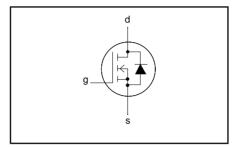
PHX6NA60E

FEATURES

- Repetitive Avalanche Rated
- Fast switching
- · Low feedback capacitance
- Stable off-state characteristics
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

$$V_{DSS}$$
 = 600 V I_{D} = 3.9 A $R_{DS(ON)} \le 1.2 \Omega$

GENERAL DESCRIPTION

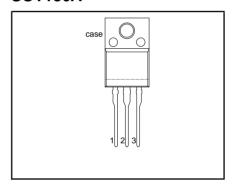
N-channel, enhancement mode field-effect power transistor, intended for use in off-line switched mode power supplies, T.V. and computer monitor power supplies, d.c. to d.c. converters, motor control circuits and general purpose switching applications.

The PHX6NA60E is supplied in the SOT186A full pack, isolated package.

PINNING

PIN DESCRIPTION	
1	gate
2	drain
3	source
case	isolated

SOT186A



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V _{DSS}	Drain-source voltage	$T_i = 25 ^{\circ}\text{C} \text{ to } 150 ^{\circ}\text{C}$	-	600	V
V _{DGR}	Drain-gate voltage	$T_i = 25 ^{\circ}\text{C}$ to 150 $^{\circ}\text{C}$; $R_{GS} = 20 \text{k}\Omega$	-	600	V
V _{GS}	Gate-source voltage	, , , , , , , , , , , , , , , , , , , ,	-	± 30	V
I _D	Continuous drain current	$T_{hs} = 25 ^{\circ}C; V_{GS} = 10 V$ $T_{hs} = 100 ^{\circ}C; V_{GS} = 10 V$	-	3.9	Α
		T_{hs}^{ii} = 100 °C; V_{GS}^{i} = 10 V	-	2.6	Α
I _{DM}	Pulsed drain current	$T_{hs} = 25 ^{\circ}C$ $T_{hs} = 25 ^{\circ}C$	-	26	Α
P _D	Total dissipation	$T_{hs}^{m} = 25 ^{\circ}C$	-	45	W
$\left \begin{array}{c} \mathbf{I}_{DM} \\ \mathbf{P}_{D} \\ \mathbf{T}_{j}, \mathbf{T}_{stg} \end{array} \right $	Operating junction and		- 55	150	°C
, olg	storage temperature range				

AVALANCHE ENERGY LIMITING VALUES

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

		, , ,			
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
E _{AS}	Single pulse avalanche energy	Unclamped inductive load, ID = 6.5A; $V_{DD} \le 50 \text{ V}$; starting $T_j = 25^{\circ}\text{C}$; $R_{GS} = 50 \Omega$; $V_{GS} = 10 \text{ V}$	-	570	mJ
	Repetitive avalanche energy ¹ Avalanche current		- -	9.5 6.5	mJ A

¹ pulse width and repetition rate limited by T_i max.

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ISOLATION LIMITING VALUE & CHARACTERISTIC

T_{hs} = 25 °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V _{isol}	R.M.S. isolation voltage from all three terminals to external heatsink	f = 50-60 Hz; sinusoidal waveform; R.H. ≤ 65%; clean and dustfree	-		2500	V
C _{isol}	Capacitance from T2 to external heatsink	f = 1 MHz	-	10	-	pF

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
R _{th j-hs}	Thermal resistance junction to heatsink	with heatsink compound	-	-	2.78	K/W
R _{th j-a}	Thermal resistance junction to ambient		-	60	-	K/W

ELECTRICAL CHARACTERISTICS

T_i = 25 °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
$\Delta V_{(BR)DSS} / \Delta T_j$	Drain-source breakdown voltage temperature coefficient	$V_{DS} = V_{GS}$; $I_D = 0.25 \text{ mA}$	-	0.1	-	%/K
$V_{GS(TO)}$	Drain-source on resistance Gate threshold voltage	$V_{GS} = 10 \text{ V}; I_{D} = 3.25 \text{ A}$ $V_{DS} = V_{GS}; I_{D} = 0.25 \text{ mA}$	- 2.0	- 3.0	1.2 4.0	$_{V}^{\Omega}$
g _{fs}	Forward transconductance Drain-source leakage current	$V_{DS} = 30 \text{ V}; I_{D} = 3.25 \text{ A}$ $V_{DS} = 600 \text{ V}; V_{GS} = 0 \text{ V}$	3 -	4.5 2	- 100	S μA
I _{GSS}	Gate-source leakage current	$V_{DS} = 480 \text{ V}; V_{GS} = 0 \text{ V}; T_j = 125 ^{\circ}\text{C}$ $V_{GS} = \pm 30 \text{ V}; V_{DS} = 0 \text{ V}$	- -	50 10	500 200	μA nA
$\begin{matrix} Q_{g(tot)} \\ Q_{gs} \\ Q_{gd} \end{matrix}$	Total gate charge Gate-source charge Gate-drain (Miller) charge	$I_D = 6.5 \text{ A}; V_{DD} = 480 \text{ V}; V_{GS} = 10 \text{ V}$	- - -	7 23	75 - -	nC nC n
$\begin{array}{c} t_{\text{d(on)}} \\ t_{\text{r}} \\ t_{\text{d(off)}} \\ t_{\text{f}} \end{array}$	Turn-on delay time Turn-on rise time Turn-off delay time Turn-off fall time	$V_{DD} = 300 \text{ V}; R_D = 56 \Omega;$ $R_G = 9.1 \Omega$			50 125 110 30	ns ns ns ns
L _d L _s	Internal drain inductance Internal source inductance	Measured from drain lead to centre of die Measured from source lead to source bond pad	-	3.5 7.5	-	nH nH
C _{iss} C _{oss} C _{rss}	Input capacitance Output capacitance Feedback capacitance	$V_{GS} = 0 \text{ V}; V_{DS} = 25 \text{ V}; f = 1 \text{ MHz}$	- - -	- 140 40	1550 - -	pF pF pF

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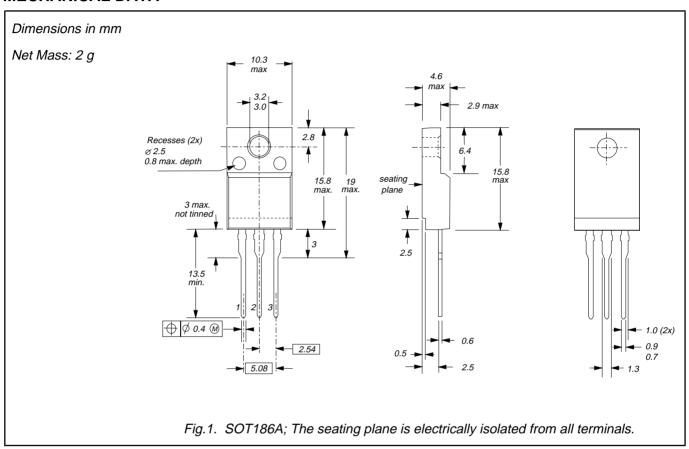
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

 $T_i = 25$ °C unless otherwise specified

	·					
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Is	Continuous source current (body diode)	$T_{hs} = 25^{\circ}C$	-	-	6.5	Α
I _{SM}		$T_{hs} = 25^{\circ}C$	-	-	26	Α
V_{SD}	Diode forward voltage	$I_{S} = 6.5 \text{ A}; V_{GS} = 0 \text{ V}$	-	-	1.2	V
t _{rr} Q _{rr}	Reverse recovery time Reverse recovery charge	$I_S = 6.5 \text{ A}; V_{GS} = 0 \text{ V}; \text{ dI/dt} = 100 \text{ A/}\mu\text{s}$	1 1	530 6.7		ns μC

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MECHANICAL DATA



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

PHX6NA60E

DEFINITIONS

Data sheet status				
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.			
Limiting values				

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.

Application information

Where application information is given, it is advisory and does not form part of the specification.

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