

## 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

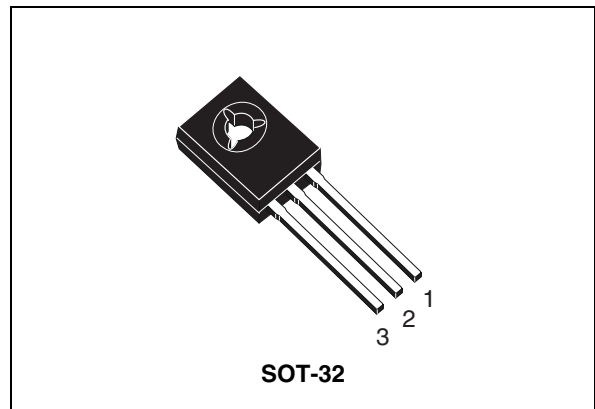
- Electronic ballast for fluorescent lighting

### Description

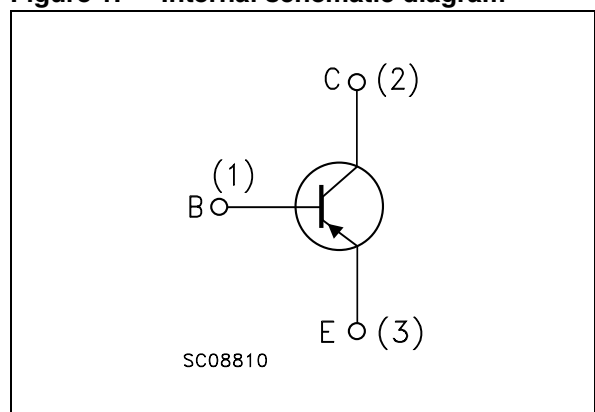
The device is manufactured using high voltage multi-epitaxial planar technology for high switching speeds and medium voltage capability.

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, $t_p < 100$ $\mu$ 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

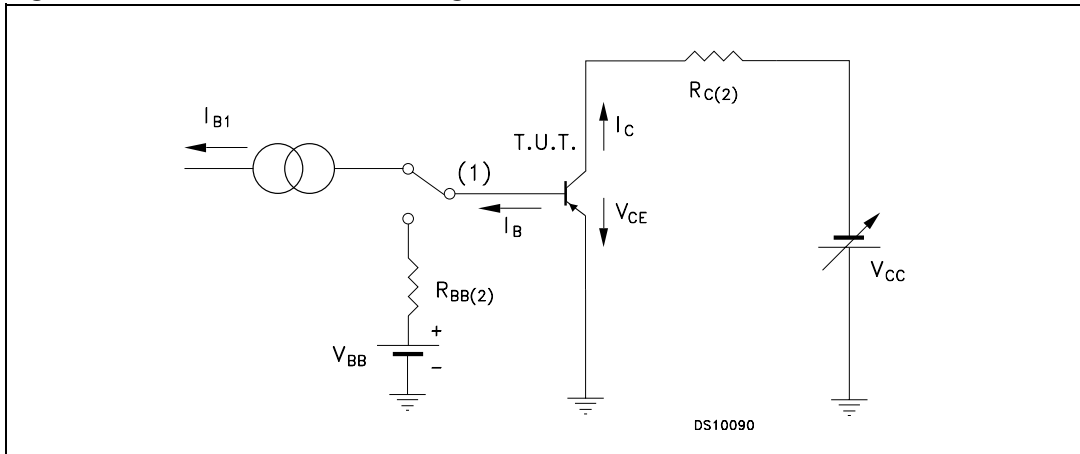
**Table 4. Electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{\text{CES}}$	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
$h_{\text{FE}}$	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	
$t_{\text{r}}$ $t_{\text{s}}$ $t_{\text{f}}$	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 $\mu\text{s}$ ns
$t_{\text{s}}$ $t_{\text{f}}$	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  $\leq 2\%$

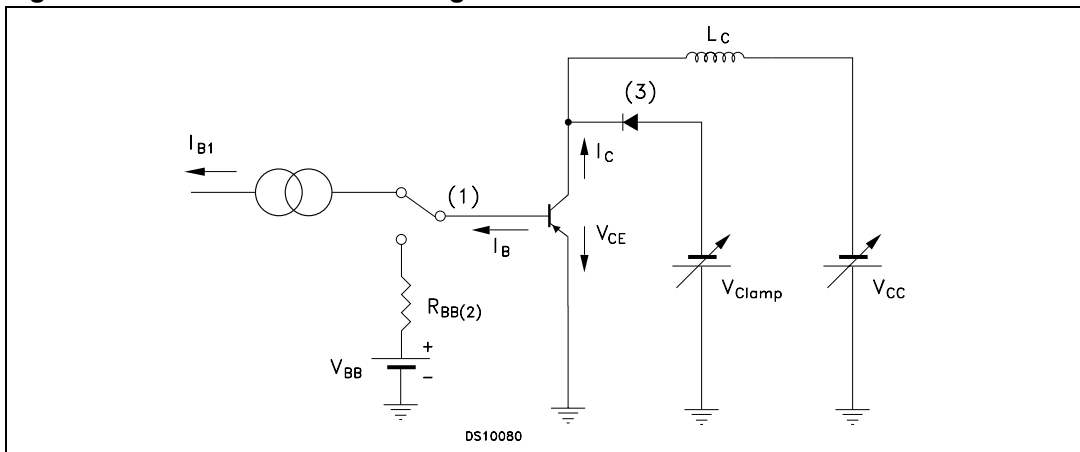
## 2.1 Test circuits

**Figure 2. Resistive load switching test circuit**



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

**Figure 3. Inductive load switching test circuit**



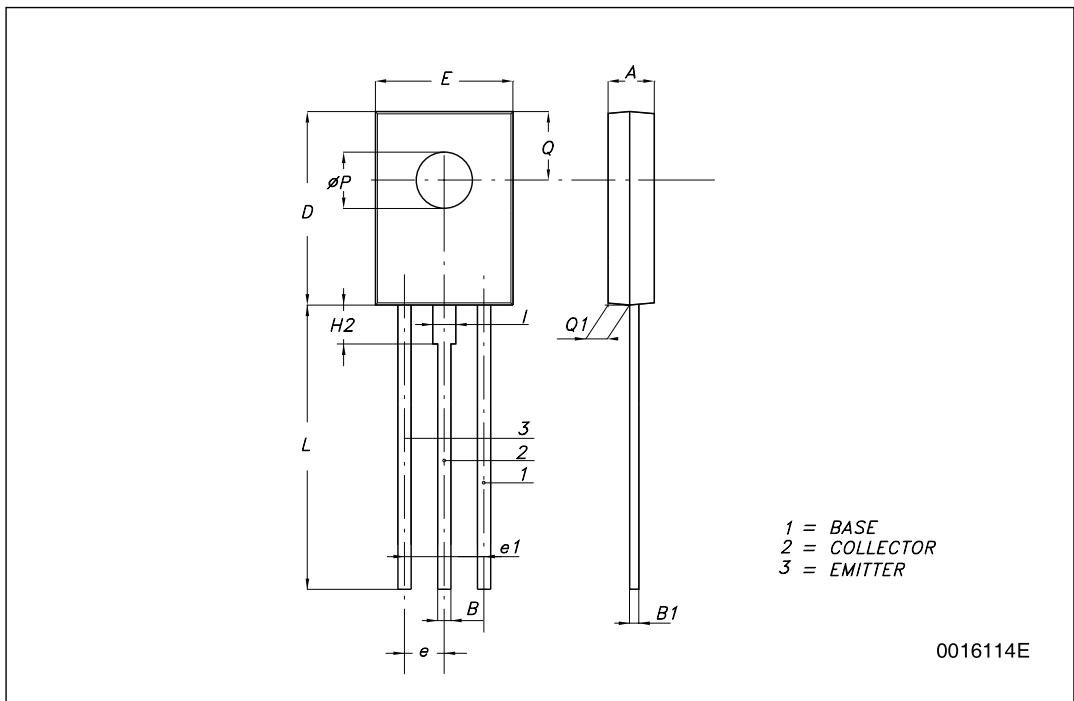
- 1. Fast electronic switch
- 2. Non-inductive resistor
- 3. Fast recovery rectifier

### 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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