

#### Important notice

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If you have any questions related to the data sheet, please contact our nearest sales office via e-mail or telephone (details via **salesaddresses@nexperia.com**). Thank you for your cooperation and understanding,

Kind regards,

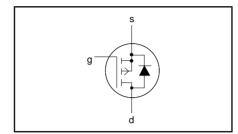
Team Nexperia

**BSH202** 

### **FEATURES**

- Low threshold voltage
- Fast switching
- Logic level compatible
- Subminiature surface mount package

### SYMBOL



### **QUICK REFERENCE DATA**

$$V_{DS} = -30 \text{ V}$$
 
$$I_{D} = -0.52 \text{ A}$$
 
$$R_{DS(ON)} \le 0.9 \Omega \text{ (V}_{GS} = -10 \text{ V)}$$

### **GENERAL DESCRIPTION**

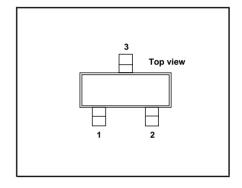
P-channel, enhancement mode, logic level, field-effect power transistor. This device has low threshold voltage and extremely fast switching making it ideal for battery powered applications and high speed digital interfacing.

The BSH202 is supplied in the SOT23 subminiature surface mounting package.

### **PINNING**

PIN	DESCRIPTION	
1	gate	
2	source	
3	drain	

### SOT23



### **LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{DS}$	Drain-source voltage		-	-30	V
$V_{DGR}$	Drain-gate voltage	$R_{GS} = 20 \text{ k}\Omega$	-	-30	V
$V_{GS}$	Gate-source voltage		-	± 20	V
I <sub>D</sub>	Drain current (DC)	$T_a = 25 ^{\circ}C$	-	-0.52	Α
		T <sub>a</sub> = 100 °C	-	-0.33	Α
I <sub>DM</sub>	Drain current (pulse peak value)	$T_a = 25 ^{\circ}C$	-	-2.1	Α
P <sub>tot</sub>	Total power dissipation	$T_a = 25 ^{\circ}C$	-	0.417	W
		T <sub>a</sub> = 100 °C	-	0.17	W
$T_{stg}, T_{j}$	Storage & operating temperature		- 55	150	°C

### THERMAL RESISTANCES

SYMBOL PARAMETER		CONDITIONS	TYP.	MAX.	UNIT
R <sub>th j-a</sub>	Thermal resistance junction to ambient	FR4 board, minimum footprint	300	-	K/W

Philips Semiconductors Product specification

# P-channel enhancement mode MOS transistor

**BSH202** 

### **ELECTRICAL CHARACTERISTICS**

T<sub>i</sub>= 25°C unless otherwise specified

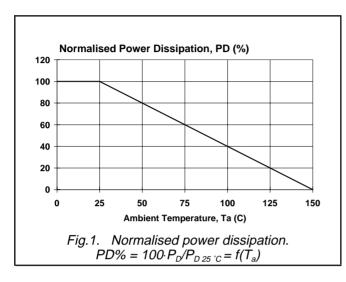
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0 \text{ V}; I_{D} = -10 \mu\text{A}$	-30	-	1	V
$V_{GS(TO)}$	Gate threshold voltage	$V_{DS} = V_{GS}$ ; $I_{D} = -1$ mA	-1	-1.9	-	V
		$T_j = 150^{\circ}C$	-0.4	-	-	V
R <sub>DS(ON)</sub>	Drain-source on-state	$V_{GS} = -10 \text{ V}; I_D = -280 \text{ mA}$	-	0.63	0.9	Ω
	resistance	$V_{GS} = -4.5 \text{ V}; I_D = -140 \text{ mA}$	-	0.89	1.35	Ω
		$V_{GS} = -10 \text{ V}; I_D = -280 \text{ mA}; T_j = 150^{\circ}\text{C}$	-	0.95	1.35	Ω
$g_{fs}$	Forward transconductance	$V_{DS} = -24 \text{ V}; I_{D} = -280 \text{ mA}$	0.2	0.7	-	S
GSS	Gate source leakage current	$V_{GS} = \pm 20 \text{ V}; V_{DS} = 0 \text{ V}$	-	±10	±100	nA
I <sub>DSS</sub>	Zero gate voltage drain	$V_{DS} = -24 \text{ V}; V_{GS} = 0 \text{ V};$	-	-50	-100	nA
	current	$T_j = 150^{\circ}C$	-	-0.4	-10	μΑ
$Q_{g(tot)}$	Total gate charge	$I_D = -0.3 \text{ A}; V_{DD} = -15 \text{ V}; V_{GS} = -10 \text{ V}$	-	2.9	-	nC
Q <sub>gs</sub>	Gate-source charge		-	0.4	-	nC
$Q_{gd}^{s}$	Gate-drain (Miller) charge		-	0.5	-	nC
t <sub>d on</sub>	Turn-on delay time	$V_{DD} = -15 \text{ V}; I_{D} = -0.5 \text{ A};$	-	2	-	ns
t <sub>r</sub>	Turn-on rise time	$V_{GS} = -10 \text{ V}; R_G = 6 \Omega$	-	4.5	-	ns
t <sub>d off</sub>	Turn-off delay time	Resistive load	-	45	-	ns
t <sub>f</sub>	Turn-off fall time		-	20	-	ns
C <sub>iss</sub>	Input capacitance	$V_{GS} = 0 \text{ V}; V_{DS} = -24 \text{ V}; f = 1 \text{ MHz}$	-	80	-	рF
Coss	Output capacitance		-	27	-	pF
C <sub>rss</sub>	Feedback capacitance		-	9	-	рF

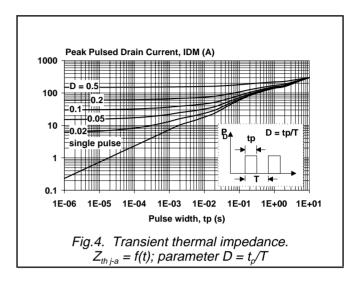
### **REVERSE DIODE LIMITING VALUES AND CHARACTERISTICS**

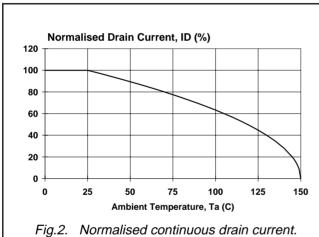
 $T_i = 25^{\circ}C$  unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I <sub>DR</sub>	Continuous reverse drain current	T <sub>a</sub> = 25 °C	-	-	-0.56	Α
$oldsymbol{I_{DRM}}{V_{SD}}$	Pulsed reverse drain current Diode forward voltage	$I_F = -0.5 \text{ A}; V_{GS} = 0 \text{ V}$	-	- -0.87	-2.2 -1.3	A V
t <sub>rr</sub> Q <sub>rr</sub>	Reverse recovery time Reverse recovery charge	$I_F = -0.5 \text{ A}; -dI_F/dt = 100 \text{ A/}\mu\text{s}; V_{GS} = 0 \text{ V}; V_R = -24 \text{ V}$	-	30 28	1 1	ns nC

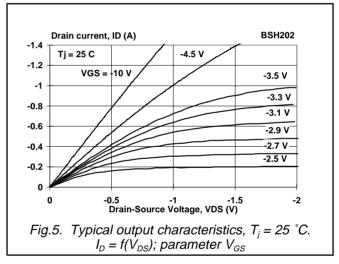
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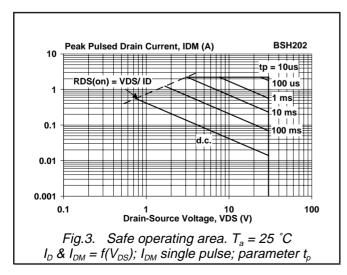




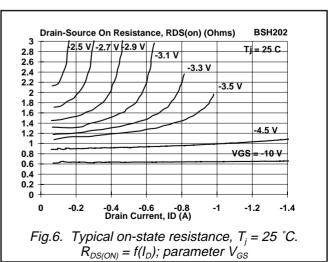


 $ID\% = 100 \cdot I_D/I_{D.25 \, ^{\circ}C} = f(T_a)$ ; conditions:  $V_{GS} \le -10 \, V$ 





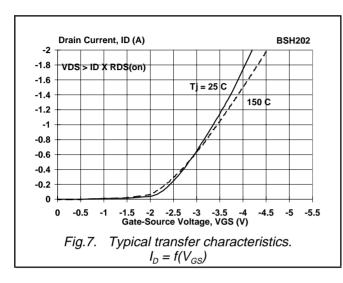
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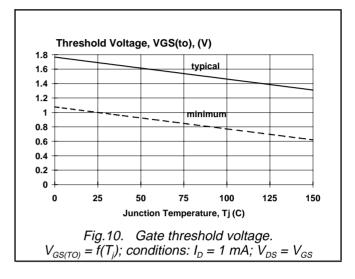


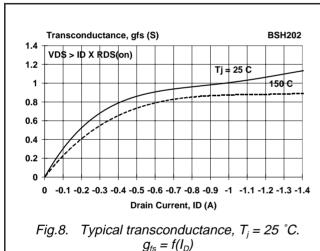
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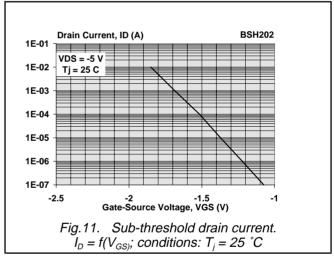
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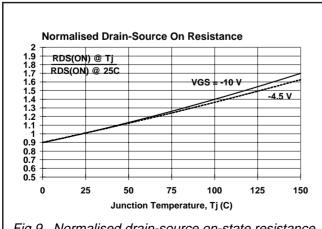
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Capacitances, Ciss, Coss, Crss (pF)

BSH202

1000

Ciss

Coss

Coss

Coss

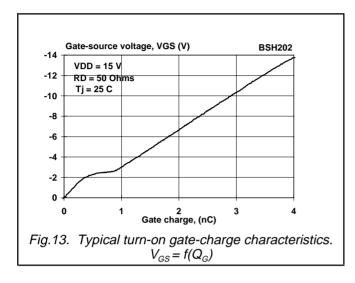
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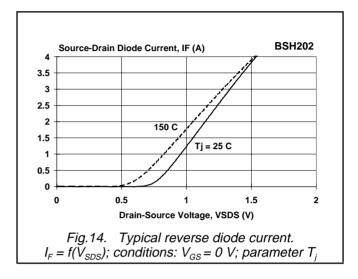
Prain-Source Voltage, VDS (V)

Fig. 12. Typical capacitances,  $C_{iss}$ ,  $C_{oss}$ ,  $C_{rss}$ .  $C = f(V_{DS})$ ; conditions:  $V_{GS} = 0$  V; f = 1 MHz

Fig.9. Normalised drain-source on-state resistance.  $R_{DS(ON)}/R_{DS(ON)25}$   $C = f(T_i)$ 

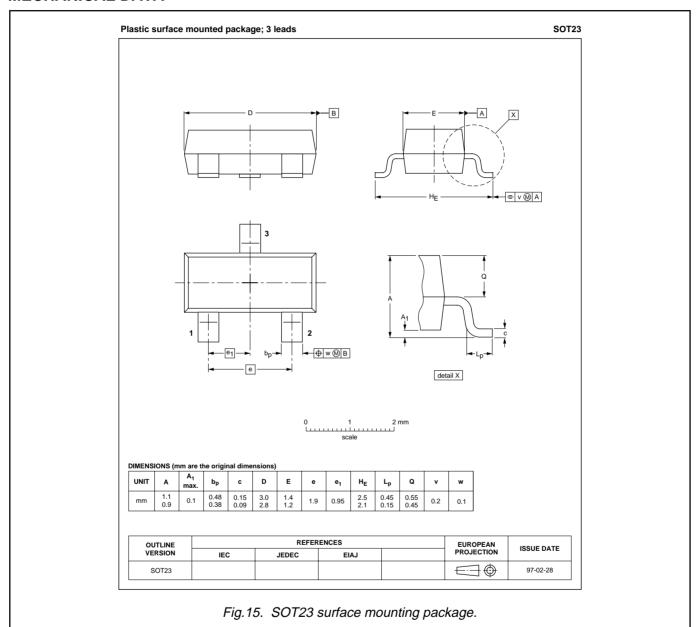
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**BSH202** 

### **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 SMD Footprint Design and Soldering Guidelines, Data Handbook SC18.
- 3. Epoxy meets UL94 V0 at 1/8".

Philips Semiconductors Product specification

### P-channel enhancement mode MOS transistor

**BSH202** 

#### **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 late				
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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