

## PowerMOS transistor

PHD10N10E

## GENERAL DESCRIPTION

N-channel enhancement mode field-effect power transistor in a plastic envelope suitable for surface mounting. The device is intended for use in Switched Mode Power Supplies (SMPS), motor control, welding, DC/DC and AC/DC converters, and in general purpose switching applications.

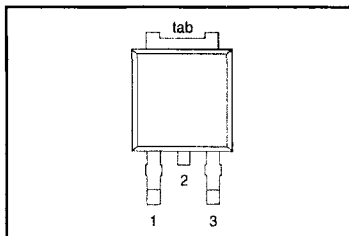
## QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
$V_{DS}$	Drain-source voltage	100	V
$I_D$	Drain current (DC)	11	A
$P_{tot}$	Total power dissipation	60	W
$T_j$	Junction temperature	175	°C
$R_{DS(ON)}$	Drain-source on-state resistance	0.25	Ω

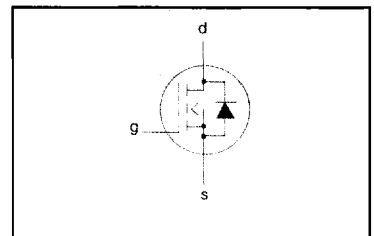
## PINNING - SOT428

PIN	DESCRIPTION
1	gate
2	drain
3	source
tab	drain

## 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	-	-	100	V
$V_{DGR}$	Drain-gate voltage	$R_{GS} = 20 \text{ k}\Omega$	-	100	V
$\pm V_{GS}$	Gate-source voltage	-	-	30	V
$I_D$	Drain current (DC)	$T_{mb} = 25 \text{ }^\circ\text{C}$	-	11	A
$I_D$	Drain current (DC)	$T_{mb} = 100 \text{ }^\circ\text{C}$	-	7.7	A
$I_{DM}$	Drain current (pulse peak value)	$T_{mb} = 25 \text{ }^\circ\text{C}$	-	44	A
$P_{tot}$	Total power dissipation	$T_{mb} = 25 \text{ }^\circ\text{C}$	-	60	W
$T_{stg}$	Storage temperature	-	-55	175	°C
$T_j$	Junction Temperature	-	-	175	°C

## THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$R_{th\ j-mb}$	Thermal resistance junction to mounting base	-	-	2.5	K/W
$R_{th\ j-a}$	Thermal resistance junction to ambient	pcb mounted, minimum footprint	50	-	K/W

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0\text{ V}; I_D = 0.25\text{ mA}$	100	-	-	V
$V_{GS(TO)}$	Gate threshold voltage	$V_{DS} = V_{GS}; I_D = 1\text{ mA}$	2.1	3.0	4.0	V
$I_{DSS}$	Zero gate voltage drain current	$V_{DS} = 100\text{ V}; V_{GS} = 0\text{ V}; T_j = 25\text{ }^\circ\text{C}$	-	1	10	$\mu\text{A}$
$I_{DSS}$	Zero gate voltage drain current	$V_{DS} = 100\text{ V}; V_{GS} = 0\text{ V}; T_j = 125\text{ }^\circ\text{C}$	-	0.1	1.0	mA
$I_{GSS}$	Gate source leakage current	$V_{GS} = \pm 30\text{ V}; V_{DS} = 0\text{ V}$	-	10	100	nA
$R_{DS(ON)}$	Drain-source on-state resistance	$V_{GS} = 10\text{ V}; I_D = 5.5\text{ A}$	-	0.22	0.25	$\Omega$

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$g_{fs}$	Forward transconductance	$V_{DS} = 25\text{ V}; I_D = 5.5\text{ A}$	3	4.2	-	S
$C_{iss}$	Input capacitance	$V_{GS} = 0\text{ V}; V_{DS} = 25\text{ V}; f = 1\text{ MHz}$	-	400	500	pF
$C_{oss}$	Output capacitance		-	90	120	pF
$C_{rss}$	Feedback capacitance		-	35	50	pF
$t_{d\text{on}}$	Turn-on delay time	$V_{DD} = 30\text{ V}; I_D = 3\text{ A};$	-	9	14	ns
$t_r$	Turn-on rise time	$V_{GS} = 10\text{ V}; R_{GS} = 50\text{ }\Omega;$	-	25	40	ns
$t_{d\text{off}}$	Turn-off delay time	$R_{gen} = 50\text{ }\Omega$	-	30	45	ns
$t_f$	Turn-off fall time		-	20	40	ns
$L_d$	Internal drain inductance	Measured from tab to centre of die	-	4.5	-	nH
$L_s$	Internal source inductance	Measured from source lead solder point to source bond pad	-	7.5	-	nH

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

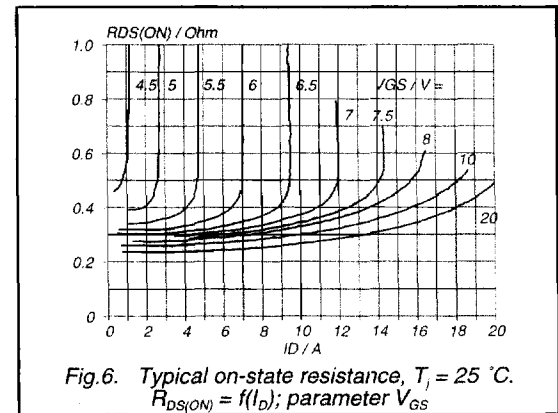
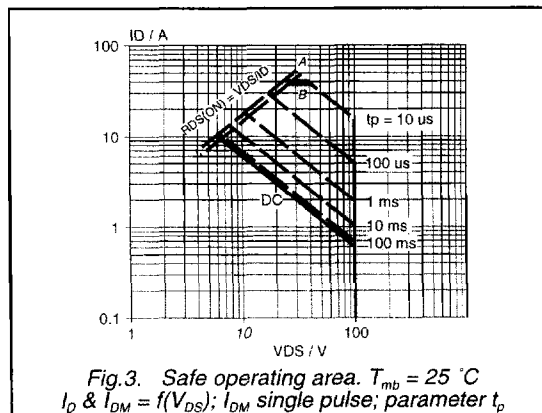
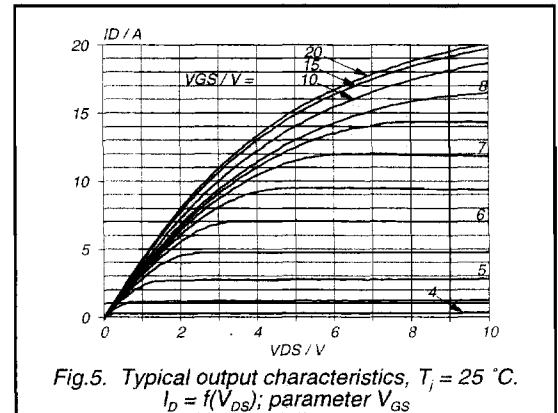
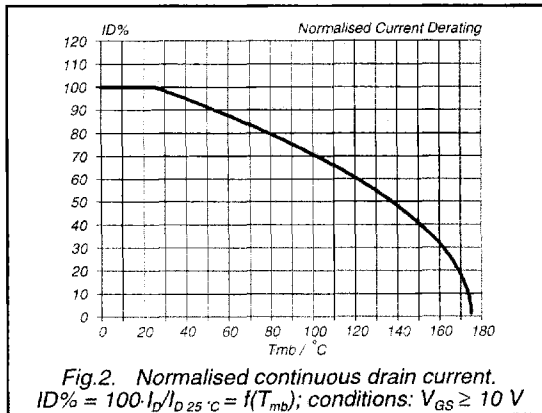
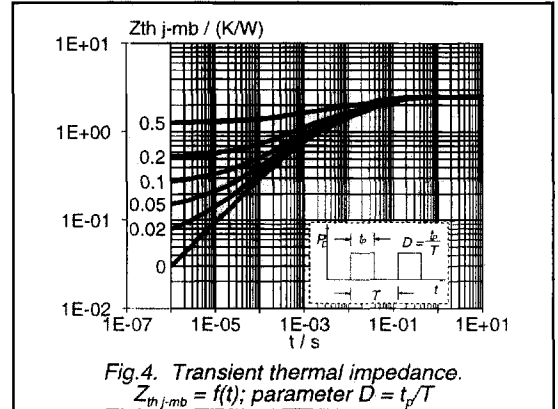
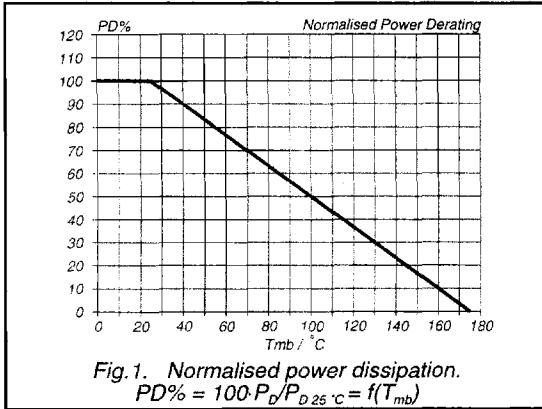
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{DR}$	Continuous reverse drain current	-	-	-	11	A
$I_{DRM}$	Pulsed reverse drain current	-	-	-	44	A
$V_{SD}$	Diode forward voltage	$I_F = 11\text{ A}; V_{GS} = 0\text{ V}$	-	1.2	1.5	V
$t_{rr}$	Reverse recovery time	$I_F = 11\text{ A}; -di_F/dt = 100\text{ A}/\mu\text{s};$	-	90	-	ns
$Q_{rr}$	Reverse recovery charge	$V_{GS} = 0\text{ V}; V_R = 30\text{ V}$	-	0.35	-	$\mu\text{C}$

**AVALANCHE LIMITING VALUE** $T_{mb} = 25\text{ }^\circ\text{C}$  unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$W_{DSS}$	Drain-source non-repetitive unclamped inductive turn-off energy	$I_D = 11\text{ A}; V_{DD} \leq 50\text{ V};$ $V_{GS} = 10\text{ V}; R_{GS} = 50\text{ }\Omega$	-	-	35	mJ

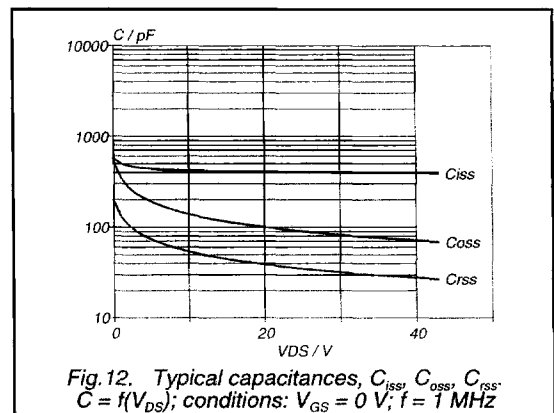
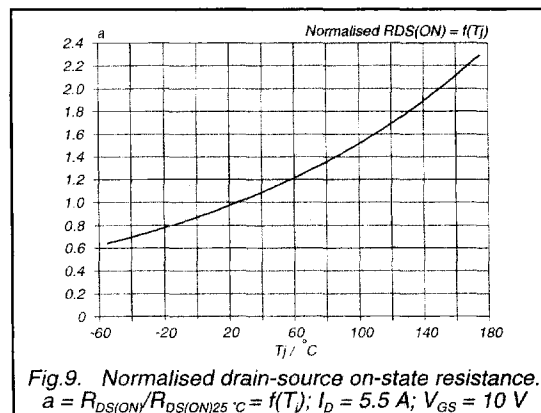
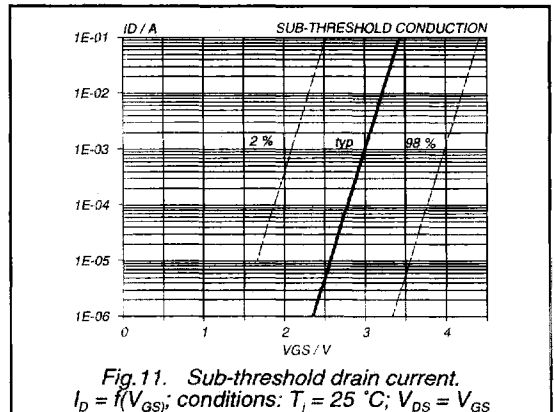
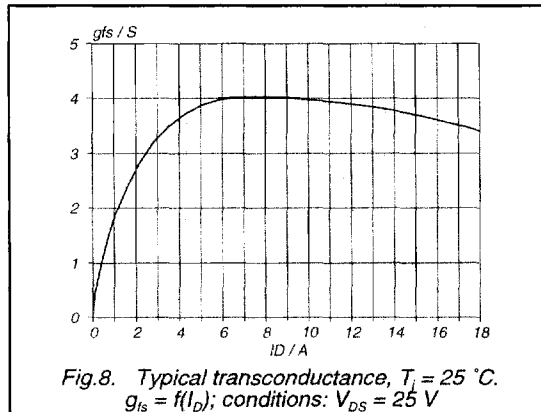
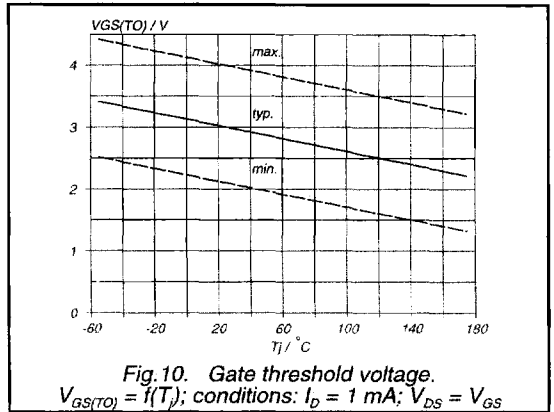
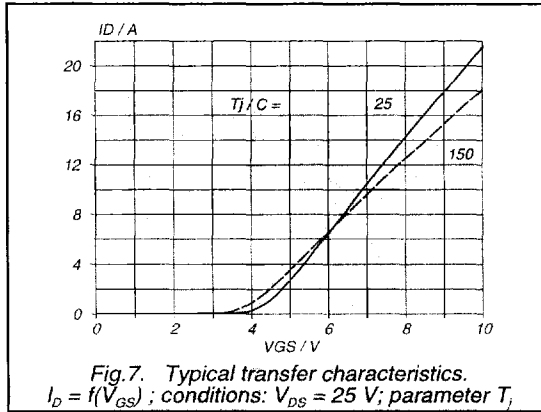
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