



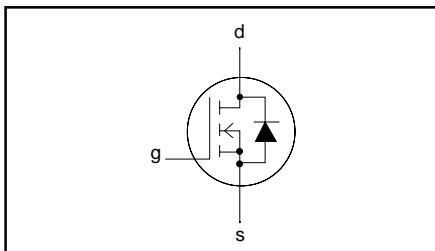
**N-channel TrenchMOS™ transistor**

**PSMN040-200W**

**FEATURES**

- 'Trench' technology
- Very low on-state resistance
- Fast switching
- Low thermal resistance

**SYMBOL**



**QUICK REFERENCE DATA**

$V_{DSS} = 200\text{ V}$
$I_D = 50\text{ A}$
$R_{DS(ON)} \leq 40\text{ m}\Omega$

**GENERAL DESCRIPTION**

SiliconMAX products use the latest Philips Trench technology to achieve the lowest possible on-state resistance in each package at each voltage rating.

**Applications:-**

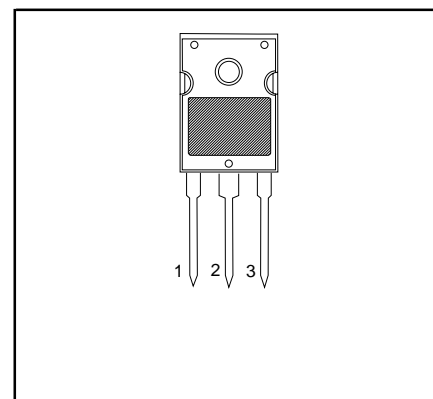
- d.c. to d.c. converters
- switched mode power supplies

The PSMN040-200W is supplied in the SOT429 (TO247) conventional leaded package.

**PINNING**

PIN	DESCRIPTION
1	gate
2	drain
3	source
tab	drain

**SOT429 (TO247)**



**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{DSS}$	Drain-source voltage	$T_j = 25\text{ }^\circ\text{C}$ to $175\text{ }^\circ\text{C}$	-	200	V
$V_{DGR}$	Drain-gate voltage	$T_j = 25\text{ }^\circ\text{C}$ to $175\text{ }^\circ\text{C}$ ; $R_{GS} = 20\text{ k}\Omega$	-	200	V
$V_{GS}$	Gate-source voltage		-	$\pm 20$	V
$I_D$	Continuous drain current	$T_{mb} = 25\text{ }^\circ\text{C}$	-	50	A
		$T_{mb} = 100\text{ }^\circ\text{C}$	-	36	A
$I_{DM}$	Pulsed drain current	$T_{mb} = 25\text{ }^\circ\text{C}$	-	200	A
$P_D$	Total power dissipation	$T_{mb} = 25\text{ }^\circ\text{C}$	-	300	W
$T_j, T_{stg}$	Operating junction and storage temperature		-55	175	$^\circ\text{C}$

**AVALANCHE ENERGY LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$E_{AS}$	Non-repetitive avalanche energy	Unclamped inductive load, $I_{AS} = 50\text{ A}$ ; $t_p = 100\text{ }\mu\text{s}$ ; $T_j$ prior to avalanche = $25\text{ }^\circ\text{C}$ ; $V_{DD} \leq 25\text{ V}$ ; $R_{GS} = 50\text{ }\Omega$ ; $V_{GS} = 10\text{ V}$ ; refer to fig.15	-	661	mJ
$I_{AS}$	Non-repetitive avalanche current		-	50	A

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N-channel TrenchMOS™ transistor

PSMN040-200W

**THERMAL RESISTANCES**

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Thermal resistance junction to mounting base		-	0.5	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	in free air	45	-	K/W

**ELECTRICAL CHARACTERISTICS** $T_j = 25^\circ\text{C}$  unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 0.25\text{ mA};$ $T_j = -55^\circ\text{C}$	200	-	-	V
$V_{GS(TO)}$	Gate threshold voltage	$V_{DS} = V_{GS}; I_D = 1\text{ mA}$ $T_j = 175^\circ\text{C}$	2.0	3.0	4.0	V
		$T_j = -55^\circ\text{C}$	1.0	-	-	V
$R_{DS(ON)}$	Drain-source on-state resistance	$V_{GS} = 10\text{ V}; I_D = 25\text{ A}$ $T_j = 175^\circ\text{C}$	-	35	40	m $\Omega$
$I_{GSS}$	Gate source leakage current	$V_{GS} = \pm 10\text{ V}; V_{DS} = 0\text{ V}$	-	2	100	nA
$I_{DSS}$	Zero gate voltage drain current	$V_{DS} = 200\text{ V}; V_{GS} = 0\text{ V};$ $T_j = 175^\circ\text{C}$	-	0.05	10	$\mu\text{A}$
			-	-	500	$\mu\text{A}$
$Q_{g(tot)}$	Total gate charge	$I_D = 50\text{ A}; V_{DD} = 160\text{ V}; V_{GS} = 10\text{ V}$	-	183	-	nC
$Q_{gs}$	Gate-source charge		-	40	-	nC
$Q_{gd}$	Gate-drain (Miller) charge		-	73	-	nC
$t_{d\ on}$	Turn-on delay time	$V_{DD} = 100\text{ V}; R_D = 3.9\ \Omega;$	-	43	-	ns
$t_r$	Turn-on rise time	$V_{GS} = 10\text{ V}; R_G = 5.6\ \Omega$	-	94	-	ns
$t_{d\ off}$	Turn-off delay time	Resistive load	-	230	-	ns
$t_f$	Turn-off fall time		-	92	-	ns
$L_d$	Internal drain inductance	Measured from tab to centre of die	-	3.5	-	nH
$L_d$	Internal drain inductance	Measured from drain lead to centre of die	-	4.5	-	nH
$L_s$	Internal source inductance	Measured from source lead to source bond pad	-	7.5	-	nH
$C_{iss}$	Input capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 25\text{ V}; f = 1\text{ MHz}$	-	9530	-	pF
$C_{oss}$	Output capacitance		-	732	-	pF
$C_{rss}$	Feedback capacitance		-	380	-	pF

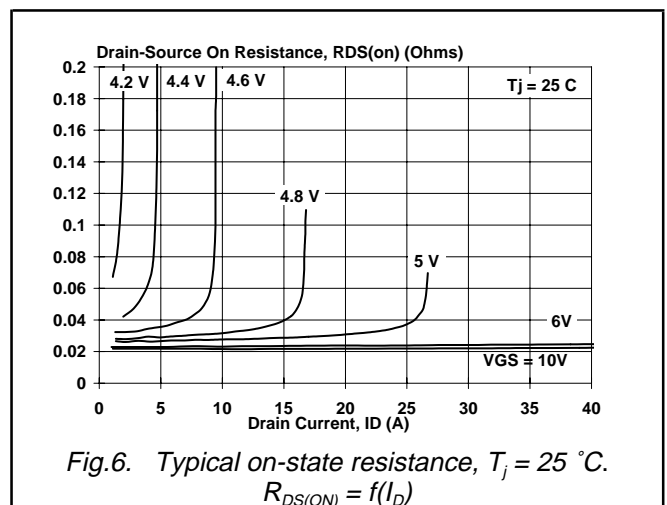
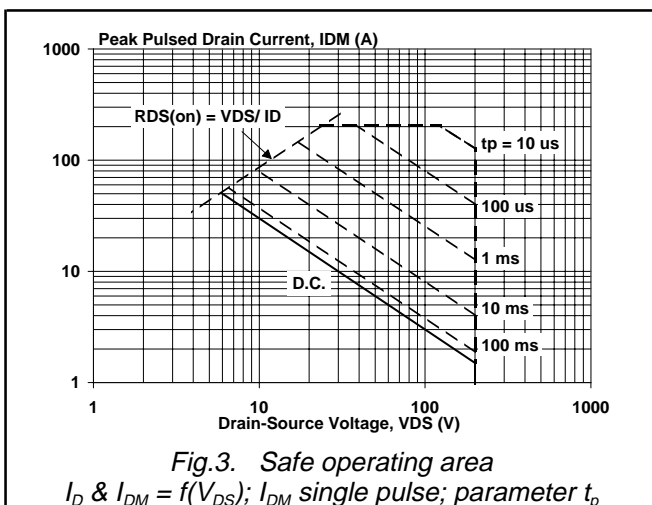
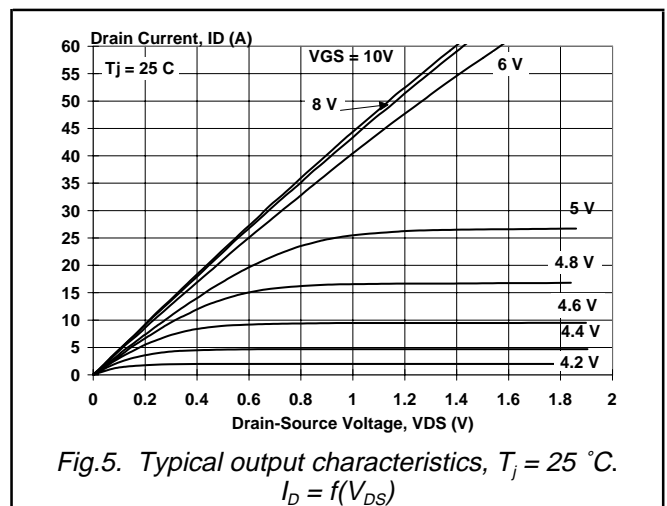
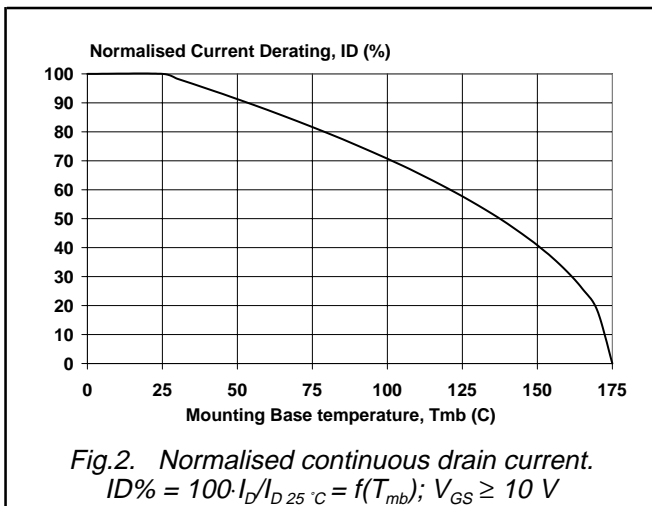
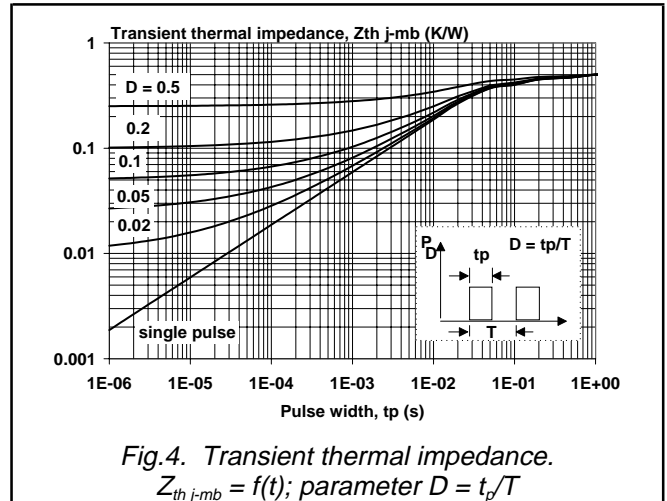
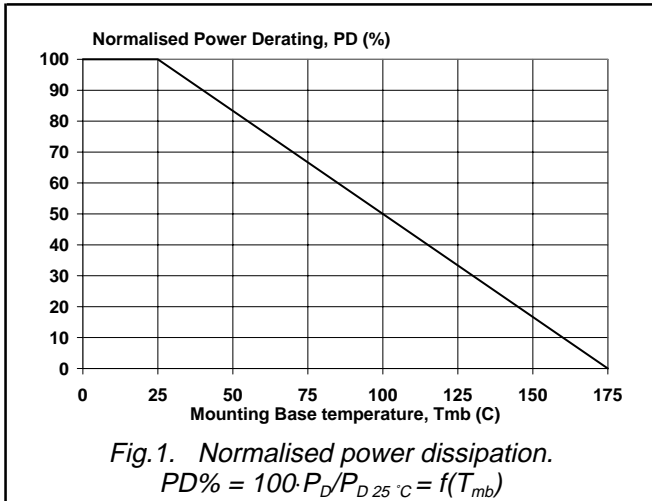
**REVERSE DIODE LIMITING VALUES AND CHARACTERISTICS** $T_j = 25^\circ\text{C}$  unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_S$	Continuous source current (body diode)		-	-	50	A
$I_{SM}$	Pulsed source current (body diode)		-	-	200	A
$V_{SD}$	Diode forward voltage	$I_F = 25\text{ A}; V_{GS} = 0\text{ V}$	-	0.85	1.2	V
$t_{rr}$	Reverse recovery time	$I_F = 20\text{ A}; -dI_F/dt = 100\text{ A}/\mu\text{s};$	-	160	-	ns
$Q_{rr}$	Reverse recovery charge	$V_{GS} = 0\text{ V}; V_R = 30\text{ V}$	-	1.4	-	$\mu\text{C}$



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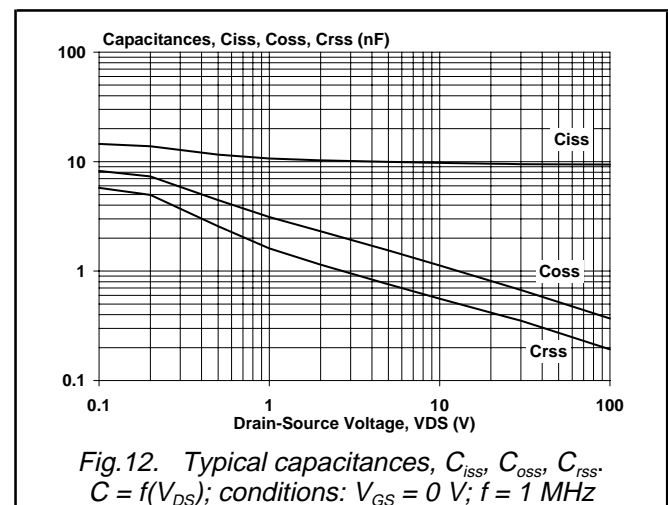
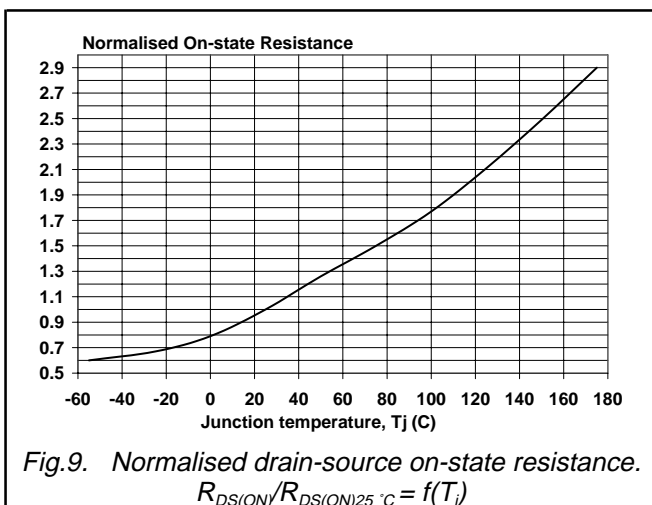
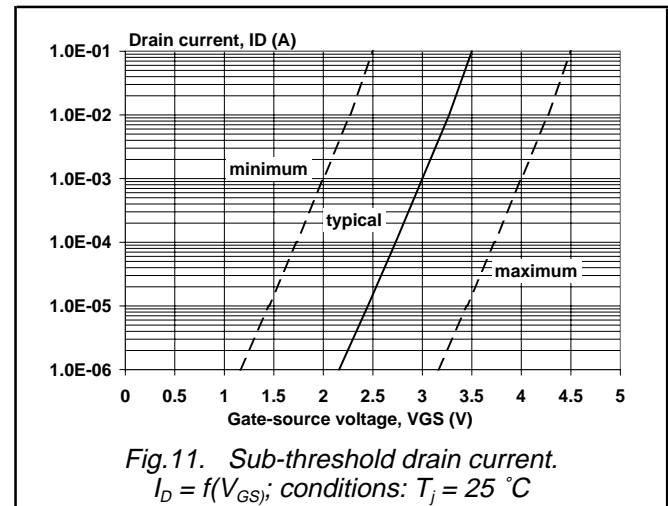
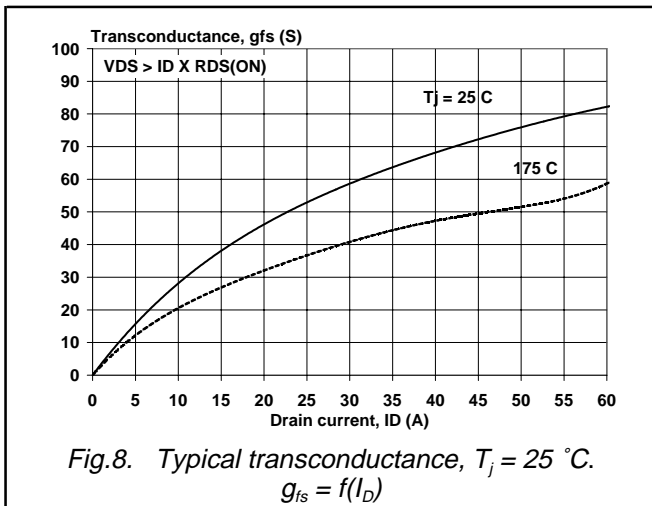
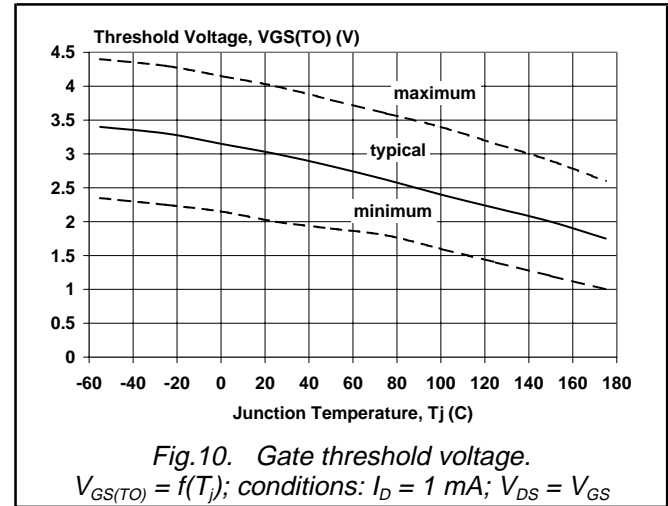
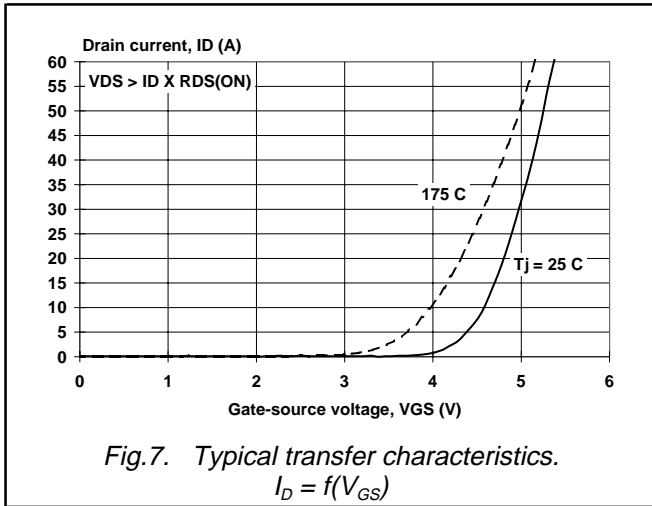
PSMN040-200W



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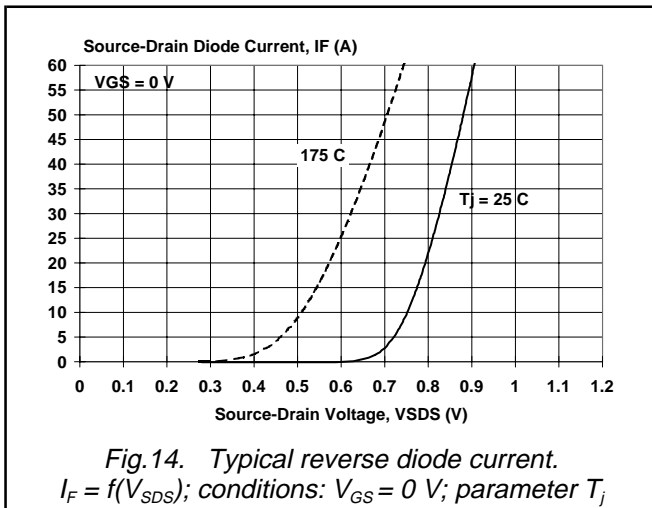
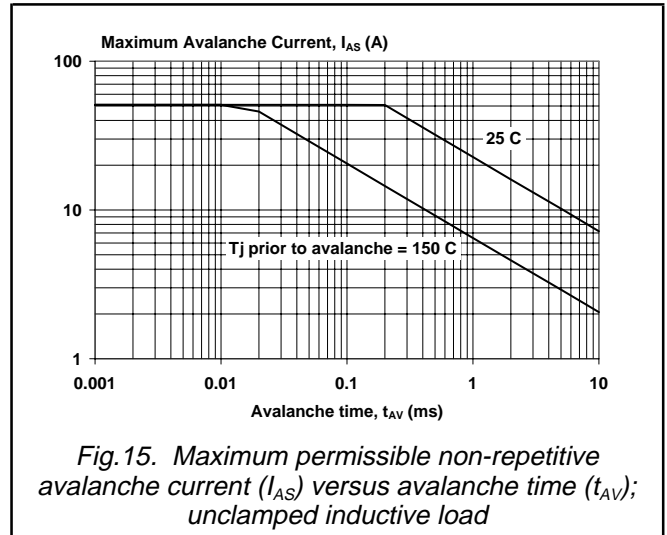
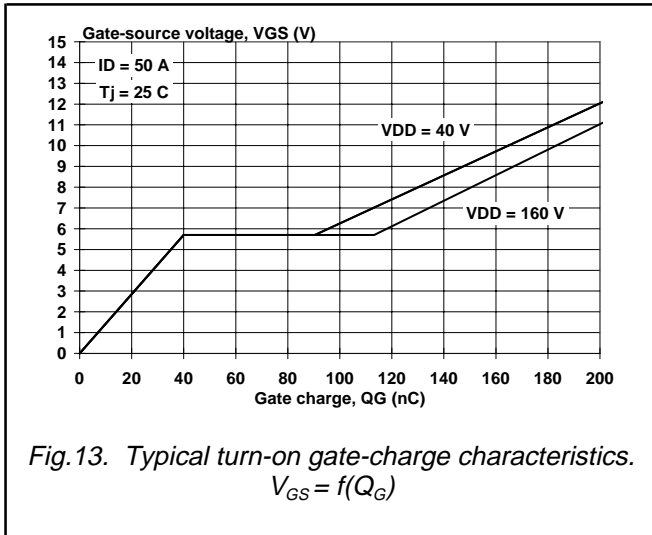
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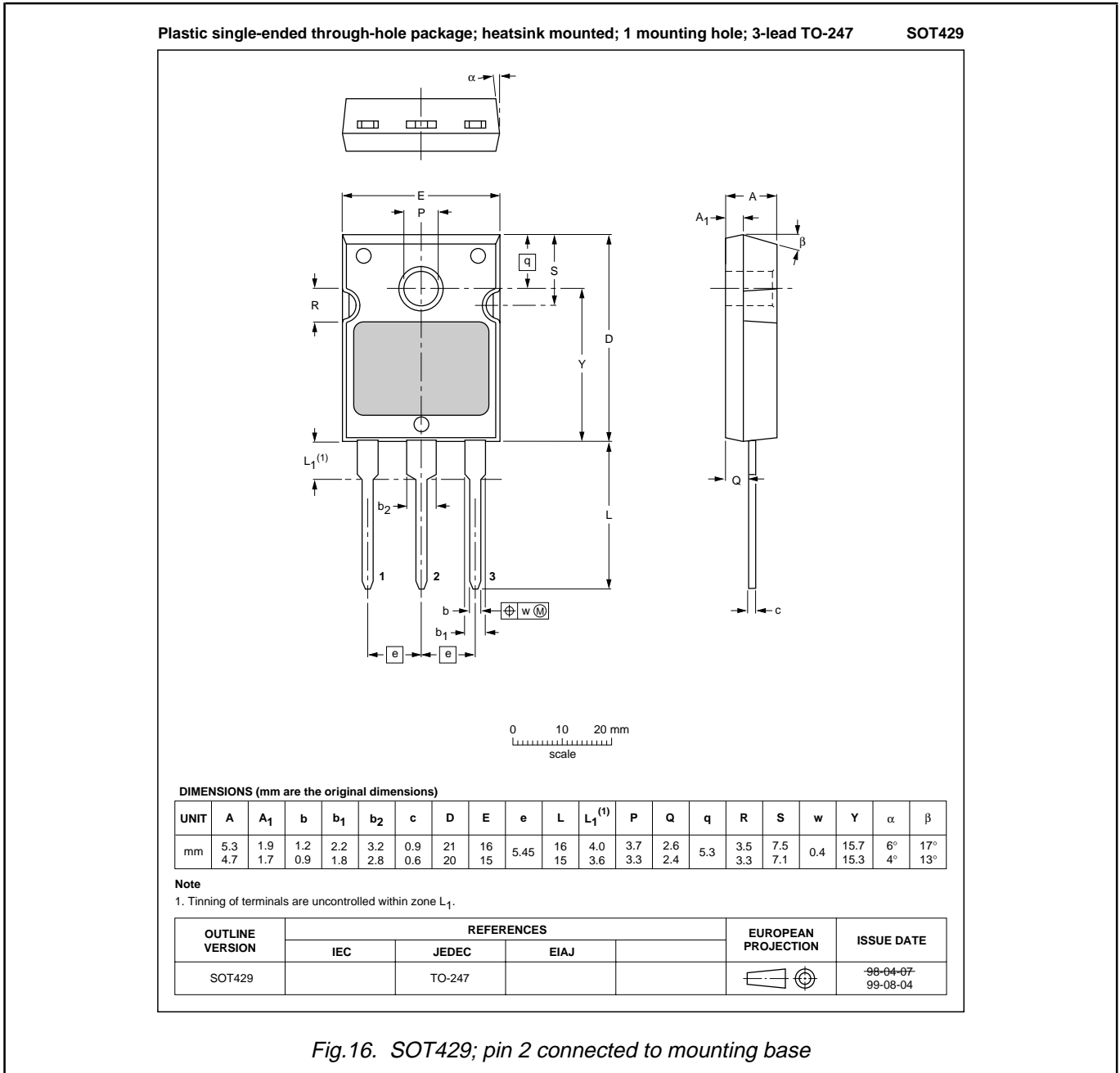




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PSMN040-200W

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 mounting instructions for SOT429 envelope.
3. Epoxy meets UL94 V0 at 1/8".



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PSMN040-200W

## 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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## LIFE SUPPORT APPLICATIONS

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