

# DATA SHEET

## **MCR08BT1** Thyristor logic level

Product specification

July 2001

Thyristor logic level

MCR08BT1

GENERAL DESCRIPTION

Passivated, sensitive gate thyristor in a plastic envelope, suitable for surface mounting, intended for use in general purpose switching and phase control applications. This device is intended to be interfaced directly to microcontrollers, logic integrated circuits and other low power gate trigger circuits.

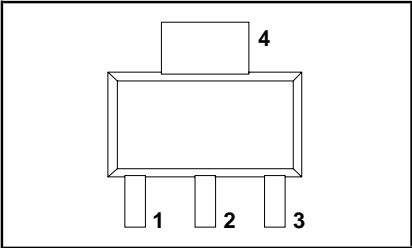
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
$V_{\text{DRM}}, V_{\text{RRM}}$	Repetitive peak off-state voltages	200	V
$I_{\text{T(AV)}}$	Average on-state current	0.5	A
$I_{\text{T(RMS)}}$	RMS on-state current	0.8	A
$I_{\text{TSM}}$	Non-repetitive peak on-state current	9	A

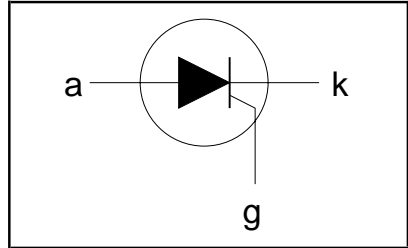
PINNING - SOT223

PIN	DESCRIPTION
1	cathode
2	anode
3	gate
tab	anode

PIN CONFIGURATION



SYMBOL



LIMITING VALUES

Limiting values in accordance with the Absolute Maximum System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{\text{DRM}}, V_{\text{RRM}}$	Repetitive peak off-state voltages		-	200 <sup>1</sup>	V
$I_{\text{T(AV)}}$	Average on-state current	half sine wave; $T_{\text{sp}} \leq 112\text{ }^{\circ}\text{C}$	-	0.5	A
$I_{\text{T(RMS)}}$	RMS on-state current	all conduction angles	-	0.8	A
$I_{\text{TSM}}$	Non-repetitive peak on-state current	half sine wave; $T_{\text{j}} = 25\text{ }^{\circ}\text{C}$ prior to surge	-	8	A
		$t = 10\text{ ms}$	-	9	A
		$t = 8.3\text{ ms}$	-	0.32	A <sup>2</sup> s
		$t = 10\text{ ms}$	-	50	A/μs
$I^2t$	$I^2t$ for fusing	$I_{\text{TM}} = 2\text{ A}; I_{\text{G}} = 10\text{ mA};$ $dI_{\text{G}}/dt = 100\text{ mA}/\mu\text{s}$	-		
$dI_{\text{T}}/dt$	Repetitive rate of rise of on-state current after triggering		-		
$I_{\text{GM}}$	Peak gate current		-	1	A
$V_{\text{GM}}$	Peak gate voltage		-	5	V
$V_{\text{RGM}}$	Peak reverse gate voltage		-	5	V
$P_{\text{GM}}$	Peak gate power		-	2	W
$P_{\text{G(AV)}}$	Average gate power	over any 20 ms period	-	0.1	W
$T_{\text{stg}}$	Storage temperature		-40	150	°C
$T_{\text{j}}$	Operating junction temperature		-	125	°C

1 Although not recommended, off-state voltages up to 800V may be applied without damage, but the thyristor may switch to the on-state. The rate of rise of current should not exceed 15 A/μs.

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## THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j-sp}$	Thermal resistance junction to solder point		-	-	15	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint	-	156	-	K/W
		pcb mounted; pad area as in fig:14	-	70	-	K/W

## STATIC CHARACTERISTICS

 $T_j = 25\ ^\circ\text{C}$  unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{GT}$	Gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 10\text{ mA}$ ; gate open circuit	-	50	200	$\mu\text{A}$
$I_L$	Latching current	$V_D = 12\text{ V}$ ; $I_{GT} = 0.5\text{ mA}$ ; $R_{GK} = 1\text{ k}\Omega$	-	2	6	mA
$I_H$	Holding current	$V_D = 12\text{ V}$ ; $I_{GT} = 0.5\text{ mA}$ ; $R_{GK} = 1\text{ k}\Omega$	-	2	5	mA
$V_T$	On-state voltage	$I_T = 2\text{ A}$	-	1.35	1.5	V
$V_{GT}$	Gate trigger voltage	$V_D = 12\text{ V}$ ; $I_T = 10\text{ mA}$ ; gate open circuit	-	0.5	0.8	V
		$V_D = V_{DRM(max)}$ ; $I_T = 10\text{ mA}$ ; $T_j = 125\ ^\circ\text{C}$ ; gate open circuit	0.2	0.3	-	V
$I_D, I_R$	Off-state leakage current	$V_D = V_{DRM(max)}$ ; $V_R = V_{RRM(max)}$ ; $T_j = 125\ ^\circ\text{C}$ ; $R_{GK} = 1\text{ k}\Omega$	-	0.05	0.1	mA

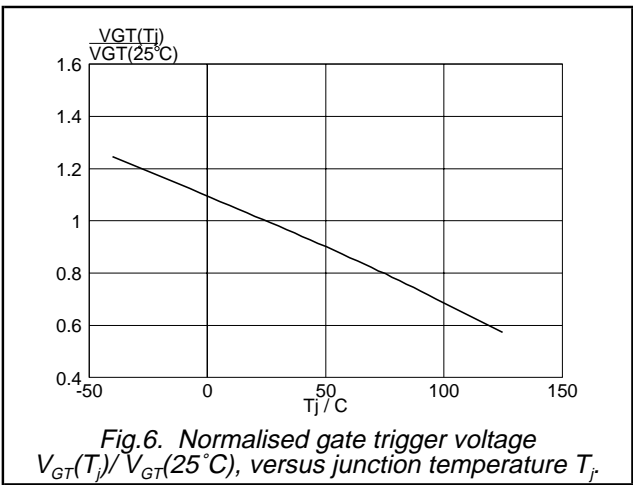
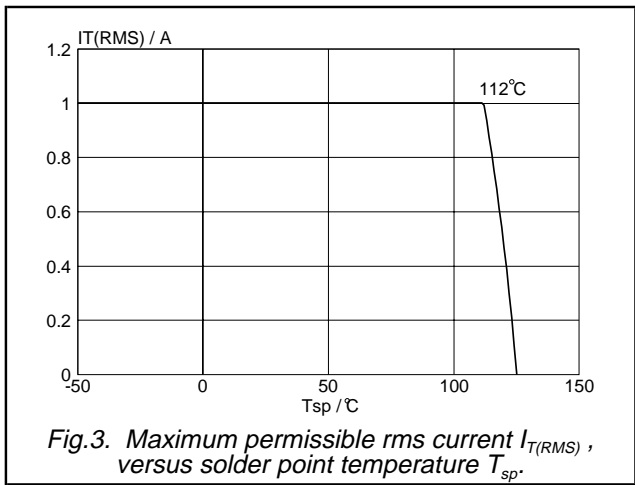
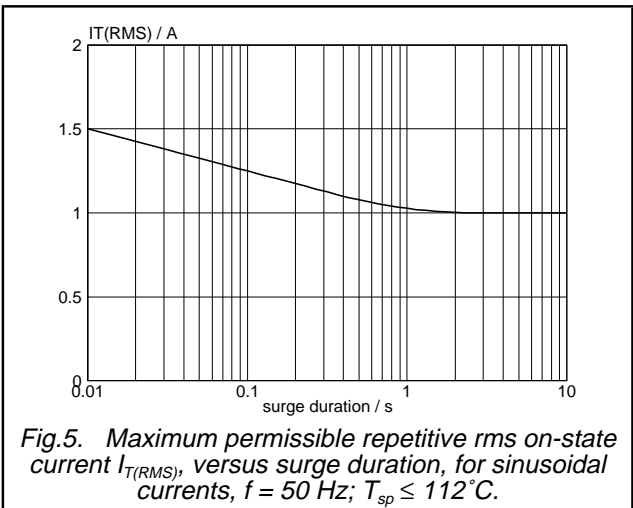
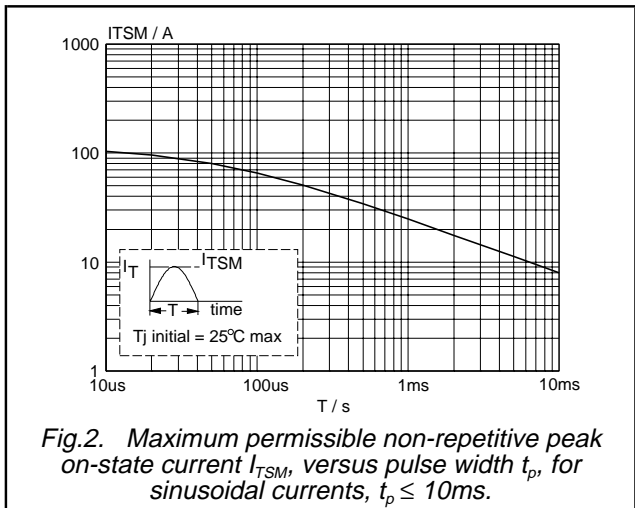
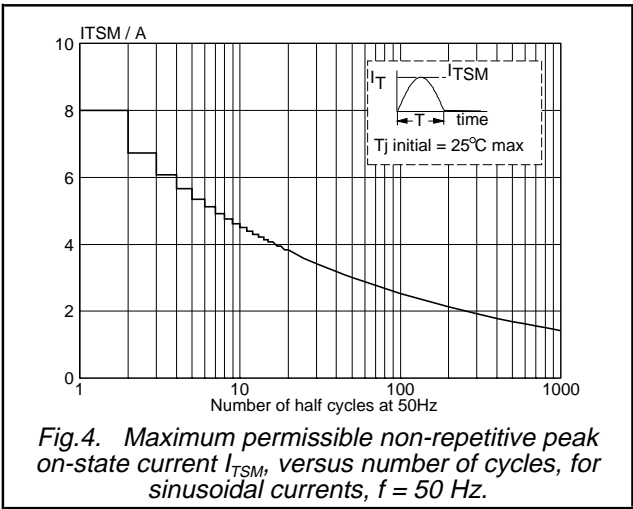
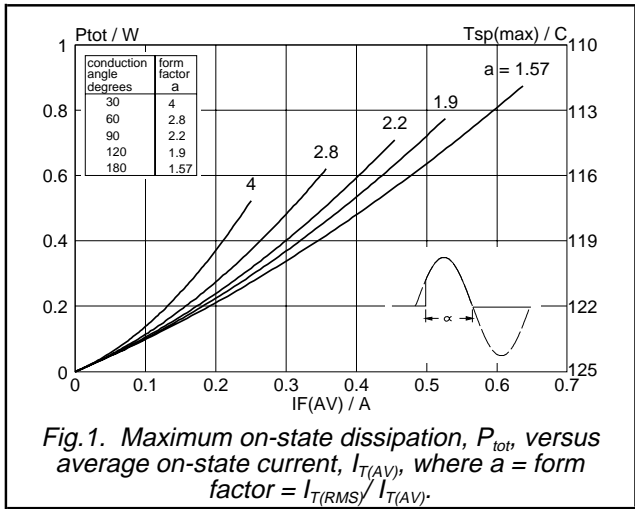
## DYNAMIC CHARACTERISTICS

 $T_j = 25\ ^\circ\text{C}$  unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$dV_D/dt$	Critical rate of rise of off-state voltage	$V_{DM} = 67\% V_{DRM(max)}$ ; $T_j = 125\ ^\circ\text{C}$ ; exponential waveform; $R_{GK} = 1\text{ k}\Omega$	-	25	-	V/ $\mu\text{s}$
$t_{gt}$	Gate controlled turn-on time	$I_{TM} = 2\text{ A}$ ; $V_D = V_{DRM(max)}$ ; $I_G = 10\text{ mA}$ ; $dI_G/dt = 0.1\text{ A}/\mu\text{s}$	-	2	-	$\mu\text{s}$
$t_q$	Circuit commutated turn-off time	$V_D = 67\% V_{DRM(max)}$ ; $T_j = 125\ ^\circ\text{C}$ ; $I_{TM} = 1.6\text{ A}$ ; $V_R = 35\text{ V}$ ; $dI_{TM}/dt = 30\text{ A}/\mu\text{s}$ ; $dV_D/dt = 2\text{ V}/\mu\text{s}$ ; $R_{GK} = 1\text{ k}\Omega$	-	100	-	$\mu\text{s}$

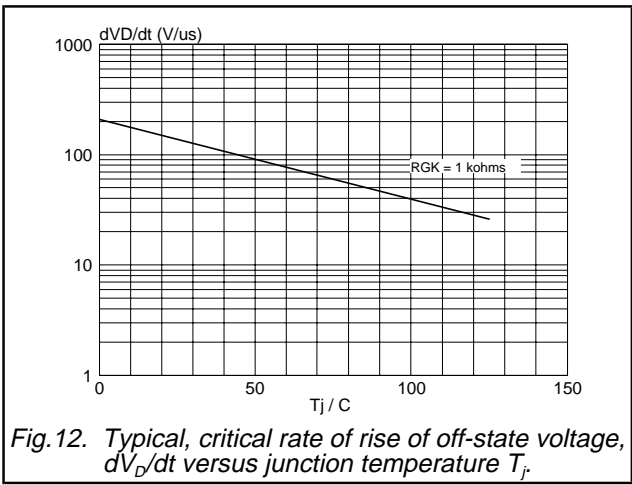
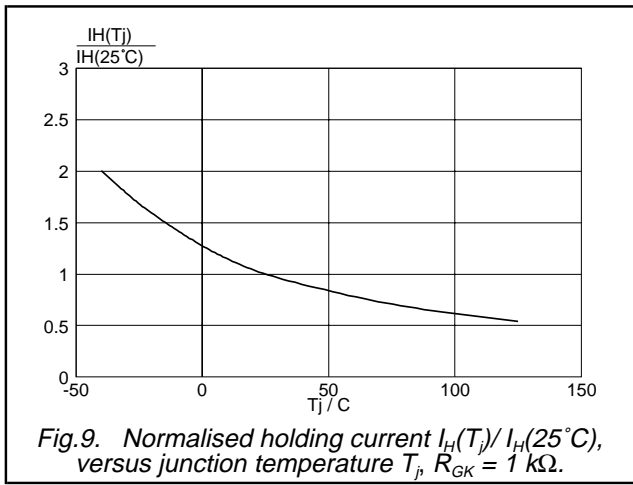
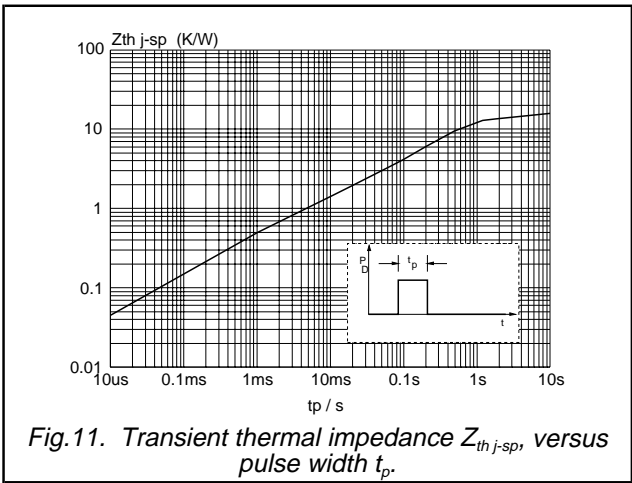
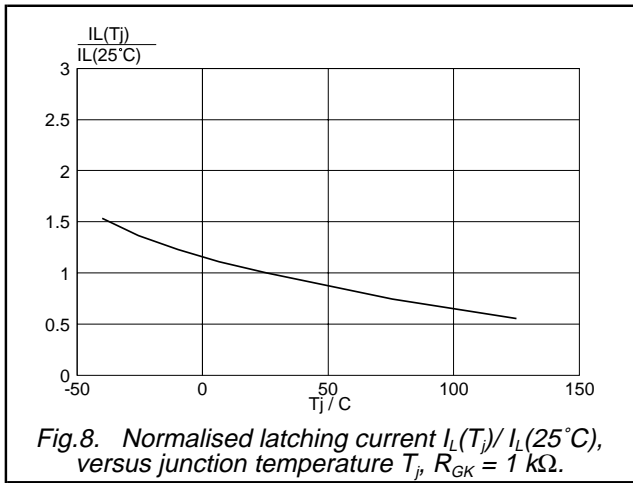
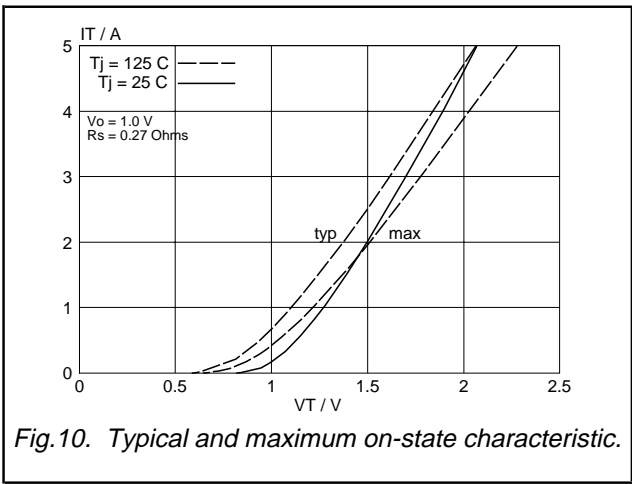
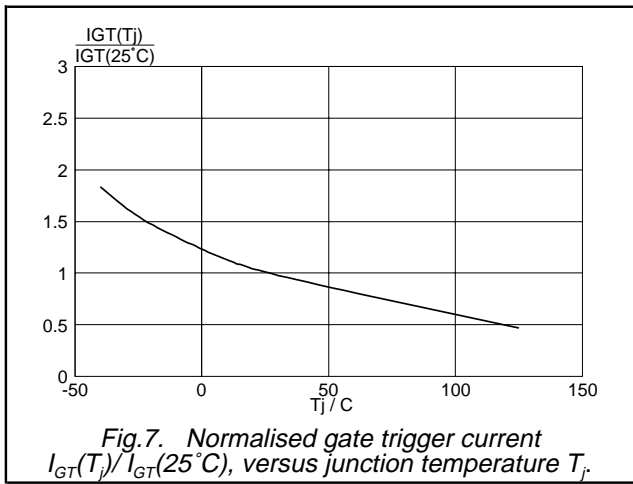
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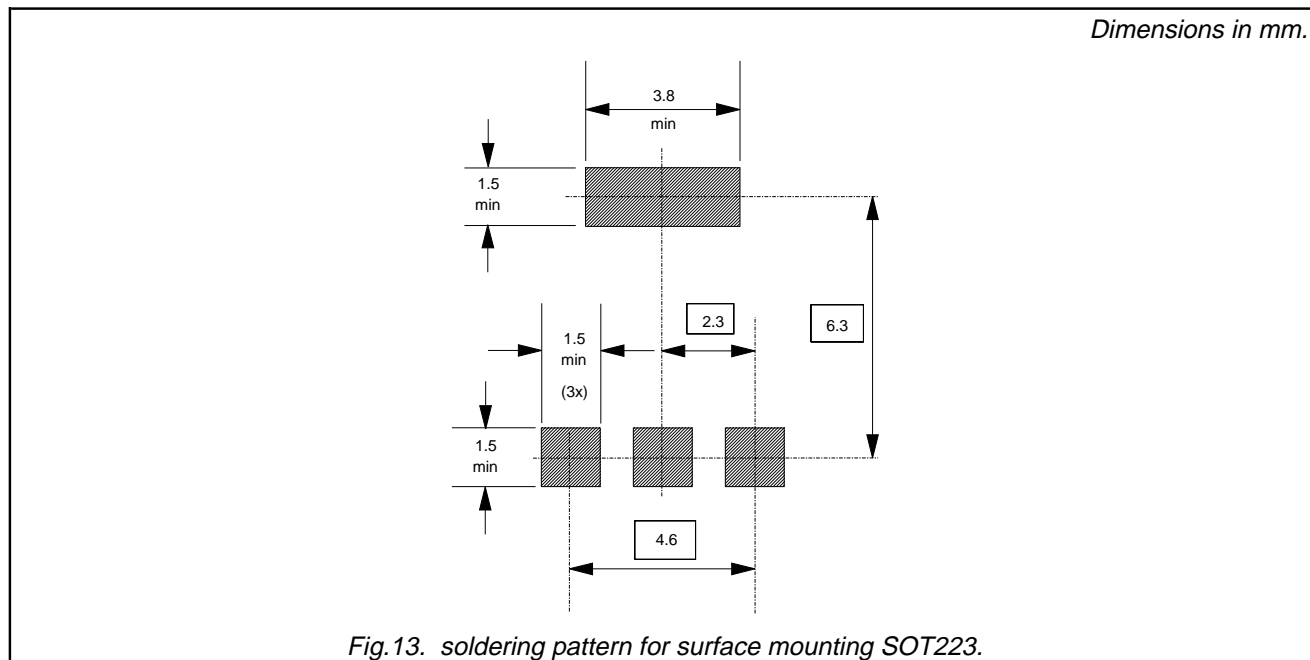
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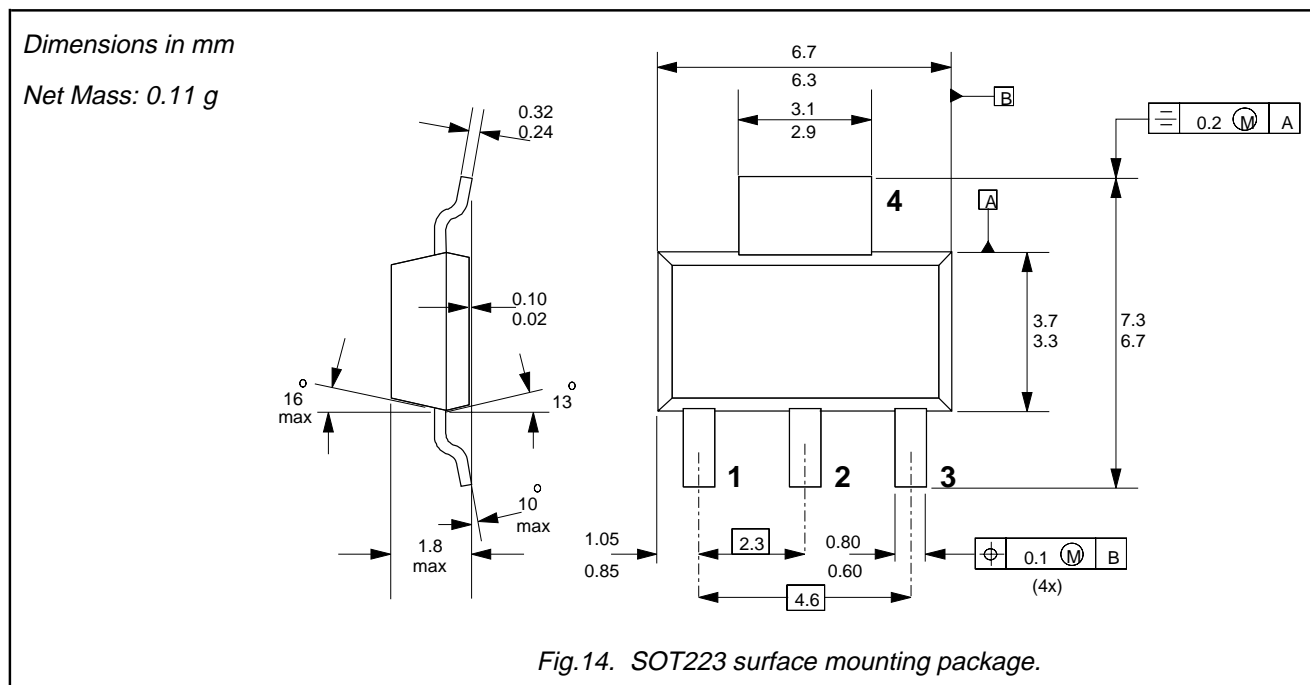
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## MOUNTING INSTRUCTIONS



## MECHANICAL DATA



## Notes

1. For further information, refer to Philips publication SC18 "SMD Footprint Design and Soldering Guidelines".  
Order code: 9397 750 00505.
2. Epoxy meets UL94 V0 at 1/8".

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**DEFINITIONS**

<b>DATA SHEET STATUS</b>		
<b>DATA SHEET STATUS<sup>2</sup></b>	<b>PRODUCT STATUS<sup>3</sup></b>	<b>DEFINITIONS</b>
Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice
Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product
Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Changes will be communicated according to the Customer Product/Process Change Notification (CPCN) procedure SNW-SQ-650A
<b>Limiting values</b>		
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<b>Application information</b>		
Where application information is given, it is advisory and does not form part of the specification.		
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