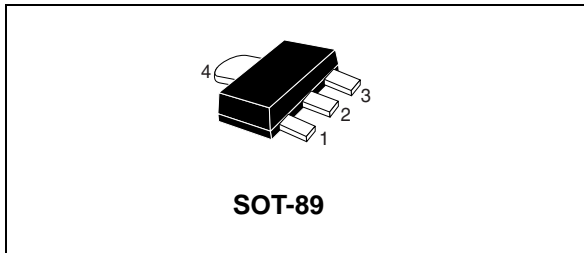
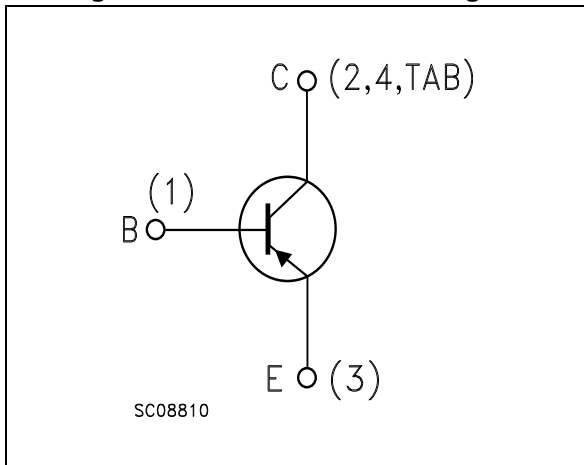


## Low voltage fast-switching PNP power transistors

Datasheet - production data



**Figure 1. Internal schematic diagram**



### Applications

- Emergency lighting
- LED
- Voltage regulation
- Relay drive

### Description

The device is PNP transistor manufactured using new "PB-HDC" (power bipolar high density current) technology. The resulting transistor shows exceptional high gain performances coupled with very low saturation voltage.

### Features

- Very low collector-emitter saturation voltage
- High current gain characteristic
- Fast-switching speed

**Table 1. Device summary**

Order code	Marking	Package	Packaging
2STF2360	2360	SOT-89	Tape and reel

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# 1 Absolute maximum ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-base voltage ( $I_E = 0$ )	-60	V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )	-60	V
$V_{EBO}$	Emitter-base voltage ( $I_C = 0$ )	-6	V
$I_C$	Collector current	-3	A
$I_{CM}$	Collector peak current ( $t_p < 5$ ms)	-5	A
$I_B$	Base current	-0.2	A
$I_{BM}$	Base peak current ( $t_p < 5$ ms)	-0.4	A
$P_{TOT}$	Total dissipation at $T_{amb} = 25$ °C	1.4	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	Unit
$R_{thJA}^{(1)}$	Thermal resistance junction-ambient Max	89	°C/W

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

## 2 Electrical characteristics

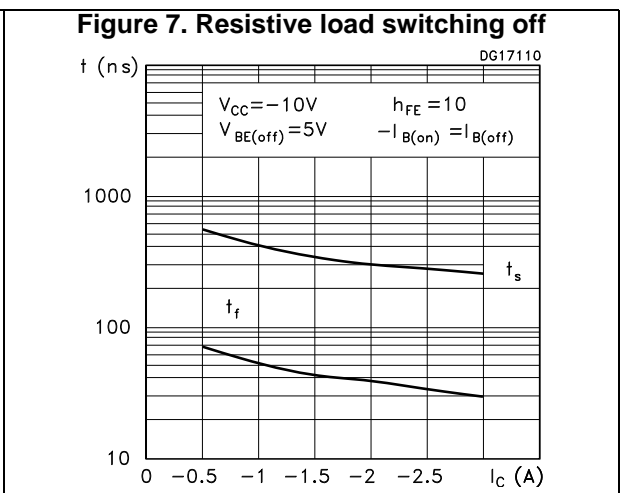
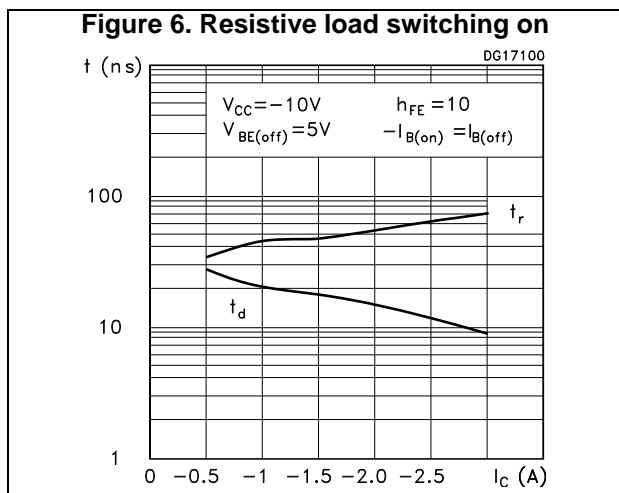
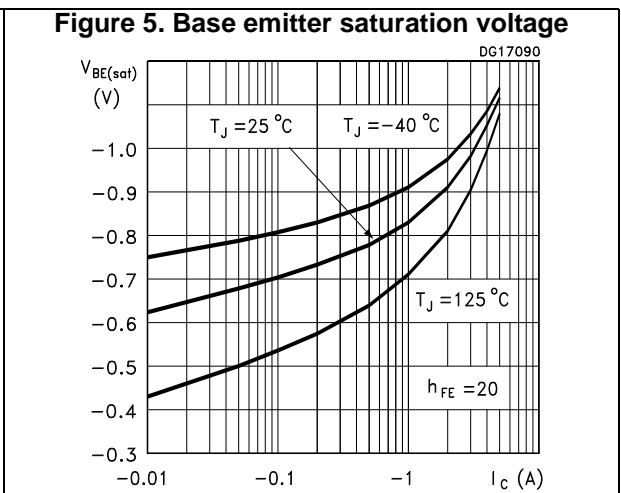
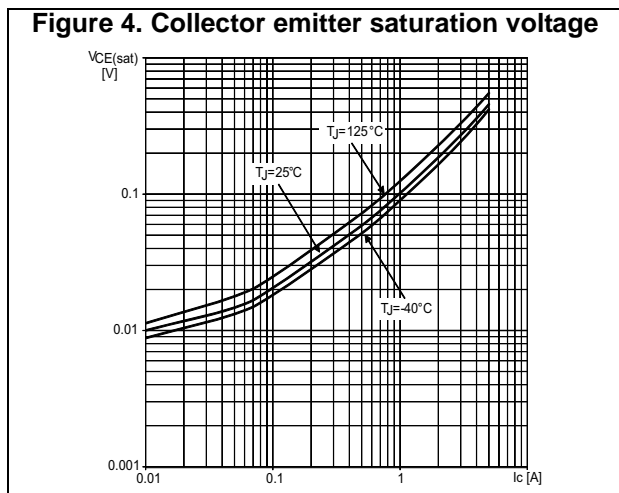
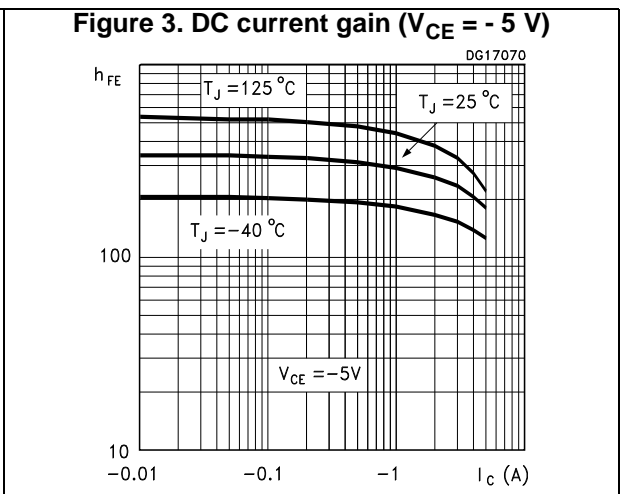
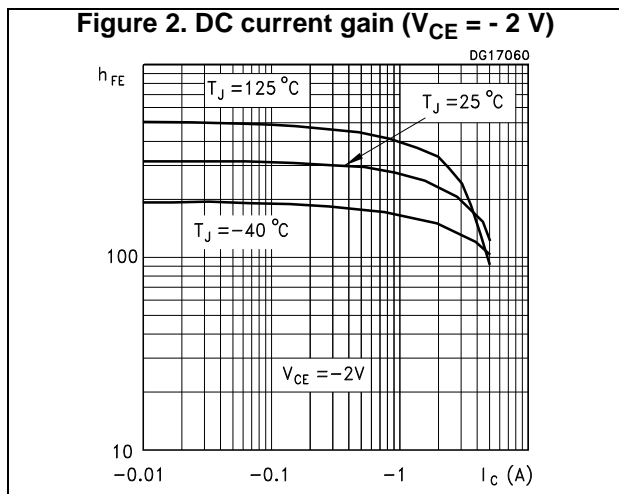
$T_{CASE} = 25^{\circ}C$ ; unless otherwise specified.

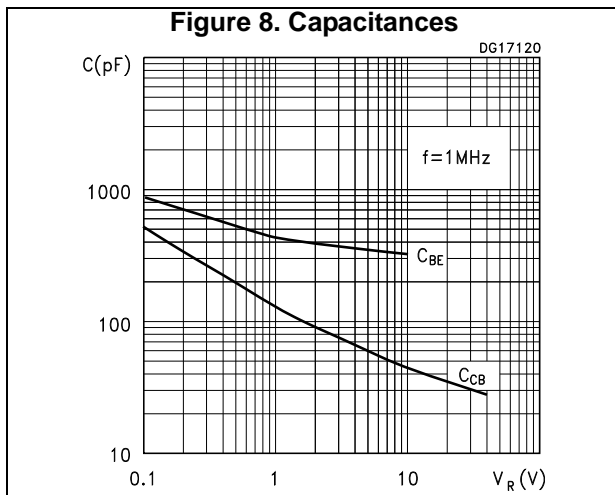
**Table 4. Electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector cut-off current ( $I_E = 0$ )	$V_{CB} = -60\text{ V}$			-100	nA
$I_{EBO}$	Emitter cut-off current ( $I_C = 0$ )	$V_{EB} = -6\text{ V}$			-100	nA
$V_{BE(on)}$	Base-emitter on voltage	$V_{CE} = -2\text{ V}$ $I_C = -100\text{ mA}$	-630	-650	-730	mV
$V_{CE(sat)}^{(1)}$	Collector-emitter saturation voltage	$I_C = -2\text{ A}$ $I_B = -100\text{ mA}$ $I_C = -3\text{ A}$ $I_B = -150\text{ mA}$		-200 -300	-320 -500	mV mV
$V_{BE(sat)}^{(1)}$	Base-emitter saturation voltage	$I_C = -2\text{ A}$ $I_B = -100\text{ mA}$		-0.9	-1.2	V
$h_{FE}^{(1)}$	DC current gain	$I_C = -100\text{ mA}$ $V_{CE} = -2\text{ V}$ $I_C = -1\text{ A}$ $V_{CE} = -2\text{ V}$	200 160		400	
$t_d$	Resistive load Delay time	$I_C = -3\text{ A}$ $V_{CC} = -10\text{ V}$ $I_{B(on)} = -I_{B(off)} = -300\text{ mA}$ $V_{BE(off)} = 5\text{ V}$		10	15	ns
$t_r$	Rise time			75	100	ns
$t_s$	Storage time			250	350	ns
$t_f$	Fall time			35	50	ns
$f_T$	Transition frequency	$I_C = -0.1\text{ A}$ $V_{CE} = -10\text{ V}$		130		MHz

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

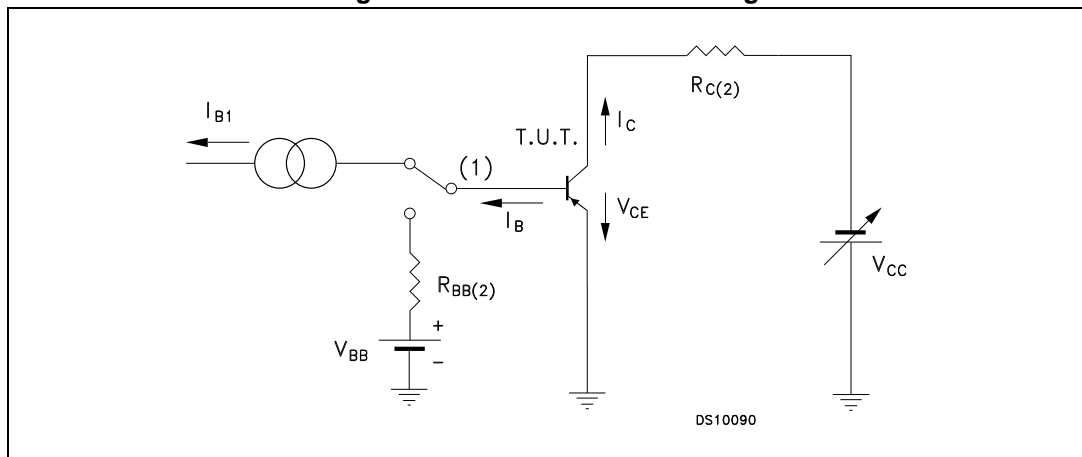
## 2.1 Typical characteristics (curves)





## 2.2 Test circuits

**Figure 9. Resistive load switching**



1. Fast electronic switch
2. Non-inductive resistor

### 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.

#### 3.1 SOT-89

Figure 10. SOT-89 package outline

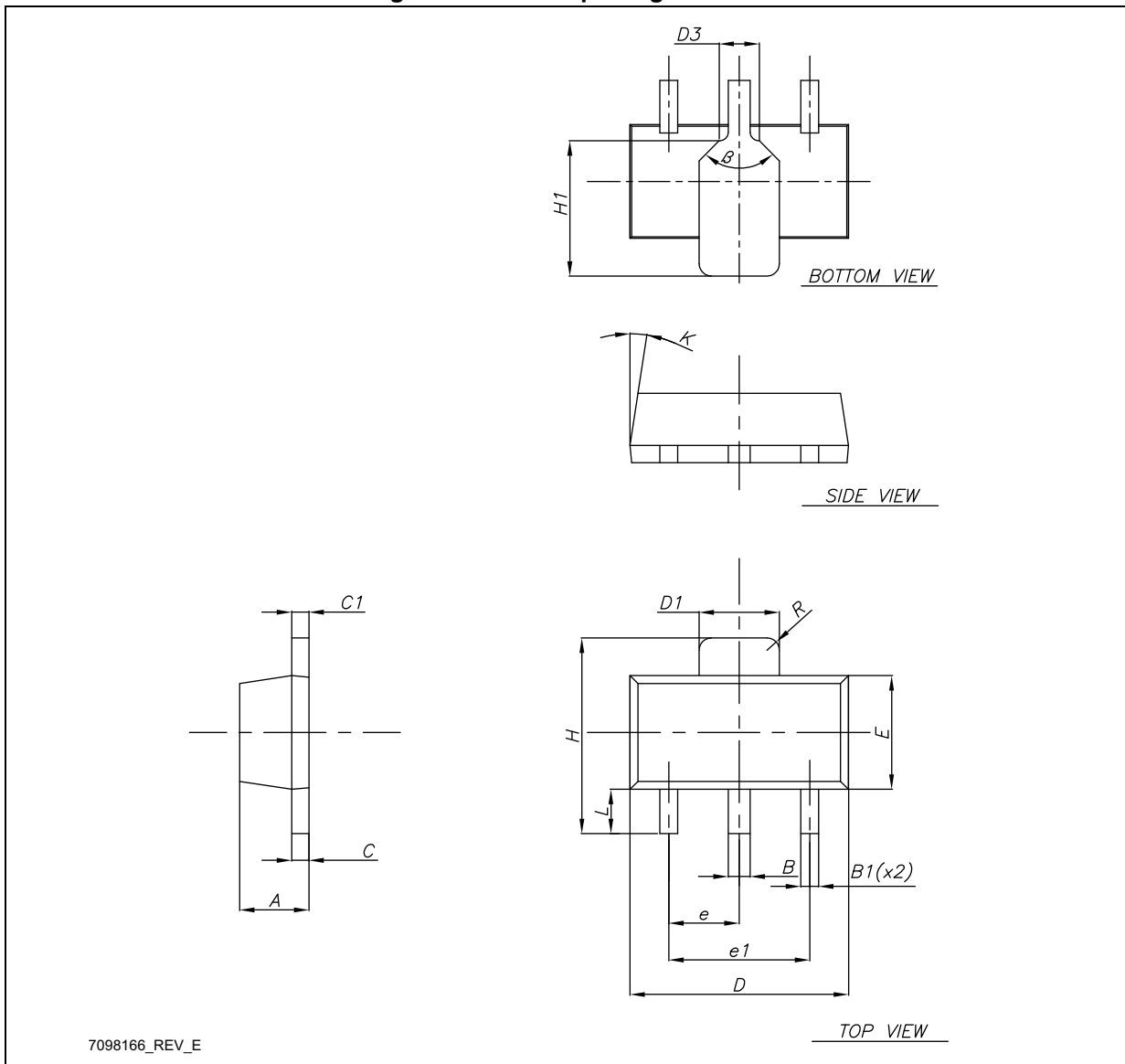
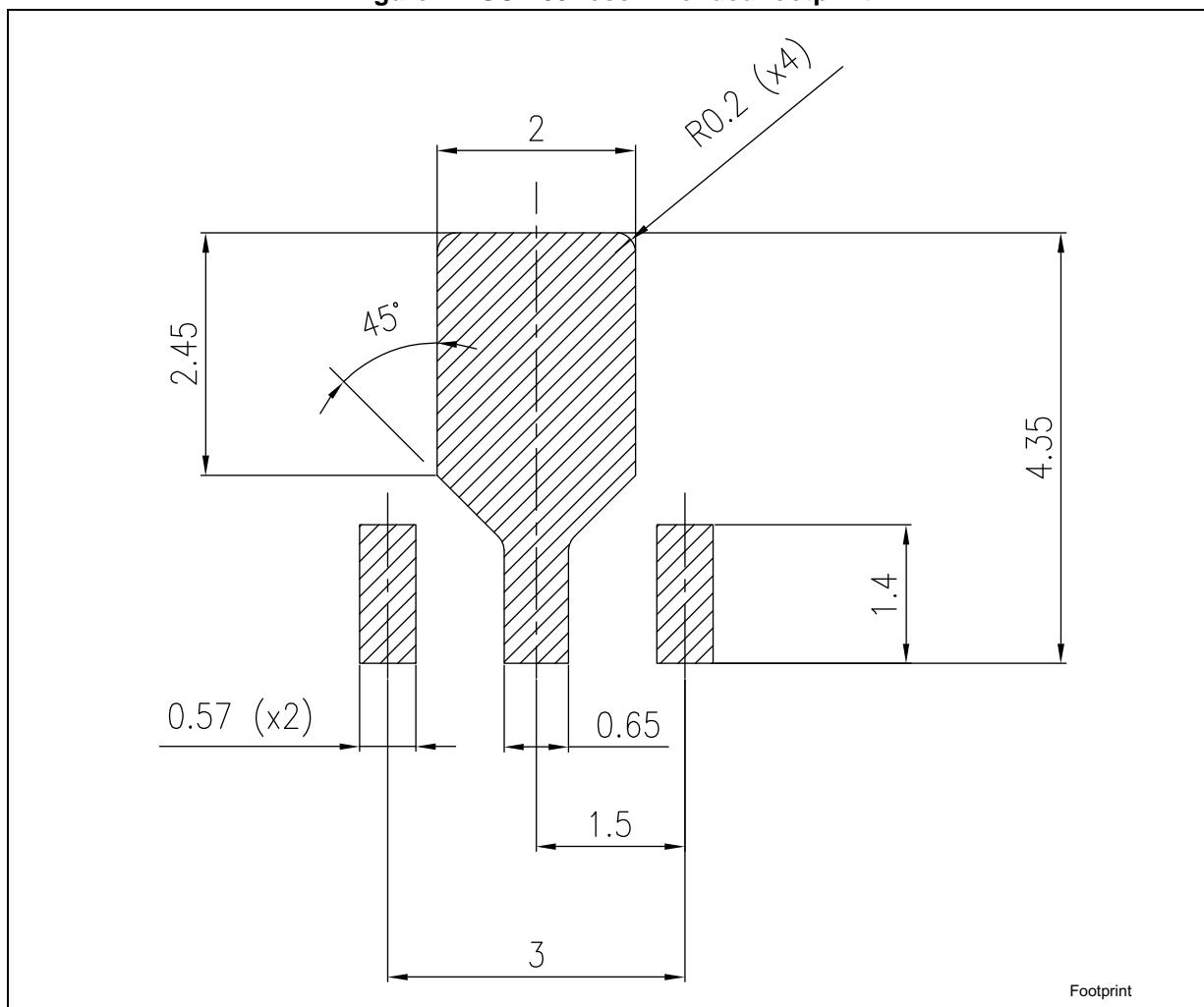


Table 5. SOT-89 mechanical data

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	
b		90°	



Figure 11. SOT-89 recommended footprint



## 4 Revision history

**Table 6. Document revision history**

Date	Revision	Changes
13-Sep-2006	1	Initial release
02-Mar-2007	2	New graphics have been added
23-Jan-2009	3	Updated mechanical data
09-Oct-2009	4	Added 2STD2360T4 in TO-252 (DPAK) package
14-Oct-2009	5	Modified <a href="#">Table 1 on page 1</a> .
05-Dec-2014	6	Removed SOT-223 and TO-250 (DPAK) packages. Update description in cover page, <a href="#">Table 1: Device summary</a> , <a href="#">Section 1: Absolute maximum ratings</a> , <a href="#">Table 4: Electrical characteristics</a> , <a href="#">Section 2.1: Typical characteristics (curves)</a> and <a href="#">Section 3: Package mechanical data</a> . Minor text changes.

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