

Low voltage high performance NPN power transistor

Datasheet - preliminary data

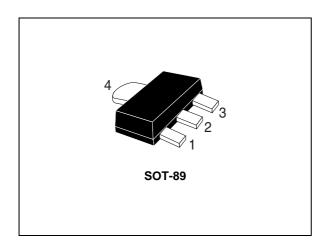
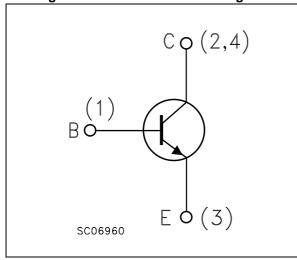


Figure 1. Internal schematic diagram



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 3STF1640

Contents

1	Electrical ratings
2	Electrical characteristics
	2.1 Test circuits
3	Package mechanical data
4	Packaging mechanical data
5	Revision history

3STF1640 Electrical ratings

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	А
I _{CM}	Collector peak current (t _P < 1 ms)	20	А
P _{tot}	Total dissipation at T _{amb} = 25 °C	1.5	W
T _{stg}	Storage temperature -65 to		°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

Electrical characteristics 3STF1640

2 Electrical characteristics

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

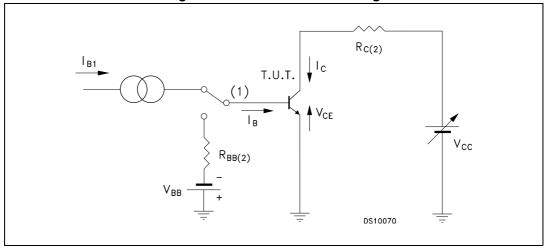
Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Тур.	Max.	Unit
I _{CBO}	Collector cut-off current (I _E = 0)	V _{CB} = 40 V			0.1	μΑ
I _{EBO}	Emitter cut-off current (I _C = 0)	V _{EB} = 5 V			0.1	μΑ
V _{(BR)CBO}	Collector-base breakdown voltage (I _E = 0)	Ι _C = 100 μΑ	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)	Ι _Ε = 100 μΑ	7			V
		I _C = 1 A, I _B = 20 mA		50		mV
V _{CE(sat)} (1)	Collector-emitter saturation voltage	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	٧
		I _C = 1 A, V _{CE} = 1 V		350		
h _{FE} ⁽¹⁾	DC current gain	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
	Resistive load Turn-on time	Ι_ = 15 Λ		TBD		ns
t _{on}	Turn-on time	$I_C = 1.5 \text{ A}$ $V_{CC} = 10 \text{ V}$		וטט		119
t _{off}	Turn-off time	$I_{B(on)} = -I_{B(off)} = 150 \text{ mA}$ $V_{BB(off)} = -5 \text{ V}$		TBD		ns

^{1.} Pulse test: pulse duration \leq 300 μ s, duty cycle \leq 2 %

2.1 Test circuits

Figure 2. Resistive load switching



- 1. Fast electronic switch
- 2. Non-inductive resistor

3 Package mechanical data

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Table 5. SOT-89 mechanical data

Dim		mm	
Dim.	Min.	Тур.	Max.
A	1.40		1.60
В	0.44		0.56
B1	0.36		0.48
С	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
е	1.42		1.57
e1	2.92		3.07
Н	3.94		4.25
H1	2.70		3.10
К	1°		8°
L	0.89		1.20
R		0.25	
β		90°	

<u>D3</u> BOTTOM VIEW SIDE VIEW <u>C1</u> <u>D1</u> <u>C</u> B1(x2) D TOP VIEW 7098166_REV_E

Figure 3. SOT-89 drawings

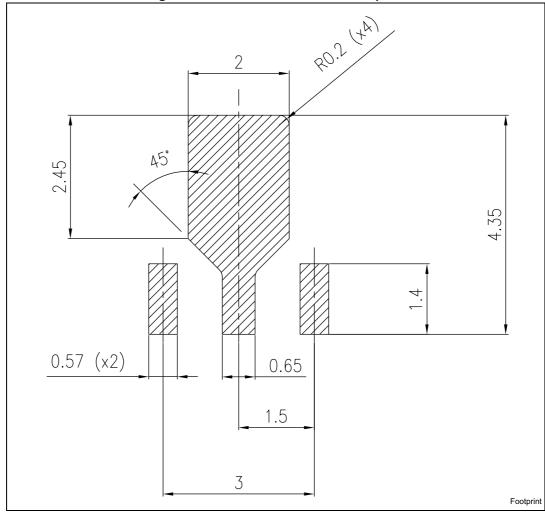


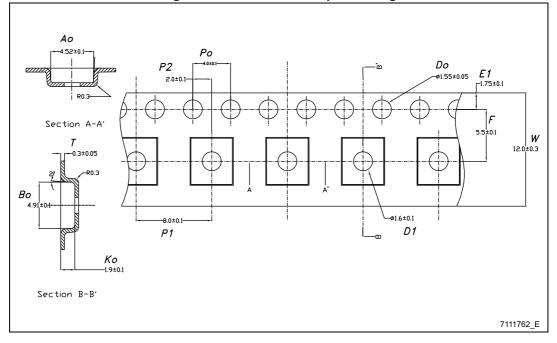
Figure 4. SOT-89 recommended footprint

4 Packaging mechanical data

Table 6. SOT-89 carrier tape dimensions

Dim	n	ım.
Dim.	Values	Tolerance
Ao	4.52	± 0.10
Во	4.91	± 0.10
Ко	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
Т	0.30	± 0.10
D	Ø 1.55	± 0.05
D1	Ø 1.60	± 0.10

Figure 5. SOT-89 carrier tape drawing



PIN 1: BASE
PIN 2: COLLECTOR
PIN 3: EMITTER

SOT-89 top view

Figure 6. SOT-89 package orientation in carrier tape

3STF1640 Revision history

5 Revision history

Table 7. Document revision history

Date	Revision	Changes	
11-Sep-2012	1	Initial release.	
31-Oct-2012 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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12/12 DocID023648 Rev 3

