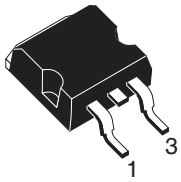
STB13007DT4

High voltage fast-switching NPN power transistor

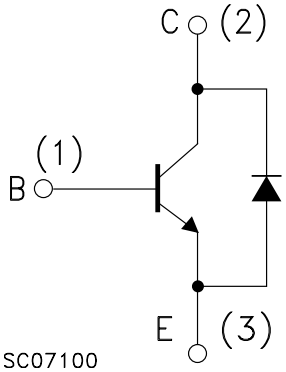
General features

- Improved specification: Lower leakage current, Tighter gain range, DC current gain preselection, Tighter storage time range
- High voltage capability
- Integrated free-wheeling diode
- Low spread of dynamic parameters
- Minimum lot-to-lot spread for reliable operation
- Very high switching speed
- Fully characterized at 125 °C
- Large RBSOA
- In compliance with the 2002/93/EC European Directive



D^2PAK
(T0-263)

Internal schematic diagram



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 to enhance switching speeds.

Applications

- Electronic transformers for halogen lamps
- Switch mode power supplies

Order codes

Part Number	Marking	Package	Packing
STB13007DT4	B13007D	D^2PAK	Tape & Reel

1 Electrical ratings

Table 1. Absolute maximum rating

Symbol	Parameter	Value	Unit
V_{CEV}	Collector-emitter voltage (V_{BE} = -1.5V)	700	V
V_{CEO}	Collector-emitter voltage (I_B = 0)	400	V
V_{EBO}	Emitter-base voltage (I_C = 0)	9	V
I_C	Collector current	8	A
I_{CM}	Collector peak current (t_P < 5ms)	16	A
I_B	Base current	4	A
I_{BM}	Base peak current (t_P < 5ms)	8	A
P_{tot}	Total dissipation at T_c = 25°C	80	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	1.56	°C/W
$R_{thj\text{-}amb}$	Thermal resistance junction-amb	max	62.5	°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} =700V V_{CE} =700V T_c =100°C			10 0.5	µA mA
I_{CEO}	Collector cut-off current (I_B =0)	V_{CE} =400V			100	µA
I_{EBO}	Emitter cut-off current (I_C =0)	V_{EB} =9V			100	µA
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage (I_B = 0)	I_C =10mA	400			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 2A I_B = 0.4A I_C = 5 A I_B = 1A I_C = 8 A I_B = 2A I_C = 5 A I_B = 1A T_c =100°C			0.8 1.5 2 3	V V V V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 2A I_B = 0.4A I_C = 5A I_B = 1A I_C = 5A I_B = 1A T_c =100°C			1.2 1.6 1.5	V V V
h_{FE}	DC current gain	I_C = 2A V_{CE} = 5V I_C = 5A V_{CE} = 5V	18 8		40 25	
V_f	Diode forward voltage	I_C = 3A			2.5	V
t_s t_f	Inductive load Storage time Fall time	I_C = 5A V_{Clamp} = 250V I_{B1} = 1A $V_{BE(off)}$ = -5V R_{BB} = 0Ω L = 200µH (see fig. 11)		1.7 90	2.3 150	µs ns
t_s t_f	Inductive load Storage time Fall time	I_C = 5A V_{Clamp} = 250V I_{B1} = 1A $V_{BE(off)}$ = -5V R_{BB} = 0Ω L = 200µH T_c =125°C (see fig. 11)		2.2 150		µs ns

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

2.1 Electrical characteristics (curves)

Figure 1. Safe operating area

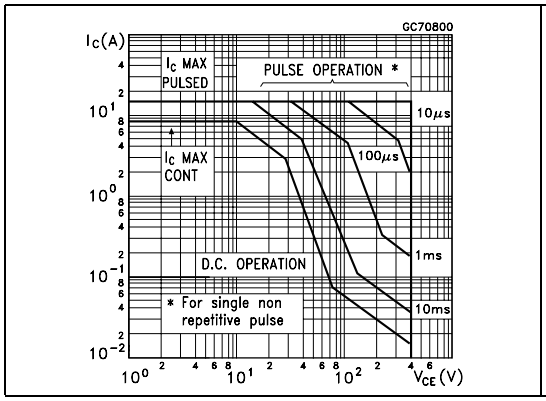


Figure 2. Derating curve

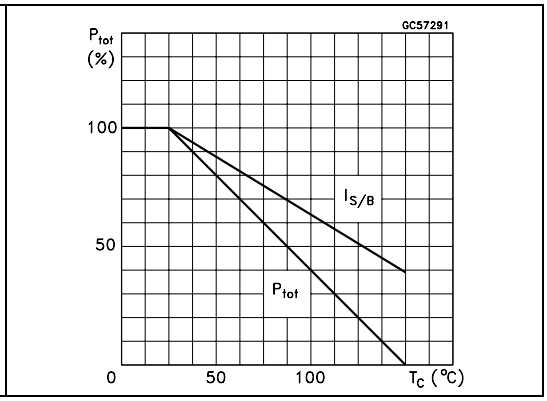


Figure 3. DC current gain

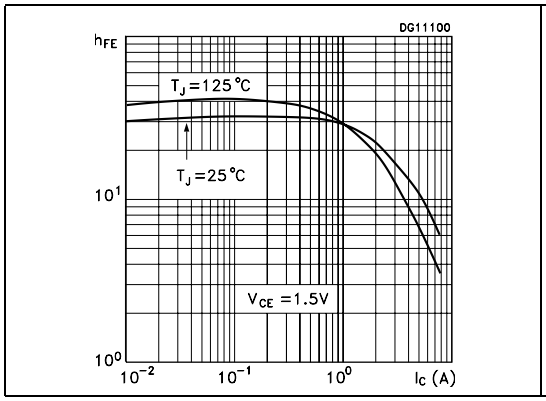


Figure 4. DC current gain

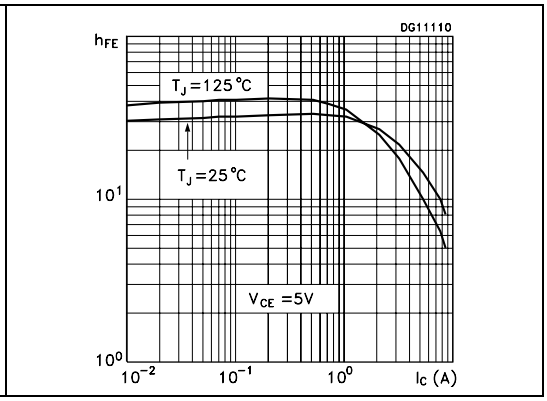


Figure 5. Collector-emitter saturation voltage

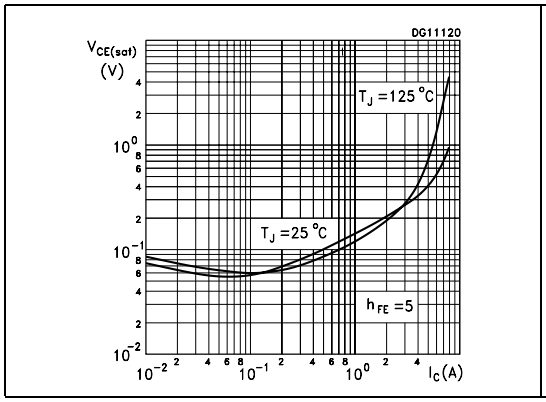


Figure 6. Base-emitter saturation voltage

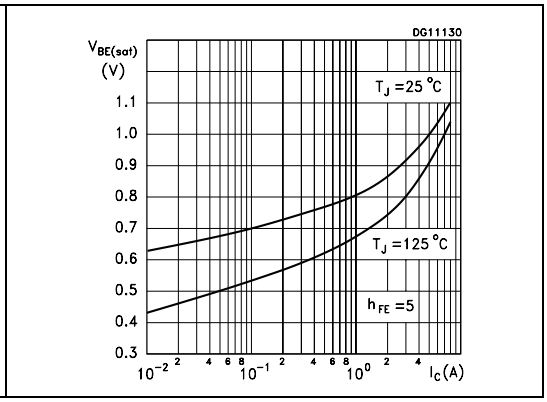


Figure 7. Diode forward voltage

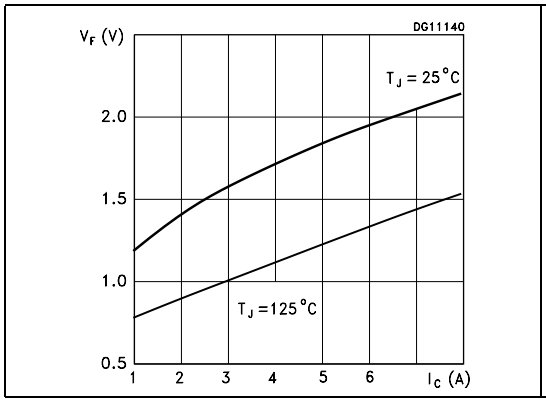


Figure 8. Switching times inductive load

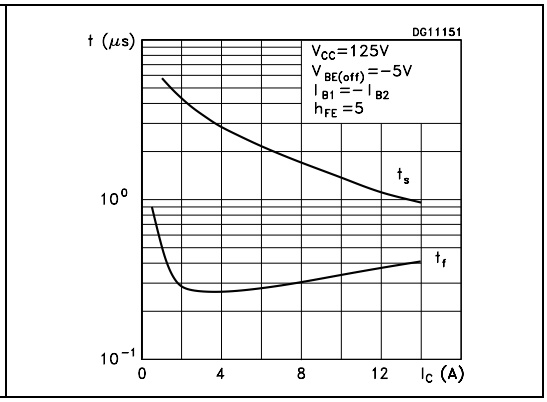


Figure 9. Switching times inductive load

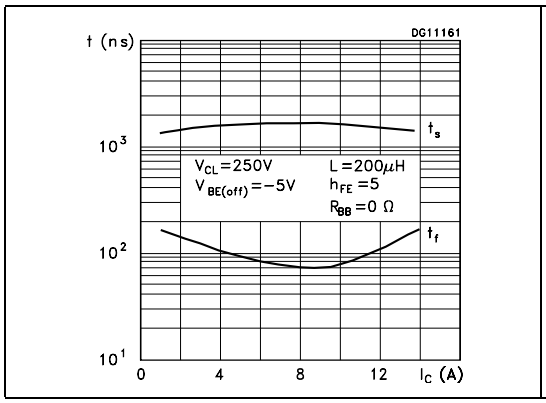
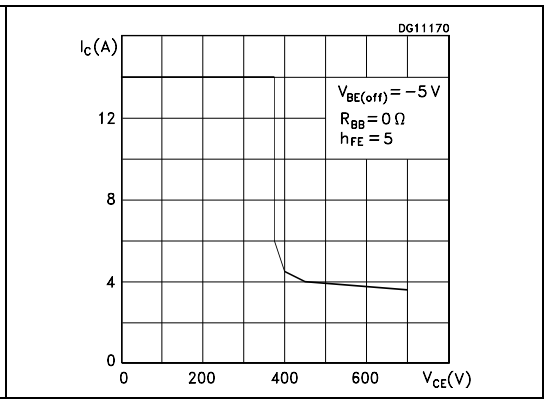
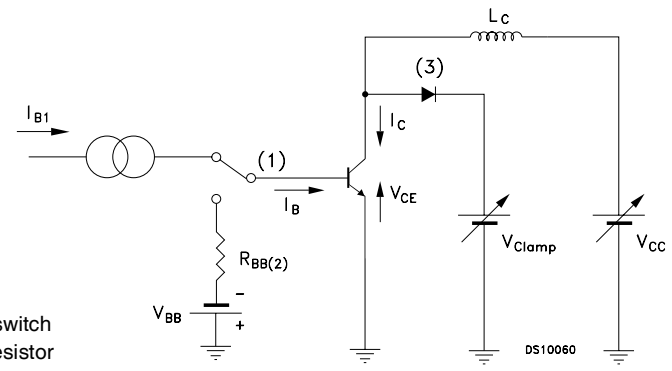


Figure 10. Reverse biased safe operating area



2.2 Test circuits

Figure 11. Inductive load switching test circuit



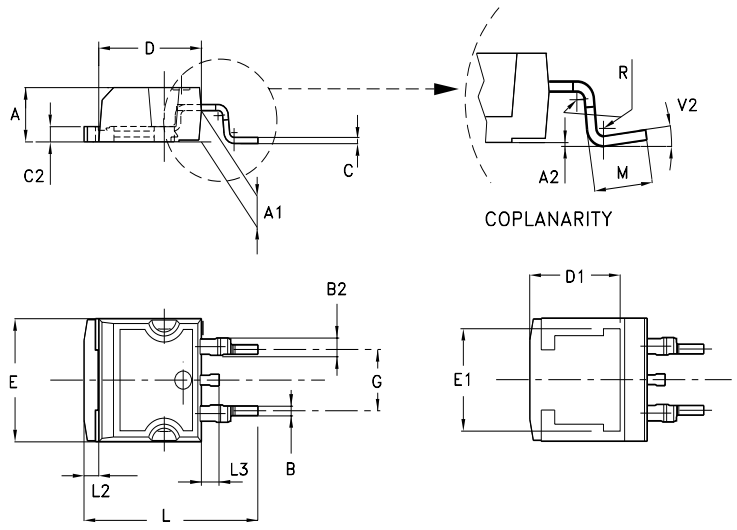
1) Fast electronic switch
2) Non-inductive resistor
3) Fast recovery rectifier

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-263 (D^2PAK) MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
A1	2.49		2.69	0.098		0.106
A2	0.03		0.23	0.001		0.009
B	0.70		0.93	0.027		0.036
B2	1.14		1.70	0.044		0.067
C	0.45		0.60	0.017		0.023
C2	1.23		1.36	0.048		0.053
D	8.95		9.35	0.352		0.368
D1		8.00			0.315	
E	10.00		10.40	0.393		0.409
E1		8.50			0.334	
G	4.88		5.28	0.192		0.208
L	15.00		15.85	0.590		0.624
L2	1.27		1.4	0.050		0.055
L3	1.40		1.75	0.055		0.068
M	2.40		3.2	0.094		0.126
R		0.40			0.016	
V2	0°		8°	0°		8°



- Weight : 1.38 g (typ.)
- The planaty of the slug must be within 30 µm

P011P6/G

4 Revision history

Table 4. Revision history

Date	Revision	Changes
19-Jun-2006	1	Initial release.
27-Apr-2007	2	The package's mechanical data has been update on page 7

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