

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

1. Description

The SI2301-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 SI2301-ES is Pb-free.

2. Features

- -20V, $R_{DS(on)}$ =58m Ω (Typ), V_{GS} =-4.5V
 $R_{DS(on)}$ =80m Ω (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
SI2301-ES	SOT-23	Halogen free	3,000 PCS	UL 94V-0

Table-1 Ordering information

5. Pin Configuration and Functions


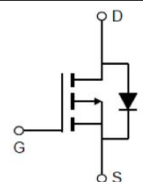
Pin	Function	Outline	Circuit Diagram
1	Gate		
2	Source		
3	Drain		

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}	± 8	V
Continuous Drain Current	I_D	$T_A=25^\circ\text{C}$	3.0
		$T_A=75^\circ\text{C}$	1.7
Maximum Power Dissipation	P_D	$T_A=25^\circ\text{C}$	1.4
		$T_A=75^\circ\text{C}$	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

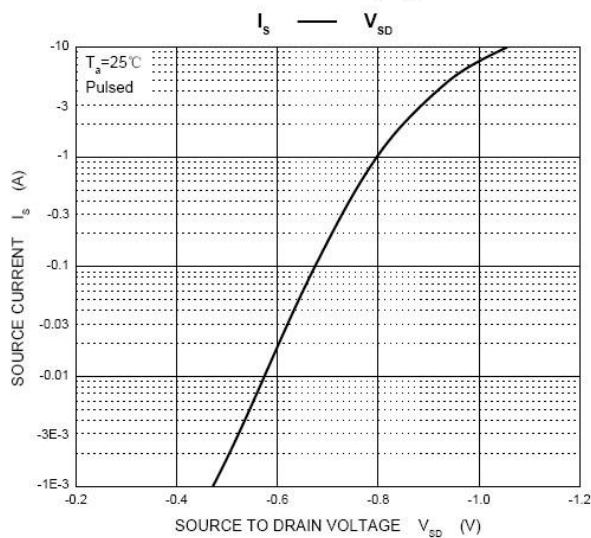
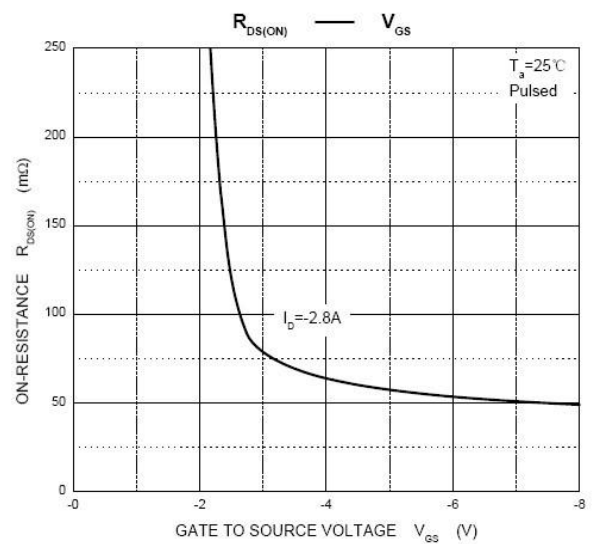
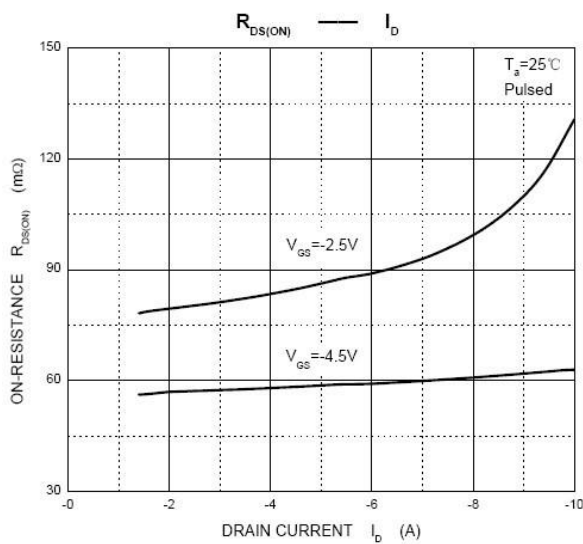
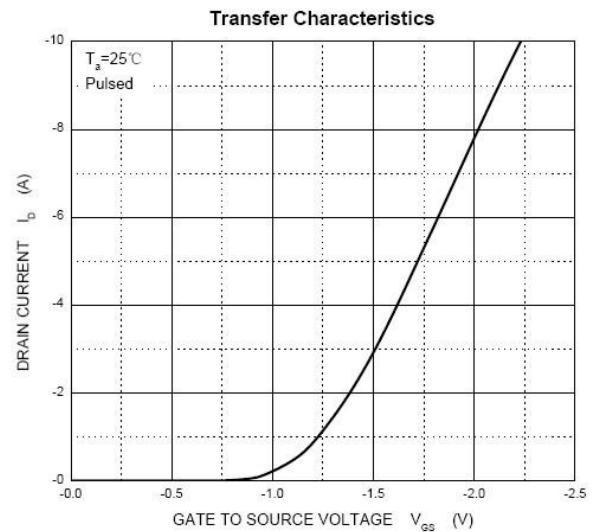
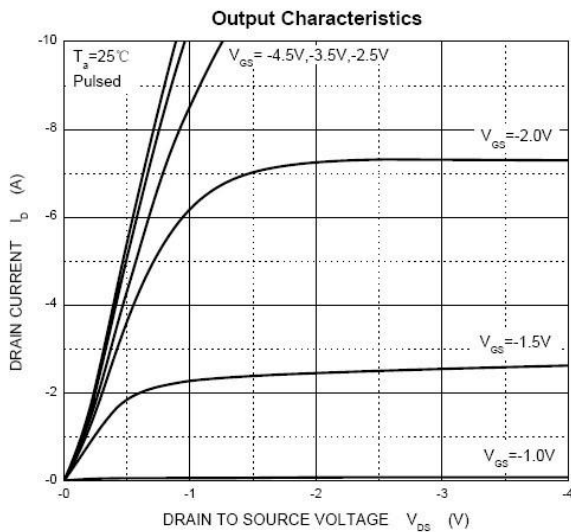
Single Operation			
Parameter	Symbol	Typical	Unit
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$	90	$^\circ\text{C/W}$

Electrical Characteristics

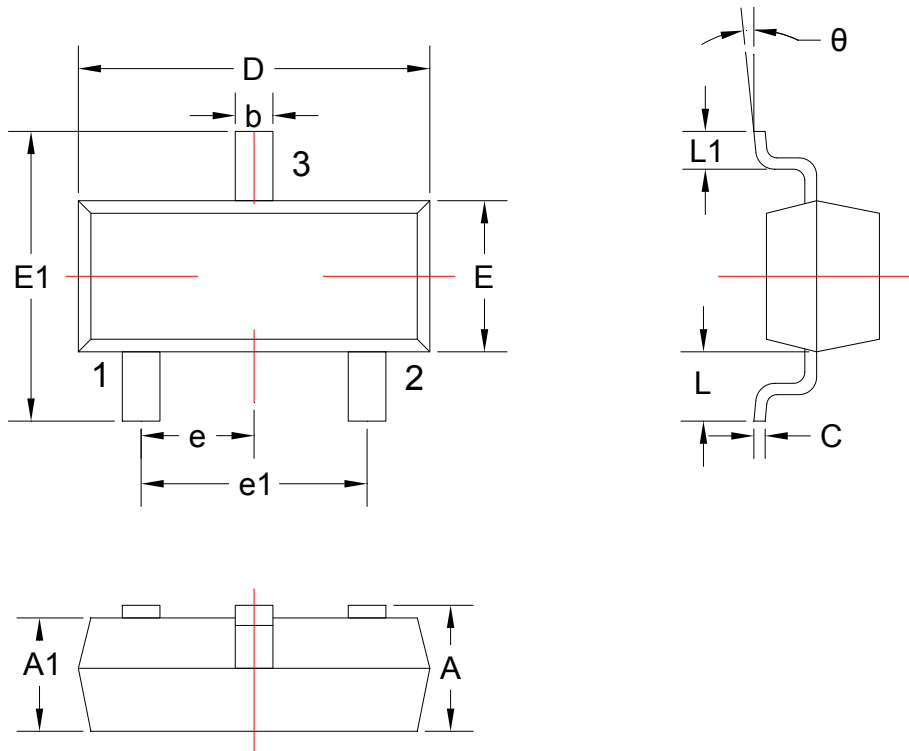
At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
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	μA
Gate-to-source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 8V$			± 100	nA
ON CHARACTERISTICS						
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 Ω
		$V_{GS}=-2.5V, I_D=-2.0A$		80	90	
Forward trans conductance(a)	gfs	$V_{DS}=-5V, I_D=-2.3A$		6.5		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
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		Ω
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		
SWITCHING CHARACTERISTICS						
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	
BODY DIODE CHARACTERISTICS						
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	θ	0°	8°

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