

High voltage fast-switching PNP power transistor

Datasheet — production data

Features

- High voltage capability
- Fast switching speed

Applications

- Lighting
- Switch mode power supply

Description

This device is a high voltage fast-switching PNP power transistor. It is manufactured using high voltage multi epitaxial planar technology for high switching speeds and medium voltage capability. It uses a cellular emitter structure with planar edge termination to enhance switching speeds while maintaining a wide RBSOA. The device is designed for use in lighting applications and low cost switch-mode power supplies.

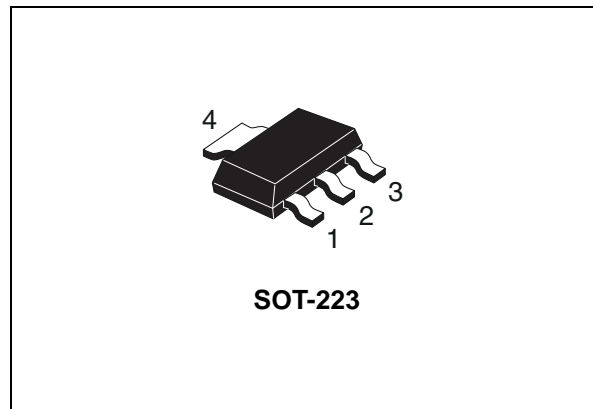


Figure 1. Internal schematic diagram

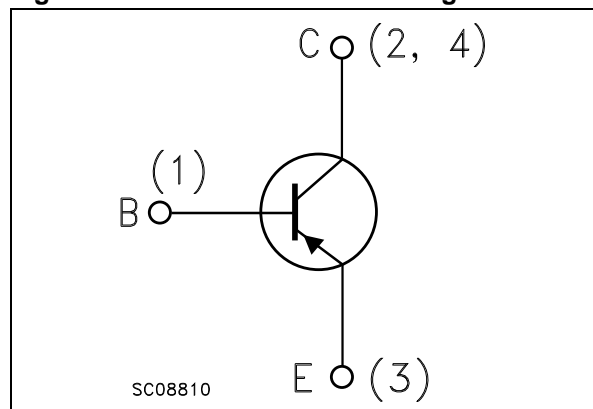


Table 1. Device summary

Part number	Marking	Package	Packaging
STN9360	N9360	SOT-223	Tape and reel

1 Electrical ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage ($V_{BE} = 0$)	-600	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	-600	V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	-7	V
I_C	Collector current	-0.5	A
I_{CM}	Collector peak current ($t_P < 5$ ms)	-1	A
I_B	Base current	-0.25	A
I_{BM}	Base peak current ($t_P < 5$ ms)	-0.5	A
P_{TOT}	Total dissipation at $T_a = 25$ °C	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	Value	Unit
R_{thJA}	Thermal resistance junction-ambient ⁽¹⁾ max	78	°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_{CES}	Collector cut-off current ($V_{\text{BE}} = 0$)	$V_{\text{CE}} = -600\text{ V}$			-10	μA
I_{EBO}	Emitter cut-off current ($I_{\text{C}} = 0$)	$V_{\text{EB}} = -7\text{ V}$			-1	μA
$V_{\text{CE(sus)}}^{(1)}$	Collector-emitter sustaining voltage ($I_{\text{B}} = 0$)	$I_{\text{C}} = -10\text{ mA}$	-600			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = -100\text{ mA}$ $I_{\text{B}} = -10\text{ mA}$			-0.5	V
$V_{\text{BE(sat)}}^{(1)}$	Base-emitter saturation voltage	$I_{\text{C}} = -100\text{ mA}$ $I_{\text{B}} = -10\text{ mA}$			-1	V
h_{FE}	DC current gain	$I_{\text{C}} = -1\text{ mA}$ $V_{\text{CE}} = -5\text{ V}$ $I_{\text{C}} = -10\text{ mA}$ $V_{\text{CE}} = -5\text{ V}$ $I_{\text{C}} = -20\text{ mA}$ $V_{\text{CE}} = -5\text{ V}$	170 120	200		
t_{r}	Resistive load Rise time	$V_{\text{CC}} = -200\text{ V}$, $I_{\text{C}} = -0.1\text{ A}$		45		ns
t_{s}	Storage time	$I_{\text{B1}} = -10\text{ mA}$, $I_{\text{B2}} = 20\text{ mA}$		3.15		μs
t_{f}	Fall time	$T_{\text{p}} = 30\text{ }\mu\text{s}$		160		ns

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

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

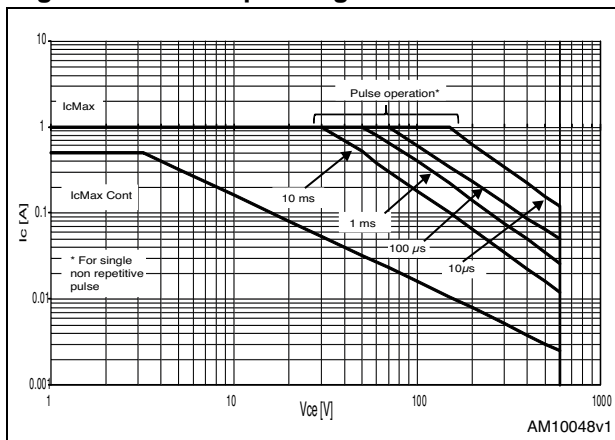


Figure 3. Derating curve

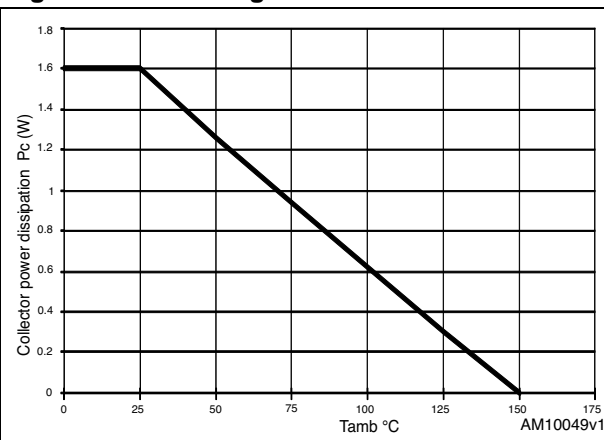


Figure 4. Output curves up to $V_{CE} = 0.5\text{ V}$

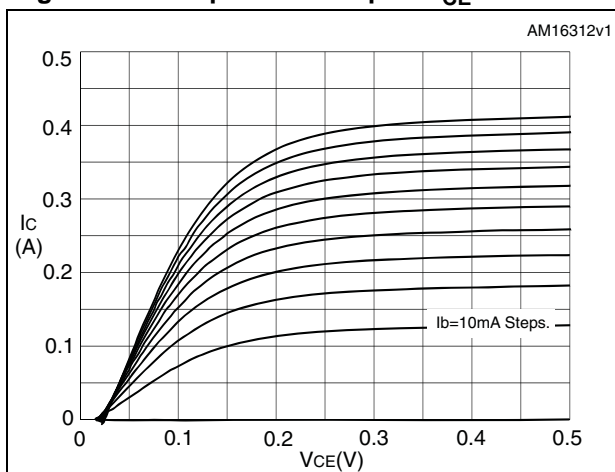


Figure 5. Output curves up to $V_{CE} = 5\text{ V}$

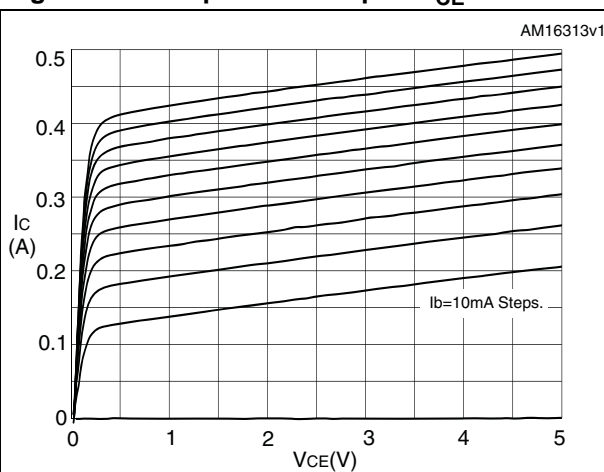


Figure 6. DC current gain ($V_{CE} = 1\text{ V}$)

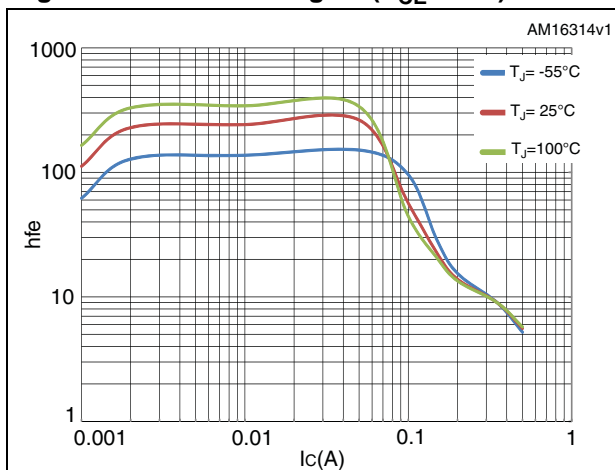


Figure 7. DC current gain ($V_{CE} = 5\text{ V}$)

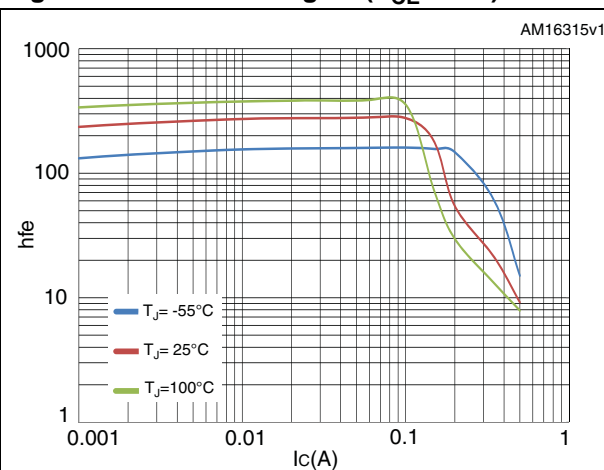


Figure 8. Collector-emitter saturation voltage Figure 9. Base-emitter saturation voltage

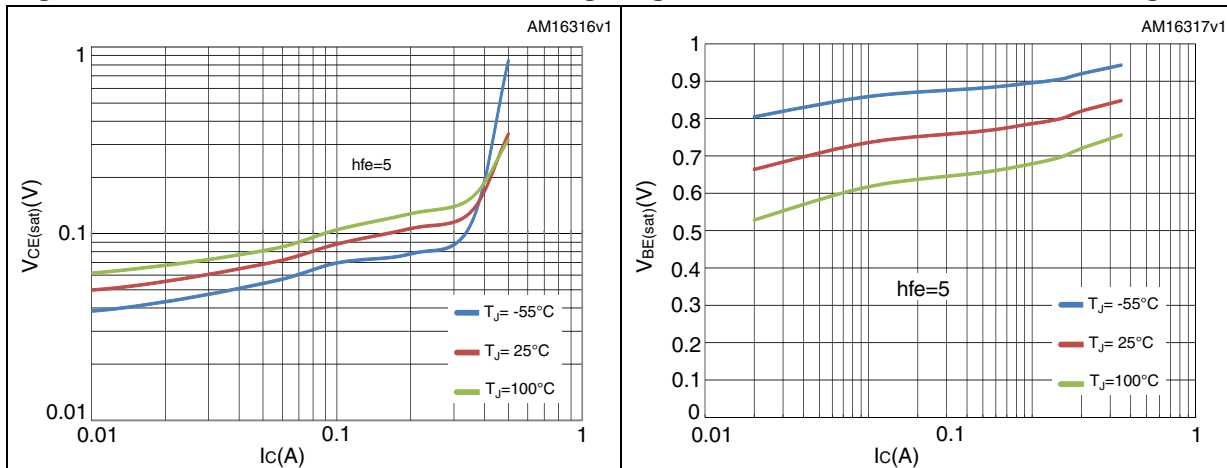


Figure 10. Base-emitter on voltage Figure 11. Capacitance variation

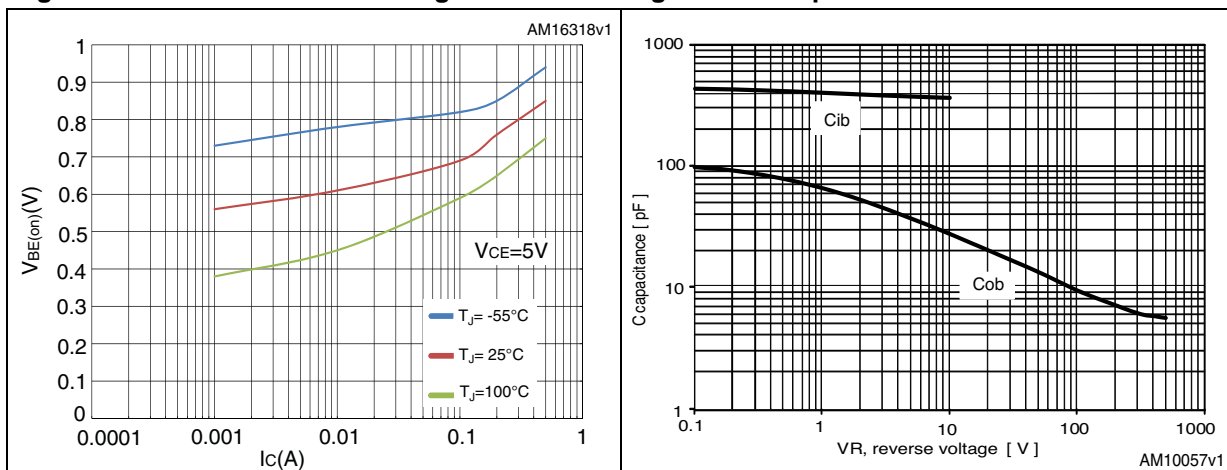
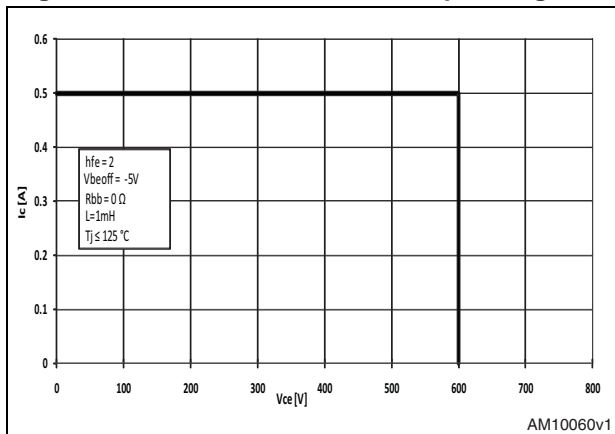
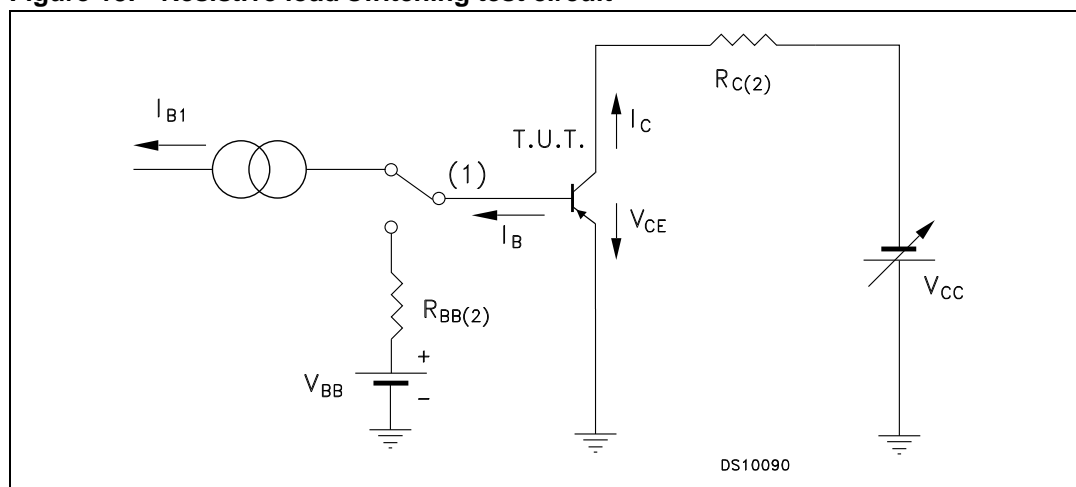


Figure 12. Reverse biased safe operating area



2.2 Test circuits

Figure 13. Resistive load switching test circuit



1. Fast electronic switching
2. Non-inductive resistor

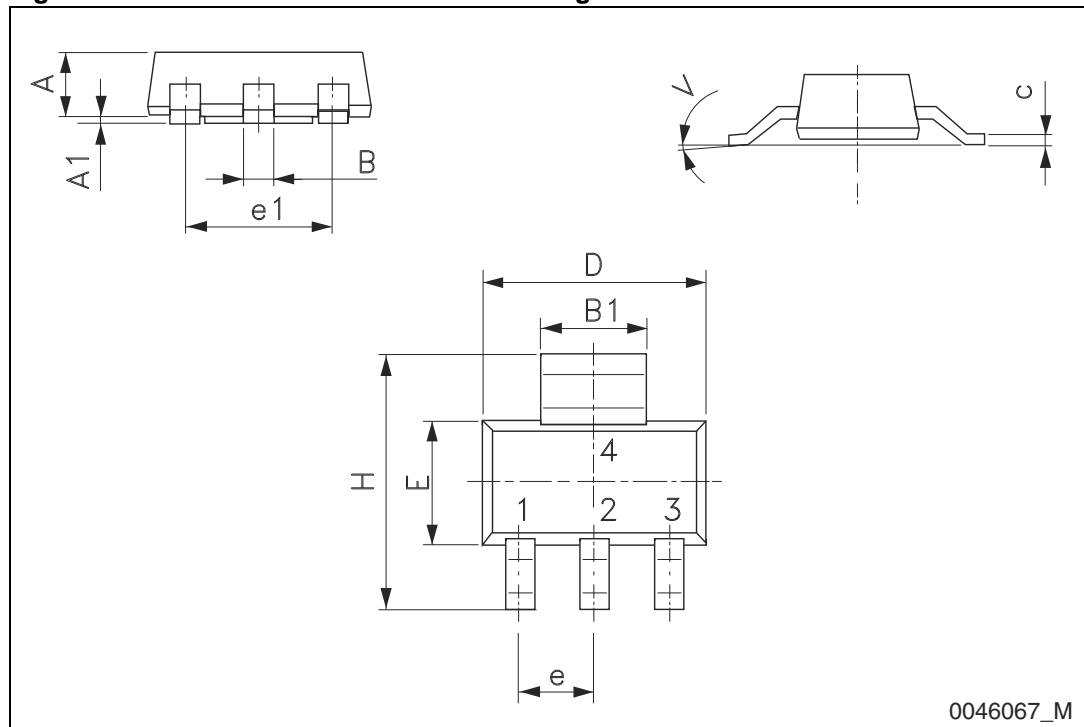
3 Package mechanical data

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-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°

Figure 14. SOT-223 mechanical data drawing



0046067_M

4 Revision history

Table 6. Document revision history

Date	Revision	Changes
21-May-2012	1	Initial release.
06-Dec-2012	2	Document status promoted from preliminary data to datasheet.

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