

Dual N-Channel MOSFET

AO4940 (KO4940)

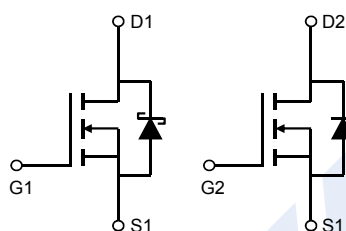
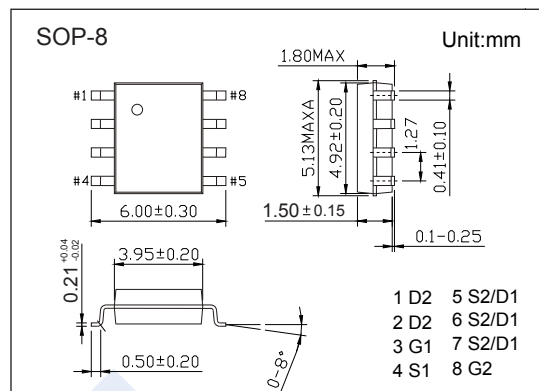
■ Features

N-Channel 1

- V_{DS} (V) = 30V
- I_D = 9.1 A (V_{GS} = 10V)
- $R_{DS(ON)}$ < 15m Ω (V_{GS} = 10V)
- $R_{DS(ON)}$ < 23m Ω (V_{GS} = 4.5V)
- SRFET™ Soft Recovery MOSFET: Integrated Schottky Diode

N-Channel 2

- V_{DS} (V) = 30V
- I_D = 7.8 A (V_{GS} = 10V)
- $R_{DS(ON)}$ < 21m Ω (V_{GS} = 10V)
- $R_{DS(ON)}$ < 32m Ω (V_{GS} = 4.5V)

■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Parameter		Symbol	N-Channel 1		N-Channel 2		Unit
			10 sec	Steady-State	10 sec	Steady-State	
Drain-Source Voltage		V _{DS}	30				V
Gate-Source Voltage		V _{GS}	± 20				
Continuous Drain Current	T _A =25°C	I _D	9.1	7.6	7.8	6.5	A
	T _A =70°C		7.3	6.1	6.3	5.2	
Pulsed Drain Current		I _{DM}	100		64		
Avalanche Current		I _{AR}	17		9		
Repetitive Avalanche Energy	L=0.3mH	E _{AR}	43		12		mJ
Power Dissipation	T _A =25°C	P _D	2	1.4	2	1.4	W
	T _A =70°C		1.3	0.9	1.3	0.9	
Thermal Resistance.Junction- to-Ambient		R _{thJA}	62.5	90	62.5	90	°C/W
Thermal Resistance.Junction- to-Lead		R _{thJL}		40		40	
Junction Temperature		T _J	150				°C
Storage Temperature Range		T _{stg}	-55 to 150				

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■ N-Channel 1 Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V _{DSS}	I _D =250μA, V _{GS} =0V	30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V			0.1	mA
		V _{DS} =30V, V _{GS} =0V, T _J =55℃			10	
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	1.3		2.5	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =9.1A			15	mΩ
		V _{GS} =10V, I _D =9.1A, T _J =125℃			22	
		V _{GS} =4.5V, I _D =7.3A			23	
On State Drain Current	I _{D(ON)}	V _{GS} =10V, V _{DS} =5V	100			A
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =9.1A		26		S
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =15V, f=1MHz		903	1100	pF
Output Capacitance	C _{oss}			225		
Reverse Transfer Capacitance	C _{rss}			91		
Gate Resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1MHz		1.7	3	Ω
Total Gate Charge (10V)	Q _g	V _{GS} =10V, V _{DS} =15V, I _D =9.1A		15.3	20	nC
Total Gate Charge (4.5V)				7.8	10	
Gate Source Charge	Q _{gs}			2		
Gate Drain Charge	Q _{gd}			3.9		
Turn-On DelayTime	t _{d(on)}			5		
Turn-On Rise Time	t _r	V _{GS} =10V, V _{DS} =15V, R _L =1.65Ω, R _{GEN} =3Ω		9.2		ns
Turn-Off DelayTime	t _{d(off)}			17.8		
Turn-Off Fall Time	t _f			4.4		
Body Diode Reverse Recovery Time	t _{rr}	I _F =9.1A, dI/dt=300A/μs		17	20	nC
Body Diode Reverse Recovery Charge	Q _{rr}			30		
Maximum Body-Diode Continuous Current	I _S				3	A
Diode Forward Voltage	V _{SD}	I _S =1A, V _{GS} =0V			0.5	V

Note. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

■ Marking

Marking	4940 KA****
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Dual N-Channel MOSFET

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■ N-Channel 2 Electrical Characteristics Ta = 25°C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V _{DSS}	I _D =250 μA, V _{GS} =0V	30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V			1	μA
		V _{DS} =30V, V _{GS} =0V, T _J =55°C			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	1.5		2.6	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =7.8A			21	mΩ
		V _{GS} =10V, I _D =7.8A, T _J =125°C			31	
		V _{GS} =4.5V, I _D =6A			32	
On State Drain Current	I _{D(ON)}	V _{GS} =10V, V _{DS} =5V	64			A
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =7.8A		20		S
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =15V, f=1MHz		373	448	pF
Output Capacitance	C _{oss}			67		
Reverse Transfer Capacitance	C _{rss}			41		
Gate Resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1MHz		1.8	2.8	Ω
Total Gate Charge (10V)	Q _g	V _{GS} =10V, V _{DS} =15V, I _D =7.8A		7.2	11	nC
Total Gate Charge (4.5V)				3.5		
Gate Source Charge	Q _{gs}			1.3		
Gate Drain Charge	Q _{gd}			1.7		
Turn-On DelayTime	t _{d(on)}	V _{GS} =10V, V _{DS} =15V, R _L =1.9Ω, R _{GEN} =3Ω		4.5		ns
Turn-On Rise Time	t _r			2.7		
Turn-Off DelayTime	t _{d(off)}			14.9		
Turn-Off Fall Time	t _f			2.9		
Body Diode Reverse Recovery Time	t _{rr}	I _F = 7.8A, dI/dt= 100A/μs		10.5	12.6	nC
Body Diode Reverse Recovery Charge	Q _{rr}			4.5		
Maximum Body-Diode Continuous Current	I _S				2.4	A
Diode Forward Voltage	V _{SD}	I _S =1A, V _{GS} =0V			1	V

Note. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

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■ N-Channel 1 Typical Characteristics

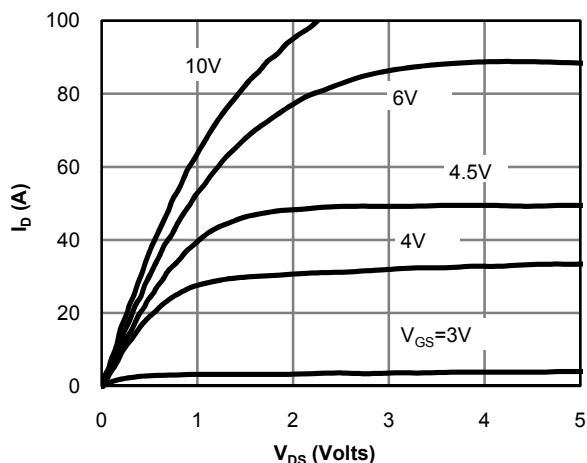


Figure 1: On-Region Characteristics

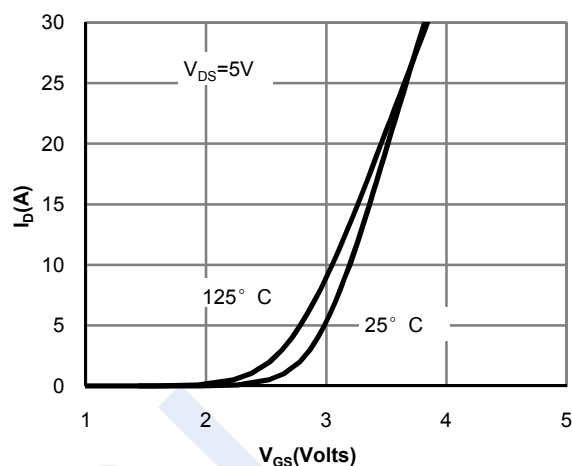


Figure 2: Transfer Characteristics

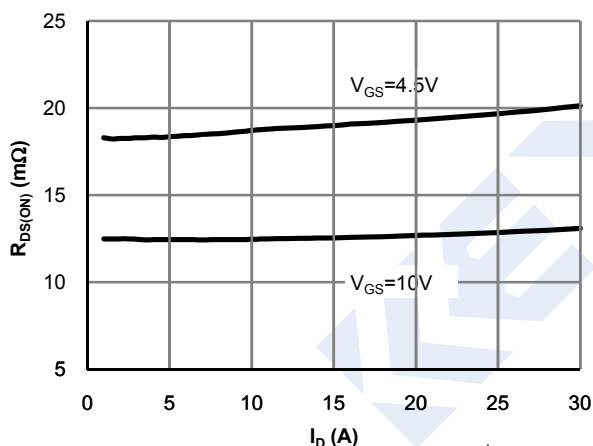


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

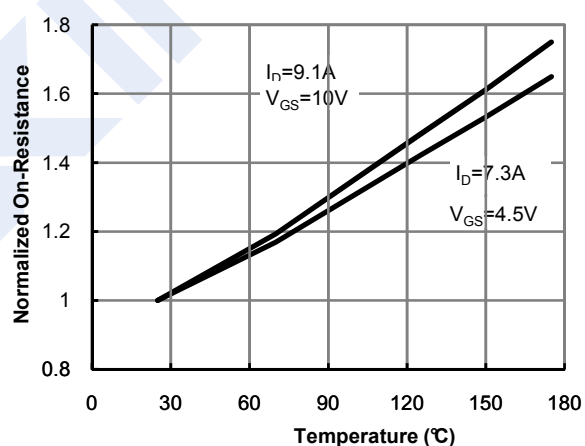


Figure 4: On-Resistance vs. Junction Temperature

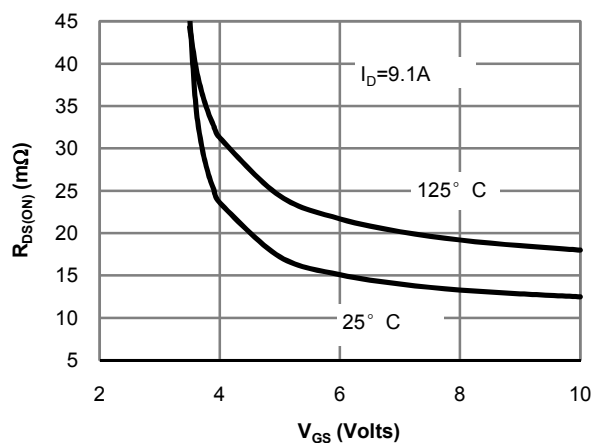


Figure 5: On-Resistance vs. Gate-Source Voltage

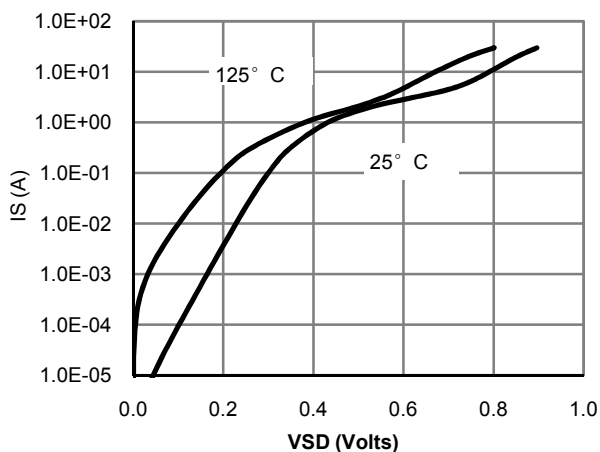
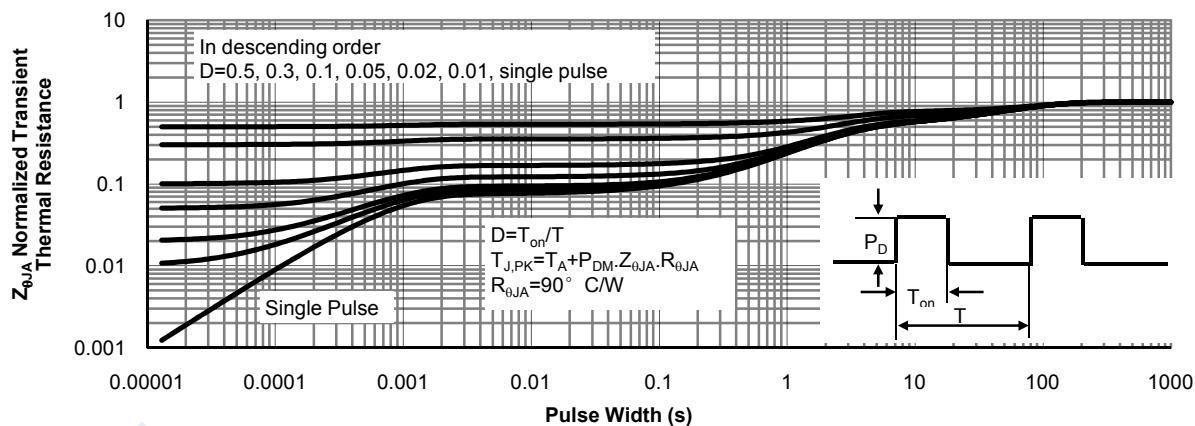
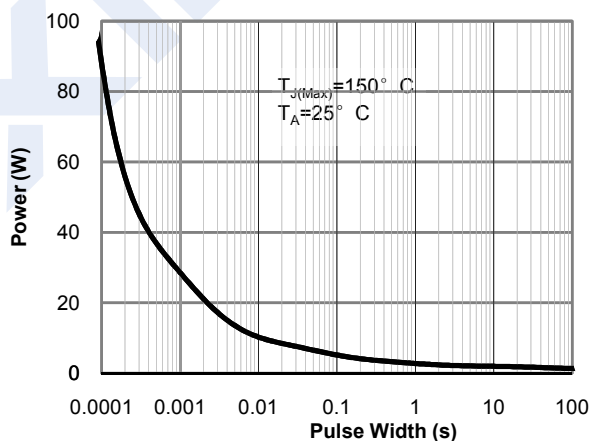
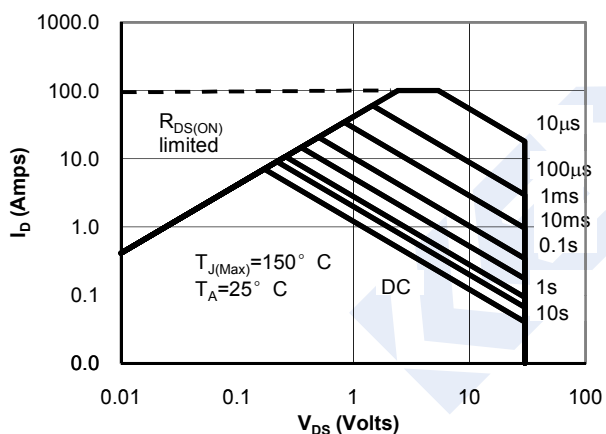
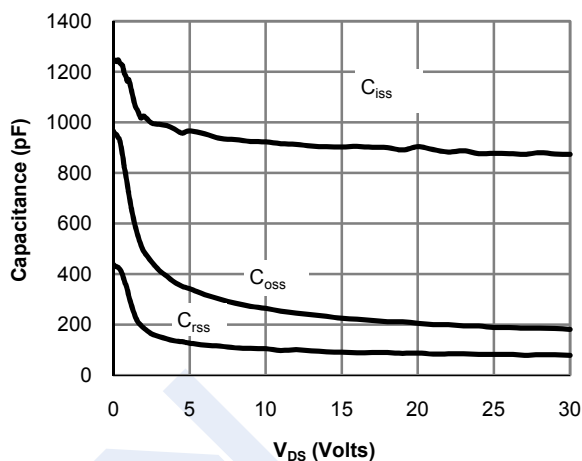
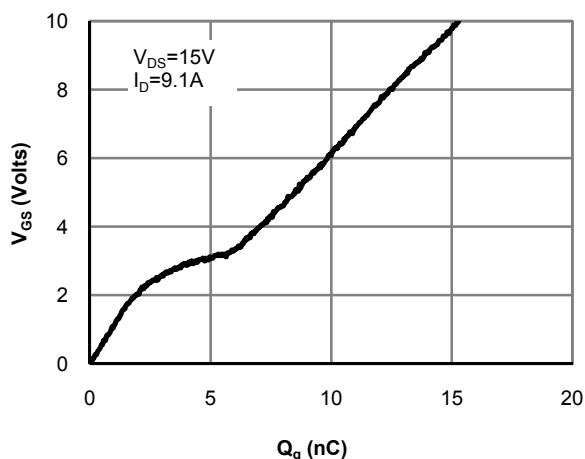


Figure 6: Body-Diode Characteristics

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■ N-Channel 1 Typical Characteristics



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■ N-Channel 2 Typical Characteristics

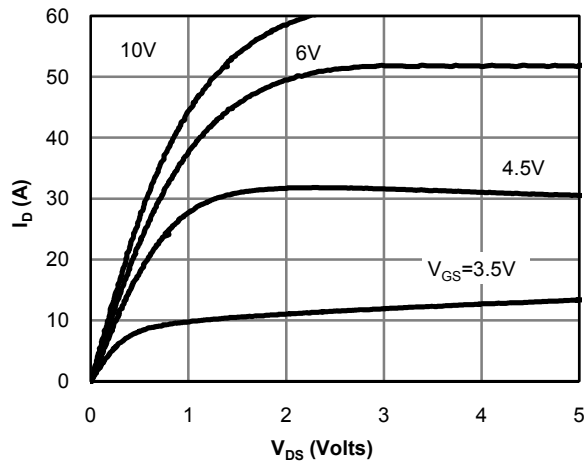


Fig 1: On-Region Characteristics

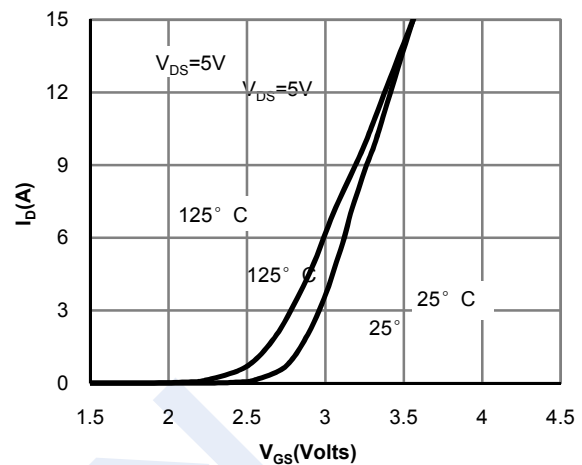


Figure 2: Transfer Characteristics

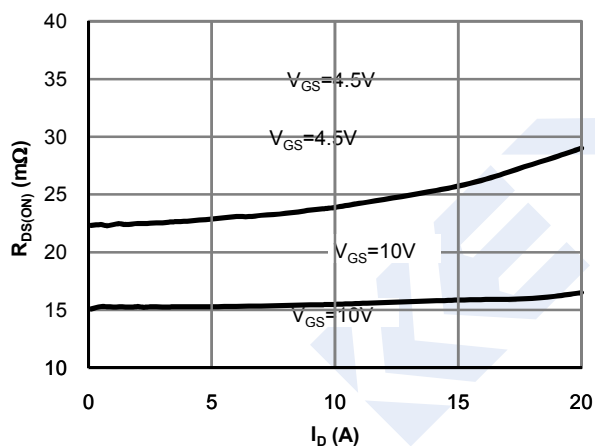


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

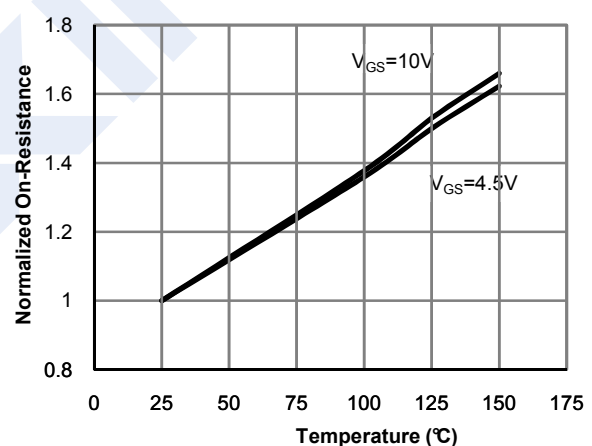


Figure 4: On-Resistance vs. Junction Temperature

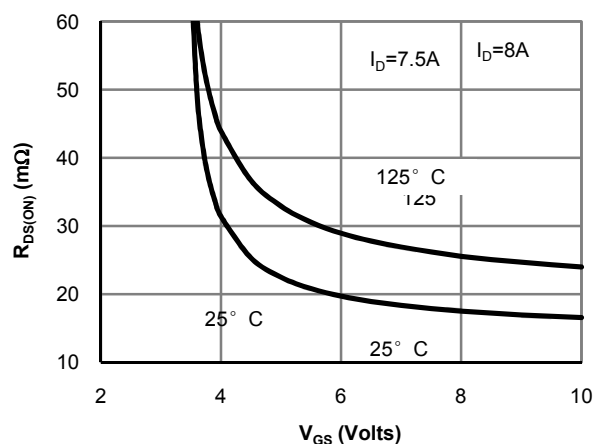


Figure 5: On-Resistance vs. Gate-Source Voltage

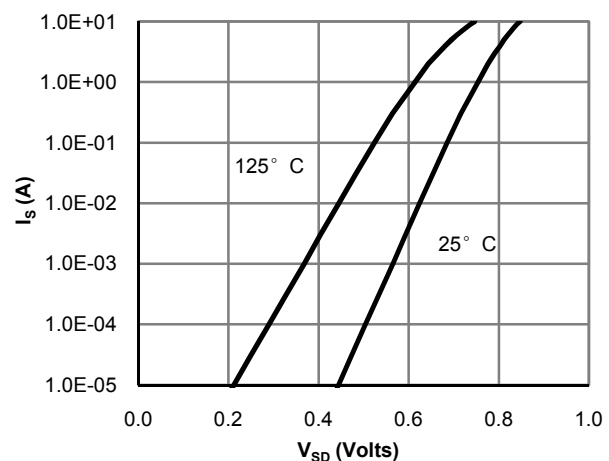


Figure 6: Body-Diode Characteristics

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■ N-Channel 2 Typical Characteristics

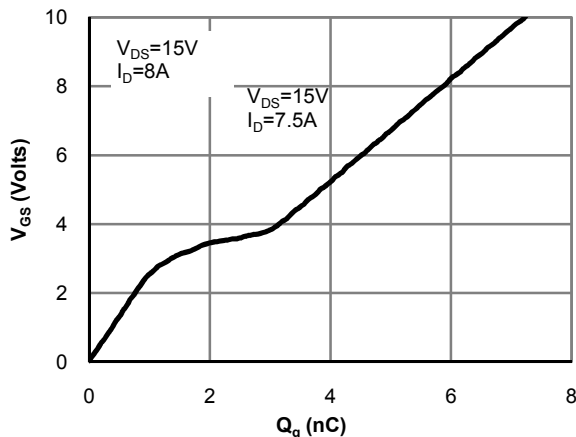


Figure 7: Gate-Charge Characteristics

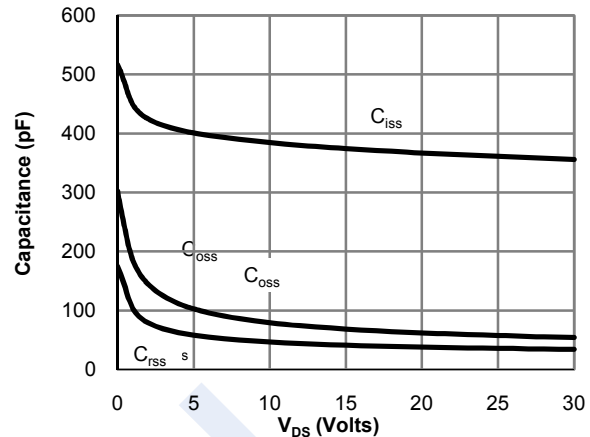


Figure 8: Capacitance Characteristics

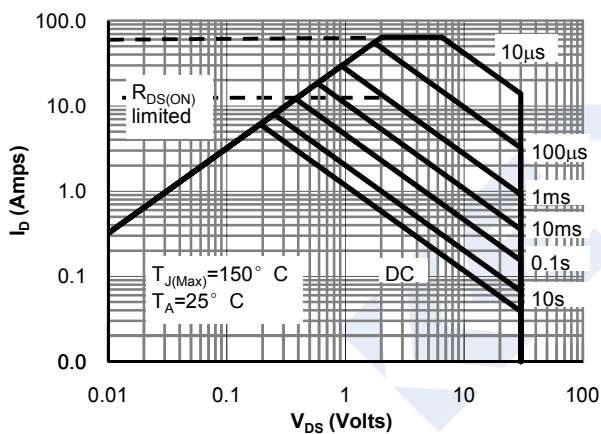


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

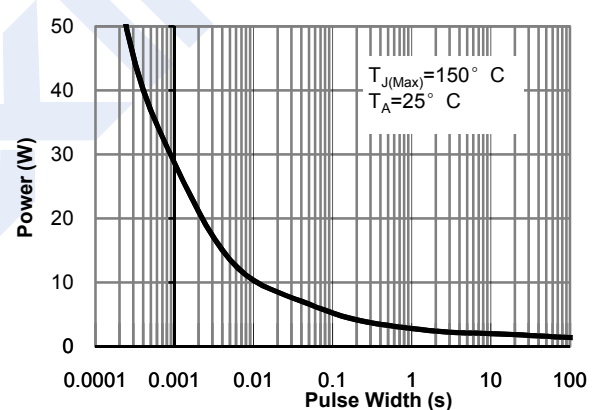


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

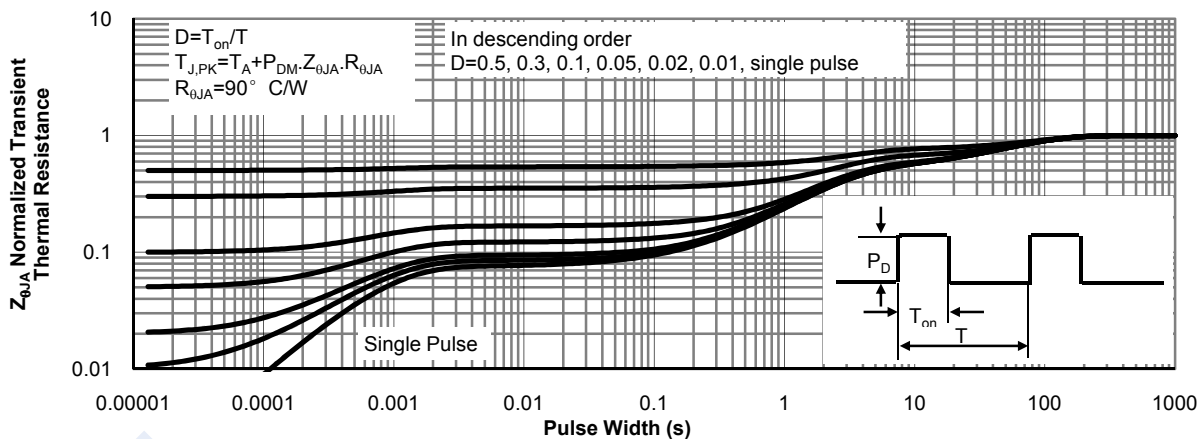


Figure 11: Normalized Maximum Transient Thermal Impedance