

# SOT-23 Plastic-Encapsulate MOSFETS

**SI2300**

## SI2300 N-Channel 20-V(D-S) MOSFET

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
20V	0.025Ω@10V	6.0A
	0.032Ω@4.5V	
	0.040Ω@2.5V	

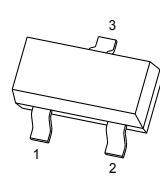
### General FEATURE

- TrenchFET Power MOSFET
- Lead free product is acquired
- Surface mount package

### APPLICATION

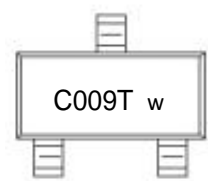
- Load Switch for Portable Devices
- DC/DC Converter

**SOT-23**



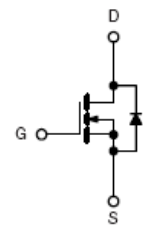
1.GATE  
2.SOURCE  
3.DRAIN

**MARKING**



\*w: week code

**Equivalent Circuit**



### ■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Parameter	Symbol	Rating	Unit	
Drain-Source Voltage	$V_{DS}$	20	V	
Gate-Source Voltage	$V_{GS}$	$\pm 10$	V	
Drain-Current	-Continuous * $T_J=125^\circ\text{C}$	$I_D$	6.0	A
	-Pulsed	$I_{DM}$	20	A
Power Dissipation *	$P_D$	1.25	W	
Thermal Resistance, Junction- to-Ambient	$R_{thJA}$	100	$^\circ\text{C/W}$	
Operating Junction and Storage Temperature Range	$T_j, T_{stg}$	-55 to 150	$^\circ\text{C}$	

\* Surface Mounted on FR 4 Board , $t \leq 10$  sec.

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### ■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	20			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =16V, V <sub>GS</sub> =0V			1	uA
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V			±100	nA
Gate Threshold Voltage *	V <sub>GS(th)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	0.5	0.78	1.0	V
Drain- Source on-state Resistance *	R <sub>DS(on)</sub>	V <sub>GS</sub> =10.0V, I <sub>D</sub> =6.0A		21	25	m Ω
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =3.0A		28	32	m Ω
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =2.0A		35	40	m Ω
On-State Drain Current *	I <sub>D(on)</sub>	V <sub>DS</sub> =5V, V <sub>GS</sub> =4.5V	5			A
Forward Transconductance *	g <sub>FS</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =6A	30			S
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHZ		888		pF
Output Capacitance	C <sub>OSS</sub>			144		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			115		pF
Turn-On Delay Time	t <sub>D(on)</sub>	V <sub>DD</sub> =10V, I <sub>D</sub> =1A, V <sub>GS</sub> =4.5V, R <sub>L</sub> =10 Ω, R <sub>GEN</sub> =6 Ω		31.8		ns
Rise Time	t <sub>r</sub>			14.5		ns
Turn-Off Delay Time	t <sub>D(off)</sub>			50.3		ns
Fall Time	t <sub>f</sub>			31.9		ns
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 3.5A, V <sub>GS</sub> = 4.5V		16.8		nC
Gate-Source Charge	Q <sub>gs</sub>			2.5		nC
Gate-Drain Charge	Q <sub>gd</sub>			5.4		nC
Drain-Source Diode Forward Current *	I <sub>S</sub>				1.25	A
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1.25A		0.825	1.3	V

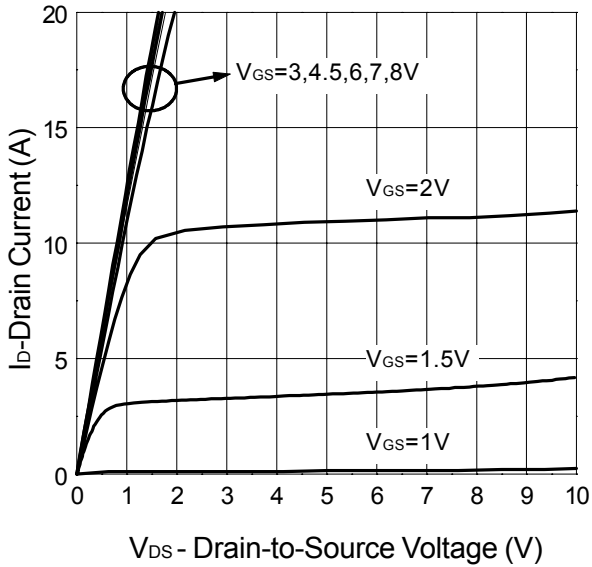
\* Pulse Test: Pulse Width ≤ 300 μ, Duty Cycle ≤ 2%

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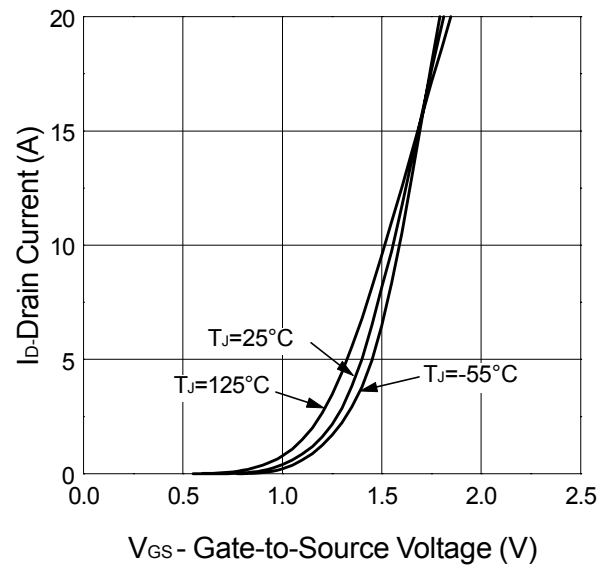
SI2300

## Typical Characteristics

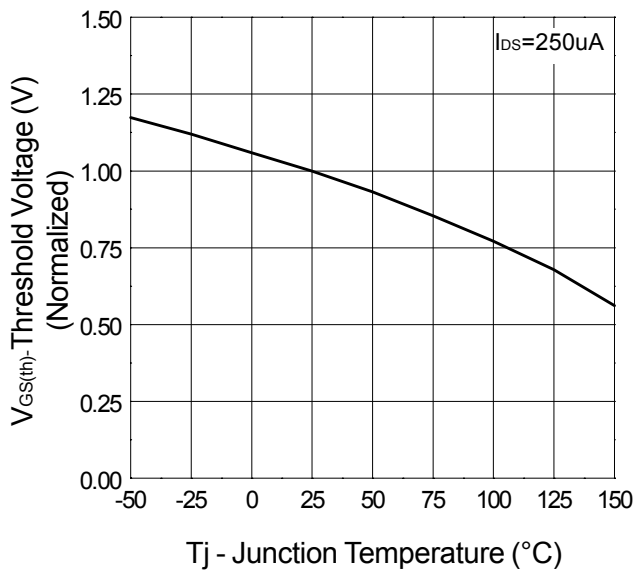
Output Characteristics



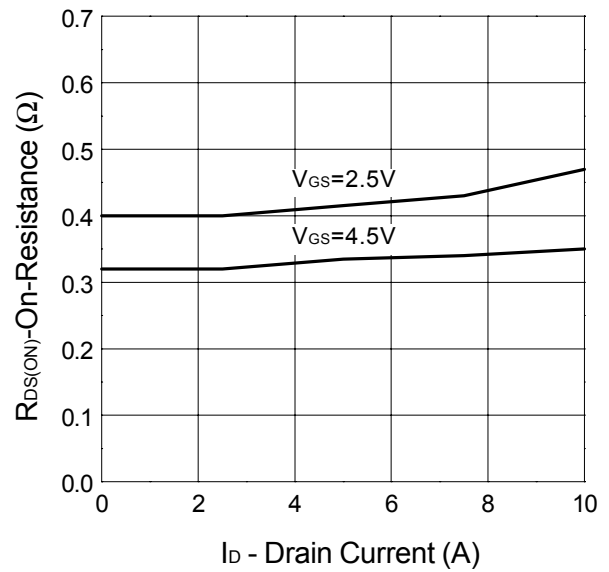
Transfer Characteristics



Threshold Voltage vs. Junction Temperature



On-Resistance vs. Drain Current

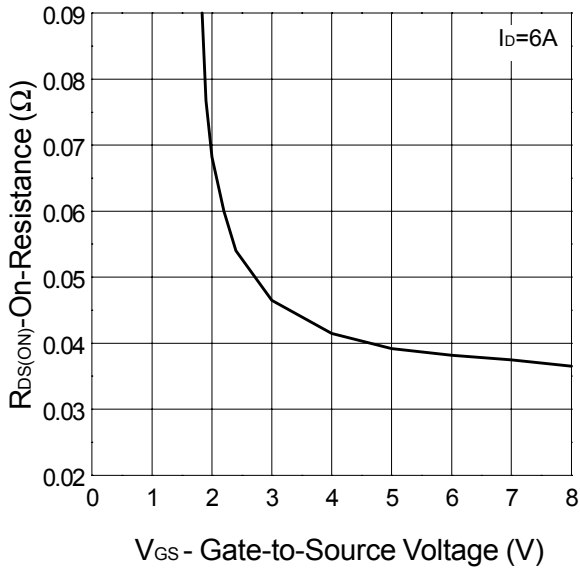


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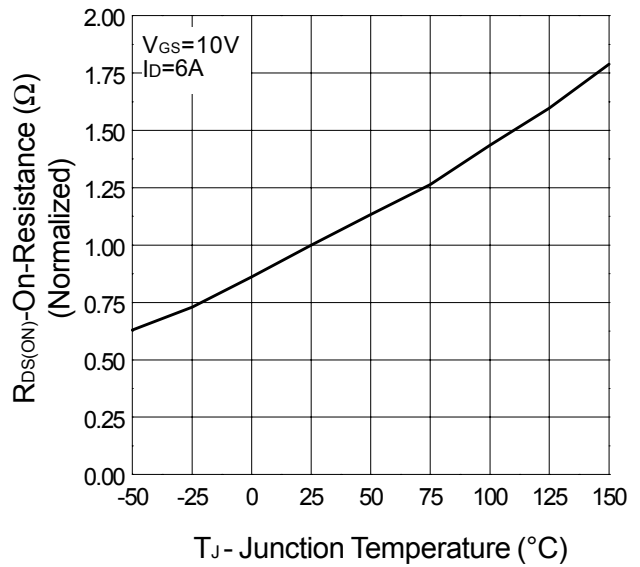
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## Typical Characteristics (Cont.)

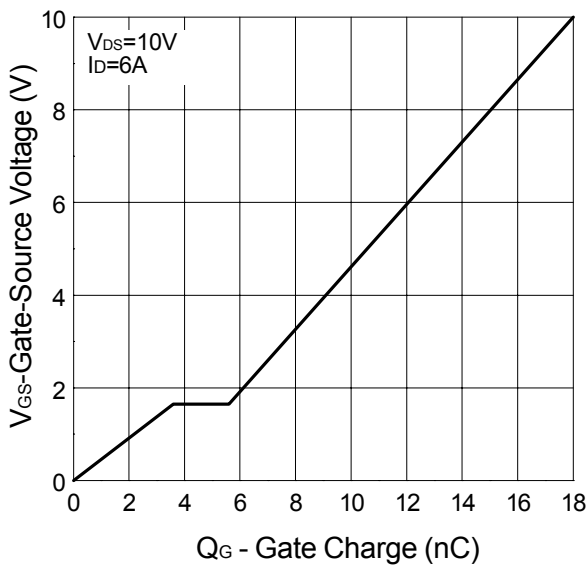
On-Resistance vs. Gate-to-Source Voltage



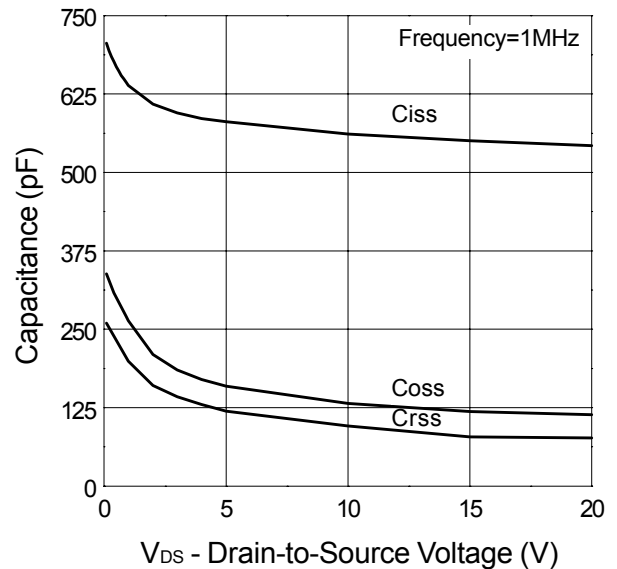
On-Resistance vs. Junction Temperature



Gate Charge



Capacitance

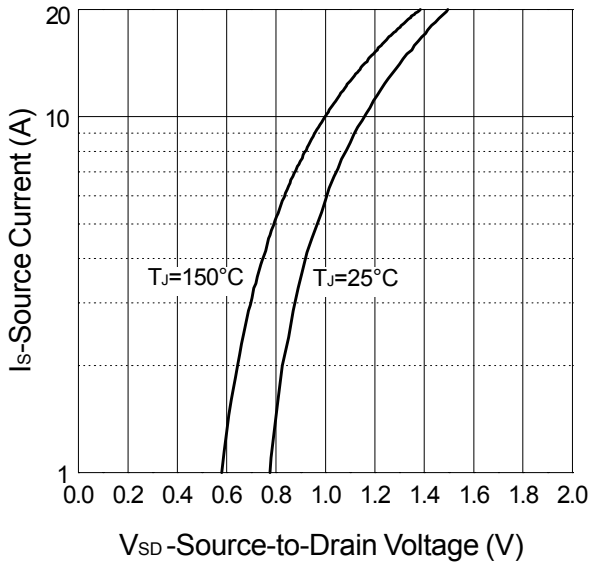


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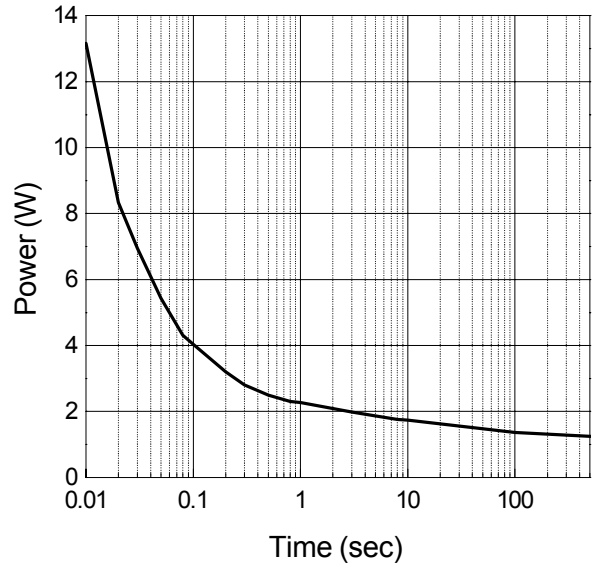
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## Typical Characteristics (Cont.)

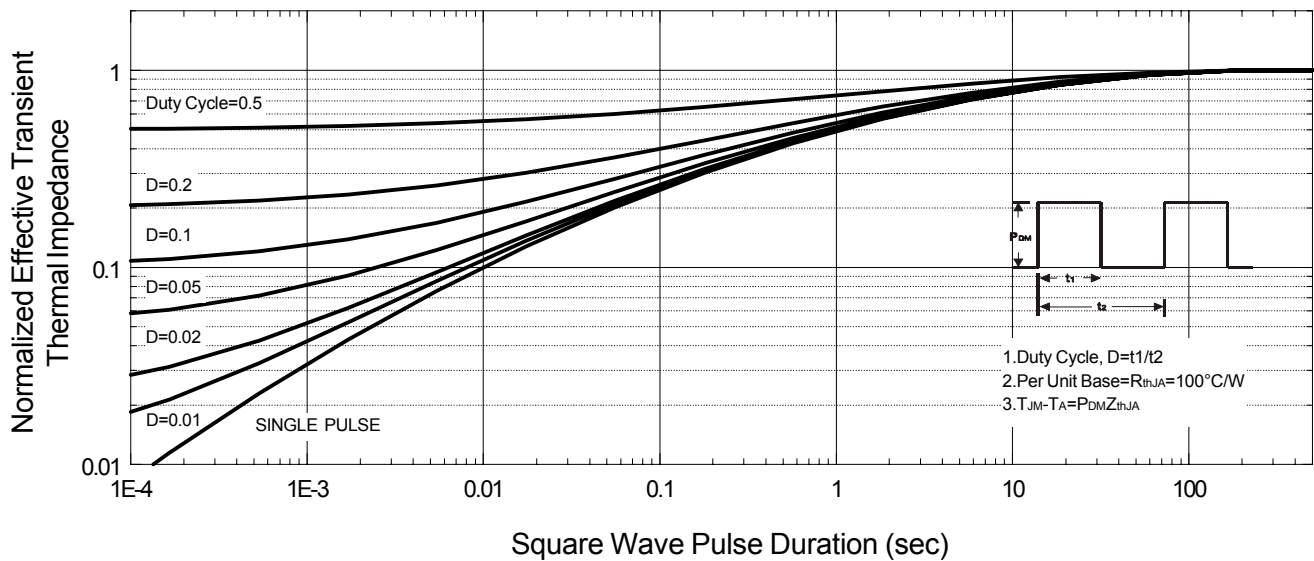
Source-Drain Diode Forward Voltage



Single Pulse Power



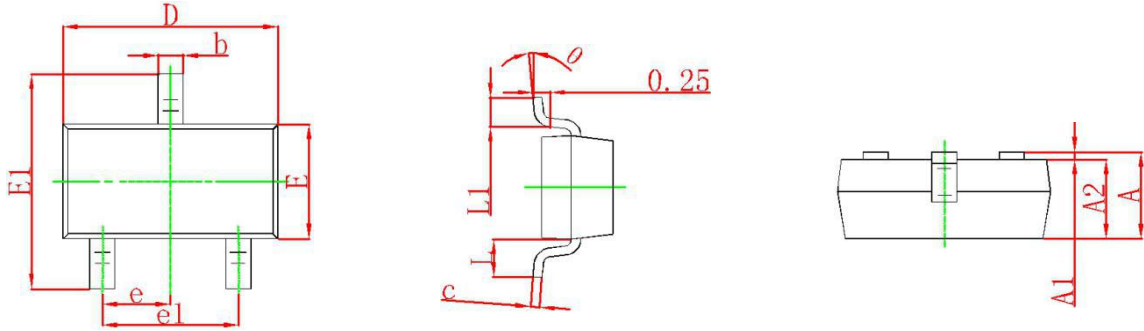
Normalized Thermal Transient Impedence, Junction to Ambient



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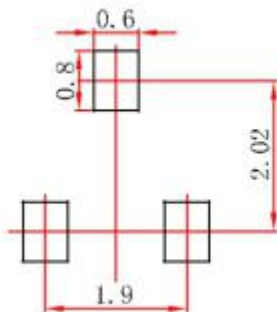
## SI2300

### SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

### SOT-23 Suggested Pad Layout



- Note:
1. Controlling dimension: in millimeters.
  2. General tolerance:  $\pm 0.05\text{mm}$ .
  3. The pad layout is for reference purposes only.