BULT3N4

Medium voltage fast-switching NPN power transistor

Features

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

Application

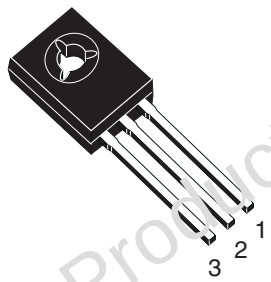
- Electronic ballast for fluorescent lighting

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 BULT3P3, its complementary PNP transistor.



SOT-32

Figure 1. Internal schematic diagram

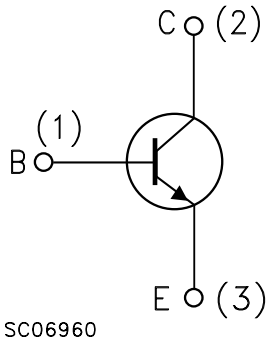


Table 1. Device summary

Order code	Marking	Package	Packing
BULT3N4	BULT3N4	SOT-32	Tube

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage (V_{BE} = 0)	400	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 µs, 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_{case} = 25 °C unless otherwise specified

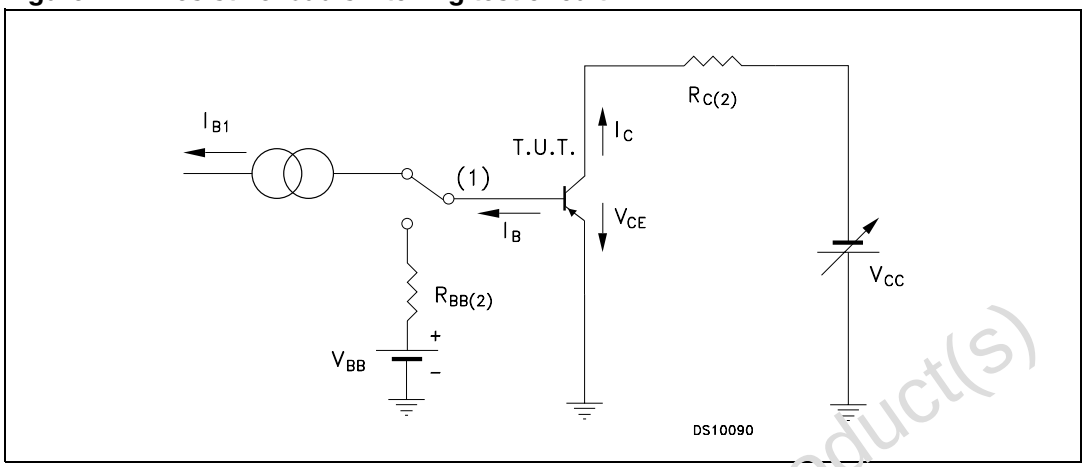
Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current (V_{BE} = 0)	V_{CE} = 400 V V_{CE} = 400 V T_C = 125 °C			0.1 0.5	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	200			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 0.7 A I_B = 0.1 A I_C = 1 A I_B = 0.2 A			0.4 0.5	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 = 0.2 A I_C = 2 A I_B = 0.4 A			1 1.1 1.3	V V V
h_{FE}	DC current gain	I_C =10 mA V_{CE} = 5 V I_C = 0.7 A V_{CE} = 5 V I_C = 2 A V_{CE} = 5 V	10 22 4	28	36	
t_r t_s t_f	Resistive load Rise time Storage time Fall time	I_C = 0.7 A V_{CC} = 150 V $I_{B(on)}$ = - $I_{B(off)}$ = 140 mA T_p = 30 µs		80 1.2 100	 1.6 130	ns µs ns
t_s t_f	Inductive load Storage time Fall time	I_C = 1 A $I_{B(on)}$ = 100 mA $V_{BE(off)}$ = - 5 V R_{BB} = 0 V_{clamp} = 150 V L = 1 mH		120 50	200 90	ns ns

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

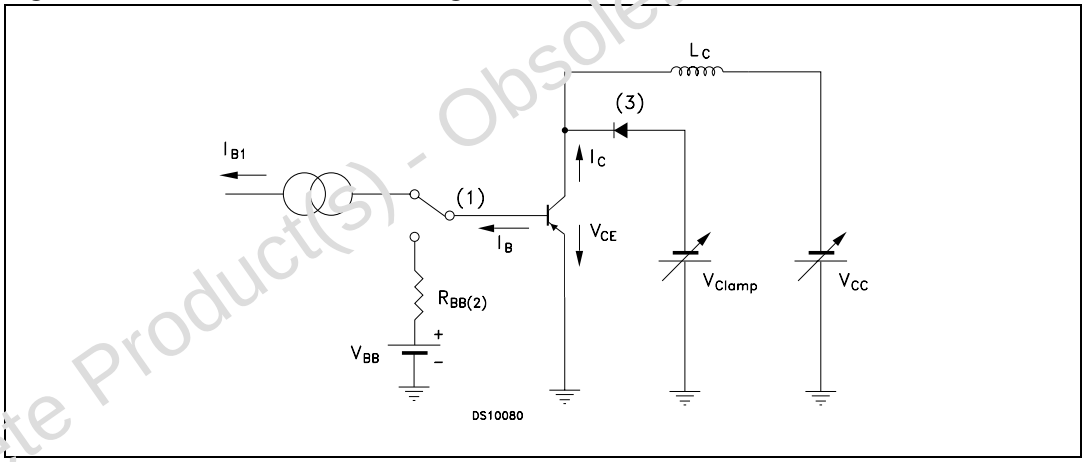
2.1 Test circuits

Figure 2. Resistive load switching test circuit



1. Fast electronic switch
2. Non-inductive resistor

Figure 3. Inductive load switching test circuit



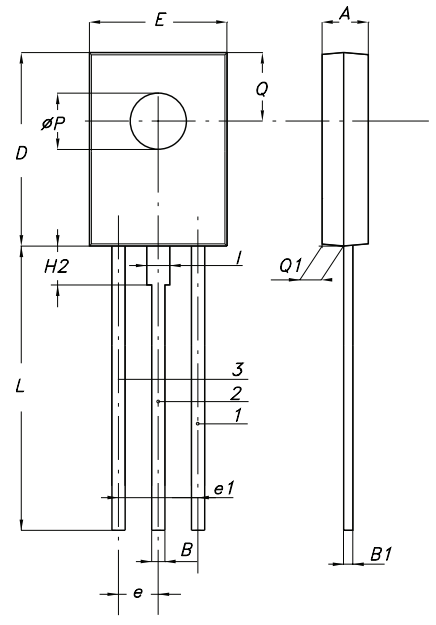
1. Fast electronic switch
2. Non-inductive resistor
3. Fast recovery rectifier

3 Package mechanical data

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.

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	



1 = BASE
2 = COLLECTOR
3 = EMITTER

0016114E

4 Revision history

Table 5. Document revision history

Date	Revision	Changes
25-Sep-2009	1	Initial release.