

SuperMOS – SOT-23 20V BV_{DSS} , 45m Ω $R_{DS(on)}$, N-channel MOSFET

1. Description

The ES2302S 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 ES2302S is Pb-free.

2. Features

- 20V, $R_{DS(on)}$ =45m Ω (TYP.) @ V_{GS} =4.5V
 $R_{DS(on)}$ =62m Ω (TYP.) @ V_{GS} =2.5V
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- ESD Protected
- 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
ES2302S	SOT-23	2302	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	7 inches

Table-1 Ordering information

5. Pin Configuration and Functions

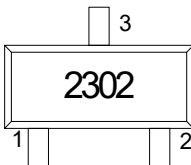
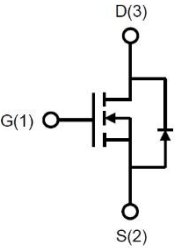
Pin	Function	Outline	Circuit Diagram
1	Gate		
2	Source		
3	Drain		

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}	±12	V
Continuous Drain Current	$T_A=25^{\circ}\text{C}$	I_D	3.3	A
	$T_A=100^{\circ}\text{C}$		2.1	
Maximum Power Dissipation		P_D	0.9	mW
Pulsed Drain Current		I_{DM}	13.2	A
Operating Junction Temperature		T_J	150	°C
Lead Temperature		T_L	260	°C
Storage Temperature Range		T_{stg}	-55 to 150	°C

Thermal resistance ratings

Single Operation			
Parameter	Symbol	Typical	Unit
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$	138	°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 =250uA	20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V, V _{GS} =0V			1.0	uA
Gate-to-source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±12V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250uA	0.4	0.7	1.0	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =4.5V, I _D =3A		45	55	mΩ
		V _{GS} =2.5V, I _D =2A		62	85	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} =0V, f=1MHz, V _{DS} =10V		200	-	pF
Output Capacitance	C _{OSS}			35	-	
Reverse Transfer Capacitance	C _{RSS}			28	-	
Total Gate Charge	Q _{G(TOT)}	V _{GS} =4.5V, V _{DS} =10V, I _D =2A		3	-	nC
Gate-to-Source Charge	Q _{GS}			0.5	-	
Gate-to-Drain Charge	Q _{GD}			0.7	-	
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =4.5V, V _{DS} =10V, I _D =2A, R _G =3Ω		3	-	ns
Rise Time	t _r			11	-	
Turn-Off Delay Time	t _{d(OFF)}			20	-	
Fall Time	t _f			8	-	
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _S =3A			1.5	V

7. Typical Characteristic

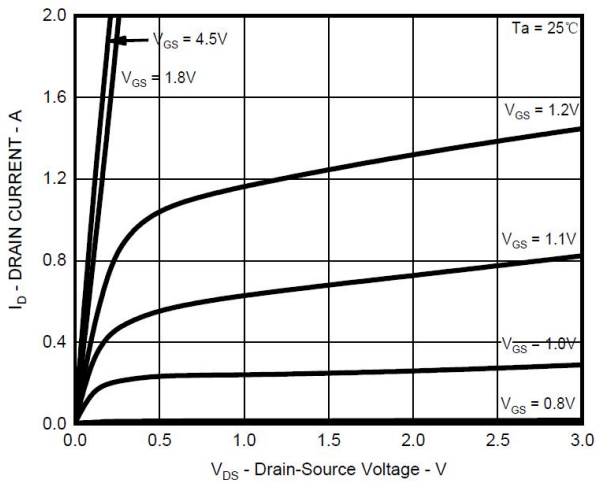


Fig.1 Output Characteristics

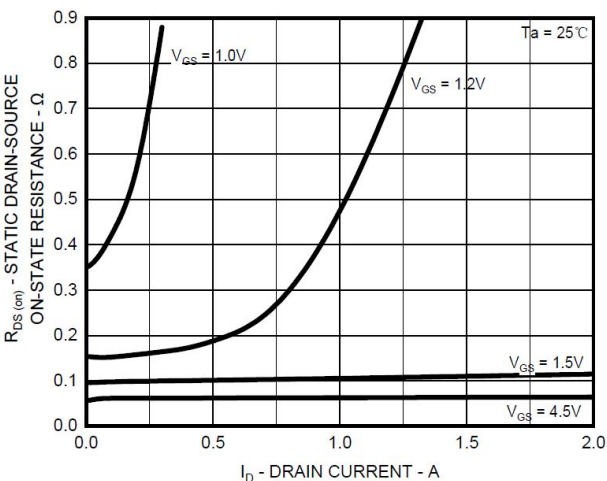


Fig.2 On-Resistance vs. Drain Current (I)

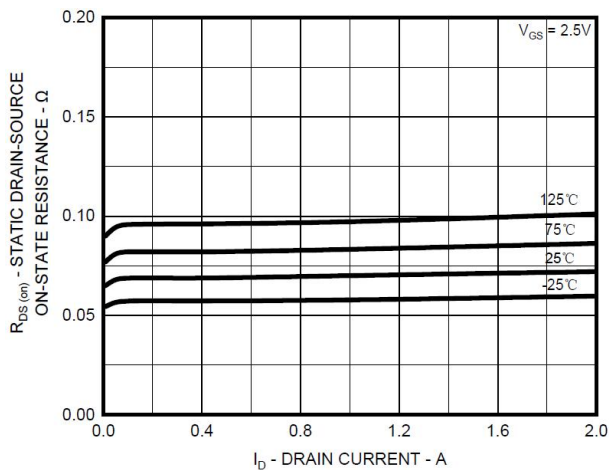


Fig.3 On-Resistance vs. Drain Current (II)

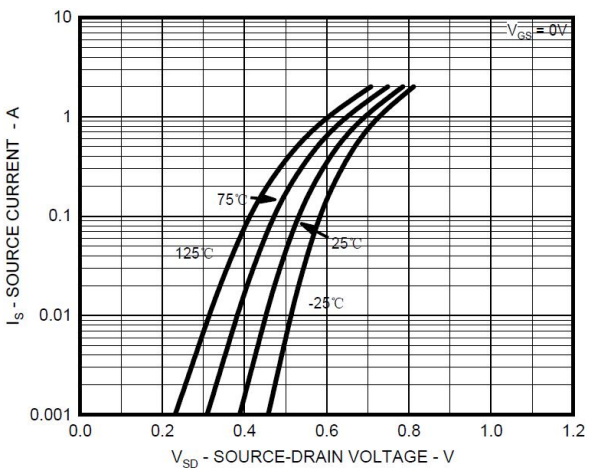


Fig.4 Diode Forward Voltage vs. Current

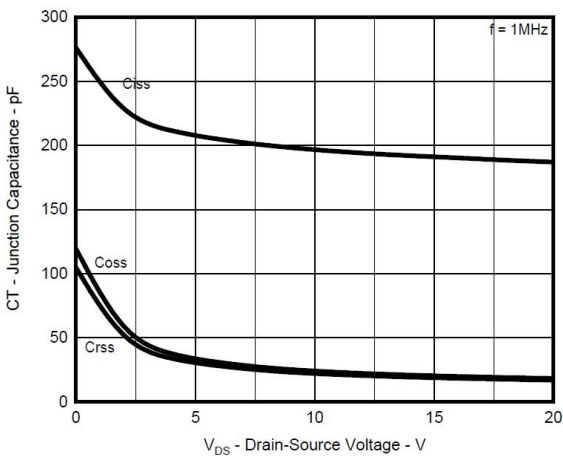


Fig.5 Capacitance Characteristics

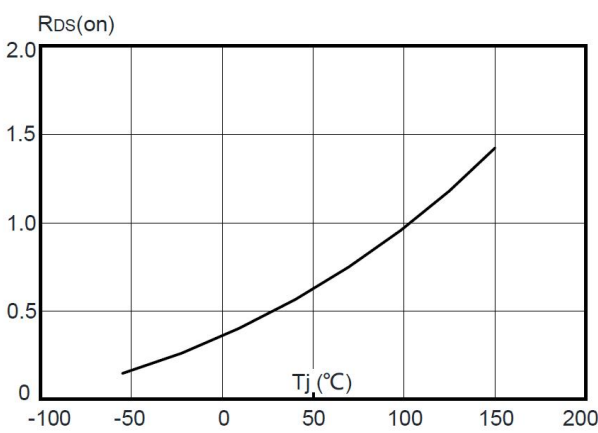
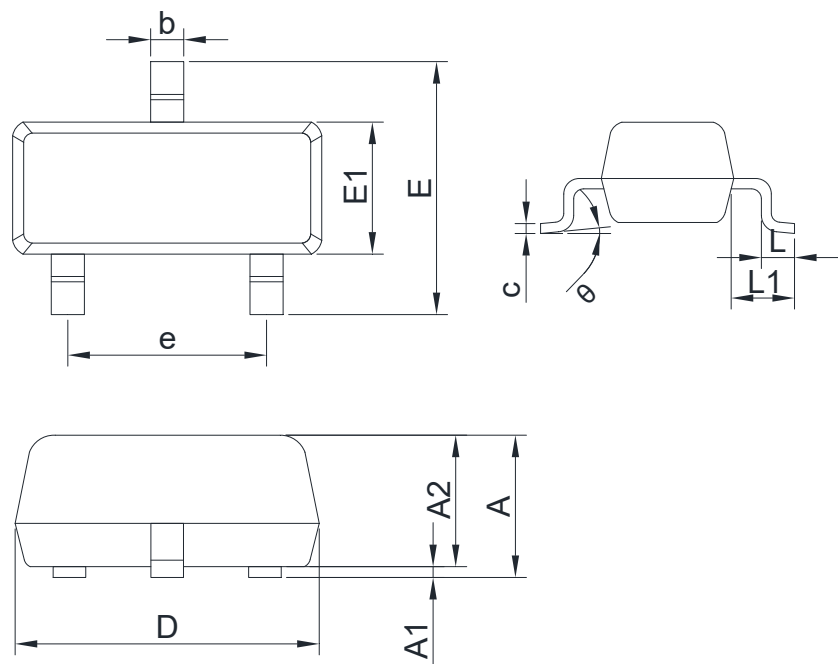


Fig.6 Normalized on Resistance vs Junction

Temperature

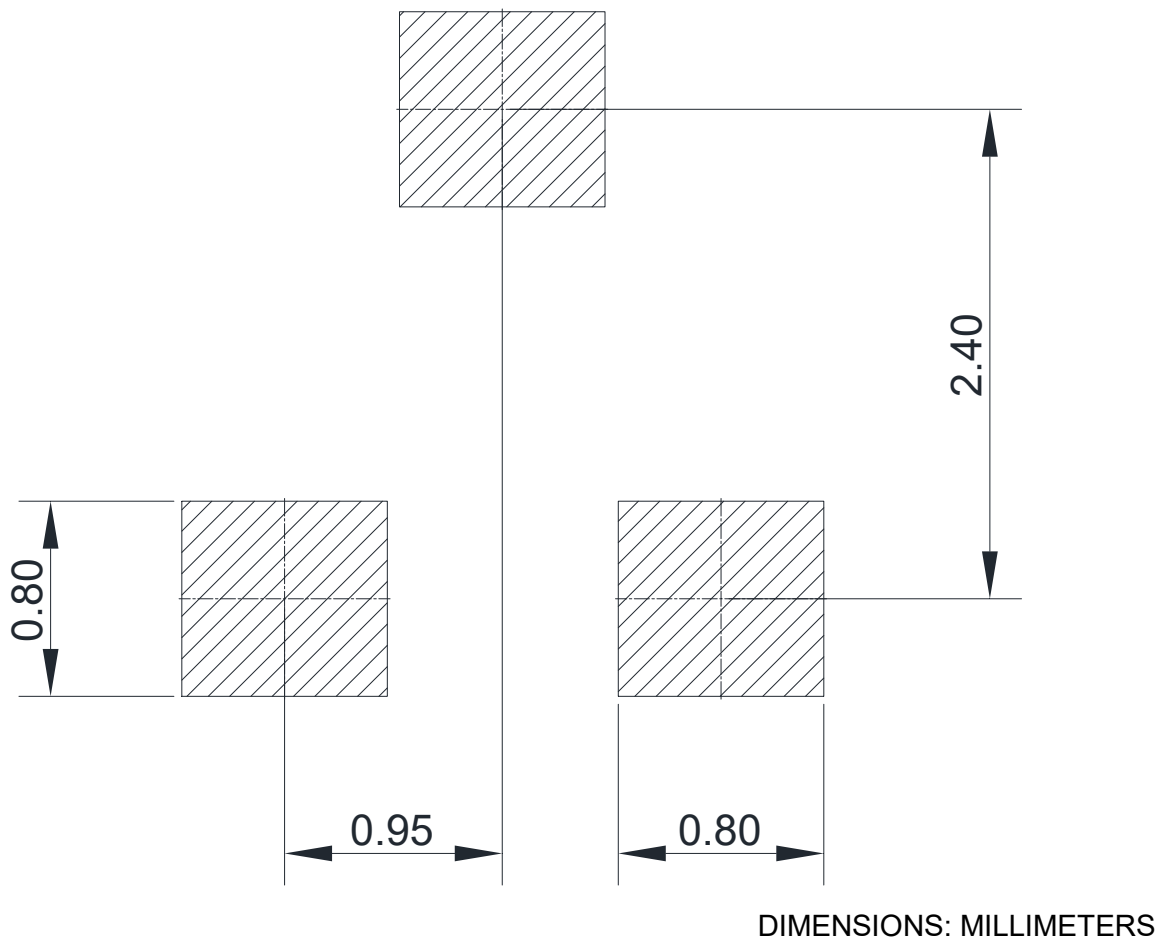
8. Dimension (SOT-23)

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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