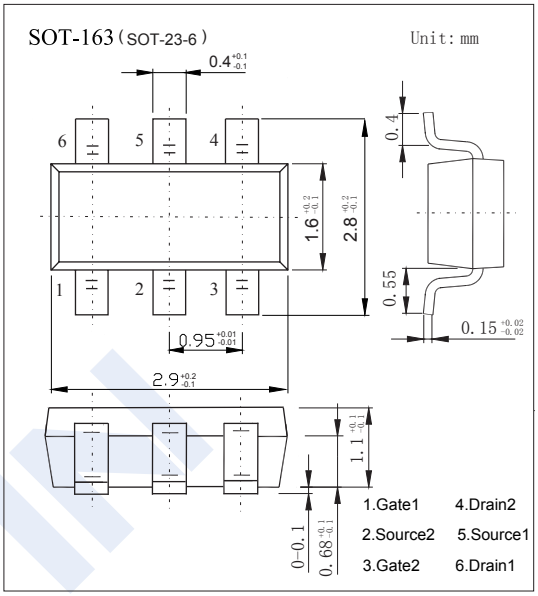
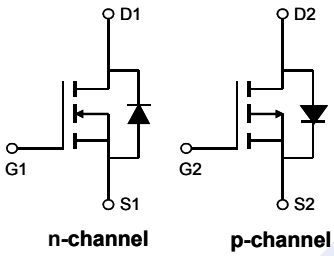
Complementary Trench MOSFET

AO6604 (KO6604)



■ Features

- N-Channel：V_{DS}=20V I_D=3.4A
  - $R_{DS(ON)}$ < 65mΩ (V_{GS} = 4.5V)
  - $R_{DS(ON)}$ < 75mΩ (V_{GS} = 2.5V)
  - $R_{DS(ON)}$ < 100mΩ (V_{GS} = 1.8V)
- P-Channel：V_{DS}=-20V I_D=-2.5A
  - $R_{DS(ON)}$ < 75mΩ (V_{GS} =-4.5V)
  - $R_{DS(ON)}$ < 95mΩ (V_{GS} =-2.5V)
  - $R_{DS(ON)}$ < 115mΩ (V_{GS} =-1.8V)



n-channel **p-channel**

■ 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}	±8		
Continuous Drain Current	Ta = 25℃	I_D	3.4	-2.5	A
	Ta = 70℃		2.5	-2	
Pulsed Drain Current		I_{DM}	13	-13	
Power Dissipation	Ta = 25℃	P_D	1.1		W
	Ta = 70℃		0.7		
Thermal Resistance.Junction- to-Ambient	t ≤ 10s	R_{thJA}	110		℃/W
	Steady-State		150		
Thermal Resistance.Junction- to-Lead	Steady-State	R_{thJL}	80		
Junction Temperature		T_J	150		℃
Storage Temperature Range		T_{stg}	-55 to 150		

Complementary Trench MOSFET

AO6604 (KO6604)

■ 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}=20V, V_{GS}=0V			1	μA
		V_{DS}=20V, V_{GS}=0V, T_J=55℃			5	
Gate-Body Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±8V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} , I_D=250μA	0.4	0.7	1	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=3.4A		51	65	mΩ
		V_{GS}=4.5V, I_D=3.4A T_J=125℃		68	85	
		V_{GS}=2.5V, I_D=3A		58	75	
		V_{GS}=1.8V, I_D=2A		68	100	
On State Drain Current	$I_{D(ON)}$	V_{GS}=4.5V, V_{DS}=5V	13			A
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=3.4A		16		S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=10V, f=1MHz	205	260	320	pF
Output Capacitance	C_{oss}		33	48	63	
Reverse Transfer Capacitance	C_{rss}		16	27	38	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz	1.5	3	4.5	Ω
Total Gate Charge (4.5V)	Q_g	V_{GS}=4.5V, V_{DS}=10V, I_D=3.4A		2.9	3.8	nC
Gate Source Charge	Q_{gs}			0.4		
Gate Drain Charge	Q_{gd}			0.6		
Turn-On DelayTime	$t_{d(on)}$	V_{GS}=5V, V_{DS}=10V, R_L=2.95Ω, R_G=3Ω		2.5		ns
Turn-On Rise Time	t_r			3.2		
Turn-Off DelayTime	$t_{d(off)}$			21		
Turn-Off Fall Time	t_f			3		
Body Diode Reverse Recovery Time	t_{rr}	I_F= 3.4A, dI/dt= 100A/μs		14	19	
Body Diode Reverse Recovery Charge	Q_{rr}			3.8		nC
Maximum Body-Diode Continuous Curren	I_S				1.5	A
Diode Forward Voltage	V_{SD}	I_S=1A,V_{GS}=0V		0.7	1	V

Complementary Trench MOSFET

AO6604 (KO6604)

■ 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	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V, V_{GS}=0V			-1	μA
		V_{DS}=-20V, V_{GS}=0V, T_J=55℃			-5	
Gate-Body leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±8V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} I_D=-250μA	-0.4	-0.65	-1	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-2.5A		56	75	mΩ
		V_{GS}=-4.5V, I_D=-2.5A T_J=125℃		80	105	
		V_{GS}=-2.5V, I_D=-2A		70	95	
		V_{GS}=-1.8V, I_D=-1A		85	115	
On state drain current	$I_{D(ON)}$	V_{GS}=-4.5V, V_{DS}=-5V	-13			A
Forward Transconductance	g_{FS}	V_{DS}=-5V, I_D=-2.5A		13		S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-10V, f=1MHz		560	745	pF
Output Capacitance	C_{oss}			80		
Reverse Transfer Capacitance	C_{rss}			70		
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz		15	23	Ω
Total Gate Charge (4.5V)	Q_g	V_{GS}=-4.5V, V_{DS}=-10V, I_D=-2.5A		8.5	11	nC
Gate Source Charge	Q_{gs}			1.2		
Gate Drain Charge	Q_{gd}			2.1		
Turn-On DelayTime	$t_{d(on)}$	V_{GS}=-4.5V, V_{DS}=-10V, R_L=4Ω,R_{GEN}=6Ω		7.2		ns
Turn-On Rise Time	t_r			36		
Turn-Off DelayTime	$t_{d(off)}$			53		
Turn-Off Fall Time	t_f			56		
Body Diode Reverse Recovery Time	t_{rr}	I_F=-2.5A, dI/dt=100A/μs		37	49	
Body Diode Reverse Recovery Charge	Q_{rr}			27		nC
Maximum Body-Diode Continuous Curren	I_S				-1.5	A
Diode Forward Voltage	V_{SD}	I_S=-1A,V_{GS}=0V		-0.7	-1	V

Complementary Trench MOSFET

AO6604 (KO6604)

■ N-Channel Typical Characterisitics

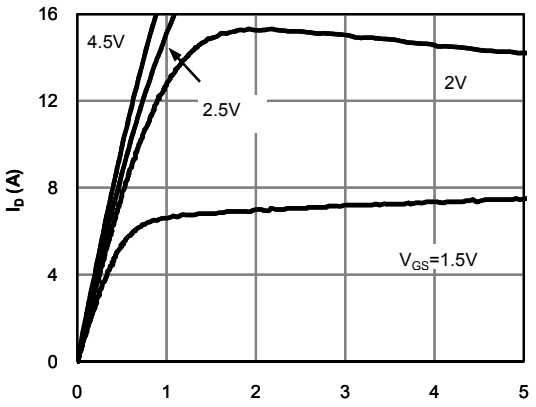


Fig 1: On-Region Characteristics (Note E)

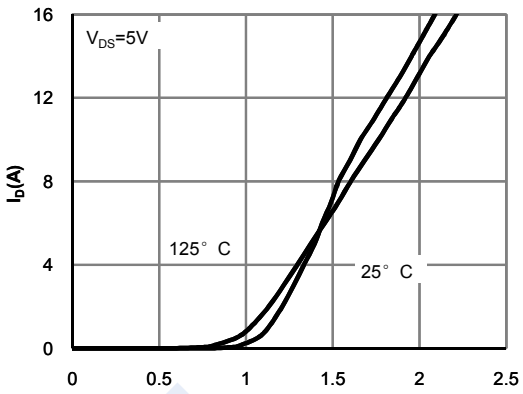


Figure 2: Transfer Characteristics (Note E)

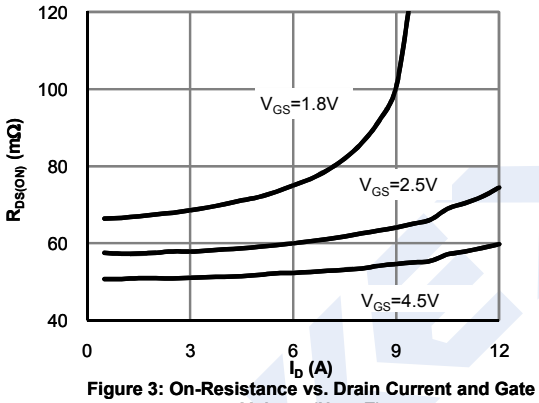


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

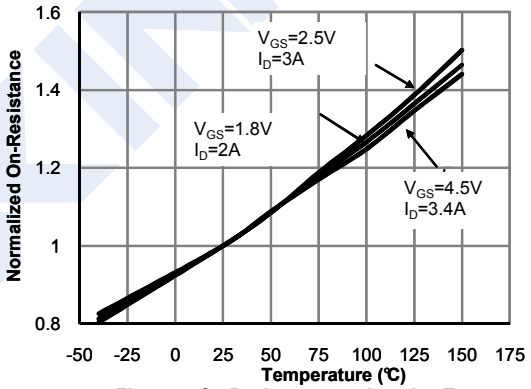


Figure 4: On-Resistance vs. Junction Temperature (Note E)

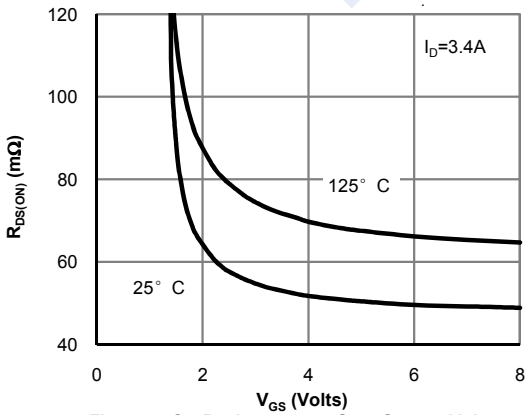


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

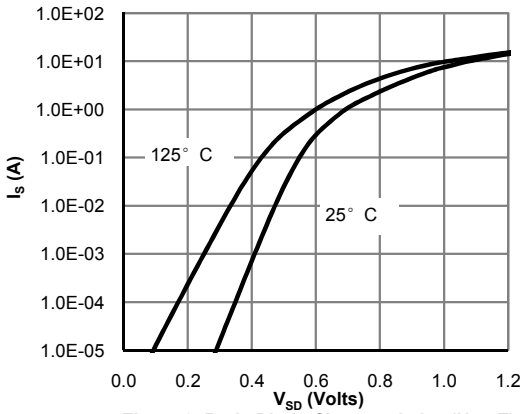


Figure 6: Body-Diode Characteristics (NoteE)

Complementary Trench MOSFET

AO6604 (KO6604)

■ N-Channel Typical Characterisitics

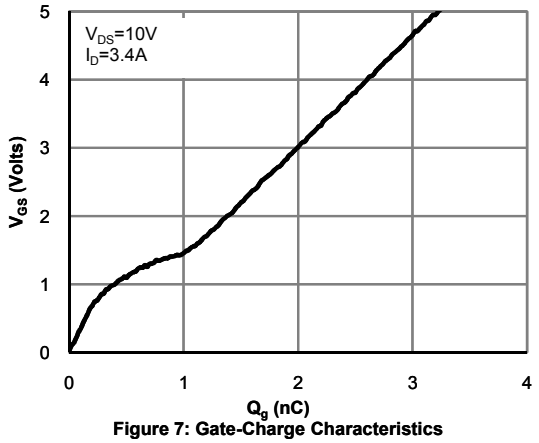


Figure 7: Gate-Charge Characteristics

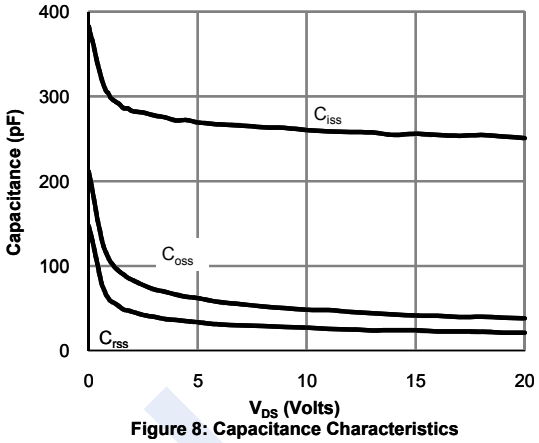


Figure 8: Capacitance Characteristics

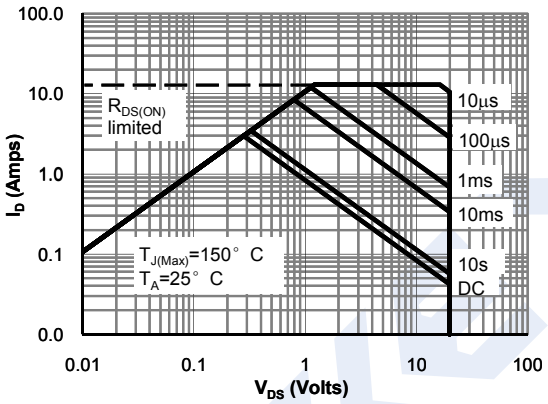


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

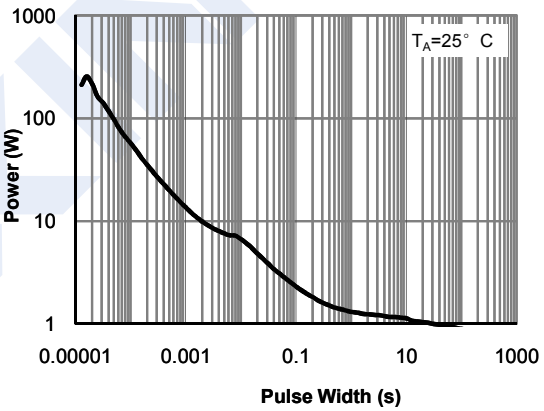


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

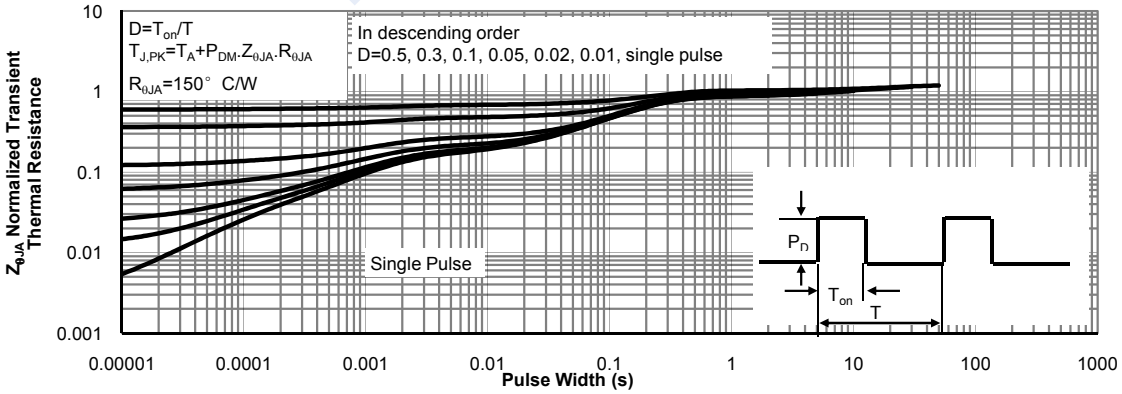


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Complementary Trench MOSFET

AO6604 (KO6604)

■ P-Channel Typical Characterisitics

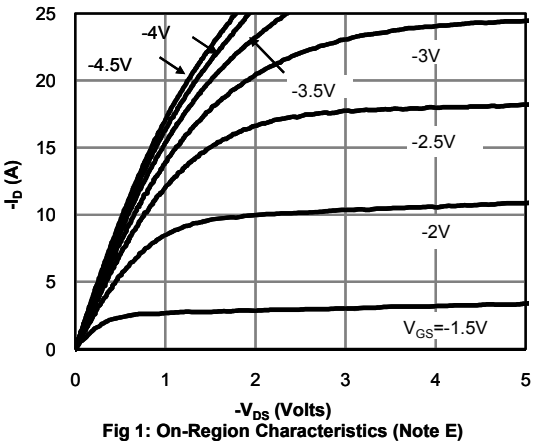


Fig 1: On-Region Characteristics (Note E)

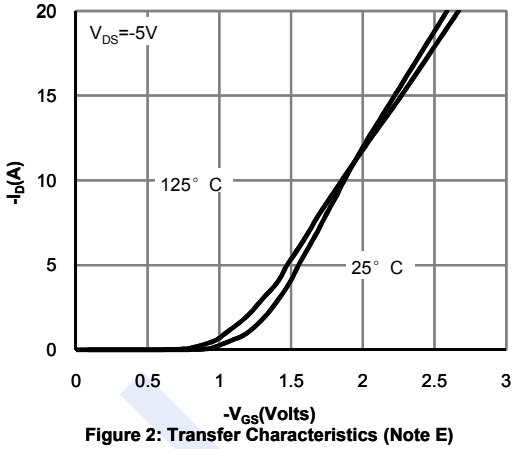


Figure 2: Transfer Characteristics (Note E)

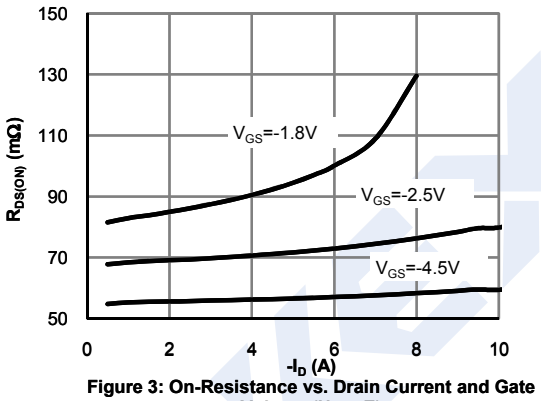


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

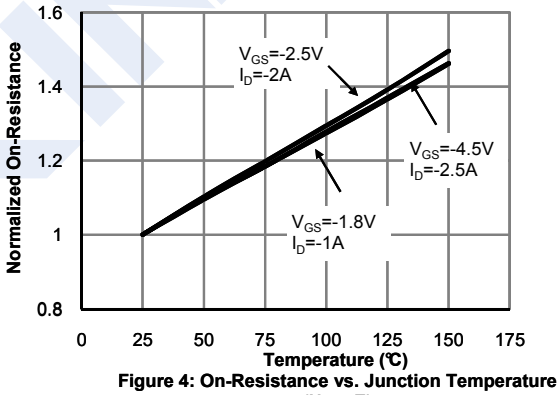


Figure 4: On-Resistance vs. Junction Temperature (Note E)

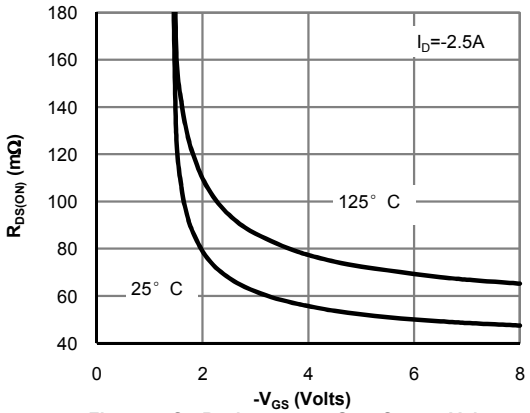


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

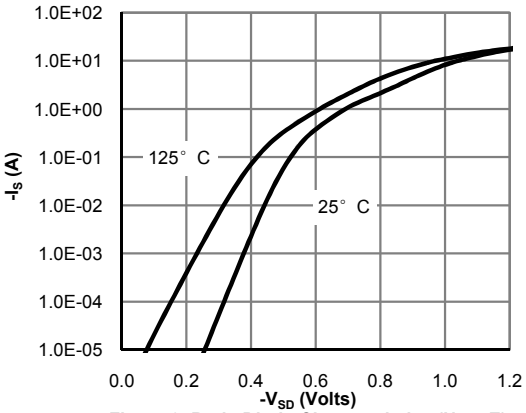


Figure 6: Body-Diode Characteristics (Note E)

Complementary Trench MOSFET

AO6604 (KO6604)

■ P-Channel Typical Characterisitics

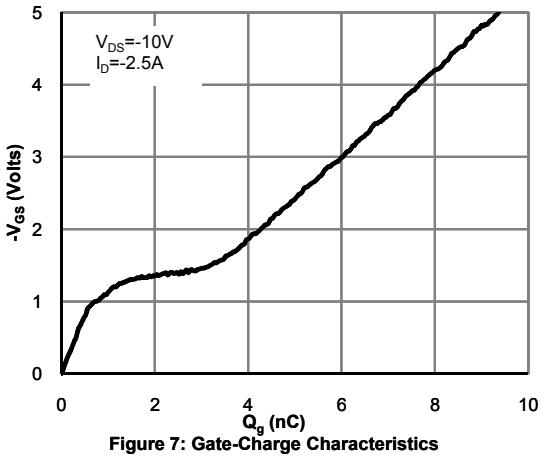


Figure 7: Gate-Charge Characteristics

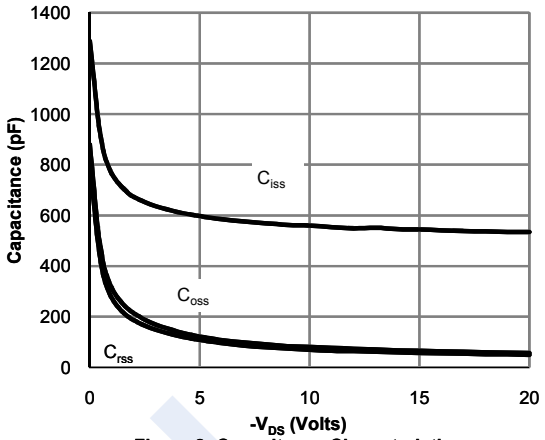


Figure 8: Capacitance Characteristics

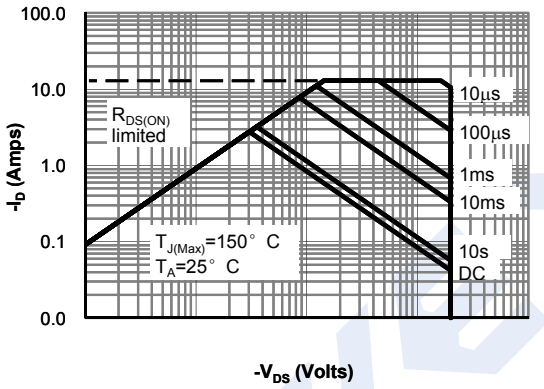


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

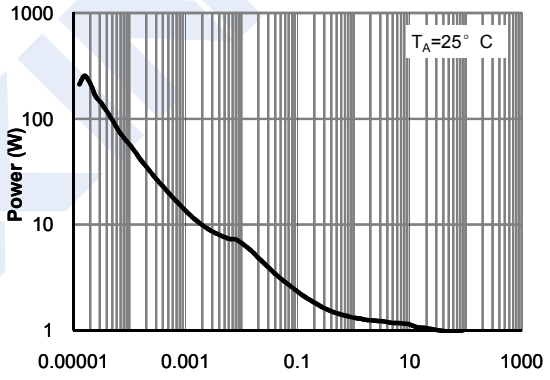


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

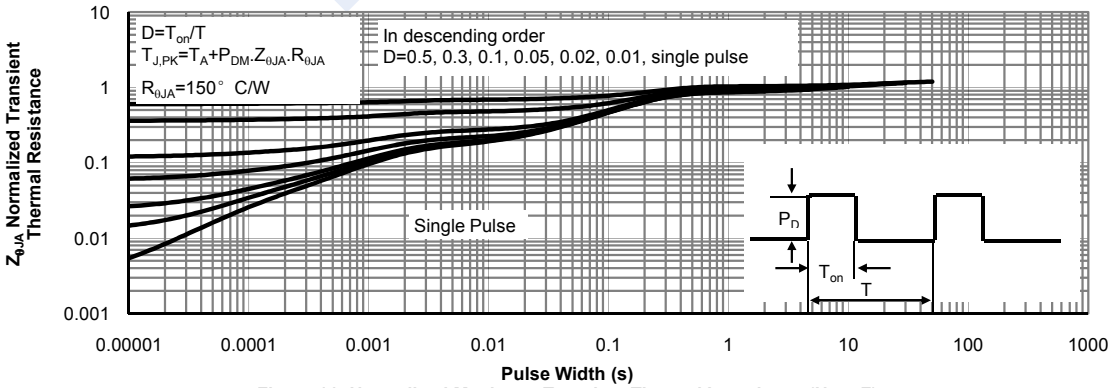


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)