



## 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.

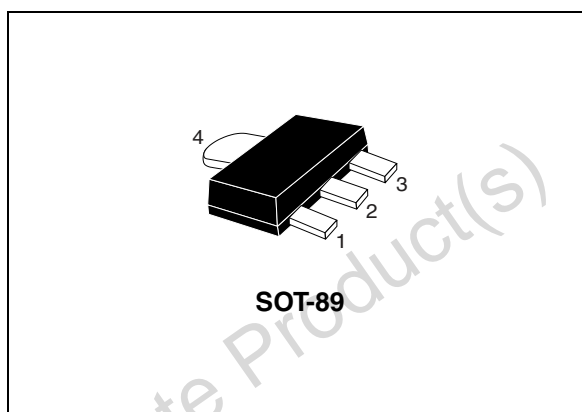


Figure 1. Internal schematic diagram

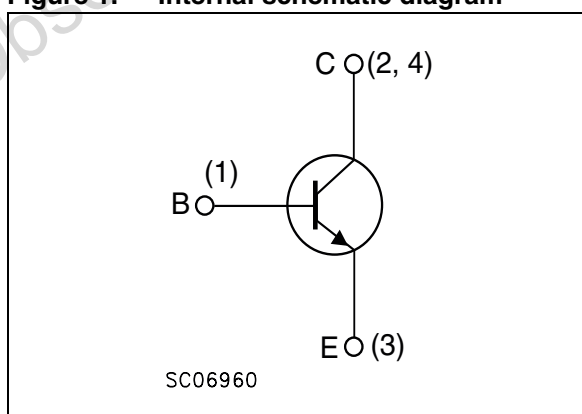


Table 1. Device summary

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

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

## 2.1 Electrical characteristics (curve)

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

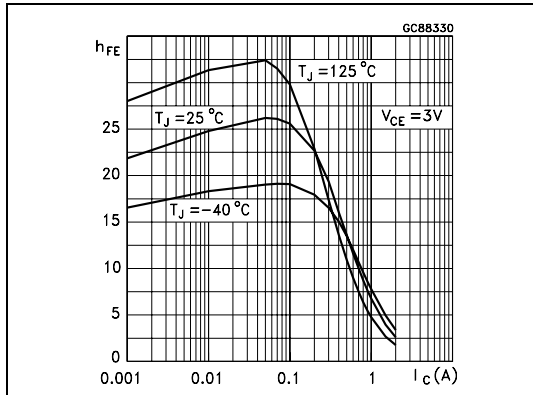


Figure 3. DC current gain ( $V_{CE}=5\text{ V}$ )

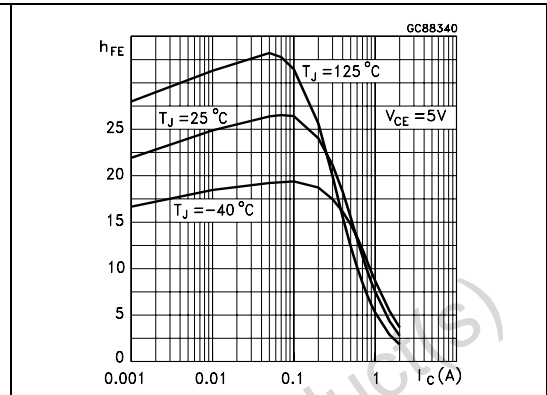


Figure 4. Collector emitter saturation voltage

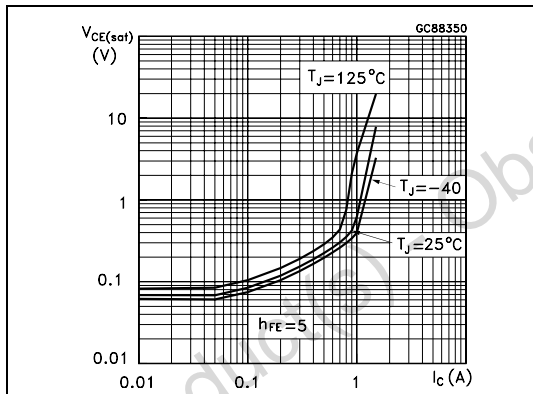


Figure 5. Base emitter saturation voltage

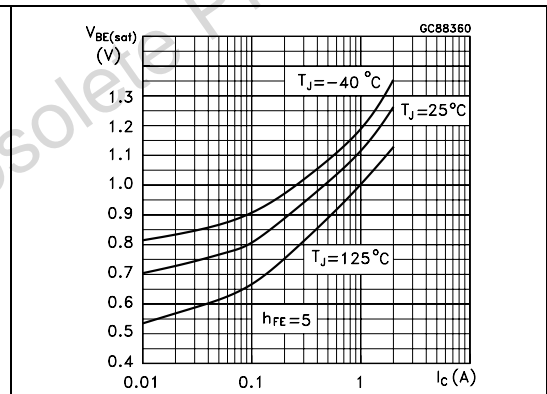
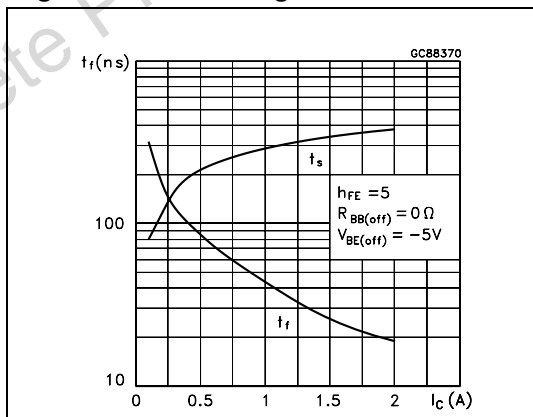


Figure 6. Switching time inductive load



### 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](http://www.st.com). ECOPACK is an ST trademark.

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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	
$\beta$		90°	

Figure 7. SOT-89 drawings

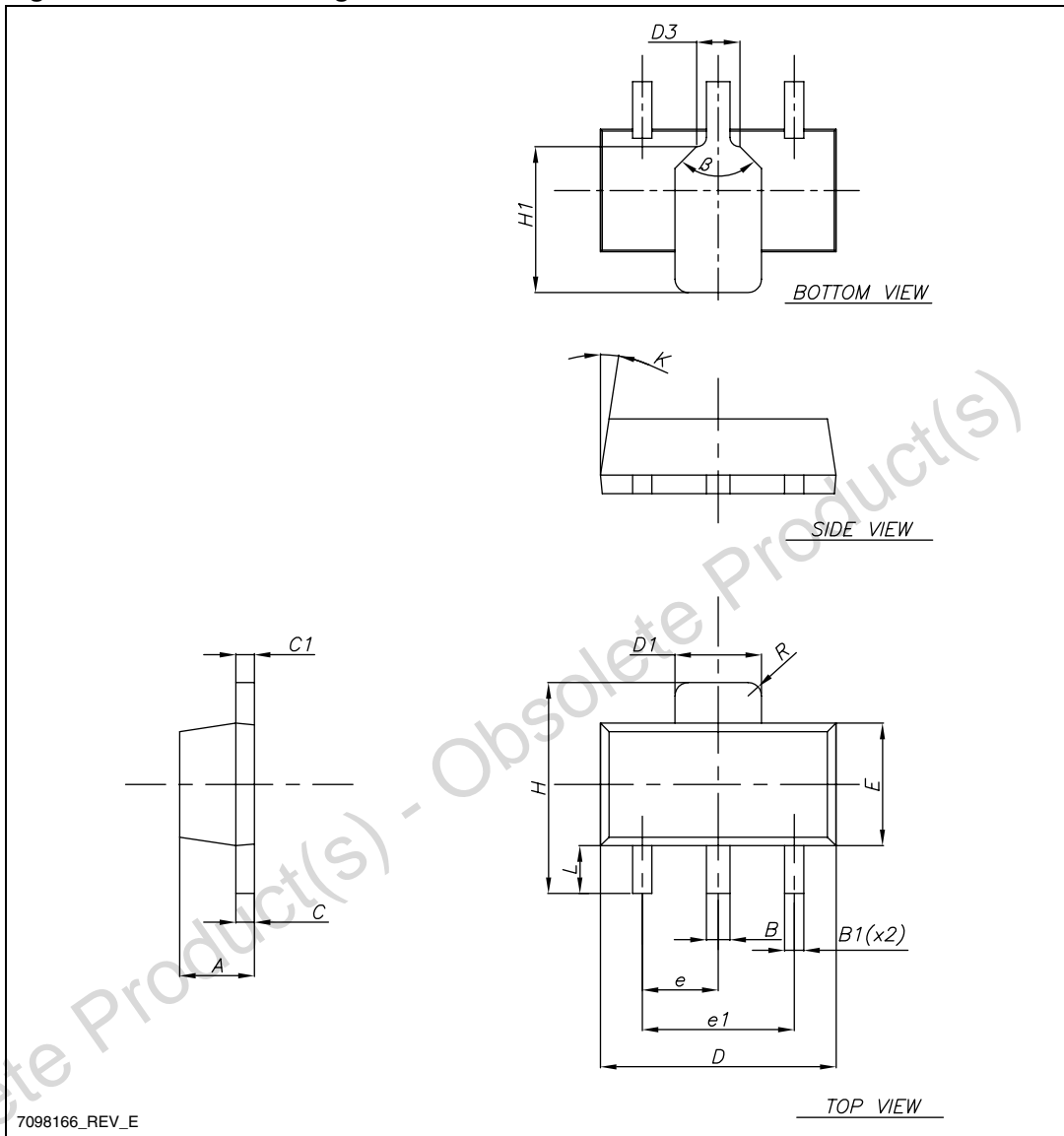
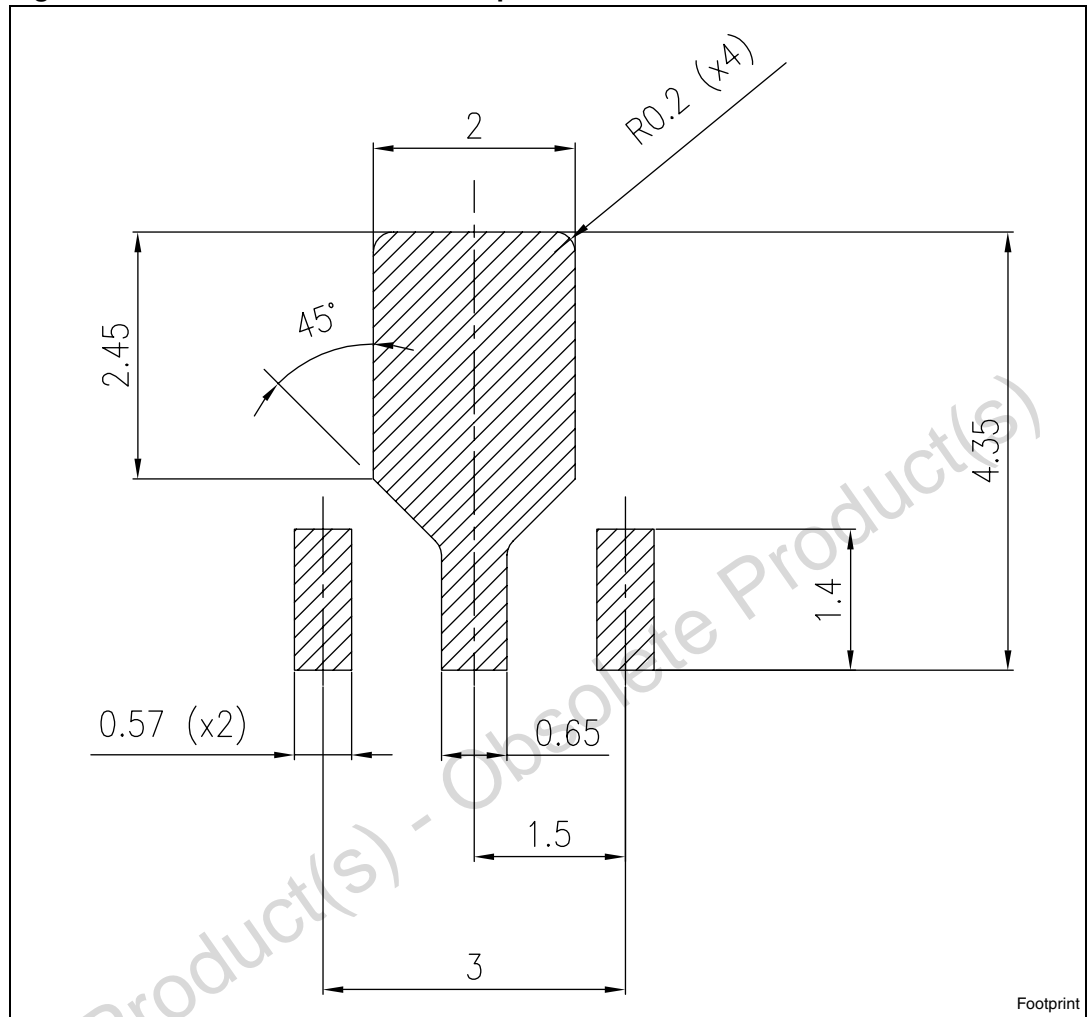


Figure 8. SOT-89 recommended footprint dimension in millimeters





## 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

Obsolete Product(s) - Obsolete Product(s)

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