PMST5551

NPN high-voltage transistor

19 January 2024 Product data sheet

1. General description

NPN high-voltage transistor in a very small SOT323 (SC-70) Surface-Mounted Device (SMD) plastic package.

PNP complement: PMST5401

2. Features and benefits

- Low current (max. 300 mA)
- High voltage (max. 160 V)
- AEC-Q101 qualified

3. Applications

- Switching and amplification in high voltage applications such as telephony.

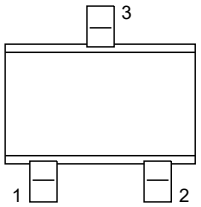
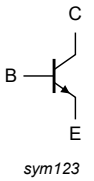
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base		-	-	160	V
I_C	collector current			-	-	300	mA
h_{FE}	DC current gain	V_{CE} = 5 V; I_C = 50 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		30	-	-	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base		
2	E	emitter		
3	C	collector		

SC-70 (SOT323)

sym123

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMST5551	SC-70	plastic, surface-mounted package; 3 leads; 1.3 mm pitch; 2 mm x 1.25 mm x 0.95 mm body	SOT323

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PMST5551	%G3

[1] % = placeholder for manufacturing site code

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter		-	180	V
V_{CEO}	collector-emitter voltage	open base		-	160	V
V_{EBO}	emitter-base voltage	open collector		-	6	V
I_C	collector current			-	300	mA
I_{CM}	peak collector current			-	600	mA
I_{BM}	peak base current			-	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	200	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

9. Thermal characteristics

Table 6. Thermal characteristics

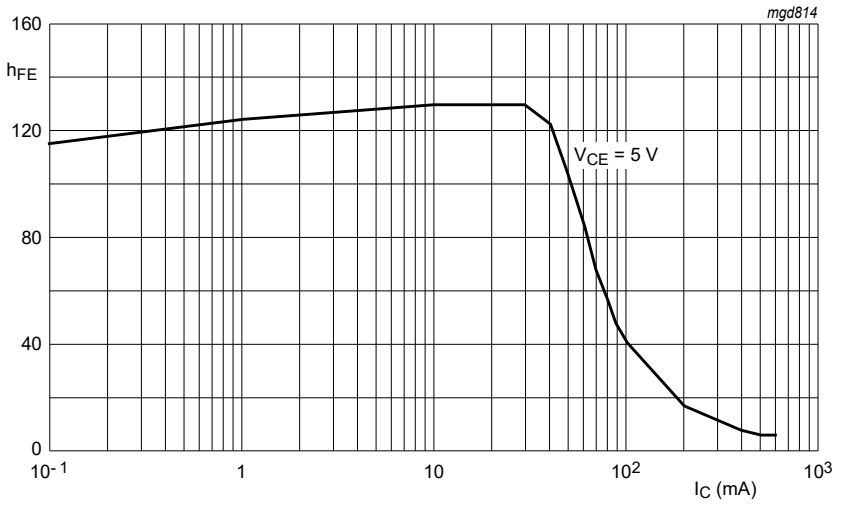
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	625	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	V_{CB} = 120 V; I_E = 0 A; T_{amb} = 25 °C		-	-	50	nA
		V_{CB} = 120 V; I_E = 0 A; T_{amb} = 100 °C		-	-	50	µA
I_{EBO}	emitter-base cut-off current	V_{EB} = 4 V; I_C = 0 A; T_{amb} = 25 °C		-	-	50	nA
h_{FE}	DC current gain	V_{CE} = 5 V; I_C = 1 mA; T_{amb} = 25 °C		80	-	-	
		V_{CE} = 5 V; I_C = 10 mA; T_{amb} = 25 °C		80	-	250	
		V_{CE} = 5 V; I_C = 50 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		30	-	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = 10 mA; I_B = 1 mA; T_{amb} = 25 °C		-	-	150	mV
		I_C = 50 mA; I_B = 5 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		-	-	200	V
V_{BEsat}	base-emitter saturation voltage	I_C = 10 mA; I_B = 1 mA; T_{amb} = 25 °C		-	-	1	V
		I_C = 50 mA; I_B = 5 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		-	-	1	V
C_c	collector capacitance	V_{CB} = 10 V; I_E = 0 A; i_e = 0 A; f = 1 MHz; T_{amb} = 25 °C		-	-	6	pF
C_e	emitter capacitance	V_{EB} = 0.5 V; I_C = 0 A; i_c = 0 A; f = 1 MHz; T_{amb} = 25 °C		-	-	30	pF
f_T	transition frequency	V_{CE} = 10 V; I_C = 10 mA; f = 100 MHz; T_{amb} = 25 °C		100	-	-	MHz
NF	noise figure	V_{CE} = 5 V; I_C = 200 µA; R_S = 2 kΩ; f = 10 Hz to 15.7 kHz		-	-	8	dB



V_{CE} = 5 V

Fig. 1. DC current gain; typical values

11. Test information

Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard *Q101 - Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

12. Package outline

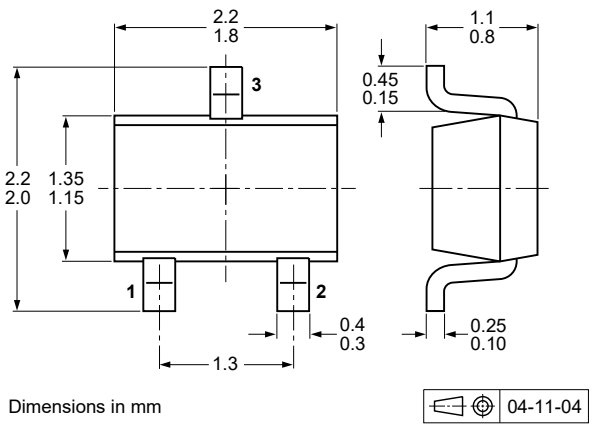


Fig. 2. Package outline SC-70 (SOT323)

13. Soldering

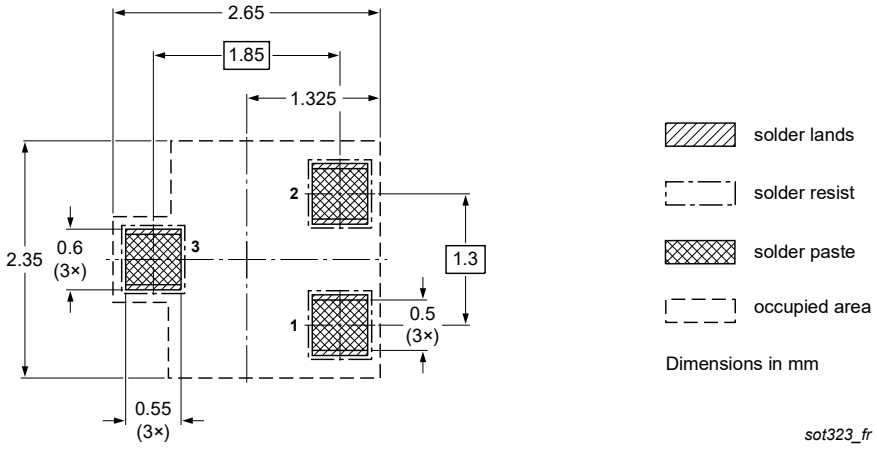


Fig. 3. Reflow soldering footprint for SC-70 (SOT323)

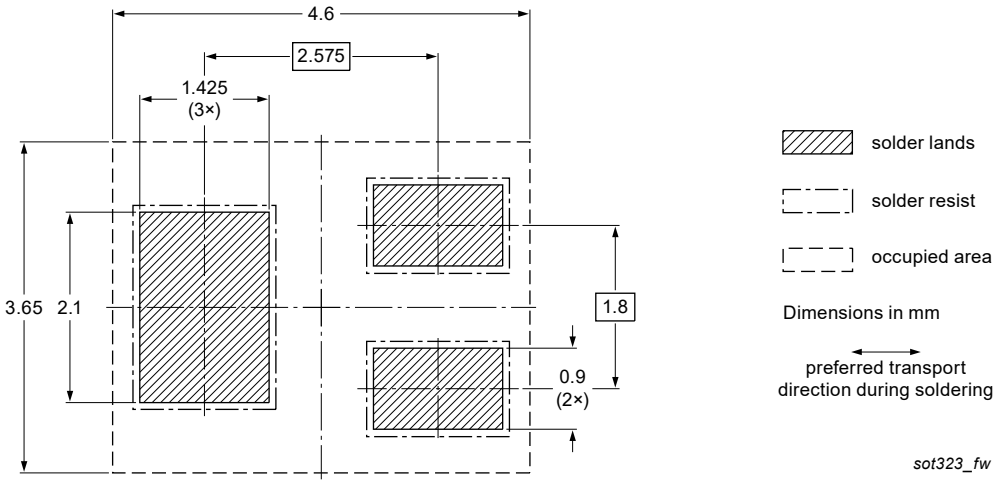


Fig. 4. Wave soldering footprint for SC-70 (SOT323)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMST5551 v.5	20240119	Product data sheet	-	PMST5551 v.4
Modifications:	• Pinning information: Graphic symbol corrected to NPN			
PMST5551 v.4	20230726	Product data sheet	-	PMST5551 v.3
PMST5551 v.3	20230302	Product data sheet	-	PMST5550_5551 v.2
PMST5550_5551 v.2	19990429	Product data sheet	-	PMST5550_5551 v.1
PMST5550_5551 v.1	19970520	Product data sheet	-	-

15. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
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