

## NPN low voltage transistors

### Features

- Low voltage small devices for surface mounting
- High ruggedness

### Applications

- Voltage regulation
- Relay driver
- Generic switch

### Description

Both STF715 and STN715 are NPN transistors manufactured using planar technology. They are housed in surface mounting power packages.

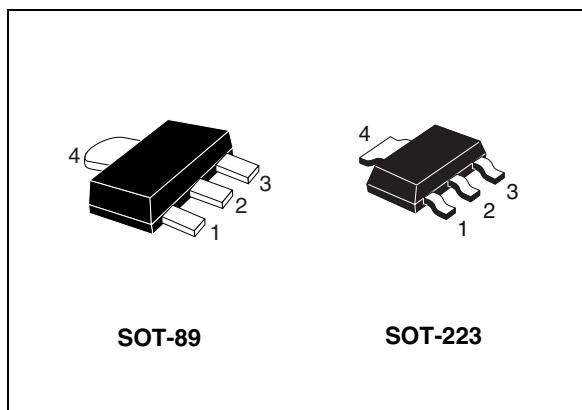


Figure 1. Internal schematic diagram

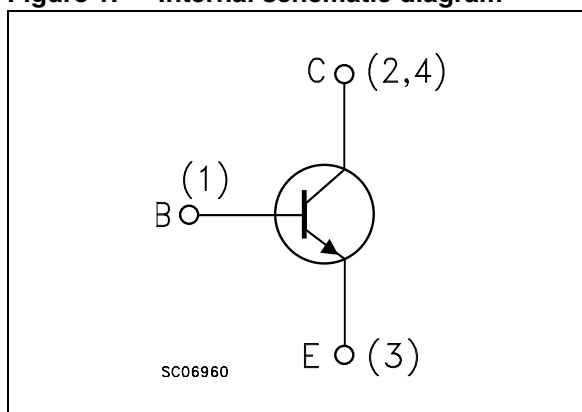


Table 1. Device summary

Order codes	Marking	Packages	Packaging
STF715	715	SOT-89	Tape and reel
STN715	N715	SOT-223	Tape and reel

# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-base voltage ( $I_E = 0$ )	140	V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )	80	V
$V_{EBO}$	Emitter-base voltage ( $I_C = 0$ )	5	V
$I_C$	Collector current	1.5	A
$I_{CM}$	Collector peak current ( $t_P < 5$ ms)	2	A
$I_B$	Base current	0.3	A
$I_{BM}$	Base peak current ( $t_P < 5$ ms)	0.6	A
$P_{TOT}$	Total dissipation at $T_{amb} = 25$ °C for STF715	1.4	W
	Total dissipation at $T_{amb} = 25$ °C for STN715	1.6	W
$T_{STG}$	Storage temperature	-65 to 150	°C
$T_J$	Max. operating junction temperature	150	°C

**Table 3. Thermal data**

Symbol	Parameter	SOT-89	SOT-223	Unit
$R_{thJA}^{(1)}$	Thermal resistance junction-ambient max	89	78	°C/W

1. Device mounted on PCB area of 1 cm<sup>2</sup>

## 2 Electrical characteristics

$T_{\text{case}} = 25\text{ °C}$  unless otherwise specified.

**Table 4. Electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{\text{CES}}$	Collector cut-off current ( $V_{\text{BE}} = 0$ )	$V_{\text{CE}} = 140\text{ V}$			500	$\mu\text{A}$
$I_{\text{CEO}}$	Collector cut-off current ( $I_{\text{B}} = 0$ )	$V_{\text{CE}} = 80\text{ V}$			1	mA
$I_{\text{EBO}}$	Emitter cut-off current ( $I_{\text{C}} = 0$ )	$V_{\text{EB}} = 5\text{ V}$			100	$\mu\text{A}$
$V_{\text{CEO(sus)}}$	Collector-emitter sustaining voltage ( $I_{\text{B}} = 0$ )	$I_{\text{C}} = 10\text{ mA}$	80			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 100\text{ mA}$ $I_{\text{B}} = 10\text{ mA}$ $I_{\text{C}} = 1\text{ A}$ $I_{\text{B}} = 100\text{ mA}$			0.25 0.5	V V
$V_{\text{BE(sat)}}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = 100\text{ mA}$ $I_{\text{B}} = 10\text{ mA}$ $I_{\text{C}} = 1\text{ A}$ $I_{\text{B}} = 100\text{ mA}$			1 1.1	V V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = 100\text{ }\mu\text{A}$ $V_{\text{CE}} = 2\text{ V}$ $I_{\text{C}} = 500\text{ mA}$ $V_{\text{CE}} = 2\text{ V}$ $I_{\text{C}} = 1\text{ A}$ $V_{\text{CE}} = 2\text{ V}$	140 80 40			
$f_{\text{T}}$	Transition frequency	$I_{\text{C}} = 100\text{ mA}$ $V_{\text{CE}} = 10\text{ V}$		50		MHz

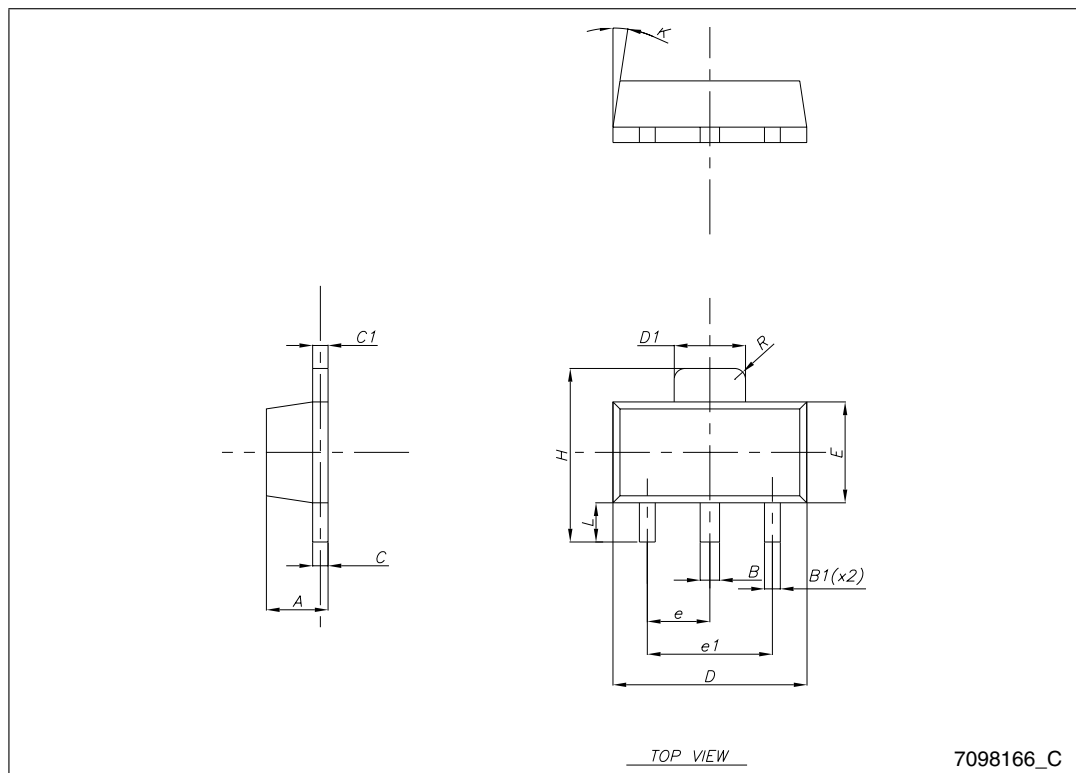
1. Pulse test: pulse duration  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$

### 3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

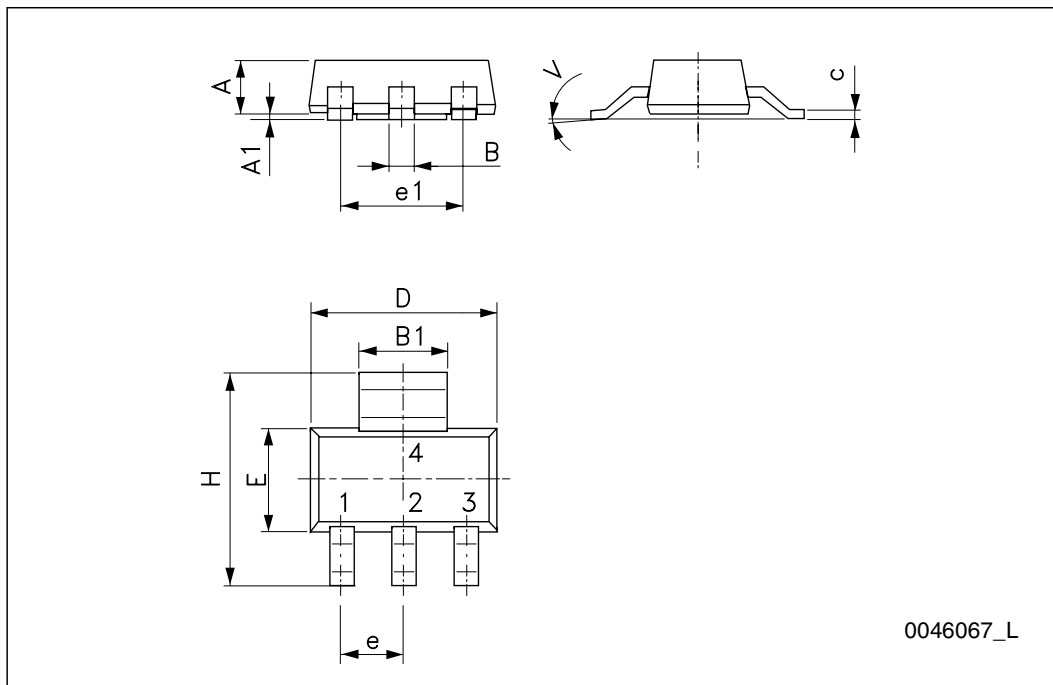
## SOT-89 mechanical data

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
E	2.29		2.60
e	1.42		1.57
e1	2.92		3.07
H	3.94		4.25
K	1°		8°
L	0.89		1.20
R		0.25	



**SOT-223 mechanical data**

DIM.	mm.		
	min.	typ	max.
A			1.80
A1	0.02		0.1
B	0.60	0.70	0.85
B1	2.90	3.00	3.15
c	0.24	0.26	0.35
D	6.30	6.50	6.70
e		2.30	
e1		4.60	
E	3.30	3.50	3.70
H	6.70	7.00	7.30
V			10°



## 4 Document revision history

**Table 5. Document revision history**

<b>Date</b>	<b>Revision</b>	<b>Changes</b>
21-Jun-2004	1	Initial release
08-Feb-2010	2	Updated package mechanical data

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