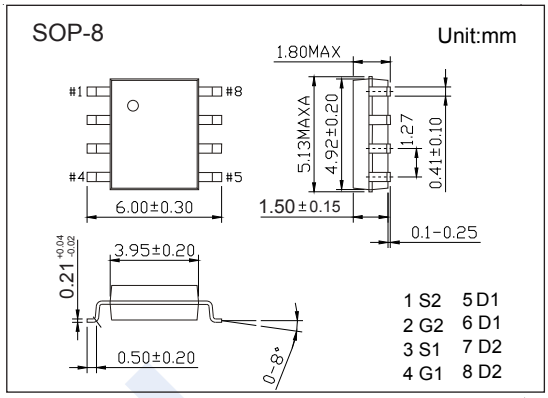
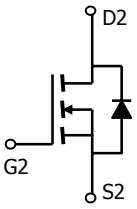
Complementary Trench MOSFET

AO4600 (KO4600)

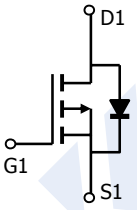


■ Features

- N-Channel :
  - $V_{DS\ (V)}$ = 30V
  - I_D = 6.9 A (V_{GS} = 10V)
  - $R_{DS(ON)}$ < 27mΩ (V_{GS} = 10V)
  - $R_{DS(ON)}$ < 32mΩ (V_{GS} = 4.5V)
  - $R_{DS(ON)}$ < 50mΩ (V_{GS} = 2.5V)
- P-Channel :
  - $V_{DS\ (V)}$ = -30V
  - I_D = -5 A (V_{GS} = -10V)
  - $R_{DS(ON)}$ < 49mΩ (V_{GS} = -10V)
  - $R_{DS(ON)}$ < 64mΩ (V_{GS} = -4.5V)
  - $R_{DS(ON)}$ < 120mΩ (V_{GS} = -2.5V)



N-channel



P-channel

■ 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}	±12		
Continuous Drain Current	T_A=25℃	I_D	6.9	-5	A
	T_A=70℃		5.8	-4.2	
Pulsed Drain Current		I_{DM}	40	-30	
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		110		
Thermal Resistance.Junction- to-Lead		R_{thJL}	40		
Junction Temperature		T_J	150		℃
Storage Temperature Range		T_{stg}	-55 to 150		

Complementary Trench MOSFET

AO4600 (KO4600)

■ 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	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V			1	uA
		V_{DS}=24V, 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=250uA	0.7		1.4	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=6.9A			27	mΩ
		V_{GS}=10V, I_D=6.9A T_J=125℃			40	
		V_{GS}=4.5V, I_D=6A			32	
		V_{GS}=2.5V, I_D=5A			50	
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	12	16		S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V, f=1MHz		858	1050	pF
Output Capacitance	C_{oss}			110		
Reverse Transfer Capacitance	C_{rss}			80		
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz		1.4	2	Ω
Total Gate Charge	Q_g	V_{GS}=4.5V, V_{DS}=15V, I_D=6.9A		9.6	12	nC
Gate Source Charge	Q_{gs}			1.65		
Gate Drain Charge	Q_{gd}			3		
Turn-On DelayTime	$t_{d(on)}$	V_{GS}=10V, V_{DS}=15V, R_L=2.2Ω, R_{GEN}=6Ω		5.7		ns
Turn-On Rise Time	t_r			13		
Turn-Off DelayTime	$t_{d(off)}$			37		
Turn-Off Fall Time	t_f			4.2		
Body Diode Reverse Recovery Time	t_{rr}	I_F= 5A, dI/dt= 100A/us		15.5	20	
Body Diode Reverse Recovery Charge	Q_{rr}			7.9		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	4600 KA****

Complementary Trench MOSFET

AO4600 (KO4600)

■ P-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	-30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V, V_{GS}=0V			-1	uA
		V_{DS}=-24V, 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	-0.7		-1.4	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-5A			49	mΩ
		V_{GS}=-10V, I_D=-5A T_J=125℃			74	
		V_{GS}=-4.5V, I_D=-4A			64	
		V_{GS}=-2.5V, I_D=-1A			120	
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	7	11		S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-15V, f=1MHz		952	1200	pF
Output Capacitance	C_{oss}			103		
Reverse Transfer Capacitance	C_{rss}			77		
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz		5.9	30	Ω
Total Gate Charge	Q_g	V_{GS}=-4.5V, V_{DS}=-15V, I_D=-5A		9.5	12	nC
Gate Source Charge	Q_{gs}			2		
Gate Drain Charge	Q_{gd}			3.1		
Turn-On DelayTime	$t_{d(on)}$	V_{GS}=-10V, V_{DS}=-15V, R_L=3Ω, R_{GEN}=6Ω		12		ns
Turn-On Rise Time	t_r			4		
Turn-Off DelayTime	$t_{d(off)}$			37		
Turn-Off Fall Time	t_f			12		
Body Diode Reverse Recovery Time	t_{rr}	I_F=-5A, dI/dt=100A/us		21	26	
Body Diode Reverse Recovery Charge	Q_{rr}			13		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.

Complementary Trench MOSFET

AO4600 (KO4600)

■ N-Channel Typical Characterisitics

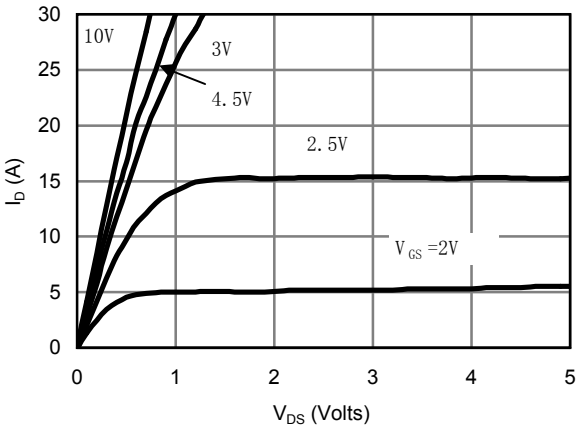


Fig 1: On-Region Characteristics

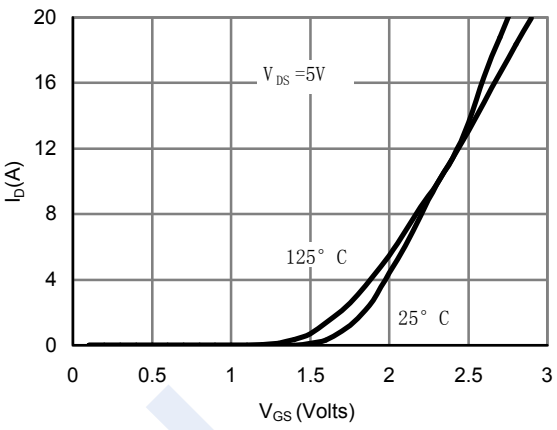


Figure 2: Transfer Characteristics

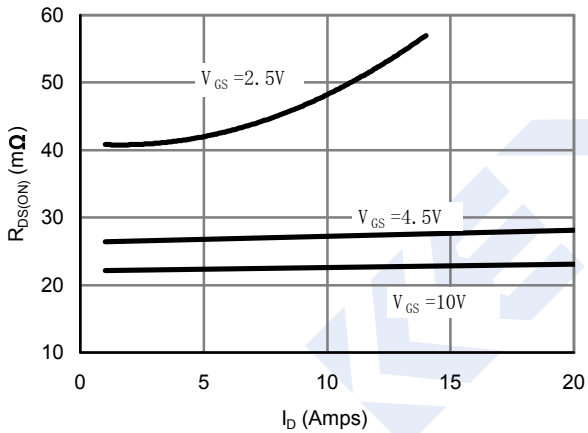


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

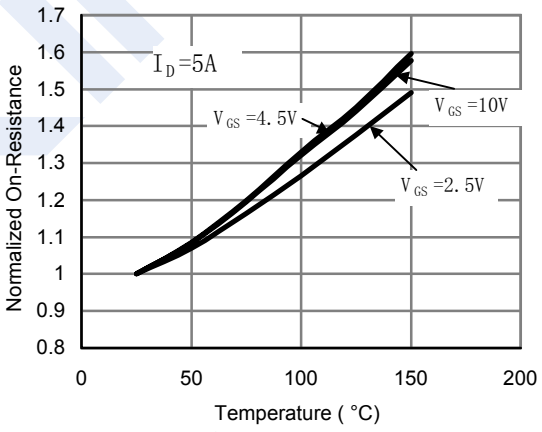


Figure 4: On-Resistance vs. Junction Temperature

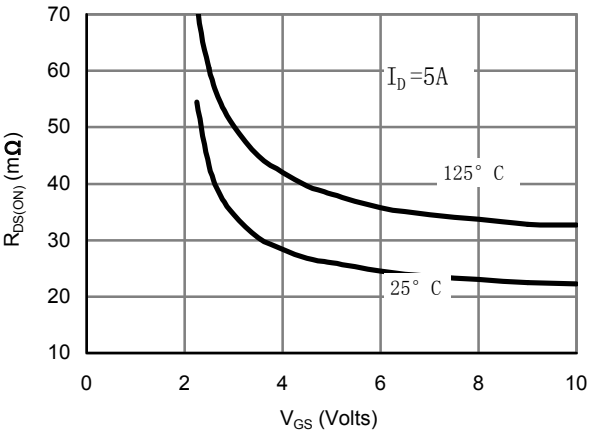


Figure 5: On-Resistance vs. Gate-Source Voltage

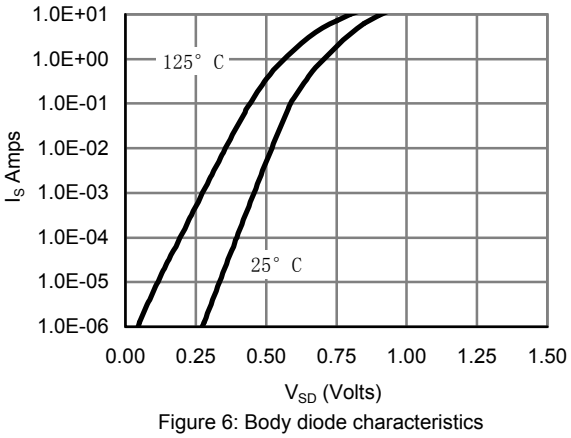


Figure 6: Body diode characteristics

Complementary Trench MOSFET

AO4600 (KO4600)

■ N-Channel Typical Characterisitics

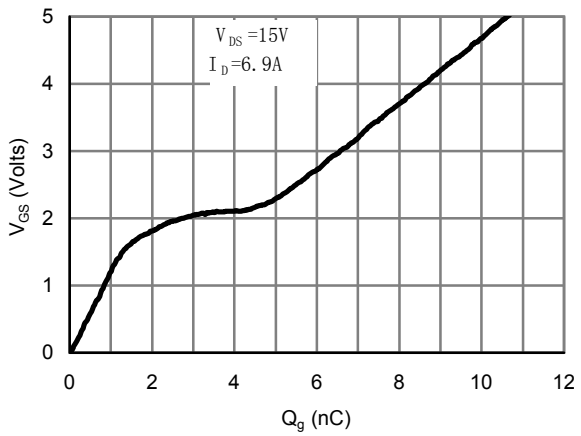


Figure 7: Gate-Charge characteristics

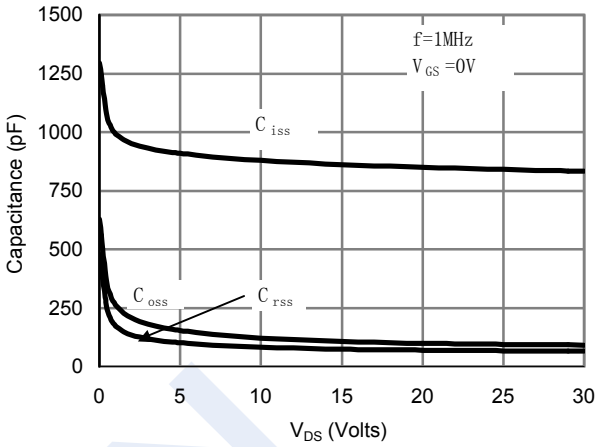


Figure 8: Capacitance Characteristics

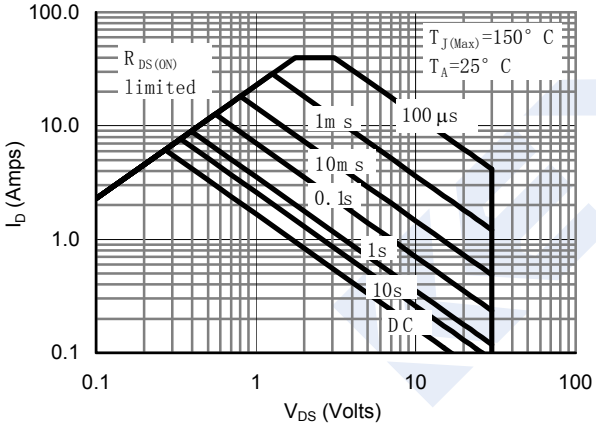


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

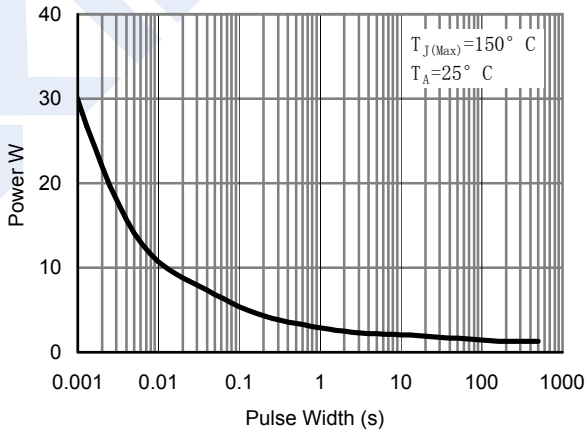


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

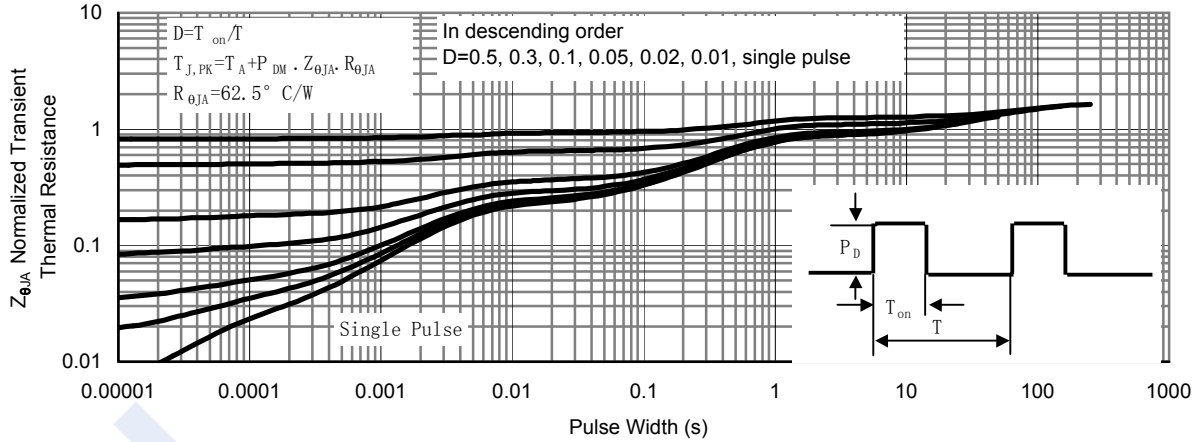


Figure 11: Normalized Maximum Transient Thermal Impedance

Complementary Trench MOSFET

AO4600 (KO4600)

■ P-Channel Typical Characterisitics

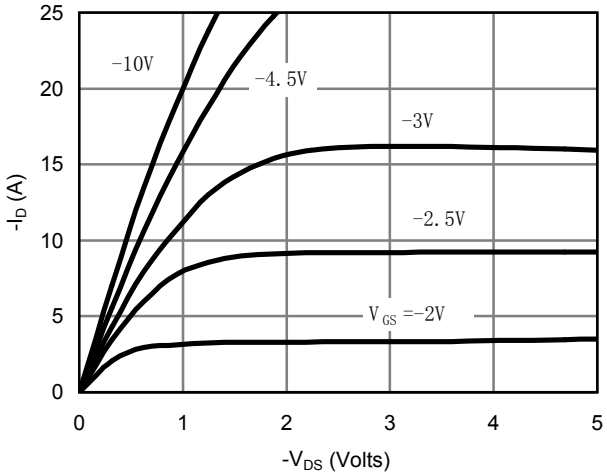


Fig 1: On-Region Characteristics

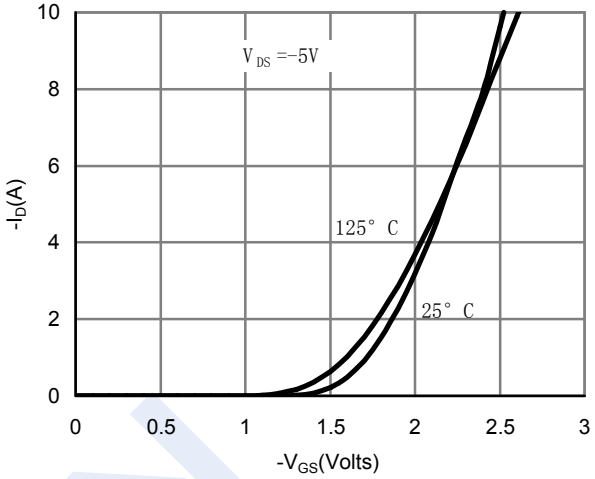


Figure 2: Transfer Characteristics

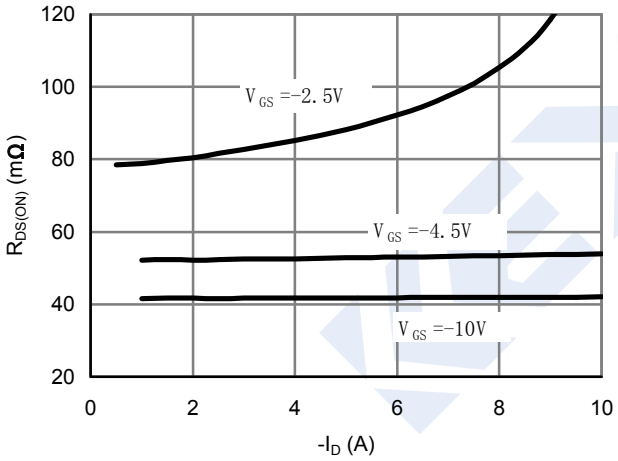


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

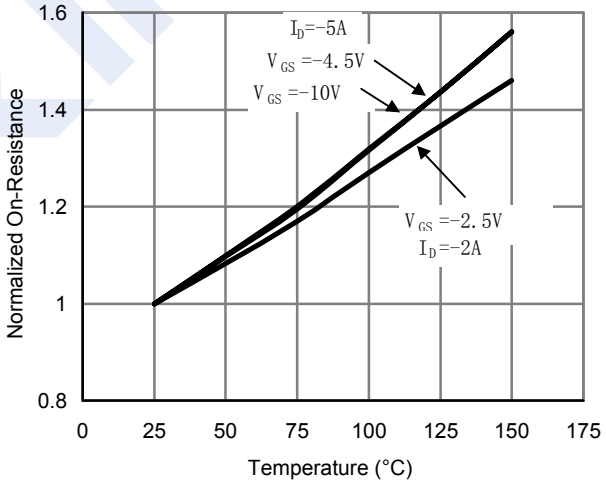


Figure 4: On-Resistance vs. Junction Temperature

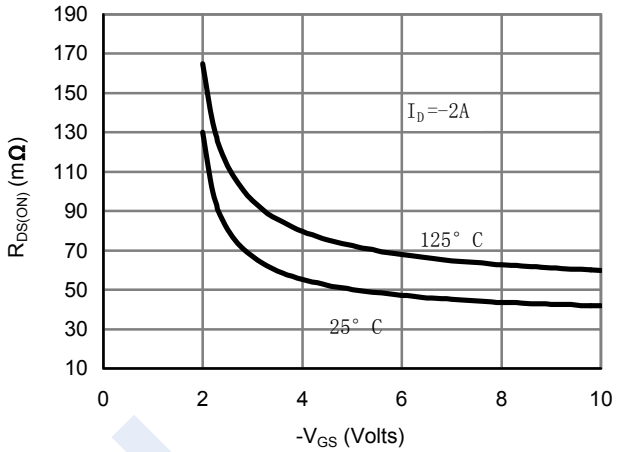


Figure 5: On-Resistance vs. Gate-Source Voltage

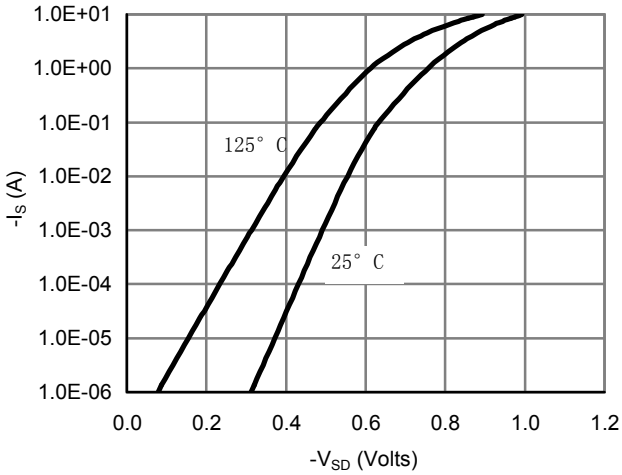


Figure 6: Body-Diode Characteristics

Complementary Trench MOSFET

AO4600 (KO4600)

■ P-Channel Typical Characterisitics

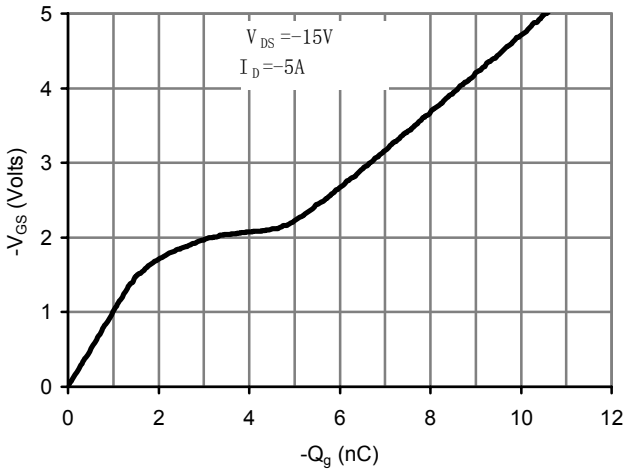


Figure 7: Gate-Charge Characteristics

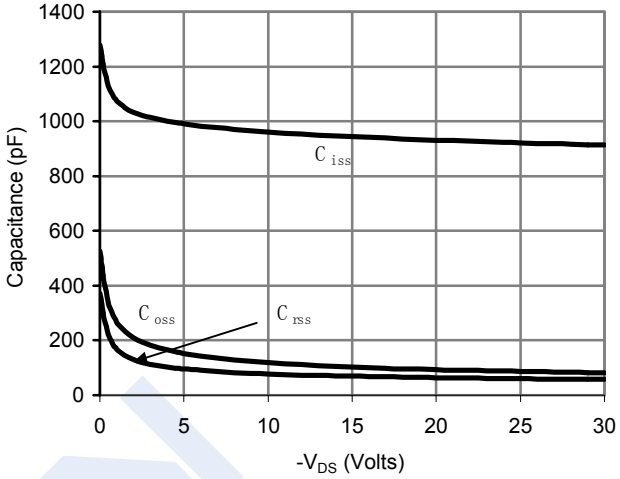


Figure 8: Capacitance Characteristics

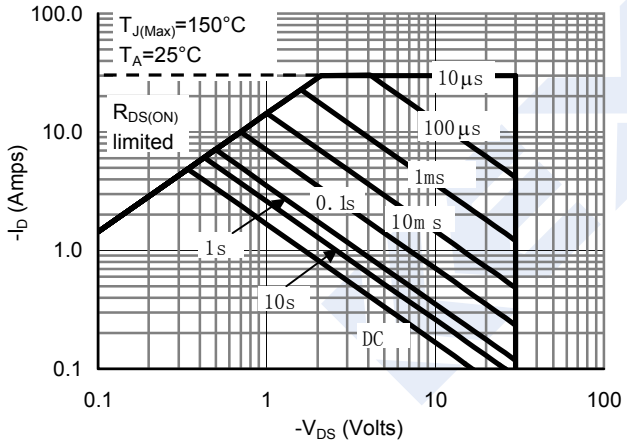


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

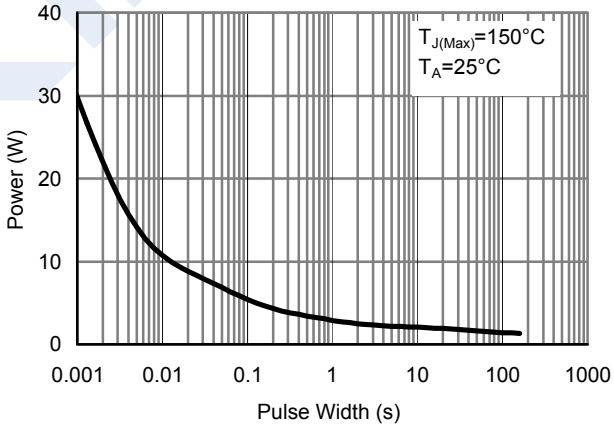


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

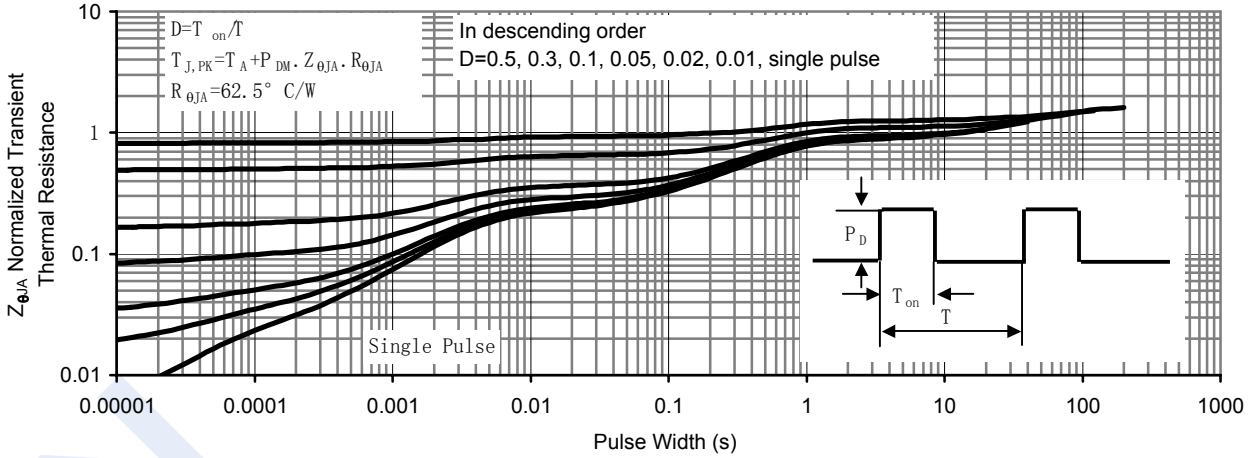


Figure 11: Normalized Maximum Transient Thermal Impedance