

**SuperMOS – SOT-23 -20V  $BV_{DSS}$ ,  $58m\Omega R_{DS(on)}$ ,  $-3.0A I_D$  P-channel MOSFET**

**1. Description**

The SI2301DS-ES is P-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent  $R_{DS(on)}$  with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product SI2301DS-ES is Pb-free.

**2. Features**

- -20V,  $R_{DS(on)}=58m\Omega(Typ)$ ,  $V_{GS}=-4.5V$   
 $R_{DS(on)}=80m\Omega(Typ)$ ,  $V_{GS}=-2.5V$
- Fast Switching
- High density cell design for low  $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

**3. Applications**

- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

**4. Ordering Information**

Part Number	Package	Material	Quantity per reel	Flammability Rating
SI2301DS-ES	SOT-23	Halogen free	3,000 PCS	UL 94V-0

Table-1 Ordering information

**5. Pin Configuration and Functions**


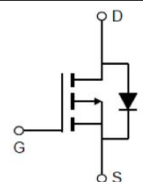
Pin	Function	Outline	Circuit Diagram
1	Gate		
2	Source		
3	Drain		

Table-2 Pin configuration

## 6. Specification

### Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	$BV_{DSS}$	-20	V	
Gate-Source Voltage	$V_{GS}$	$\pm 8$	V	
Continuous Drain Current	$I_D$	$T_A=25^\circ\text{C}$	3.0	A
		$T_A=75^\circ\text{C}$	1.7	
Maximum Power Dissipation	$P_D$	$T_A=25^\circ\text{C}$	1.4	W
		$T_A=75^\circ\text{C}$	0.84	
Pulsed Drain Current	$I_{DM}$	9.2	A	
Operating Junction Temperature	$T_J$	150	$^\circ\text{C}$	
Storage Temperature Range	$T_{stg}$	-55 to +150	$^\circ\text{C}$	

#### Thermal resistance ratings

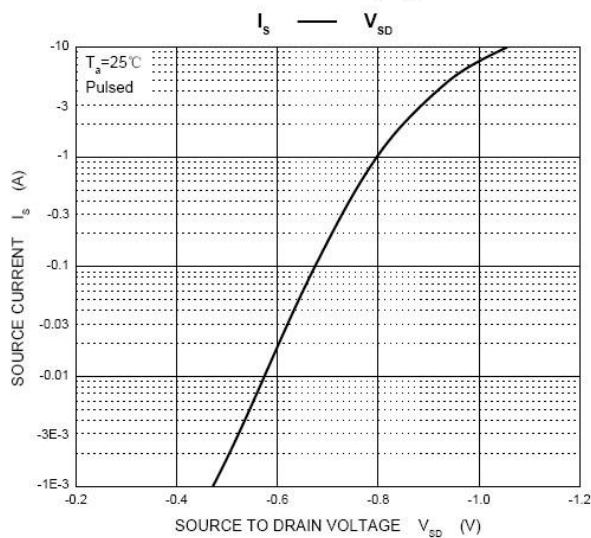
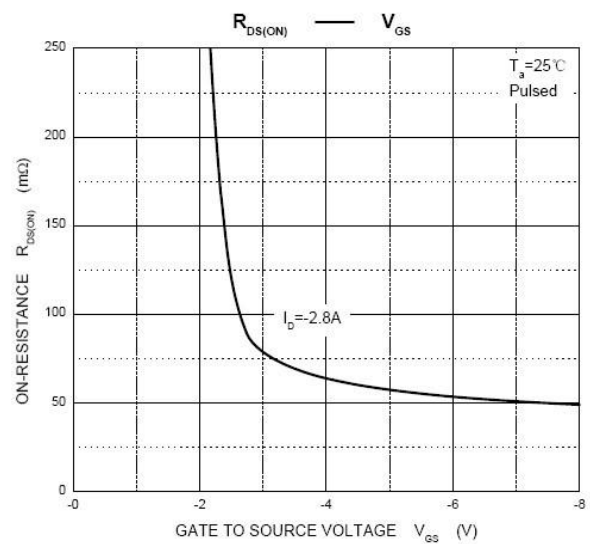
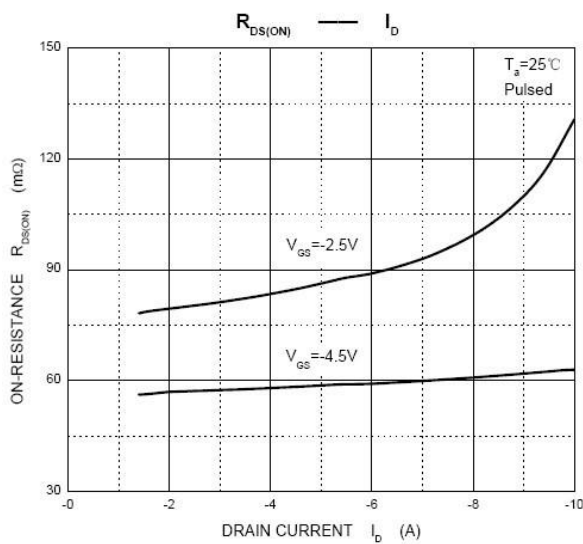
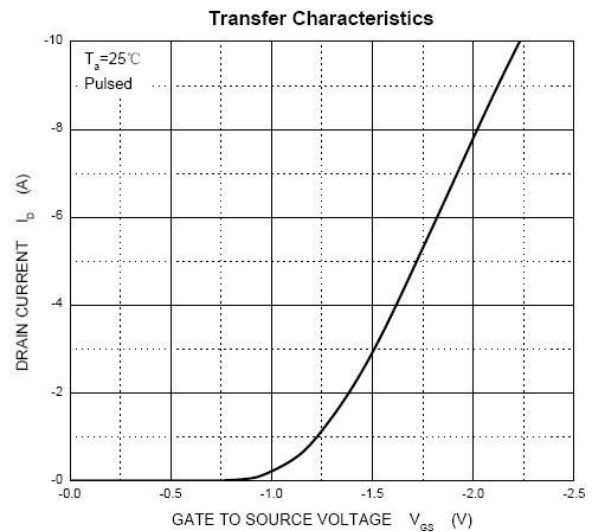
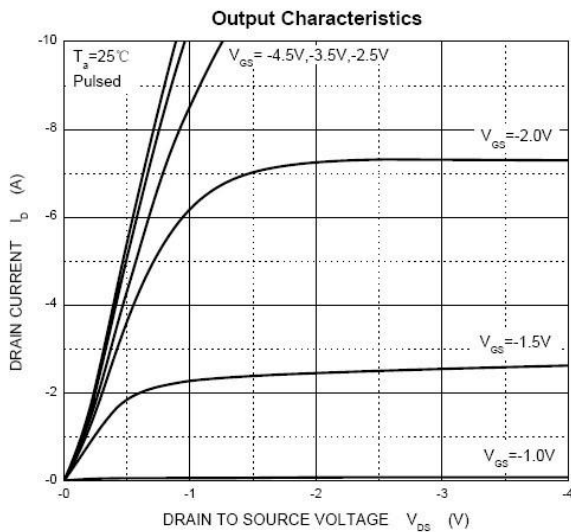
Single Operation			
Parameter	Symbol	Typical	Unit
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$	90	$^\circ\text{C/W}$

## Electrical Characteristics

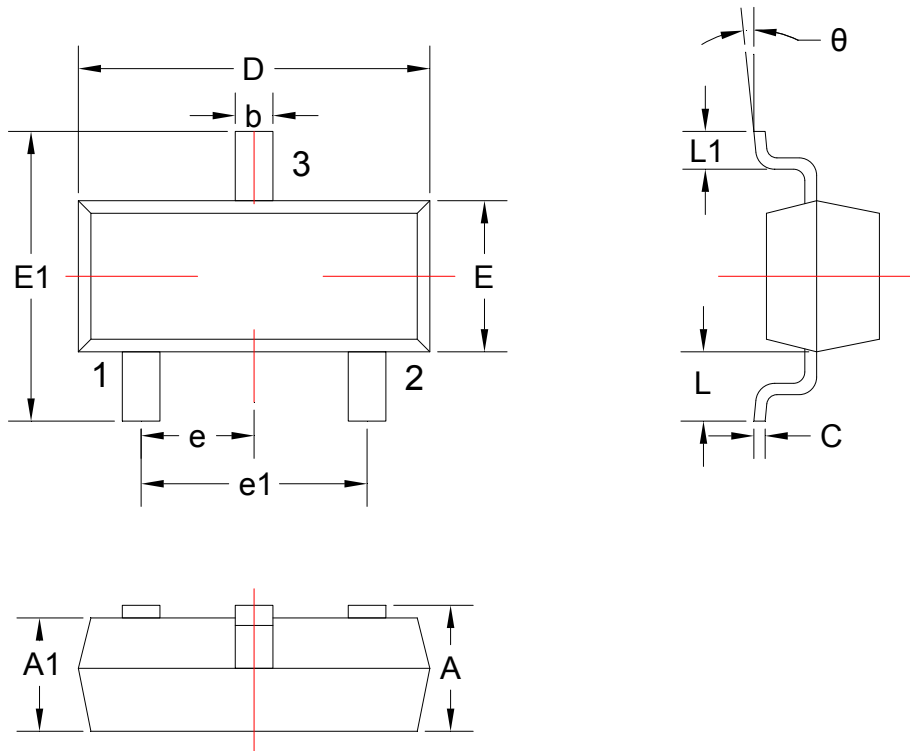
At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V$			-1	$\mu A$
Gate-to-source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 8V$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-0.4	-0.7	-1.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-3.0A$		58	75	m $\Omega$
		$V_{GS}=-2.5V, I_D=-2.0A$		80	90	
Forward trans conductance(a)	gfs	$V_{DS}=-5V, I_D=-2.3A$		6.5		S
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, V_{DS}=-10V,$ $f=1MHz$			405	pF
Output Capacitance	$C_{OSS}$				75	
Reverse Transfer Capacitance	$C_{RSS}$				55	
Gate Resistance	$R_g$	$f=1MHz$		6		$\Omega$
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=-2.5V, V_{DS}=-10V,$ $I_D=-2.3A$		3.3	6	nC
Gate-to-Source Charge	$Q_{GS}$			0.7		
Gate-to-Drain Charge	$Q_{GD}$			1.3		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=-4.5V, V_{DS}=10V,$ $R_L=10\Omega, I_D=-1A,$ $R_G=1\Omega$		11	20	ns
Rise Time	$t_r$			35	60	
Turn-Off Delay Time	$t_{d(OFF)}$			30	50	
Fall Time	$t_f$			10	20	
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-1.0A$		-0.8	-1.2	V

## 7. Typical Characteristic



8. Dimension (SOT-23)



COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
A	0.900	1.150	E1	2.250	2.550
A1	0.900	1.050	e	0.950TYP	
b	0.300	0.500	e1	1.800	2.000
c	0.080	0.150	L	0.550REF	
D	2.800	3.00	L1	0.300	0.500
E	1.200	1.400	theta	0°	8°

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