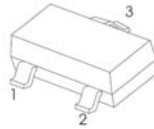


FEATURE

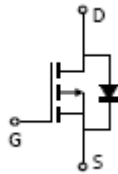
- High density cell design for low $R_{DS(ON)}$
- Voltage controlled small signal switch
- Rugged and reliable
- High saturation current capability

SOT-23

1. GATE
2. SOURCE
3. DRAIN

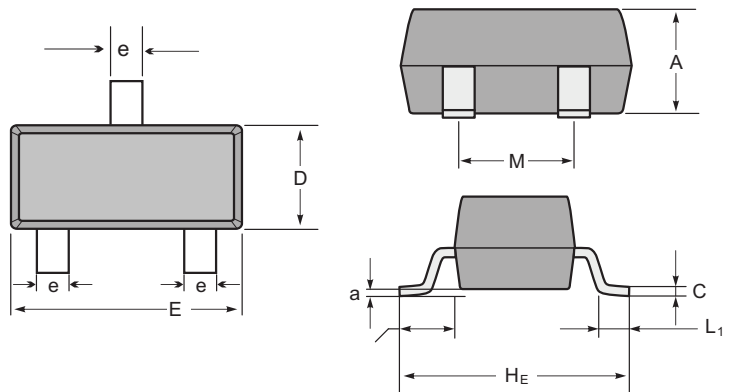


Equivalent Circuit



Marking

Type number	Marking code
SI2309	S9



SOT-23 mechanical data

UNIT		A	C	D	E	H _E	e	M	L	L ₁	a
mm	max	1.1	0.15	1.4	3.0	2.6	0.5	1.95	0.55 (ref)	0.36 (ref)	0.0
	min	0.9	0.08	1.2	2.8	2.2	0.3	1.7			0.15
mil	max	43	6	55	118	102	20	77	22 (ref)	14 (ref)	0.0
	min	35	3	47	110	87	12	67			6

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current *1,*2 $T_a = 25^\circ\text{C}$ $T_a = 70^\circ\text{C}$	I_D	-1.25	A
		-0.85	
Pulsed Drain Current	I_{DM}	-8	W
Avalanche Current $L=0.1\text{mH}$	I_{AS}	-5	
Power Dissipation *1,*2 $T_a = 25^\circ\text{C}$ $T_a = 70^\circ\text{C}$	P_D	1.25	W
		0.8	
Thermal Resistance.Junction- to-Ambient $t \leq 5$ sec Steady State *1	R_{thJA}	100	$^\circ\text{C/W}$
		166	
Thermal Resistance.Junction- to-Case *1	R_{thJC}	60	$^\circ\text{C}$
Junction Temperature	T_J	150	
Storage Temperature Range	T_{stg}	-55 to 150	

*1 Surface Mounted on FR4 Board.

*2 $t \leq 5$ sec.

SI2309

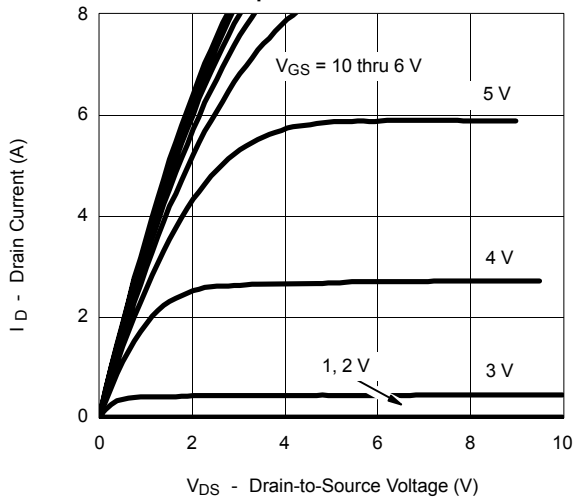
■ Electrical Characteristics Ta = 25 °C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V _{DSS}	I _D =-250 μ A, V _{GS} =0V	-60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-48V, V _{GS} =0V			-1	μ A
		V _{DS} =-48V, V _{GS} =0V, T _J =125 °C			-50	
Gate-Body leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} I _D =-250 μ A	-1		-3	V
Static Drain-Source On-Resistance *1	R _{DS(on)}	V _{GS} =-10V, I _D =-1.25A		160	340	m Ω
		V _{GS} =-4.5V, I _D =-1A			550	
On state drain current *1	I _{D(ON)}	V _{GS} =-4.5V, V _{DS} =-10V	-6			A
Forward Transconductance *1	g _{FS}	V _{DS} =-4.5V, I _D =-1A		1.9		S
Total Gate Charge	Q _g	V _{GS} =-10V, V _{DS} =-30V, I _D =-1.25A		5.4	12	nC
Gate Source Charge	Q _{gs}			1.15		
Gate Drain Charge	Q _{gd}			0.92		
Turn-On DelayTime	t _{d(on)}	V _{GS} =-4.5V, V _{DS} =-30V, R _L =30 Ω, R _{GEN} =6 Ω I _D =-1A		10.5	20	ns
Turn-On Rise Time	t _r			11.5	20	
Turn-Off DelayTime	t _{d(off)}			15.5	30	
Turn-Off Fall Time	t _f			7.5	15	
Body Diode Reverse Recovery Time	t _{rr}	I _F =-1.25A, di/dt=100A/ μ s		30	55	
Maximum Body-Diode Continuous Current	I _S				-1.25	A
Diode Forward Voltage	V _{SD}	I _S =-1.25A, V _{GS} =0V		-0.82	-1.2	V

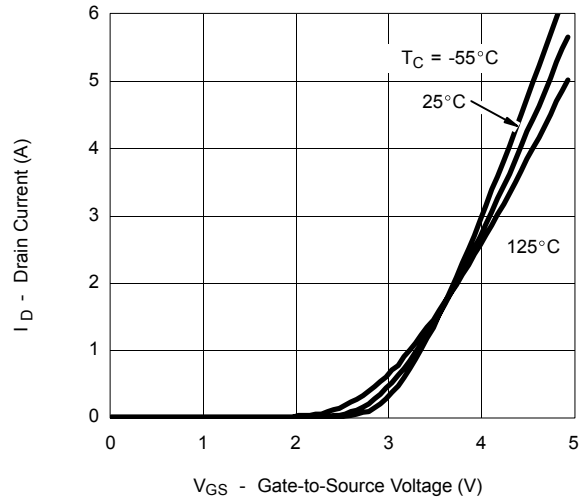
*1 Pulse test; pulse width ≤ 300us, duty cycle ≤ 2%.

RATING AND CHARACTERISTIC CURVES (SI2309)

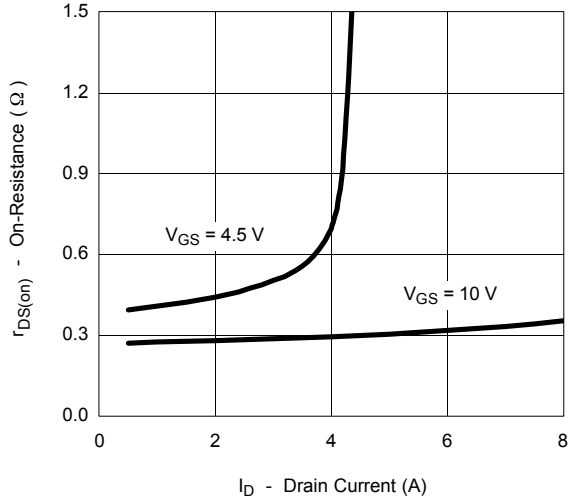
Output Characteristics



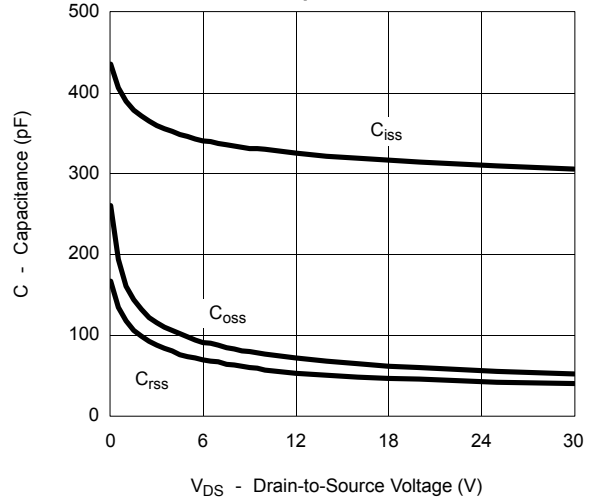
Transfer Characteristics



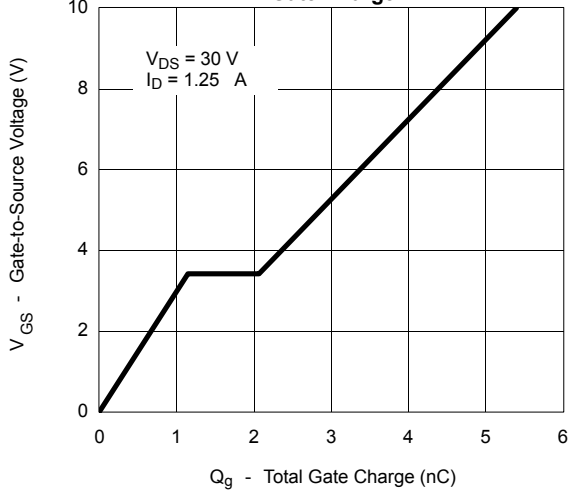
On-Resistance vs. Drain Current



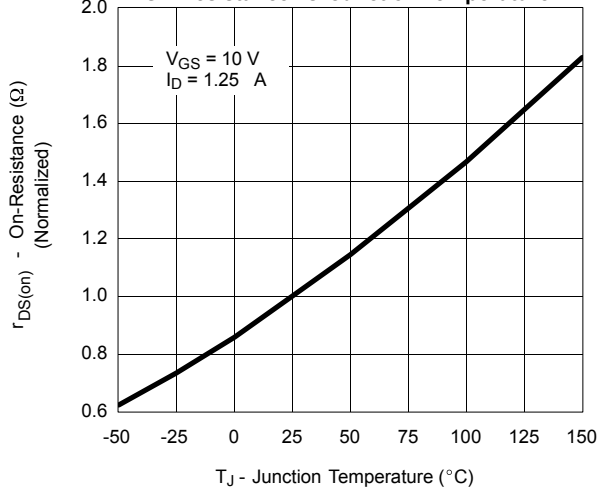
Capacitance



Gate Charge

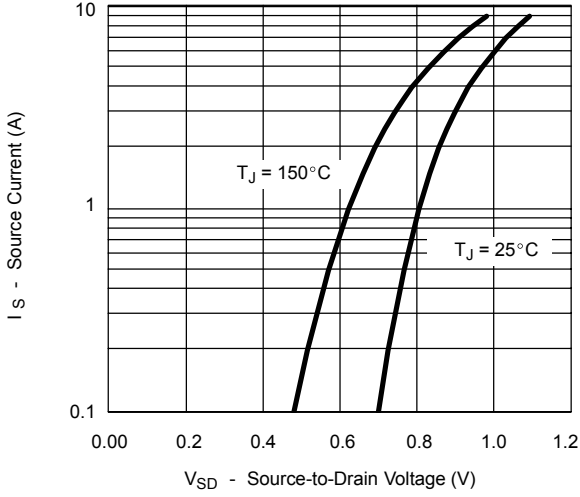


On-Resistance vs. Junction Temperature

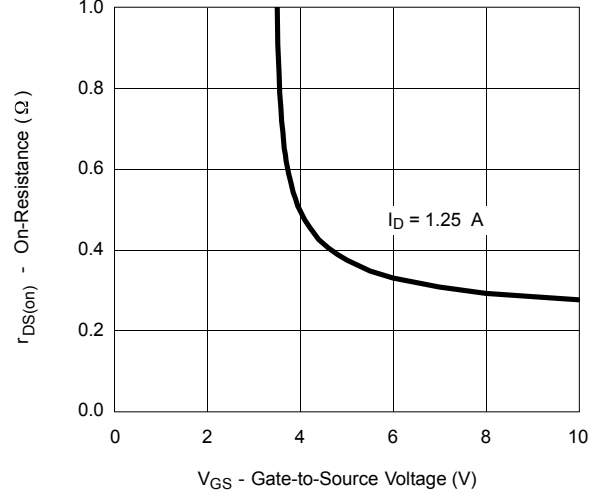


RATING AND CHARACTERISTIC CURVES (SI2309)

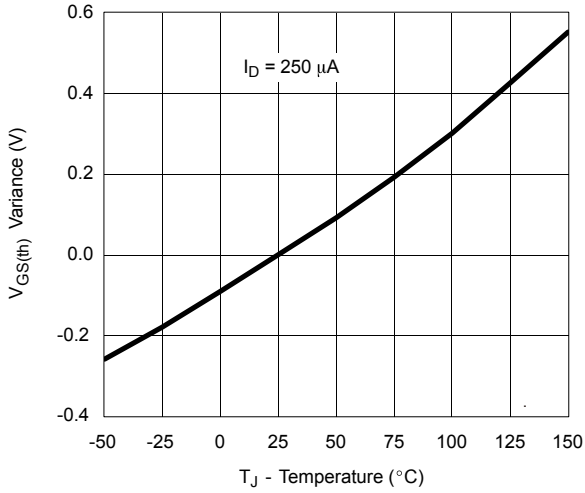
Source-Drain Diode Forward Voltage



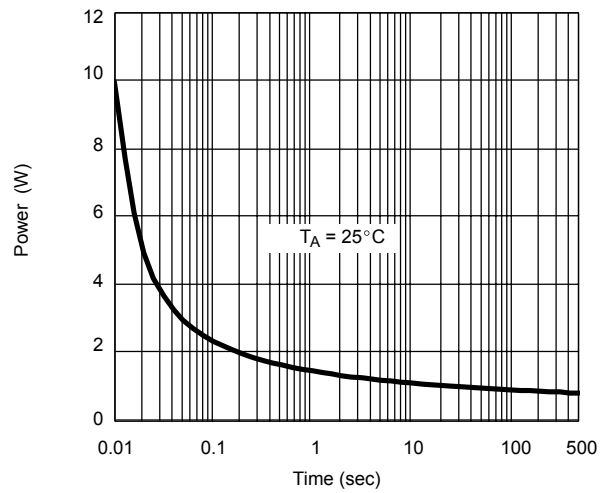
On-Resistance vs. Gate-to-Source Voltage



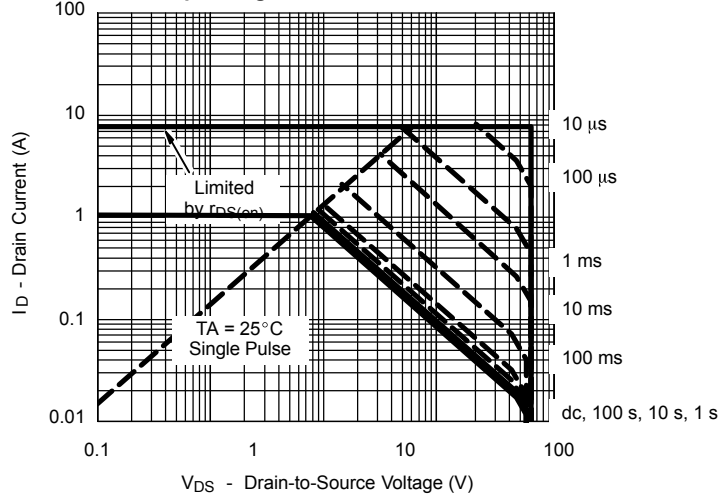
Threshold Voltage



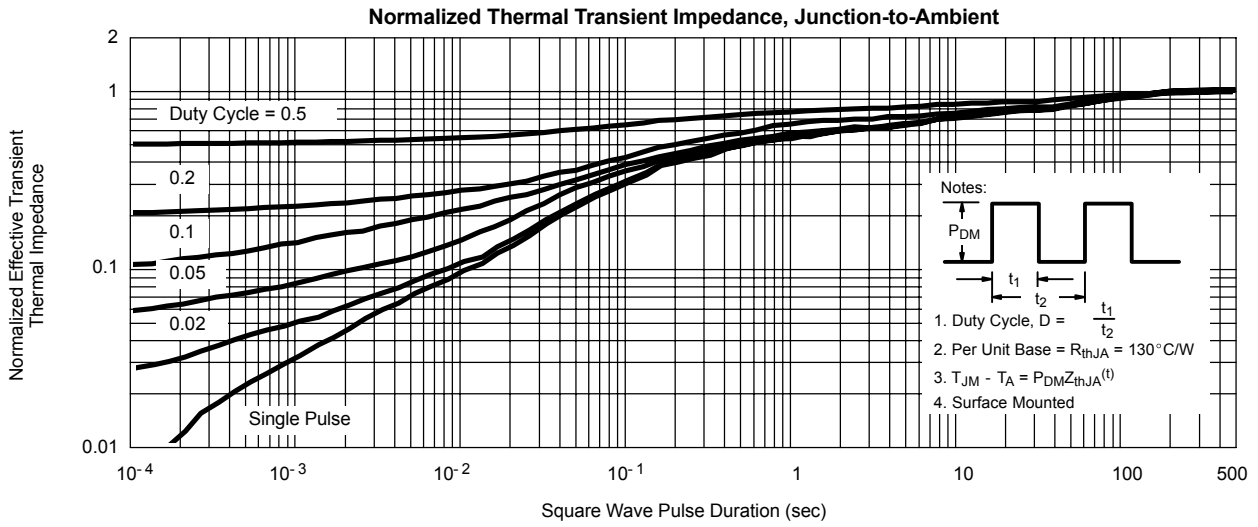
Single Pulse Power



Safe Operating Area, Junction-to-Ambient



RATING AND CHARACTERISTIC CURVES (SI2309)



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