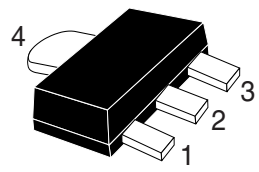
3STF1640

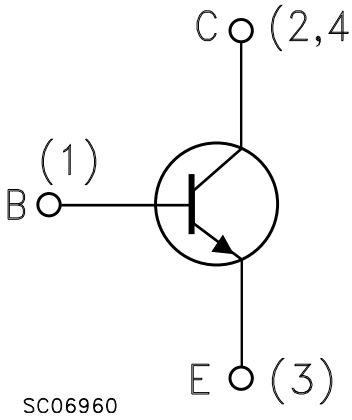
Low voltage high performance NPN power transistor

Datasheet - preliminary data



SOT-89

Figure 1. Internal schematic diagram



Features

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

Applications

- Power management
- DC-DC converters
- Automotive

Description

This device is a NPN transistor manufactured using new low voltage planar technology with double metal process. The result is a transistor which boasts exceptionally high gain performance coupled with very low saturation voltage.

Table 1. Device summary

Order codes	Marking	Package	Packaging
3STF1640	1640	SOT-89	Tape and reel

Contents

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage (V_{BE} = 0)	40	V
V_{CEO}	Collector-emitter voltage (I_B = 0)	40	V
V_{EBO}	Emitter-base voltage (I_C = 0)	7	V
I_C	Collector current	6	A
I_{CM}	Collector peak current (t_P < 1 ms)	20	A
P_{tot}	Total dissipation at T_{amb} = 25 °C	1.5	W
T_{stg}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJA}(1)	Thermal resistance junction-ambient max	83	°C/W

1. Device mounted on PCB area of 1 cm²

2 Electrical characteristics

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

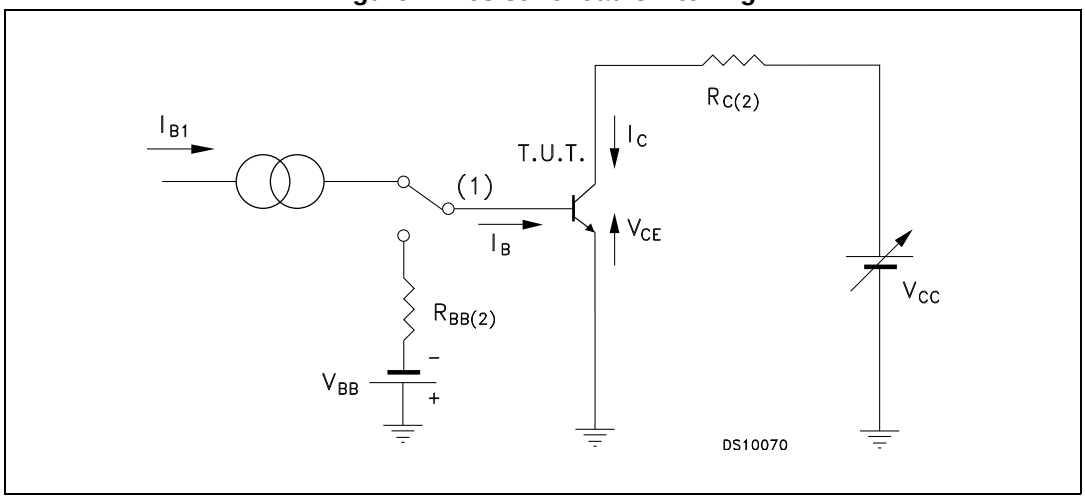
Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current (I_E = 0)	V_{CB} = 40 V			0.1	µA
I_{EBO}	Emitter cut-off current (I_C = 0)	V_{EB} = 5 V			0.1	µA
$V_{(BR)CBO}$	Collector-base breakdown voltage (I_E = 0)	I_C = 100 µA	40			V
$V_{(BR)CEO}$ (1)	Collector-emitter breakdown voltage (I_B = 0)	I_C = 10 mA	40			V
$V_{(BR)EBO}$	Emitter-base breakdown voltage (I_C = 0)	I_E = 100 µA	7			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 1 A, I_B = 20 mA		50		mV
		I_C = 1 A, I_B = 100 mA		40		mV
		I_C = 6 A, I_B = 300 mA		170		mV
$V_{BE(sat)}$ (1)	Base-emitter saturation voltage	I_C = 6 A, I_B = 6 mA			1.1	V
h_{FE} (1)	DC current gain	I_C = 1 A, V_{CE} = 1 V		350		
		I_C = 6 A, V_{CE} = 1 V		100		
		I_C = 20 A, V_{CE} = 1 V		20		
f_T	Transition frequency	I_C = 0.1 A V_{CE} = 10 V f = 100 MHz		100		MHz
C_{CBO}	Collector-base capacitance (I_E = 0)	f = 1 MHz V_{CB} = 10 V		30		pF
t_{on}	Resistive load Turn-on time	I_C = 1.5 A V_{CC} = 10 V		TBD		ns
t_{off}	Turn-off time	$I_{B(on)}$ = - $I_{B(off)}$ = 150 mA $V_{BB(off)}$ = - 5 V		TBD		ns

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

2.1 Test circuits

Figure 2. 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® 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 3. SOT-89 drawings

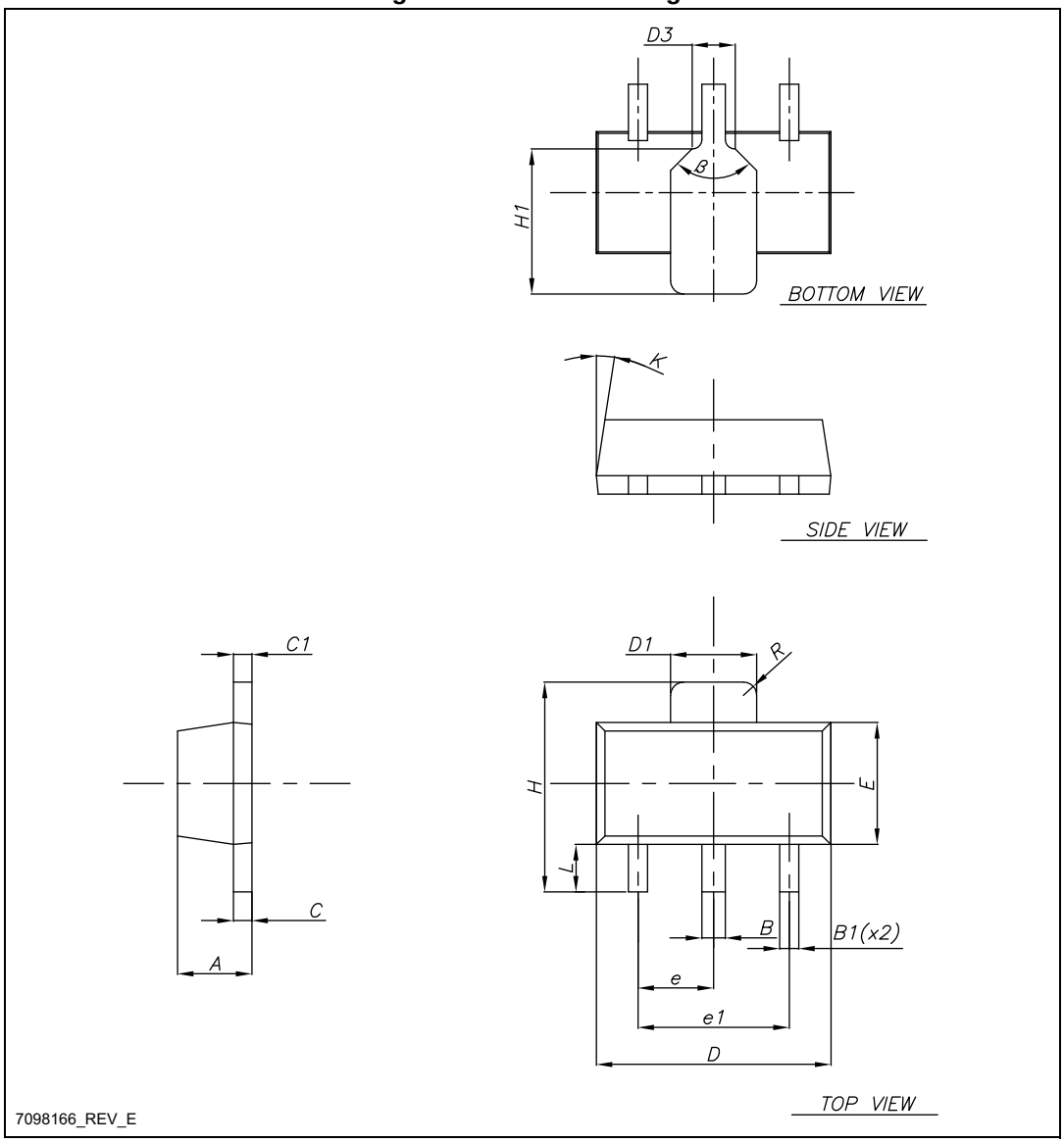
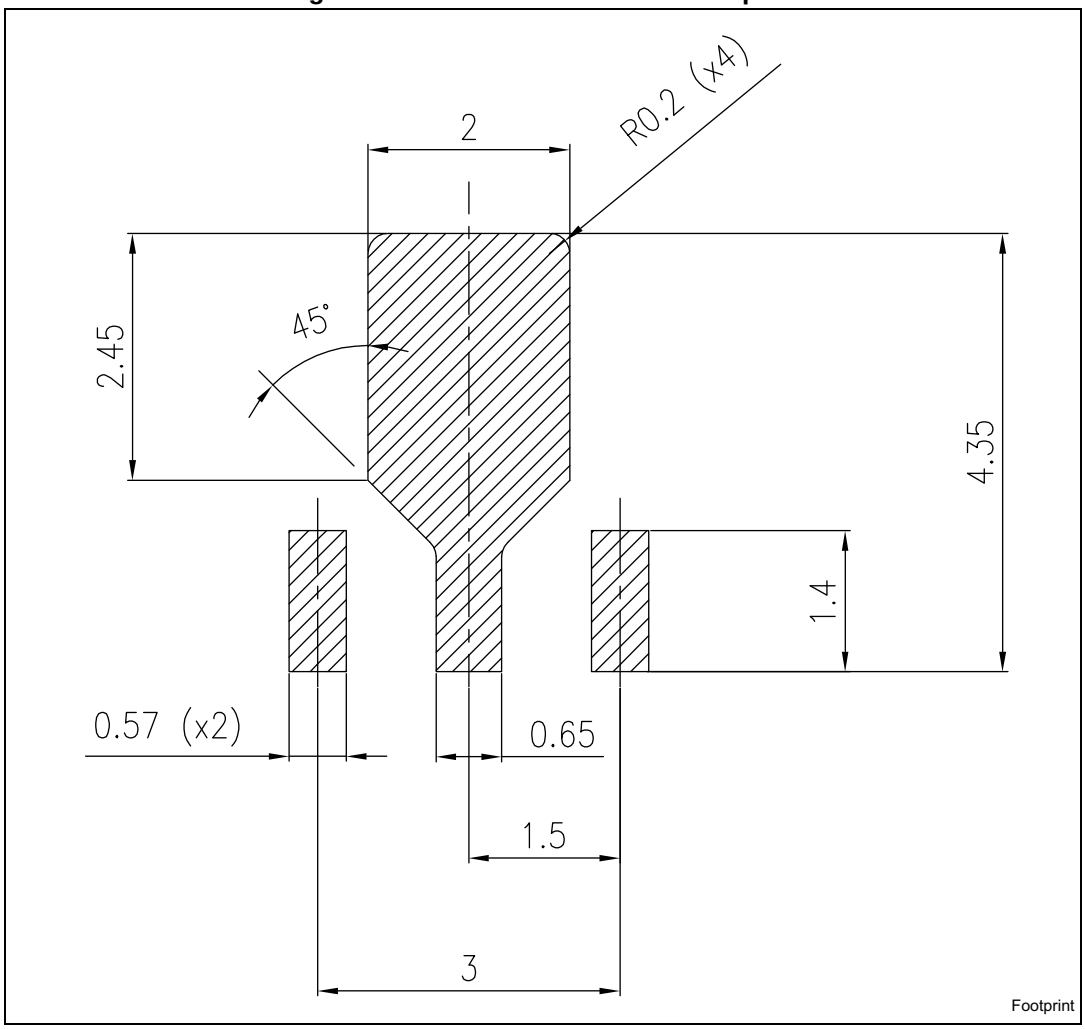


Figure 4. SOT-89 recommended footprint



4 Packaging mechanical data

Table 6. SOT-89 carrier tape dimensions

Dim.	mm.	
	Values	Tolerance
Ao	4.52	± 0.10
Bo	4.91	± 0.10
Ko	1.90	± 0.10
F	5.50	± 0.10
E	1.75	± 0.10
W	12	± 0.30
P2	2	± 0.10
Po	4	± 0.10
P1	8	± 0.10
T	0.30	± 0.10
D	∅ 1.55	± 0.05
D1	∅ 1.60	± 0.10

Figure 5. SOT-89 carrier tape drawing

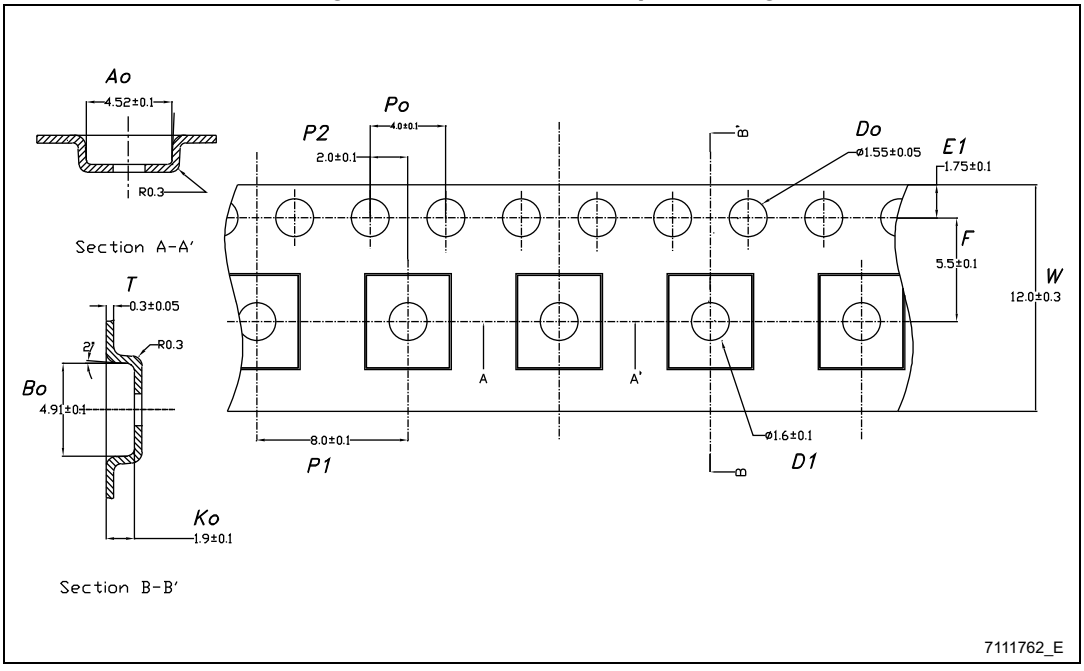
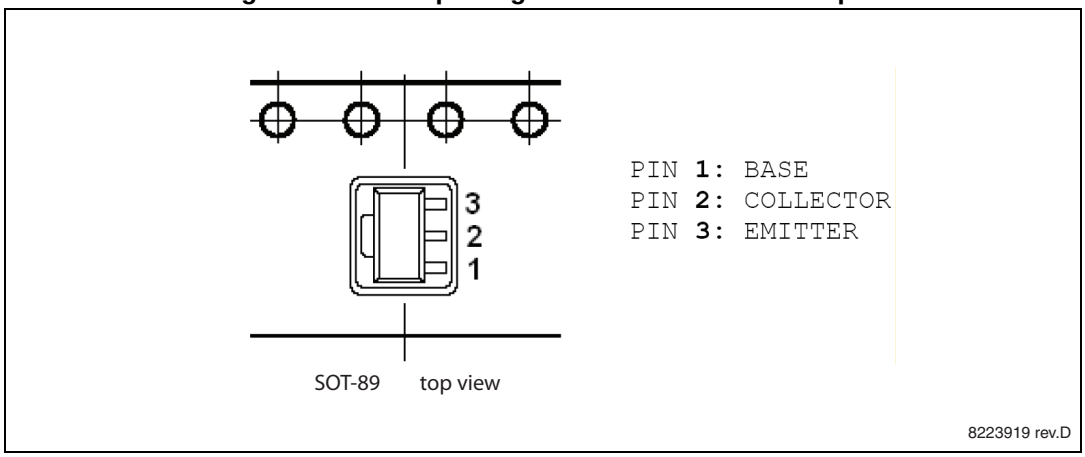


Figure 6. SOT-89 package orientation in carrier tape



5 Revision history

Table 7. Document revision history

Date	Revision	Changes
11-Sep-2012	1	Initial release.
31-Oct-2012	2	Updated title and description on the cover page. Document status promoted from target to preliminary data.
10-Apr-2013	3	*Applications* and *Description* have been modified in cover page.

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