

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

Description

The device is manufactured using high voltage Multi-Epitaxial Planar technology for high switching speeds and high voltage capability.

Thanks to an increased intermediate layer, it has an intrinsic ruggedness which enables the transistor to withstand an high collector current level during breakdown condition, without using the transil protection usually necessary in typical converters for lamp ballast.

Applications

- Electronic ballast for fluorescent lighting
- Switch mode power supplies.

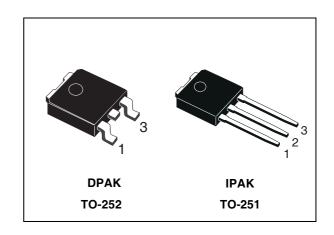


Figure 1. Internal schematic diagram

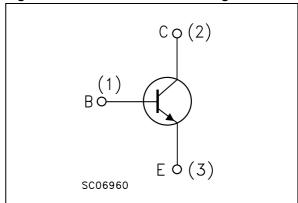


Table 1. Device summary

Order codes	Marking	Package	Packaging
BULD741T4	BULD741	DPAK	Tape & reel
BULD741-1	BULD741	741 IPAK Tube	

Electrical ratings BULD741

1 Electrical ratings

Table 2. Absolute maximum rating

Symbol	Parameter	Value	Unit
V _{CES}	Collector-emitter voltage (V _{BE} = 0)	1050	V
V _{CEO}	Collector-emitter voltage (I _B = 0)	400	V
V _{EBO}	Emitter-base voltage ($I_C = 0$, $I_B = 2A$, $t_P < 10ms$)	V _{(BR)EBO}	V
I _C	Collector current	2.5	Α
I _{CM}	Collector peak current (t _P < 5ms)	5	Α
I _B	Base current	1.5	Α
I _{BM}	Base peak current (t _P < 5ms)	3	Α
P _{tot}	Total dissipation at T _c = 25°C	30	W
T _{stg}	Storage temperature	-65 to 150	°C
TJ	Max. operating junction temperature	150	°C

Table 3. Thermal data

Symbol	Parameter	Value	Unit	
R _{thj-case}	Thermal resistance junction-case	max	4.16	°C/W

2 Electrical characteristics

 $(T_{case} = 25^{\circ}C \text{ unless otherwise specified})$

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions		Min.	Тур.	Max.	Unit
I _{CES}	Collector cut-off current (V _{BE} =0V)	V _{CE} =1050V			0.2	10	μА
I _{CEO}	Collector cut-off current (I _B =0)	V _{CE} =400V			10	250	μА
V _{(BR)EBO}	Emitter-base breakdown voltage (I _C = 0)	I _E =1mA		15	19	24	V
V _{CEO(sus)} (1)	Collector-emitter sustaining voltage (I _B = 0)	I _C =10mA		400	450		V
V _{CE(sat)} (1)	Collector-emitter saturation voltage	I _C =0.7A I _C =2A	$I_B = 0.14A$ $I_B = 0.6A$		0.15 0.5	0.5 1.5	V V
V _{BE(sat)} (1)	Base-emitter saturation voltage	I _C =2A	I _B =0.6A		1.1	1.5	V
h	DC assument assis	I _C =0.1A	V _{CE} =5V	48	70	100	
h _{FE}	DC current gain	I _C =0.45A	$V_{CE} = 3V$	25	35	50	
	Resistive load	V _{CC} =125V	I _C =1A				
t _s	Storage time	$I_{B1} = -I_{B2} = 0.2A$	$t_{p} = 300 \mu s$		2.5	3.5	μs
t _f	Fall time	$V_{BE(off)} = -5V$			350	500	ns
E _{ar}	Repetitive avalanche energy	L =2mH V _{BE(off)} =-5V	C =1.8nF	5			mJ

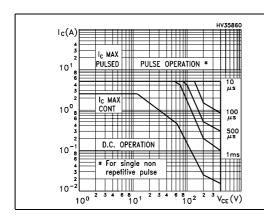
Note (1) Pulsed duration = $300\mu s$, duty cycle $\leq 1.5\%$

Electrical characteristics BULD741

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

Figure 3. Derating curve



Ptot (%)

100

80

60

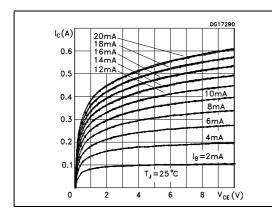
40

20

0 25 50 75 100 125 T_{case}(°C)

Figure 4. Output characteristics

Figure 5. Reverse biased safe operating area



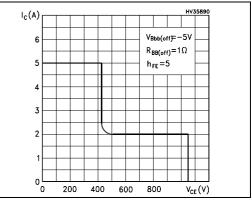
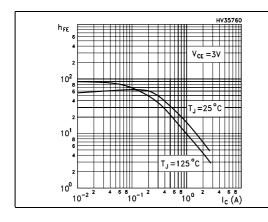
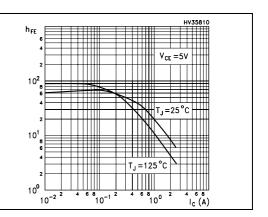


Figure 6. DC current gain

Figure 7. DC current gain



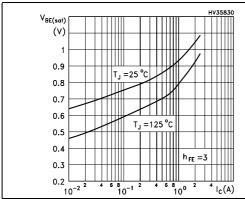


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BULD741 Electrical characteristics

Figure 8. Base-emitter saturation voltage

Figure 9. Collector-emitter saturation voltage



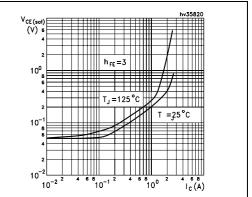
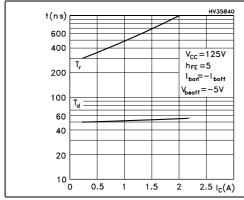


Figure 10. Resistive load switching on times

Figure 11. Resistive load switching on times



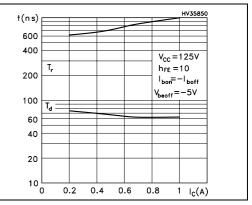
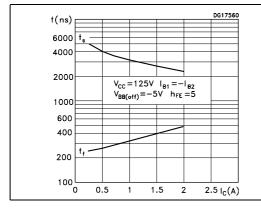
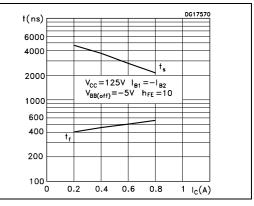


Figure 12. Resistive load switching off times

Figure 13. Resistive load switching off times





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Electrical characteristics BULD741

2.2 Test circuits

Figure 14. Resistive load switching test circuit

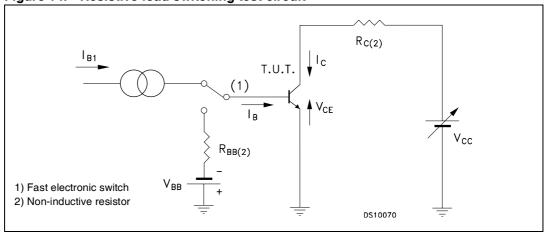
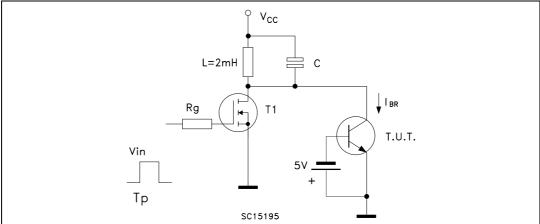


Figure 15. Energy rating test circuit



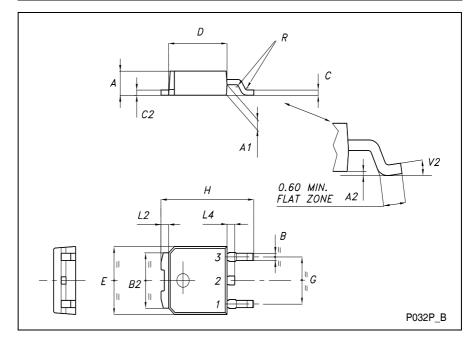
3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

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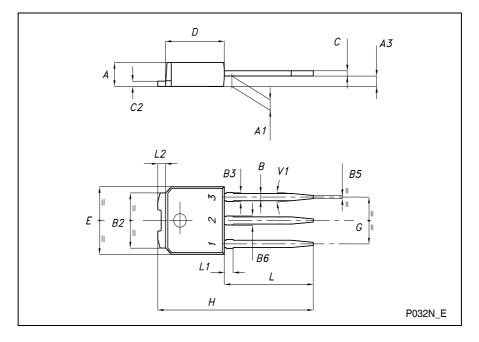
TO-252 (DPAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
Α	2.20		2.40	0.087		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
В	0.64		0.90	0.025		0.035
B2	5.20		5.40	0.204		0.213
С	0.45		0.60	0.018		0.024
C2	0.48		0.60	0.019		0.024
D	6.00		6.20	0.236		0.244
E	6.40		6.60	0.252		0.260
G	4.40		4.60	0.173		0.181
Н	9.35		10.10	0.368		0.398
L2		0.8			0.031	
L4	0.60		1.00	0.024		0.039
V2	0°		8°	0°		0°



TO-251 (IPAK) MECHANICAL DATA

DIM.	mm			inch			
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Α	2.20		2.40	0.087		0.094	
A1	0.90		1.10	0.035		0.043	
A3	0.70		1.30	0.028		0.051	
В	0.64		0.90	0.025		0.035	
B2	5.20		5.40	0.204		0.213	
В3			0.85			0.033	
B5		0.30			0.012		
B6			0.95			0.037	
С	0.45		0.60	0.018		0.024	
C2	0.48		0.60	0.019		0.024	
D	6.00		6.20	0.237		0.244	
E	6.40		6.60	0.252		0.260	
G	4.40		4.60	0.173		0.181	
Н	15.90		16.30	0.626		0.642	
L	9.00		9.40	0.354		0.370	
L1	0.80		1.20	0.031		0.047	
L2		0.80	1.00		0.031	0.039	
V1		10°			10°		



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Revision history BULD741

4 Revision history

Table 5. Revision history

Date	Revision	Changes
20-Dec-2006	1	Initial release.
09-Jul-2007	2	Updated package names in page 1, added figure 4, updated figure 12 and 13.

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