



ALPHA & OMEGA
SEMICONDUCTOR

AO4619

Complementary Enhancement Mode Field Effect Transistor

General Description

The AO4619 uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used in inverter and other applications.

Product Summary

N-Channel

V_{DS} (V) = 30V
 I_D = 7.4A (V_{GS} =10V)
 $R_{DS(ON)}$
 < 24m Ω (V_{GS} =10V)
 < 36m Ω (V_{GS} =4.5V)

100% UIS Tested
 100% Rg Tested

P-Channel

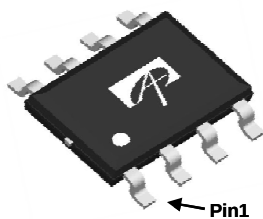
-30V
 I_D = -5.2A (V_{GS} = -10V)
 $R_{DS(ON)}$
 < 46m Ω (V_{GS} = -10V)
 < 72m Ω (V_{GS} = -4.5V)

100% UIS Tested
 100% Rg Tested

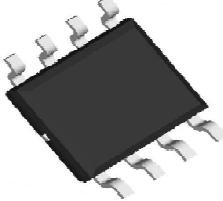


SOIC-8

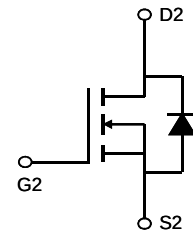
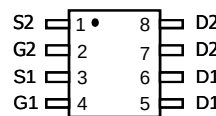
Top View



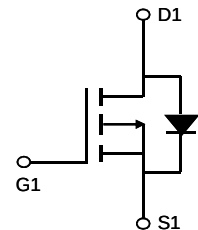
Bottom View



Top View



n-channel



p-channel

Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Max n-channel	Max p-channel	Units
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Continuous Drain Current ^F	I_D	7.4	-5.2	A
$T_A=25^\circ\text{C}$				
$T_A=70^\circ\text{C}$		6	-4.2	
Pulsed Drain Current ^B	I_{DM}	64	-25	
Power Dissipation ^A	P_D	2	2	W
$T_A=25^\circ\text{C}$				
$T_A=70^\circ\text{C}$		1.3	1.3	
Avalanche Current ^B	I_{AR}	9	11	A
Repetitive avalanche energy 0.3mH ^B	E_{AR}	12	18	mJ
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	-55 to 150	$^\circ\text{C}$

Thermal Characteristics: n-channel and p-channel

Parameter	Symbol	Device	Typ	Max	Units
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	n-ch	50	62.5	$^\circ\text{C/W}$
$t \leq 10\text{s}$					
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	n-ch	82	110	$^\circ\text{C/W}$
Steady-State					
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	n-ch	41	50	$^\circ\text{C/W}$
Steady-State					
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	p-ch	50	62.5	$^\circ\text{C/W}$
$t \leq 10\text{s}$					
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	p-ch	82	110	$^\circ\text{C/W}$
Steady-State					
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	p-ch	41	50	$^\circ\text{C/W}$
Steady-State					

N-channel MOSFET Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0V	30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V T _J =55°C			1 5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} = ±20V			100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} I _D =250μA	1.5	2.1	2.6	V
I _{D(ON)}	On state drain current	V _{GS} =4.5V, V _{DS} =5V	64			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =7.4A T _J =125°C		17.7 25	24 34	mΩ
		V _{GS} =4.5V, I _D =6A		25.3	36	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =7.4A		20		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.74	1	V
I _S	Maximum Body-Diode Continuous Current				2.5	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		373	448	pF
C _{oss}	Output Capacitance			67		pF
C _{rss}	Reverse Transfer Capacitance			41		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		1.2	1.8	Ω
SWITCHING PARAMETERS						
Q _g (10V)	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =7.4A		7.2		nC
Q _g (4.5V)	Total Gate Charge			3.5		nC
Q _{gs}	Gate Source Charge			1.3		nC
Q _{gd}	Gate Drain Charge			1.7		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =2Ω, R _{GEN} =3Ω		4.5		ns
t _r	Turn-On Rise Time			2.7		ns
t _{D(off)}	Turn-Off DelayTime			14.9		ns
t _f	Turn-Off Fall Time			2.9		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =7.4A, dI/dt=100A/μs		10.5		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =7.4A, dI/dt=100A/μs		4.5		nC

A: The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

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

E: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The SOA curve provides a single pulse rating.

F: The current rating is based on the t ≤ 10s thermal resistance rating.

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N-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

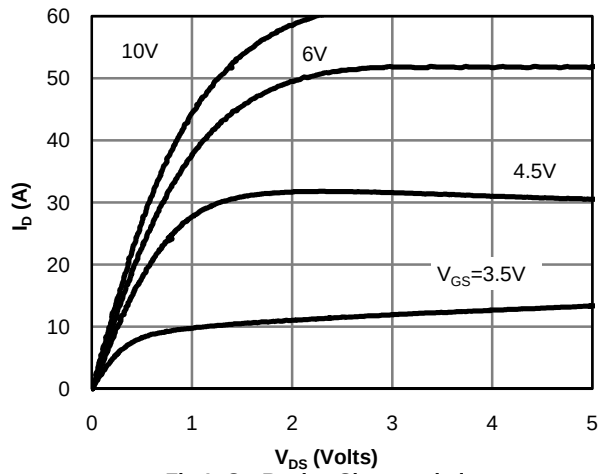


Fig 1: On-Region Characteristics

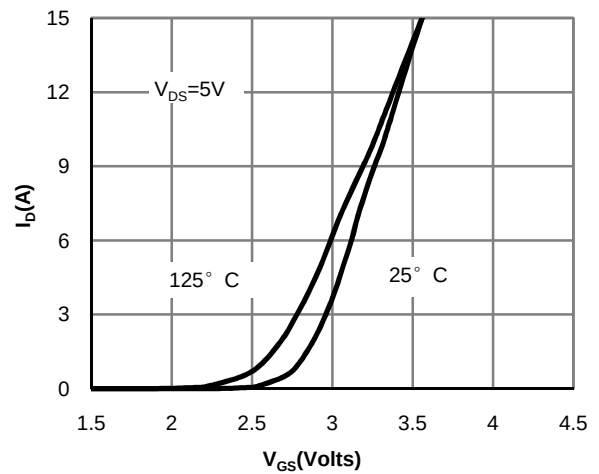


Figure 2: Transfer Characteristics

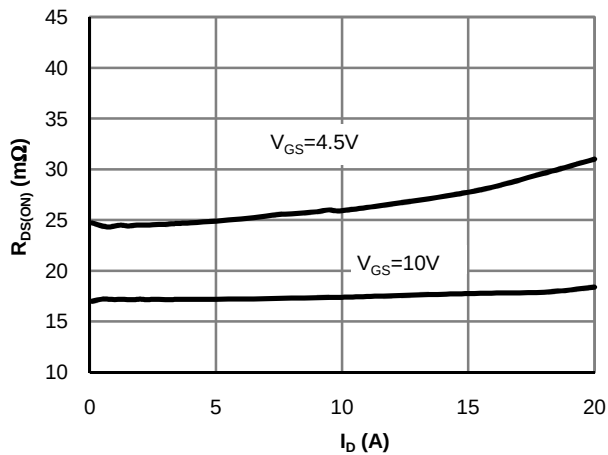


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

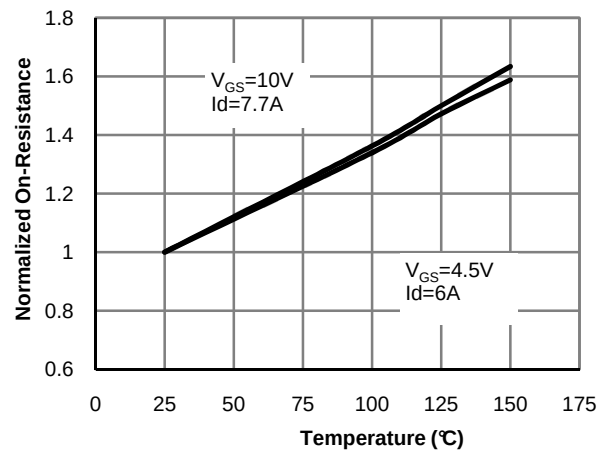


Figure 4: On-Resistance vs. Junction Temperature

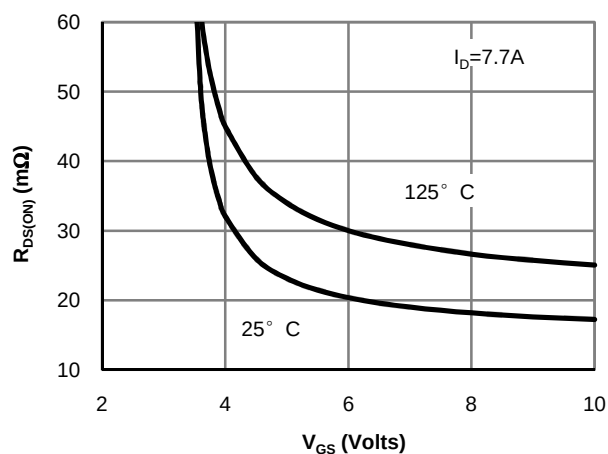


Figure 5: On-Resistance vs. Gate-Source Voltage

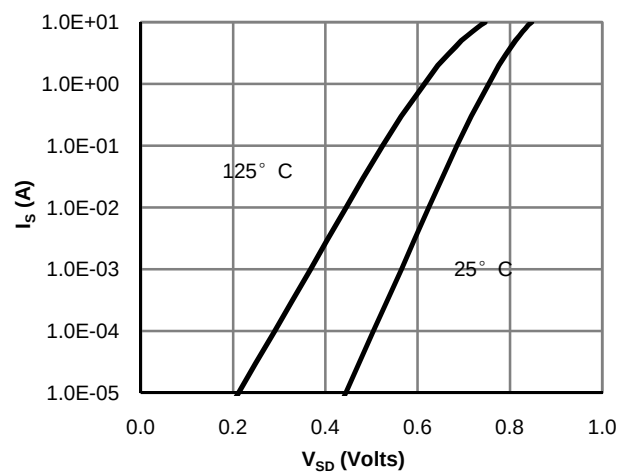
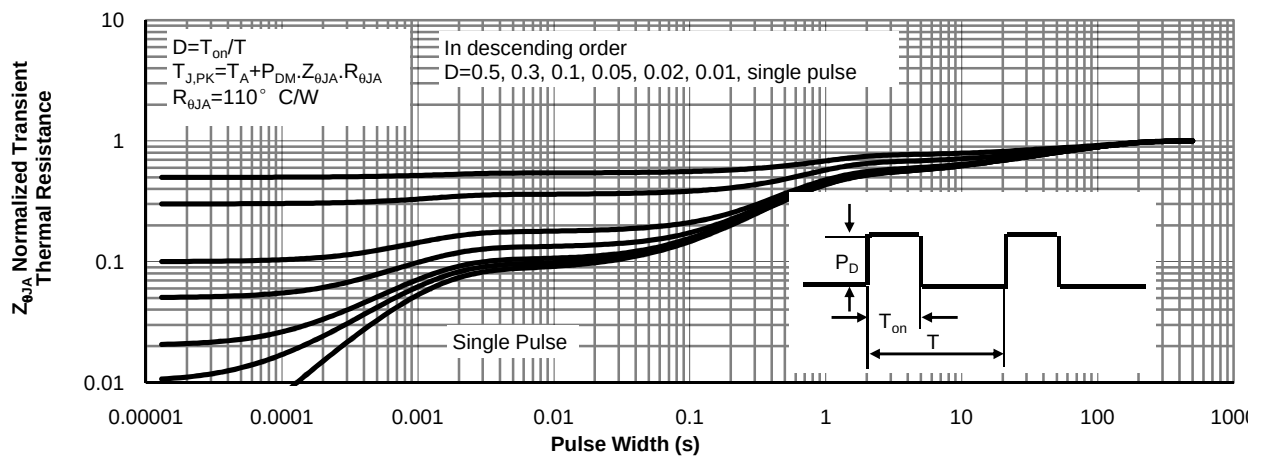
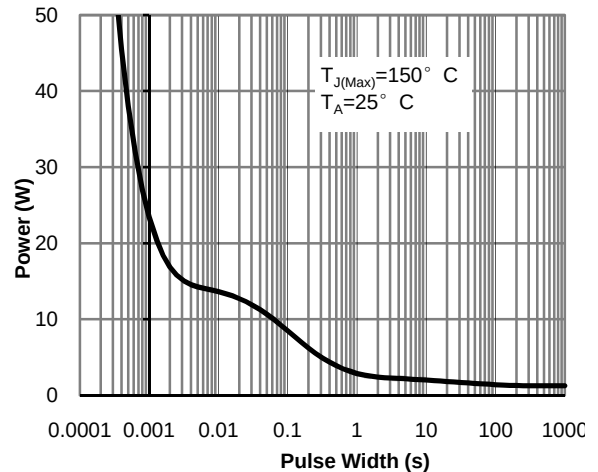
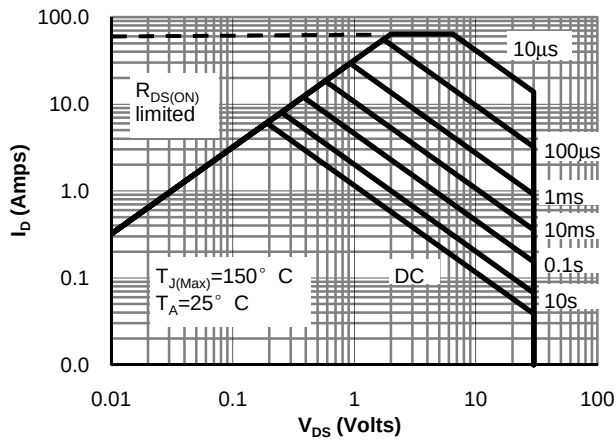
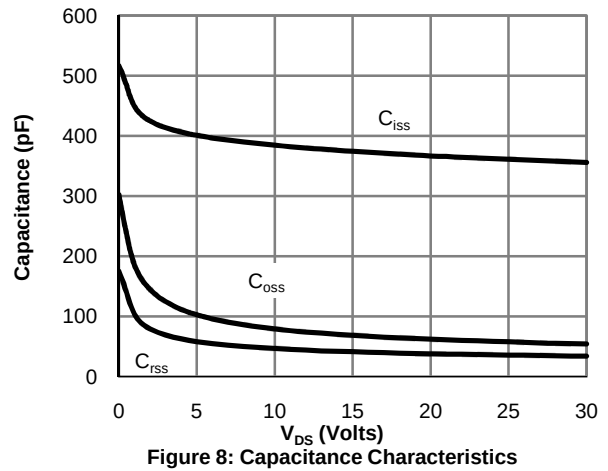
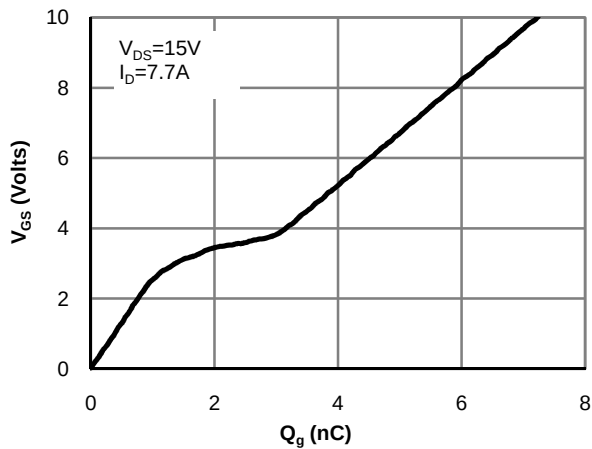


Figure 6: Body-Diode Characteristics

N-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



P-channel MOSFET Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =-250μA, V _{GS} =0V	-30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-24V, V _{GS} =0V T _J =55°C			-1 -5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±20V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1.4	-1.9	-2.4	V
I _{D(ON)}	On state drain current	V _{GS} =-10V, V _{DS} =-5V	-30			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-5.2A T _J =125°C		33 50	46 68	mΩ
		V _{GS} =-4.5V, I _D =-4A		53	72	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-5.2A		14		S
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V		-0.8	-1	V
I _S	Maximum Body-Diode Continuous Current				-3.5	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz		520		pF
C _{oss}	Output Capacitance			100		pF
C _{rss}	Reverse Transfer Capacitance			65		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		7.5	11.5	Ω
SWITCHING PARAMETERS						
Q _{g(10V)}	Total Gate Charge (10V)	V _{GS} =-10V, V _{DS} =-15V, I _D =-5.2A		9.2		nC
Q _{g(4.5V)}	Total Gate Charge (4.5V)			4.6		nC
Q _{gs}	Gate Source Charge			1.6		nC
Q _{gd}	Gate Drain Charge			2.2		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =-10V, V _{DS} =-15V, R _L =3Ω, R _{GEN} =3Ω		7.5		ns
t _r	Turn-On Rise Time			5.5		ns
t _{D(off)}	Turn-Off DelayTime			19		ns
t _f	Turn-Off Fall Time			7		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-5.2A, dI/dt=100A/μs		11		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-5.2A, dI/dt=100A/μs		5.3		nC

A: The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The value in any given application depends on the user's specific board design.

B: Repetitive rating, pulse width limited by junction temperature.

C: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

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

E: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The SOA curve provides a single pulse rating.

F: The current rating is based on the t ≤ 10s thermal resistance rating.

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P-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

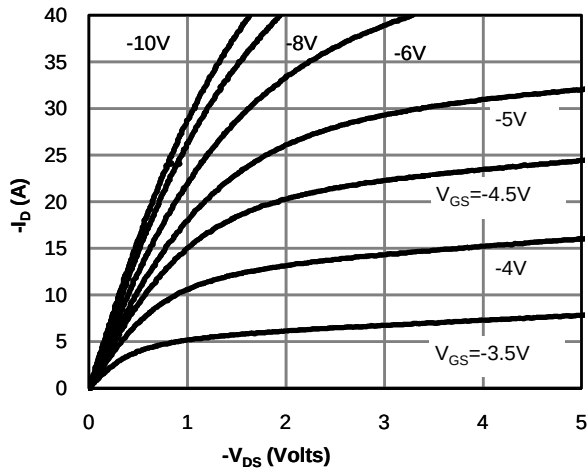


Fig 1: On-Region Characteristics

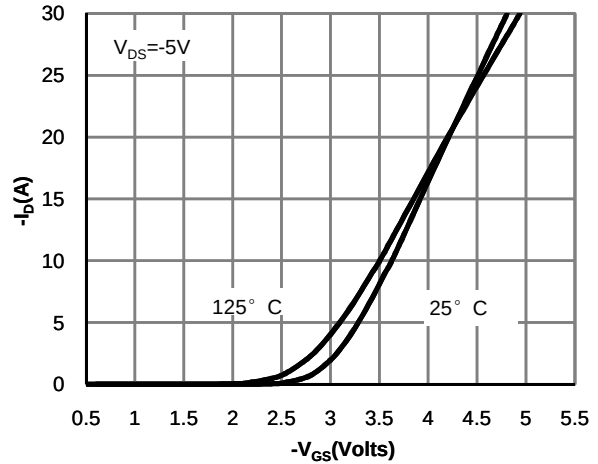


Figure 2: Transfer Characteristics

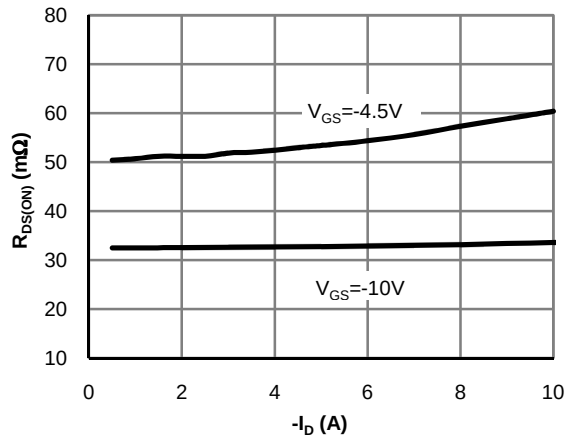


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

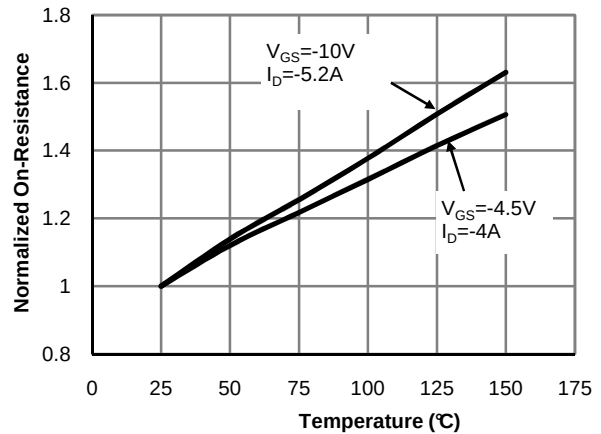


Figure 4: On-Resistance vs. Junction Temperature

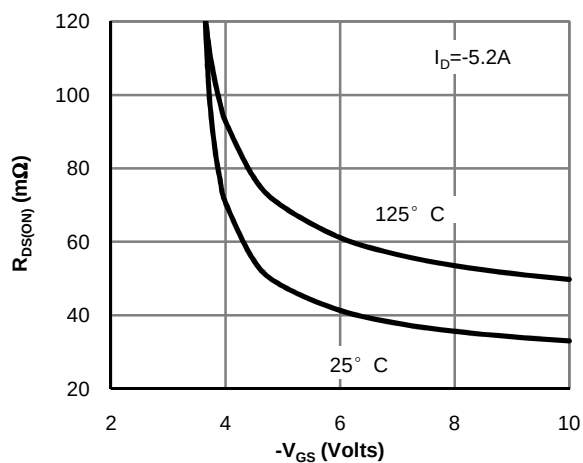


Figure 5: On-Resistance vs. Gate-Source Voltage

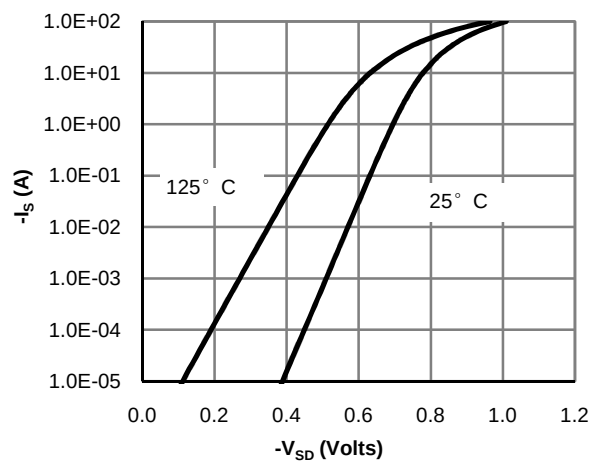


Figure 6: Body-Diode Characteristics

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