



**AON4605**  
**Complementary Enhancement Mode Field Effect Transistor**

**General Description**

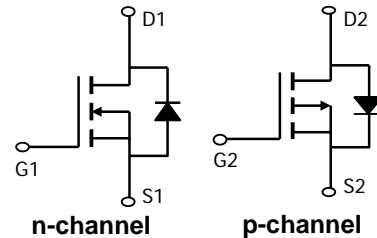
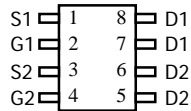
The AON4605 uses advanced trench technology to provide excellent  $R_{DS(ON)}$  and low gate charge. The complementary MOSFETs form a high-speed power inverter, suitable for a multitude of applications. Standard Product AON4605 is Pb-free (meets ROHS & Sony 259 specifications).

**Features**

n-channel	p-channel	
$V_{DS} (V) = 30V$	-30V	
$I_D = 4.3A$	-3.4A	( $V_{GS} = \pm 10V$ )
$R_{DS(ON)} < 65m\Omega$	$< 110m\Omega$	( $V_{GS} = \pm 10V$ )
$R_{DS(ON)} < 115m\Omega$	$< 180m\Omega$	( $V_{GS} = \pm 4.5V$ )



DFN3X2-8L



**Absolute Maximum Ratings  $T_A=25^\circ C$  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>A,F</sup>	$T_A=25^\circ C$	4.3	-3.4	A
		$T_A=70^\circ C$	3.4	
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	12	-12	
Power Dissipation	$T_A=25^\circ C$	1.9	1.9	W
		$T_A=70^\circ C$	1.2	
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	-55 to 150	$^\circ C$

**Thermal Characteristics: n-channel**

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>A</sup>	$R_{\theta JA}$	51.5	65	$^\circ C/W$
Maximum Junction-to-Ambient <sup>A</sup>		82	100	
Maximum Junction-to-Lead <sup>C</sup>	$R_{\theta JL}$	37	50	$^\circ C/W$

**Thermal Characteristics: p-channel**

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>A</sup>	$R_{\theta JA}$	51.5	65	$^\circ C/W$
Maximum Junction-to-Ambient <sup>A</sup>		82	100	
Maximum Junction-to-Lead <sup>C</sup>	$R_{\theta JL}$	37	50	$^\circ C/W$

N-Channel 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	$V_{DS}=30\text{V}$ , $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1	$\mu\text{A}$
					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	1.9	3	V
$I_{D(ON)}$	On state drain current	$V_{GS}=10\text{V}$ , $V_{DS}=5\text{V}$	12			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$ , $I_D=4.3\text{A}$ $T_J=125^\circ\text{C}$		52	65	m $\Omega$
				78		
				90	115	m $\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS}=5\text{V}$ , $I_D=4.3\text{A}$		5.4		S
$V_{SD}$	Diode Forward Voltage	$I_S=1\text{A}$		0.8	1	V
$I_S$	Maximum Body-Diode Continuous Current				2.5	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}$ , $V_{DS}=15\text{V}$ , $f=1\text{MHz}$		238	310	pF
$C_{oss}$	Output Capacitance			50		pF
$C_{riss}$	Reverse Transfer Capacitance			30		pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$		2.3	3.5	$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$ , $V_{DS}=15\text{V}$ , $I_D=4.3\text{A}$		6.5	8.5	nC
$Q_g(4.5\text{V})$	Total Gate Charge			3.1	4	nC
$Q_{gs}$	Gate Source Charge			1.2		nC
$Q_{gd}$	Gate Drain Charge			1.6		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=10\text{V}$ , $V_{DS}=15\text{V}$ , $R_L=3.5\Omega$ , $R_{GEN}=3\Omega$		3.3		ns
$t_r$	Turn-On Rise Time			2.5		ns
$t_{D(off)}$	Turn-Off DelayTime			13.2		ns
$t_f$	Turn-Off Fall Time			1.7		ns
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=4.3\text{A}$ , $di/dt=100\text{A}/\mu\text{s}$		9.4	12	ns
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=4.3\text{A}$ , $di/dt=100\text{A}/\mu\text{s}$		3.5		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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TYPICAL N-CANNEL ELECTRICAL AND THERMAL CHARACTERISTICS

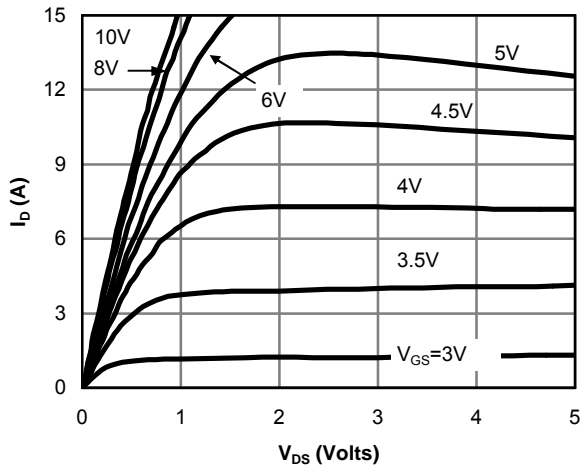


Figure 1: On-Region Characteristics

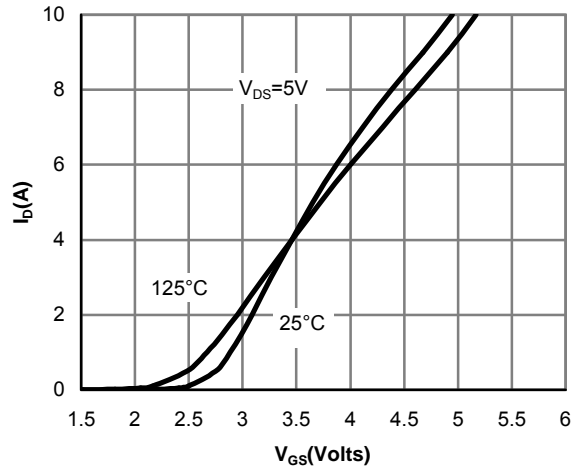


Figure 2: Transfer Characteristics

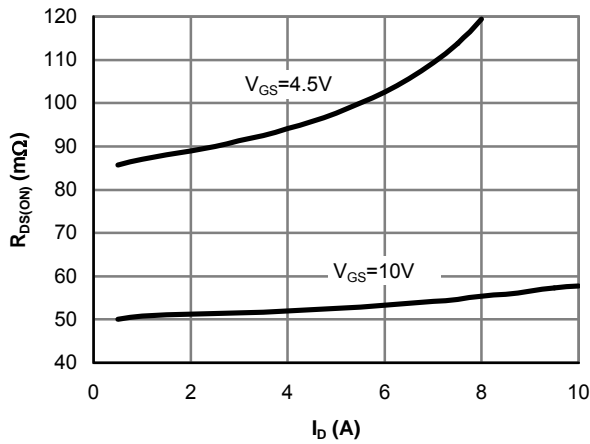


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

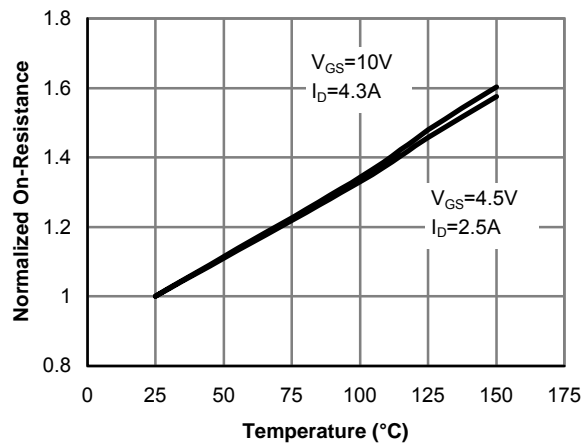


Figure 4: On-Resistance vs. Junction Temperature

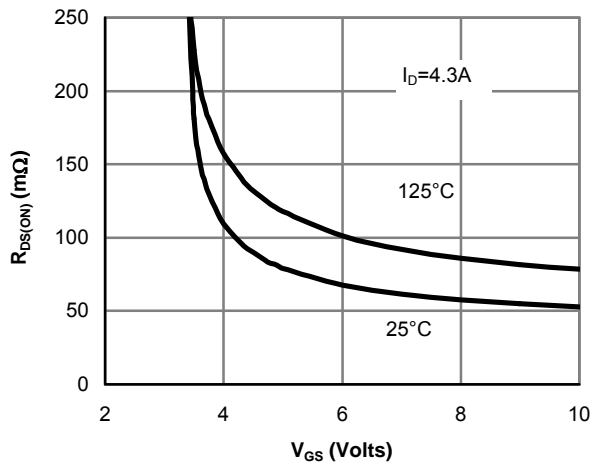


Figure 5: On-Resistance vs. Gate-Source Voltage

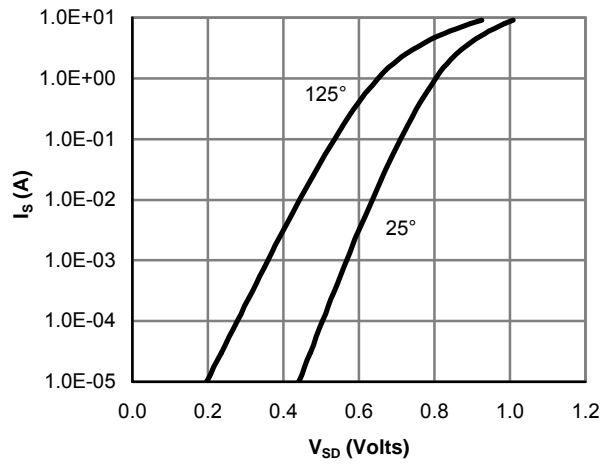


Figure 6: Body-Diode Characteristics

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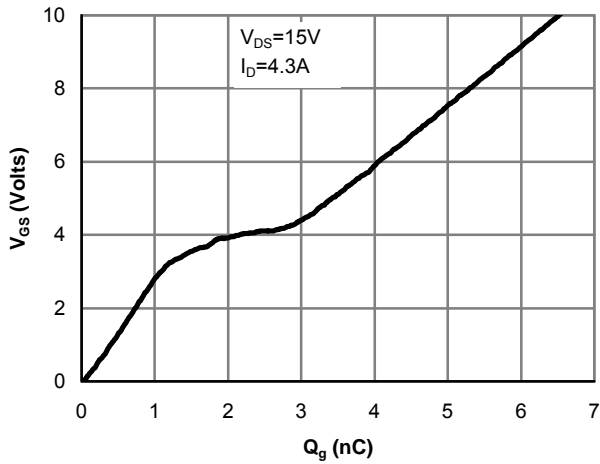


Figure 7: Gate-Charge Characteristics

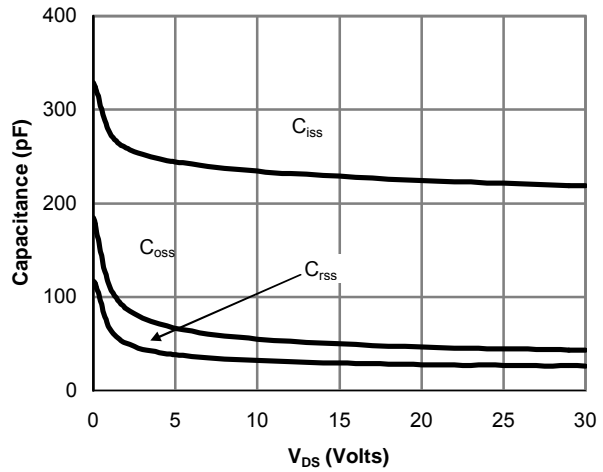


Figure 8: Capacitance Characteristics

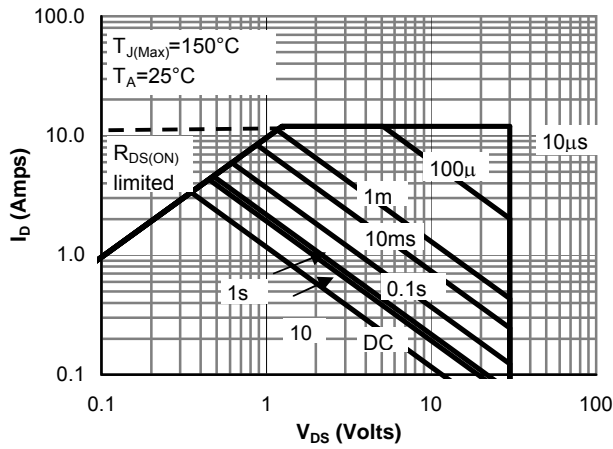


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

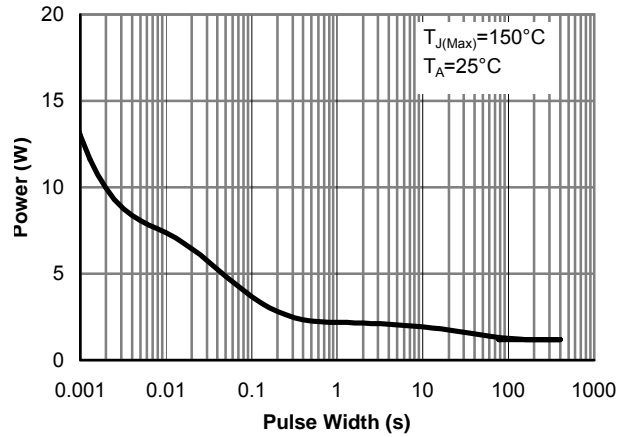


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

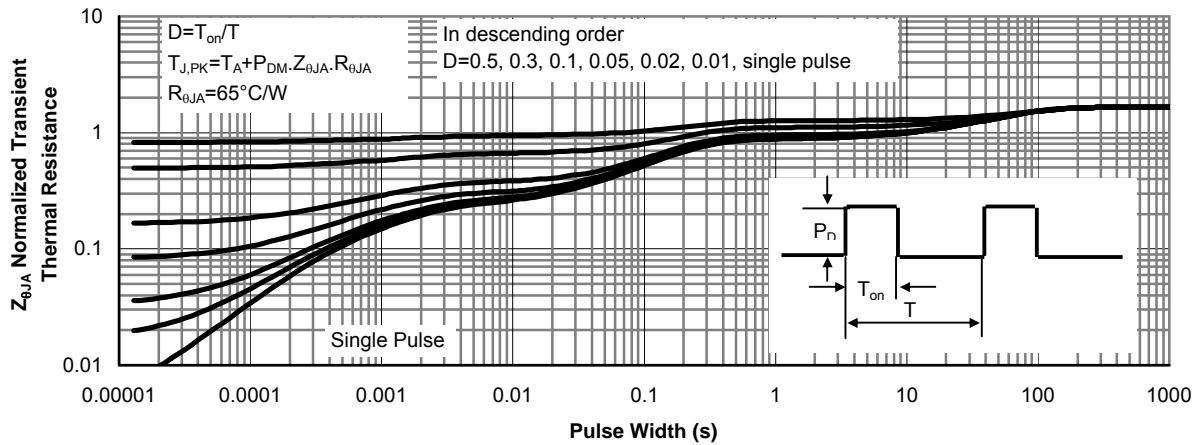


Figure 11: Normalized Maximum Transient Thermal Impedance

P-Channel Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> =-250μA, V <sub>GS</sub> =0V	-30			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V T <sub>J</sub> =55°C			-1 -5	μA
I <sub>GSS</sub>	Gate-Body leakage current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V			±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1	-2	-3	V
I <sub>D(ON)</sub>	On state drain current	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-5V	-12			A
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =-10V, I <sub>D</sub> =-3.4A T <sub>J</sub> =125°C		88 122	110	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2A		138	180	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =-5V, I <sub>D</sub> =-3.4A		4.5		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =-1A, V <sub>GS</sub> =0V		-0.8	-1	V
I <sub>S</sub>	Maximum Body-Diode Continuous Current				-2.5	A
<b>DYNAMIC PARAMETERS</b>						
C <sub>iss</sub>	Input Capacitance			290	350	pF
C <sub>oss</sub>	Output Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =-15V, f=1MHz		65		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			44		pF
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz		4.3	6.5	Ω
<b>SWITCHING PARAMETERS</b>						
Q <sub>g(10)</sub>	Total Gate Charge(10V)			5.8	7	nC
Q <sub>g(4.5)</sub>	Total Gate Charge(4.5V)	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, I <sub>D</sub> =-3.4A		3	4	nC
Q <sub>gs</sub>	Gate Source Charge			0.78		nC
Q <sub>gd</sub>	Gate Drain Charge			1.6		nC
t <sub>D(on)</sub>	Turn-On DelayTime			7		ns
t <sub>r</sub>	Turn-On Rise Time	V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V, R <sub>L</sub> =4.4Ω,		6		ns
t <sub>D(off)</sub>	Turn-Off DelayTime	R <sub>GEN</sub> =3Ω		15		ns
t <sub>f</sub>	Turn-Off Fall Time			7.5		ns
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =-3.4A, dI/dt=100A/μs		12.5	15	ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge	I <sub>F</sub> =-3.4A, dI/dt=100A/μs		5.5		nC

A: The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C.

The value in any given application depends on the user's specific board design.

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C. The R<sub>θJA</sub> is the sum of the thermal impedance from junction to lead R<sub>θJL</sub> and lead to ambient.

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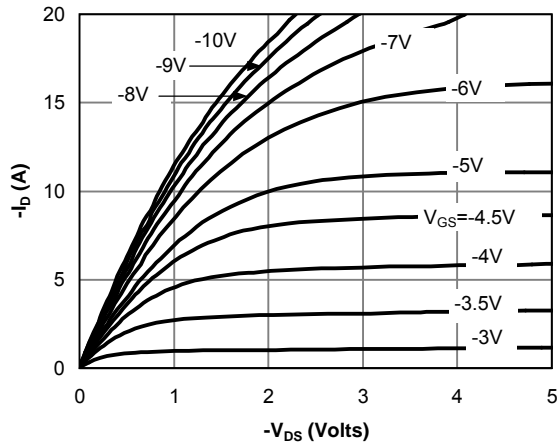


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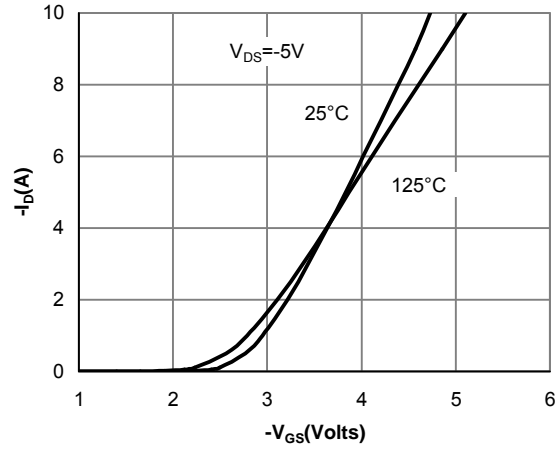


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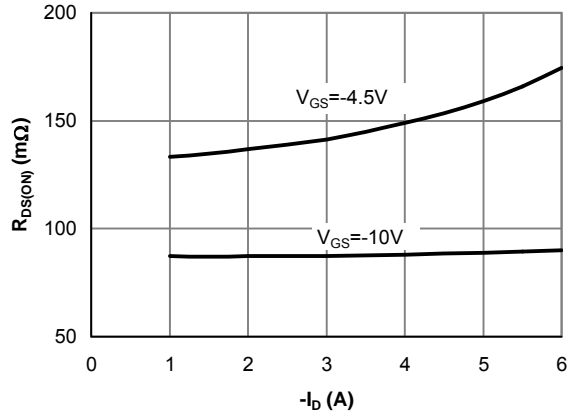


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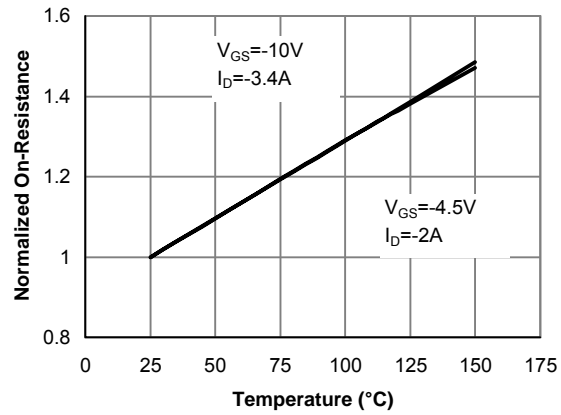


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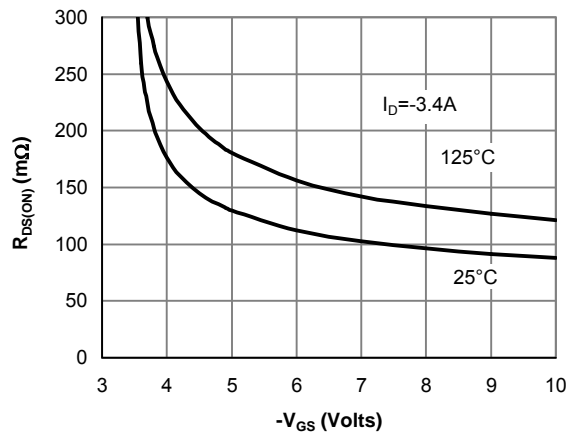


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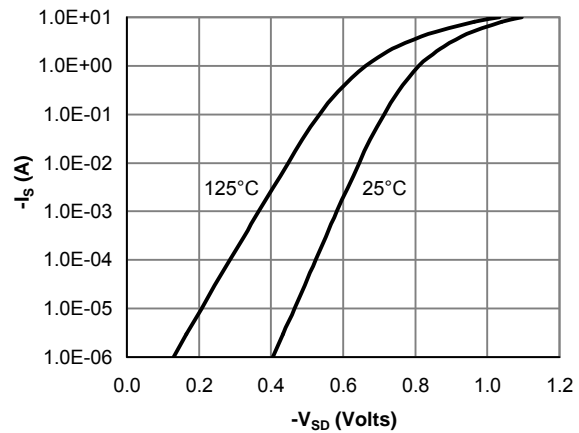


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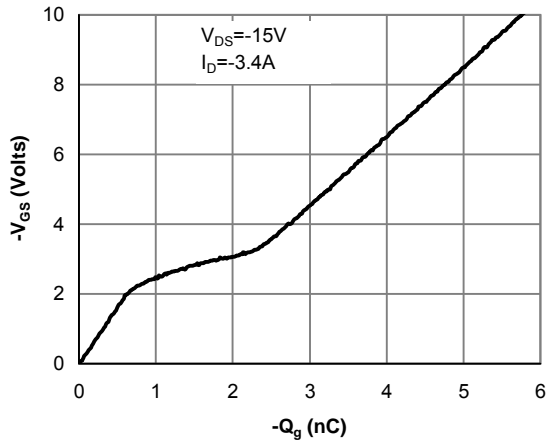


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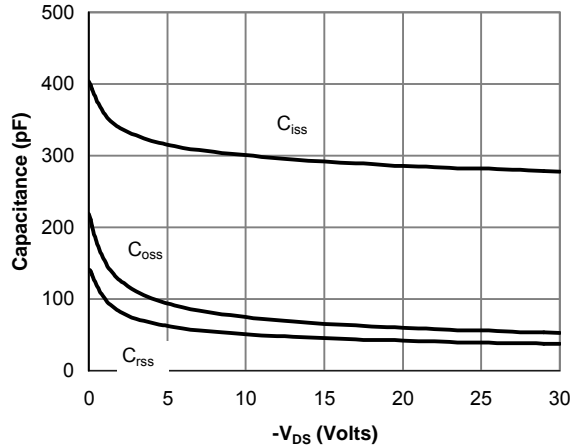


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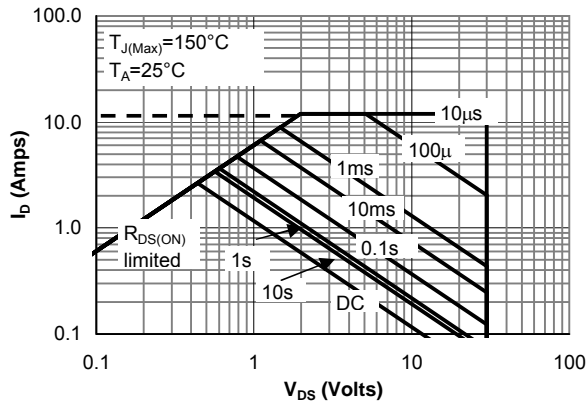


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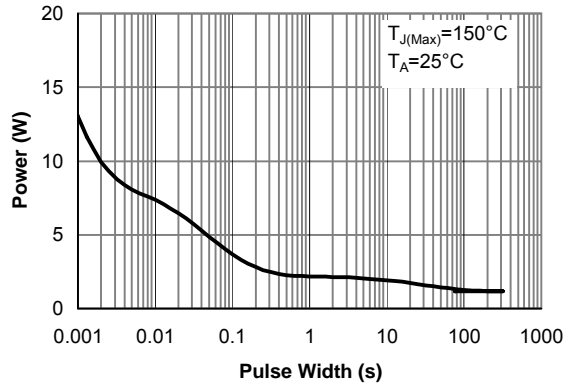


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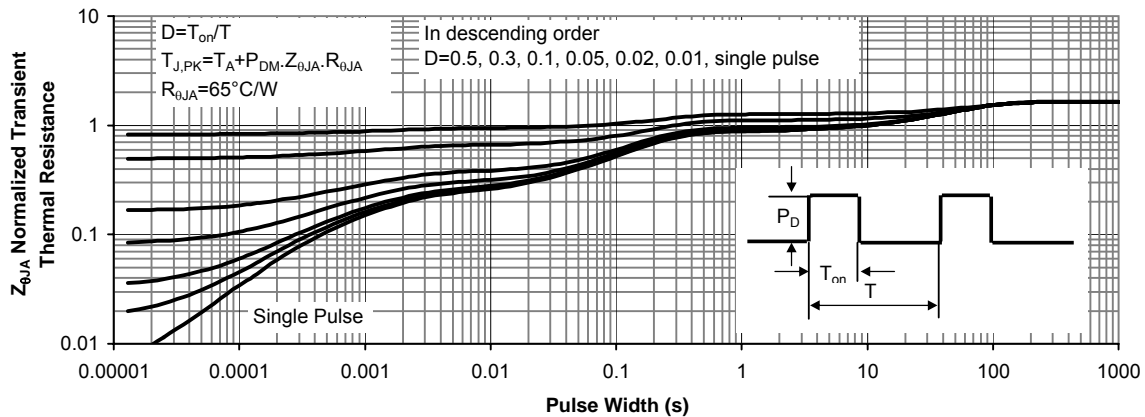


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