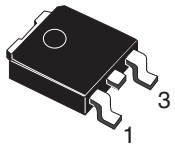
BULD742C

High voltage fast-switching NPN power transistor

Features

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



DPAK

Applications

- Electronic ballast for fluorescent lighting
- Switch mode power supplies

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.

Figure 1. Internal schematic diagram

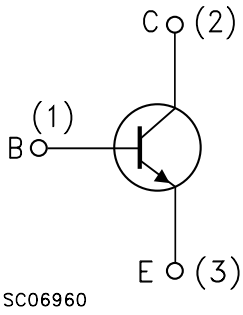


Table 1. Device summary

Order code	Marking	Package	Packaging
BULD742CT4	BULD742C	DPAK	Tape & reel

Contents

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 = 2 A, t_p < 10 ms)	$V_{(BR)EBO}$	V
I_C	Collector current	4	A
I_{CM}	Collector peak current (t_P < 5ms)	8	A
I_B	Base current	2	A
I_{BM}	Base peak current (t_P < 5ms)	4	A
P_{tot}	Total dissipation at T_c = 25°C	45	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
$R_{thj\text{-}case}$	Thermal resistance junction - case	2.78	°C/W
$R_{thj\text{-}amb}$	Thermal resistance junction - ambient	73	°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} =1050 V		0.2	10	µA
I_{CEO}	Collector cut-off current (I_B = 0)	V_{CE} =400 V		10	250	µA
$V_{(BR)EBO}$	Emitter base breakdown voltage (I_C = 0)	I_E = 1 mA	15	19	24	V
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage (I_B = 0)	I_C =10 mA	400	450		V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 1 A I_B = 0.2 A I_C = 3.5 A I_B = 1 A		0.15 0.6	0.5 1.5	V V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 3.5 A I_B = 1 A		1.1	1.5	V
h_{FE} (1)	DC current gain	I_C = 0.1 A V_{CE} = 5 V I_C = 0.8 A V_{CE} = 3 V	48 25	75 35	100 50	
t_s t_f	Resistive load Storage time Fall time	I_C = 2 A V_{CC} = 125 V I_{B1} = -I_{B2} = 400 mA t_p = 300 µs $V_{BE(off)}$ = -5 V		2.4 350	3.5 500	µs ns
E_{ar}	Repetitive avalanche energy	L = 2 mH C = 1.8 nF $V_{BE(off)}$ = -5 V	6			mJ

1. Pulsed duration = 300 ms, duty cycle ≤1.5%

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

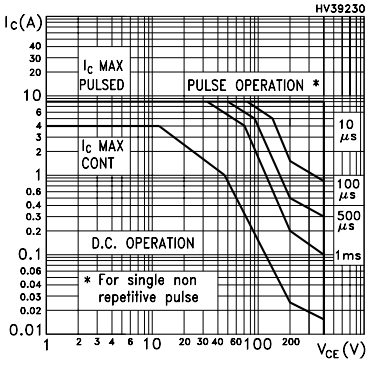


Figure 3. Derating curve

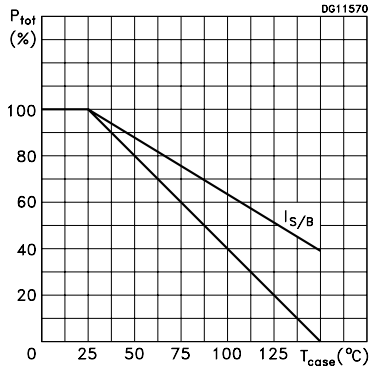


Figure 4. Output characteristics

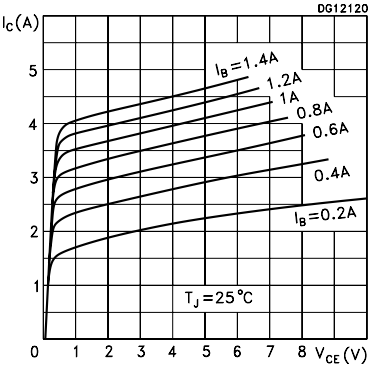


Figure 5. DC current gain

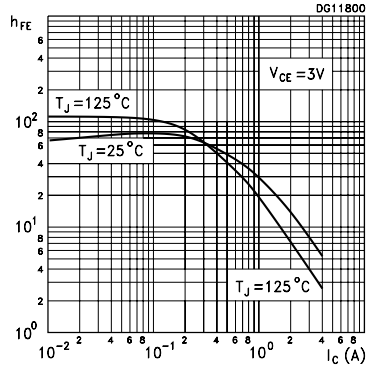


Figure 6. DC current gain

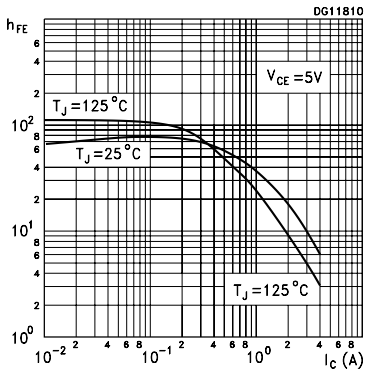


Figure 7. Collector - emitter saturation voltage

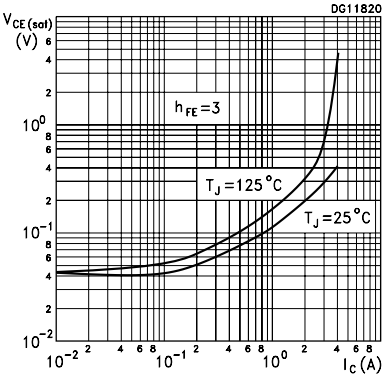


Figure 8. Base-emitter saturation voltage

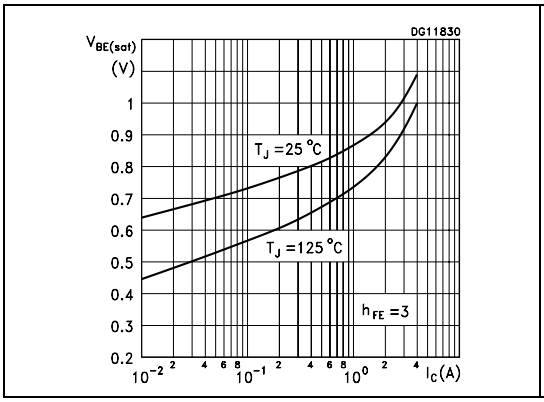


Figure 9. Resistive load switching on times (h_{FE} = 5)

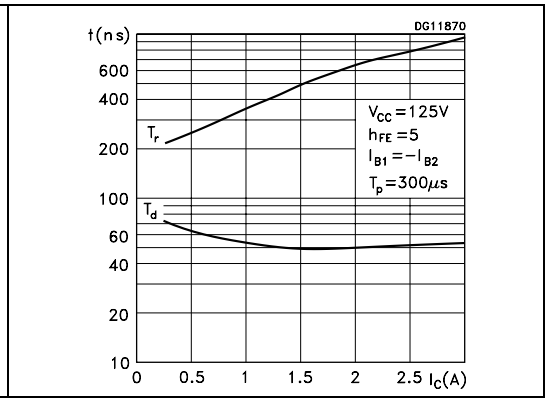


Figure 10. Resistive load switching off times (h_{FE} = 5)

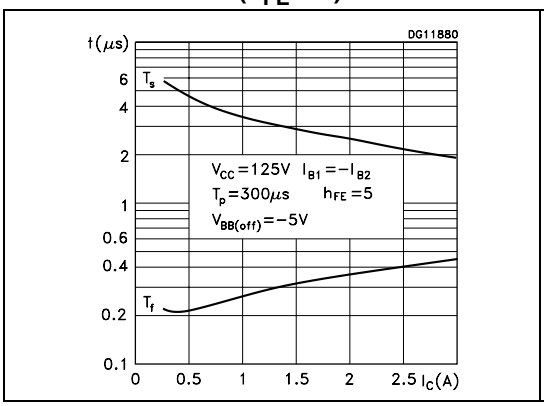


Figure 11. Resistive load switching on times (h_{FE} = 10)

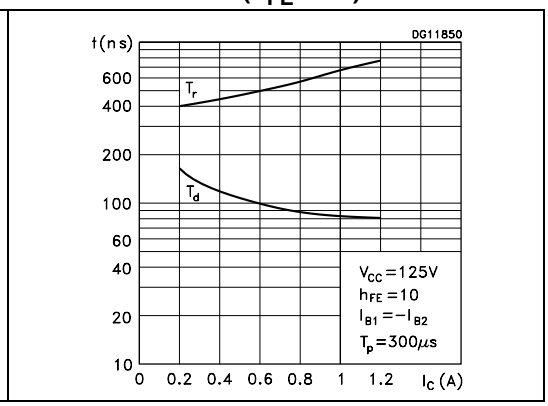


Figure 12. Resistive load switching off times (h_{FE} = 10)

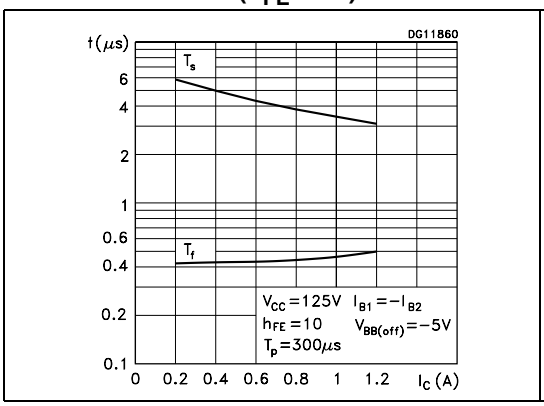
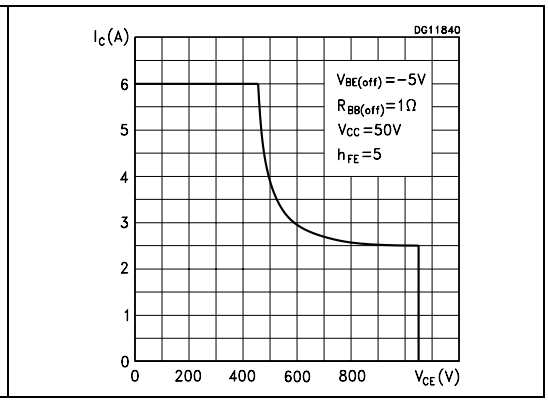


Figure 13. Reverse biased SOA



3 Test circuit

Figure 14. Energy rating test circuit

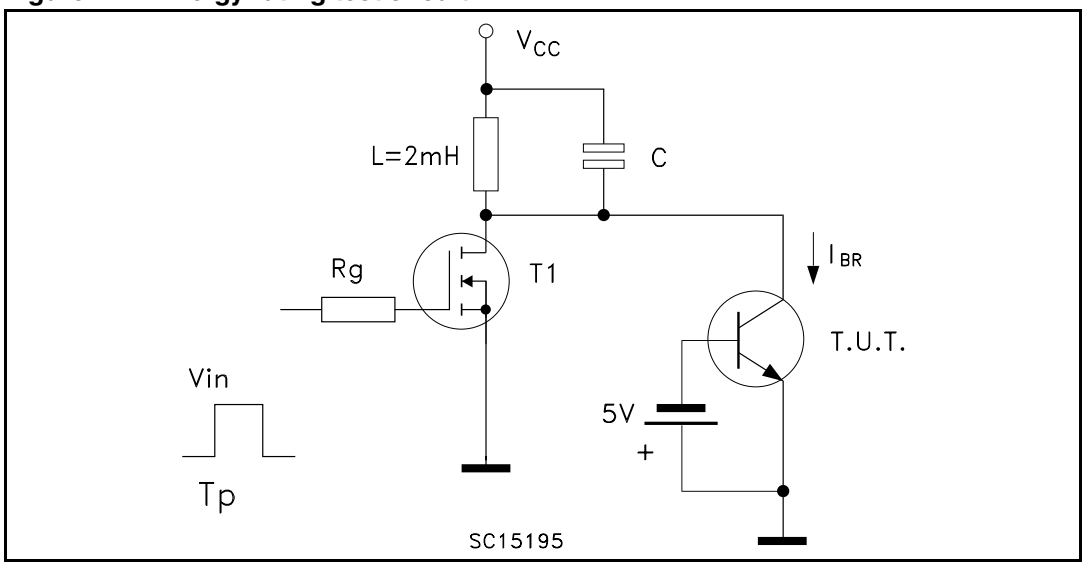
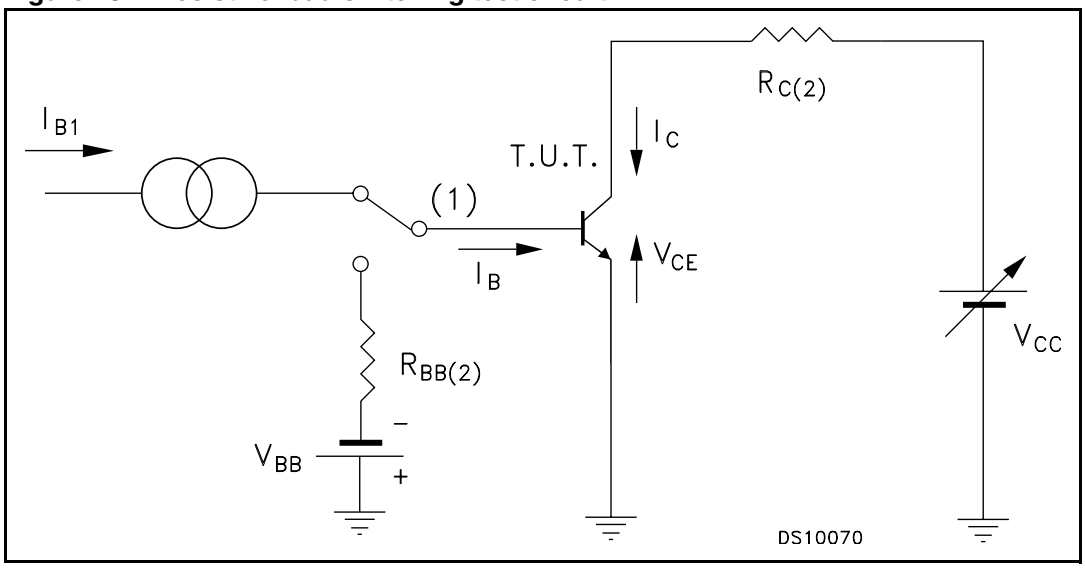


Figure 15. Resistive load switching test circuit

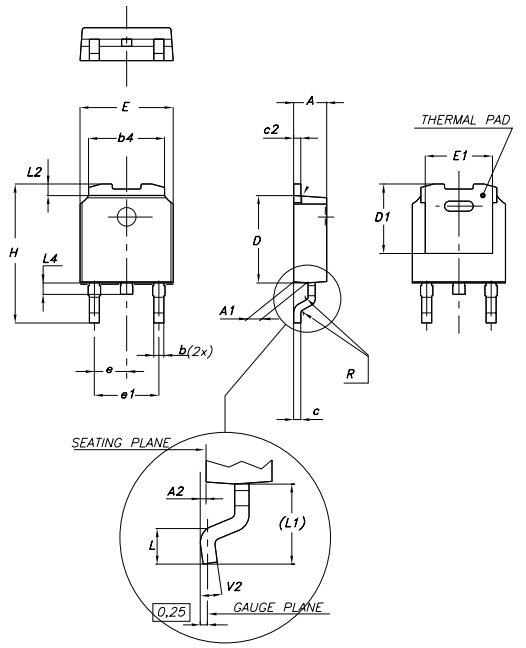


4 Package mechanical data

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

DPAK MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	2.2		2.4	0.086		0.094
A1	0.9		1.1	0.035		0.043
A2	0.03		0.23	0.001		0.009
B	0.64		0.9	0.025		0.035
b4	5.2		5.4	0.204		0.212
C	0.45		0.6	0.017		0.023
C2	0.48		0.6	0.019		0.023
D	6		6.2	0.236		0.244
D1		5.1			0.200	
E	6.4		6.6	0.252		0.260
E1		4.7			0.185	
e		2.28			0.090	
e1	4.4		4.6	0.173		0.181
H	9.35		10.1	0.368		0.397
L	1			0.039		
(L1)		2.8			0.110	
L2		0.8			0.031	
L4	0.6		1	0.023		0.039
R		0.2			0.008	
V2	0°		8°	0°		8°



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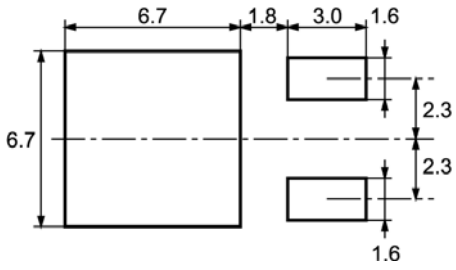
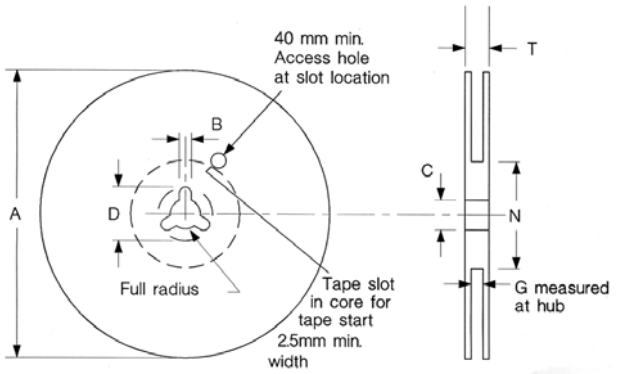
5 Packaging mechanical data

DPAK FOOTPRINT



All dimensions are in millimeters

TAPE AND REEL SHIPMENT



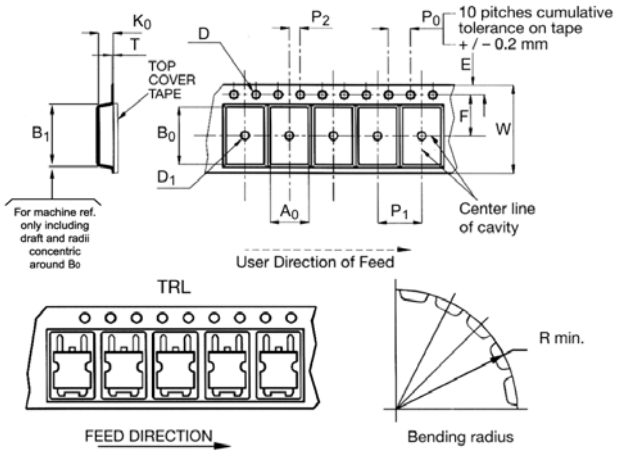
REEL MECHANICAL DATA

DIM.	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A		330		12.992
B	1.5		0.059	
C	12.8	13.2	0.504	0.520
D	20.2		0.795	
G	16.4	18.4	0.645	0.724
N	50		1.968	
T		22.4		0.881

BASE QTY	BULK QTY
2500	2500

TAPE MECHANICAL DATA

DIM.	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A0	6.8	7	0.267	0.275
B0	10.4	10.6	0.409	0.417
B1		12.1		0.476
D	1.5	1.6	0.059	0.063
D1	1.5		0.059	
E	1.65	1.85	0.065	0.073
F	7.4	7.6	0.291	0.299
K0	2.55	2.75	0.100	0.108
P0	3.9	4.1	0.153	0.161
P1	7.9	8.1	0.311	0.319
P2	1.9	2.1	0.075	0.082
R	40		1.574	
W	15.7	16.3	0.618	0.641



6 Revision history

Table 5. Document revision history

Date	Revision	Changes
09-Aug-2007	1	First release.

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