#### **Philips Semiconductors**

**Product specification** 

#### P-channel enhancement mode MOS transistor

# **PHK04P02T**

#### **FEATURES**

- Very low threshold voltage
- Fast switching
- Logic level compatible
- Surface mount package



DESCRIPTION

# QUICK REFERENCE DATA



SOT96-1

#### **GENERAL DESCRIPTION**

P-channel, enhancement mode, logic level, field-effect power transistor. This device has low threshold voltage and extremely fast switching making it ideal for battery powered applications and high speed digital interfacing.

The PHK04P02T is supplied in the SOT96-1 (SO8) surface mounting package.

#### LIMITING VALUES

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Vns	Drain-source voltage	1001. OM.T	-	-16	V
	Drain-gate voltage	$R_{GS} = 20 \text{ k}\Omega$	W - W	-16	V
V <sub>GS</sub>	Gate-source voltage	COM.		± 8	$-\mathbf{C}\mathbf{V}^{\prime}$
n	Drain current (DC)	$T_{sp} = 25 \degree C$	$\mathcal{T}^{\mathcal{W}} = \mathcal{W}$	-4.66	Α
-	WWW.IC ONLOW	$T_{sp}^{op} = 100 \ ^{\circ}C$	7 - 177	-1.87	A
М	Drain current (pulse peak value)	$T_{sp}^{op} = 25 \text{°C}$	A.L	-26.4	A
o tot	Total power dissipation	$T_{sp}^{op} = 25 \text{°C}$	- 177	5.0	W
	WW.100 COM.	$T_{sp}^{op} = 100 \ ^{\circ}C$	NI -	2.0	W
<sub>sta</sub> , T <sub>i</sub>	Storage & operating temperature	1001.	- 55	150	°C

# THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$R_{thj-sp}$	Thermal resistance junction to solder point	mounted on metal clad substrate.	25	E.W.	K/W

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PINNING

PIN

1,2,3

4

5,6,7,8

source

gate

drain

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# **ELECTRICAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V <sub>(BR)DSS</sub>	Drain-source breakdown voltage	$V_{GS} = 0 \text{ V}; \text{ I}_{D} = -10 \mu\text{A}$	-16	-	-	V
V <sub>GS(TO)</sub>	Gate threshold voltage	$V_{DS} = V_{GS}; I_D = -1 \text{ mA}$	-0.4	-0.6	-	V
R <sub>DS(ON)</sub> g <sub>fs</sub> I <sub>GSS</sub> I <sub>DSS</sub>	Drain-source on-state resistance Forward transconductance Gate source leakage current Zero gate voltage drain current	$V_{GS} = -4.5 \text{ V}; I_D = -1 \text{ A}$ $V_{GS} = -2.5 \text{ V}; I_D = -1 \text{ A}$ $V_{GS} = -1.8 \text{ V}; I_D = -0.5 \text{ A}$ $V_{GS} = -2.5 \text{ V}; I_D = -1 \text{ A}; T_j = 150^{\circ}\text{C}$ $V_{DS} = -12.8 \text{ V}; I_D = -1 \text{ A}$ $V_{GS} = \pm 8 \text{ V}; V_{DS} = 0 \text{ V}$ $V_{DS} = -12.8 \text{ V}; V_{GS} = 0 \text{ V};$ $T_j = 150^{\circ}\text{C}$	1.5	80 117 140 175 4.5 ±10 -50 -13	120 150 180 230 - ±100 -100 -100	v mΩ mΩ mΩ S nA nA μA
Q <sub>g(tot)</sub> Q <sub>gs</sub> Q <sub>gd</sub>	Total gate charge Gate-source charge Gate-drain (Miller) charge	$I_{D} = -1 \text{ A}; V_{DD} = -10 \text{ V}; V_{GS} = -4.5 \text{ V}$	100X.	7.2 1.7 1.83	TN TN	nC nC nC
t <sub>d on</sub> t <sub>r</sub> t <sub>d off</sub> t <sub>f</sub>	Turn-on delay time Turn-on rise time Turn-off delay time Turn-off fall time		N.100 N.10	2 4.5 45 20	M.TW	ns ns ns ns
C <sub>iss</sub> C <sub>oss</sub> C <sub>rss</sub>	Input capacitance Output capacitance Feedback capacitance	V <sub>GS</sub> = 0 V; V <sub>DS</sub> = -12.8 V; f = 1 MHz	NNN.	528 200 57	CO <sub>W</sub>	pF pF pF

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#### **REVERSE DIODE LIMITING VALUES AND CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX.	UNIT
I <sub>DR</sub>	Continuous reverse drain current	$T_{sp} = 25 \ ^{\circ}C, t \le 5 \ s$		NN N	-4.66	A
I <sub>DRM</sub> V <sub>SD</sub>	Pulsed reverse drain current Diode forward voltage	I <sub>F</sub> = -0.62 A; V <sub>GS</sub> = 0 V	N - N -	- -0.62	-26 -1.3	AV
t <sub>rr</sub> Q <sub>rr</sub>	Reverse recovery time Reverse recovery charge	$I_F = -0.5 \text{ A}; -dI_F/dt = 100 \text{ A}/\mu\text{s};$ $V_{GS} = 0 \text{ V}; V_R = -12.8 \text{ V}$	TN	75 69	W.10	ns nC

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# **MECHANICAL DATA**



#### Notes

- 1. This product is supplied in anti-static packaging. The gate-source input must be protected against static discharge during transport or handling.
- 2. Refer to Integrated Circuit Packages, Data Handbook IC26.
- 3. Epoxy meets UL94 V0 at 1/8".

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Product specification

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#### DEFINITIONS

DATA SHEET STATUS				
DATA SHEET STATUS <sup>1</sup>	PRODUCT STATUS <sup>2</sup>	DEFINITIONS		
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 withour 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		

#### 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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