

# SOT-23 Plastic-Encapsulate MOSFETS

## SI2302 N-Channel 20V(D-S) MOSFET

### Features

- $V_{DS} = 20V$ ,  $I_D = 2.5A$
- $R_{DS(ON)} < 115m\Omega$  @  $V_{GS} = 2.5V$
- $R_{DS(ON)} < 85m\Omega$  @  $V_{GS} = 4.5V$
- Super high density cell design for extremely low  $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability

### Applications

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- Load Switch
- DSC

### Description

The SI2302 is the N-Channel logic enhancement mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for low voltage application such as cellular phone and notebook computer power management and other battery powered circuits where high-side switching and low in-line power loss are needed in a very small outline surface mount package.

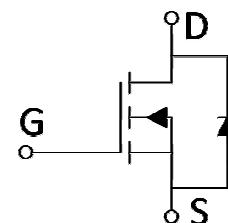
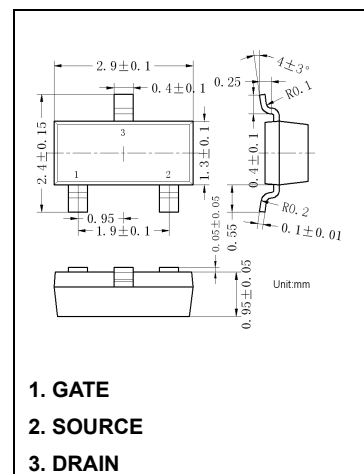
**Marking: A2SHB.**

### Maximum Ratings ( $T_a=25\text{ }^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
$V_{DS}$	Drain-source voltage	20	V
$V_{GS}$	Gate-source voltage	$\pm 8$	V
$I_D$	Continuous drain current	2.5	A
$I_{DM}$	Pulsed Drain Current <sup>1)</sup>	10	
$P_D$	Power dissipation	0.9	W
$T_J$	Operating Junction	150	$^\circ\text{C}$
$T_{stg}$	Storage temperature	-55 to 150	$^\circ\text{C}$

### Thermal Characteristic

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance from Junction to Ambient ( $t \leq 5s$ ) <sup>2)</sup>	139	$^\circ\text{C} / \text{W}$



**Electrical Characteristics (T<sub>a</sub>=25 °C unless otherwise noted)**

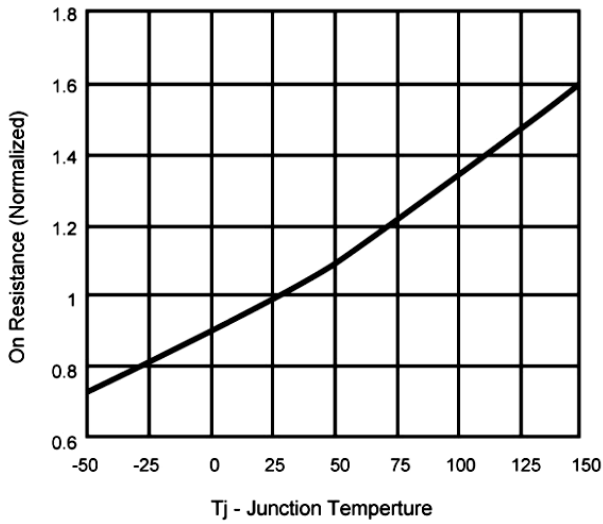
Symbol	Parameter	Test conditions	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
V <sub>(BR)DSS</sub>	Drain- source breakdown voltage	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250uA	20			V
I <sub>DSS</sub>	Zero gate voltage drain current	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V			1	μA
I <sub>GSS</sub>	Gate-body leakage current	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V			±100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate threshold voltage	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250uA	0.5		1.2	V
R <sub>DS(on)</sub>	Drain-Source on-state resistance	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 2.5A		55	85	mΩ
		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 2.0A		65	115	
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input capacitance	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 10V, f = 1MHz		450		pF
C <sub>oss</sub>	Output capacitance			72		
C <sub>rss</sub>	Reverse transfer capacitance			22		
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on delay time	V <sub>DD</sub> = 10V, R <sub>L</sub> =10Ω V <sub>GEN</sub> = 4.5Ω, R <sub>G</sub> =6Ω		9		ns
t <sub>r</sub>	Rise time			23		
t <sub>d(off)</sub>	Turn-off delay time			38		
t <sub>f</sub>	Fall time			3		
Q <sub>g</sub>	Total gate charge	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 2.5A		9		nC
Q <sub>gs</sub>	Gate-source charge			2.2		
Q <sub>gd</sub>	Gate-drain charge			3		
<b>Drain-source body diode characteristics</b>						
V <sub>SD</sub>	Diode forward voltage	V <sub>GS</sub> = 0 V, I <sub>S</sub> = 1A		0.75	1.2	V

**Notes:**

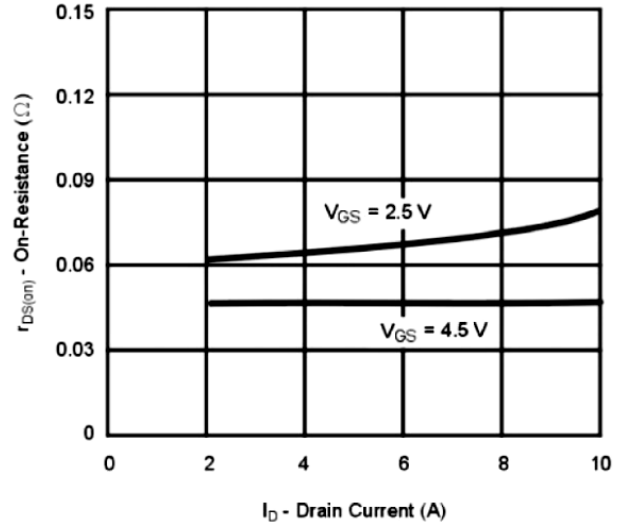
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.

# Typical Electrical and Thermal Characteristics

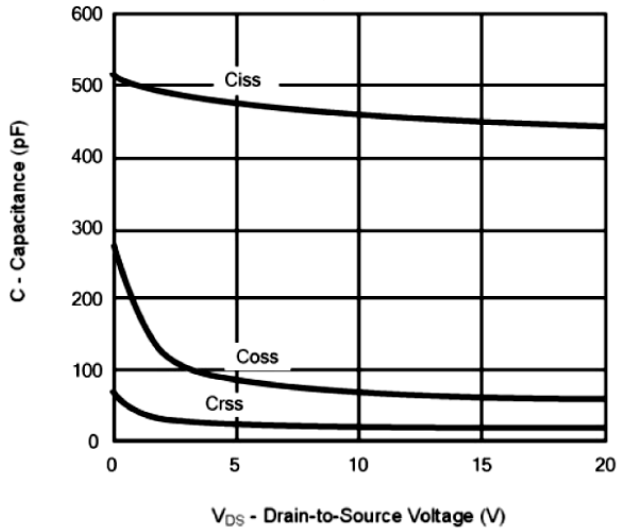
On Resistance vs. Junction Temperature



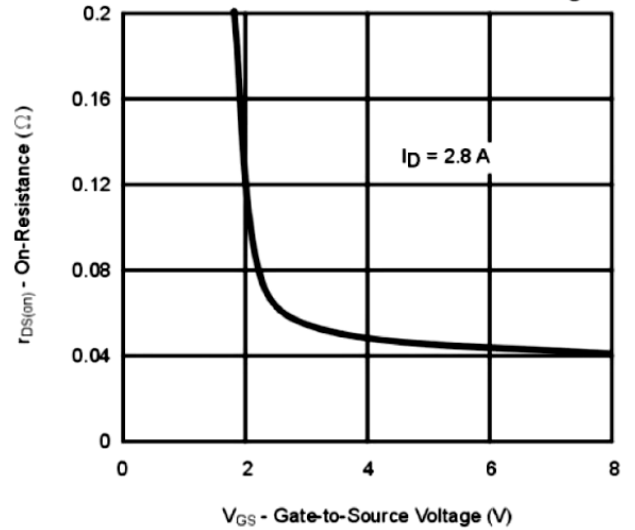
On-Resistance vs. Drain Current



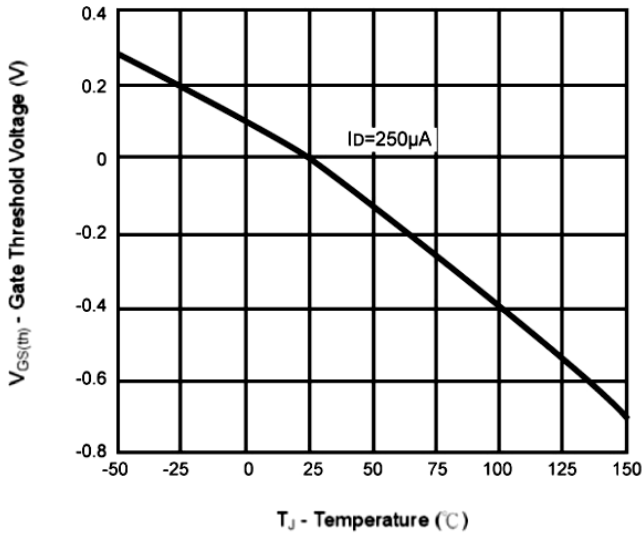
Capacitance



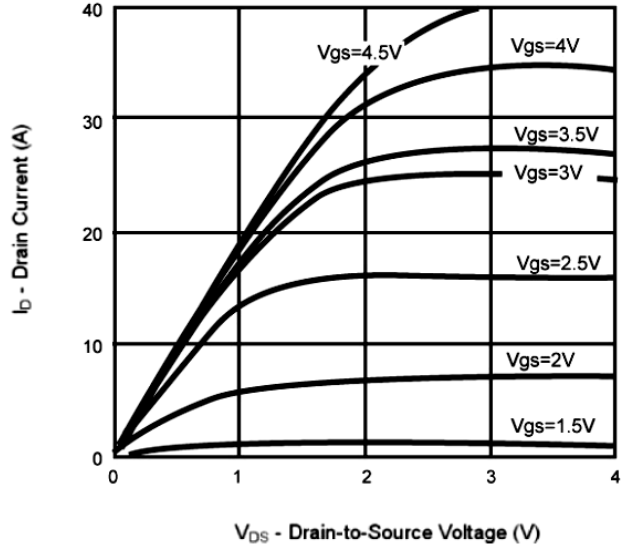
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

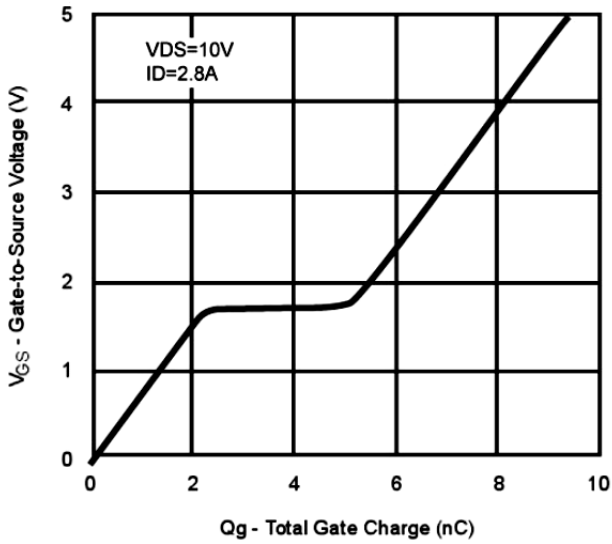


On-Region Characteristics

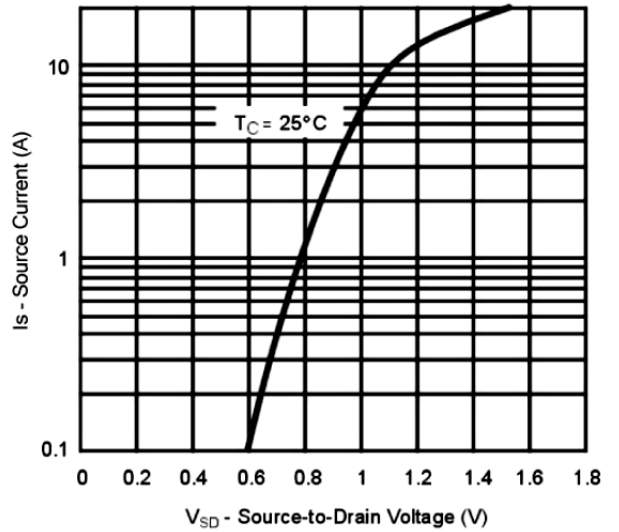


Typical Electrical and Thermal Characteristics(Cont.)

Gate Charge



Body-diode characteristics



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