

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

**1. Description**

The CJ2302S-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 CJ2302S-ES is Pb-free.

**2. Features**

- 20V,  $R_{DS(ON)}=45m\Omega(TYP.) @V_{GS}=4.5V$
- $R_{DS(ON)}=62m\Omega(TYP.) @V_{GS}=2.5V$
- 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
CJ2302S-ES	SOT-23	2302	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	7 inches

Table-1 Ordering information

**5. Pin Configuration and Functions**

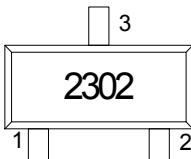
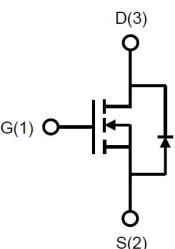
Pin	Function	Outline	Circuit Diagram
1	Gate		
2	Source		
3	Drain		

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

#### Thermal resistance ratings

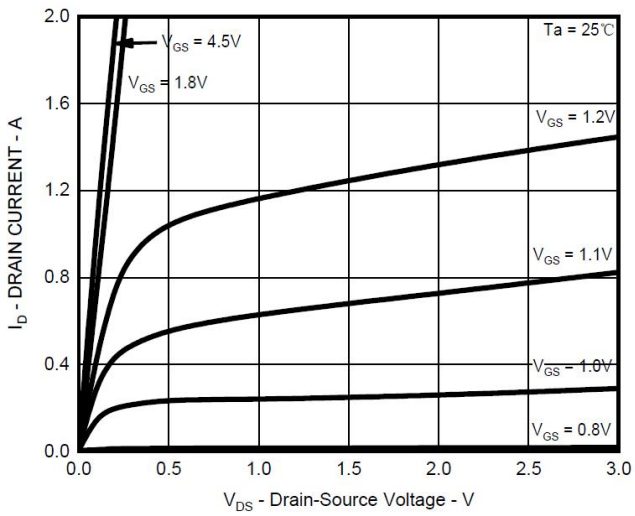
Single Operation			
Parameter	Symbol	Typical	Unit
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$	138	$^\circ\text{C}/\text{W}$

## Electrical Characteristics

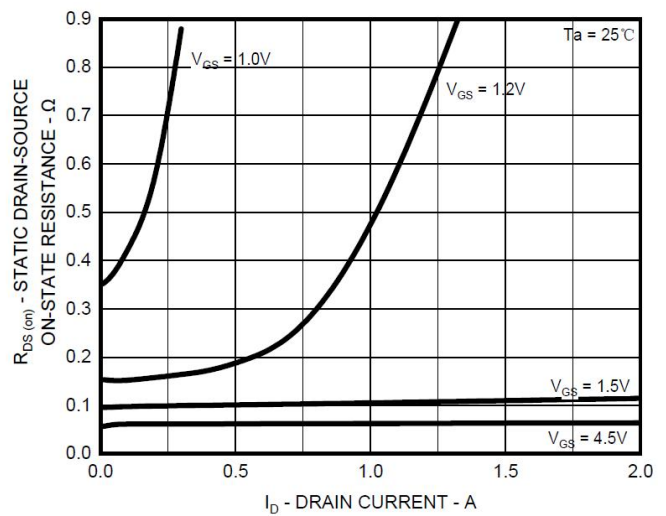
At TA = 25°C unless otherwise specified

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	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$			1.0	$\mu A$
Gate-to-source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 12V$			$\pm 100$	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	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=3A$		45	55	m $\Omega$
		$V_{GS}=2.5V, I_D=2A$		62	85	
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
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	-	
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=4.5V, V_{DS}=10V, I_D=2A, R_G=3\Omega$		3	-	ns
Rise Time	$t_r$			11	-	
Turn-Off Delay Time	$t_{d(OFF)}$			20	-	
Fall Time	$t_f$			8	-	
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=3A$			1.5	V

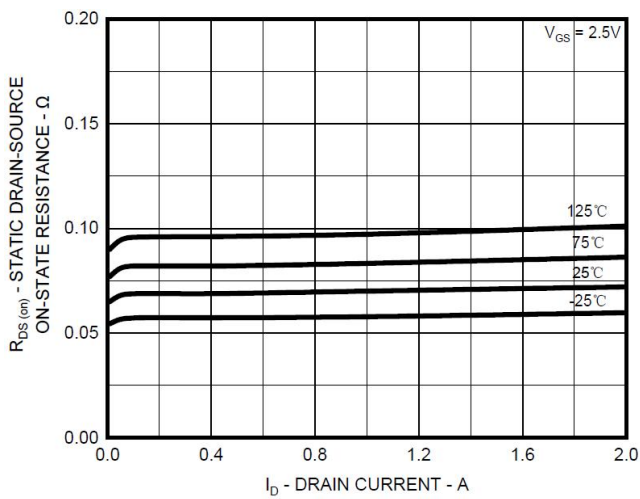
7. Typical Characteristic



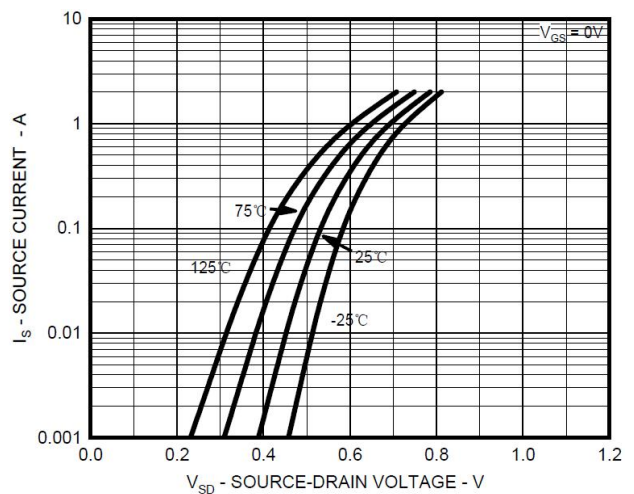
**Fig.1 Output Characteristics**



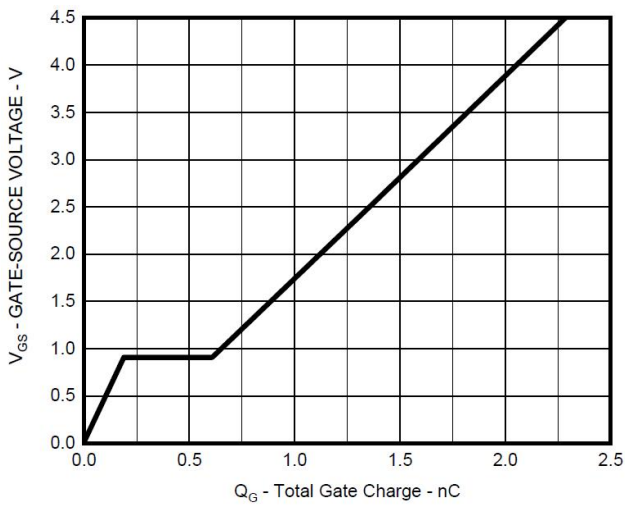
**Fig.2 On-Resistance vs. Drain Current (I)**



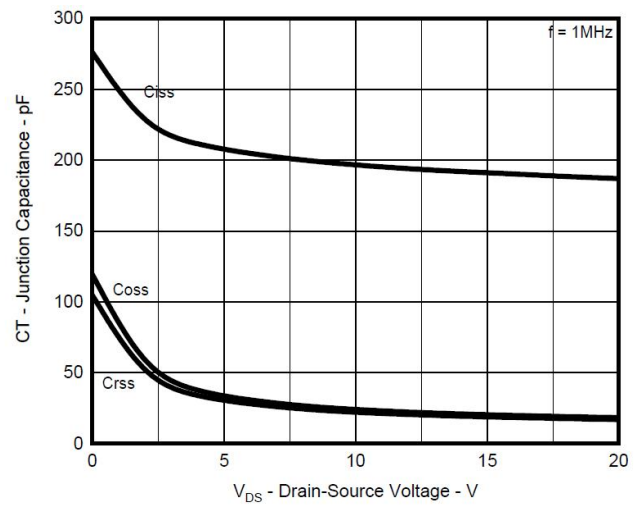
**Fig.3 On-Resistance vs. Drain Current (II)**



**Fig.4 Diode Forward Voltage vs. Current**

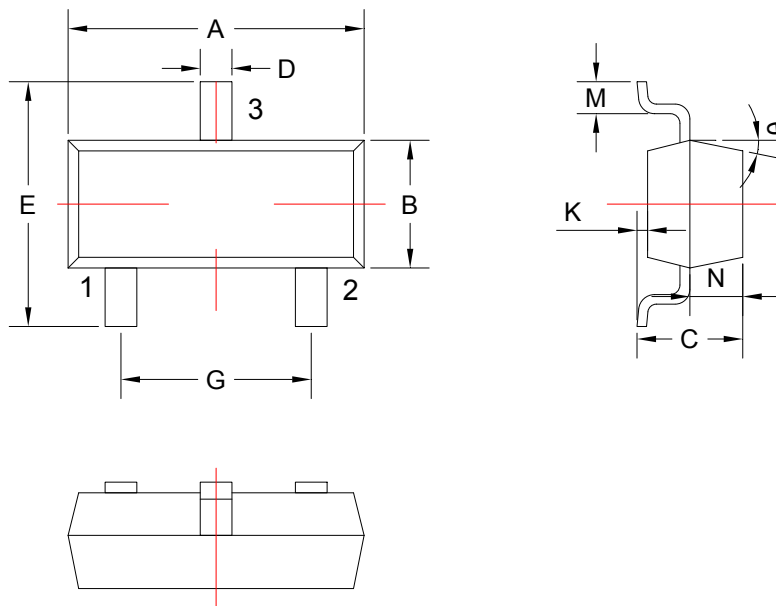


**Fig.5 Gate Charge Characteristics**



**Fig.6 Typical Junction Capacitance**

8. Dimension (SOT-23)



COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER					
SYMBOL	MIN	MAX	SYMBOL	MIN	MAX
A	2.85	3.04	G	1.80	2.00
B	1.20	1.40	K	0	0.10
C	0.90	1.10	M	0.20	-
D	0.40	0.50	N	0.50	0.70
E	2.25	2.55	θ	5°	9°

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