



# THE DATASHEET OF AO4619



## Complementary Enhancement Mode Field Effect Transistor

### General Description

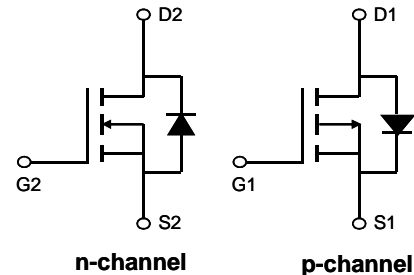
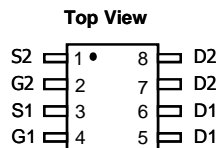
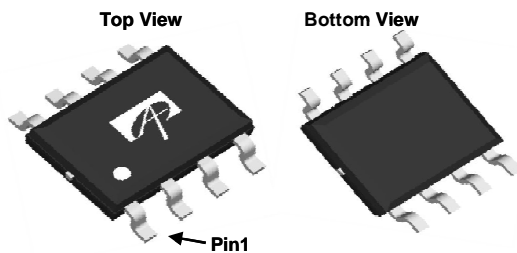
The AO4619 uses advanced trench technology MOSFETs to provide excellent  $R_{DS(ON)}$  and low gate charge. The complementary MOSFETs may be used in inverter and other applications.

### Product Summary

N-Channel	P-Channel
$V_{DS}$ (V) = 30V	-30V
$I_D = 7.4A$ ( $V_{GS}=10V$ )	-5.2A ( $V_{GS} = -10V$ )
$R_{DS(ON)}$ < 24m $\Omega$ ( $V_{GS}=10V$ ) < 36m $\Omega$ ( $V_{GS}=4.5V$ )	$R_{DS(ON)}$ < 46m $\Omega$ ( $V_{GS} = -10V$ ) < 72m $\Omega$ ( $V_{GS} = -4.5V$ )
100% UIS Tested	100% UIS Tested
100% Rg Tested	100% Rg Tested



SOIC-8



### 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	$V_{GS}$	$\pm 20$	$\pm 20$	V
Continuous Drain Current <sup>F</sup>	$I_D$	7.4	-5.2	A
		6	-4.2	
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	64	-25	
Power Dissipation <sup>A</sup>	$P_D$	2	2	W
		1.3	1.3	
Avalanche Current <sup>B</sup>	$I_{AR}$	9	11	A
Repetitive avalanche energy 0.3mH <sup>B</sup>	$E_{AR}$	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 <sup>A</sup>	$R_{\theta JA}$	n-ch	50	62.5	$^\circ\text{C/W}$
			82	110	$^\circ\text{C/W}$
Maximum Junction-to-Lead <sup>C</sup>	$R_{\theta JL}$	n-ch	41	50	$^\circ\text{C/W}$
Maximum Junction-to-Ambient <sup>A</sup>	$R_{\theta JA}$	p-ch	50	62.5	$^\circ\text{C/W}$
			82	110	$^\circ\text{C/W}$
Maximum Junction-to-Lead <sup>C</sup>	$R_{\theta JL}$	p-ch	41	50	$^\circ\text{C/W}$

N-channel MOSFET Electrical Characteristics ( $T_J=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=24\text{V}$ , $V_{GS}=0\text{V}$			1	$\mu\text{A}$
		$T_J=55^\circ\text{C}$			5	
$I_{GSS}$	Gate-Body leakage current	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 20\text{V}$			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	1.5	2.1	2.6	V
$I_{D(ON)}$	On state drain current	$V_{GS}=4.5\text{V}$ , $V_{DS}=5\text{V}$	64			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$ , $I_D=7.4\text{A}$		17.7	24	m $\Omega$
		$T_J=125^\circ\text{C}$		25	34	
		$V_{GS}=4.5\text{V}$ , $I_D=6\text{A}$		25.3	36	m $\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS}=5\text{V}$ , $I_D=7.4\text{A}$		20		S
$V_{SD}$	Diode Forward Voltage	$I_S=1\text{A}$ , $V_{GS}=0\text{V}$		0.74	1	V
$I_S$	Maximum Body-Diode Continuous Current				2.5	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}$ , $V_{DS}=15\text{V}$ , $f=1\text{MHz}$		373	448	pF
$C_{oss}$	Output Capacitance			67		pF
$C_{rss}$	Reverse Transfer Capacitance			41		pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$		1.2	1.8	$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$ , $V_{DS}=15\text{V}$ , $I_D=7.4\text{A}$		7.2		nC
$Q_g(4.5\text{V})$	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 Delay Time	$V_{GS}=10\text{V}$ , $V_{DS}=15\text{V}$ , $R_L=2\Omega$ , $R_{GEN}=3\Omega$		4.5		ns
$t_r$	Turn-On Rise Time			2.7		ns
$t_{D(off)}$	Turn-Off Delay Time			14.9		ns
$t_f$	Turn-Off Fall Time			2.9		ns
$t_{rr}$	Body Diode Reverse Recovery Time		$I_F=7.4\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$		10.5	
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=7.4\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$		4.5		nC

A: The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . 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  $R_{\theta JA}$  is the sum of the thermal impedance from junction to lead  $R_{\theta JL}$  and lead to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using <300  $\mu\text{s}$  pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in <sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . The SOA curve provides a single pulse rating.

F: The current rating is based on the  $t \leq 10\text{s}$  thermal resistance rating.

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N-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

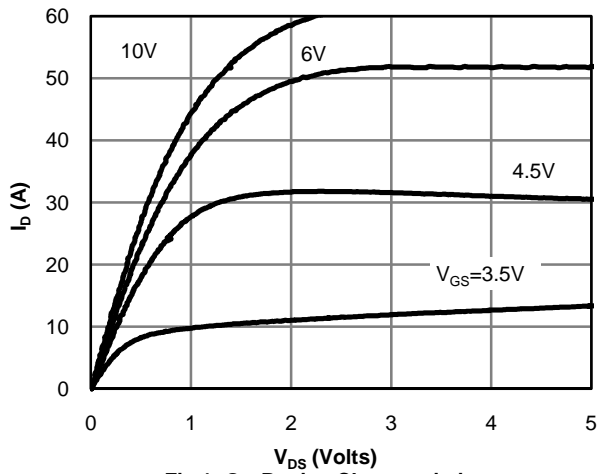


Fig 1: On-Region Characteristics

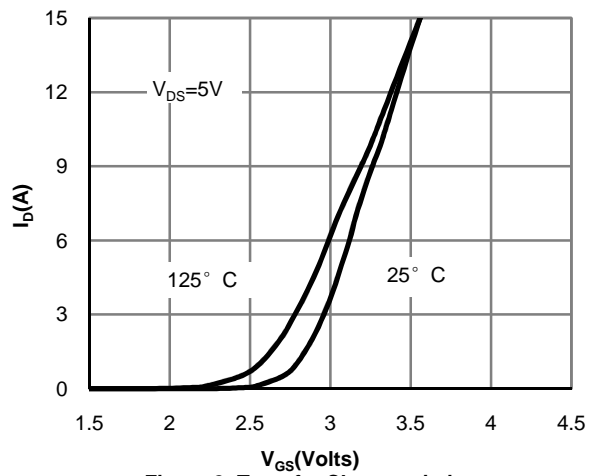


Figure 2: Transfer Characteristics

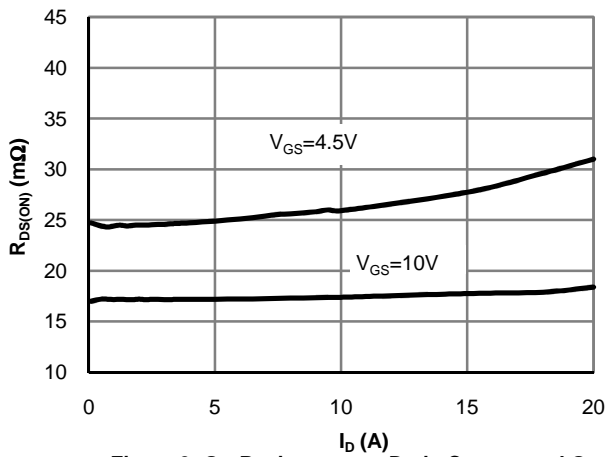


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

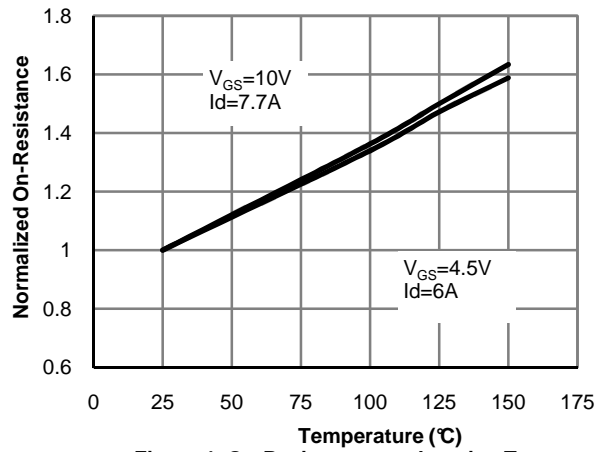


Figure 4: On-Resistance vs. Junction Temperature

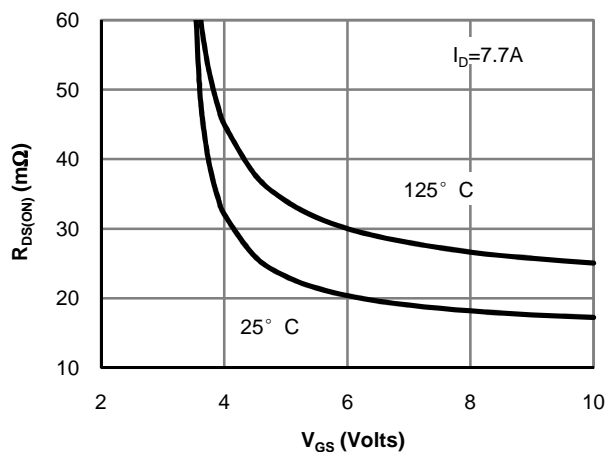


Figure 5: On-Resistance vs. Gate-Source Voltage

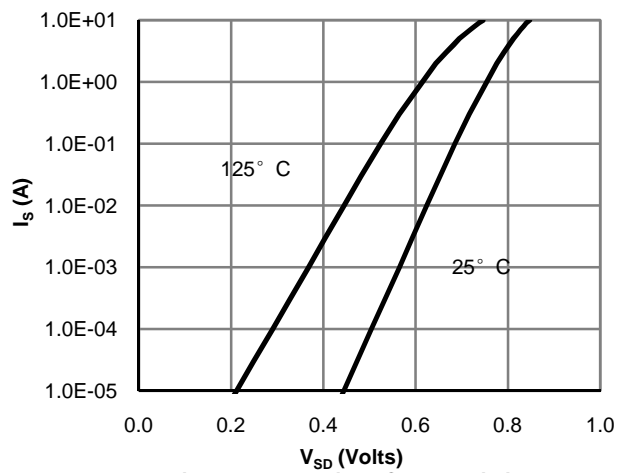


Figure 6: Body-Diode Characteristics

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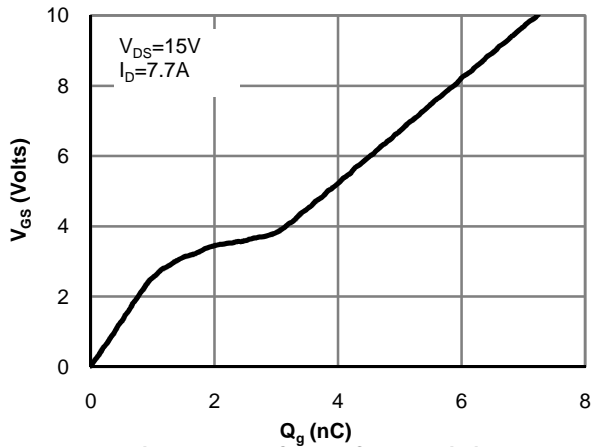


Figure 7: Gate-Charge Characteristics

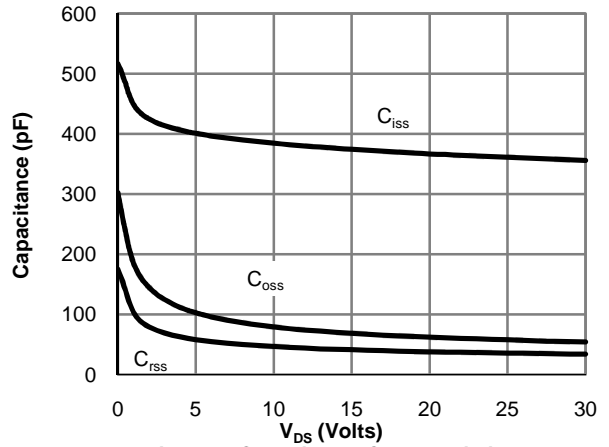


Figure 8: Capacitance Characteristics

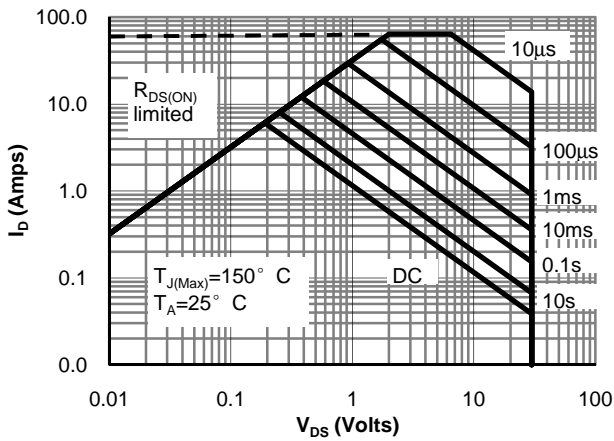


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

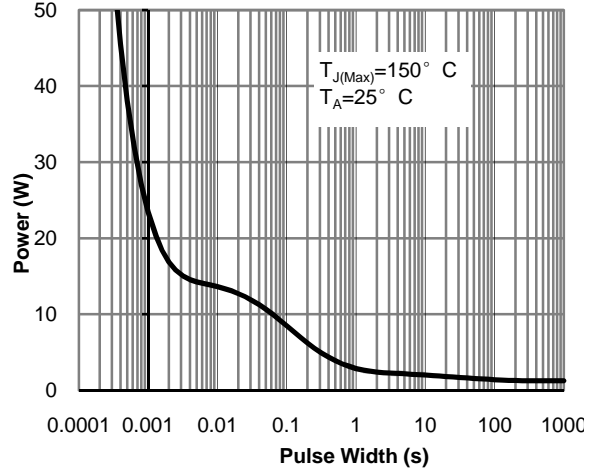


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

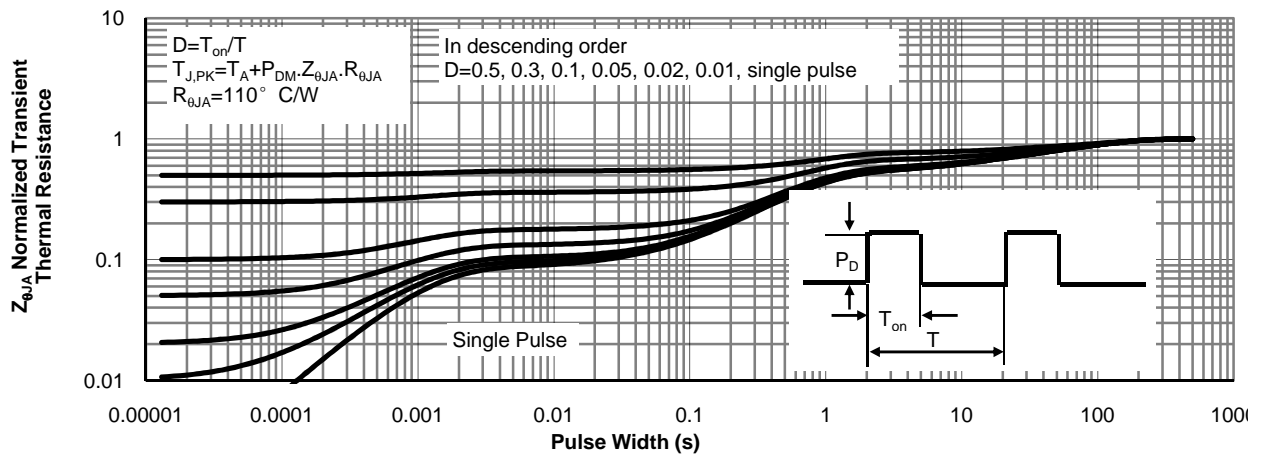


Figure 11: Normalized Maximum Transient Thermal Impedance

P-channel MOSFET Electrical Characteristics ( $T_J=25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D=-250\mu\text{A}$ , $V_{GS}=0\text{V}$	-30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=-24\text{V}$ , $V_{GS}=0\text{V}$			-1	$\mu\text{A}$
		$T_J=55^\circ\text{C}$			-5	
$I_{GSS}$	Gate-Body leakage current	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 20\text{V}$			$\pm 100$	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=-250\mu\text{A}$	-1.4	-1.9	-2.4	V
$I_{D(ON)}$	On state drain current	$V_{GS}=-10\text{V}$ , $V_{DS}=-5\text{V}$	-30			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10\text{V}$ , $I_D=-5.2\text{A}$		33	46	m $\Omega$
		$T_J=125^\circ\text{C}$		50	68	
		$V_{GS}=-4.5\text{V}$ , $I_D=-4\text{A}$		53	72	m $\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS}=-5\text{V}$ , $I_D=-5.2\text{A}$		14		S
$V_{SD}$	Diode Forward Voltage	$I_S=-1\text{A}$ , $V_{GS}=0\text{V}$		-0.8	-1	V
$I_S$	Maximum Body-Diode Continuous Current				-3.5	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}$ , $V_{DS}=-15\text{V}$ , $f=1\text{MHz}$		520		pF
$C_{oss}$	Output Capacitance			100		pF
$C_{rss}$	Reverse Transfer Capacitance			65		pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$		7.5	11.5	$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g(10\text{V})$	Total Gate Charge (10V)	$V_{GS}=-10\text{V}$ , $V_{DS}=-15\text{V}$ , $I_D=-5.2\text{A}$		9.2		nC
$Q_g(4.5\text{V})$	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 Delay Time	$V_{GS}=-10\text{V}$ , $V_{DS}=-15\text{V}$ , $R_L=3\Omega$ , $R_{GEN}=3\Omega$		7.5		ns
$t_r$	Turn-On Rise Time			5.5		ns
$t_{D(off)}$	Turn-Off Delay Time			19		ns
$t_f$	Turn-Off Fall Time			7		ns
$t_{rr}$	Body Diode Reverse Recovery Time		$I_F=-5.2\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$		11	
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=-5.2\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$		5.3		nC

A: The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ . The value in any given application depends on the user's specific board design.

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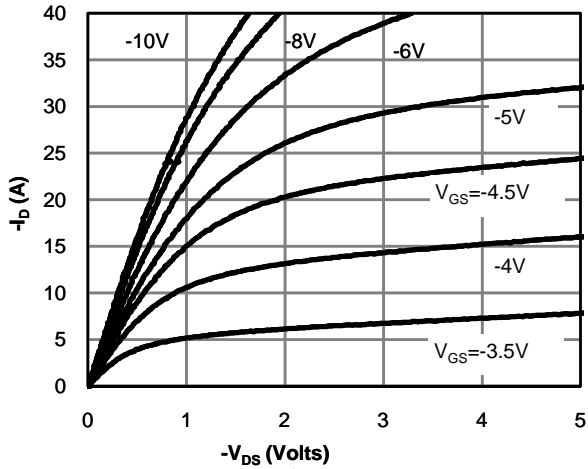


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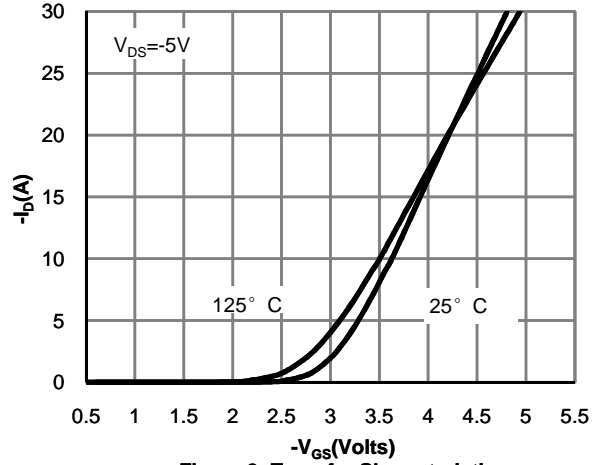


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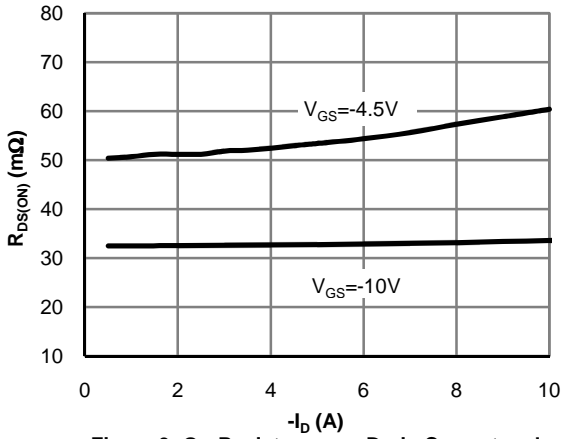


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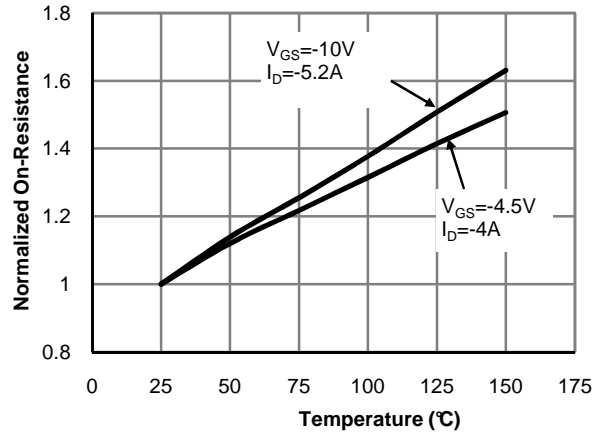


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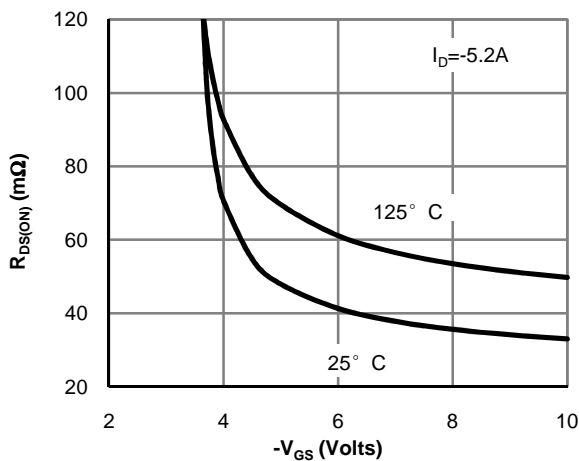


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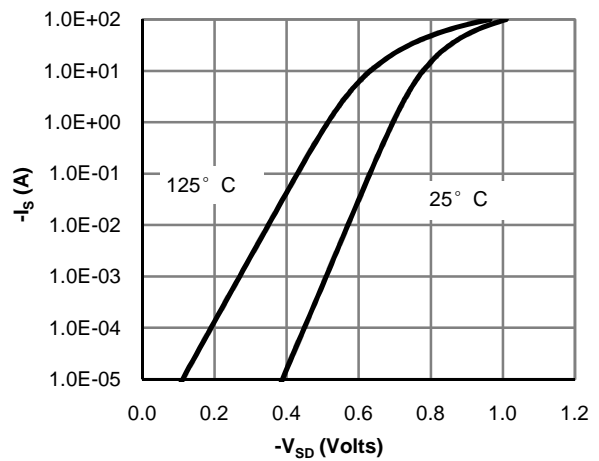


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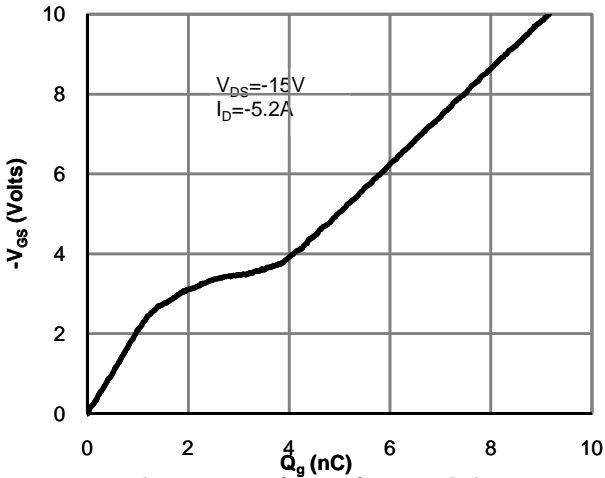


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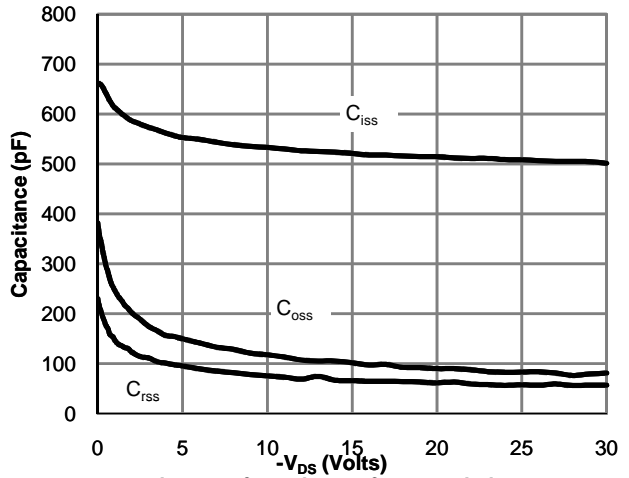


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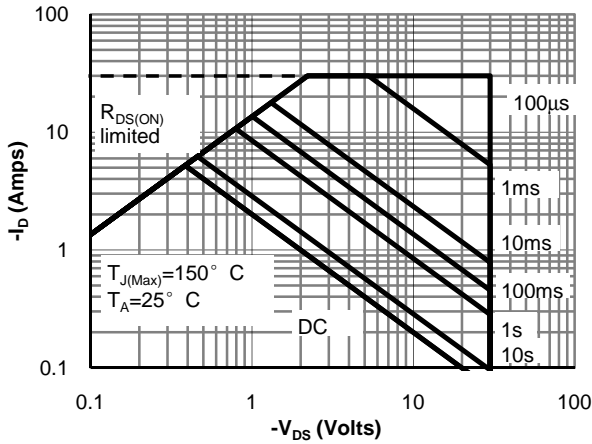


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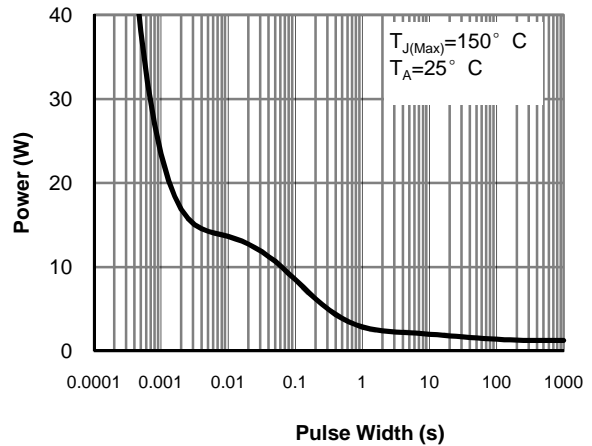


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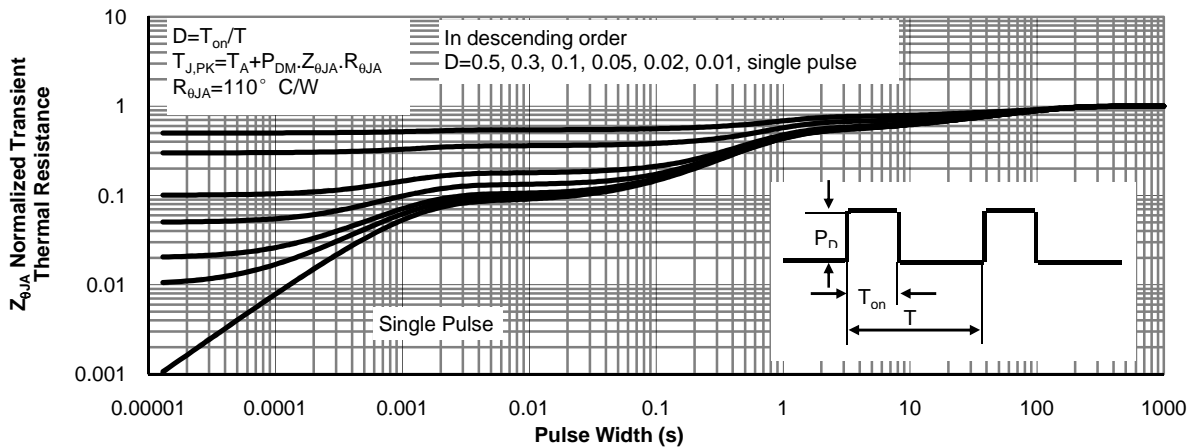




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