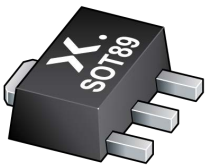


PXT2222A

NPN switching transistors

2 April 2014 **Product data sheet**

1. General description

NPN switching transistor in a medium power flat lead SOT89 (SC-62/TO-243) Surface-Mounted Device (SMD) plastic package.

PNP complement: PXT2907A

2. Features and benefits

- High current: max. 600 mA
- Low voltage: max. 40 V

3. Applications

- Switching and linear amplification

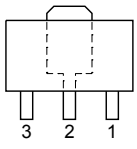
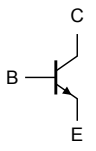
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base		-	-	40	V
I_C	collector current			-	-	600	mA
h_{FE}	DC current gain	V_{CE} = 10 V; I_C = 150 mA; T_{amb} = 25 °C; δ ≤ 0.02; t_p ≤ 300 µs; pulsed		100	-	300	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E	emitter	 **SOT89**	 *sym123*
2	C	collector		
3	B	base		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PXT2222A	SOT89	plastic surface-mounted package; die pad for good heat transfer; 3 leads	SOT89

7. Marking

Table 4. Marking codes

Type number	Marking code [1]
PXT2222A	%1P

[1] % = placeholder for manufacturing site code

8. Limiting values

Table 5. Limiting values

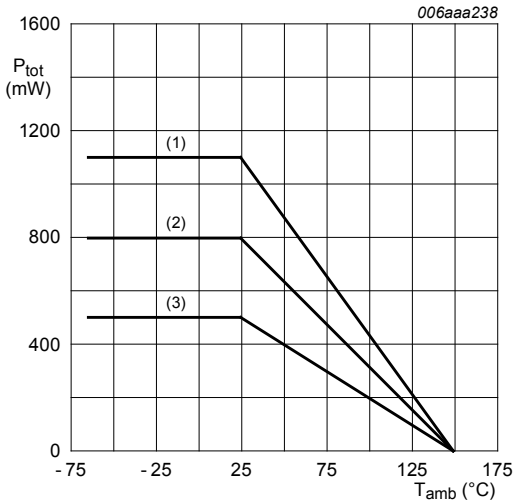
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter		-	60	V
V_{CEO}	collector-emitter voltage	open base		-	40	V
V_{EBO}	emitter-base voltage	open collector		-	6	V
I_C	collector current			-	600	mA
I_{CM}	peak collector current	$t_p \leq 1$ ms; single pulse		-	800	mA
I_{BM}	peak base current			-	200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	0.5	W
			[2]	-	0.8	W
			[3]	-	1.1	W
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C

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

[2] Transistor mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for collector 1 cm^2.

[3] Transistor mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for collector 6 cm^2.



(1) FR4 PCB; 6 cm^2 mounting pad for collector.

(2) FR4 PCB; 1 cm^2 mounting pad for collector.

(3) FR4 PCB; standard footprint.

Fig. 1. Power derating curves

9. Thermal characteristics

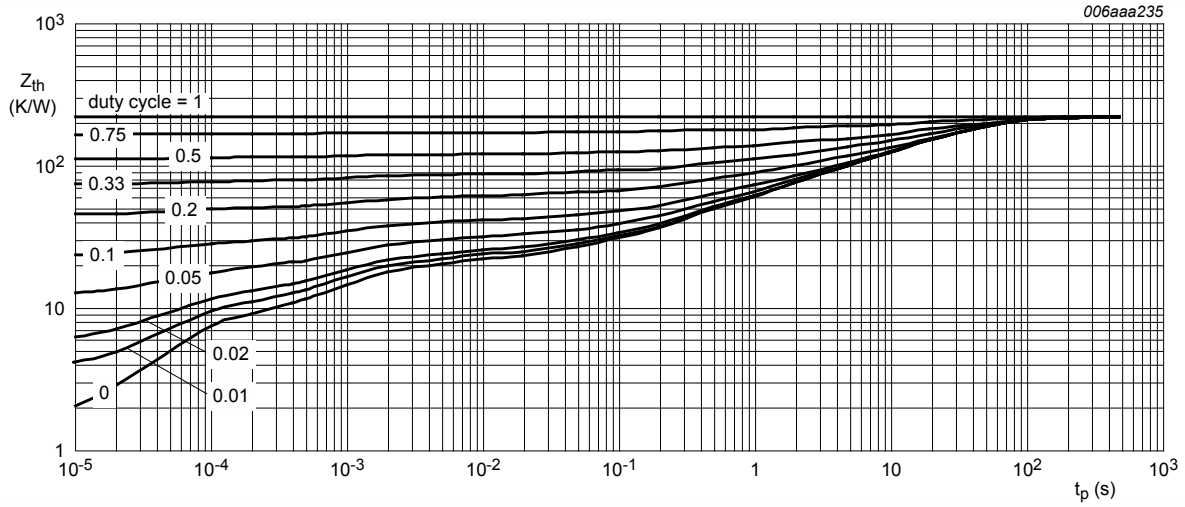
Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	250	K/W
			[2]	-	-	156	K/W
			[3]	-	-	113	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	30	K/W

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

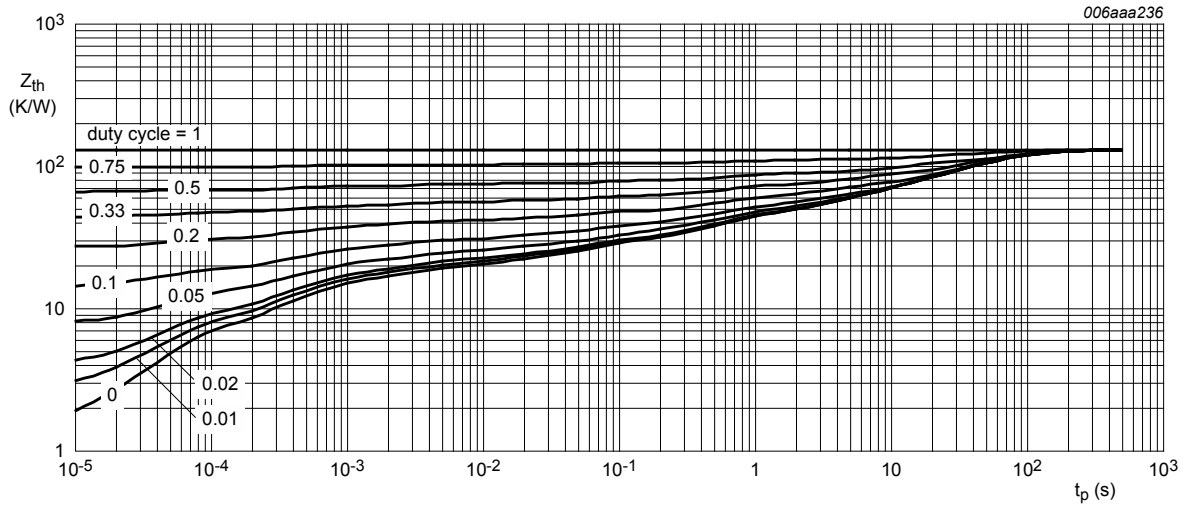
[2] Transistor mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for collector 1 cm^2.

[3] Transistor mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for collector 6 cm^2.



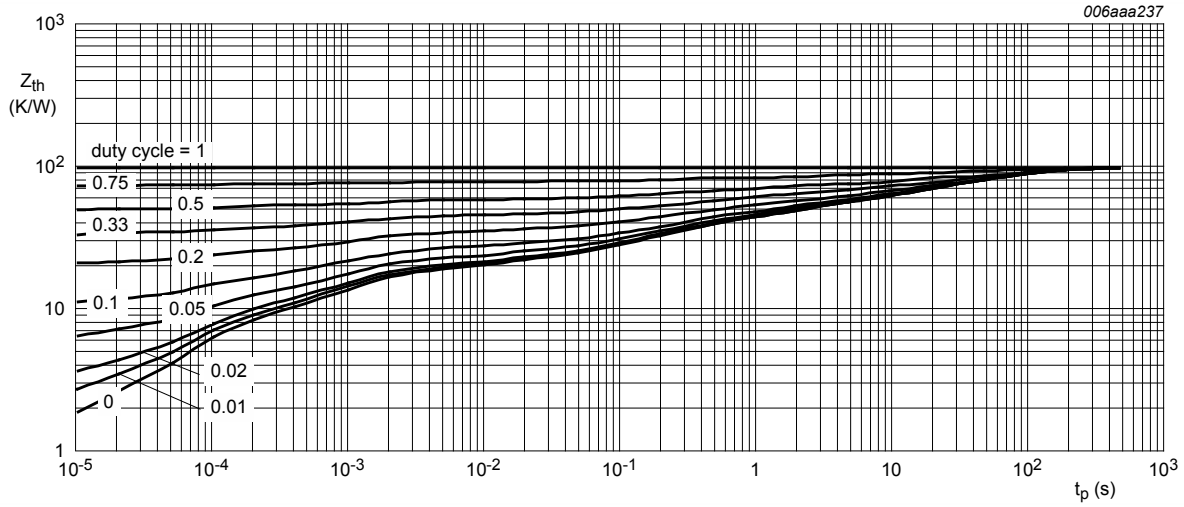
Mounted on FR4 PCB; standard footprint.

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



Mounted on FR4 PCB; mounting pad for collector 1 cm^2.

Fig. 3. Transient thermal impedance as a function of pulse time; typical values



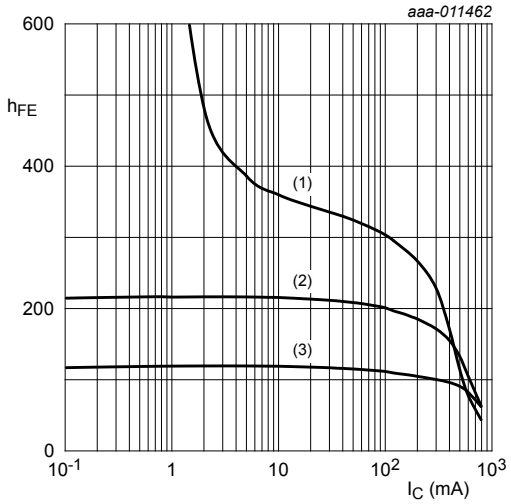
Mounted on FR4 PCB; mounting pad for collector 6 cm2.

Fig. 4. 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} = 60 V; I_E = 0 A; T_{amb} = 25 °C		-	-	10	nA
		V_{CB} = 60 V; I_E = 0 A; T_j = 125 °C		-	-	10	µA
I_{EBO}	emitter-base cut-off current	V_{EB} = 5 V; I_C = 0 A; T_{amb} = 25 °C		-	-	10	nA
h_{FE}	DC current gain	V_{CE} = 10 V; I_C = 0.1 mA; T_{amb} = 25 °C		35	-	-	
		V_{CE} = 10 V; I_C = 1 mA; T_{amb} = 25 °C		50	-	-	
		V_{CE} = 10 V; I_C = 10 mA; T_{amb} = 25 °C		75	-	-	
		V_{CE} = 10 V; I_C = 10 mA; T_j = -55 °C		35	-	-	
		V_{CE} = 1 V; I_C = 150 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C; pulsed		50	-	-	
		V_{CE} = 10 V; I_C = 150 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C; pulsed		100	-	300	
		V_{CE} = 10 V; I_C = 500 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C; pulsed		40	-	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = 150 mA; I_B = 15 mA; T_{amb} = 25 °C		-	-	300	mV
		I_C = 500 mA; I_B = 50 mA; T_{amb} = 25 °C		-	-	1	V
V_{BEsat}	base-emitter saturation voltage	I_C = 150 mA; I_B = 15 mA; T_{amb} = 25 °C		0.6	-	1.2	V
		I_C = 500 mA; I_B = 50 mA; T_{amb} = 25 °C		-	-	2	V
t_d	delay time	I_C = 150 mA; I_{Bon} = 15 mA; I_{Boff} = -15 mA; T_{amb} = 25 °C		-	-	15	ns
t_r	rise time			-	-	20	ns
t_{on}	turn-on time			-	-	35	ns
t_s	storage time			-	-	200	ns
t_f	fall time			-	-	60	ns
t_{off}	turn-off time			-	-	250	ns
C_C	collector capacitance	V_{CB} = 10 V; I_E = 0 A; i_e = 0 A; f = 1 MHz; T_{amb} = 25 °C		-	-	8	pF
C_E	emitter capacitance	V_{EB} = 500 mV; I_C = 0 A; i_c = 0 A; f = 1 MHz; T_{amb} = 25 °C		-	-	25	pF
f_T	transition frequency	V_{CE} = 10 V; I_C = 20 mA; f = 100 MHz; T_{amb} = 25 °C		300	-	-	MHz
NF	noise figure	V_{CE} = 5 V; I_C = 200 µA; R_S = 2 kΩ; f = 1 kHz; B = 200 Hz; T_{amb} = 25 °C		-	-	4	dB



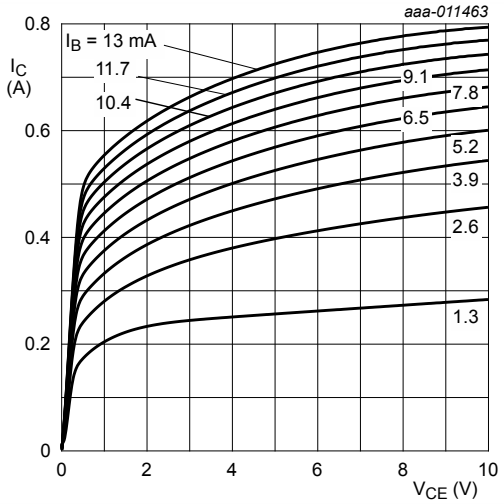
V_{CE} = 10 V

(1) T_{amb} = 150 °C

(2) T_{amb} = 25 °C

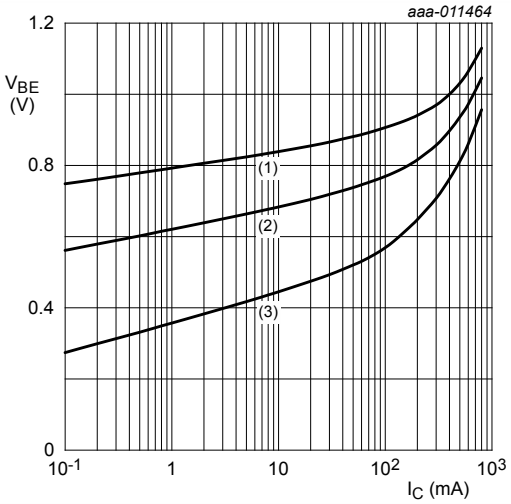
(3) T_{amb} = −55 °C

Fig. 5. DC current gain as a function of collector current; typical values



T_{amb} = 25 °C

Fig. 6. Collector current as a function of collector-emitter voltage; typical values



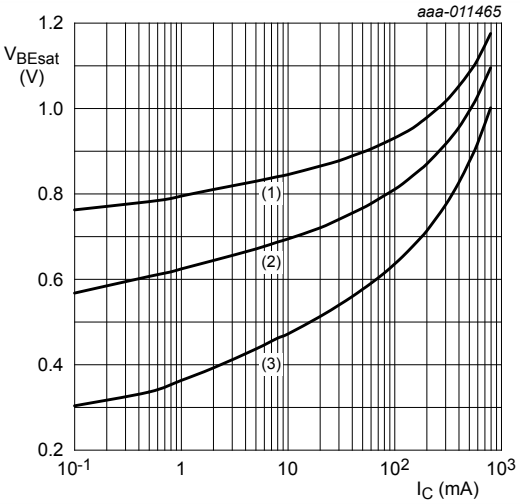
V_{CE} = 1 V

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 150 °C

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



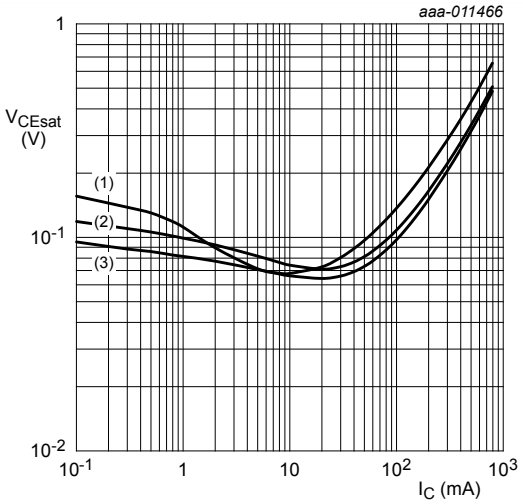
I_C/I_B = 10

(1) T_{amb} = −55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 150 °C

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



I_C/I_B = 10

(1) T_{amb} = 150 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = −55 °C

Fig. 9. Collector-emitter saturation voltage as a function of collector current; typical values

11. Test information

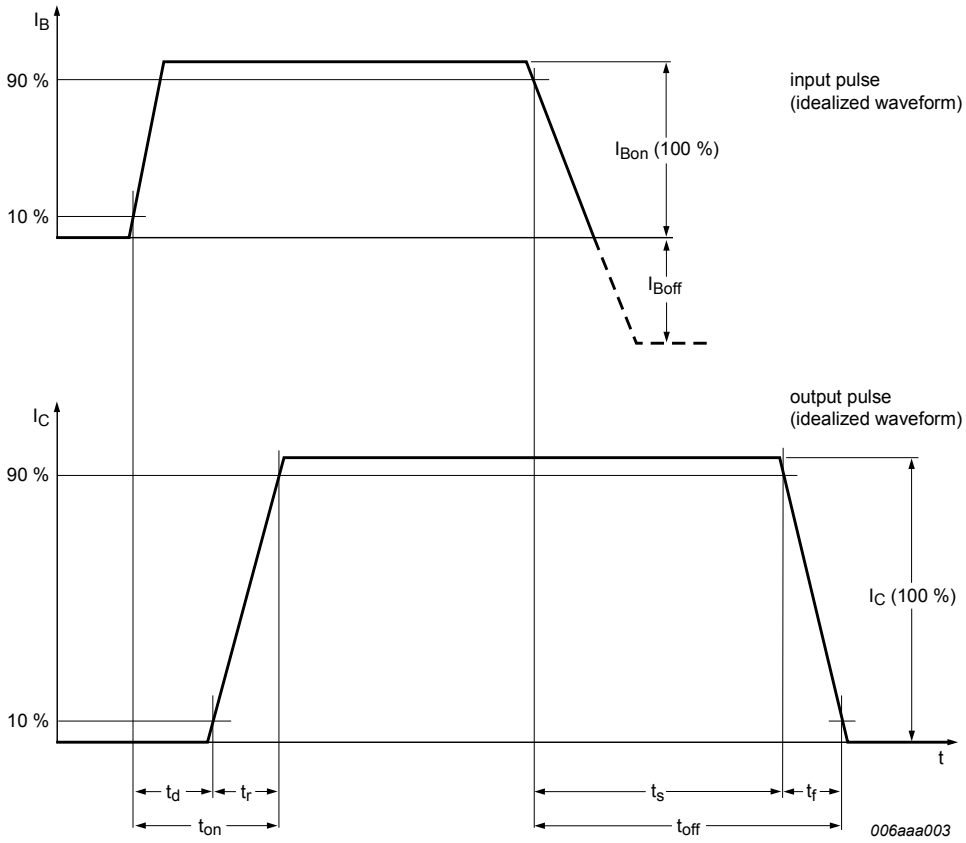


Fig. 10. BISS transistor switching time definition

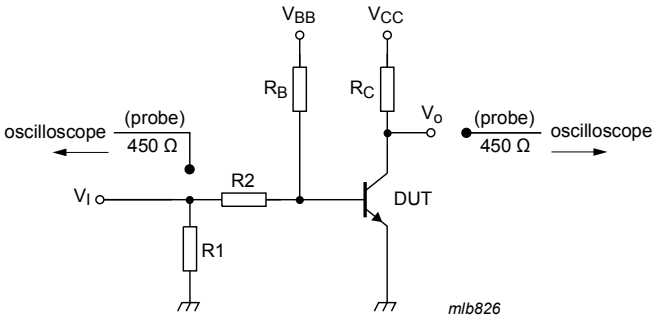


Fig. 11. Test circuit for switching times

12. Package outline

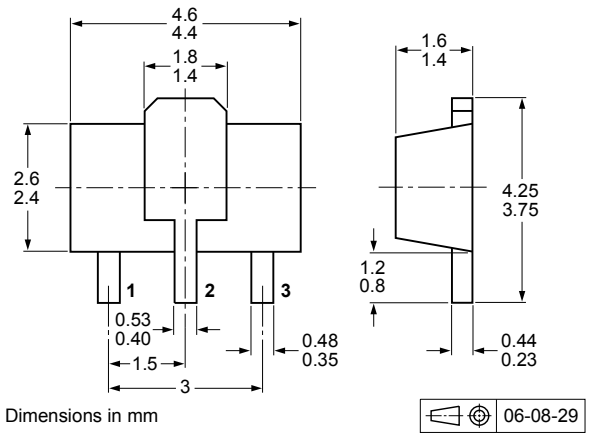


Fig. 12. Package outline SOT89

13. Soldering

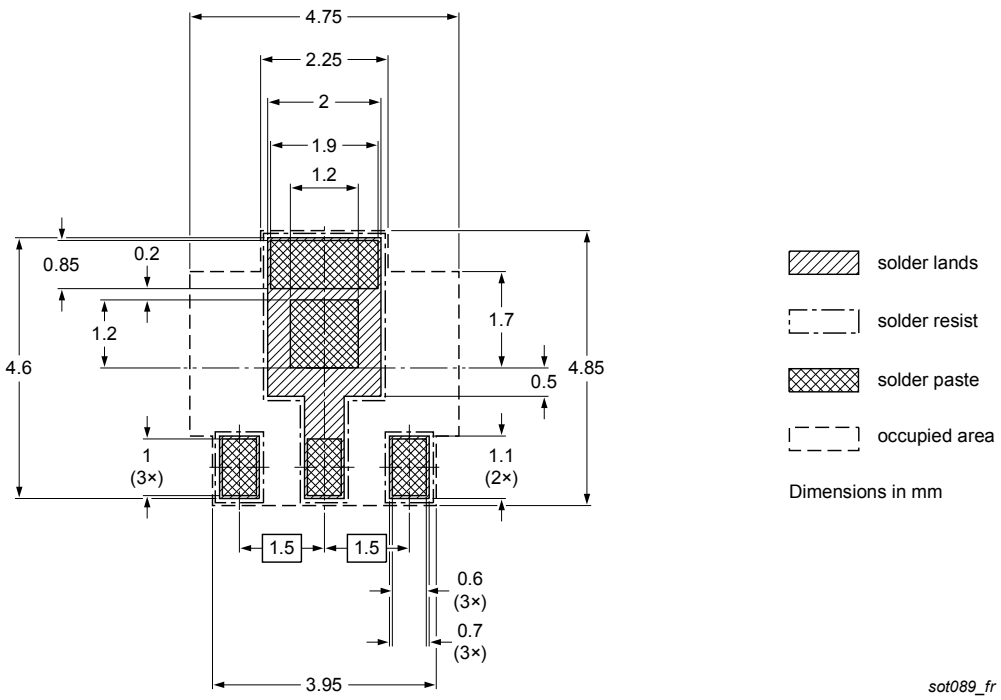


Fig. 13. Reflow soldering footprint for SOT89

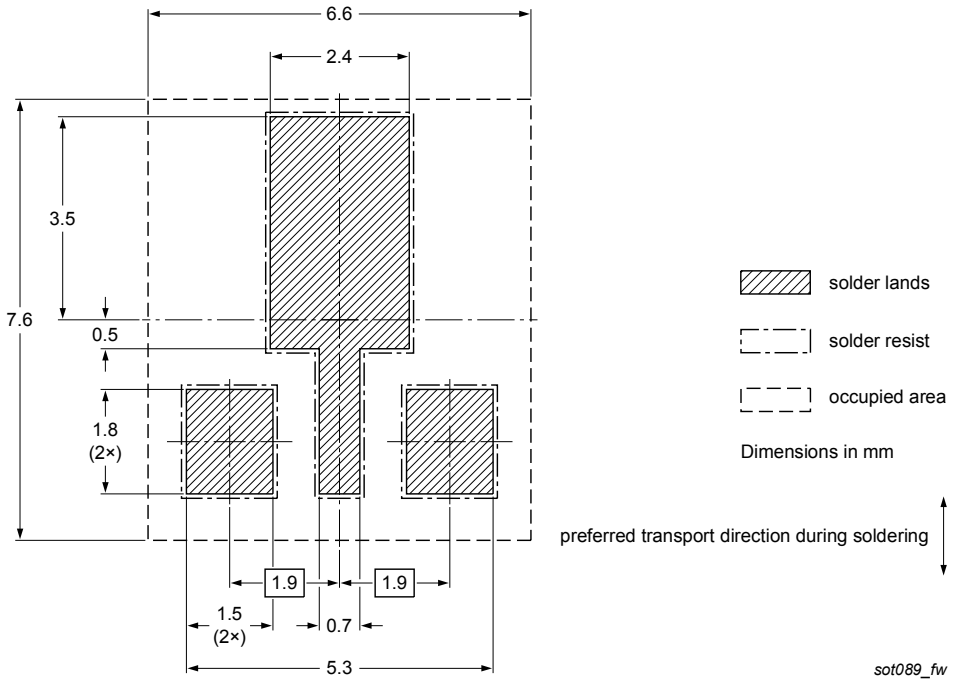


Fig. 14. Wave soldering footprint for SOT89

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PXT2222A v.5	20140402	Product data sheet	-	PXT2222A v.4
Modifications:	• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • General description: updated. • Quick refernce data: added. • Thermal characteristics: Figure 2 to 4 updated. • Limiting values: values of I_C, I_{CM} and I_{BM} parameters corrected. • Characteristics: Figures 5 to 9 added. • Soldering information: added. • Legal information: updated.			
PXT2222A v.4	20041122	Product specification	-	PXT2222A v.3
PXT2222A v.3	19990414	Product specification	-	PXT2222A v.2
PXT2222A v.2	19970505	Product specification	-	PXT2222A v.1
PXT2222A v.1	19940901	Product specification	-	-

15. Legal information

15.1 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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16. Contents

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Date of release: 02 April 2014