



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.

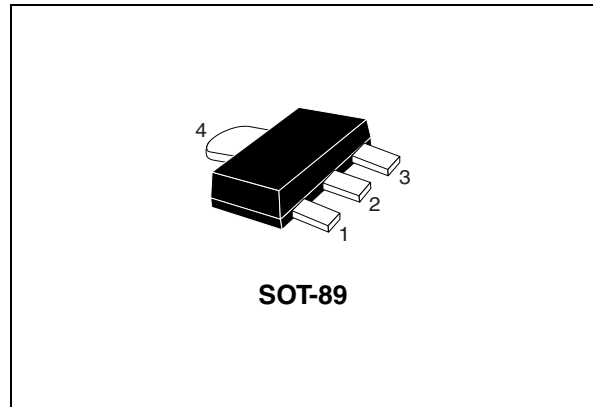


Figure 1. Internal schematic diagram

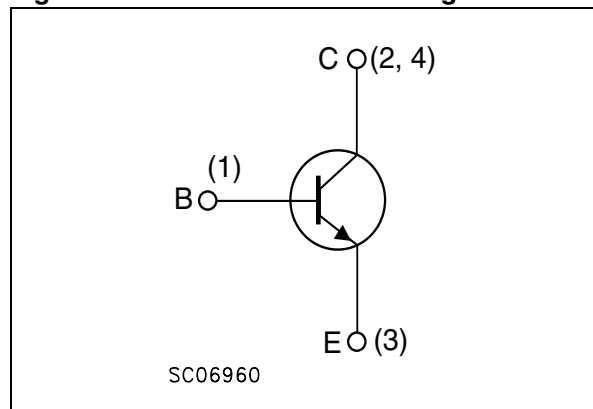


Table 1. Device summary

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
$R_{thj-amb}$	Thermal resistance junction ambient max	90	°C/W

2 Electrical characteristics

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

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current ($V_{\text{BE}} = 0$)	$V_{\text{CE}} = 700\text{ V}$ $V_{\text{CE}} = 700\text{ V}; T_{\text{C}} = 125^{\circ}\text{C}$			0.1 0.5	mA mA
I_{EBO}	Collector cut-off current ($I_{\text{C}} = 0$)	$V_{\text{EB}} = 9\text{ V}$			0.1	mA
$V_{\text{CEO(sus)}}^{(1)}$	Collector-emitter sustaining voltage ($I_{\text{B}} = 0$)	$I_{\text{C}} = 10\text{ mA}$	400			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 0.25\text{ A}$ $I_{\text{B}} = 0.05\text{ A}$ $I_{\text{C}} = 0.5\text{ A}$ $I_{\text{B}} = 0.125\text{ A}$ $I_{\text{C}} = 0.75\text{ A}$ $I_{\text{B}} = 0.25\text{ A}$		0.2 0.3 0.4	0.5 1 1.5	V V V
$V_{\text{BE(sat)}}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = 0.25\text{ A}$ $I_{\text{B}} = 0.05\text{ A}$ $I_{\text{C}} = 0.5\text{ A}$ $I_{\text{B}} = 0.125\text{ A}$			1 1.2	V V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = 0.4\text{ A}$ $V_{\text{CE}} = 5\text{ V}$ $I_{\text{C}} = 0.8\text{ A}$ $V_{\text{CE}} = 5\text{ V}$	10 5		30 20	
t_{f}	Inductive load Fall time	$I_{\text{C}} = 250\text{ mA}$ $I_{\text{B(on)}} = -I_{\text{B(off)}} = 50\text{ mA}$ $L = 200\text{ }\mu\text{H}$		0.3		μs

1. Pulse test: pulse duration $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

2.1 Electrical characteristics (curve)

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

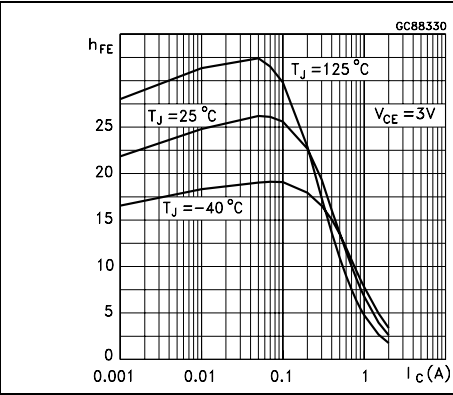


Figure 3. DC current gain ($V_{CE}=5\text{ V}$)

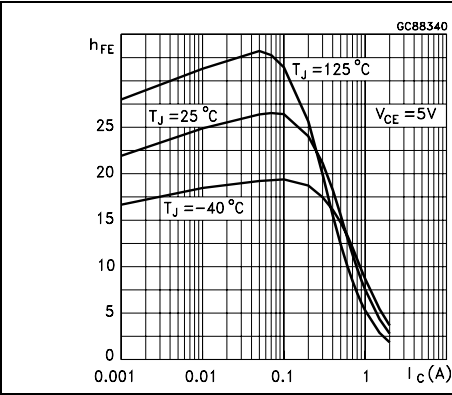


Figure 4. Collector emitter saturation voltage

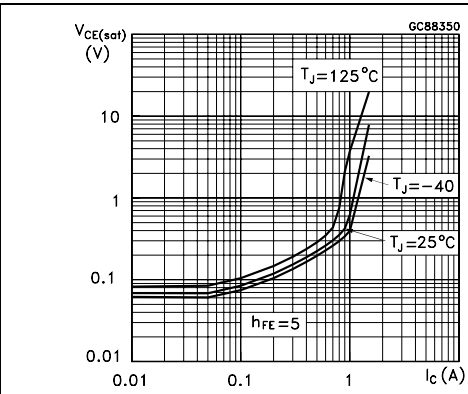


Figure 5. Base emitter saturation voltage

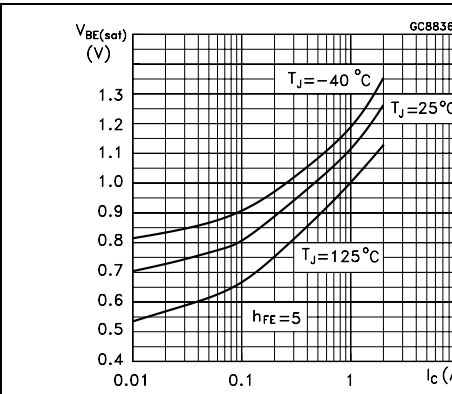
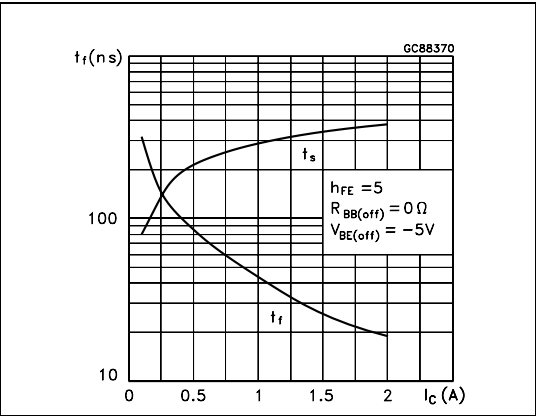


Figure 6. Switching time inductive load



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

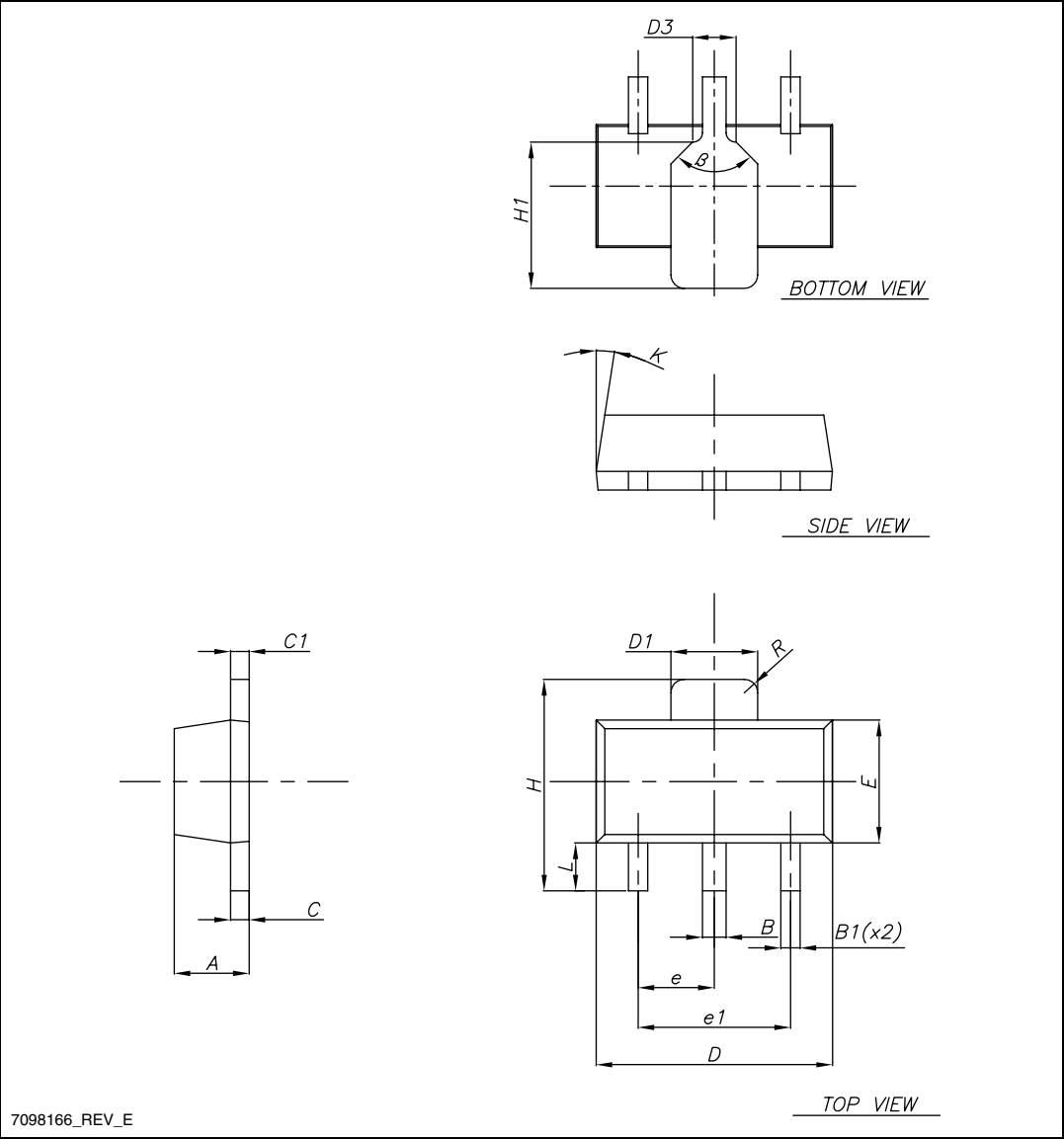
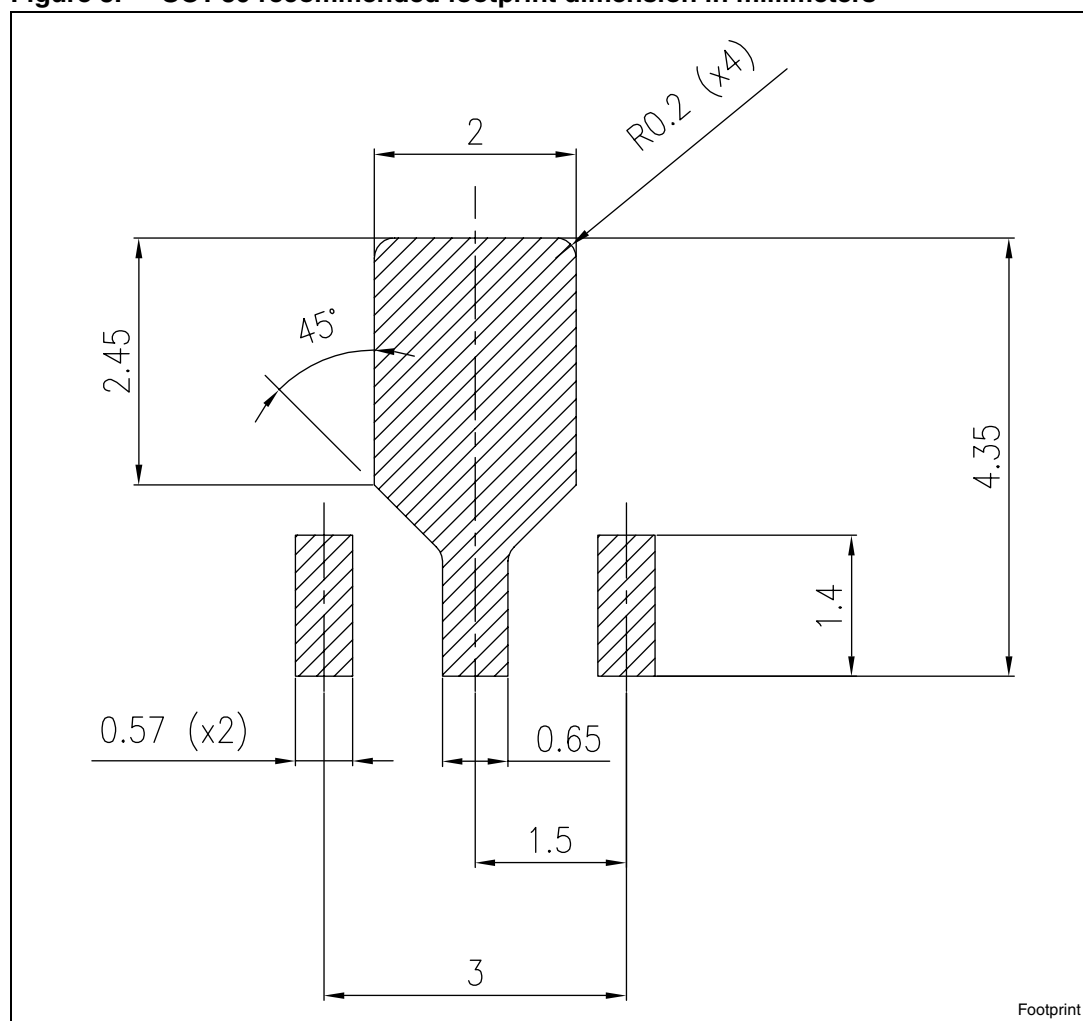


Figure 8. SOT-89 recommended footprint dimension in millimeters

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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