

## Complementary MOSFET

## SI1029X

## ■ Features

## ● N-Channel

$$V_{DS} = 60V, I_D = 500mA$$

$$R_{DS(ON)} < 1.4 \Omega @ V_{GS}=10V$$

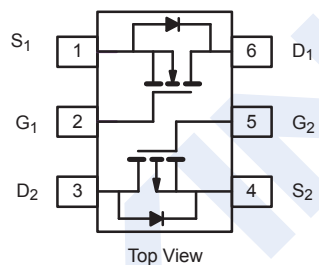
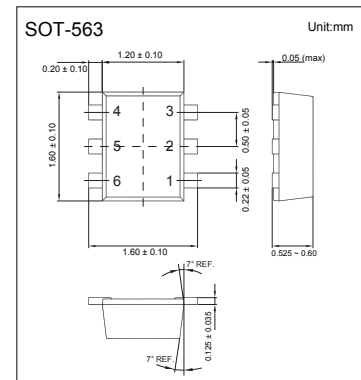
$$R_{DS(ON)} < 3 \Omega @ V_{GS}=4.5V$$

## ● P-Channel

$$V_{DS} = -60V, I_D = -500mA$$

$$R_{DS(ON)} < 4 \Omega @ V_{GS}=-10V$$

$$R_{DS(ON)} < 8 \Omega @ V_{GS}=-4.5V$$

■ Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$  Unless otherwise specified)

Parameter	Symbol	N-Channel		P-Channel		Unit	
		5 s	Steady State	5 s	Steady State		
Drain-Source Voltage	$V_{DS}$	60		-60		V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$					
Continuous Drain Current (Note 1)	$I_D$	$T_A=25^\circ\text{C}$	320	305	-200	-190	mA
		$T_A=85^\circ\text{C}$	230	220	-145	-135	
Pulsed Drain Current (Note 2)	$I_{DM}$	650		-650			
Continuous Diode Conduction Current (Note 1)	$I_S$	450	380	-450	-380		
Maximum Power Dissipation (Note 1)	$P_D$	$T_A=25^\circ\text{C}$	280	250	280	250	mW
		$T_A=85^\circ\text{C}$	145	130	145	130	
Junction Temperature	$T_J$	150				$^\circ\text{C}$	
Storage Temperature Range	$T_{stg}$	-55 to 150					
Gate-Source ESD Rating - HBM	ESD	2000				V	

Notes 1. Surface mounted on FR4 board.

2. Pulse width limited by maximum junction temperature.

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■ Electrical Characteristics (T<sub>J</sub> = 25°C Unless otherwise specified)

Parameter	Symbol	Test Conditions	Type	Min	Typ	Max	Unit
<b>Static</b>							
Drain-Source Breakdown Voltage	V <sub>DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 10 μA	N-CH	60			V
		V <sub>GS</sub> = 0 V, I <sub>D</sub> = -10 μA	P-CH	-60			
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 0 V	N-CH			10	nA
		V <sub>DS</sub> = -50 V, V <sub>GS</sub> = 0 V	P-CH			-25	
		V <sub>DS</sub> = 50 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 85 °C	N-CH			100	
		V <sub>DS</sub> = -50 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 85 °C	P-CH			-250	
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±5 V	N-CH			±50	nA
			P-CH			±100	
		V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±10 V	N-CH			±150	
			P-CH			±200	
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	N-CH	1		2.5	V
		V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	P-CH	-1		-3.0	
On-State Drain Current (Note 1)	I <sub>D(on)</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 4.5 V	N-CH	500			mA
		V <sub>DS</sub> = -10 V, V <sub>GS</sub> = -4.5 V	P-CH	-50			
		V <sub>DS</sub> = 7.5 V, V <sub>GS</sub> = 4.5 V	N-CH	800			
		V <sub>DS</sub> = -10 V, V <sub>GS</sub> = -10 V	P-CH	-600			
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 200 mA	N-CH			3	Ω
		V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -25 mA	P-CH			8	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 500 mA	N-CH			1.4	
		V <sub>GS</sub> = -10 V, I <sub>D</sub> = -500 mA	P-CH			4	
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 500 mA, T <sub>J</sub> = 125 °C	N-CH			2.5	
		V <sub>GS</sub> = -10 V, I <sub>D</sub> = -500 mA, T <sub>J</sub> = 125 °C	P-CH			6	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 200 mA	N-CH		200		mS
		V <sub>DS</sub> = -10 V, I <sub>D</sub> = -100 mA	P-CH		100		
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> = 200 mA, V <sub>GS</sub> = 0 V	N-CH			1.4	V
		I <sub>S</sub> = -200 mA, V <sub>GS</sub> = 0 V	P-CH			-1.4	
<b>Dynamic (Note 2)</b>							
Input Capacitance	C <sub>iss</sub>	N-Channel: V <sub>DS</sub> = 25 V, V <sub>GS</sub> = 0 V, f = 1 MHz P-Channel: V <sub>DS</sub> = -25 V, V <sub>GS</sub> = 0 V, f = 1 MHz	N-CH		30		pF
			P-CH		23		
Output Capacitance	C <sub>oss</sub>		N-CH		6		
			P-CH		10		
Reverse Transfer Capacitance	C <sub>rss</sub>		N-CH		3		
			P-CH		5		
Total Gate Charge	Q <sub>g</sub>	N-Channel: V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 250 mA P-Channel: V <sub>DS</sub> = -30 V, V <sub>GS</sub> = -15 V, I <sub>D</sub> = -500 mA	N-CH		75		nC
			P-CH		1700		
Gate Source Charge	Q <sub>gs</sub>		N-CH		75		
			P-CH		260		
Gate Drain Charge	Q <sub>gd</sub>		N-CH		225		
			P-CH		460		
Turn-On Time (Note 3)	t <sub>d(on)</sub>	N-Channel: V <sub>DD</sub> = 30 V, R <sub>L</sub> = 150 Ω, $\square$ I <sub>D</sub> ≥ 200 mA, V <sub>GEN</sub> = 10 V, R <sub>g</sub> = 10 Ω P-Channel: V <sub>DD</sub> = -25 V, R <sub>L</sub> = 150 Ω, I <sub>D</sub> ≤ -165 mA, V <sub>GEN</sub> = -10 V, R <sub>g</sub> = 10 Ω	N-CH		15		ns
			P-CH		20		
Turn-Off Time (Note 3)	t <sub>d(off)</sub>		N-CH		20		
			P-CH		35		

Notes 1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

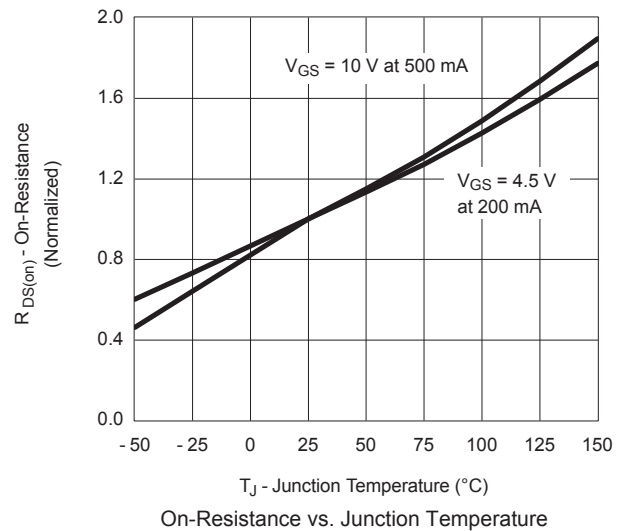
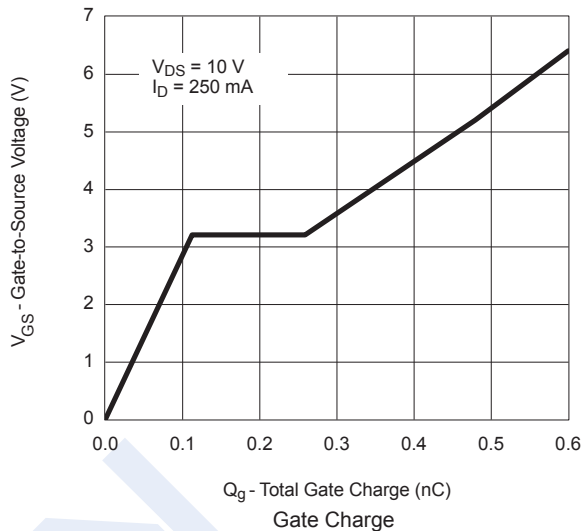
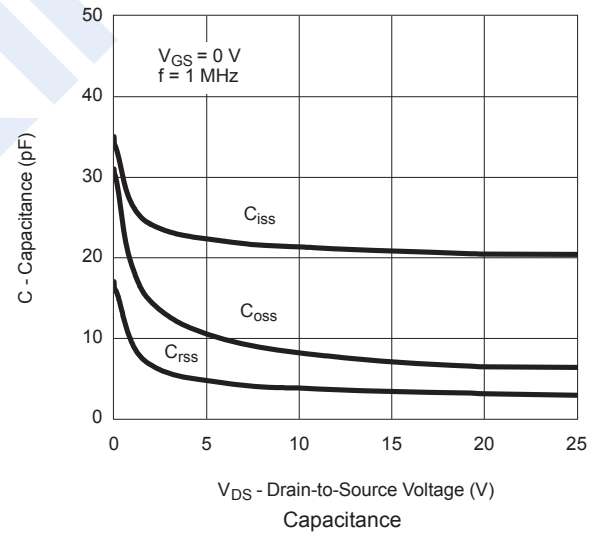
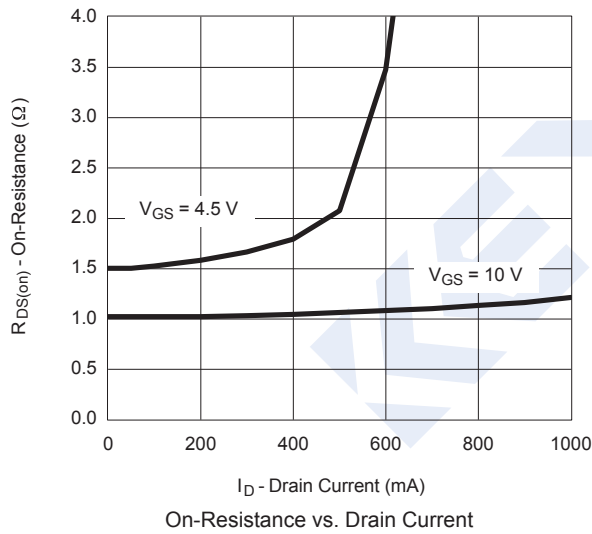
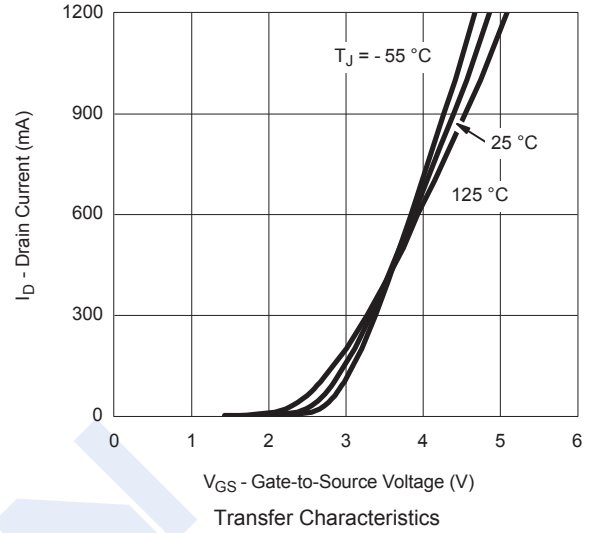
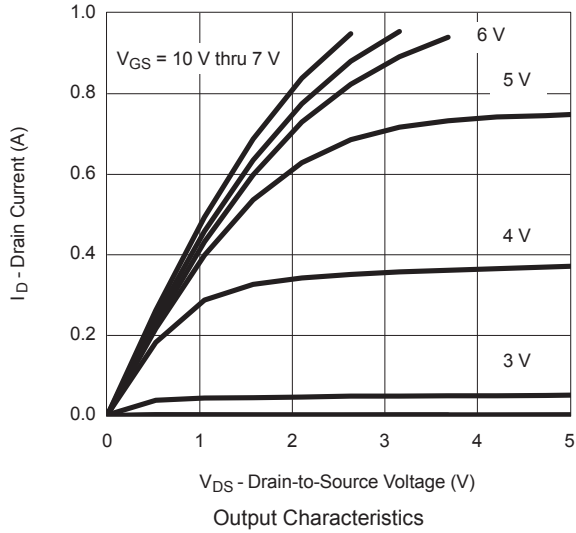
2. Guaranteed by design, not subject to production.

3. Switching time is essentially independent of operating temperature.

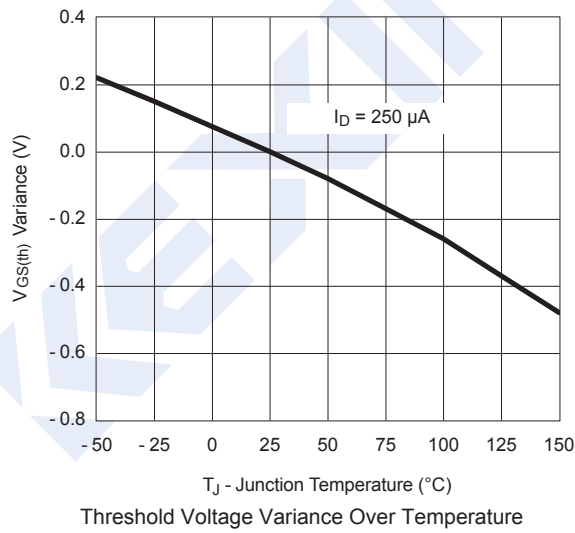
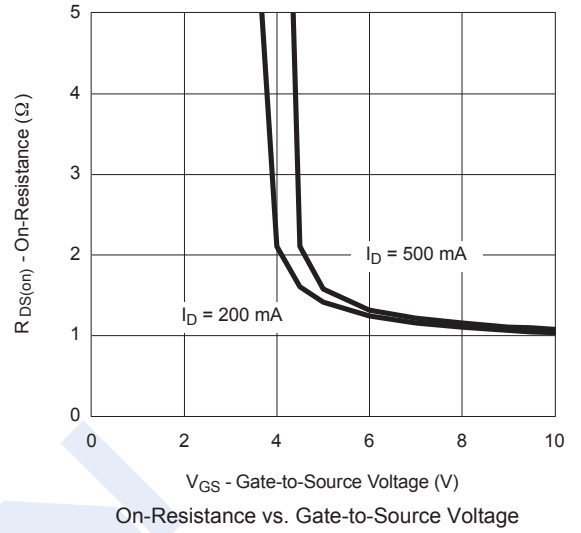
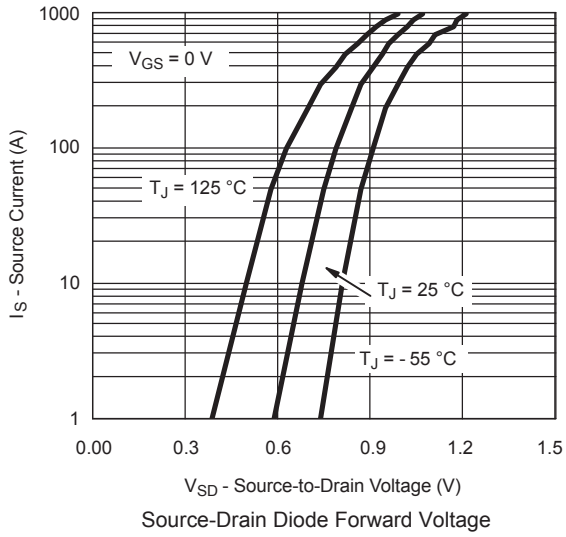
## ■ Marking: H

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## ■ N-Channel Typical Characteristics (T<sub>a</sub> = 25 °C, Unless Otherwise Noted)

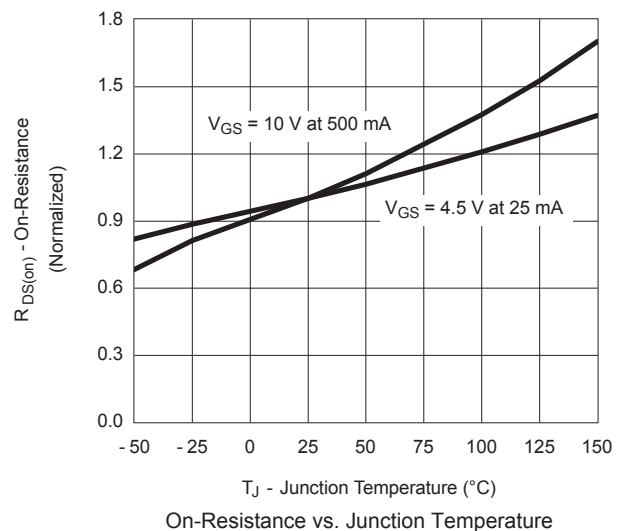
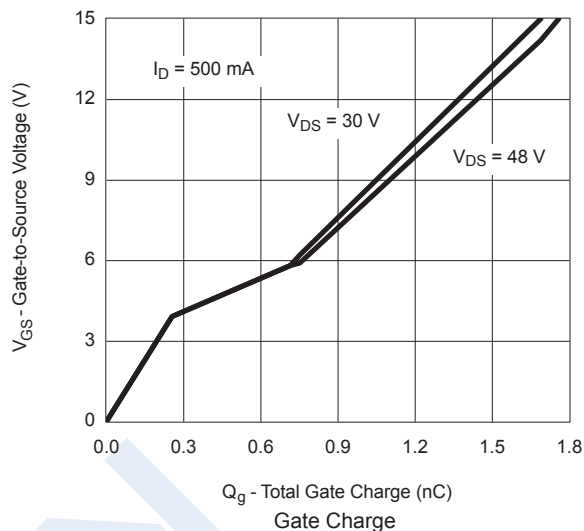
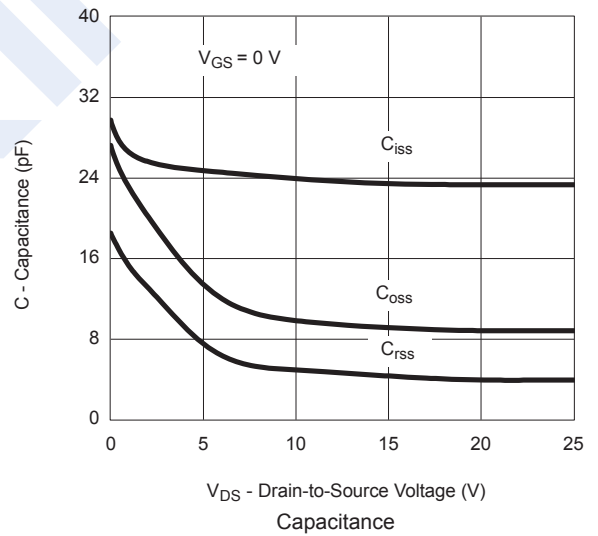
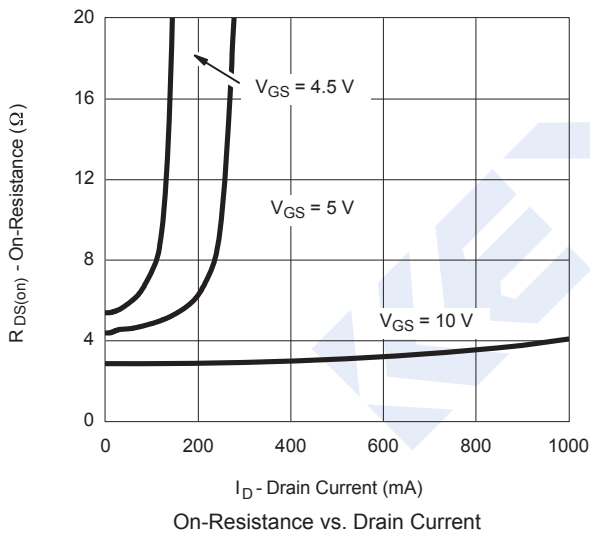
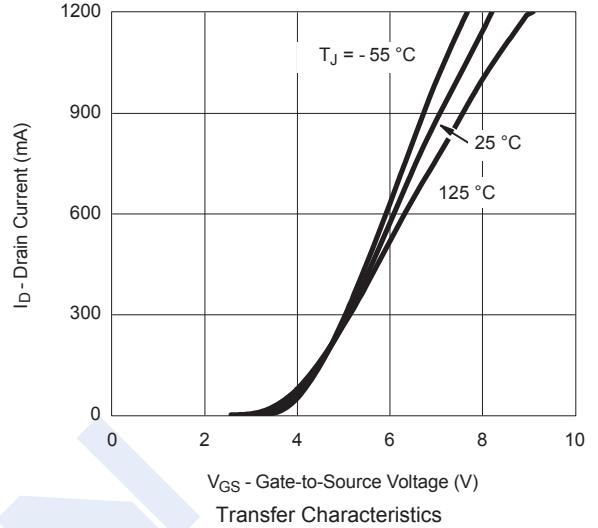
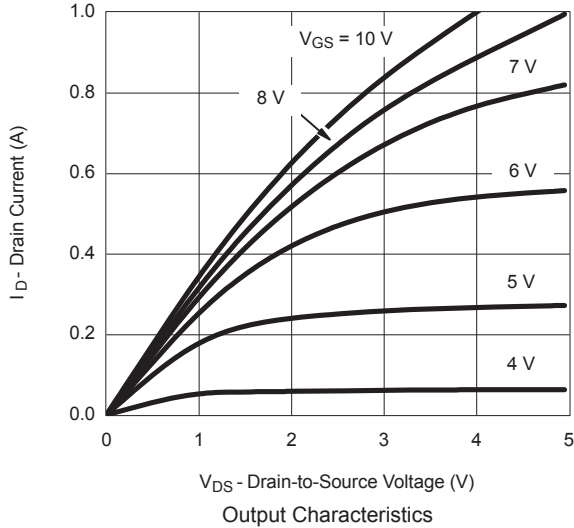


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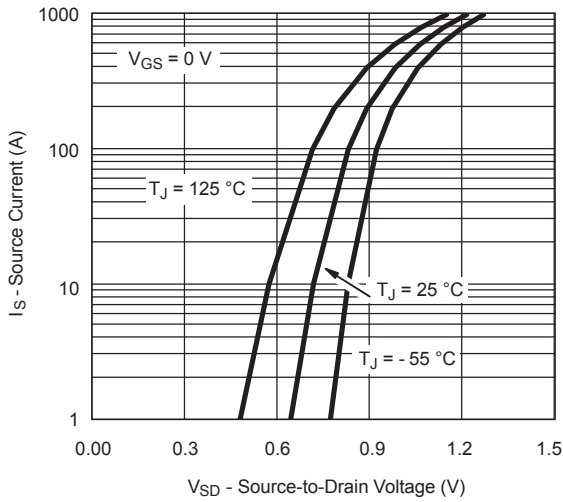


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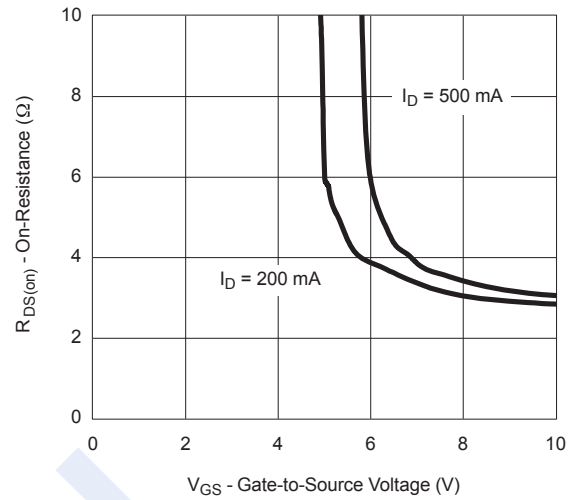
■ P-Channel Typical Characteristics ( $T_a = 25\text{ }^\circ\text{C}$ , Unless Otherwise Noted)



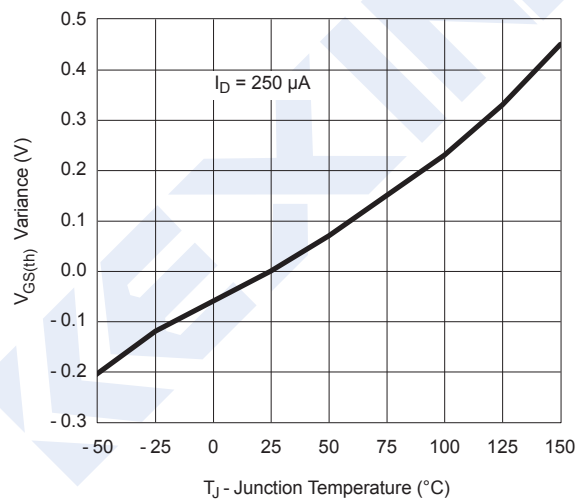
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Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage Variance Over Temperature

■ N or P-Channel Typical Characteristics ( $T_a = 25^\circ\text{C}$ , Unless Otherwise Noted)

