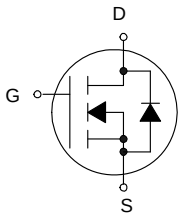
SI2318

N-Channel MOSFET

1.Gate
2.Source
3.Drain

SOT-23



PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)[a]	Q_g (Typ.)
40	0.042 at V_{GS} = 10 V	5.6	2.9 nC
	0.051 at V_{GS} = 4.5 V	5.1	

APPLICATIONS

- DC/DC Converters
- Load Switch
- Portable and Consumer Applications

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	5.6[a]	A
	T_C = 70 °C		4.5	
	T_A = 25 °C		4.3[b, c]	
	T_A = 70 °C		3.5[b, c]	
Pulsed Drain Current		I_{DM}	20	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	1.75	
	T_A = 25 °C		1.04[b, c]	
Maximum Power Dissipation	T_C = 25 °C	P_D	2.1	W
	T_C = 70 °C		1.3	
	T_A = 25 °C		1.25[b, c]	
	T_A = 70 °C		0.8[b, c]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C
Soldering Recommendations (Peak Temperature)			260	

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[b, d]	t ≤ 5 s	R_{thJA}	80	100	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	40	60	

Notes:
a. Based on T_C = 25 °C
b. Surface mounted on 1" x 1" FR4 board.
c. t = 5 s.
d. Maximum under steady state conditions is 125 °C/W.

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SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	40			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = 250 µA		39		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 4.7		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D = 250 µA	1.2		2.5	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 40 V, V_{GS} = 0 V			1	µA
		V_{DS} = 40 V, V_{GS} = 0 V, T_J = 70 °C			10	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≤ 5 V, V_{GS} = 10 V	20			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 4.3 A		0.035	0.042	Ω
		V_{GS} = 4.5 V, I_D = 3.9 A		0.041	0.051	
Forward Transconductance[a]	g_{fs}	V_{DS} = 20 V, I_D = 4.3 A		17		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = 20 V, V_{GS} = 0 V, f = 1 MHz		340		pF
Output Capacitance	C_{oss}			60		
Reverse Transfer Capacitance	C_{rss}			30		
Total Gate Charge	Q_g	V_{DS} = 20 V, V_{GS} = 10 V, I_D = 4.3 A		5.8	9	nC
		V_{DS} = 20 V, V_{GS} = 4.5 V, I_D = 4.3 A		2.9	6	
Gate-Source Charge	Q_{gs}			1.1		
Gate-Drain Charge	Q_{gd}			0.9		
Gate Resistance	R_g	f = 1 MHz	0.6	3.3	6.6	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 20 V, R_L = 5.7 Ω I_D ≅ 3.5 A, V_{GEN} = 4.5 V, R_g = 1 Ω		12	20	ns
Rise Time	t_r			50	75	
Turn-Off Delay Time	$t_{d(off)}$			10	20	
Fall Time	t_f			8	16	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 20 V, R_L = 5.7 Ω I_D ≅ 3.5 A, V_{GEN} = 10 V, R_g = 1 Ω		7	14	
Rise Time	t_r			20	30	
Turn-Off Delay Time	$t_{d(off)}$			14	21	
Fall Time	t_f			8	16	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C			1.75	A
Pulse Diode Forward Current	I_{SM}				20	
Body Diode Voltage	V_{SD}	I_S = 3.5 A, V_{GS} = 0 V		0.85	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 3.5 A, dI/dt = 100 A/µs, T_J = 25 °C		15	23	ns
Body Diode Reverse Recovery Charge	Q_{rr}			7	14	nC
Reverse Recovery Fall Time	t_a			11		ns
Reverse Recovery Rise Time	t_b			4		

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

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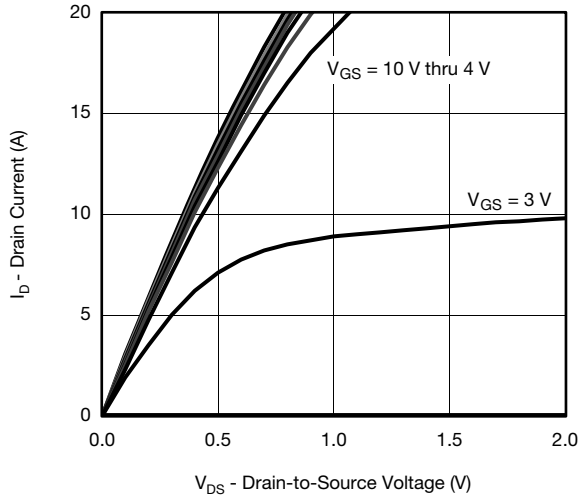
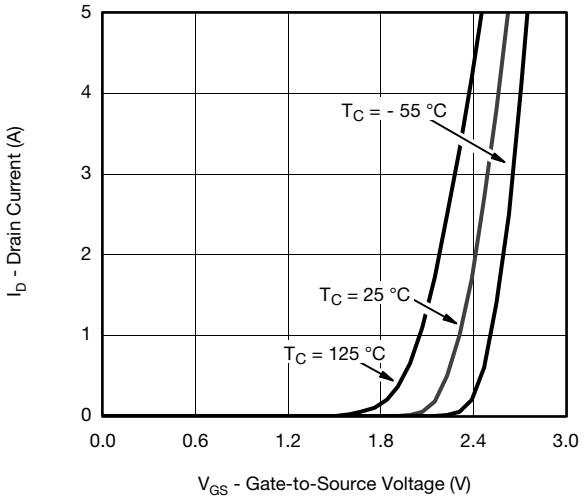
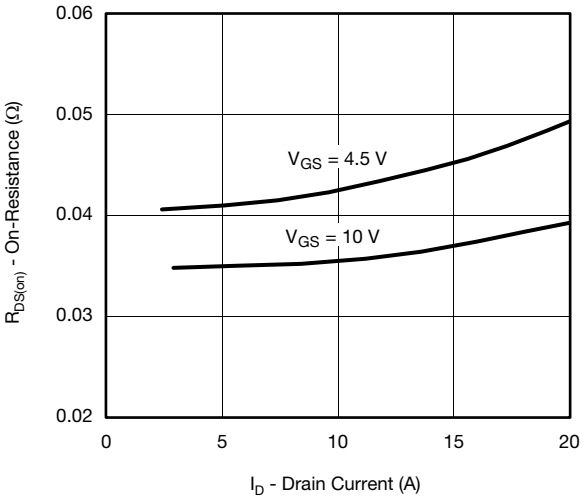
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



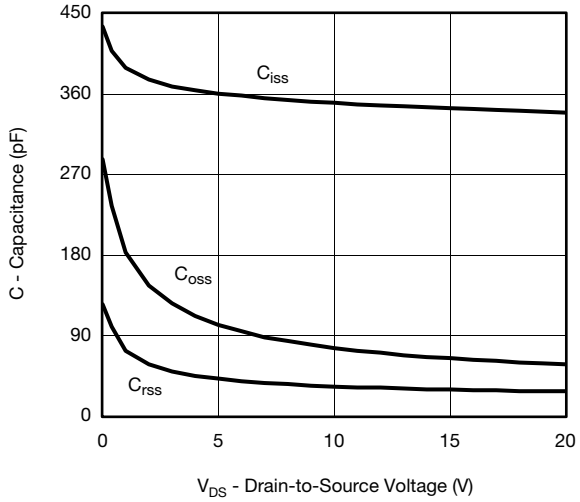
Output Characteristics



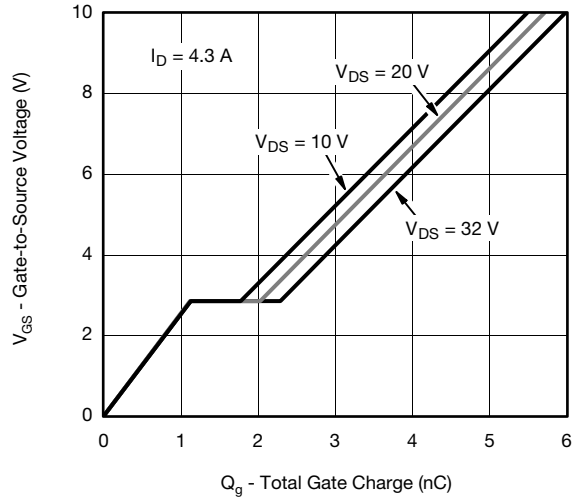
Transfer Characteristics



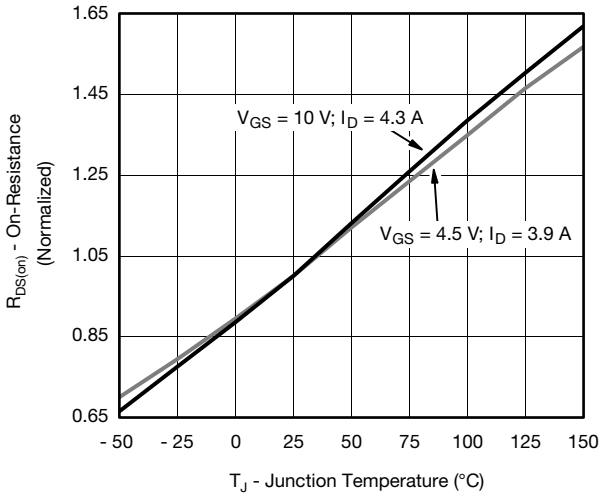
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



Gate Charge



On-Resistance vs. Junction Temperature

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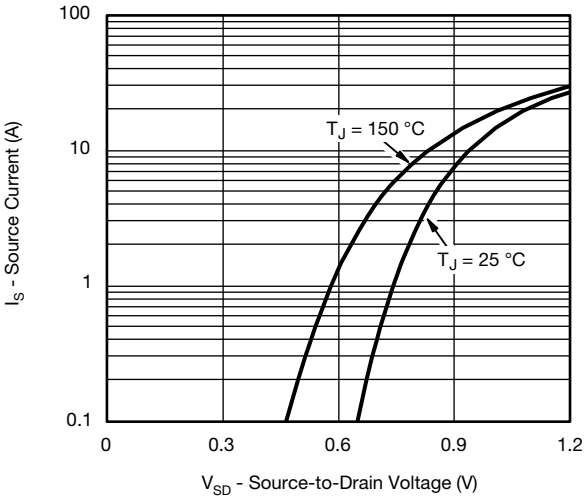
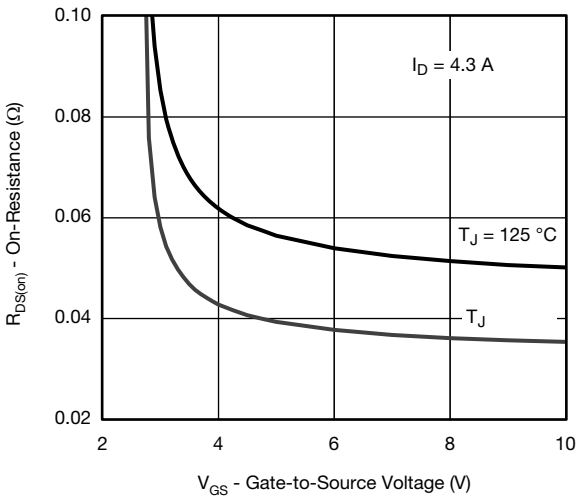
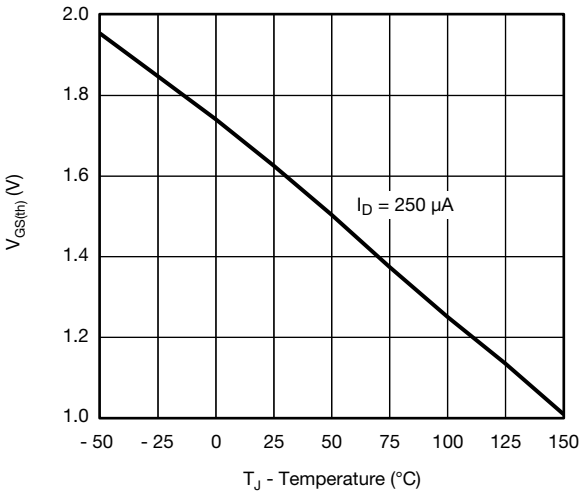
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



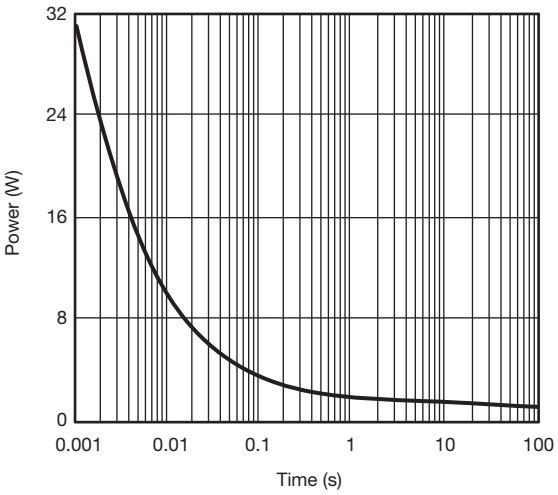
Source-Drain Diode Forward Voltage



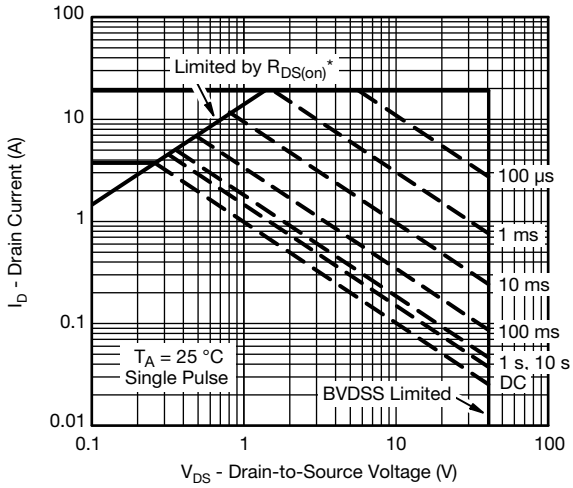
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power (Junction-to-Ambient)



* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient