

## General Description

This MOSFET uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as -2.5V. This device is suitable for use as a wide variety of applications.

## Features

- High Dense Design
- Ultra Low On-Resistance
- Reliable and Rugged



## Applications

- PWM applications
- Power management
- Load switch

## Key Performance Parameters

Parameter	Value	Unit
$V_{DS}$	-20	V
$R_{DS(ON), max} @ V_{GS} = -4.5V$	80	m $\Omega$

## Marking Information

Product Name	Package	Marking
OSH2301	SOT-23	2301

## Package & Pin information



**Absolute Maximum Ratings** at  $T_j=25^{\circ}\text{C}$  unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-source voltage	$V_{DS}$	-20	V
Gate-source voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current	$I_D$	-3.0	A
Pulsed Drain Current <sup>1)</sup>	$I_{D,pulse}$	-12	A
Power Dissipation	$P_D$	1	W
Operation and storage temperature	$T_{stg}, T_j$	-55 to 150	$^{\circ}\text{C}$

**Thermal Characteristics**

Parameter	Symbol	Value	Unit
Thermal resistance, junction-ambient <sup>2)</sup>	$R_{\theta JA}$	125	$^{\circ}\text{C/W}$

**Electrical Characteristics** at  $T_j=25^{\circ}\text{C}$  unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	$BV_{DSS}$	-20			V	$V_{GS}=0\text{ V}, I_D=-250\ \mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	-0.5	-0.85	-1.2	V	$V_{DS}=V_{GS}, I_D=-250\ \mu\text{A}$
Drain-source on-state resistance	$R_{DS(ON)}$		54	80	$\text{m}\Omega$	$V_{GS}=-4.5\text{ V}, I_D=-2.5\text{ A}$
Drain-source on-state resistance	$R_{DS(ON)}$		67	100	$\text{m}\Omega$	$V_{GS}=-2.5\text{ V}, I_D=-2\text{ A}$
Gate-source leakage current	$I_{GSS}$			$\pm 100$	nA	$V_{GS}=\pm 12\text{ V}, V_{DS}=0\text{ V}$
Drain-source leakage current	$I_{DSS}$			-1	$\mu\text{A}$	$V_{DS}=-20\text{ V}, V_{GS}=0\text{ V}$

### Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	$C_{iss}$		461		pF	$V_{GS}=0\text{ V}$ , $V_{DS}=-10\text{ V}$ , $f=1.0\text{ MHz}$
Output capacitance	$C_{oss}$		52		pF	
Reverse transfer capacitance	$C_{rss}$		47		pF	
Turn-on Delay Time	$t_{d(on)}$		10		ns	$V_{GS}=-4.5\text{ V}$ , $V_{DS}=-10\text{ V}$ , $R_L=3.3\ \Omega$ , $R_{GEN}=6\ \Omega$
Turn-on Rise Time	$t_r$		32		ns	
Turn-Off Delay Time	$t_{d(off)}$		50		ns	
Turn-Off Fall Time	$t_f$		52		ns	

### Gate Charge Characteristics

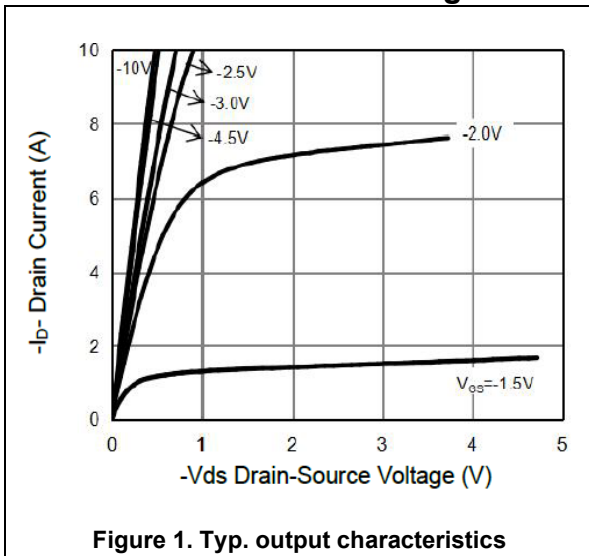
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	$Q_g$		6.1		nC	$V_{GS}=-4.5\text{ V}$ , $V_{DS}=-10\text{ V}$ , $I_D=-3\text{ A}$
Gate-source charge	$Q_{gs}$		1.5		nC	
Gate-drain charge	$Q_{gd}$		1.5		nC	

### Body Diode Characteristics

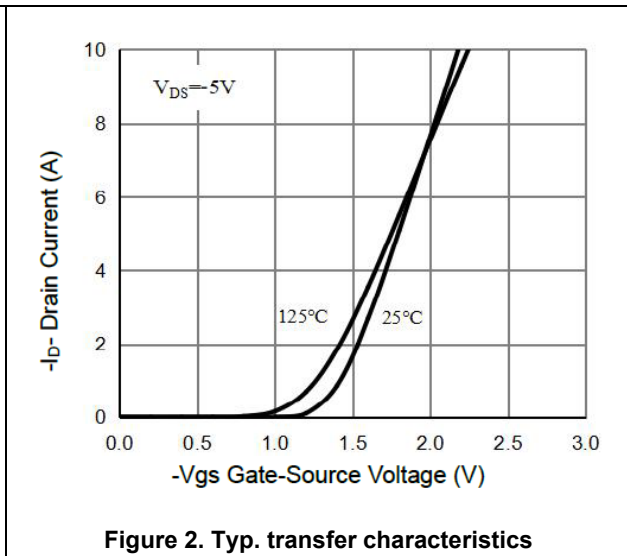
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Source drain current (Body Diode)	$I_{SD}$			-3	A	$T_A=25^\circ\text{C}$
Diode forward voltage	$V_{SD}$			-1.2	V	$I_S=-3\text{ A}$ , $V_{GS}=0\text{ V}$

- Note:**
- 1) Pulse width limited by maximum allowable junction temperature.
  - 2) Repetitive Rating: Pulse width limited by maximum junction temperature.

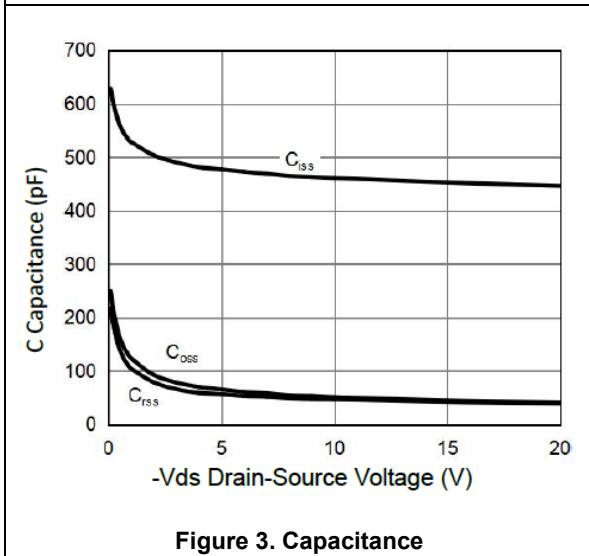
**Electrical Characteristics Diagrams**



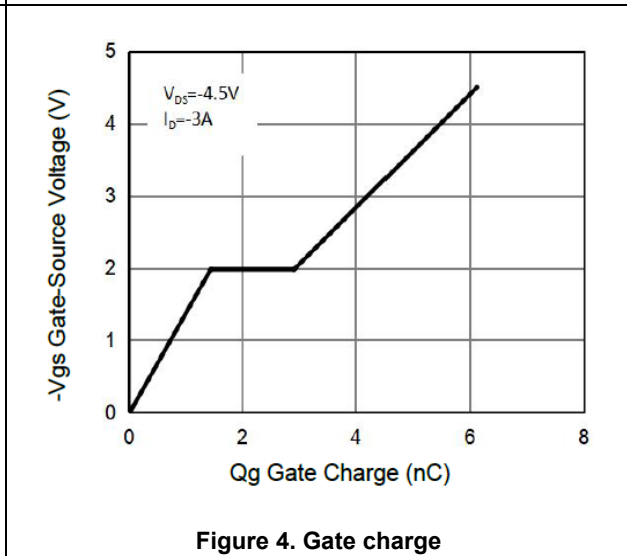
**Figure 1. Typ. output characteristics**



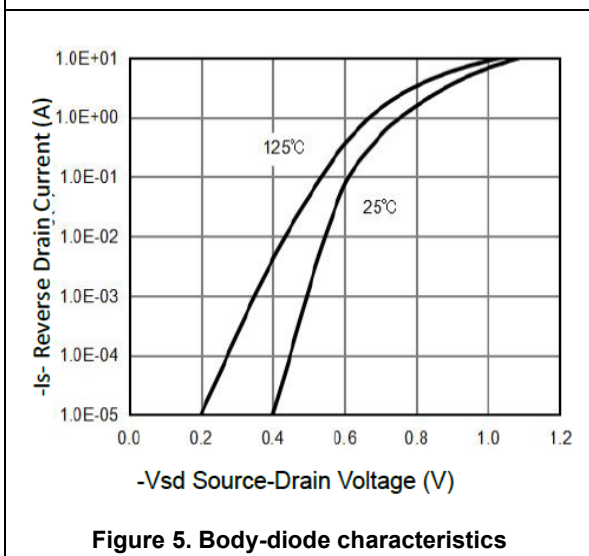
**Figure 2. Typ. transfer characteristics**



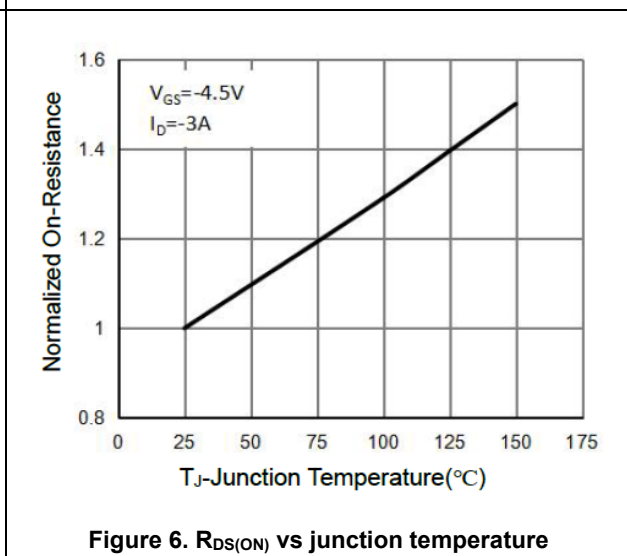
**Figure 3. Capacitance**



**Figure 4. Gate charge**

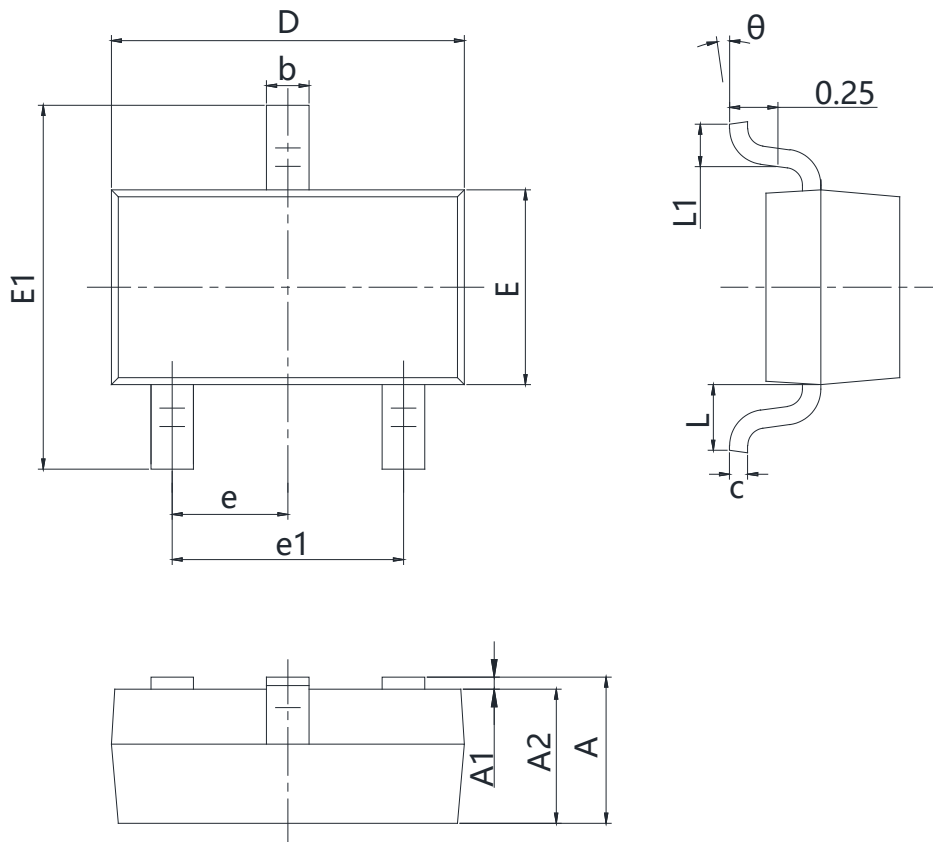


**Figure 5. Body-diode characteristics**



**Figure 6.  $R_{DS(ON)}$  vs junction temperature**

**Package Information**



Symbol	mm	
	Min	Max
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	0.280	3.000
E	1.200	1.400
E1	2.250	2.250
e	0.950 TYP	
e1	1.800	2.000
L	0.550 REF	
L1	0.300	0.500
θ	0°	8°

Version1 : SOT-23-V package outline dimension

**Ordering Information**

Package Type	Units/ Reel	Reels/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
SOT-23-V	3000	15	45000	4	180000

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