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# PMST4403

40 V, 600 mA PNP switching transistor

1 August 2016

Product data sheet

## 1. General description

PNP switching transistor in a very small SOT323 (SC-70) Surface-Mounted Device (SMD) plastic package.

NPN complement: PMST4401

## 2. Features and benefits

- General purpose switching transistor
- AEC-Q101 qualified

## 3. Applications

- Switching and linear amplification.

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CE0}$	collector-emitter voltage	open base	-	-	-40	V
$I_C$	collector current		-	-	-600	mA
$h_{FE}$	DC current gain	$V_{CE} = -2 \text{ V}$ ; $I_C = -150 \text{ mA}$ ; pulsed; $t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25 \text{ }^\circ\text{C}$	100	-	300	

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	<p>SC-70 (SOT323)</p>	<p>sym132</p>
2	E	emitter		
3	C	collector		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMST4403	SC-70	plastic surface-mounted package; 3 leads	SOT323

## 7. Marking

Table 4. Marking codes

Type number	Marking code <sup>[1]</sup>
PMST4403	%2T

[1] % = placeholder for manufacturing site code

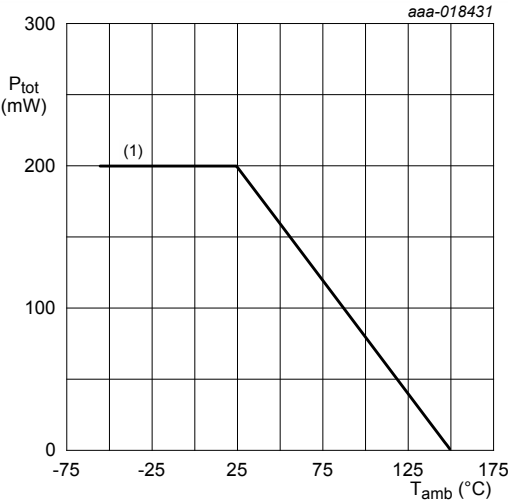
## 8. Limiting values

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		-	-40	V
$V_{CEO}$	collector-emitter voltage	open base		-	-40	V
$V_{EBO}$	emitter-base voltage	open collector		-	-5	V
$I_C$	collector current			-	-600	mA
$I_{CM}$	peak collector current	single pulse; $t_p \leq 1$ ms		-	-800	mA
$I_{BM}$	peak base current			-	-200	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.



(1) FR4 PCB; standard footprint

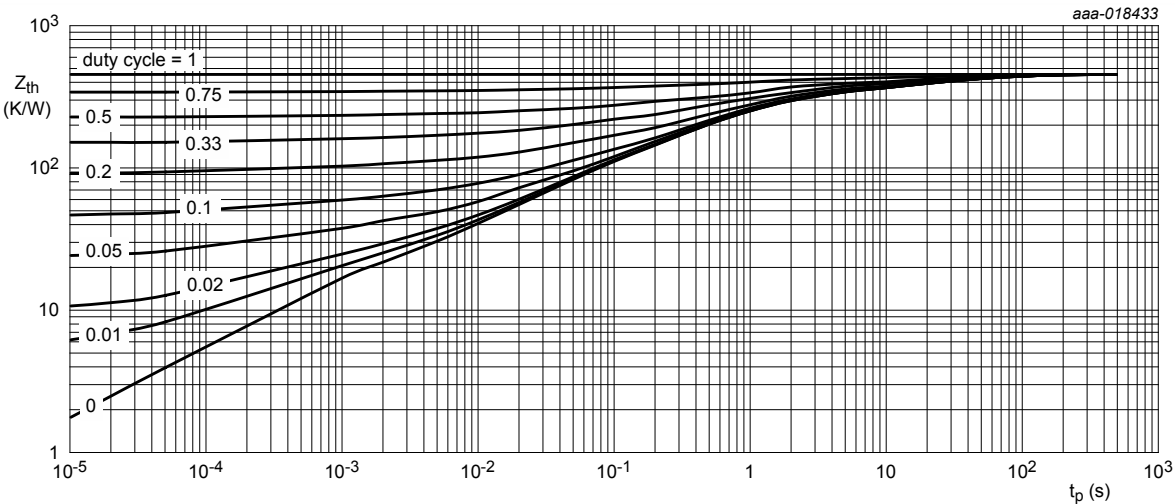
Fig. 1. Power derating curve

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.



Mounted on FR4 PCB; standard footprint

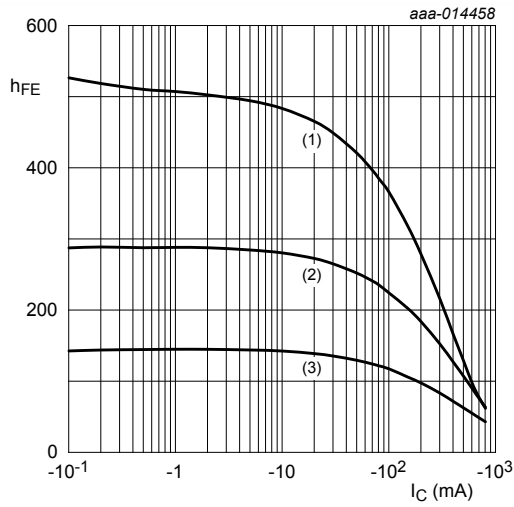
Fig. 2. Transient thermal impedance as a function of pulse time; typical values



## 10. Characteristics

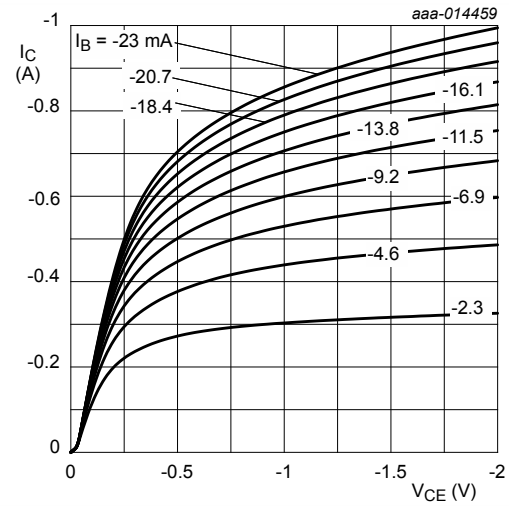
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{CBO}$	collector-base cut-off current	$V_{CB} = -40\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	-50	nA
		$V_{CB} = -40\text{ V}; I_E = 0\text{ A}; T_j = 125\text{ }^{\circ}\text{C}$	-	-	-10	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = -5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	-50	nA
$h_{FE}$	DC current gain	$V_{CE} = -1\text{ V}; I_C = -0.1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	30	-	-	
		$V_{CE} = -1\text{ V}; I_C = -1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	60	-	-	
		$V_{CE} = -1\text{ V}; I_C = -10\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	100	-	-	
		$V_{CE} = -2\text{ V}; I_C = -150\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^{\circ}\text{C}$	100	-	300	
		$V_{CE} = -2\text{ V}; I_C = -500\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^{\circ}\text{C}$	20	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -150\text{ mA}; I_B = -15\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	-400	mV
		$I_C = -500\text{ mA}; I_B = -50\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	-750	mV
$V_{BEsat}$	base-emitter saturation voltage	$I_C = -150\text{ mA}; I_B = -15\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	-950	mV
		$I_C = -500\text{ mA}; I_B = -50\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	-1.3	V
$t_d$	delay time	$I_C = -150\text{ mA}; I_{B(on)} = -15\text{ mA}; I_{B(off)} = 15\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	15	ns
$t_r$	rise time		-	-	30	ns
$t_{on}$	turn-on time		-	-	40	ns
$t_s$	storage time		-	-	300	ns
$t_f$	fall time		-	-	50	ns
$t_{off}$	turn-off time		-	-	350	ns
$C_C$	collector capacitance	$V_{CB} = -10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	8.5	pF
$C_E$	emitter capacitance	$V_{EB} = -500\text{ mV}; I_C = 0\text{ A}; i_c = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$	-	-	35	pF
$f_T$	transition frequency	$V_{CE} = -10\text{ V}; I_C = -20\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$	200	-	-	MHz



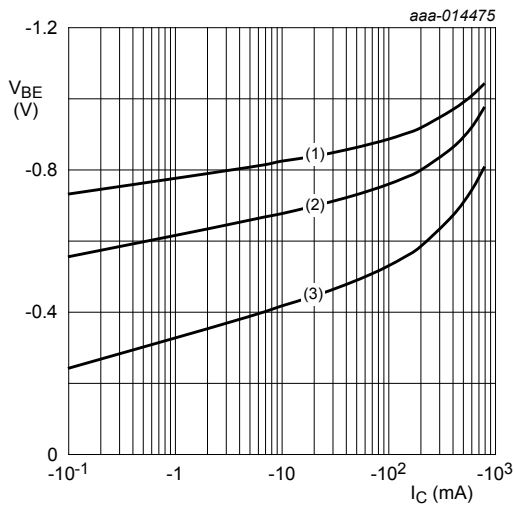
$V_{CE} = -2$  V  
 (1)  $T_{amb} = 150$  °C  
 (2)  $T_{amb} = 25$  °C  
 (3)  $T_{amb} = -55$  °C

**Fig. 3. DC current gain as a function of collector current; typical values**



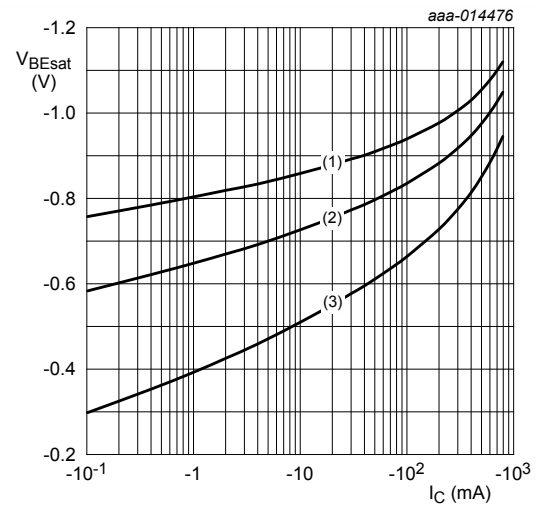
$T_{amb} = 25$  °C

**Fig. 4. Collector current as a function of collector-emitter voltage; typical values**



$V_{CE} = -2$  V  
 (1)  $T_{amb} = -55$  °C  
 (2)  $T_{amb} = 25$  °C  
 (3)  $T_{amb} = 150$  °C

**Fig. 5. Base-emitter voltage as a function of collector current; typical values**



$I_C/I_B = 10$   
 (1)  $T_{amb} = -55$  °C  
 (2)  $T_{amb} = 25$  °C  
 (3)  $T_{amb} = 150$  °C

**Fig. 6. Base-emitter saturation voltage as a function of collector current; typical values**

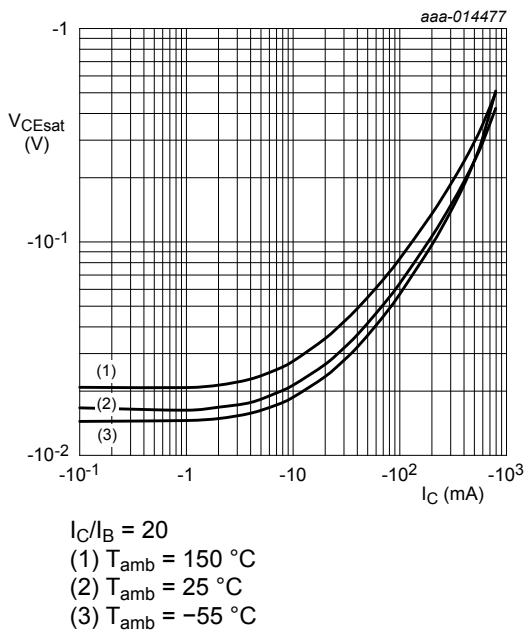


Fig. 7. Collector-emitter saturation voltage as a function of collector current; typical values

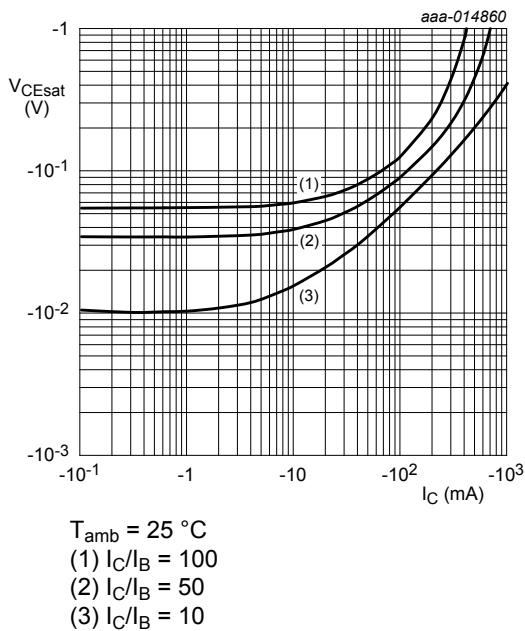


Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values

11. Test information

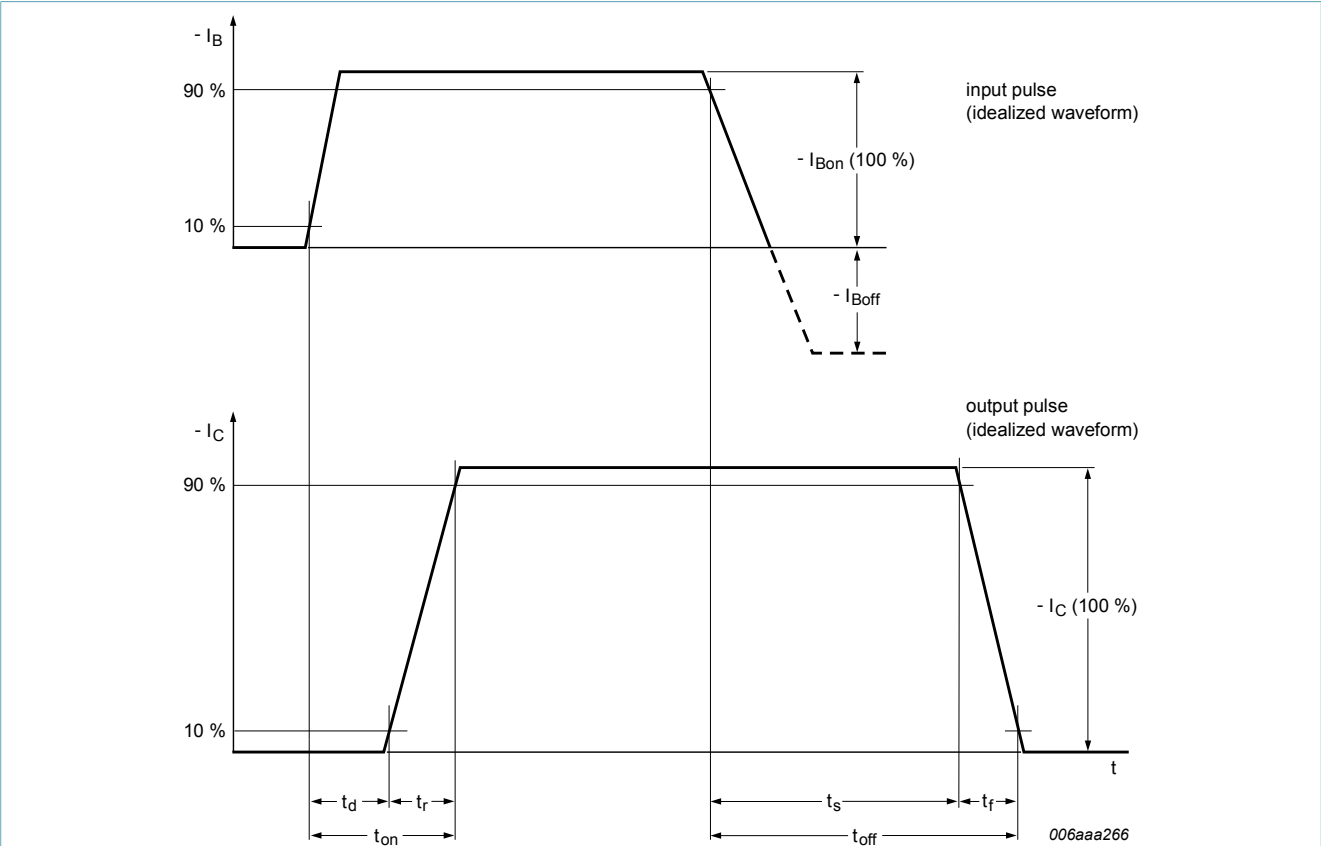


Fig. 9. Transistor switching time definition

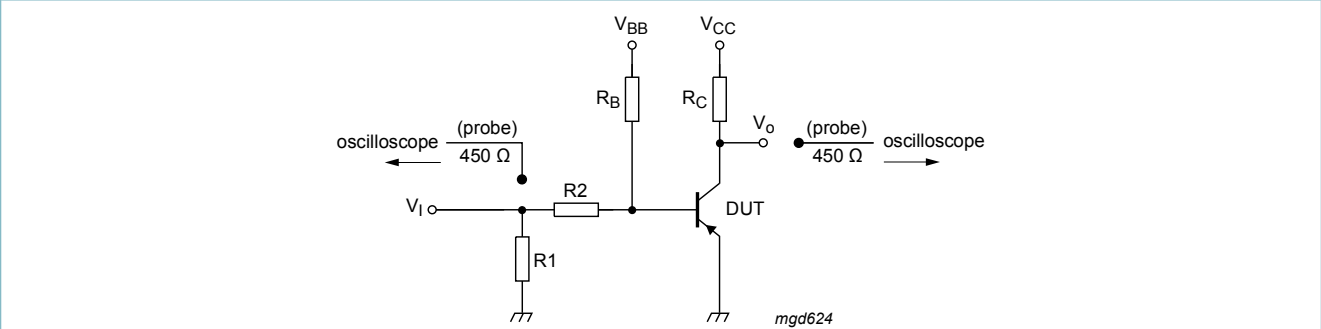


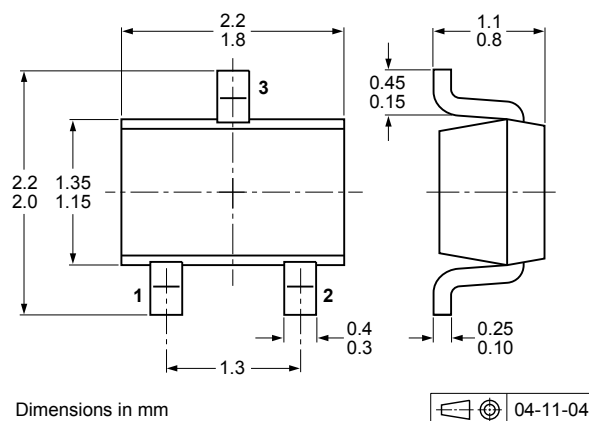
Fig. 10. Test circuit for switching times

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.

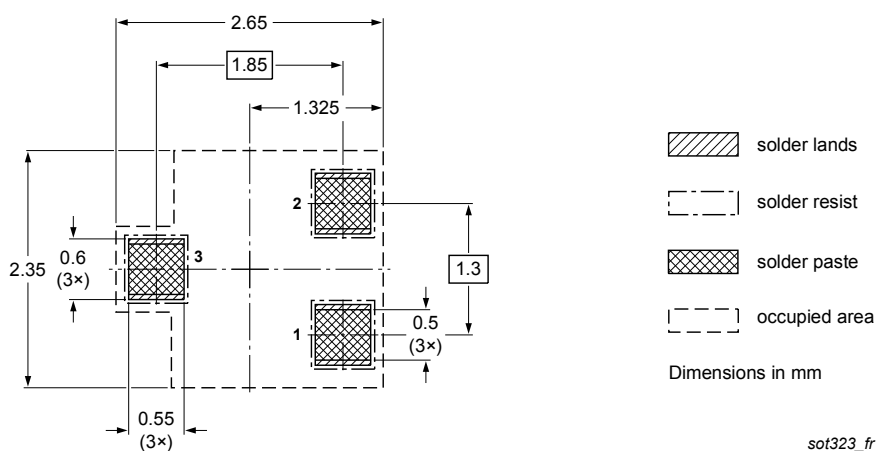


## 12. Package outline

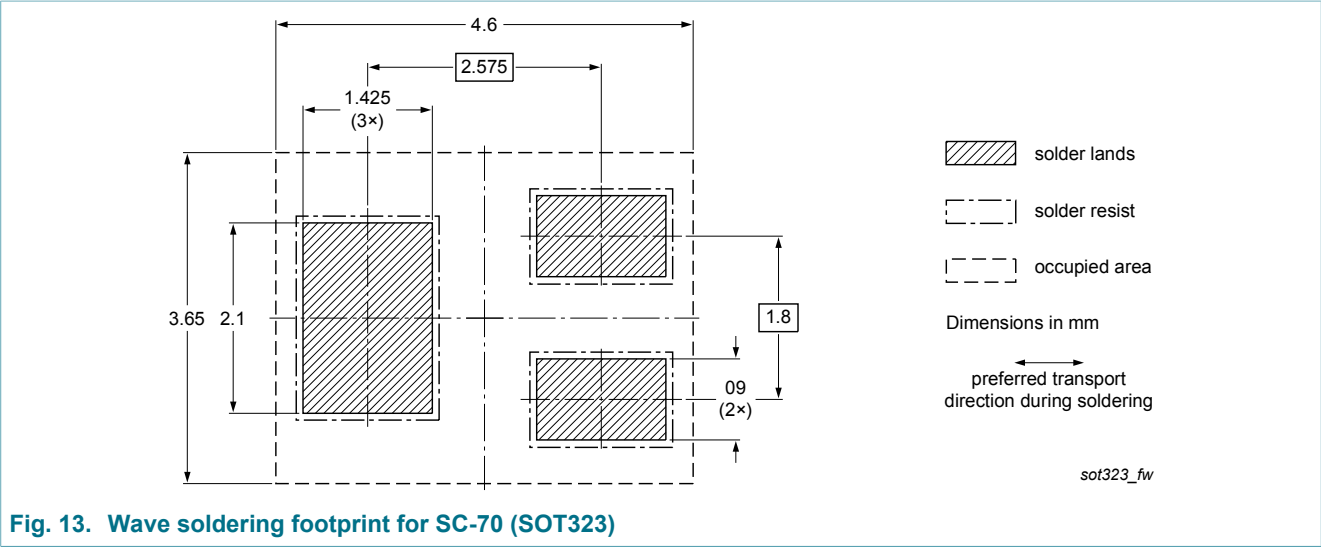


**Fig. 11. Package outline SC-70 (SOT323)**

## 13. Soldering



**Fig. 12. Reflow soldering footprint for SC-70 (SOT323)**



## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMST4403 v.4	20160801	Product data sheet	-	PMST4403 v.3
Modifications:	<ul style="list-style-type: none"><li>The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li><li>Legal texts have been adapted to the new company name where appropriate.</li></ul>			
PMST4403 v.3	19990422	Product data sheet	-	PMST4403 v.2
PMST4403 v.2	19970529	Product data sheet	-	PMST4403 v.1
PMST4403 v.1	199308xx	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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