

Dual N-Channel MOSFET

AO4940 (KO4940)

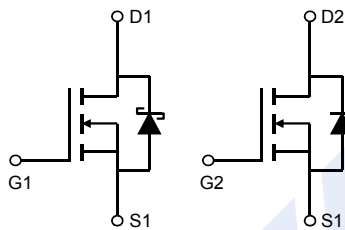
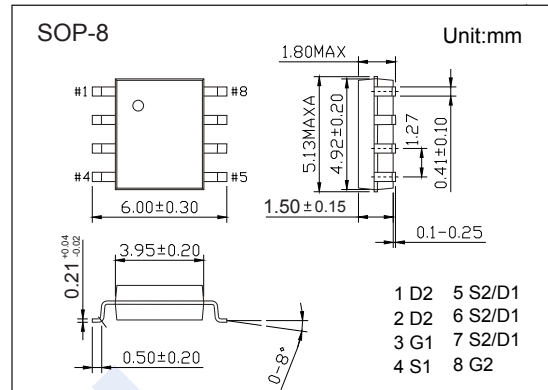
■ Features

N-Channel 1

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

N-Channel 2

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



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

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	I_D	$T_A=25^\circ C$	9.1	7.6	7.8	6.5	A
		$T_A=70^\circ C$	7.3	6.1	6.3	5.2	
Pulsed Drain Current	I_{DM}	100		64		mJ	
Avalanche Current	I_{AR}	17		9			
Repetitive Avalanche Energy	$L=0.3mH$ E_{AR}	43		12		W	
Power Dissipation	P_D	$T_A=25^\circ C$	2	1.4	2		1.4
		$T_A=70^\circ C$	1.3	0.9	1.3	0.9	
Thermal Resistance.Junction- to-Ambient	R_{thJA}	62.5	90	62.5	90	$^\circ C/W$	
Thermal Resistance.Junction- to-Lead	R_{thJL}		40		40		
Junction Temperature	T_J	150				$^\circ C$	
Storage Temperature Range	T_{stg}	-55 to 150					

Dual N-Channel MOSFET

AO4940 (KO4940)

■ N-Channel 1 Electrical Characteristics Ta = 25°C

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°C			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°C			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)}	V _{GS} =10V, V _{DS} =15V, R _L =1.65Ω, R _{GEN} =3Ω		5		ns	
Turn-On Rise Time	t _r			9.2			
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/us		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 <300us pulses, duty cycle 0.5% max.

■ Marking

Marking	4940
	KA****

Dual N-Channel MOSFET

AO4940 (KO4940)

■ 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/us		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 <300us pulses, duty cycle 0.5% max.

Dual N-Channel MOSFET AO4940 (KO4940)

■ N-Channel 1 Typical Characteristics

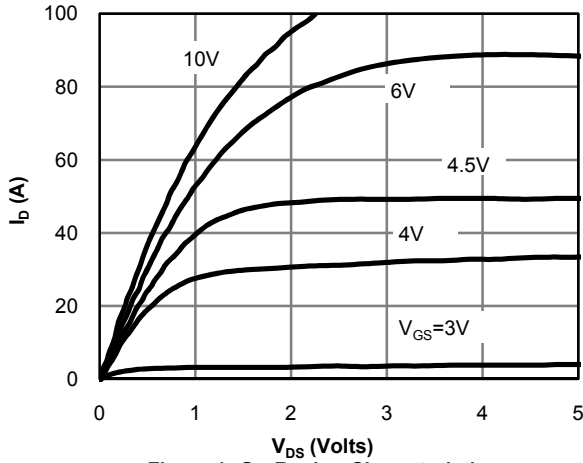


Figure 1: On-Region Characteristics

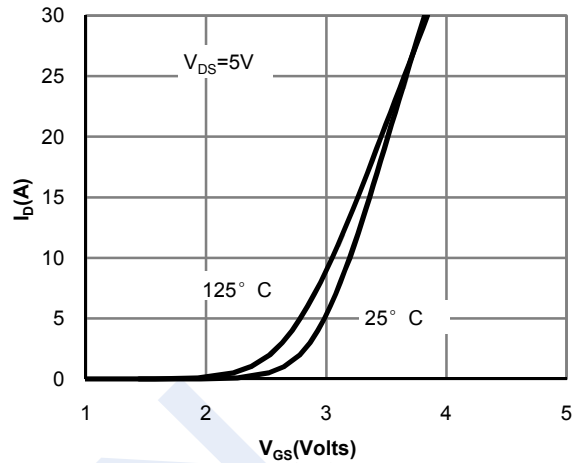


Figure 2: Transfer Characteristics

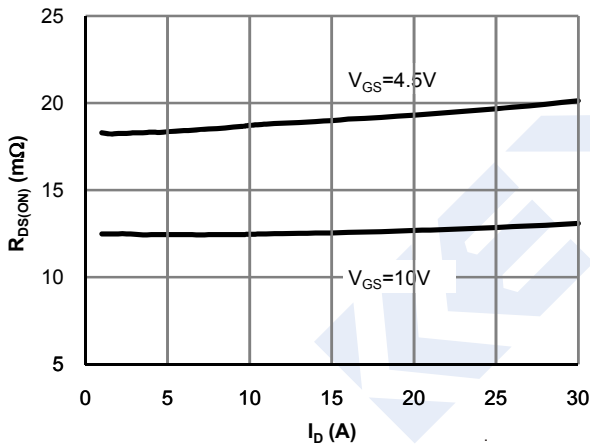


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

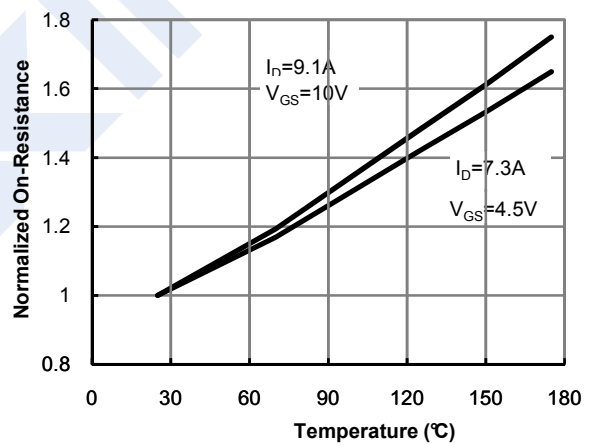


Figure 4: On-Resistance vs. Junction Temperature

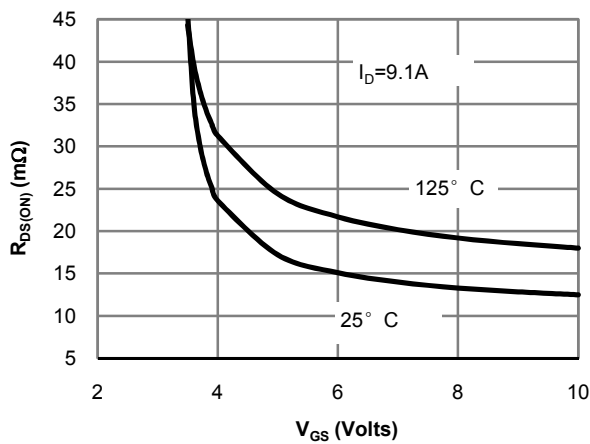


Figure 5: On-Resistance vs. Gate-Source Voltage

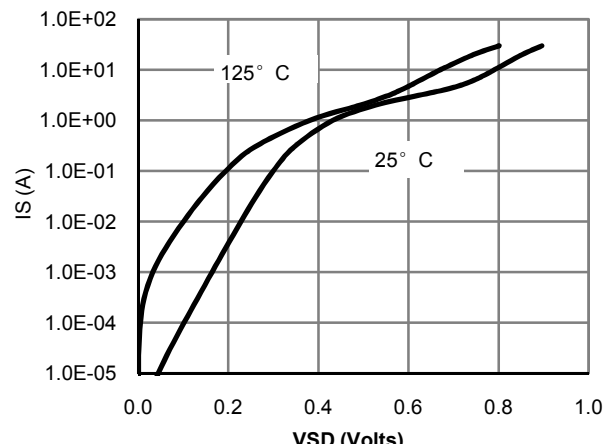
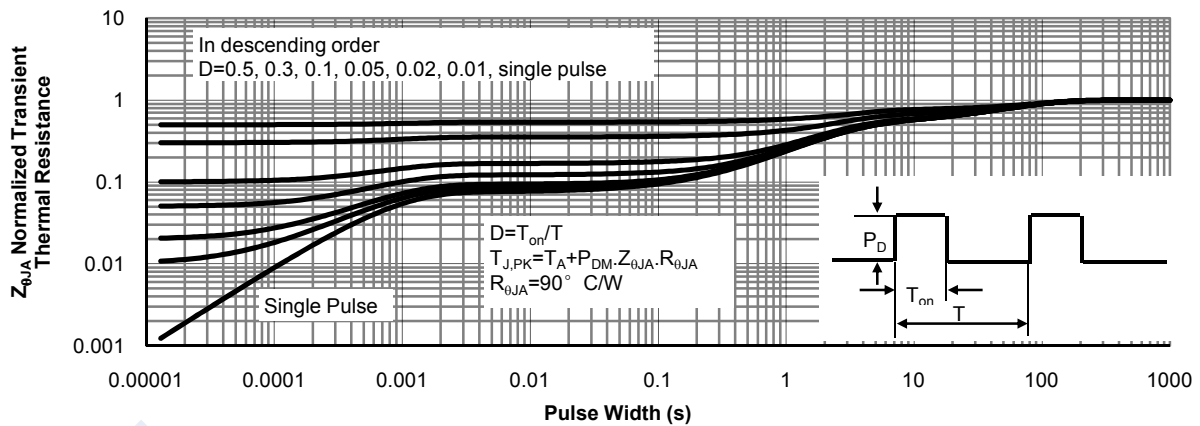
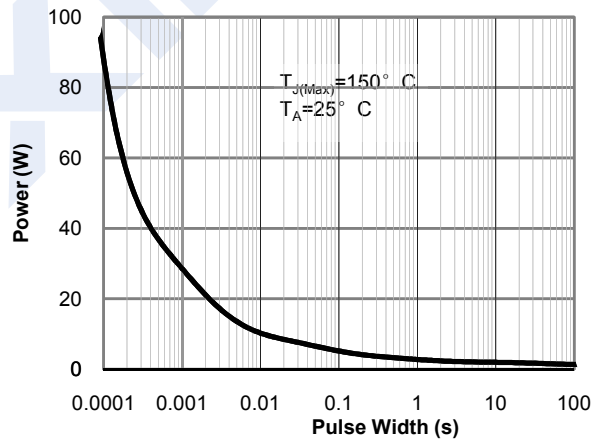
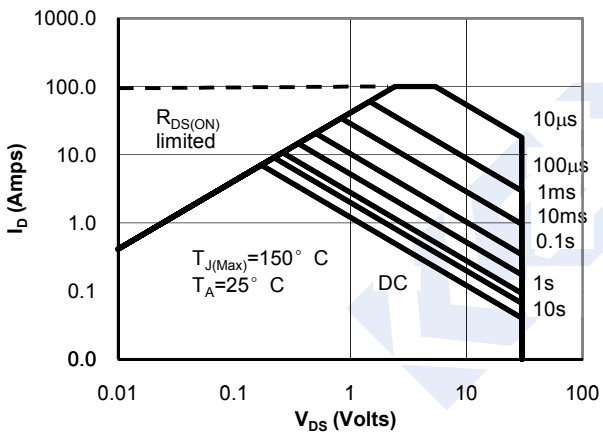
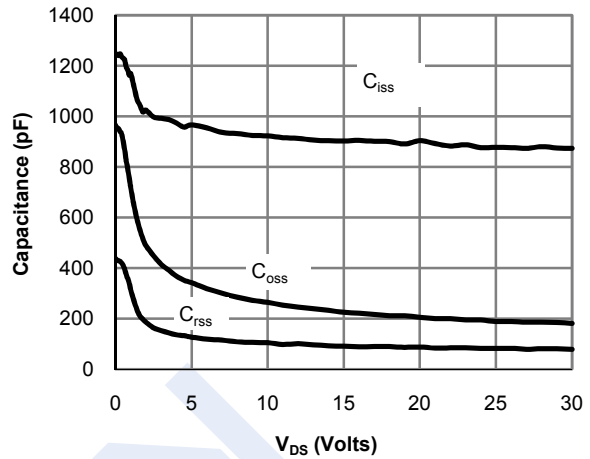
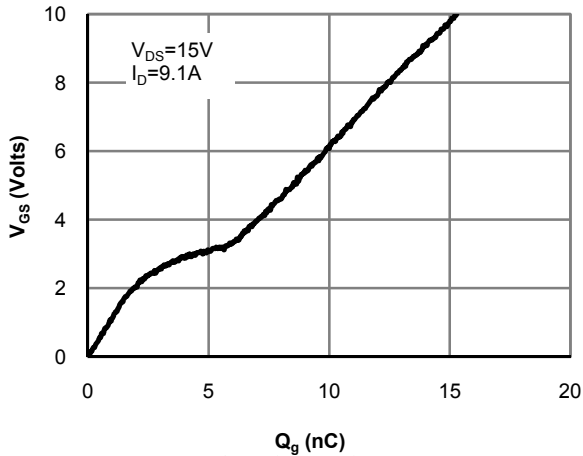


Figure 6: Body-Diode Characteristics

Dual N-Channel MOSFET AO4940 (KO4940)

■ N-Channel 1 Typical Characteristics



Dual N-Channel MOSFET AO4940 (K04940)

■ N-Channel 2 Typical Characteristics

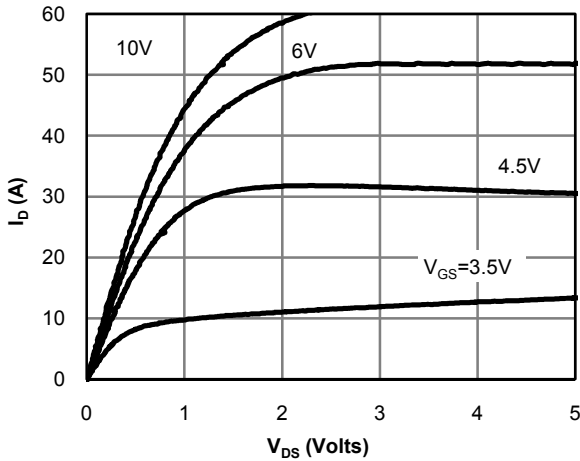


Fig 1: On-Region Characteristics

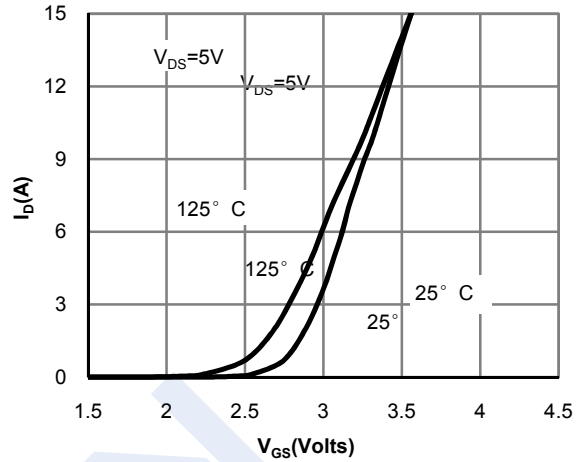


Figure 2: Transfer Characteristics

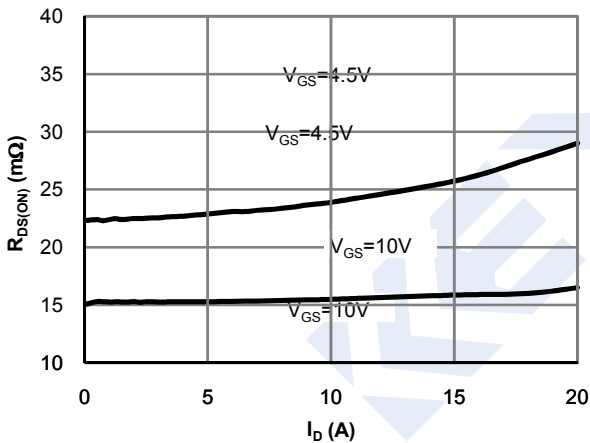


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

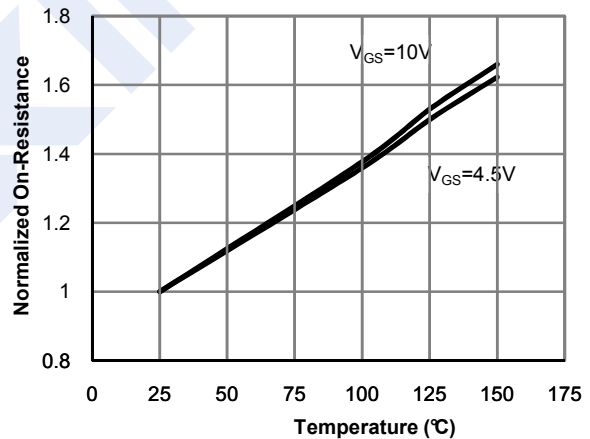


Figure 4: On-Resistance vs. Junction Temperature

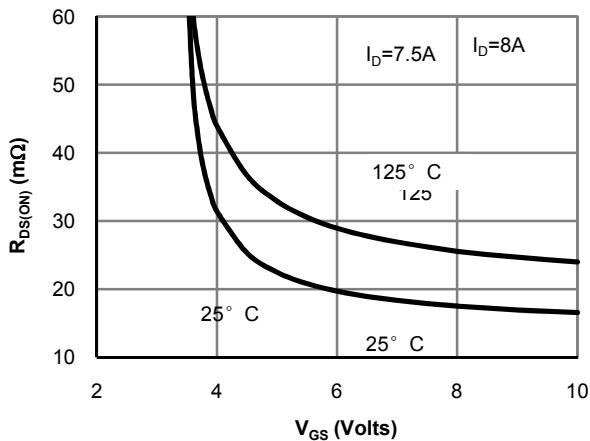


Figure 5: On-Resistance vs. Gate-Source Voltage

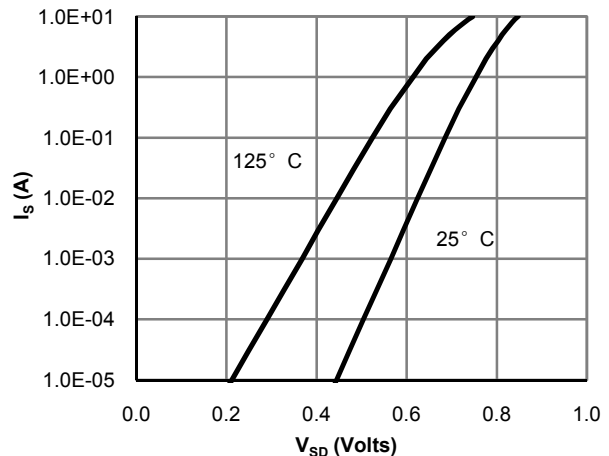


Figure 6: Body-Diode Characteristics

Dual N-Channel MOSFET AO4940 (KO4940)

■ N-Channel 2 Typical Characteristics

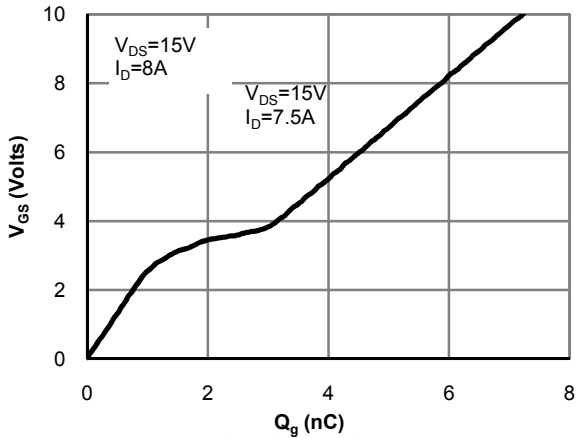


Figure 7: Gate-Charge Characteristics

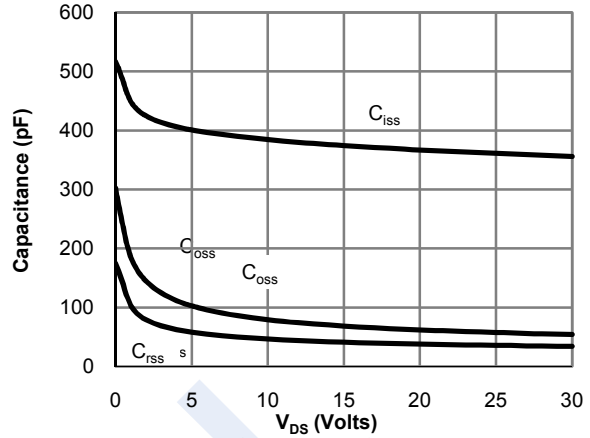


Figure 8: Capacitance Characteristics

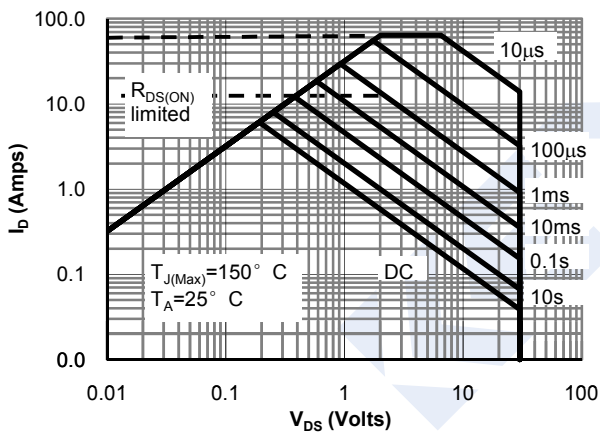


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

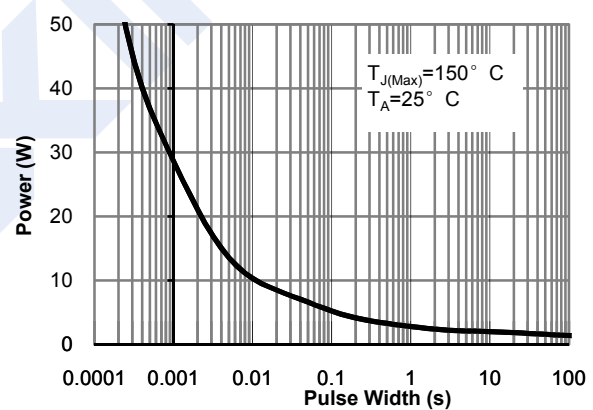


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

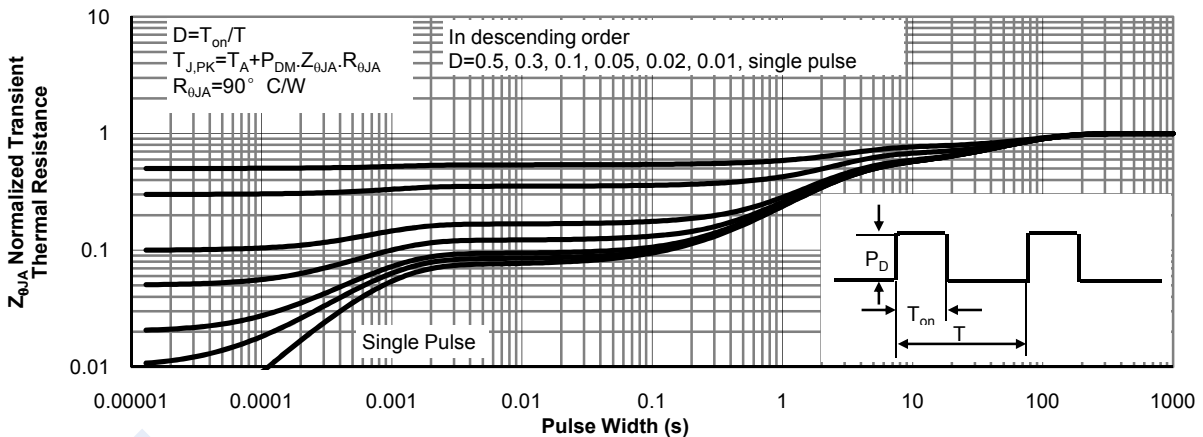


Figure 11: Normalized Maximum Transient Thermal Impedance