

SuperMOS – SOT-23 60V B_{VDSS} , 58m Ω $R_{DS(ON)}$, N-channel MOSFET

1. Description

The SI2308BDS-ES is N-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 SI2308BDS-ES is Pb-free.

2. Features

- 60V, $R_{DS(ON)}$ =58m Ω (TYP.) @ V_{GS} =10V
 $R_{DS(ON)}$ =69m Ω (TYP.) @ V_{GS} =4.5V
- Use trench MOSFET technology
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

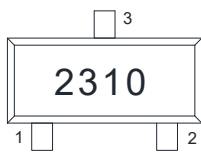
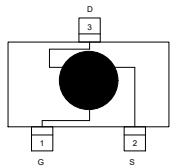
3. Applications

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

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
SI2308BDS-ES	SOT-23	2310	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	7 inches

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
1	Gate		
2	Source		
3	Drain		

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}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current ^a	$T_A=25^{\circ}\text{C}$	I_D	3.2	A
	$T_A=75^{\circ}\text{C}$		2.4	
Maximum Power Dissipation ^a	$T_A=25^{\circ}\text{C}$	P_D	1.4	W
	$T_A=75^{\circ}\text{C}$		0.84	
Pulsed Drain Current ^b		I_{DM}	12.8	A
Operating Junction Temperature		T_J	150	$^{\circ}\text{C}$
Lead Temperature		T_L	260	$^{\circ}\text{C}$
Storage Temperature Range		T_{stg}	-55 to 150	$^{\circ}\text{C}$

Thermal resistance ratings

Single Operation					
Parameter		Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance ^a	$t \leq 10 \text{ s}$	$R_{\theta JA}$	75	90	$^{\circ}\text{C/W}$

Note:

a: Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper

b: Repetitive rating, pulse width limited by junction temperature, $t_p=10\mu\text{s}$, Duty Cycle=1%

SI2308BDS-ES

Rev-1.3

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 =250uA	60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V			1	uA
Gate-to-source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250uA	0.9	1.35	2.0	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =10V, I _D =3A		58	90	mΩ
		V _{GS} =4.5V, I _D =2A		69	110	
Forward Trans conductance	g _{FS}	V _{DS} =5.0V, I _D =3A		6.5	15	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} =0V, f=1MHz, V _{DS} =30V		400		pF
Output Capacitance	C _{OSS}			29		
Reverse Transfer Capacitance	C _{RSS}			24		
Total Gate Charge	Q _{G(TOT)}	V _{GS} =10V, V _{DS} =30V, I _D =3A		8.8		nC
Gate-to-Source Charge	Q _{GS}			1		
Gate-to-Drain Charge	Q _{GD}			2.5		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =10V, V _{DS} =30V, I _D =3A, R _G =2.3Ω		4.5		ns
Rise Time	t _r			10		
Turn-Off Delay Time	t _{d(OFF)}			12.5		
Fall Time	t _f			1.5		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _S =1.0A	0.45	0.75	1.5	V

7. Typical Characteristic

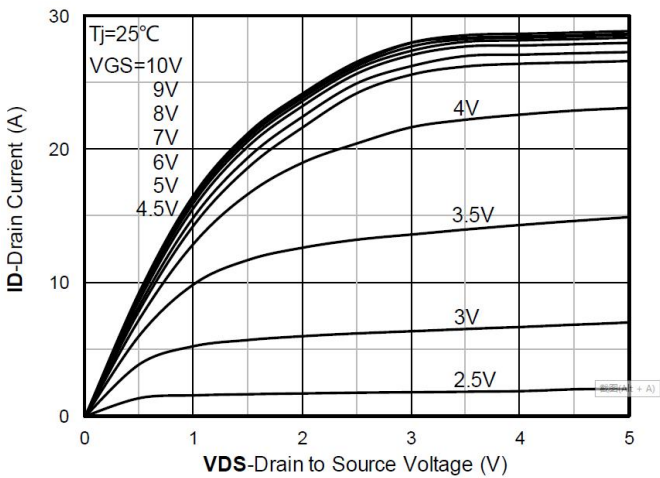


Figure 1. Output Characteristics

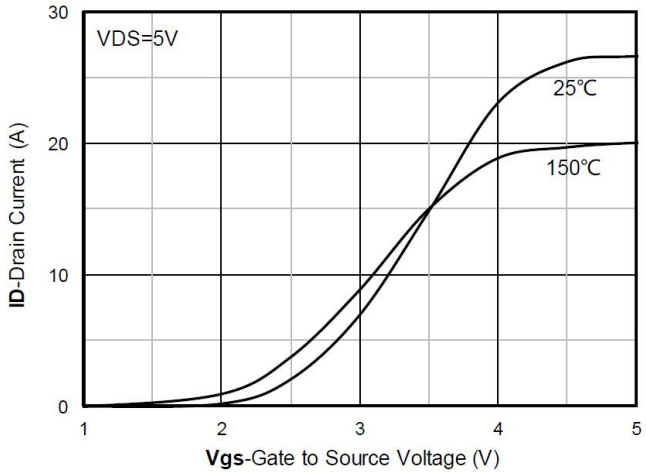


Figure 2. Transfer Characteristics

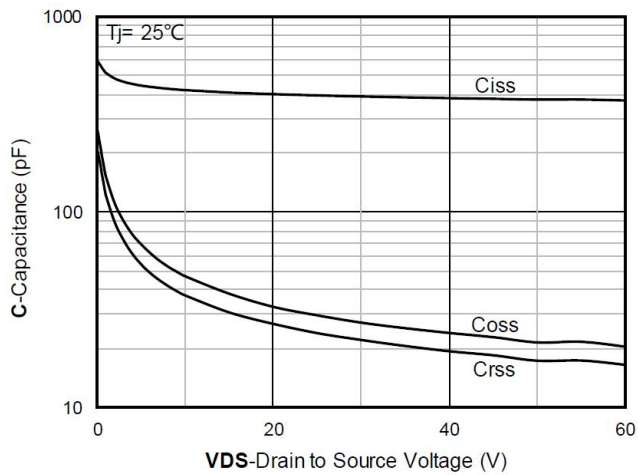


Figure 3. Capacitance Characteristics

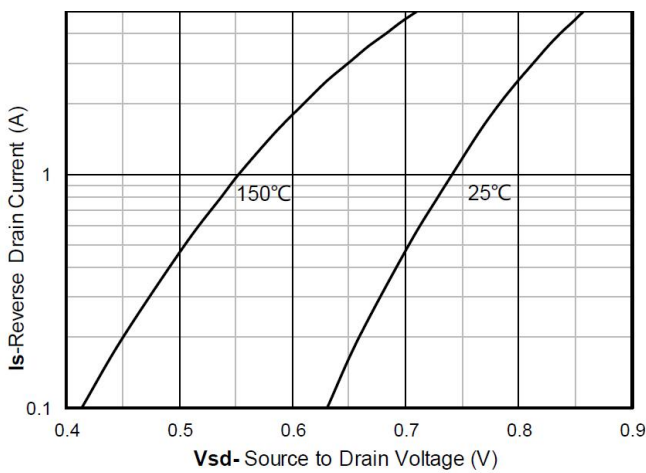


Figure 4. Forward characteristics of reverse diode

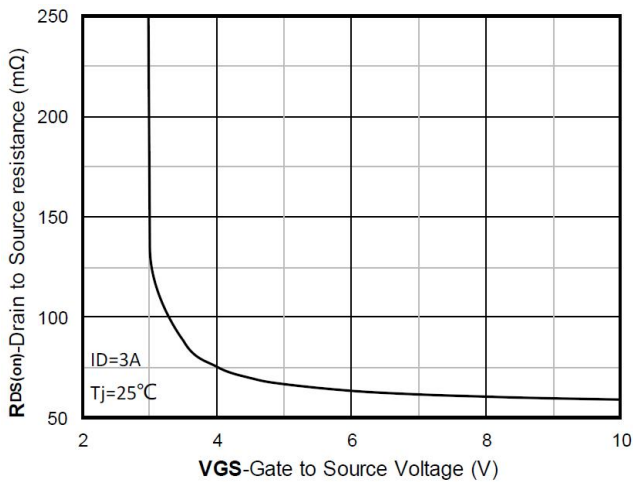


Figure 5. $R_{DS(on)}$ VS V_{GS}

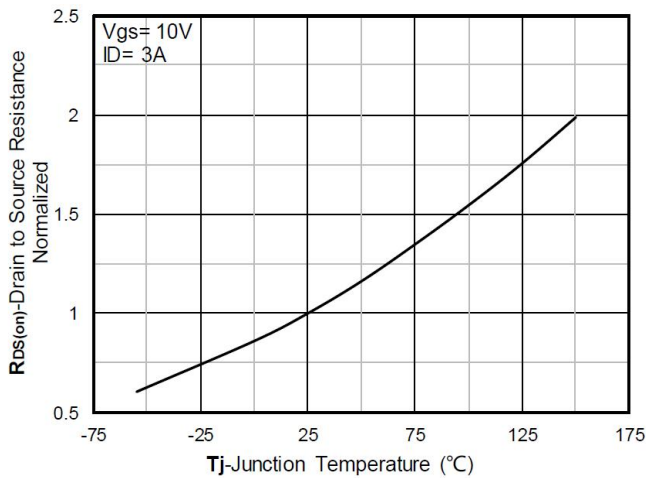
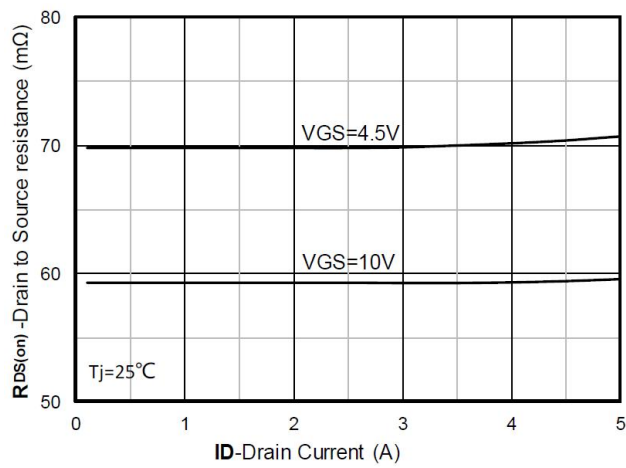
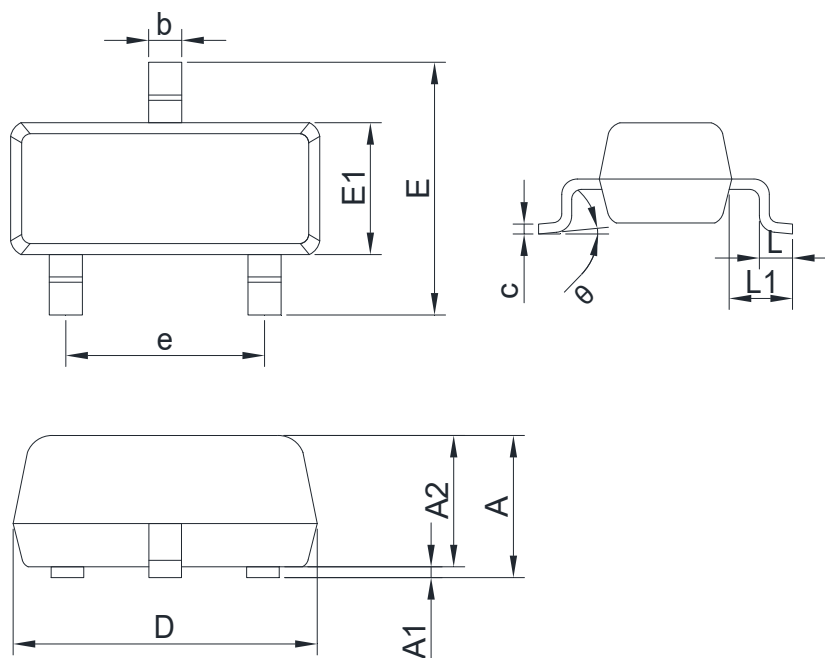


Figure 6. $R_{DS(on)}$ VS T_j

Figure 7. $R_{DS(on)}$ VS Drain Current

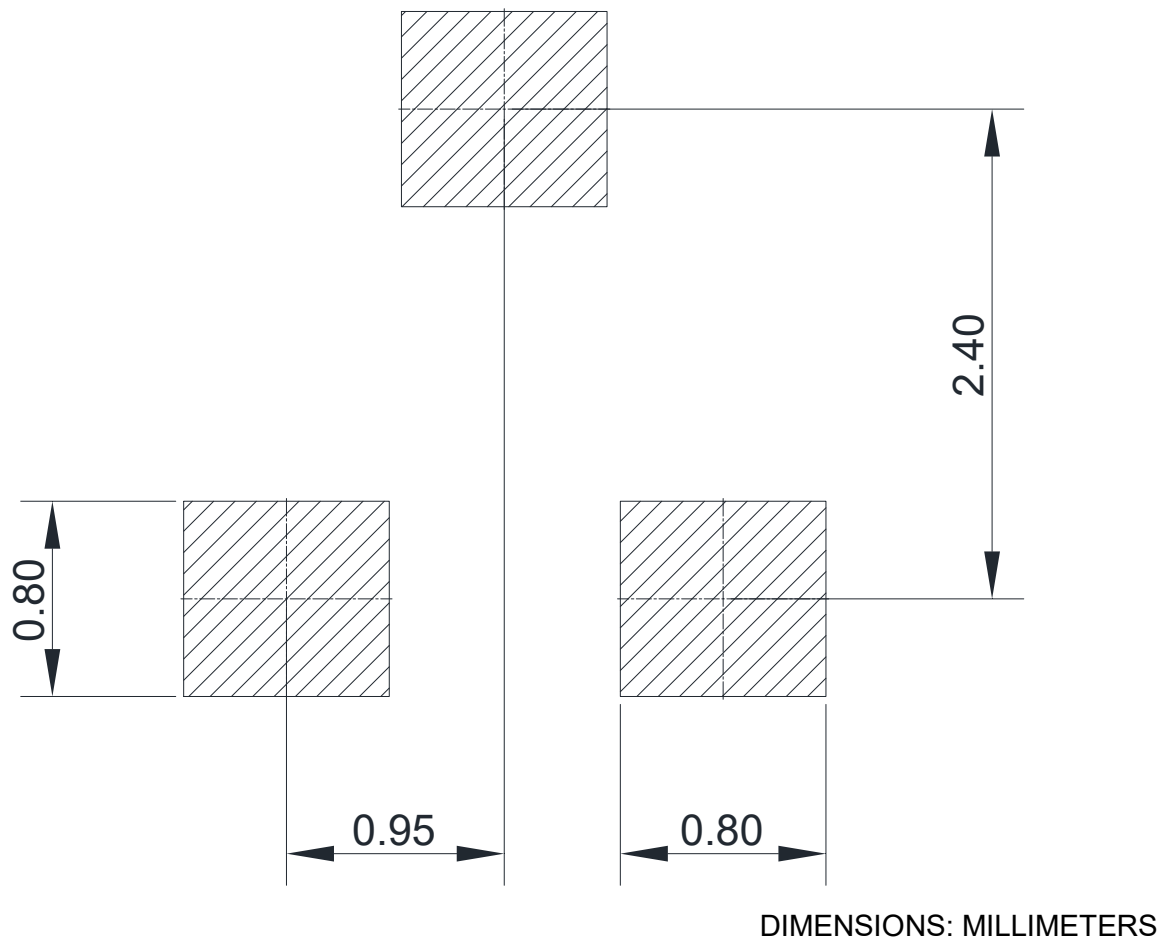
8. Dimension (SOT-23)

POD(Z)



COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER					
SYMBOL	MIN	MAX	SYMBOL	MIN	MAX
A	0.90	1.20	E	2.25	2.55
A1	0.00	0.10	E1	1.20	1.40
A2	0.90	1.10	e	1.80	2.00
b	0.30	0.50	L	0.30	0.50
c	0.07	0.18	L1	0.475	0.625
D	2.80	3.04	θ	0°	8°

9. Recommended Soldering Footprint



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