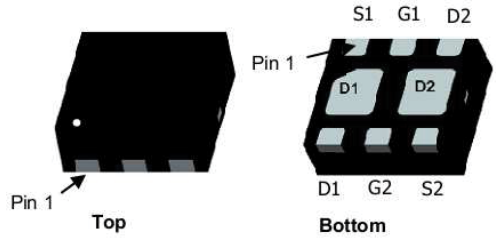
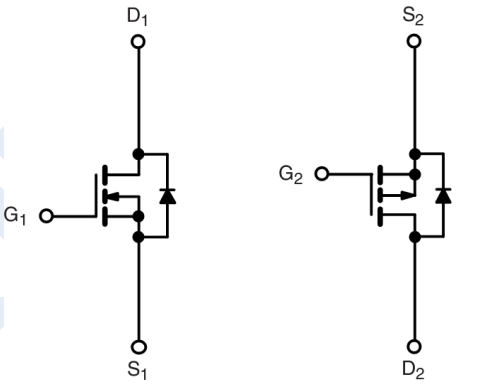
Complementary Enhancement MOSFET

SI5513CD (KI5513CD)

■ Features

- N-Channel: V_{DS}=20V I_D=4A(V_{GS}=4.5V)
  - $R_{DS(ON)}$ < 35mΩ (V_{GS} = 4.5V)
  - $R_{DS(ON)}$ < 50mΩ (V_{GS} = 2.5V)
  - $R_{DS(ON)}$ < 90mΩ (V_{GS} = 1.8V)
- P-Channel: V_{DS}=-20V I_D=-2.5A(V_{GS}=-4.5V)
  - $R_{DS(ON)}$ < 85mΩ (V_{GS} =-4.5V)
  - $R_{DS(ON)}$ < 115mΩ (V_{GS} =-2.5V)
  - $R_{DS(ON)}$ < 150mΩ (V_{GS} =-1.8V)





N-Channel MOSFET P-Channel MOSFET

■ Absolute Maximum Ratings Ta = 25℃

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V_{DS}	20	-20	V
Gate-Source Voltage	V_{GS}	±12	±12	
Continuous Drain Current Ta=25℃	I_D	4	-2.5	A
Ta=70℃		3.2	-2	
Pulsed Drain Current	I_{DM}	20	-20	
Power Dissipation for Dual Operation	P_D	1.5	1.5	W
Power Dissipation for single Operation Ta=70℃		0.95	0.95	
Junction Temperature	T_J	150		℃
Storage Temperature Range	T_{stg}	-55 to 150		

Complementary Enhancement MOSFET

SI5513CD (KI5513CD)

■ 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	20			V
		I_D=-250μA, V_{GS}=0V	P-CH	-20			
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V, V_{GS}=0V	N-CH			300	nA
		V_{DS}=-20V, V_{GS}=0V	P-CH			-300	
Gate-Body Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±12V	N-CH			±100	nA
		V_{DS}=0V, V_{GS}=±12V	P-CH			±100	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} , I_D=250μA	N-CH	0.62	0.75	1.0	V
		V_{DS}=V_{GS}, I_D=-250μA	P-CH	-0.5			
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=3.5A	N-CH		25	35	mΩ
		V_{GS}=2.5V, I_D=2.5A			34	50	
		V_{GS}=1.8V, I_D=2A			64	90	
		V_{GS}=-4.5V, I_D=-2.8A	P-CH		80	85	
		V_{GS}=-2.5V, I_D=-2A			95	115	
		V_{GS}=-1.8V, I_D=-2A			117	150	
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=3A	N-CH		16		S
		V_{DS}=-5V, I_D=-2.5A	P-CH		13		
Input Capacitance	C_{iss}	N-Channel: V_{GS}=8V, V_{DS}=0V, f=1MHz P-Channel: V_{GS}=0V, V_{DS}=-10V, f=1MHz	N-CH		522.3		pF
			P-CH		589		
Output Capacitance	C_{oss}		N-CH		98.48		
			P-CH		91.18		
Reverse Transfer Capacitance	C_{rss}		N-CH		74.69		
			P-CH		67.18		
Total Gate Charge	Q_g	N-Channel: V_{GS}=4.5V, V_{DS}=10V, I_D=4A P-Channel: V_{GS}=-4.5V, V_{DS}=-6V, I_D=-2.5A	N-CH		6.24	8.11	nC
			P-CH		6.55	8.52	
Gate Source Charge	Q_{gs}		N-CH		1.64	2.13	
			P-CH		0.31	0.4	
Gate Drain Charge	Q_{gd}		N-CH		1.34	1.74	
			P-CH		1.3	1.69	
Turn-On DelayTime	$t_{d(on)}$	N-Channel: V_{GS}=4.5V, V_{DS}=10V, I_D=1A, R_{GEN}=6Ω P-Channel: V_{GS}=-4.5V, V_{DS}=-6V, I_D=-1A, R_{GEN}=6Ω	N-CH		10.4	20.8	ns
			P-CH		9.72	19.44	
Turn-On Rise Time	t_r		N-CH		4.4	8.8	
			P-CH		3.56	7.12	
Turn-Off DelayTime	$t_{d(off)}$		N-CH		27.38	54.72	
			P-CH		33.32	66.64	
Turn-Off Fall Time	t_f		N-CH		4.16	8.32	
			P-CH		4.52	9.04	
Maximum Body-Diode Continuous Current	I_S		N-CH			1.7	A
			P-CH			-1.6	
Diode Forward Voltage	V_{SD}	I_S=1.7A,V_{GS}=0V	N-CH		0.74	1.0	
		I_S=-1.6A,V_{GS}=0V	P-CH	0.6	-0.8	-1.2	V

SI5513CD (KI5513CD)

■ N-channel Typical Characterisitics

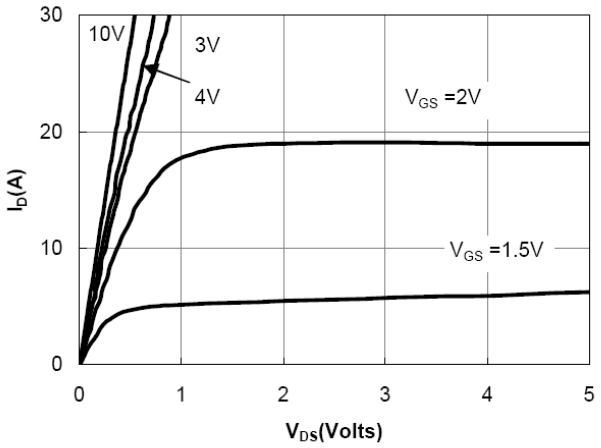


Figure 1: On-Regions Characteristics

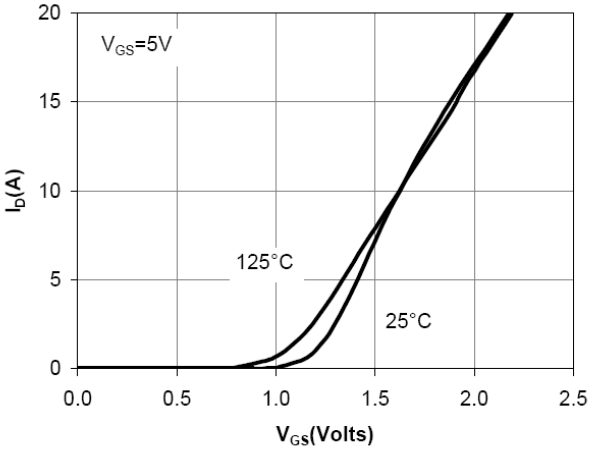


Figure 2: Transfer Characteristics

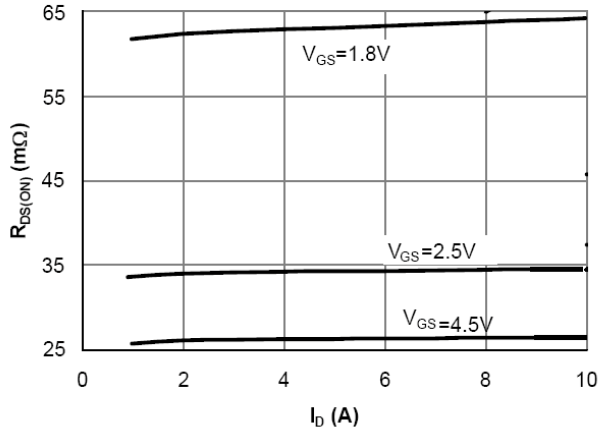


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

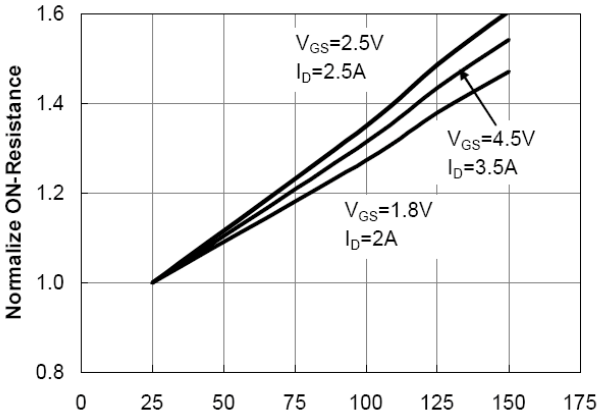


Figure 4: On-Resistance vs. Junction Temperature

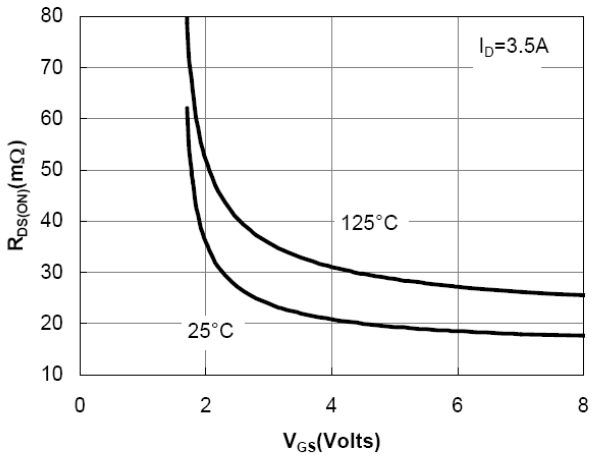


Figure 5: On-Resistance vs. Gate-Source Voltage

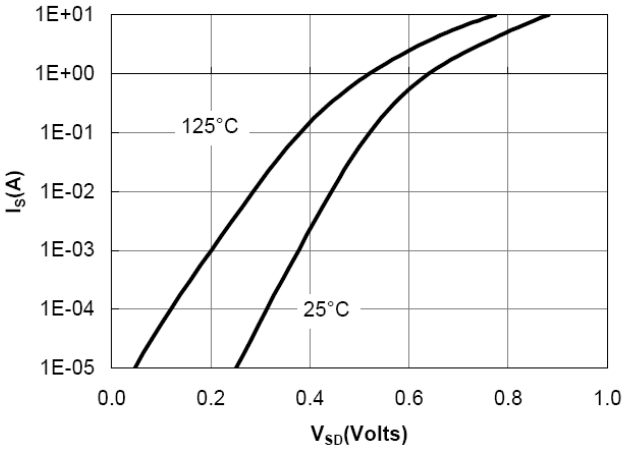


Figure 6: Body-Diode Characteristics

SI5513CD (KI5513CD)

■ N-channel Typical Characterisitics

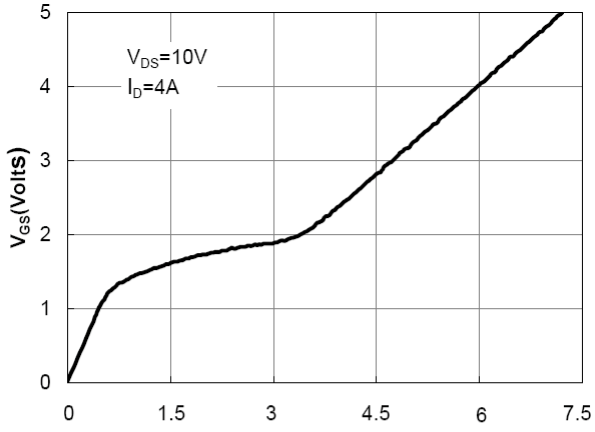


Figure 7: Gate-Charge Characteristics

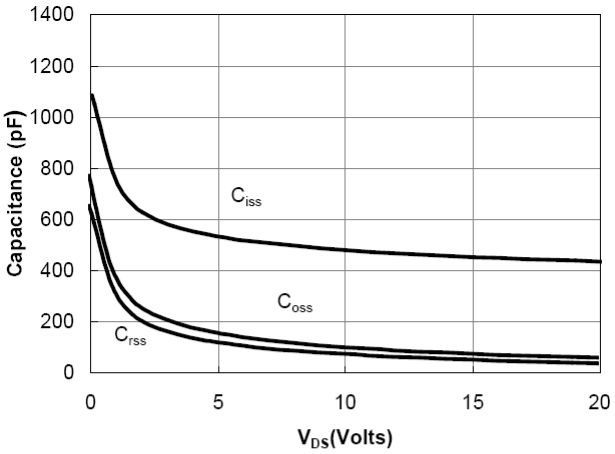


Figure 8: Capacitance Characteristics

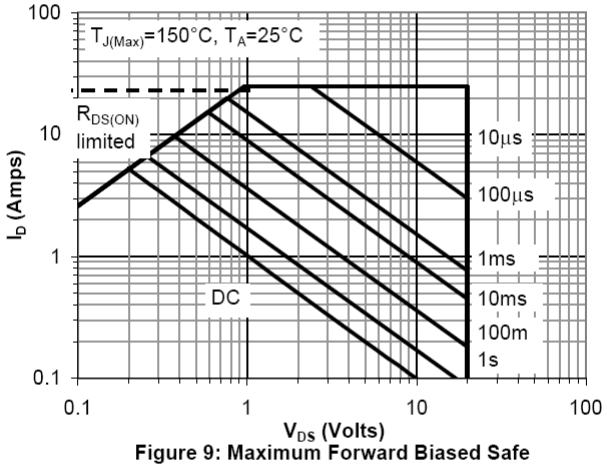


Figure 9: Maximum Forward Biased Safe Operating Area

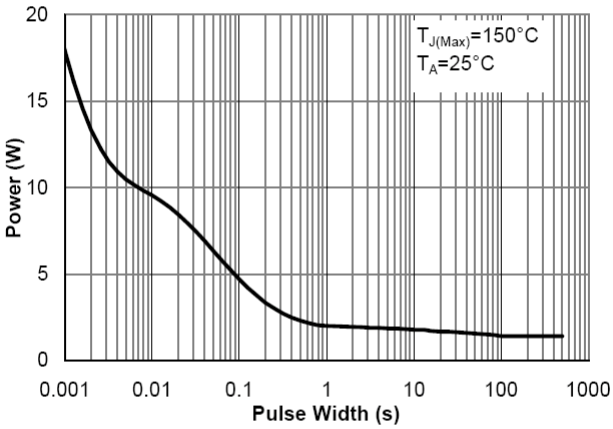


Figure 10: Single Pulse Power Rating Junction-to-Ambient

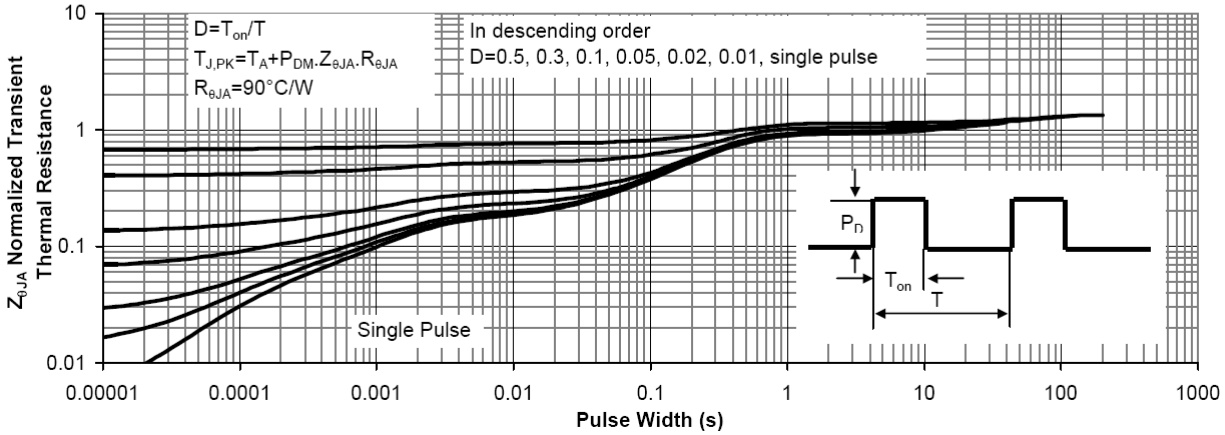


Figure 11: Normalized Maximum Transient Thermal Impedance

SI5513CD (KI5513CD)

■ P-Channel Typical Characterisitics

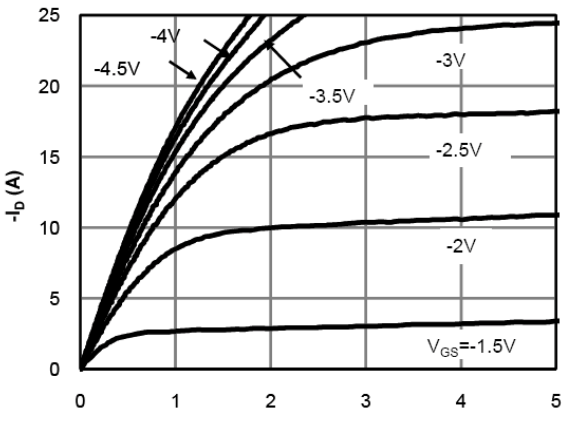


Figure 1: On-Region Characteristics

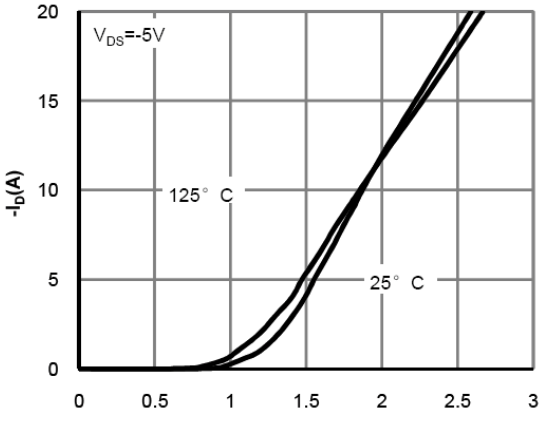


Figure 2: Transfer Characteristics

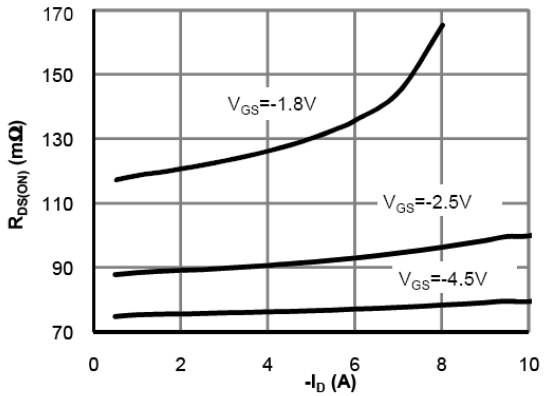


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

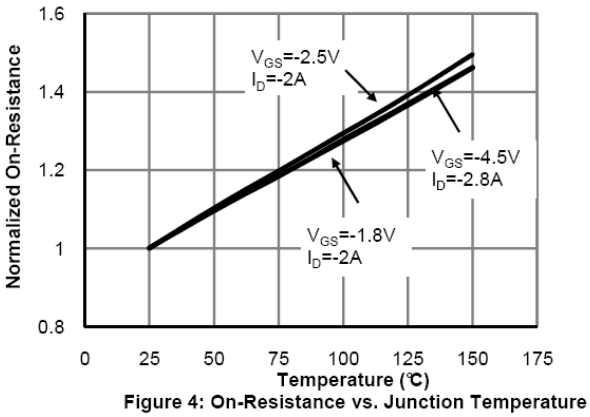


Figure 4: On-Resistance vs. Junction Temperature

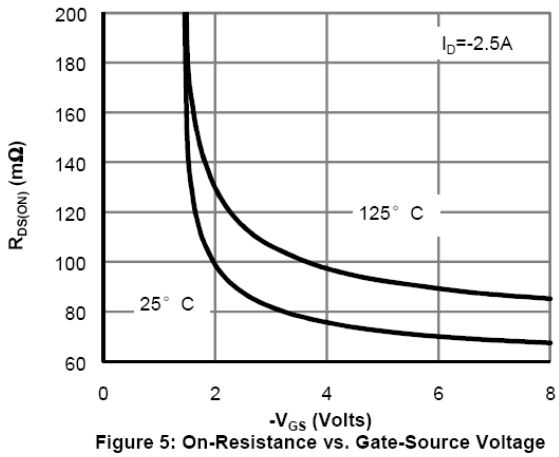


Figure 5: On-Resistance vs. Gate-Source Voltage

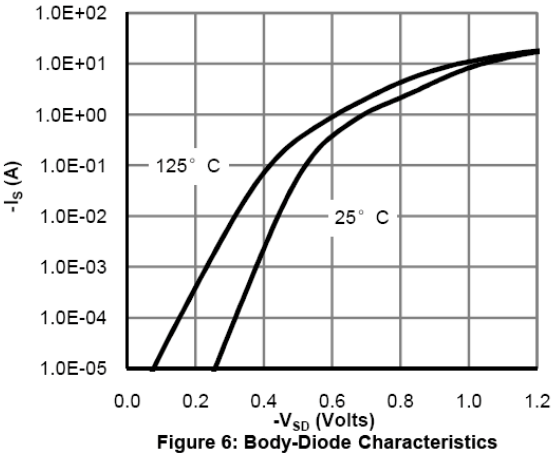


Figure 6: Body-Diode Characteristics

SI5513CD (KI5513CD)

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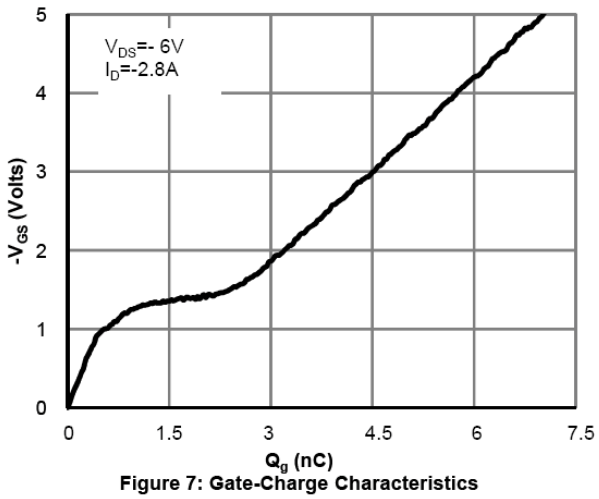

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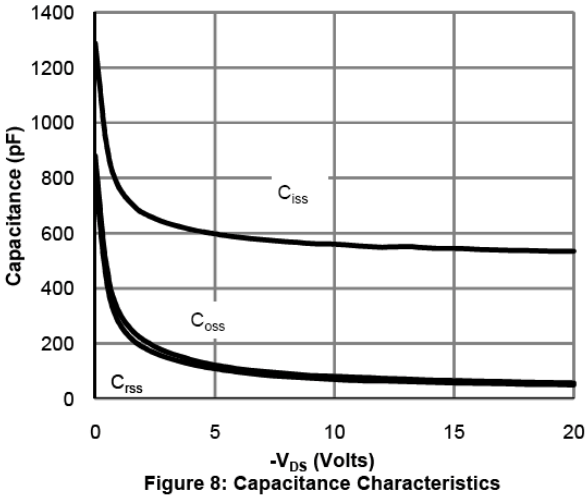
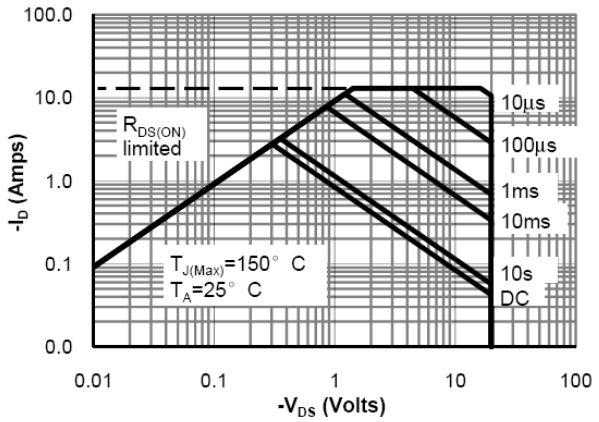


Figure 8: Capacitance Characteristics



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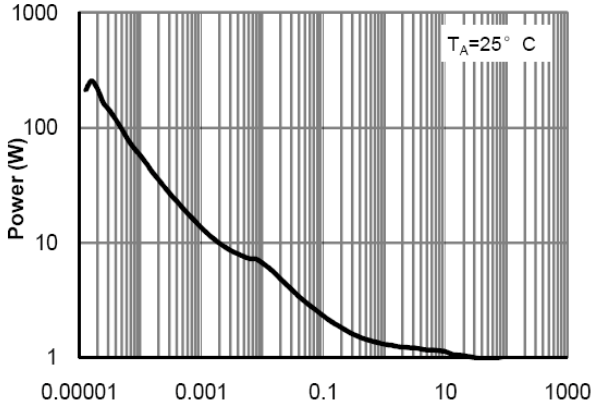

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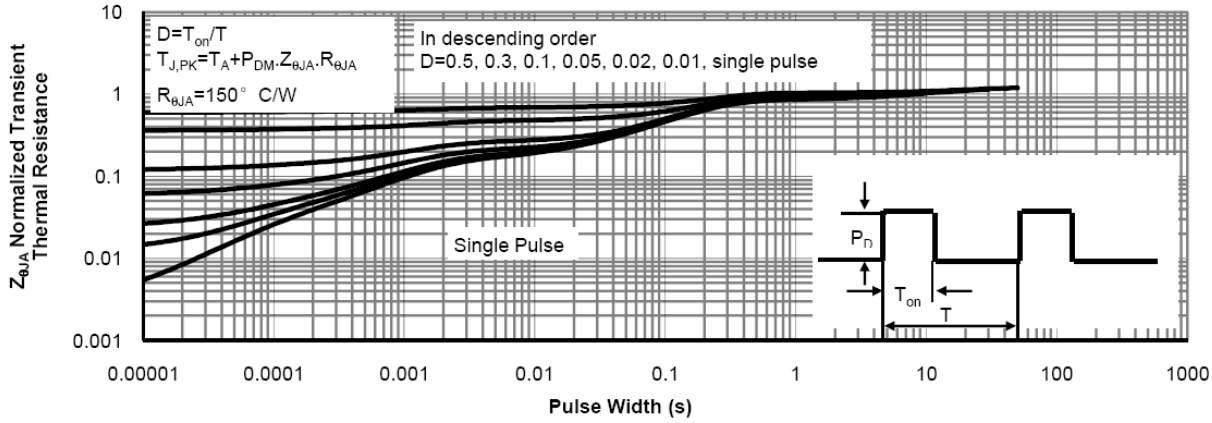

Figure 11: Normalized Maximum Transient Thermal Impedance