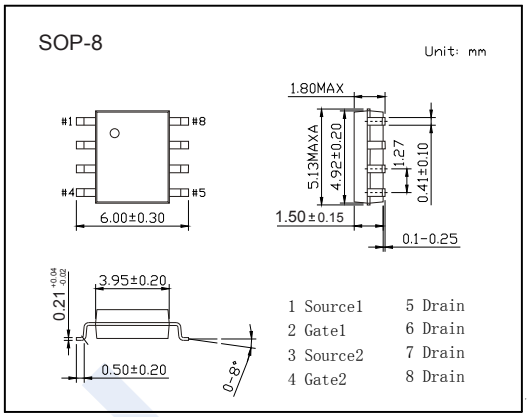
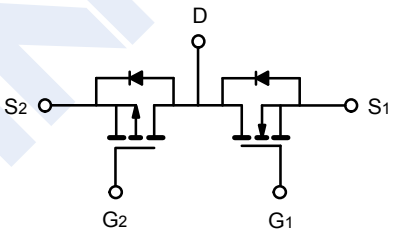
Complementary Power Trench MOSFET

SI4558DY (KI4558DY)



■ Features

- N-Channel: V_{DS}=30V I_D=6A
- $R_{DS(ON)}$ < 40mΩ (V_{GS} = 10V)
- $R_{DS(ON)}$ < 60mΩ (V_{GS} = 4.5V)
- P-Channel: V_{DS}=-30V I_D=-6A
- $R_{DS(ON)}$ < 40mΩ (V_{GS} =-10V)
- $R_{DS(ON)}$ < 70mΩ (V_{GS} =-4.5V)



■ Absolute Maximum Ratings Ta = 25℃

Parameter		Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage		V_{DS}	30	-30	V
Gate-Source Voltage		V_{GS}	±20		
Continuous Drain Current @ T_J=150℃ (Note.1)	Ta = 25 ℃	I_D	6	-6	A
	Ta = 70 ℃		4.7	-4.7	
Pulsed Drain Current		I_{DM}	30	-30	
Power Dissipation	Ta = 25 ℃	P_D	2.4		W
	Ta = 70 ℃		1.5		
Thermal Resistance.Junction- to-Ambient (Note.1)		R_{thJA}	52		℃/W
Junction Temperature		T_J	150		℃
Storage Temperature Range		T_{stg}	-55 to 150		

Note.1:Surface Mounted on FR4 Board, t ≤ 10 sec.

■ Marking

Marking	4558 KA****

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■ Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test Conditions	Type	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	I_D=250μA, V_{GS}=0V	N-CH	30			V
		I_D=-250μA, V_{GS}=0V	P-CH	-30			
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V	N-CH			1	μA
		V_{DS}=-30V, V_{GS}=0V	P-CH			-1	
		V_{DS}=24V, V_{GS}=0V,T_J=70℃	N-CH			5	
		V_{DS}=-24V, V_{GS}=0V,T_J=70℃	P-CH			-5	
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=250μA	N-CH	1			V
		V_{DS}=V_{GS}, I_D=-250μA	P-CH	-1			
Static Drain-Source On-Resistance (Note.1)	$R_{DS(ON)}$	V_{GS}=10V, I_D=6A	N-CH		32	40	mΩ
		V_{GS}=4.5V, I_D=4.8A			45	60	
		V_{GS}=-10V, I_D=-6A	P-CH		32	40	
		V_{GS}=-4.5V, I_D=-4.4A			56	70	
On-State drain Current (Note.1)	$I_{D(ON)}$	V_{DS}=5V, V_{GS}=10V	N-CH	30			A
		V_{DS}=-5V, V_{GS}=-10V	P-CH	-30			
		V_{DS}=5V, V_{GS}=4.5V	N-CH	8			
		V_{DS}=-5V, V_{GS}=-4.5V	P-CH	-8			
Forward Transconductance (Note.1)	g_{FS}	V_{DS}=15V, I_D=6A	N-CH		13		S
		V_{DS}=-15V, I_D=-6A	P-CH		10.6		
Total Gate Charge	Q_g	N-Channel: V_{GS}=10V, V_{DS}=15V, I_D=6A P-Channel: V_{GS}=-10V, V_{DS}=-15V, I_D=-6A	N-CH		16	30	nC
			P-CH		22	35	
Gate Source Charge	Q_{gs}		N-CH		3.4		
			P-CH		5.4		
Gate Drain Charge	Q_{gd}		N-CH		2.3		
			P-CH		3.6		
Turn-On DelayTime	$t_{d(on)}$	N-Channel: V_{GS}=10V, V_{DS}=15V, I_D=1A, R_G=6Ω R_L=15Ω P-Channel: V_{GS}=-10V, V_{DS}=-15V, I_D=-1A, R_G=6Ω R_L=15Ω	N-CH		12	25	ns
			P-CH		12	25	
Turn-On Rise Time	t_r		N-CH		12	25	
			P-CH		12	25	
Turn-Off DelayTime	$t_{d(off)}$		N-CH		27	55	
			P-CH		38	55	
Turn-Off Fall Time	t_f		N-CH		24	50	
			P-CH		25	50	
Body Diode Reverse Recovery Time	t_{rr}	I_F=2A, dI/dt=100A/μs	N-CH		45	80	
		I_F=-2A, dI/dt=100A/μs	P-CH		50	80	
Maximum Body-Diode Continuous Curren	I_S		N-CH			2	A
			P-CH			-2	
Diode Forward Voltage (Note.1)	V_{SD}	I_S=2A,V_{GS}=0V	N-CH		0.77	1.2	
		I_S=-2A,V_{GS}=0V	P-CH		-0.77	-1.2	V

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

Complementary Power Trench MOSFET

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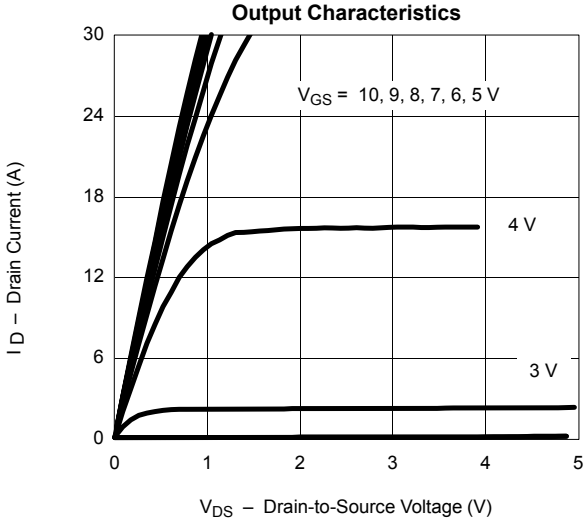
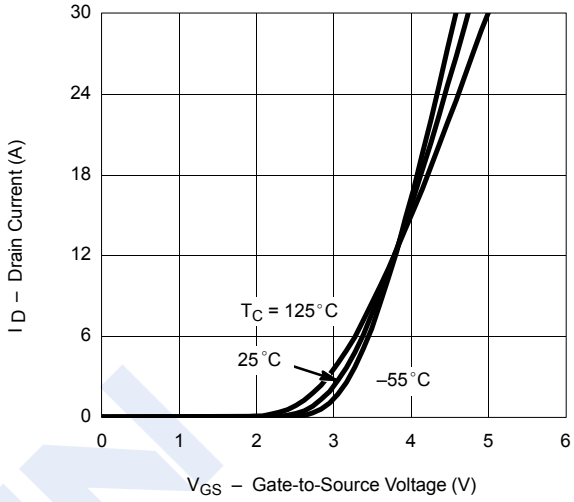
■ N-MOSFET Typical Characterisitics

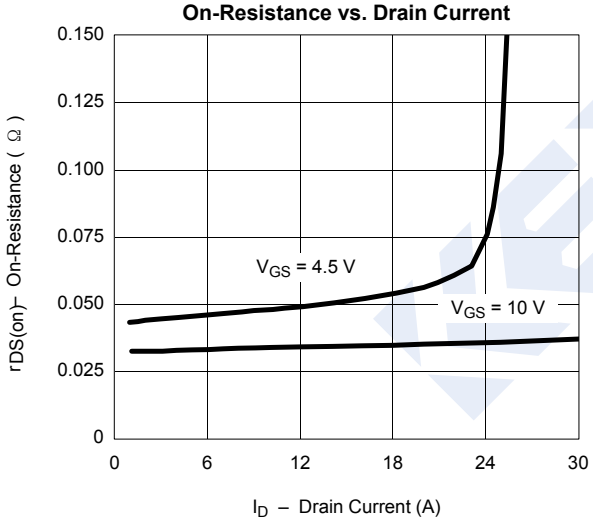
Output Characteristics



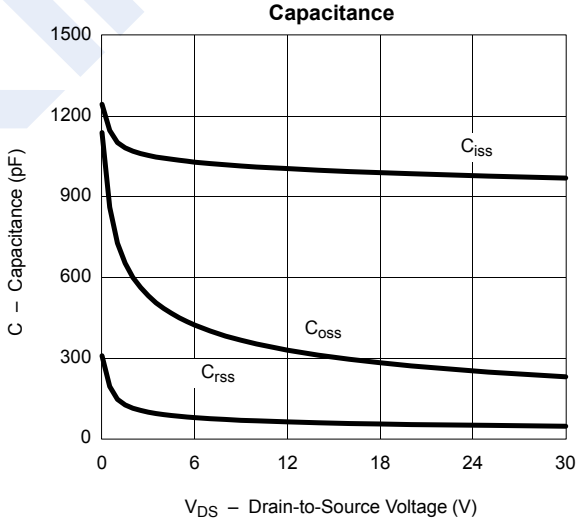
Transfer Characteristics



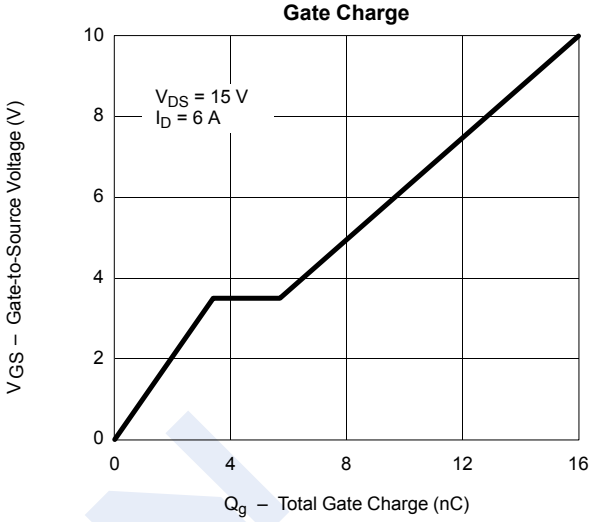
On-Resistance vs. Drain Current



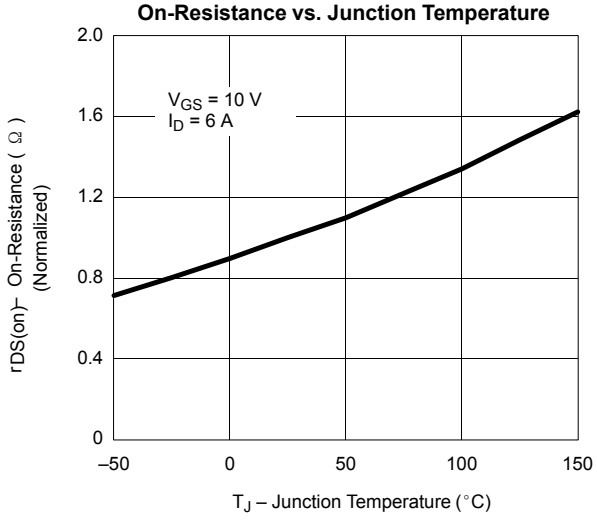
Capacitance



Gate Charge



On-Resistance vs. Junction Temperature

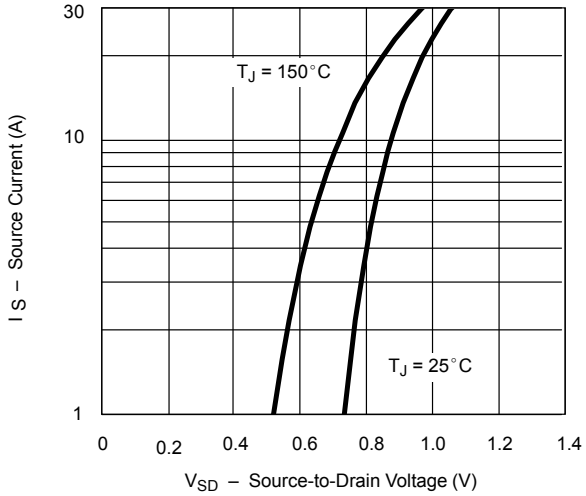


Complementary Power Trench MOSFET

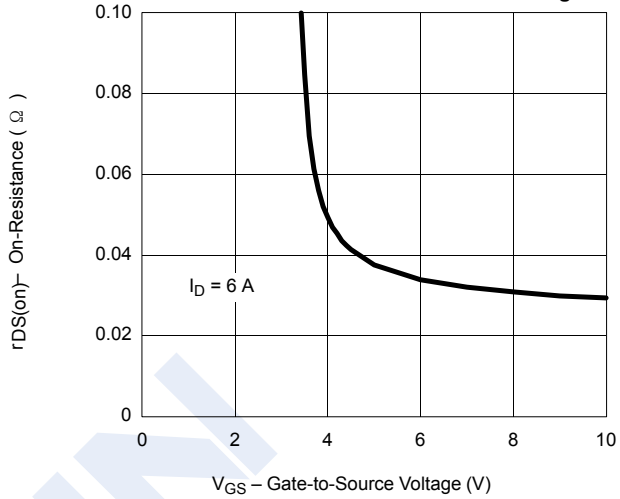
SI4558DY (KI4558DY)

■ N-MOSFET Typical Characterisitics

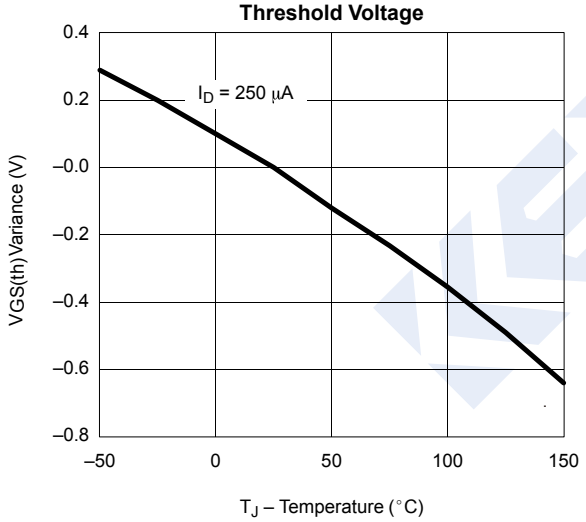
Source-Drain Diode Forward Voltage



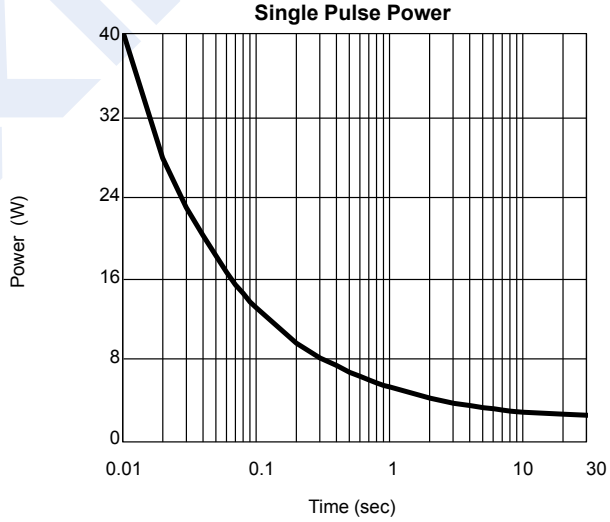
On-Resistance vs. Gate-to-Source Voltage



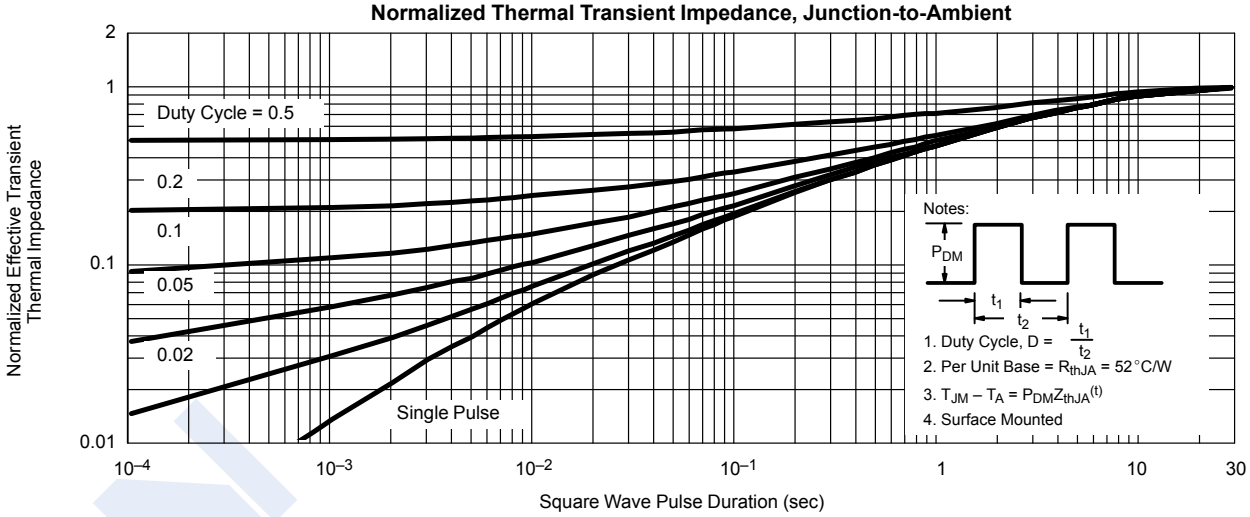
Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

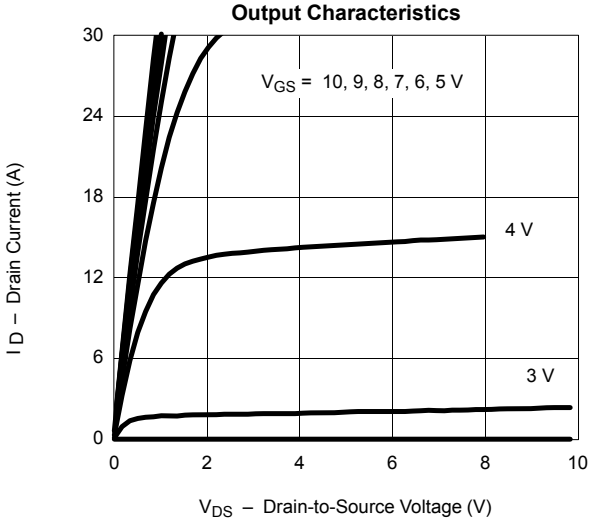


Complementary Power Trench MOSFET

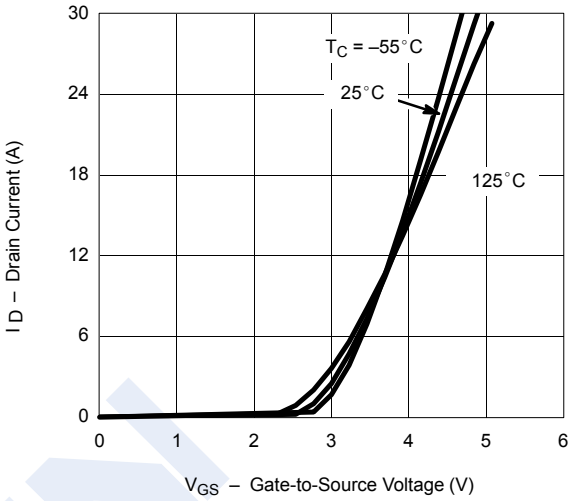
SI4558DY (KI4558DY)

■ P-MOSFET Typical Characterisitics

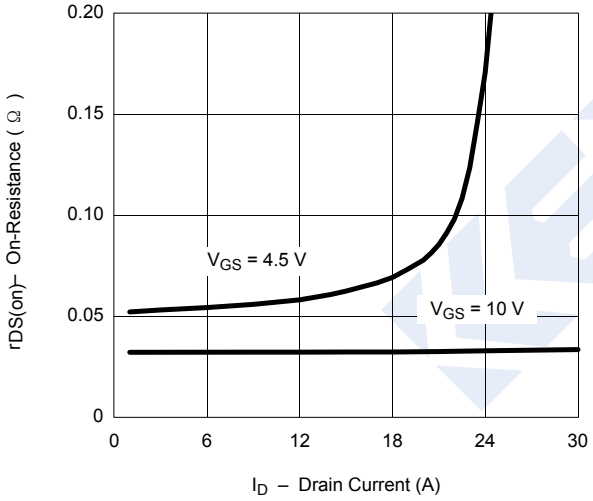
Output Characteristics



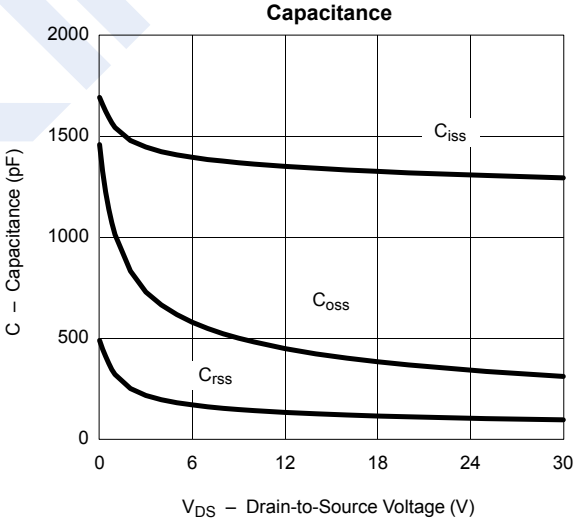
Transfer Characteristics



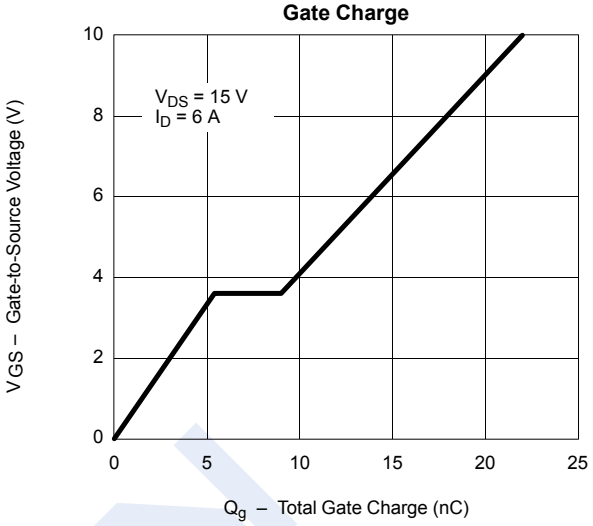
On-Resistance vs. Drain Current



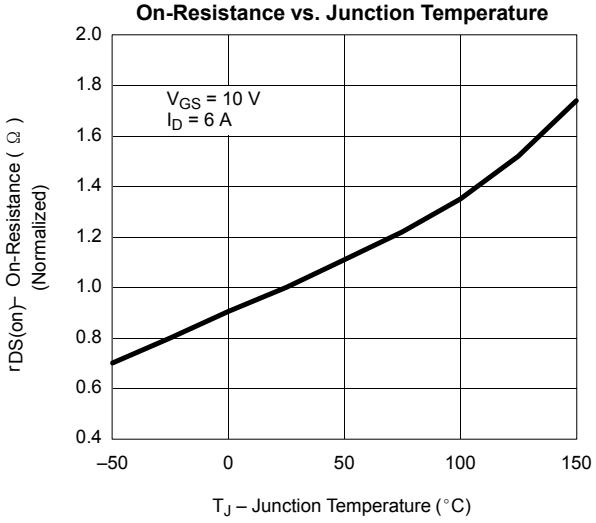
Capacitance



Gate Charge



On-Resistance vs. Junction Temperature



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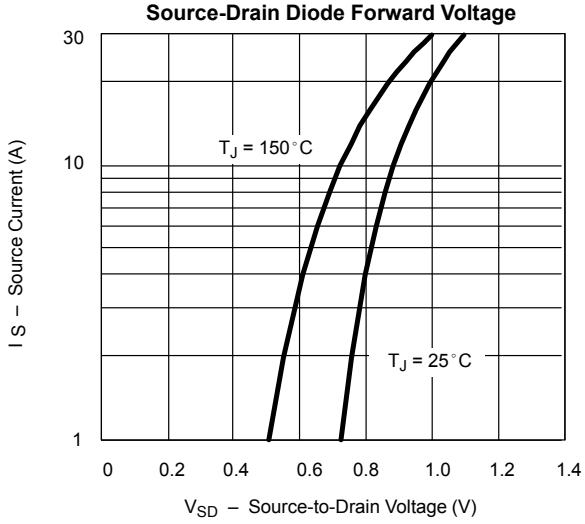
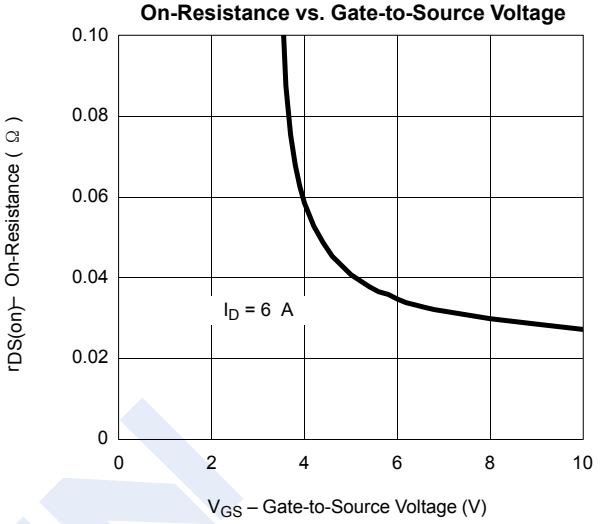
SI4558DY (KI4558DY)

■ P-MOSFET Typical Characterisitics

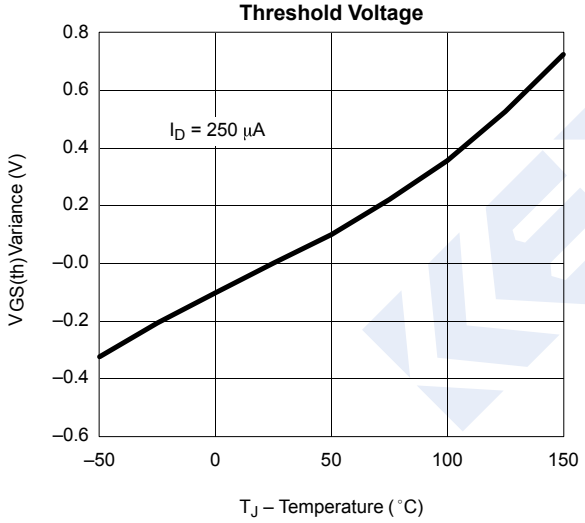
Source-Drain Diode Forward Voltage



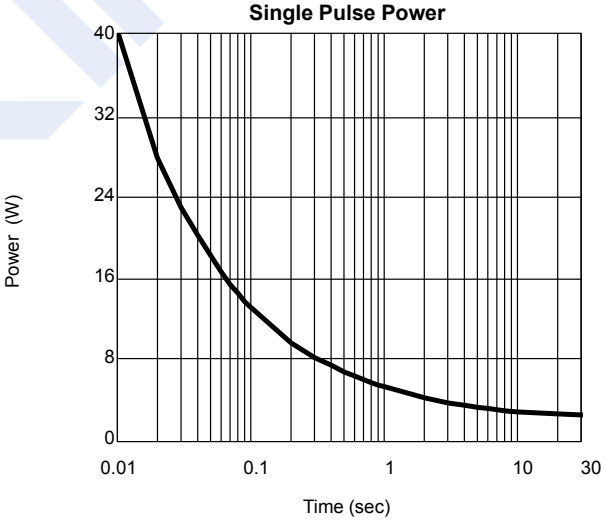
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient