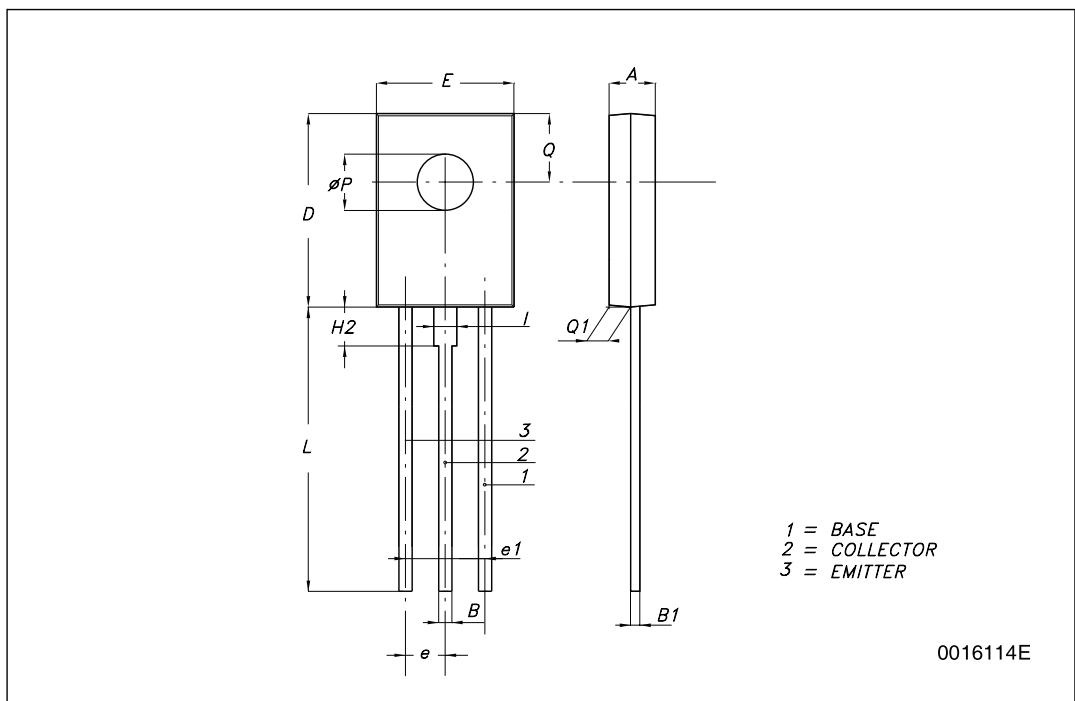
- 1. Fast electronic switch
- 2. Non-inductive resistor
- 3. Fast recovery rectifier

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
25-Sep-2009	1	Initial release

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