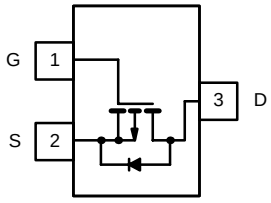
P-Channel 60-V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
-60	0.340 @ V_{GS} = -10 V	- 1.25
	0.550 @ V_{GS} = -4.5 V	- 1

TO-236
(SOT-23)



Top View
Si2309DS (A9)*
*Marking Code

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	-60	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current (T_J = 150°C)[a, b]	T_A = 25°C	I_D	-1.25	A
	T_A = 100°C		-0.85	
Pulsed Drain Current		I_{DM}	-8	
Avalanche Current	L = 0.1 mH	I_{AS}	-5	
Maximum Power Dissipation[a, b]	T_A = 25°C	P_D	1.25	W
	T_A = 70°C		0.8	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[a]	t ≤ 5 sec	R_{thJA}		100	°C/W
	Steady State		130	166	
Maximum Junction-to-Lead[a]	Steady State	R_{thJL}	45	60	

Notes
a. Surface Mounted on FR4 Board.
b. t ≤ 5 sec.

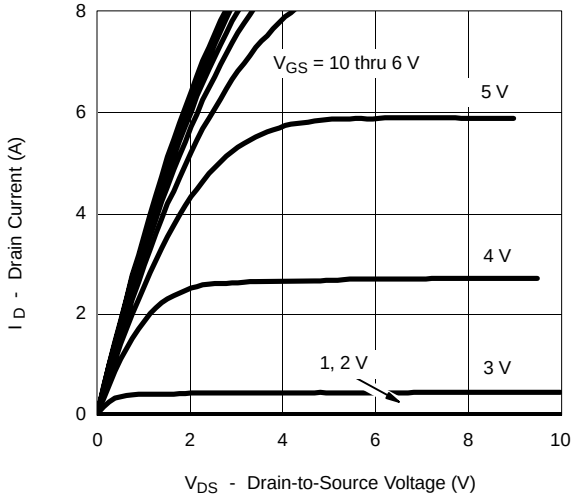
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{DS} = 0 V, I_D = -250 µA	-60			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250 µA	-1			
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -48 V, V_{GS} = 0 V			-1	µA
		V_{DS} = -48 V, V_{GS} = 0 V, T_J = 125°C			-50	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ -4.5 V, V_{GS} = -10 V	-6			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = -10 V, I_D = -1.25 A		0.275	0.340	Ω
		V_{GS} = -4.5 V, I_D = -1 A		0.406	0.550	
Forward Transconductance[a]	g_{fs}	V_{DS} = -4.5 V, I_D = -1 A		1.9		S
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = -30 V, V_{GS} = -10 V, I_D = -1.25 A		5.4	12	nC
Gate-Source Charge	Q_{gs}			1.15		
Gate-Drain Charge	Q_{gd}			0.92		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = -30 V, R_L = 30 Ω I_D ≅ -1 A, V_{GEN} = -4.5 V, R_G = 6 Ω		10.5	20	ns
Rise Time	t_r			11.5	20	
Turn-Off Delay Time	$t_{d(off)}$			15.5	30	
Fall Time	t_f			7.5	15	
Source-Drain Rating Characteristics[b]						
Continuous Current	I_S				-1.25	A
Pulsed Current	I_{SM}				-8	
Diode Forward Voltage[a]	V_{SD}	I_S = -1.25 A, V_{GS} = 0 V		-0.82	-1.2	V
Source-Drain Reverse Recovery Time	t_{rr}	I_F = -1.25 A, di/dt = 100 A/µs		30	55	ns

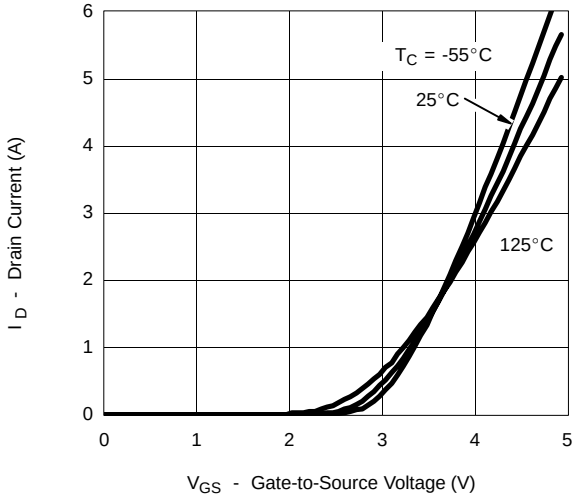
Notes
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

Output Characteristics

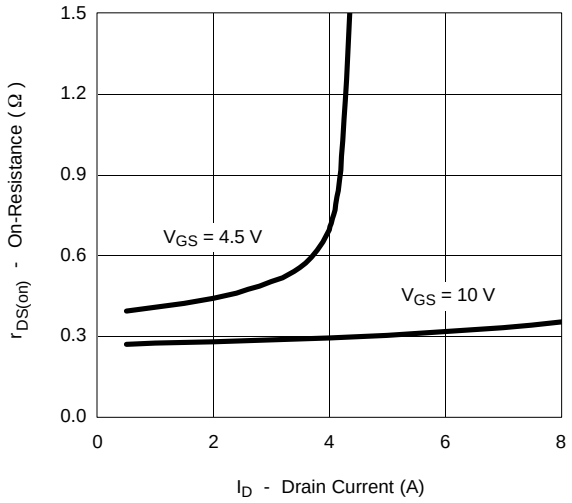


Transfer Characteristics

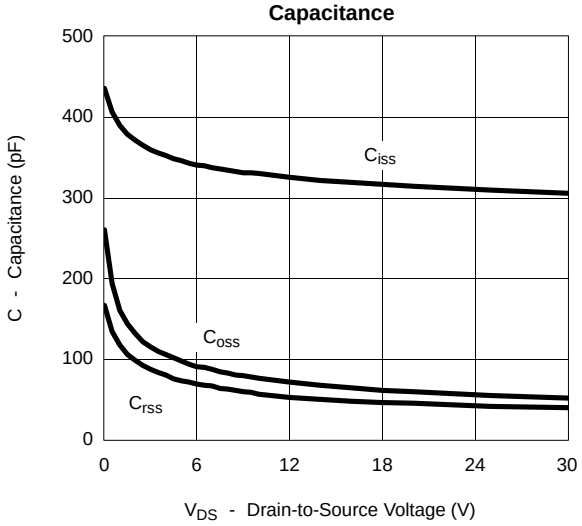


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

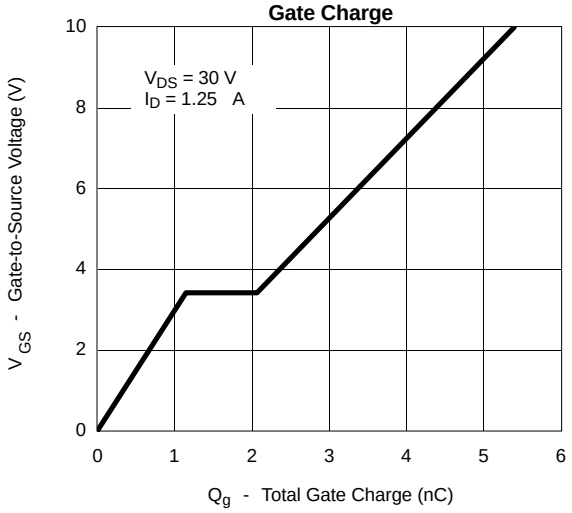
On-Resistance vs. Drain Current



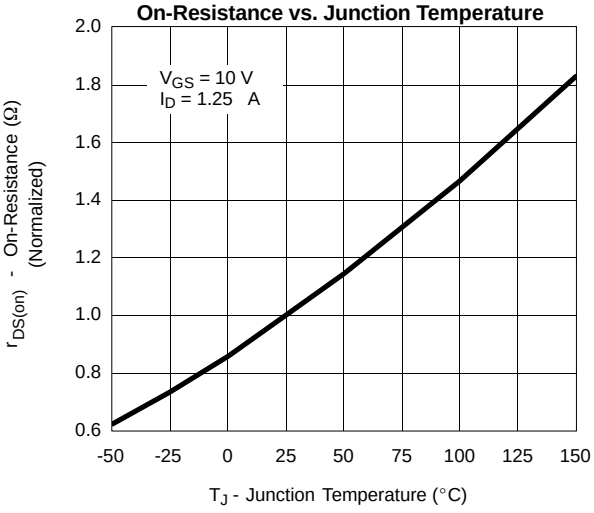
Capacitance



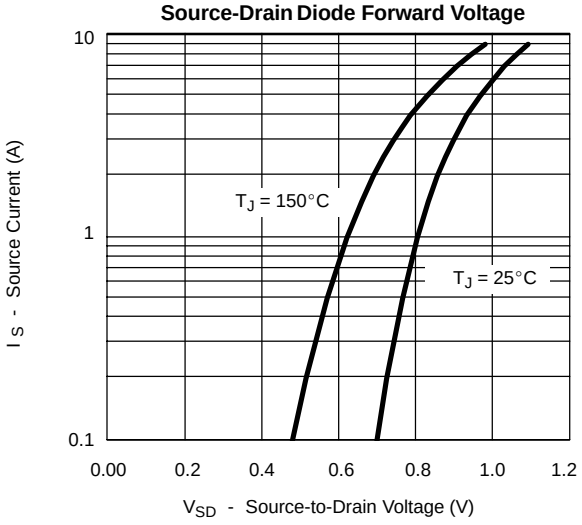
Gate Charge



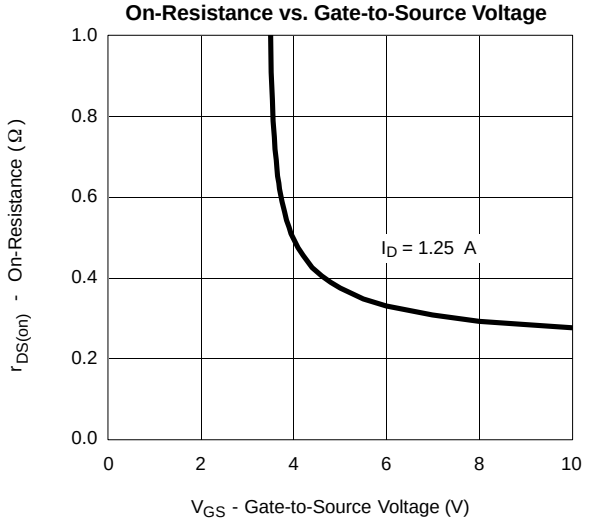
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

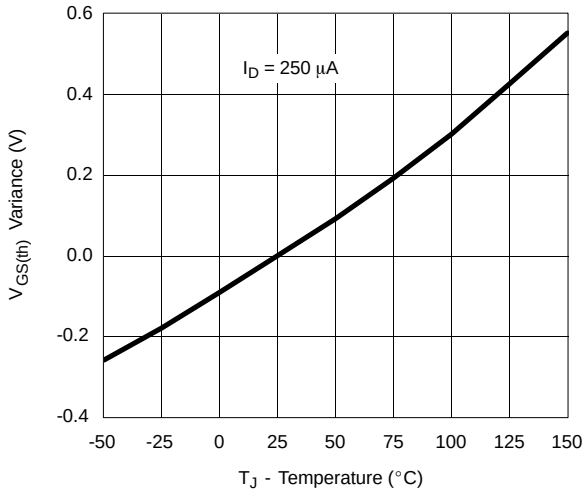


On-Resistance vs. Gate-to-Source Voltage

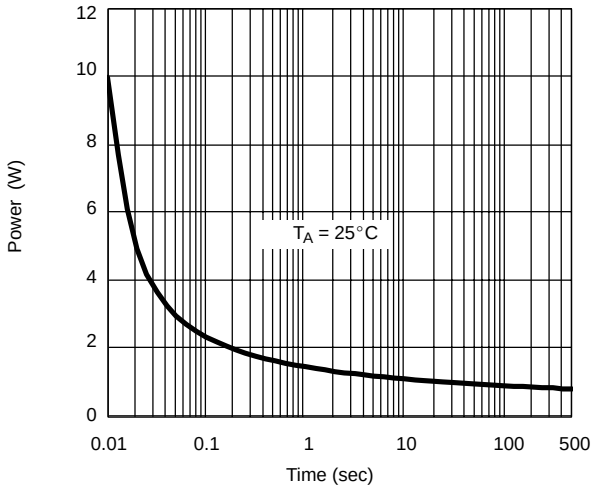


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

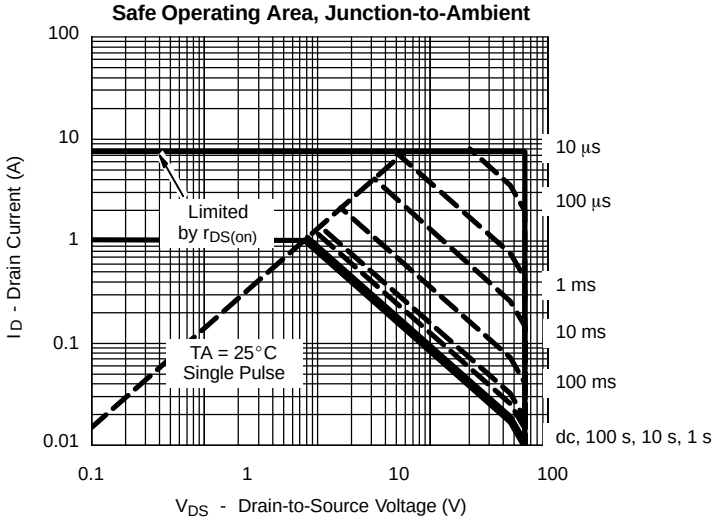
Threshold Voltage



Single Pulse Power



Safe Operating Area, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Ambient