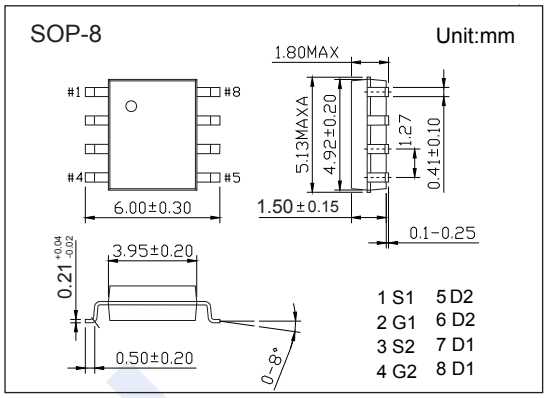
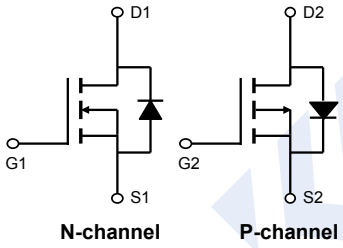
Complementary Trench MOSFET

AO4622 (KO4622)



■ Features

- N-Channel :
  - $V_{DS\ (V)}$ = 20V
  - I_D = 7.3 A (V_{GS} = 4.5V)
  - $R_{DS(ON)}$ < 23mΩ (V_{GS} = 10V)
  - $R_{DS(ON)}$ < 30mΩ (V_{GS} = 4.5V)
  - $R_{DS(ON)}$ < 84mΩ (V_{GS} = 2.5V)
- P-Channel :
  - $V_{DS\ (V)}$ = -20V
  - I_D = -5 A (V_{GS} = -4.5V)
  - $R_{DS(ON)}$ < 53mΩ (V_{GS} = -10V)
  - $R_{DS(ON)}$ < 87mΩ (V_{GS} = -4.5V)



■ 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}	±16	±12	
Continuous Drain Current	T_A=25℃	I_D	7.3	-5	A
	T_A=70℃		6.2	-4.2	
Pulsed Drain Current		I_{DM}	35	-25	
Avalanche Current		I_{AR}	13	-13	
Repetitive Avalanche Energy	L=0.1mH	E_{AR}	25	25	mJ
Power Dissipation	T_A=25℃	P_D	2		W
	T_A=70℃		1.44		
Thermal Resistance.Junction- to-Ambient	t ≤ 10s	R_{thJA}	62.5		℃/W
	Steady-State		100		
Thermal Resistance.Junction- to-Lead		R_{thJL}	40		
Junction Temperature		T_J	150		℃
Storage Temperature Range		T_{stg}	-55 to 150		

Complementary Trench MOSFET

AO4622 (KO4622)

■ N-Channel Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	I_D=250μA, V_{GS}=0V	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=16V, V_{GS}=0V			1	uA
		V_{DS}=16V, V_{GS}=0V, T_J=55℃			5	
Gate-Body Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±16V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} , I_D=250uA	0.6		2	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=7.3A			23	mΩ
		V_{GS}=10V, I_D=7.3A T_J=125℃			33.6	
		V_{GS}=4.5V, I_D=6.4A			30	
		V_{GS}=2.5V, I_D=2A			84	
On State Drain Current	$I_{D(ON)}$	V_{GS}=4.5V, V_{DS}=5V	35			A
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=7.3A		17		S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=10V, f=1MHz		900	1100	pF
Output Capacitance	C_{oss}			162		
Reverse Transfer Capacitance	C_{rss}			105		
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz		0.9	1.35	Ω
Total Gate Charge (10V)	Q_g	V_{GS}=10V, V_{DS}=10V, I_D=6.5A		15	18	nC
Total Gate Charge (4.5V)				7.9	9	
Gate Source Charge	Q_{gs}			1.8		
Gate Drain Charge	Q_{gd}			2.8		
Turn-On DelayTime	$t_{d(on)}$	V_{GS}=10V, V_{DS}=10V, R_L=1.4Ω, R_{GEN}=3Ω		4.5		ns
Turn-On Rise Time	t_r			9.2		
Turn-Off DelayTime	$t_{d(off)}$			18.7		
Turn-Off Fall Time	t_f			3.3		
Body Diode Reverse Recovery Time	t_{rr}	I_F= 7.3A, dI/dt= 100A/us		18		
Body Diode Reverse Recovery Charge	Q_{rr}			9.5		nC
Maximum Body-Diode Continuous Current	I_S				3	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 <300 us pulses, duty cycle 0.5% max.

■ Marking

Marking	4622 KA****

Complementary Trench MOSFET

AO4622 (KO4622)

■ P-Channel Electrical Characteristics Ta = 25℃

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	I_D=-250uA, V_{GS}=0V	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-16V, V_{GS}=0V			-1	uA
		V_{DS}=-16V, V_{GS}=0V, T_J=55℃			-5	
Gate-Body leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±12V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} , I_D=-250μA	-0.5		-1.3	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-5A			53	mΩ
		V_{GS}=-4.5V, I_D=-5A T_J=125℃			71	
		V_{GS}=-2.5V, I_D=-4.2A			87	
On state drain current	$I_{D(ON)}$	V_{GS}=-4.5V, V_{DS}=-5V	-25			A
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-5A		13		S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-10V, f=1MHz		800	960	pF
Output Capacitance	C_{oss}			131		
Reverse Transfer Capacitance	C_{rss}			103		
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz		6.7	10	Ω
Total Gate Charge (10V)	Q_g	V_{GS}=-4.5V, V_{DS}=-10V, I_D=-4.5A		15.5		nC
Total Gate Charge (4.5V)				7.4		
Gate Source Charge	Q_{gs}			1.3		
Gate Drain Charge	Q_{gd}			2.9		
Turn-On DelayTime	$t_{d(on)}$	V_{GS}=-4.5V, V_{DS}=-10V, R_L=2Ω, R_{GEN}=3Ω		4.4		ns
Turn-On Rise Time	t_r			7.6		
Turn-Off DelayTime	$t_{d(off)}$			44		
Turn-Off Fall Time	t_f			13.5		
Body Diode Reverse Recovery Time	t_{rr}	I_F=-5A, dI/dt=100A/us		20		
Body Diode Reverse Recovery Charge	Q_{rr}			9		nC
Maximum Body-Diode Continuous Current	I_S				-2.5	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 <300 us pulses, duty cycle 0.5% max.

Complementary Trench MOSFET

AO4622 (KO4622)

■ N-Channel Typical Characterisitics

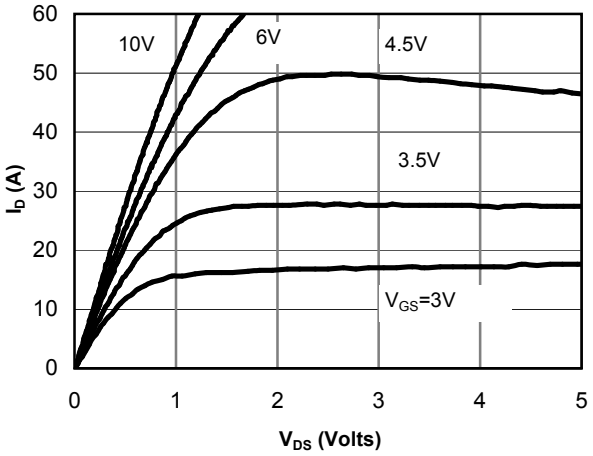


Figure 1: On-Region Characteristics

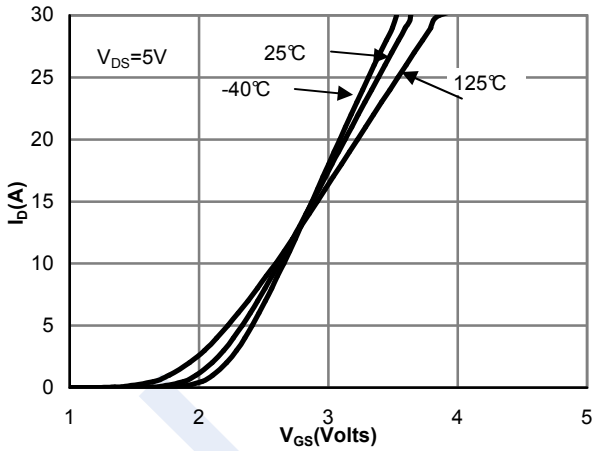


Figure 2: Transfer Characteristics

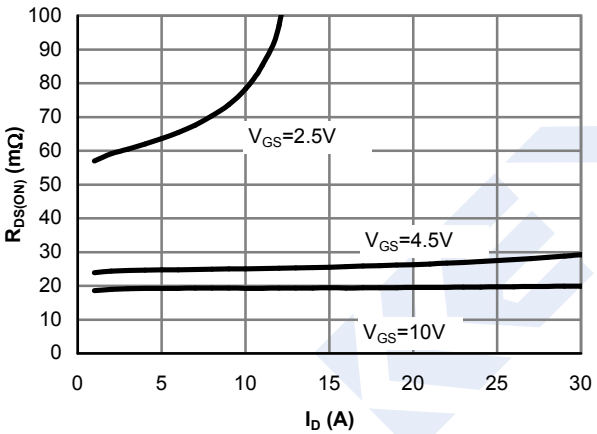


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

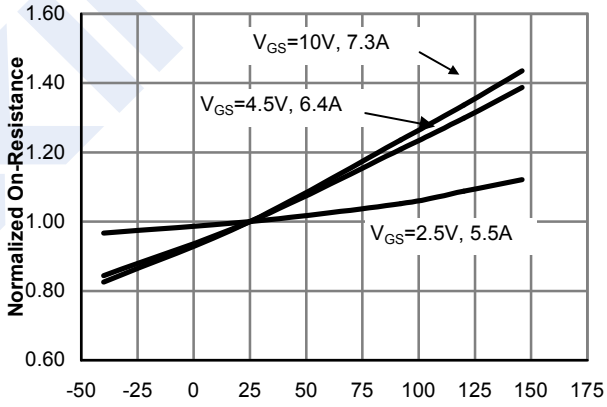


Figure 4: On-Resistance vs. Junction Temperature

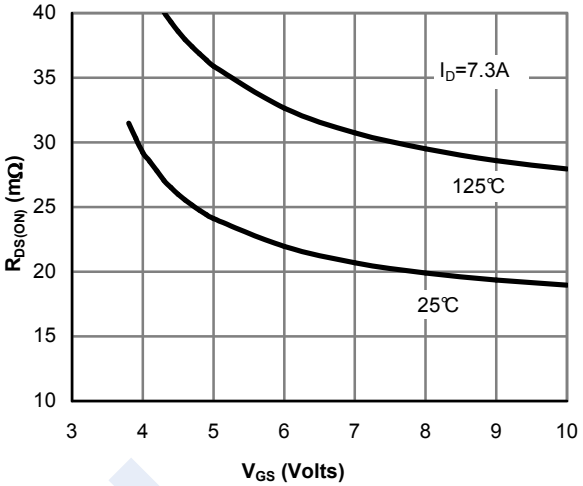


Figure 5: On-Resistance vs. Gate-Source Voltage

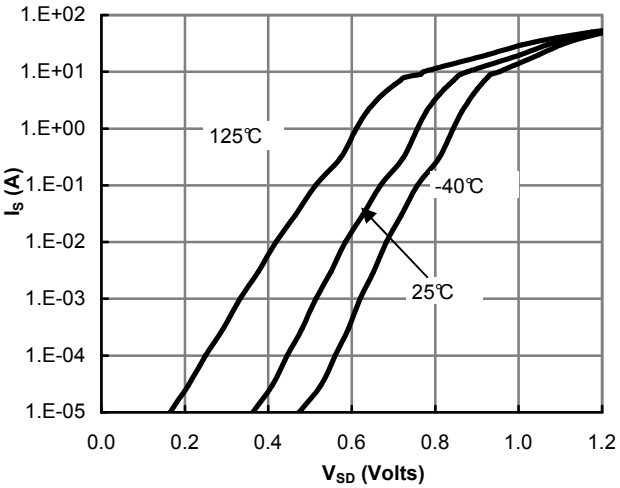


Figure 6: Body-Diode Characteristics

Complementary Trench MOSFET

AO4622 (KO4622)

■ N-Channel Typical Characterisitics

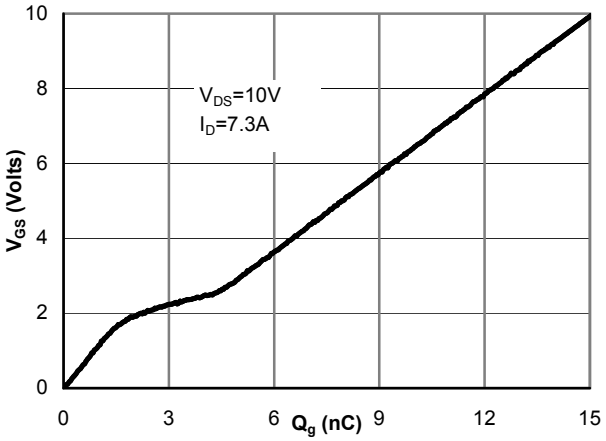


Figure 7: Gate-Charge Characteristics

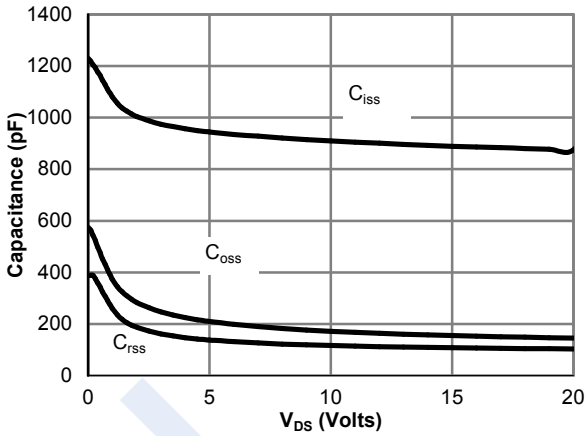


Figure 8: Capacitance Characteristics

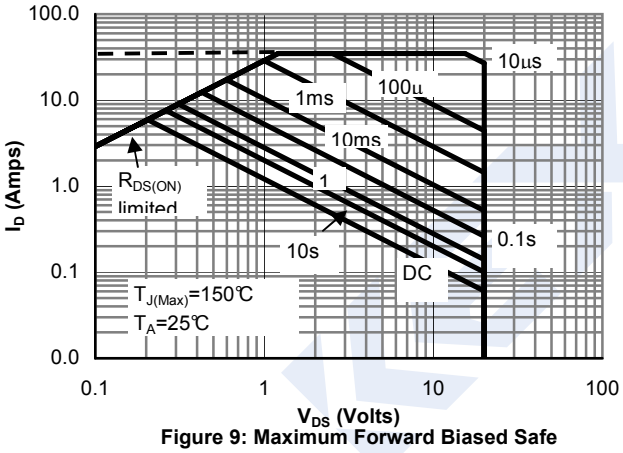


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

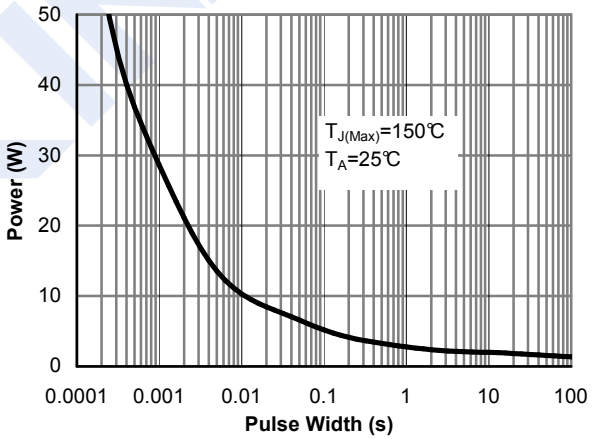


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

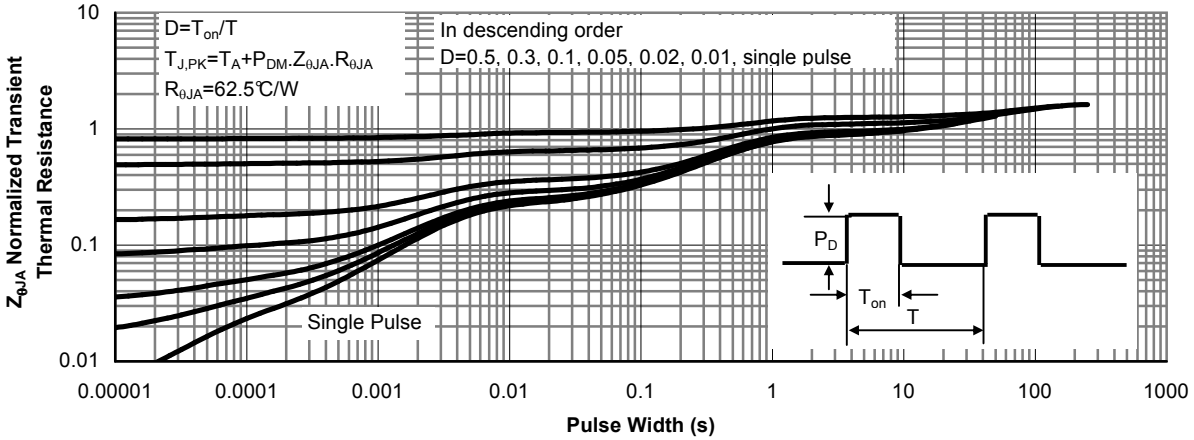


Figure 11: Normalized Maximum Transient Thermal Impedance

Complementary Trench MOSFET

AO4622 (KO4622)

■ P-Channel Typical Characterisitics

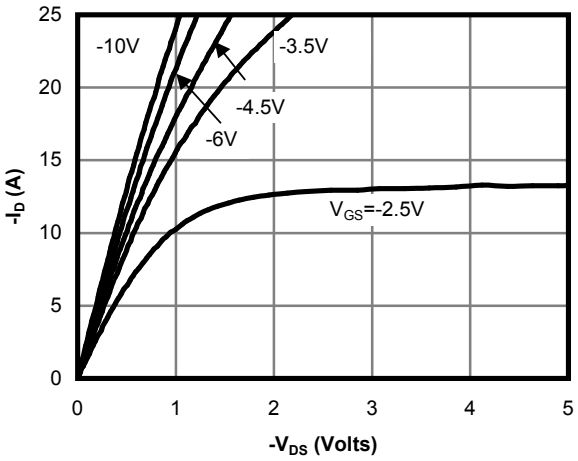


Fig 1: On-Region Characteristics

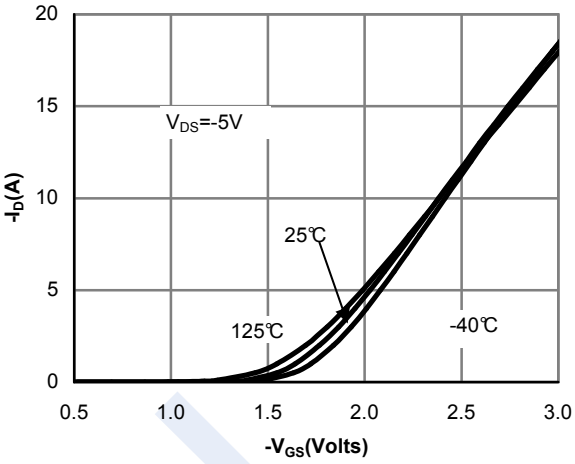


Figure 2: Transfer Characteristics

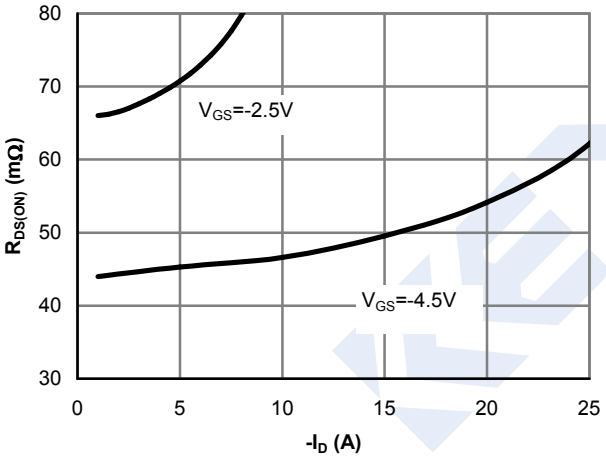


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

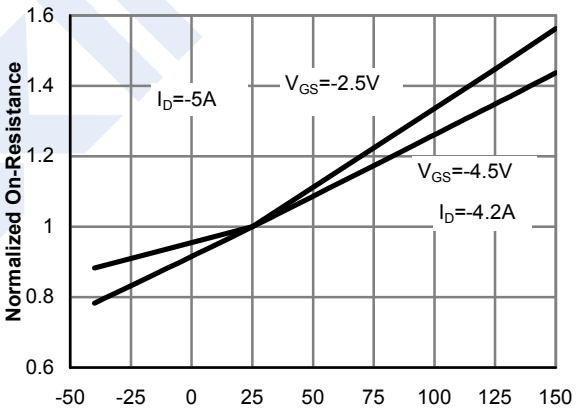


Figure 4: On-Resistance vs. Junction Temperature

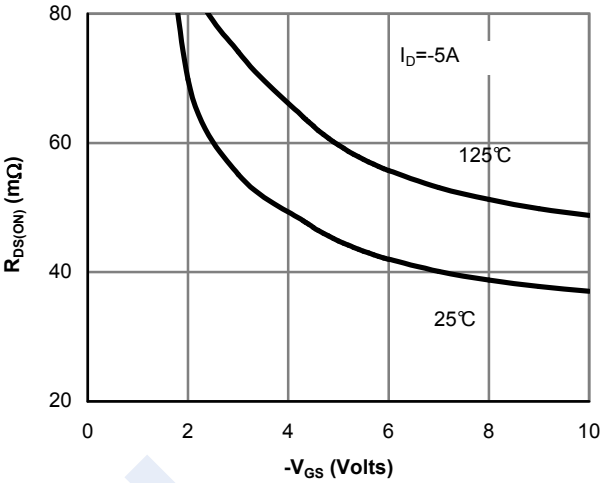


Figure 5: On-Resistance vs. Gate-Source Voltage

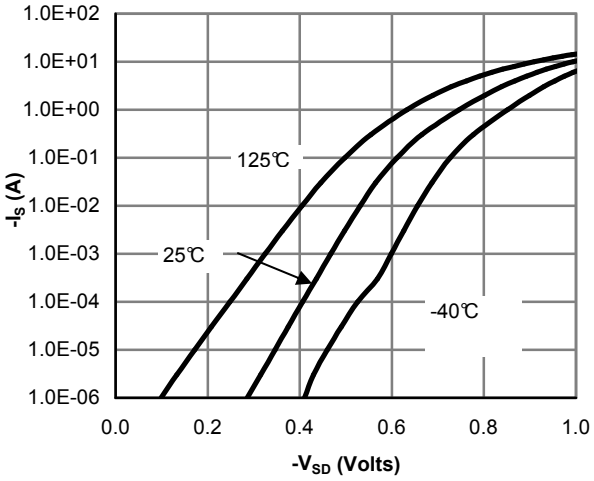


Figure 6: Body-Diode Characteristics

Complementary Trench MOSFET

AO4622 (KO4622)

■ P-Channel Typical Characterisitics

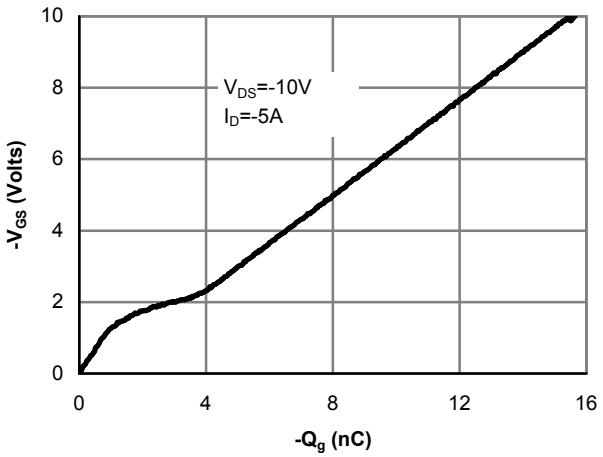


Figure 7: Gate-Charge Characteristics

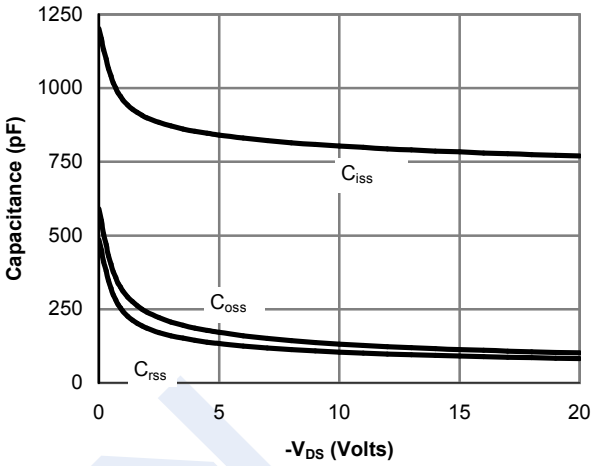


Figure 8: Capacitance Characteristics

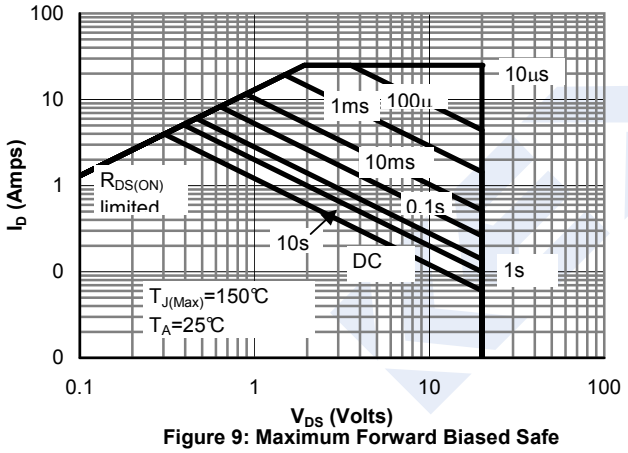


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

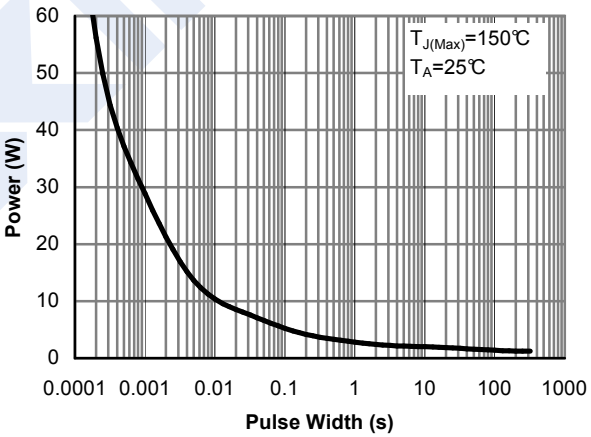


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

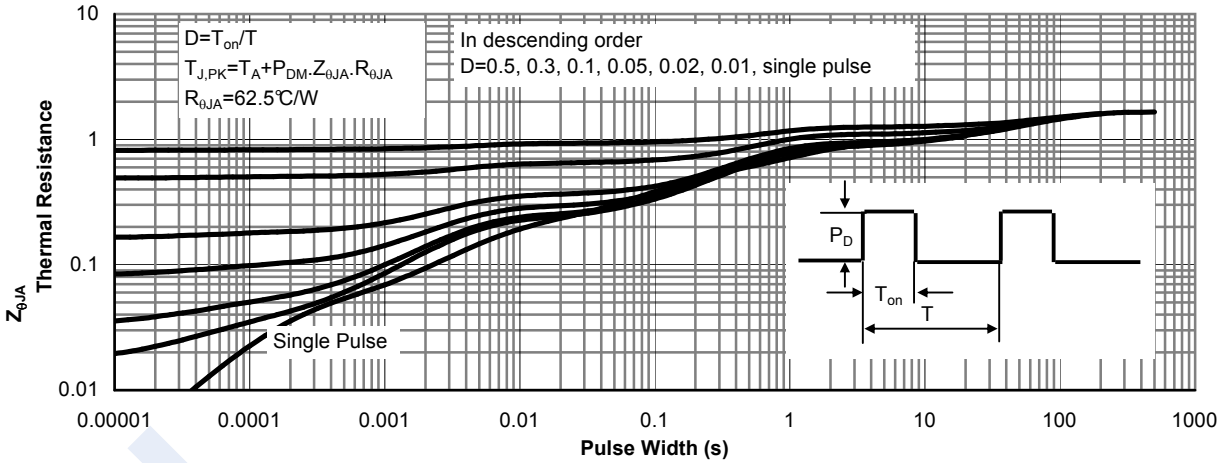


Figure 11: Normalized Maximum Transient Thermal Impedance