AO4620
Complementary Enhancement Mode Field Effect Transistor

General Description

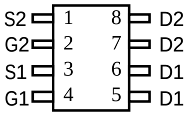
The AO4620/L uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used in inverter and other applications.*AO4620 and AO4620L are electrically identical.*

-RoHS Compliant

-AO4620L is Halogen Free

Features

n-channel	p-channel
V_{DS} (V) = 30V	-30V
I_D = 7.2A (V_{GS}=10V)	-5.3A (V_{GS} = -10V)
$R_{DS(ON)}$	$R_{DS(ON)}$
< 24mΩ (V_{GS}=10V)	< 38mΩ (V_{GS} = -10V)
< 36mΩ (V_{GS}=4.5V)	< 60mΩ (V_{GS} = -4.5V)



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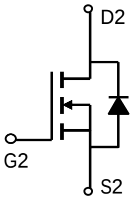
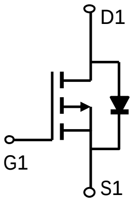


n-channel



p-channel

Absolute Maximum Ratings T_A=25°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]	T_A=25°C	I_D	7.2	-5.3	A
	T_A=70°C		6.2	-4.5	
Pulsed Drain Current[B]		I_{DM}	30	-30	
Power Dissipation[F]	T_A=25°C	P_D	2	2	W
	T_A=70°C		1.44	1.44	
Avalanche Current[B]		I_{AR}	13	17	A
Repetitive avalanche energy 0.3mH[B]		E_{AR}	25	43	mJ
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	-55 to 150	°C

Thermal Characteristics: n-channel and p-channel

Parameter		Symbol	Device	Typ	Max	Units
Maximum Junction-to-Ambient[A]	t ≤ 10s	$R_{\theta JA}$	n-ch	50	62.5	°C/W
Maximum Junction-to-Ambient[A]	Steady-State		n-ch	80	100	°C/W
Maximum Junction-to-Lead[C]	Steady-State	$R_{\theta JL}$	n-ch	32	40	°C/W
Maximum Junction-to-Ambient[A]	t ≤ 10s	$R_{\theta JA}$	p-ch	50	62.5	°C/W
Maximum Junction-to-Ambient[A]	Steady-State		p-ch	80	100	°C/W
Maximum Junction-to-Lead[C]	Steady-State	$R_{\theta JL}$	p-ch	32	40	°C/W

N-CHANNEL 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}=30V, V_{GS}=0V			1	µA
		T_J=55°C			5	
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	1.3	1.6	3	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=7.2A		20	24	mΩ
		T_J=125°C		26	32	
		V_{GS}=4.5V, I_D=5A		29	36	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=7.2A		24		S
V_{SD}	Diode Forward Voltage	I_S=1A,V_{GS}=0V		0.77	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		660	792	pF
C_{oss}	Output Capacitance			110		pF
C_{rss}	Reverse Transfer Capacitance			87		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		0.8	1.5	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=7.2A		11.3	14.125	nC
Q_g(4.5V)	Total Gate Charge			5.7		nC
Q_{gs}	Gate Source Charge			2.1		nC
Q_{gd}	Gate Drain Charge			3		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=2.1Ω, R_{GEN}=3Ω		4.5		ns
t_r	Turn-On Rise Time			3.1		ns
$t_{D(off)}$	Turn-Off DelayTime			15.1		ns
t_f	Turn-Off Fall Time			2.7		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=7.2A, dI/dt=100A/µs		15.5	20	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=7.2A, dI/dt=100A/µs		7.1		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 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. The current rating is based on the t ≤ 10s thermal resistance rating.
B: Repetitive rating, pulse width limited by junction temperature.
C. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.
D. The static characteristics in Figures 1 to 6 are obtained using <300µs pulses, duty cycle 0.5% max.
E. These tests are performed with the device mounted on 1 in^2 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 power dissipation and current rating are based on the t ≤ 10s thermal resistance rating.

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N-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

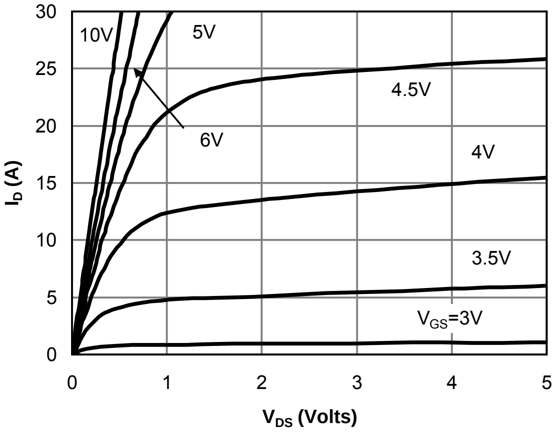

Figure 1: On-Region Characteristics

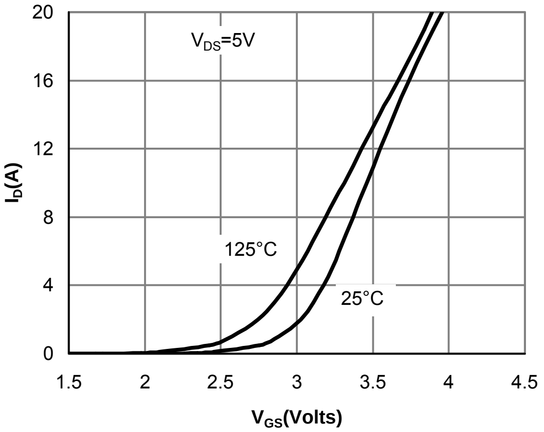

Figure 2: Transfer Characteristics

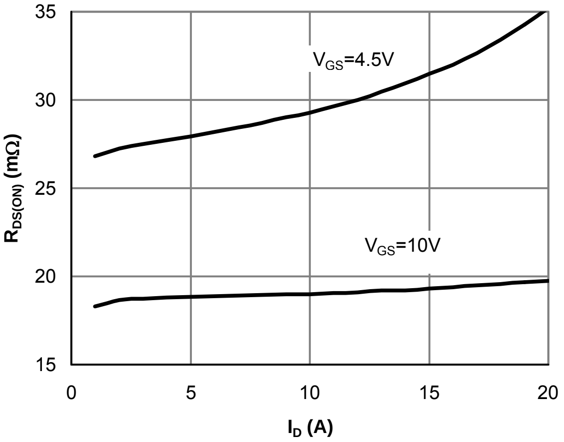

Figure 3: On-Resistance vs. Drain Current and Gate Voltage

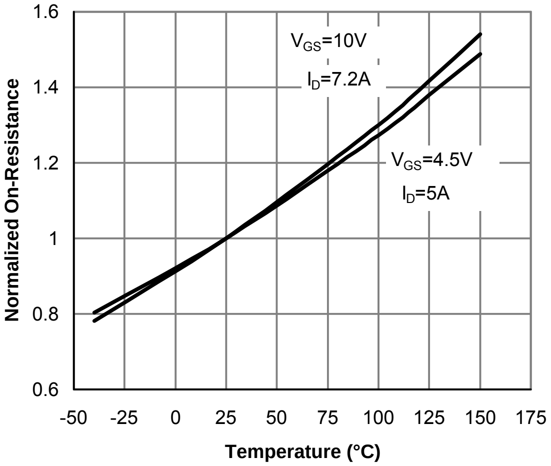

Figure 4: On-Resistance vs. Junction Temperature

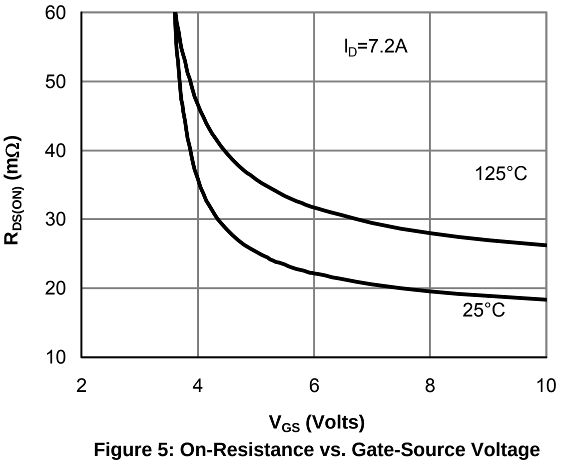

Figure 5: On-Resistance vs. Gate-Source Voltage

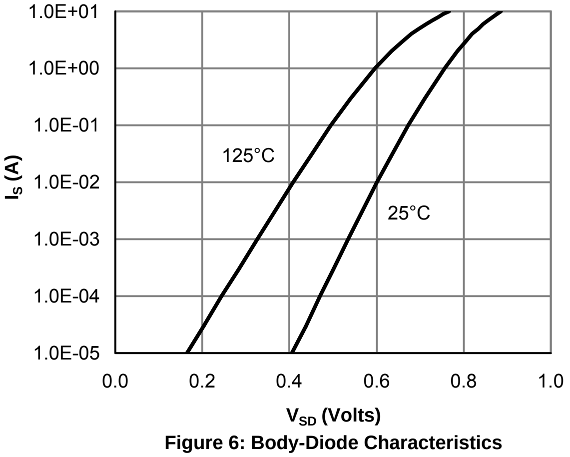

Figure 6: Body-Diode Characteristics

N-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

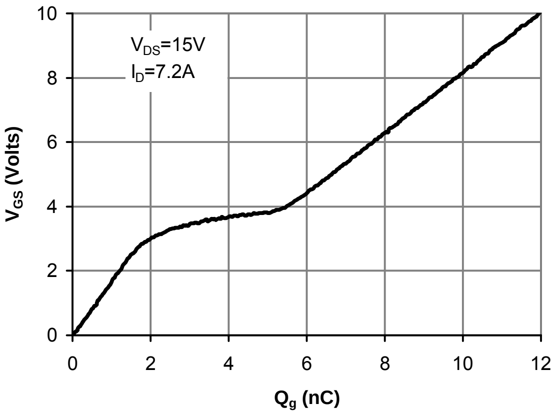

Figure 7: Gate-Charge Characteristics

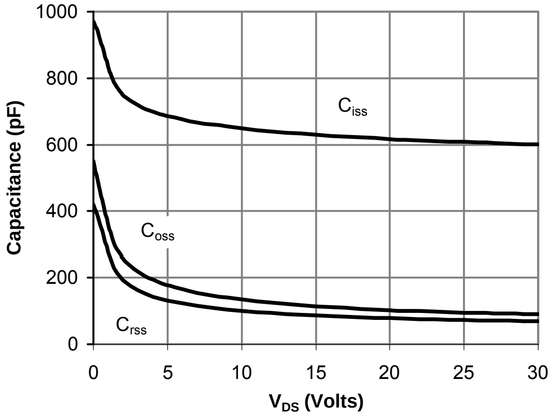

Figure 8: Capacitance Characteristics

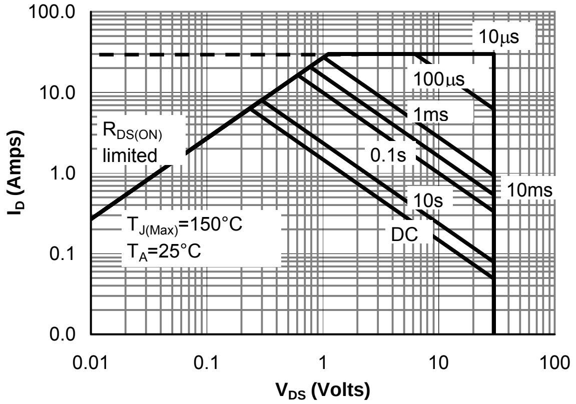

Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

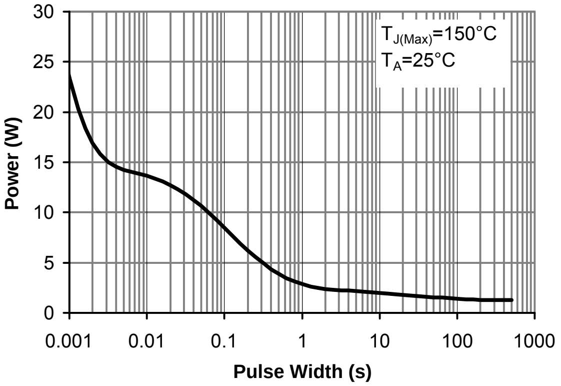

Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

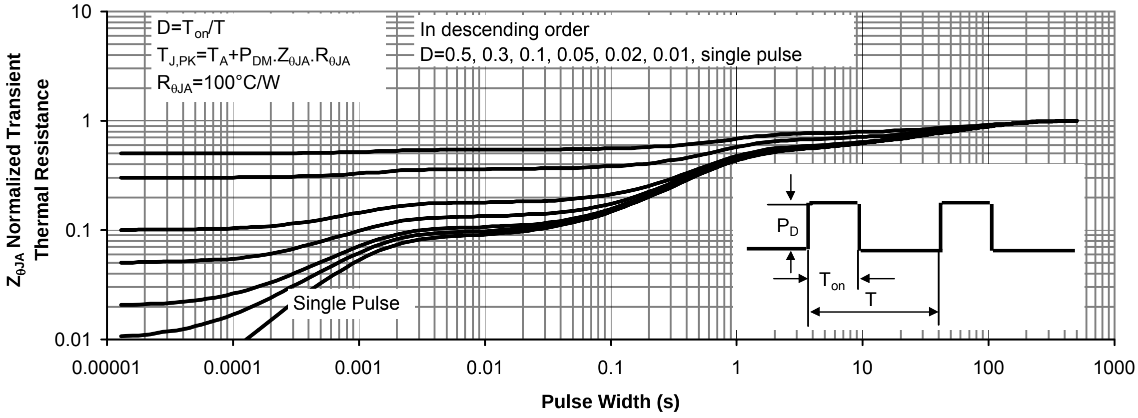

Figure 11: Normalized Maximum Transient Thermal Impedance

P-CHANNEL Electrical Characteristics (T_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}=-30V, V_{GS}=0V			-1	µA
		T_J=55°C			-5	
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	-3	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=-5.3A		31	38	mΩ
		T_J=125°C		42		
		V_{GS}=-4.5V, I_D=-4.5A		48	60	mΩ
g_{FS}	Forward Transconductance	V_{DS}=-5V, I_D=-5.3A		15		S
V_{SD}	Diode Forward Voltage	I_S=-1A,V_{GS}=0V		-0.77	-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		980	1225	pF
C_{oss}	Output Capacitance			150		pF
C_{rss}	Reverse Transfer Capacitance			115		pF
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz		2.2	3.3	Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge (10V)	V_{GS}=-10V, V_{DS}=-15V, I_D=-5.3A		18.7	24	nC
Q_g(4.5V)	Total Gate Charge (4.5V)			9.6		nC
Q_{gs}	Gate Source Charge			3.2		nC
Q_{gd}	Gate Drain Charge			4.8		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=-10V, V_{DS}=-15V, R_L=2.8Ω, R_{GEN}=3Ω		7.7		ns
t_r	Turn-On Rise Time			6		ns
$t_{D(off)}$	Turn-Off DelayTime			20		ns
t_f	Turn-Off Fall Time			7		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=-5.3A, dI/dt=100A/µs		21	26	ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=-5.3A, dI/dt=100A/µs		13		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 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. The current rating is based on the t ≤ 10s thermal resistance rating.

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

C. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.

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

E. These tests are performed with the device mounted on 1 in^2 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 power dissipation and current rating are based on the t ≤ 10s thermal resistance rating.

Rev3:June 2008

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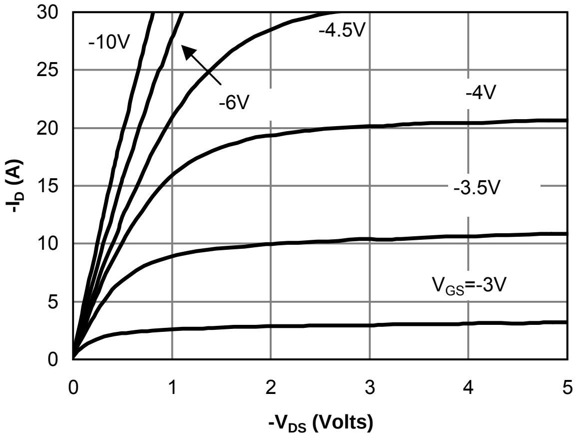

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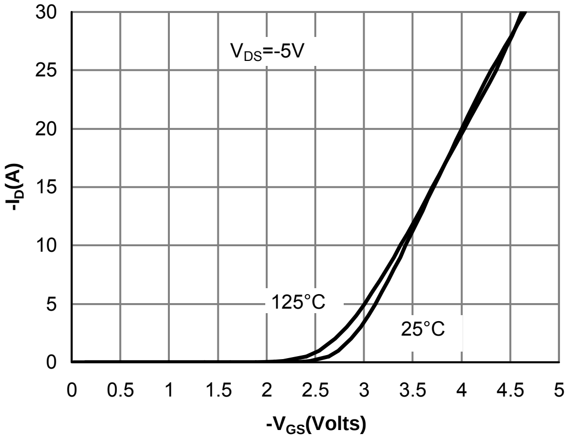

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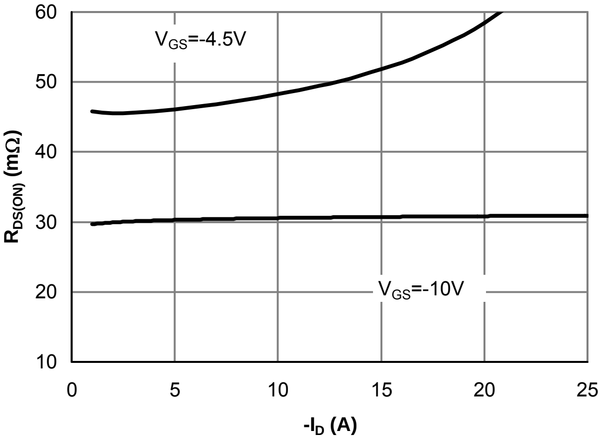

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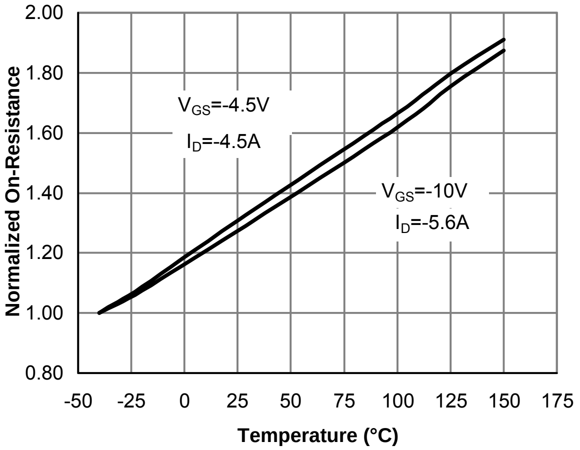

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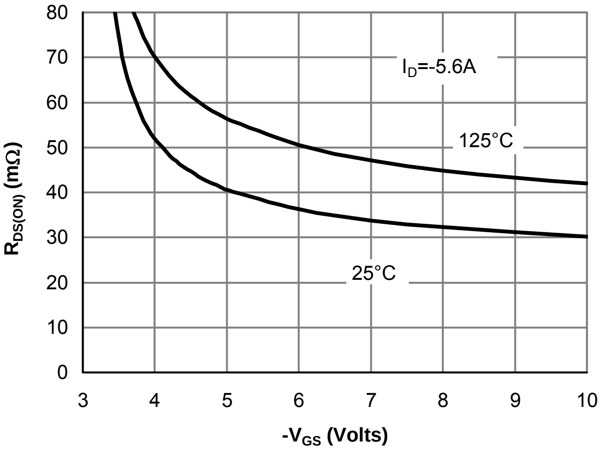

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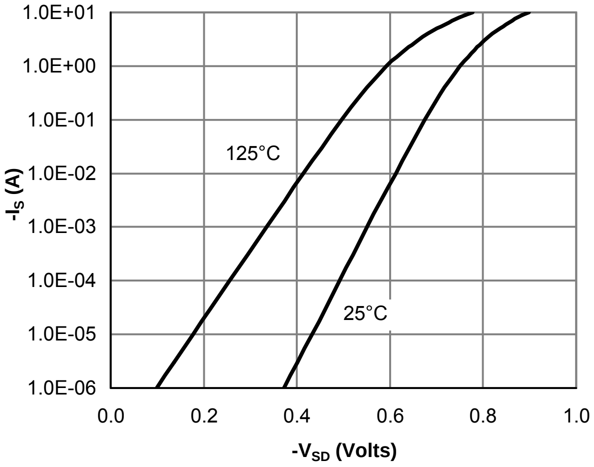

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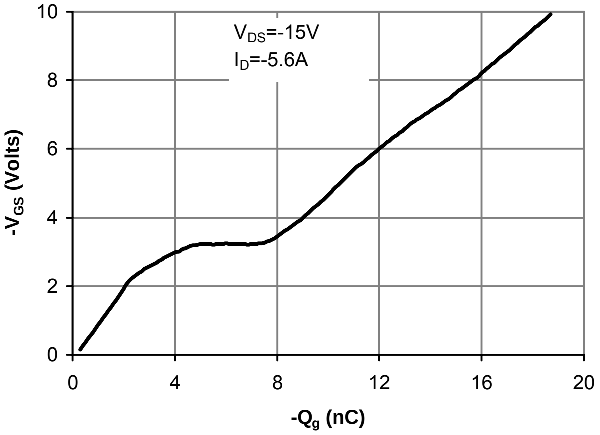

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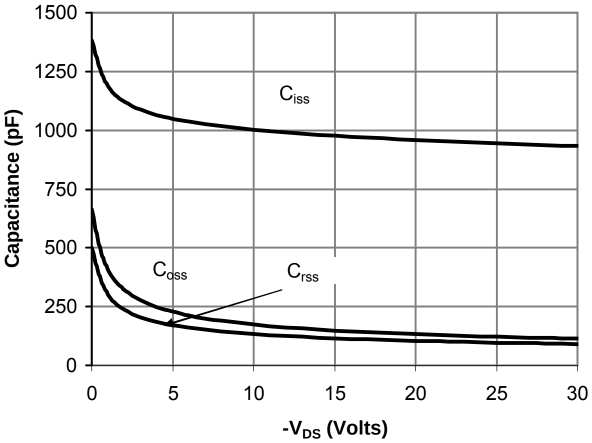

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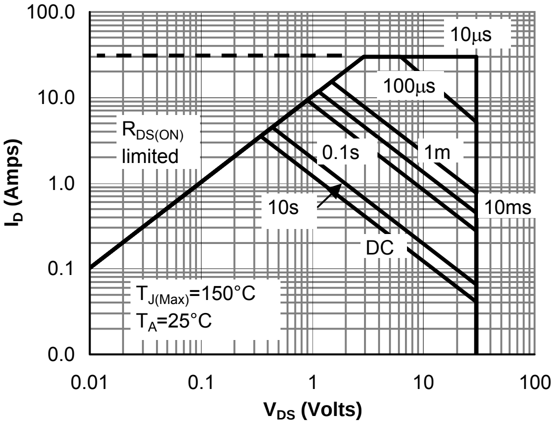

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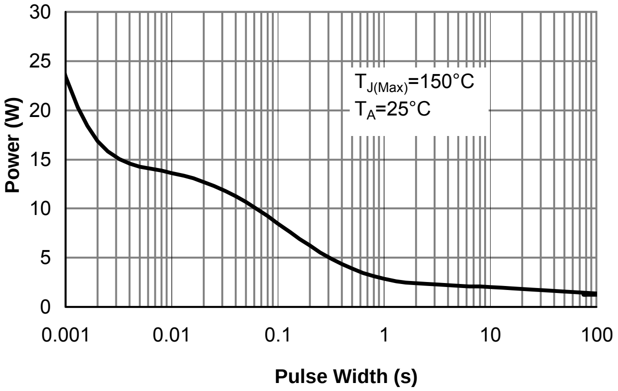
Safe Operating Area (Note E)



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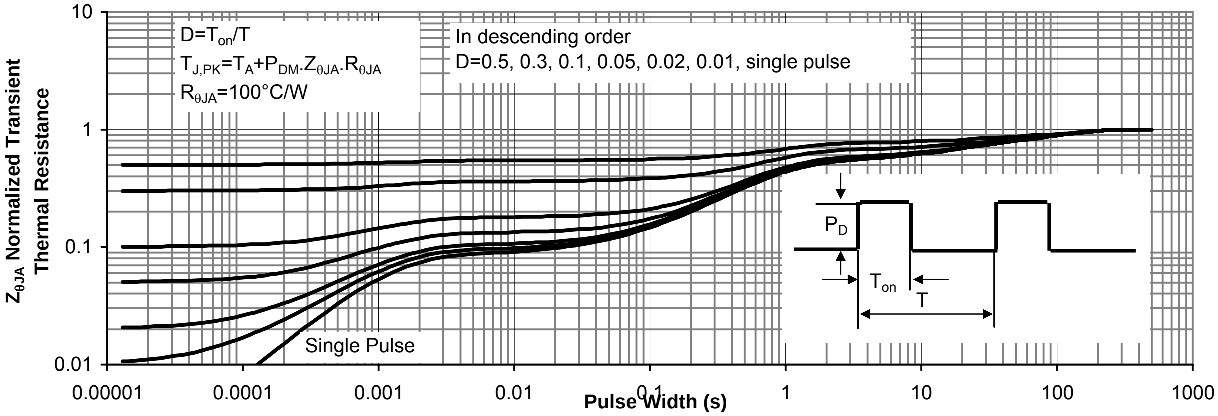

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