

**PowerMOS transistor**

**PHT1N60R**

**GENERAL DESCRIPTION**

N-channel enhancement mode field-effect power transistor in a plastic envelope suitable for surface mounting featuring high avalanche energy capability, stable blocking voltage, fast switching and high thermal cycling performance. Intended for use in Compact Fluorescent Lights (CFL) and general purpose switching applications.

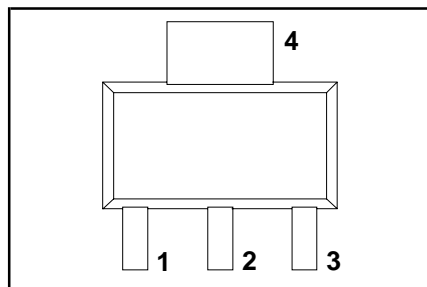
**QUICK REFERENCE DATA**

SYMBOL	PARAMETER	MAX.	UNIT
$V_{DS}$	Drain-source voltage	600	V
$I_D$	Drain current (DC)	0.53	A
$P_{tot}$	Total power dissipation	1.8	W
$R_{DS(ON)}$	Drain-source on-state resistance	16.0	$\Omega$

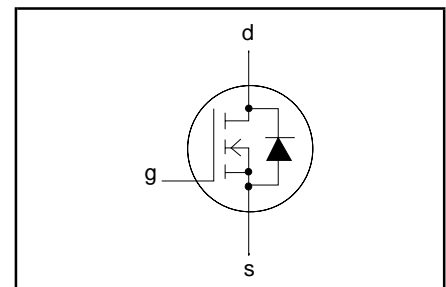
**PINNING - SOT223**

PIN	DESCRIPTION
1	gate
2	drain
3	source
4	drain (tab)

**PIN CONFIGURATION**



**SYMBOL**



**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{DS}$	Drain-source voltage		-	600	V
$V_{DGR}$	Drain-gate voltage	$R_{GS} = 20 \text{ k}\Omega$	-	600	V
$\pm V_{GS}$	Gate-source voltage		-	30	V
$I_D$	Drain current (DC)	$T_{sp} = 25 \text{ }^\circ\text{C}$	-	0.53	A
		$T_{sp} = 100 \text{ }^\circ\text{C}$	-	0.4	A
$I_{DM}$	Drain current (pulse peak value)	$T_{sp} = 25 \text{ }^\circ\text{C}$	-	2.12	A
$I_{DR}$	Source-drain diode current (DC)	$T_{sp} = 25 \text{ }^\circ\text{C}$	-	0.53	A
$I_{DRM}$	Source-drain diode current (pulse peak value)	$T_{sp} = 25 \text{ }^\circ\text{C}$	-	2.12	A
$P_{tot}$	Total power dissipation	$T_{sp} = 25 \text{ }^\circ\text{C}$	-	1.8	W
$T_{stg}$	Storage temperature		-55	150	$^\circ\text{C}$
$T_j$	Junction temperature		-	150	$^\circ\text{C}$

**AVALANCHE LIMITING VALUE**

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$W_{DSS}$	Drain-source non-repetitive unclamped inductive turn-off energy	$I_D = 2 \text{ A}$ ; $V_{DD} \leq 50 \text{ V}$ ; $V_{GS} = 10 \text{ V}$ ; $R_{GS} = 50 \text{ }\Omega$	-	20	mJ
		$T_j = 25 \text{ }^\circ\text{C}$ prior to surge	-	8	mJ
		$T_j = 100 \text{ }^\circ\text{C}$ prior to surge	-	3.6	mJ
$W_{DSR}^1$	Drain-source repetitive unclamped inductive turn-off energy	$I_D = 2 \text{ A}$ ; $V_{DD} \leq 50 \text{ V}$ ; $V_{GS} = 10 \text{ V}$ ; $R_{GS} = 50 \text{ }\Omega$ ; $T_j \leq 150 \text{ }^\circ\text{C}$	-	3.6	mJ

1. Pulse width and frequency limited by  $T_{j(max)}$

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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 pcb mounted; pad area as in fig:2	-	156 70	-	K/W K/W

## STATIC CHARACTERISTICS

 $T_{mb} = 25\text{ °C}$  unless otherwise specified

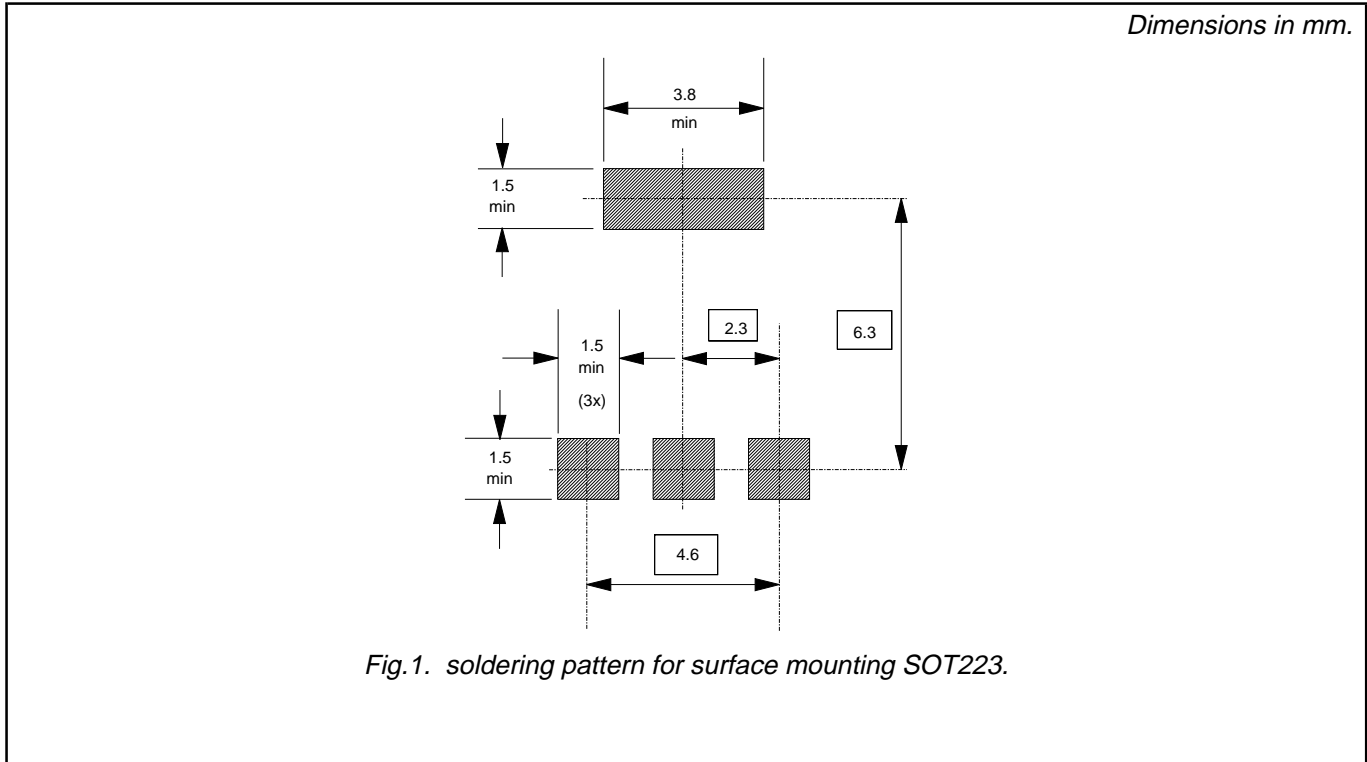
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 0.25\text{ mA}$	600	-	-	V
$V_{GS(TO)}$	Gate threshold voltage	$V_{DS} = V_{GS}; I_D = 0.25\text{ mA}$	2.0	3.0	4.0	V
$I_{DSS}$	Drain-source leakage current	$V_{DS} = 500\text{ V}; V_{GS} = 0\text{ V}; T_j = 25\text{ °C}$	-	1	100	$\mu\text{A}$
$I_{GSS}$	Gate-source leakage current	$V_{DS} = 400\text{ V}; V_{GS} = 0\text{ V}; T_j = 125\text{ °C}$	-	0.1	1.0	mA
$R_{DS(ON)}$	Drain-source on-state resistance	$V_{GS} = \pm 35\text{ V}; V_{DS} = 0\text{ V}$	-	4	100	nA
$V_{SD}$	Source-drain diode forward voltage	$V_{GS} = 10\text{ V}; I_D = 1\text{ A}$	-	-	16.0	$\Omega$
		$I_F = 2\text{ A}; V_{GS} = 0\text{ V}$	-	0.85	1.2	V

## DYNAMIC CHARACTERISTICS

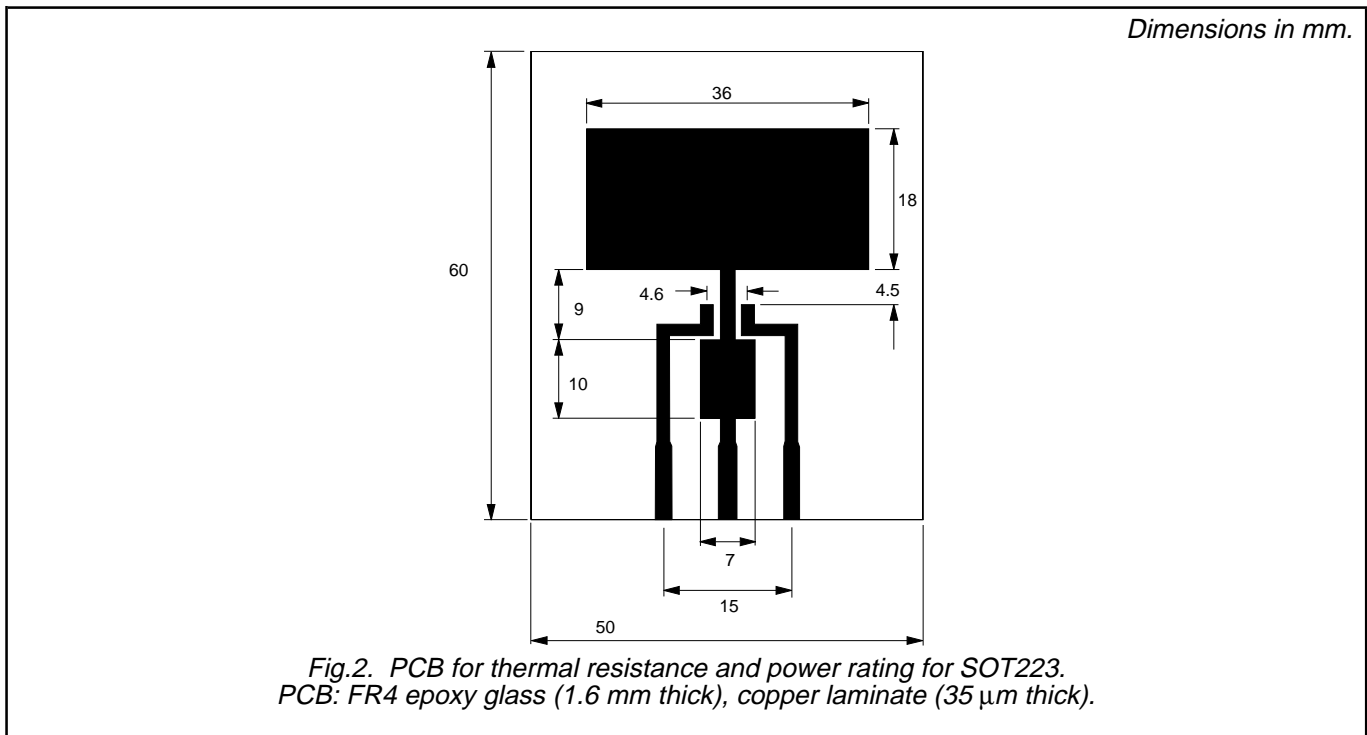
 $T_{mb} = 25\text{ °C}$  unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$g_{fs}$	Forward transconductance	$V_{DS} = 15\text{ V}; I_D = 1\text{ A}$	0.5	0.8	-	S
$C_{iss}$	Input capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 25\text{ V}; f = 1\text{ MHz}$	-	75	100	pF
$C_{oss}$	Output capacitance		-	10	15	pF
$C_{rss}$	Feedback capacitance		-	5	10	pF
$Q_{g(tot)}$	Total gate charge	$V_{GS} = 10\text{ V}; I_D = 2\text{ A}; V_{DS} = 400\text{ V}$	-	5	-	nC
$Q_{gs}$	Gate to source charge		-	.5	-	nC
$Q_{gd}$	Gate to drain (Miller) charge		-	3	-	nC
$t_{don}$	Turn-on delay time	$V_{DD} = 30\text{ V}; I_D = 2\text{ A};$	-	5	10	ns
$t_r$	Turn-on rise time	$V_{GS} = 10\text{ V}; R_{GS} = 50\text{ }\Omega;$	-	15	20	ns
$t_{doff}$	Turn-off delay time	$R_{GEN} = 50\text{ }\Omega$	-	15	20	ns
$t_f$	Turn-off fall time		-	7	15	ns
$t_{rr}$	Source-drain diode Reverse recovery time	$I_F = 2\text{ A}; -di_F/dt = 100\text{ A}/\mu\text{s};$	-	150	-	ns
$Q_{rr}$	Source-drain diode Reverse recovery charge	$V_{GS} = 0\text{ V}; V_R = 100\text{ V}$	-	1.5	-	$\mu\text{C}$

**MOUNTING INSTRUCTIONS**



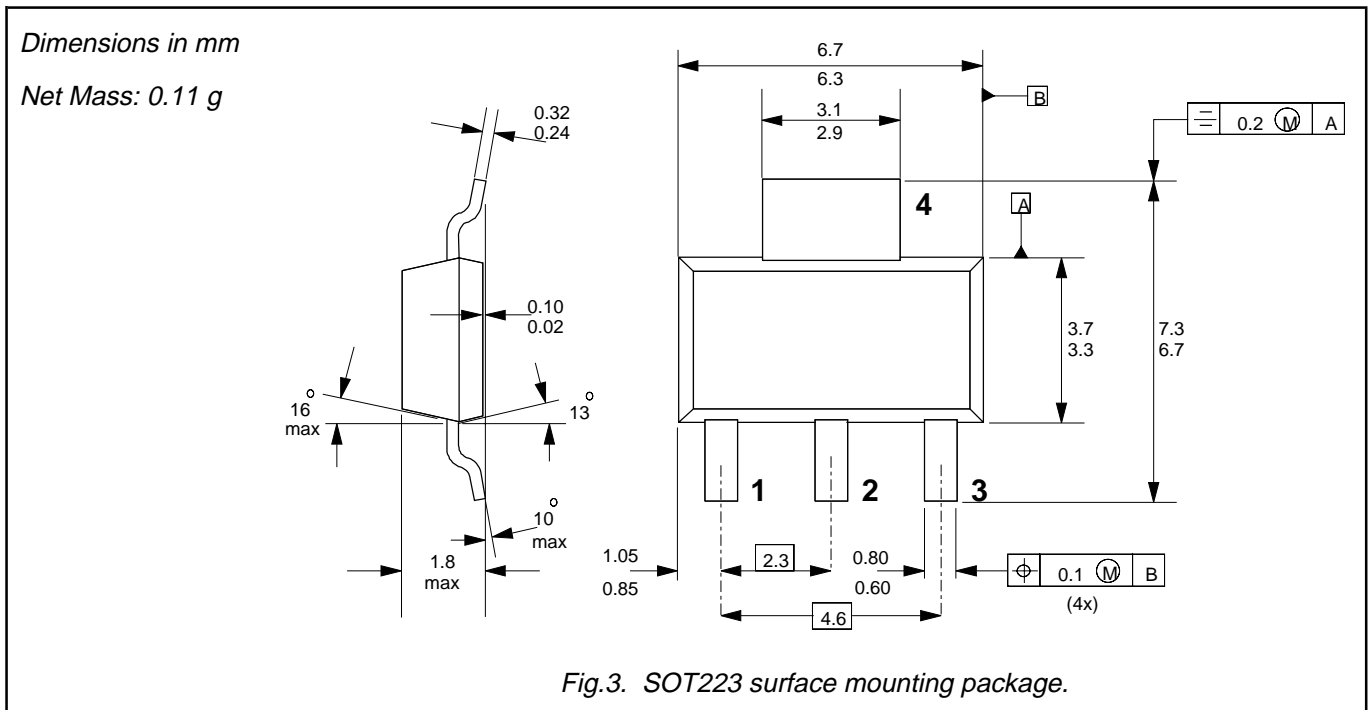
**PRINTED CIRCUIT BOARD**



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**MECHANICAL DATA**



**Notes**

1. Observe the general handling precautions for electrostatic-discharge sensitive devices (ESDs) to prevent damage to MOS gate oxide.
2. Refer to surface mounting instructions for SOT223 envelope.
3. Epoxy meets UL94 V0 at 1/8".

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**DEFINITIONS**

<b>Data sheet status</b>	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
<b>Limiting values</b>	
Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	
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