# P-channel enhancement mode MOS transistor   BSH207

FEATURES

• Very low threshold voltage
• Fast switching
• Logic level compatible
• Subminiature surface mount package

SYMBOL

QUICK REFERENCE DATA

$$V_{DS} = -12 \text{ V}$$

$$I_D = -1.52 \text{ A}$$

$$R_{DS(ON)} \leq 0.15 \ \Omega \ (V_{GS} = -2.5 \text{ V})$$

$$V_{GS(TO)} \geq 0.4 \text{ V}$$

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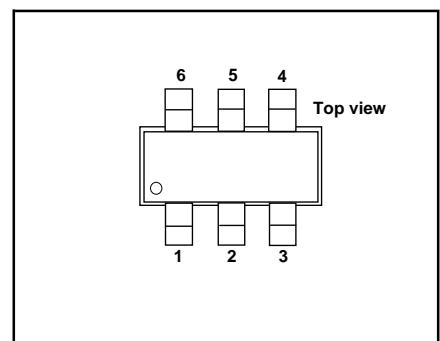
P-channel, enhancement mode, logic level, field-effect power transistor. This device has low threshold voltage and extremely fast switching making it ideal for battery powered applications and high speed digital interfacing.

The BSH207 is supplied in the SOT457 subminiature surface mounting package.

PINNING

PIN	DESCRIPTION
1,2,5,6	drain
3	gate
4	source

SOT457

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	Drain-source voltage		-	-12	V
V_{DGR}	Drain-gate voltage	$R_{GS} = 20 \text{ k}\Omega$	-	-12	V
V_{GS}	Gate-source voltage		-	± 8	V
I_D	Drain current (DC)	$T_a = 25 \ ^\circ C$	-	-1.52	A
		$T_a = 100 \ ^\circ C$	-	-0.96	A
I_{DM}	Drain current (pulse peak value)	$T_a = 25 \ ^\circ C$	-	-6.09	A
P_{tot}	Total power dissipation	$T_a = 25 \ ^\circ C$	-	0.417	W
		$T_a = 100 \ ^\circ C$	-	0.17	W
T_{stg}, T_j	Storage & operating temperature		- 55	150	$^\circ C$

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
$R_{th \ j-a}$	Thermal resistance junction to ambient	FR4 board, minimum footprint	300	-	K/W

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ELECTRICAL CHARACTERISTICS

$T_j = 25°C$ unless otherwise specified

| SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)DSS}$	Drain-source breakdown voltage	$V_{GS} = 0$ V; $I_D = -10$ μA	-12	-	-	V
$V_{GS(TO)}$	Gate threshold voltage	$V_{DS} = V_{GS}$; $I_D = -1$ mA	-0.4	-0.6	-	V
		$T_j = 150°C$	-0.1	-	-	V
$R_{DS(ON)}$	Drain-source on-state resistance	$V_{GS} = -4.5$ V; $I_D = -1$ A	-	80	120	mΩ
		$V_{GS} = -2.5$ V; $I_D = -1$ A	-	117	150	mΩ
		$V_{GS} = -1.8$ V; $I_D = -0.5$ A	-	140	180	mΩ
		$V_{GS} = -2.5$ V; $I_D = -1$ A; $T_j = 150°C$	-	175	230	mΩ
g_{fs}	Forward transconductance	$V_{DS} = -9.6$ V; $I_D = -1$ A	1.5	4.5	-	S
I_{GSS}	Gate source leakage current	$V_{GS} = ±8$ V; $V_{DS} = 0$ V	-	±10	±100	nA
I_{DSS}	Zero gate voltage drain current	$V_{DS} = -9.6$ V; $V_{GS} = 0$ V;	-	-50	-100	nA
		$T_j = 150°C$	-	-13	-100	μA
$Q_{g(tot)}$	Total gate charge	$I_D = -1$ A; $V_{DD} = -10$ V; $V_{GS} = -4.5$ V	-	8.8	-	nC
Q_{gs}	Gate-source charge		-	0.7	-	nC
Q_{gd}	Gate-drain (Miller) charge		-	2.0	-	nC
$t_{d\ on}$	Turn-on delay time	$V_{DD} = -10$ V; $I_D = -1$ A;	-	2	-	ns
t_r	Turn-on rise time	$V_{GS} = -8$ V; $R_G = 6$ Ω	-	4.5	-	ns
$t_{d\ off}$	Turn-off delay time	Resistive load	-	45	-	ns
t_f	Turn-off fall time		-	20	-	ns
C_{iss}	Input capacitance	$V_{GS} = 0$ V; $V_{DS} = -9.6$ V; $f = 1$ MHz	-	500	-	pF
C_{oss}	Output capacitance		-	210	-	pF
C_{rss}	Feedback capacitance		-	62	-	pF

REVERSE DIODE LIMITING VALUES AND CHARACTERISTICS

$T_j = 25°C$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{DR}	Continuous reverse drain current	$T_a = 25\ °C$	-	-	-1.52	A
I_{DRM}	Pulsed reverse drain current		-	-	-6.09	A
V_{SD}	Diode forward voltage	$I_F = -0.62$ A; $V_{GS} = 0$ V	-	-0.62	-1.3	V
t_{rr}	Reverse recovery time	$I_F = -0.5$ A; $-dI_F/dt = 100$ A/μs;	-	75	-	ns
Q_{rr}	Reverse recovery charge	$V_{GS} = 0$ V; $V_R = -9.6$ V	-	69	-	nC

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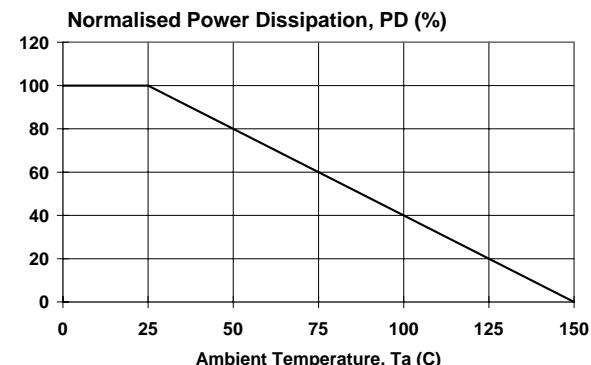
Fig.1.   Normalised power dissipation.
$PD\% = 100 \cdot P_D/P_{D\,25\,°C} = f(T_a)$
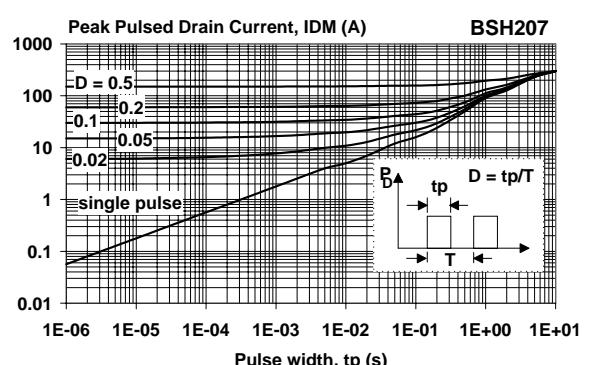
Fig.4.   Transient thermal impedance.
$Z_{th\,j-a} = f(t)$; parameter $D = t_p/T$
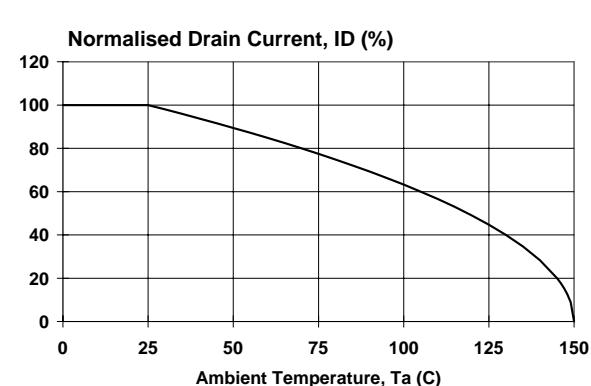
Fig.2.   Normalised continuous drain current.
$ID\% = 100 \cdot I_D/I_{D\,25\,°C} = f(T_a)$; conditions: $V_{GS} \leq -10\ V$
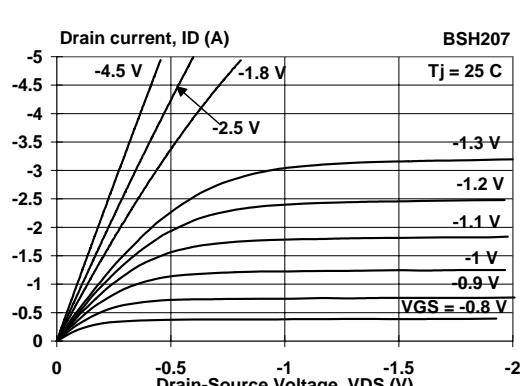
Fig.5.   Typical output characteristics, $T_j = 25\ °C$.
$I_D = f(V_{DS})$; parameter V_{GS}
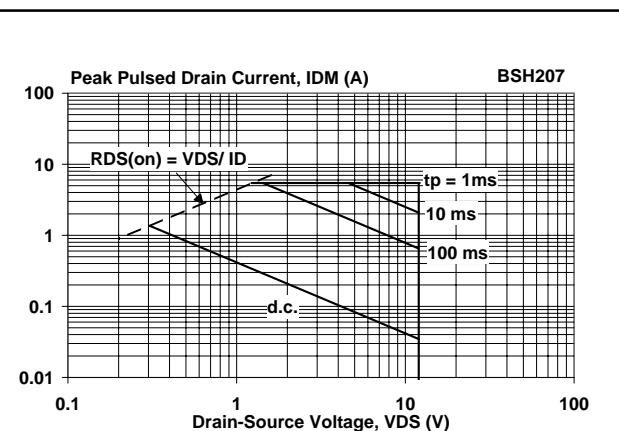
Fig.3.   Safe operating area. $T_a = 25\ °C$
I_D & $I_{DM} = f(V_{DS})$; I_{DM} single pulse; parameter t_p
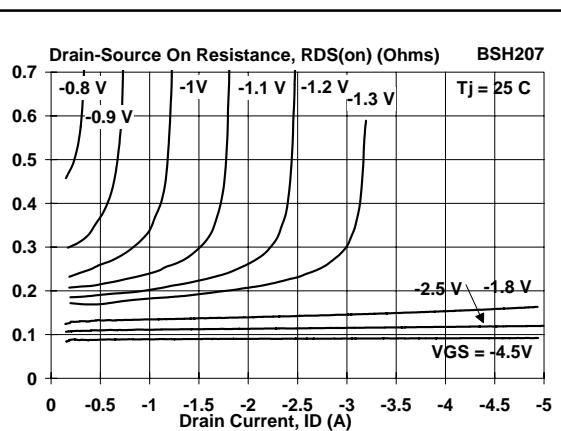
Fig.6.   Typical on-state resistance, $T_j = 25\ °C$.
$R_{DS(ON)} = f(I_D)$; parameter V_{GS}

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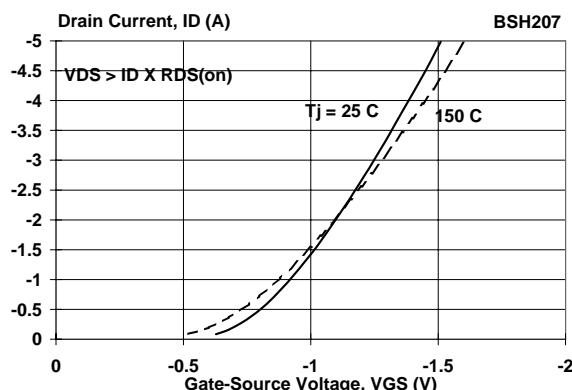
Fig.7. Typical transfer characteristics.
$I_D = f(V_{GS})$
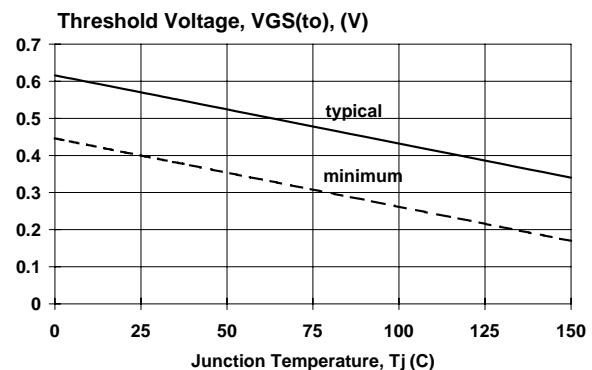
Fig.10. Gate threshold voltage.
$V_{GS(TO)} = f(T_j)$; conditions: $I_D = 1$ mA; $V_{DS} = V_{GS}$
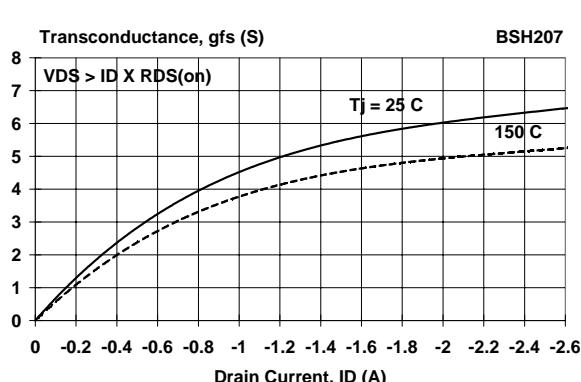
Fig.8. Typical transconductance, $T_j = 25$ °C.
$g_{fs} = f(I_D)$
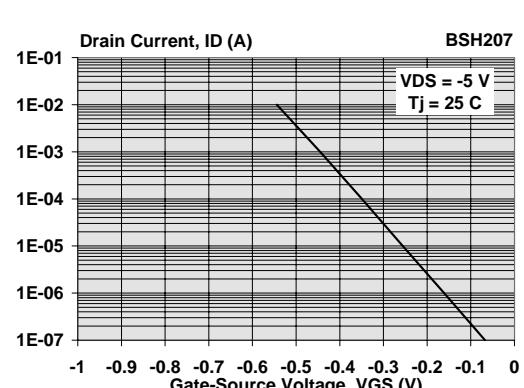
Fig.11. Sub-threshold drain current.
$I_D = f(V_{GS})$; conditions: $T_j = 25$ °C
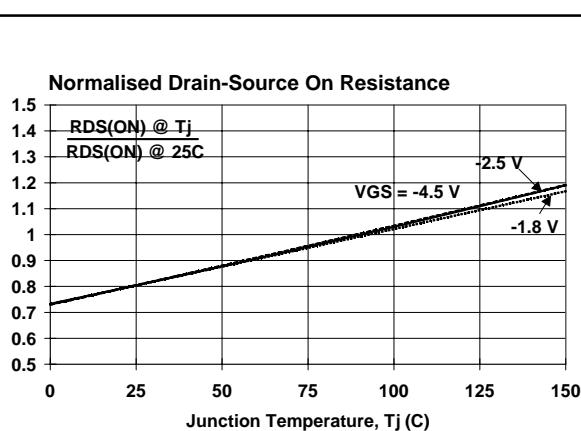
Fig.9. Normalised drain-source on-state resistance.
$R_{DS(ON)}/R_{DS(ON)25 °C} = f(T_j)$
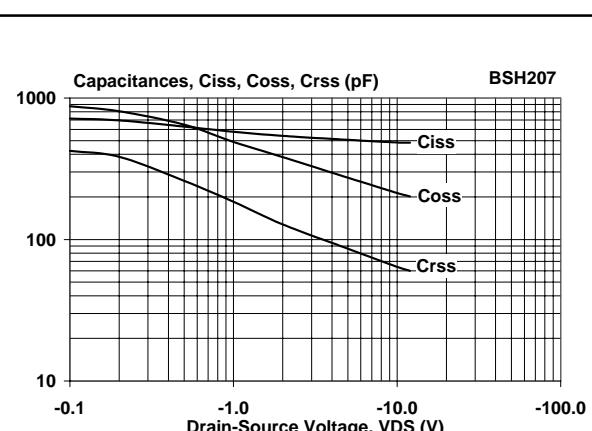
Fig.12. Typical capacitances, C_{iss}, C_{oss}, C_{rss}.
$C = f(V_{DS})$; conditions: $V_{GS} = 0$ V; $f = 1$ MHz

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Gate-source voltage, VGS (V)   **BSH207**
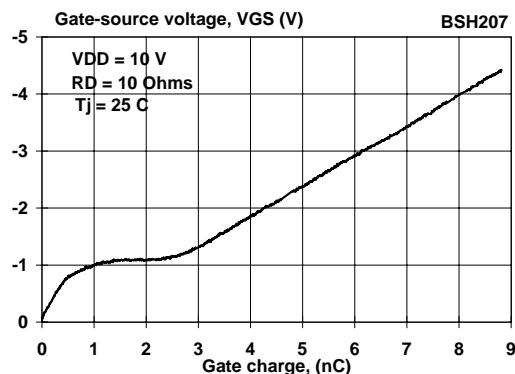
Fig.13. Typical turn-on gate-charge characteristics.
$V_{GS} = f(Q_G)$

Source-Drain Diode Current, IF (A)   **BSH207**
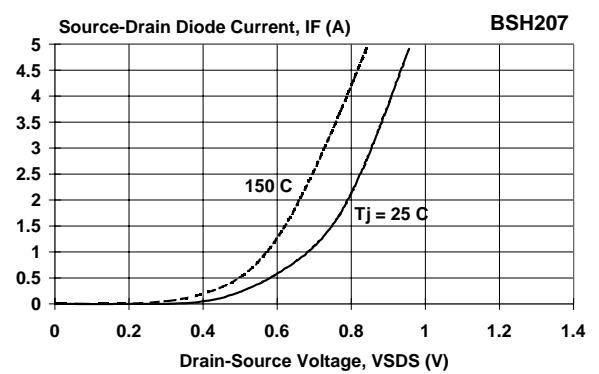
Fig.14.   Typical reverse diode current.
$I_F = f(V_{SDS})$; conditions: $V_{GS} = 0$ V; parameter T_j
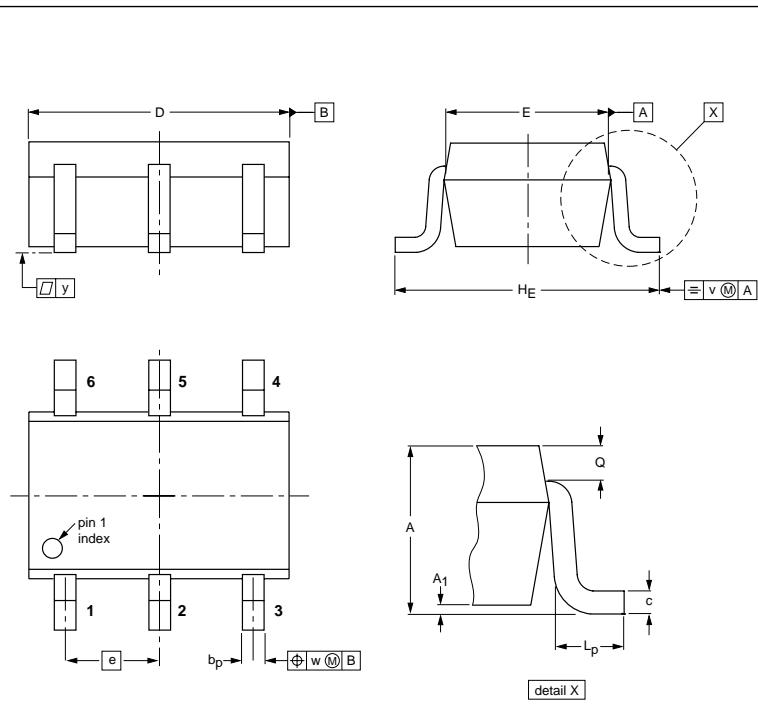
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MECHANICAL DATA

Plastic surface mounted package; 6 leads   **SOT457**

DIMENSIONS (mm are the original dimensions)

UNIT	A	A₁	bₚ	c	D	E	e	H_E	Lₚ	Q	v	w	y
mm	1.1 0.9	0.1 0.013	0.40 0.25	0.26 0.10	3.1 2.7	1.7 1.3	0.95	3.0 2.5	0.6 0.2	0.33 0.23	0.2	0.2	0.1

| OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT457			SC-74			97-02-28

Fig.15. SOT457 surface mounting package.

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".

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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