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High voltage fast-switching NPN power transistor

Datasheet - production data

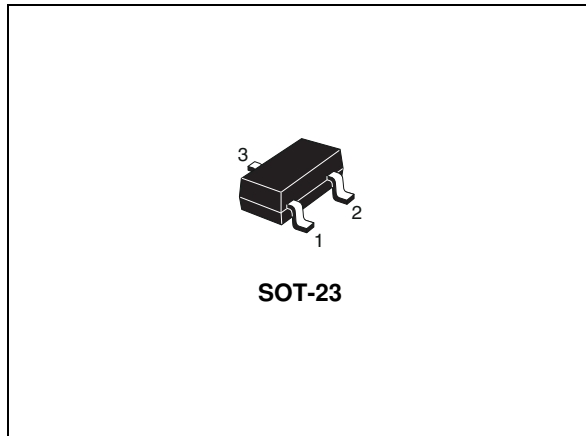
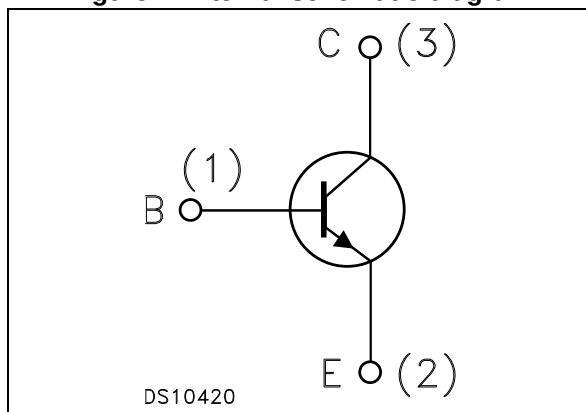


Figure 1. Internal schematic diagram



Features

- Excellent h_{FE} linearity up to 50 mA
- Miniature SOT-23 plastic package for surface mounting circuits
- Tape and reel packaging
- The PNP complementary type is STR2550

Applications

- LED driving

Description

This device is a high voltage fast-switching NPN power transistor, manufactured using diffused collector planar technology for high switching speeds.

It employs a base island structure with planar edge termination to enhance switching speeds, while maintaining a wide RBSOA.

Table 1. Device summary

Order code	Marking	Package	Packing
STR1550	1550	SOT-23	Tape and reel

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1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base voltage ($I_E = 0$)	500	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	500	V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	9	V
I_C	Collector current	0.5	A
I_{CM}	Collector peak current ($t_P < 5$ ms)	1	A
P_{TOT}	Total dissipation at $T_{amb} = 25$ °C	500	mW
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	250	°C/W

1. Device mounted on PCB area of 1 cm².

2 Electrical characteristics

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

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current ($I_{\text{E}} = 0$)	$V_{\text{CB}} = 500\text{ V}$			10	μA
$V_{(\text{BR})\text{CBO}}$	Collector-base breakdown voltage ($I_{\text{E}} = 0$)	$I_{\text{C}} = 100\text{ }\mu\text{A}$	500			V
$V_{(\text{BR})\text{CEO}}^{(1)}$	Collector-emitter breakdown voltage ($I_{\text{B}} = 0$)	$I_{\text{C}} = 1\text{ mA}$	500			V
$V_{(\text{BR})\text{EBO}}$	Emitter-base breakdown voltage ($I_{\text{C}} = 0$)	$I_{\text{E}} = 100\text{ }\mu\text{A}$	12			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 20\text{ mA}, I_{\text{B}} = 2\text{ mA}$			0.2	V
		$I_{\text{C}} = 50\text{ mA}, I_{\text{B}} = 6\text{ mA}$			0.3	V
$V_{\text{BE(sat)}}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = 50\text{ mA}, I_{\text{B}} = 5\text{ mA}$			0.9	V
$V_{\text{BE(on)}}$	Base-emitter on voltage	$I_{\text{C}} = 50\text{ mA}, V_{\text{CE}} = 10\text{ V}$			0.9	V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = 1\text{ mA}, V_{\text{CE}} = 10\text{ V}$	100			
		$I_{\text{C}} = 50\text{ mA}, V_{\text{CE}} = 10\text{ V}$	100		300	
		$I_{\text{C}} = 100\text{ mA}, V_{\text{CE}} = 10\text{ V}$	10			

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

2.1 Electrical characteristics (curves)

Figure 2. h_{FE} vs. I_{C} @ $V_{\text{CE}} = 5\text{ V}$

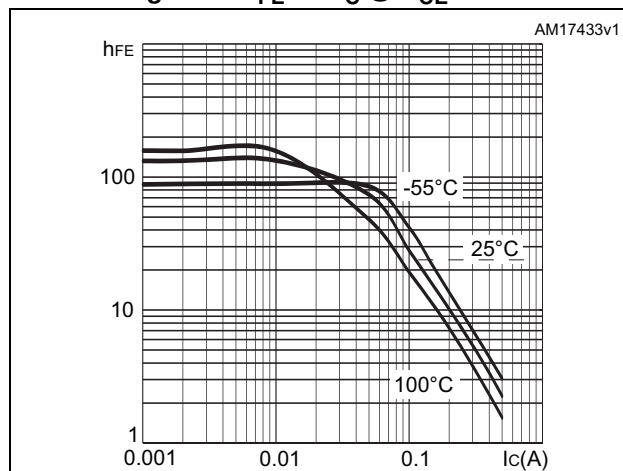


Figure 3. h_{FE} vs. I_{C} @ $V_{\text{CE}} = 10\text{ V}$

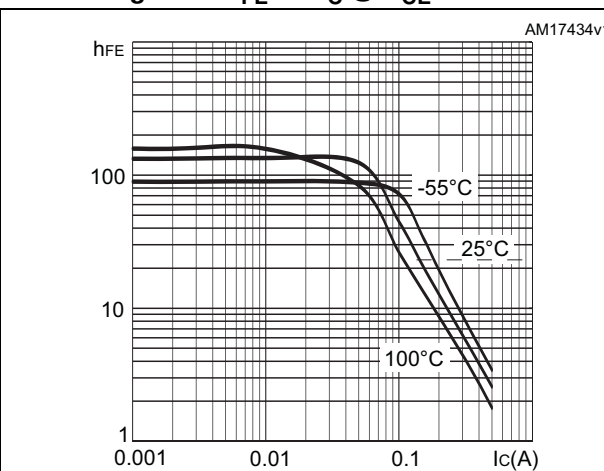
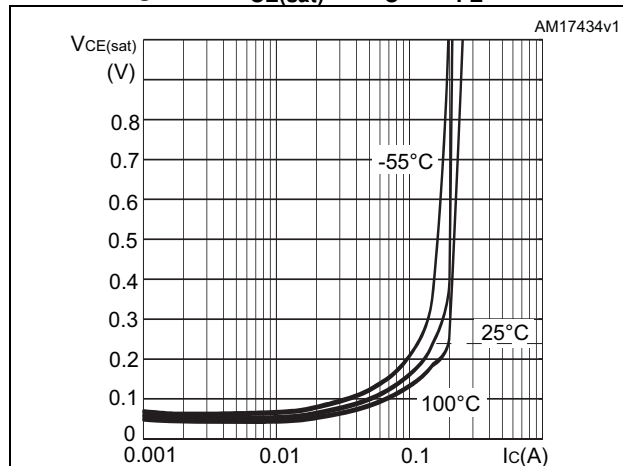
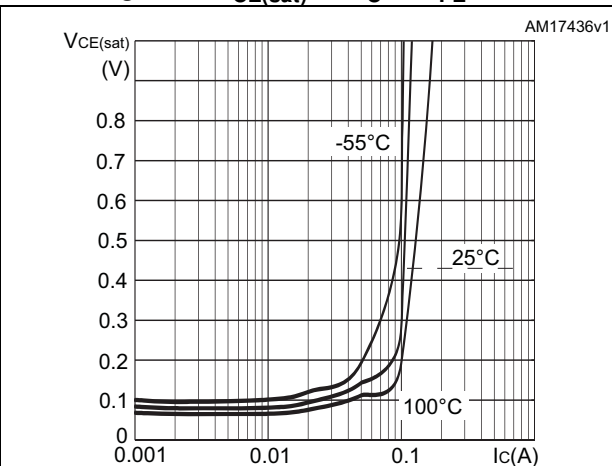
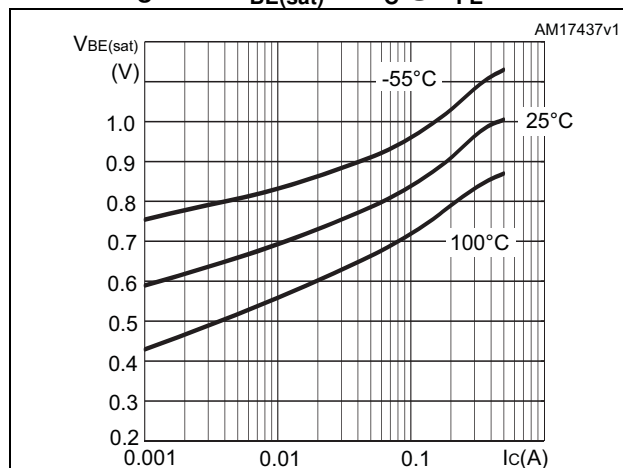
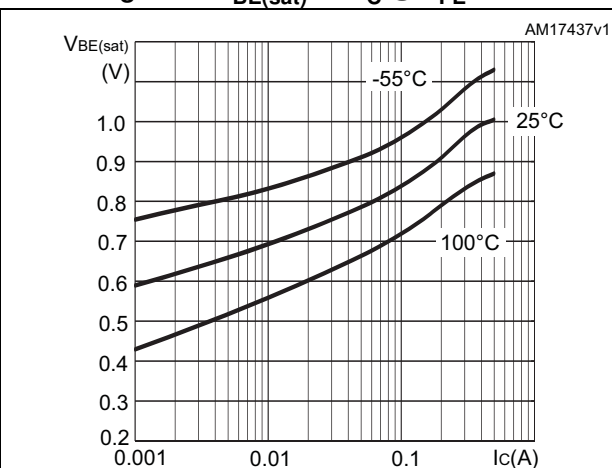
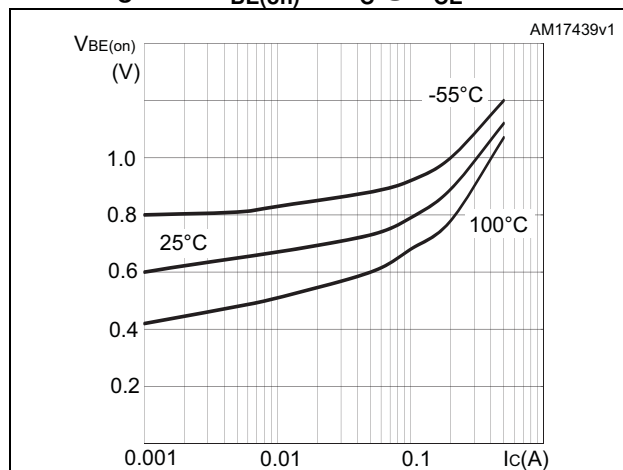


Figure 4. $V_{CE(sat)}$ vs. I_C @ $h_{FE}=5$ Figure 5. $V_{CE(sat)}$ vs. I_C @ $h_{FE}=10$ Figure 6. $V_{BE(sat)}$ vs. I_C @ $h_{FE}=5$ Figure 7. $V_{BE(sat)}$ vs. I_C @ $h_{FE}=10$ Figure 8. $V_{BE(on)}$ vs. I_C @ $V_{CE}=10\text{ V}$ 

3 Package mechanical data

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Figure 9. SOT-23 drawings

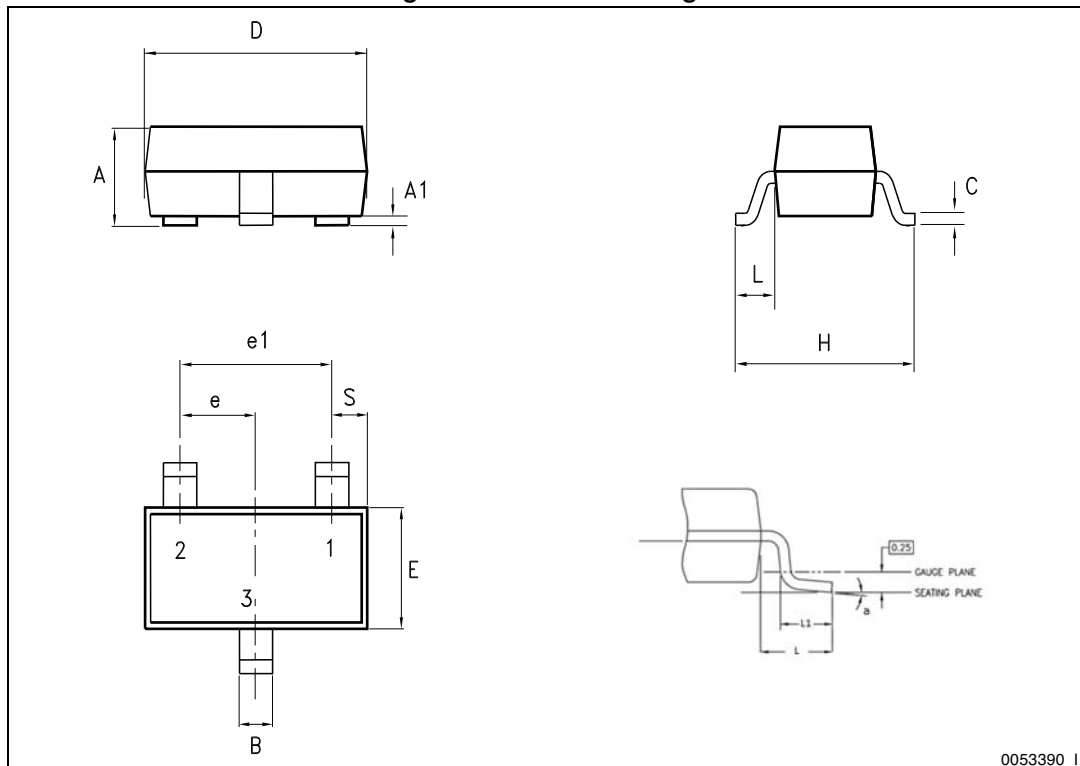
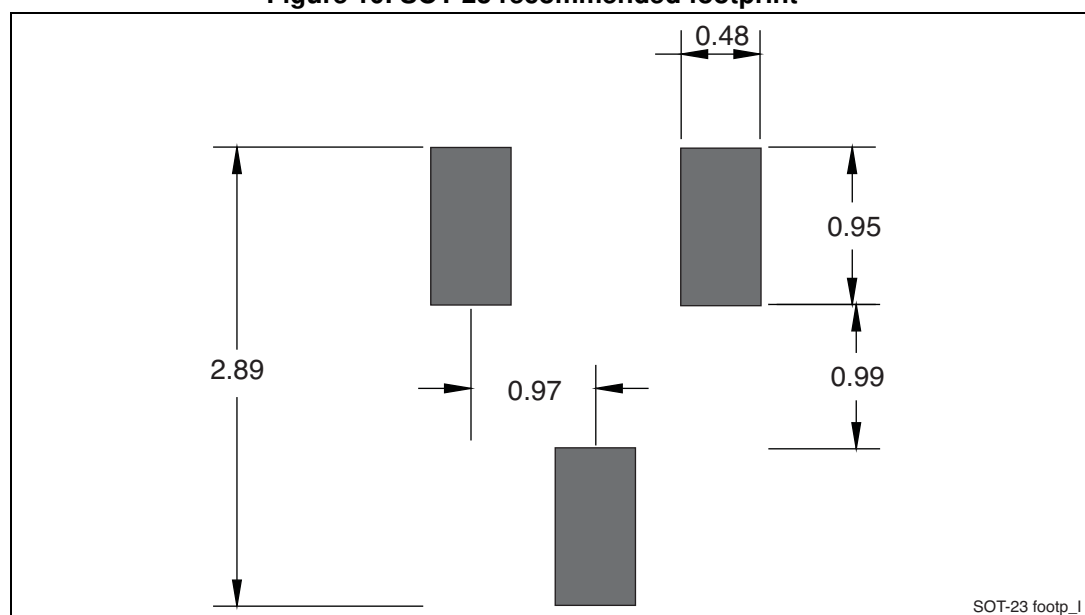


Table 5. SOT-23 mechanical data

Dim.	mm		
	Min.	Typ.	Max.
A	0.89		1.40
A1	0		0.10
B	0.30		0.51
C	0.085		0.18
D	2.75		3.04
e	0.85		1.05
e1	1.70		2.10
E	1.20		1.75
H	2.10		3.00
L		0.60	
S	0.35		0.65
L1	0.25		0.55
a	0°		8°

Figure 10. SOT-23 recommended footprint (a)



a. Dimensions are in mm.

4 Revision history

Table 6. Document revision history

Date	Revision	Changes
17-Oct-2011	1	Initial release
05-Jun-2012	2	Modified: features, Table 4 ($V_{CE(sat)}$ values, h_{FE} test conditions and values)
21-May-2013	3	<ul style="list-style-type: none">– Modified: Table 4 ($V_{BE(sat)}$ values, h_{FE} max. value and $V_{(BR)EBO}$ min. value– Inserted: $V_{BE(on)}$– Modified: Table 4 (h_{FE} max. value)– Added new section: Electrical characteristics (curves)
27-May-2013	4	– Document status promoted from preliminary to production data
09-May-2014	5	– Updated Table 1: Device summary and Section 3: Package mechanical data

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