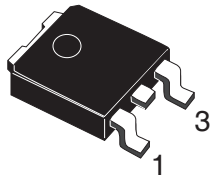
BULD3P5T4

Medium voltage fast-switching PNP Power Transistor

General features

- Medium voltage capability
- Low spread of dynamic parameters
- Minimum lot-to-lot spread for reliable operation
- Very high switching speed
- In compliance with the 2002/93/EC European Directive



DPAK

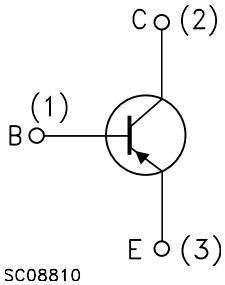
Description

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, H.F. ballast voltage FED where it is coupled with the BULD3N7T4, its complementary NPN transistor.

Internal schematic diagram



Applications

- Electronic ballast for fluorescent lighting

Order codes

Part Number	Marking	Package	Packing
BULD3P5T4	BULD3P5	DPAK	Tape & Reel

Contents

1 Electrical ratings

Table 1. Absolute maximum rating

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage (V_{BE} = 0)	-500	V
V_{CEO}	Collector-emitter voltage (I_B = 0)	-400	V
V_{EBO}	Emitter-base voltage (I_C = 0, I_B = -0.75 A, t_p < 100ms, T_j < 150°C)	$V_{(BR)EBO}$	V
I_C	Collector current	-3	A
I_{CM}	Collector peak current (t_P < 5ms)	-6	A
I_B	Base current	-1.5	A
I_{BM}	Base peak current (t_P < 5ms)	-3	A
P_{tot}	Total dissipation at T_c = 25°C	22	W
T_{stg}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Table 2. Thermal data

Symbol	Parameter		Value	Unit
$R_{thj\text{-}case}$	Thermal resistance junction-case	max	5.6	°C/W
$R_{thj\text{-}amb}$	Thermal resistance junction-amb	max	100	°C/W

2 Electrical characteristics

(T_{case} = 25°C unless otherwise specified)

Table 3. Electrical characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current (V_{BE} =0V)	V_{CE} =-500V V_{CE} =-500V T_C =125°C			-0.1 -0.5	mA mA
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage (I_C = 0)	I_E =-10mA	-5		-10	V
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage (I_B = 0)	I_C =-100mA	-400			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = -0.7A I_B = -0.1A I_C = -1A I_B = 0.2A			-0.5 -0.5	V V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = -0.5A I_B = -0.1A I_C = -1A I_B = -0.2A I_C = -2A I_B = -0.4A			-1.1 -1.2 -1.3	V V V
h_{FE}	DC current gain	I_C =-10mA V_{CE} =-5V I_C =-0.7A V_{CE} =-5V I_C =-2A V_{CE} =-5V	10 18 4		34	
t_r t_s t_f	Resistive load Rise time Storage time Fall time	I_C = -0.7A V_{CC} = -250V I_{B1} = -0.14A I_{B2} = 0.14A T_p = 30µs (see fig, 9)		100 2.4 80		ns µs ns
t_s t_f	Inductive load Storage time Fall time	I_C = -1A I_{B1} = -0.2A $V_{BE(off)}$ = 5V R_{bb} = 0Ω L = 1mH V_{clamp} = 200V (see fig, 10)		450 70		ns ns

Note (1) Pulsed duration = 300 µs, duty cycle ≤1.5%

2.1 Electrical characteristics (curves)

Figure 1. Safe operating area

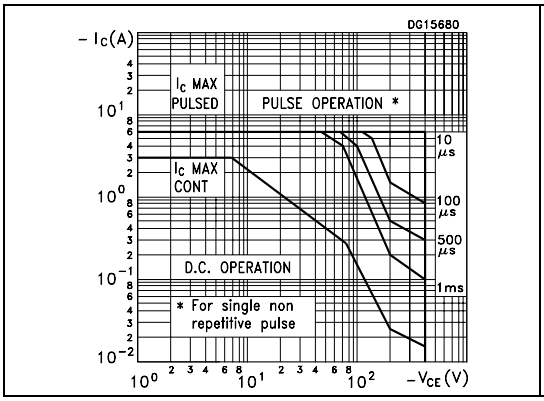


Figure 2. DC current gain

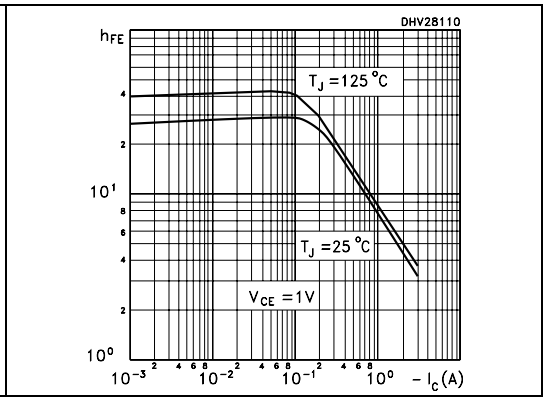


Figure 3. DC current gain

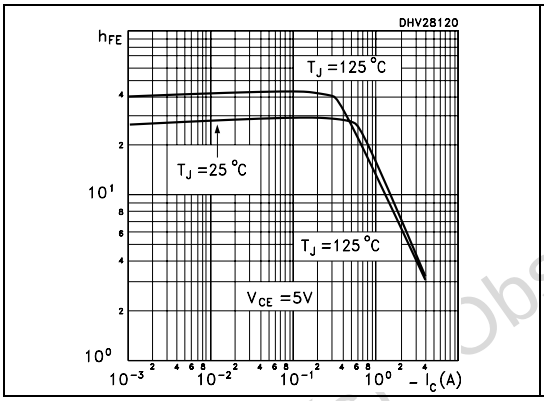


Figure 4. Collector-emitter saturation voltage

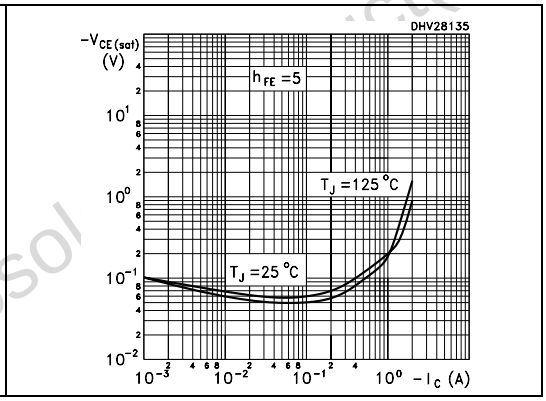


Figure 5. Base-emitter saturation voltage

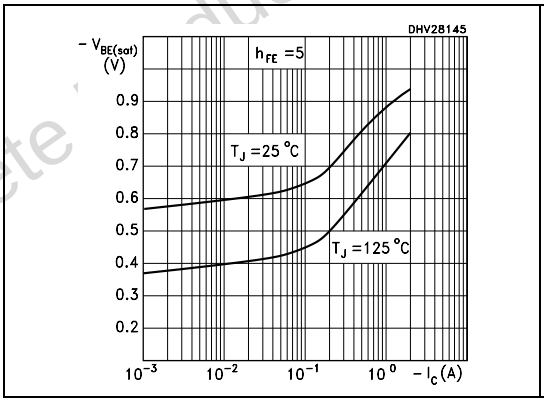


Figure 6. Switching times resistive load

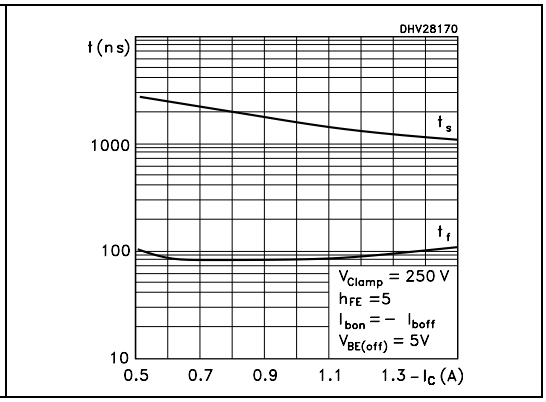


Figure 7. Switching times inductive load

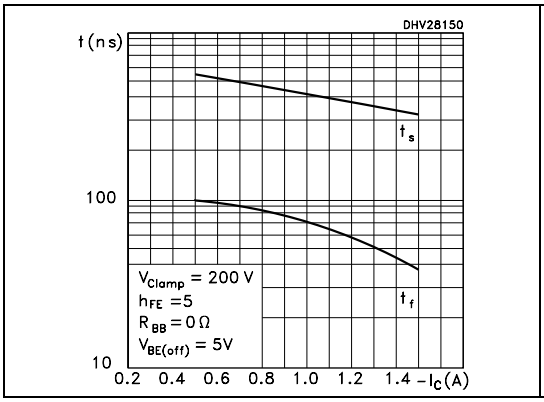
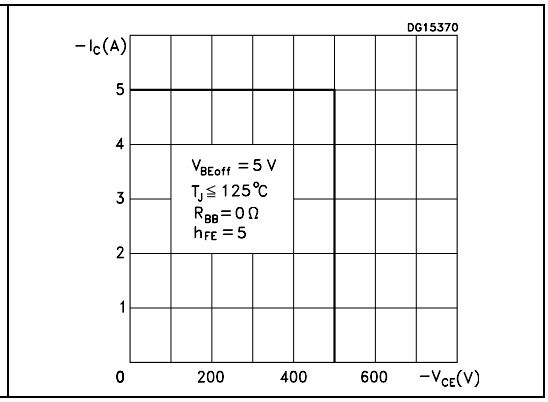
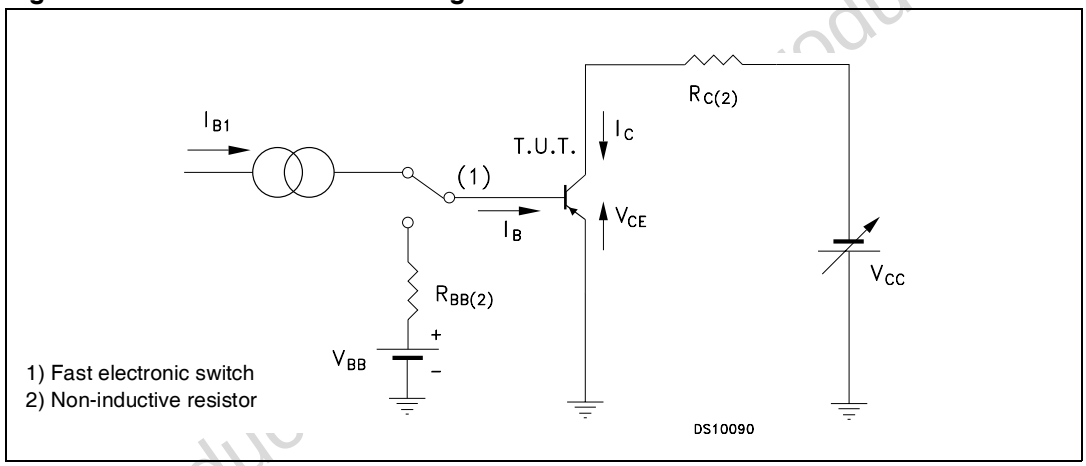


Figure 8. Reverse biased safe operating area



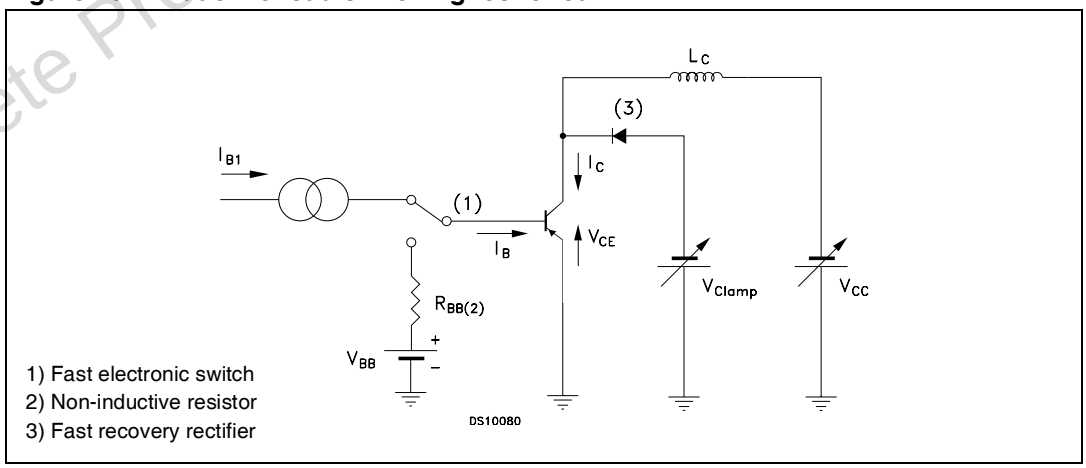
2.2 Test circuits

Figure 9. Resistive load switching test circuit



1) Fast electronic switch
2) Non-inductive resistor

Figure 10. Inductive load switching test circuit



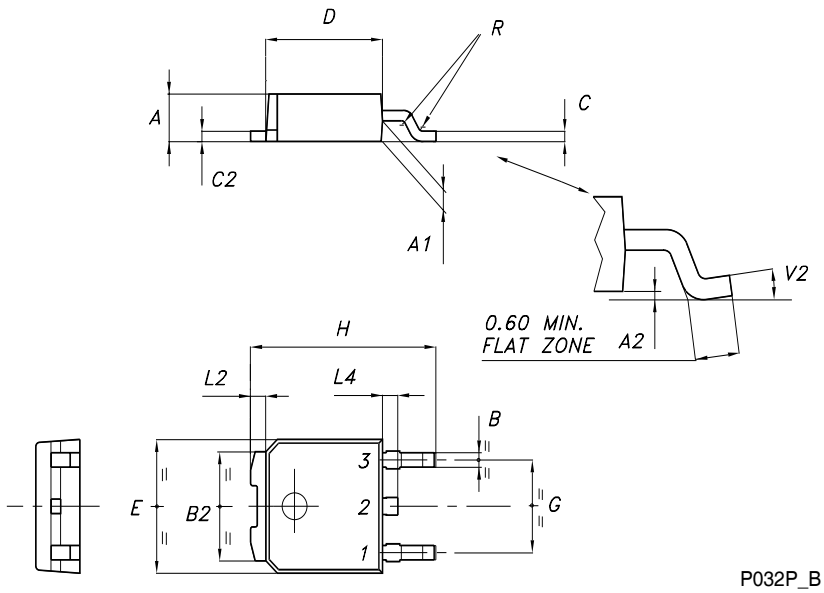
1) Fast electronic switch
2) Non-inductive resistor
3) Fast recovery rectifier

3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in 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

TO-252 (DPAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	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
B	0.64		0.90	0.025		0.035
B2	5.20		5.40	0.204		0.213
C	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
H	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°



P032P_B

4 Revision history

Table 4. Revision history

Date	Revision	Changes
01-Jun-2006	1	Initial release.

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