STFN42

High voltage fast-switching NPN power transistor

Features

- High voltage capability
- Very high switching speed

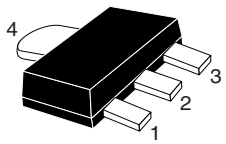
Applications

- Electronic ballasts for fluorescent lighting
- Battery charger

Description

This device is a high voltage fast-switching NPN power transistor, manufactured using high voltage multi-epitaxial planar technology for high switching speeds.

It employs a cellular emitter structure with planar edge termination to enhance switching speeds, while maintaining a wide RBSOA.



SOT-89

Figure 1. Internal schematic diagram

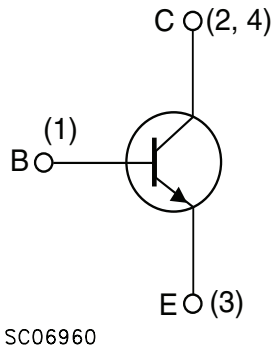


Table 1. Device summary

Order code	Marking	Packages	Packaging
STFN42	N42	SOT-89	Tape and reel

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage (V_{BE} = 0)	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	1	A
I_{CM}	Collector peak current (t_P < 5 ms)	2	A
I_B	Base current	0.5	A
I_{BM}	Base peak current (t_P < 5 ms)	1	A
P_{TOT}	Total dissipation at T_a = 25 °C	1.4	W
T_{stg}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj\text{-}amb}$	Thermal resistance junction ambient max	90	°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} = 700 V V_{CE} = 700 V; T_C= 125 °C			0.1 0.5	mA mA
I_{EBO}	Collector cut-off current (I_C =0)	V_{EB} = 9 V			0.1	mA
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage (I_B =0)	I_C = 10 mA	400			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 0.25 A I_B = 0.05 A I_C = 0.5 A I_B = 0.125 A I_C = 0.75 A I_B = 0.25 A		0.2 0.3 0.4	0.5 1 1.5	V V V
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 0.25 A I_B = 0.05 A I_C = 0.5 A I_B = 0.125 A			1 1.2	V V
h_{FE} (1)	DC current gain	I_C = 0.4 A V_{CE} = 5 V I_C = 0.8 A V_{CE} = 5 V	10 5		30 20	
t_f	Inductive load Fall time	I_C = 250 mA $I_{B(on)}$ = -$I_{B(off)}$ = 50 mA L = 200 µH		0.3		µs

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

2.1 Electrical characteristics (curve)

Figure 2. DC current gain (V_{CE}=3 V)

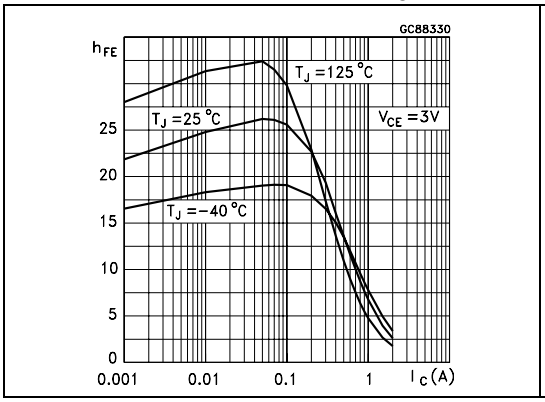


Figure 3. DC current gain (V_{CE}=5 V)

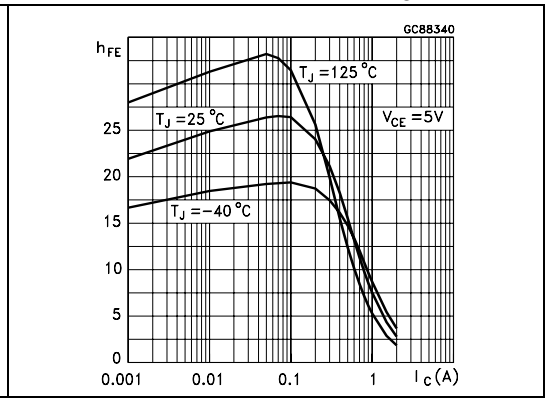


Figure 4. Collector emitter saturation voltage

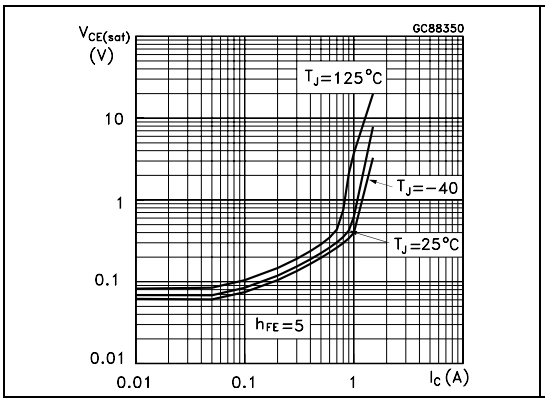


Figure 5. Base emitter saturation voltage

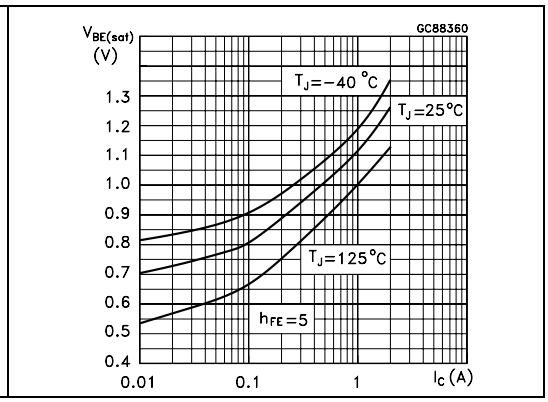
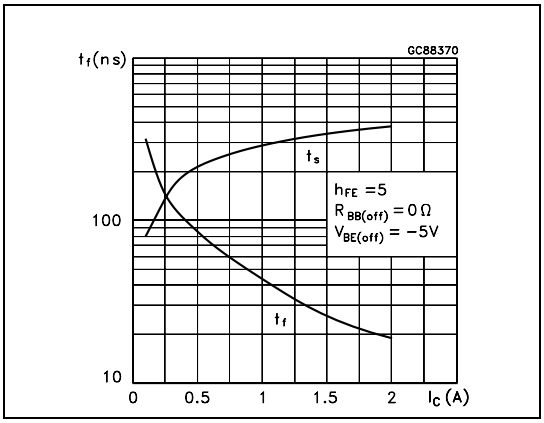


Figure 6. Switching time inductive load



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.

Table 5. SOT-89 mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	1.40		1.60
B	0.44		0.56
B1	0.36		0.48
C	0.35		0.44
C1	0.35		0.44
D	4.40		4.60
D1	1.62		1.83
D3		0.90	
E	2.29		2.60
e	1.42		1.57
e1	2.92		3.07
H	3.94		4.25
H1	2.70		3.10
K	1°		8°
L	0.89		1.20
R		0.25	
β		90°	

Figure 7. SOT-89 drawings

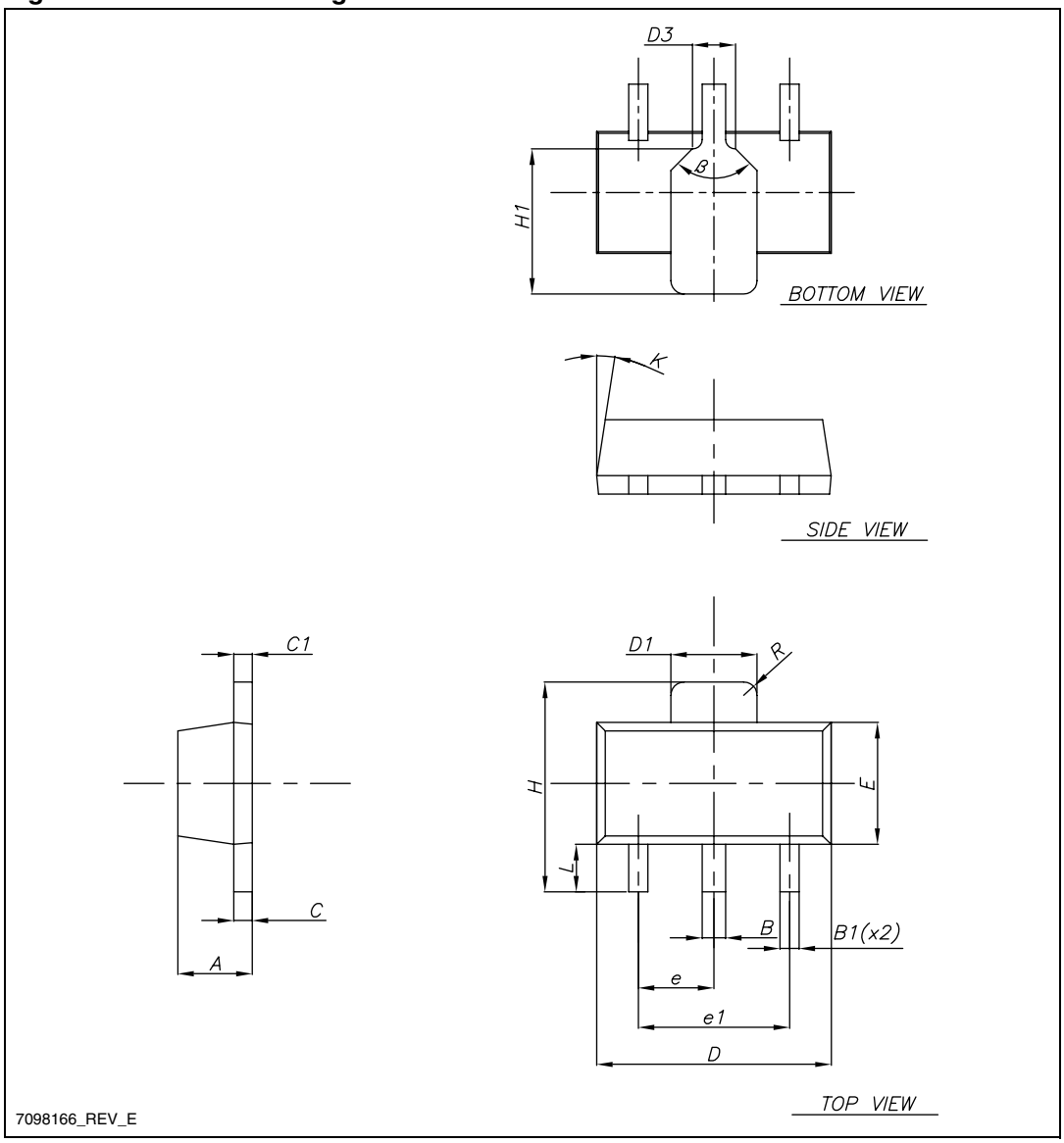
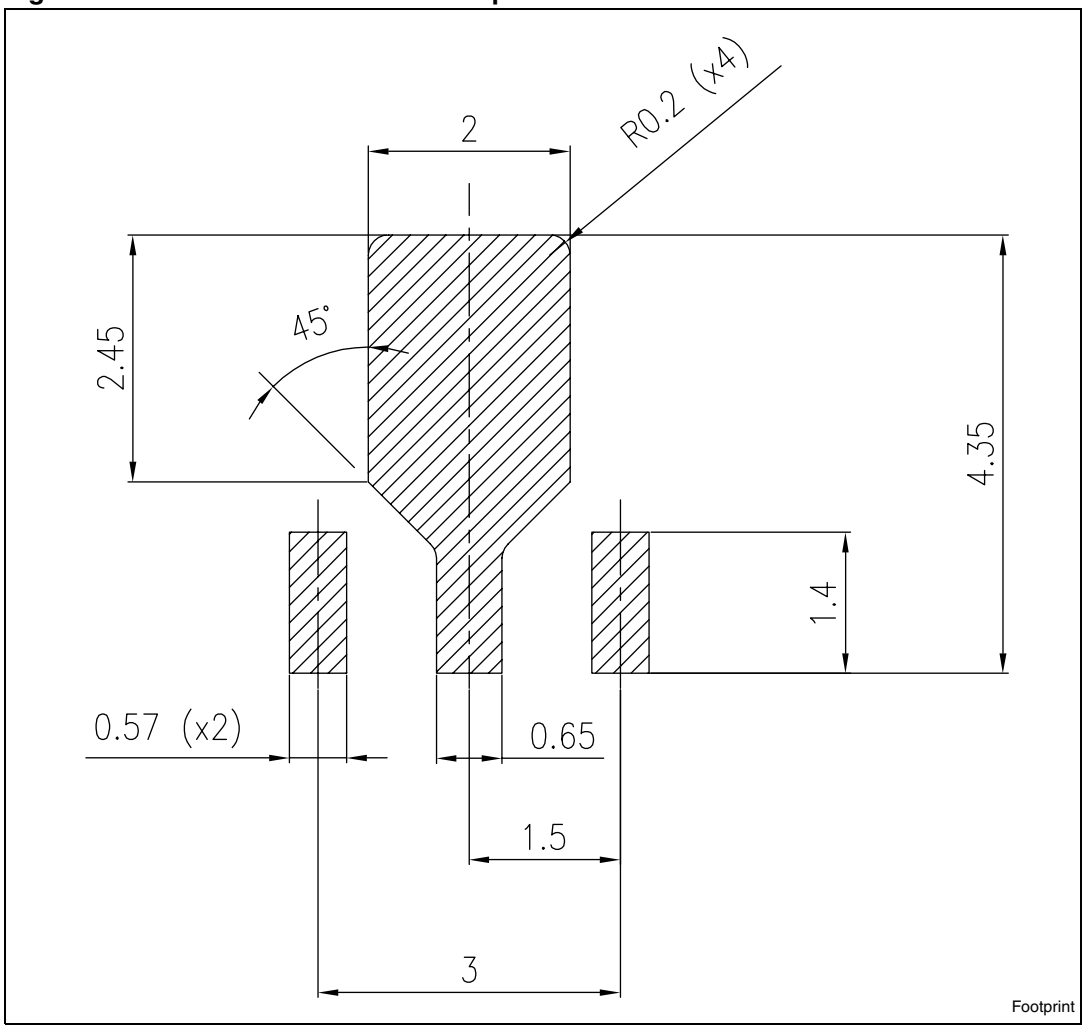


Figure 8. SOT-89 recommended footprint dimension in millimeters



4 Document revision history

Table 6. Document revision history

Date	Revision	Changes
16-Mar-2006	1	Initial release.
25-Jan-2011	2	Updated package mechanical data.
08-Feb-2012	3	Mechanical data updated

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