



ALPHA & OMEGA
SEMICONDUCTOR



AOP608

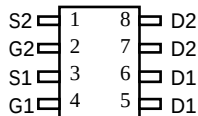
Complementary Enhancement Mode Field Effect Transistor

General Description

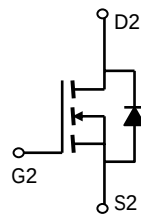
The AOP608 uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used in H-bridge, Inverters and other applications. *Standard Product AOP608 is Pb-free (meets ROHS & Sony 259 specifications). AOP608L is a Green Product ordering option. AOP608 and AOP608L are electrically identical.*

Features

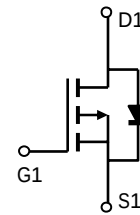
n-channel	p-channel
V_{DS} (V) = 40V	-40V
I_D = 6.3A (V_{GS} =10V)	-5.5A (V_{GS} = -10V)
$R_{DS(ON)}$	$R_{DS(ON)}$
< 33m Ω (V_{GS} =10V)	< 45m Ω (V_{GS} = -10V)
< 46m Ω (V_{GS} =4.5V)	< 63m Ω (V_{GS} = -4.5V)



PDIP-8



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}	40	-40	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Continuous Drain Current ^A	I_D	6.3	-5.5	A
		5	-4.4	
Pulsed Drain Current ^B	I_{DM}	20	-20	
Power Dissipation	P_D	2.5	2.5	W
		1.6	1.6	
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	37	50	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A		n-ch	74	90	$^\circ\text{C/W}$
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	n-ch	28	40	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	p-ch	35	50	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A		p-ch	73	90	$^\circ\text{C/W}$
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	p-ch	32	40	$^\circ\text{C/W}$

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	40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =32V, 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	2.3	3	V
I _{D(ON)}	On state drain current	V _{GS} =10V, V _{DS} =5V	20			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =6.3A T _J =125°C		24.1 40	33	mΩ
		V _{GS} =4.5V, I _D =5A		33.7	46	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =6.3A		22		S
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.77	1	V
I _S	Maximum Body-Diode Continuous Current				6.3	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =30V, f=1MHz		404		pF
C _{oss}	Output Capacitance			95		pF
C _{rss}	Reverse Transfer Capacitance			37		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		2.7		Ω
SWITCHING PARAMETERS						
Q _g (10V)	Total Gate Charge	V _{GS} =10V, V _{DS} =20V, I _D =6.3A		9.2		nC
Q _g (4.5V)	Total Gate Charge			4.6		nC
Q _{gs}	Gate Source Charge			1.6		nC
Q _{gd}	Gate Drain Charge			2.5		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =20V, R _L =3Ω, R _{GEN} =3Ω		4.3		ns
t _r	Turn-On Rise Time			3.4		ns
t _{D(off)}	Turn-Off DelayTime			15		ns
t _f	Turn-Off Fall Time			2.8		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =6.3A, dI/dt=100A/μs		21.2		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =6.3A, dI/dt=100A/μs		15.8		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. The current rating is based on the t ≤ 10s thermal resistance rating.

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 80μs 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.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS: N-CHANNEL

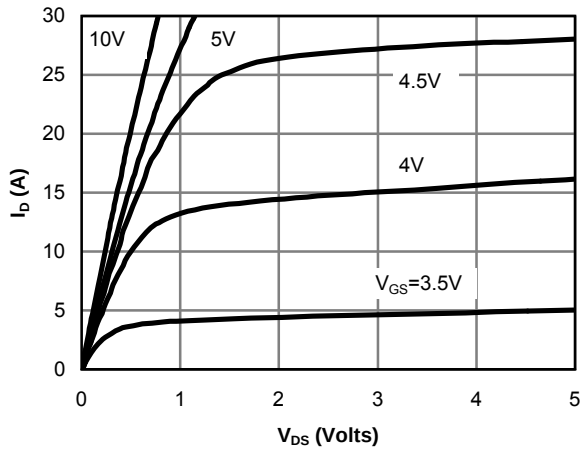


Fig 1: On-Region Characteristics

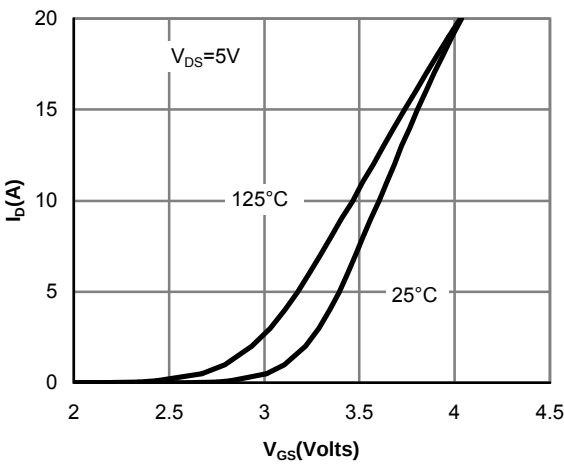


Figure 2: Transfer Characteristics

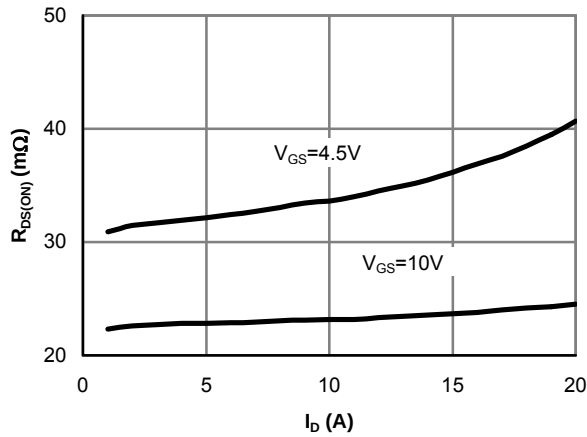


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

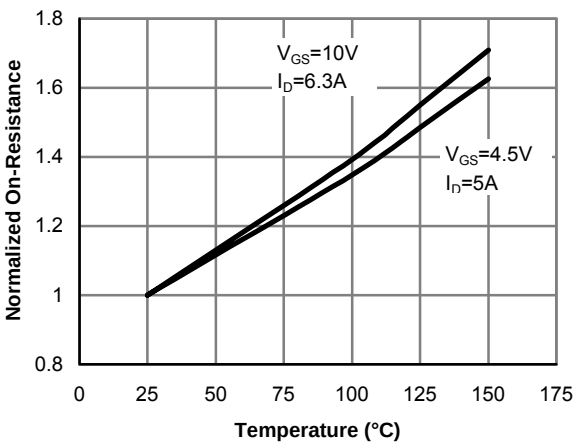


Figure 4: On-Resistance vs. Junction Temperature

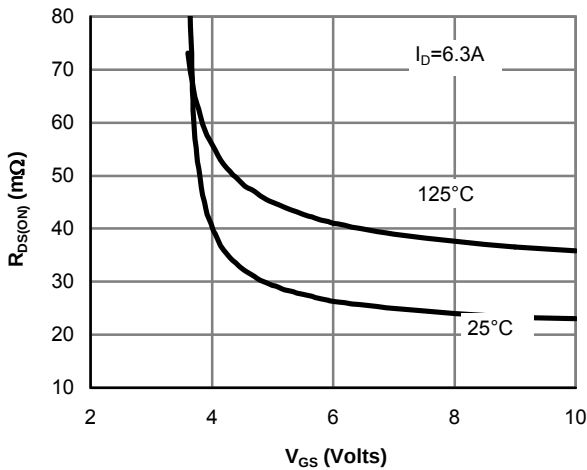


Figure 5: On-Resistance vs. Gate-Source Voltage

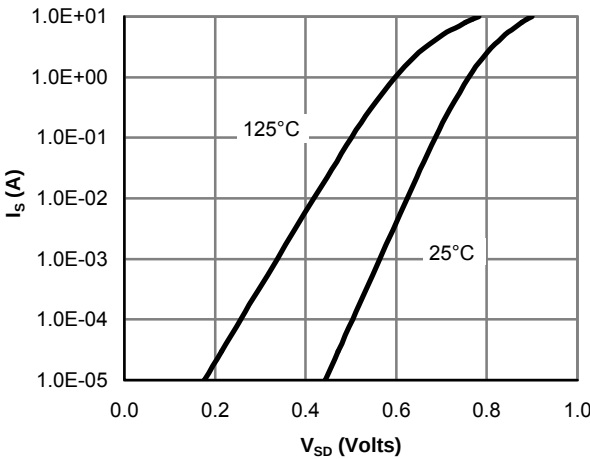


Figure 6: Body-Diode Characteristics

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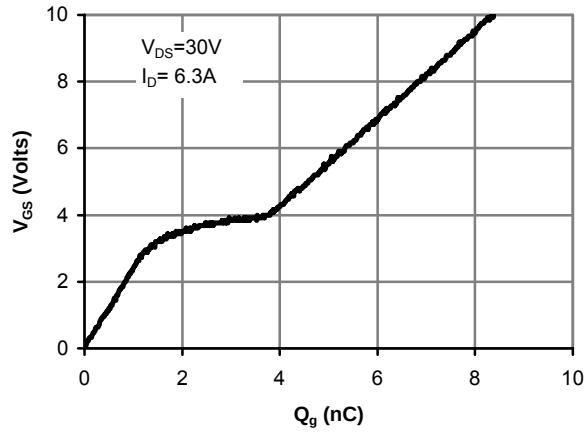


Figure 7: Gate-Charge Characteristics

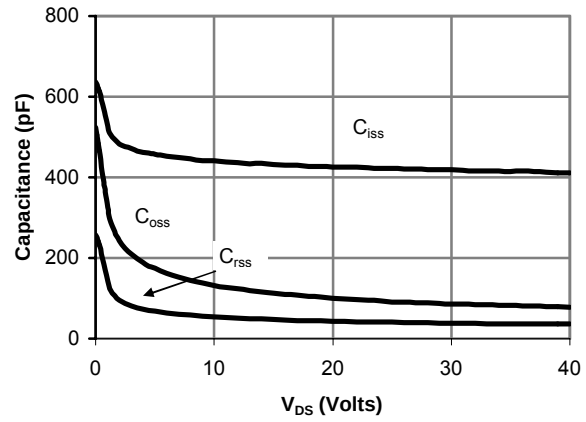


Figure 8: Capacitance Characteristics

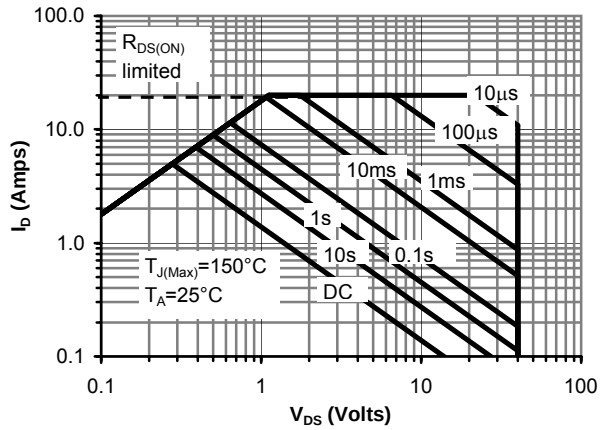


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

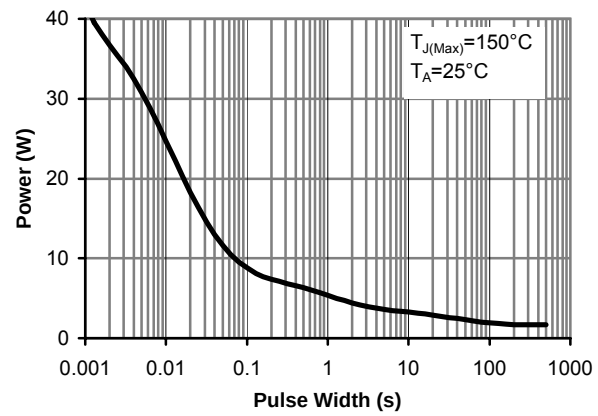


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

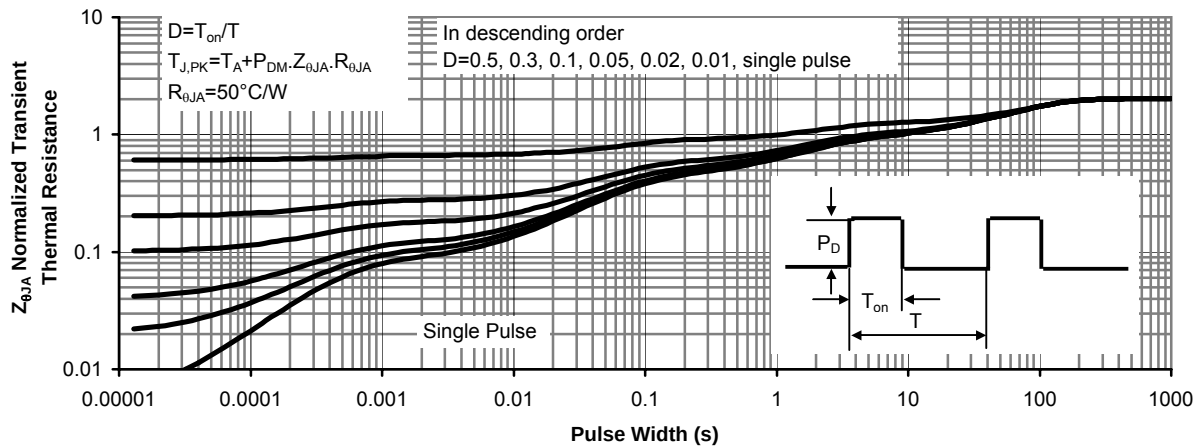


Figure 11: Normalized Maximum Transient Thermal Impedance

P-Channel 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	-40			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-32V, 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	-1.9	-3	V
I _{D(ON)}	On state drain current	V _{GS} =-10V, V _{DS} =-5V	-20			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-5.5A T _J =125°C		34.7 56	45 70	mΩ
		V _{GS} =-4.5V, I _D =-4.6A		50.6	63	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-5.5A		12		S
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V		-0.75	-1	V
I _S	Maximum Body-Diode Continuous Current				-5.5	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-20V, f=1MHz		657		pF
C _{oss}	Output Capacitance			143		pF
C _{rss}	Reverse Transfer Capacitance			63		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		6.5		Ω
SWITCHING PARAMETERS						
Q _g (10V)	Total Gate Charge (10V)	V _{GS} =-10V, V _{DS} =-20V, I _D =-5.5A		14.2		nC
Q _g (4.5V)	Total Gate Charge (4.5V)			7.1		nC
Q _{gs}	Gate Source Charge			2.2		nC
Q _{gd}	Gate Drain Charge			4.1		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =-10V, V _{DS} =-20V, R _L =3.6Ω, R _{GEN} =3Ω		7.7		ns
t _r	Turn-On Rise Time			8		ns
t _{D(off)}	Turn-Off DelayTime			26.5		ns
t _f	Turn-Off Fall Time			11.5		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-5.5A, dI/dt=100A/μs		21.9		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-5.5A, dI/dt=100A/μs		14.9		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. The current rating is based on the t≤ 10s thermal resistance rating.

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 6,12,14 are obtained using 80μs 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.

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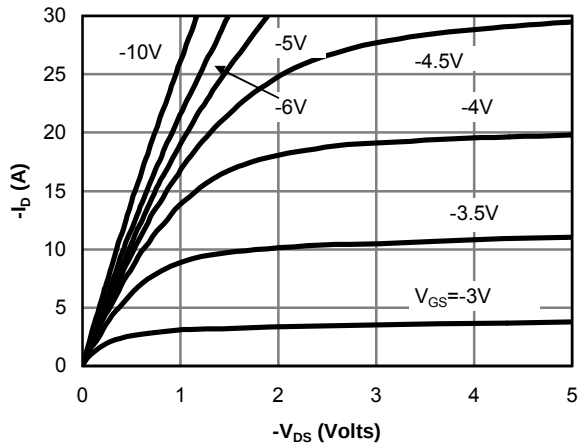


Fig 1: On-Region Characteristics

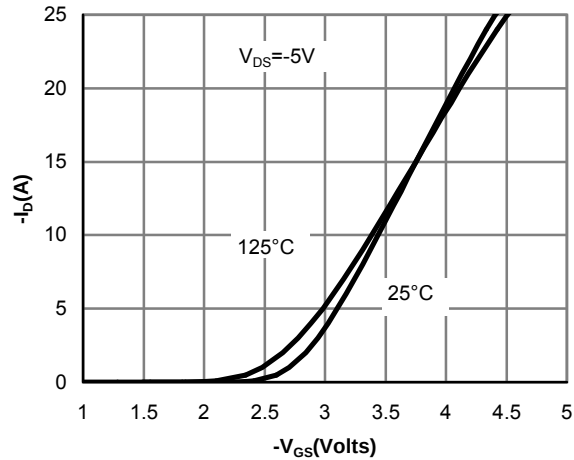


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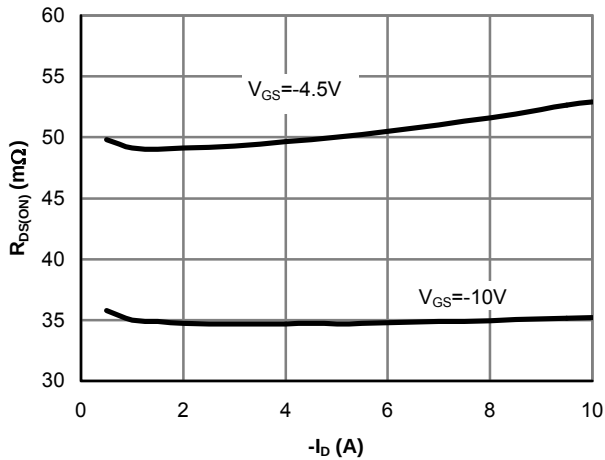


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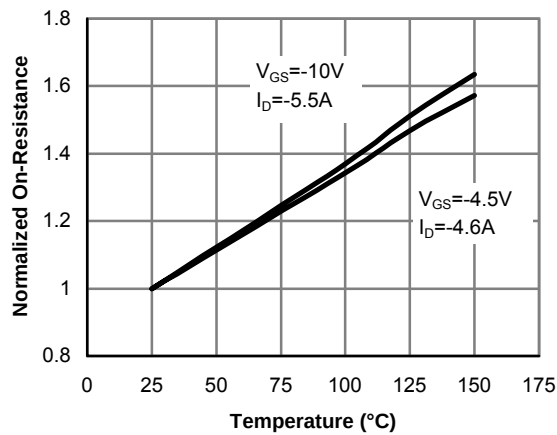


Figure 4: On-Resistance vs. Junction Temperature

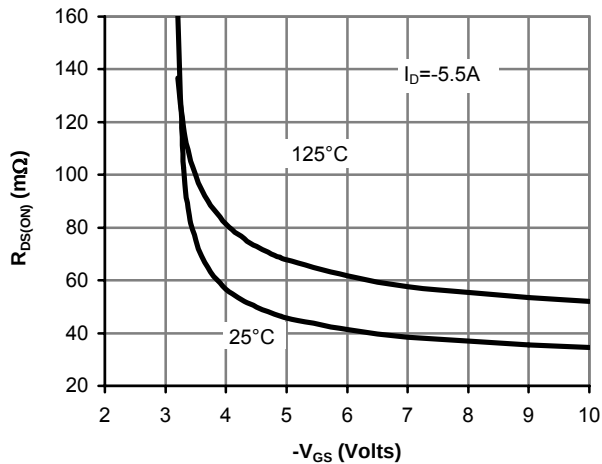


Figure 5: On-Resistance vs. Gate-Source Voltage

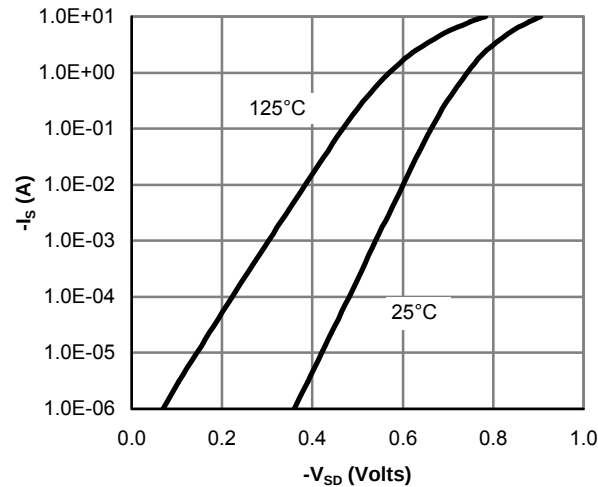


Figure 6: Body-Diode Characteristics

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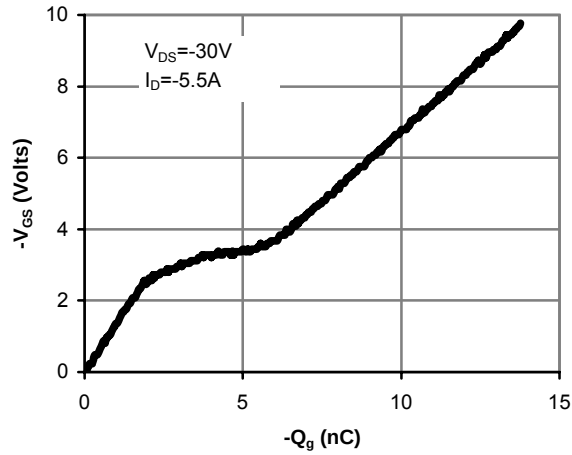


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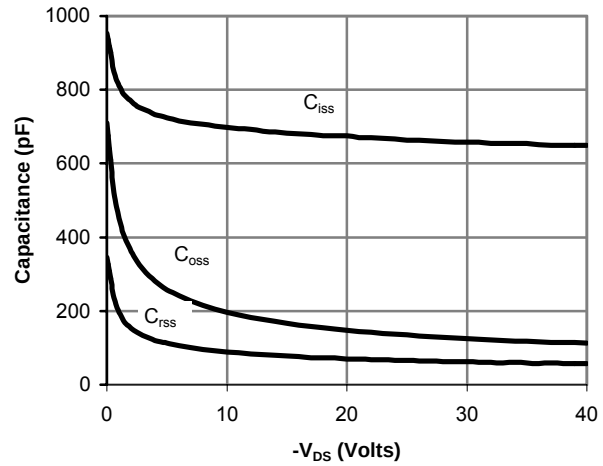


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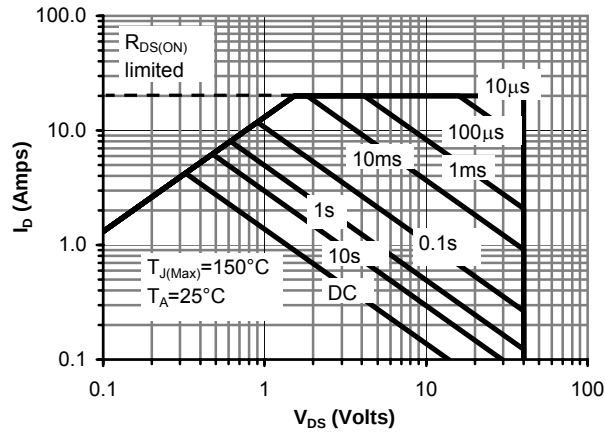


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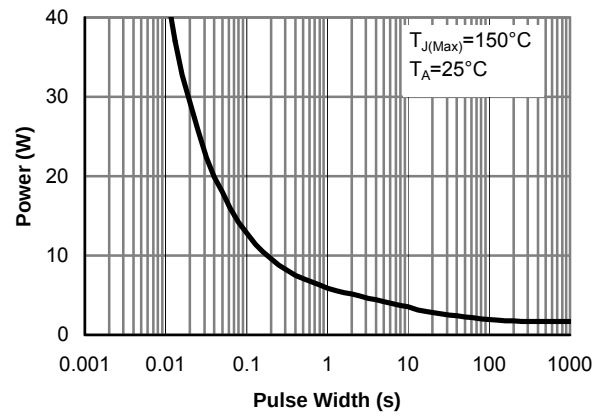


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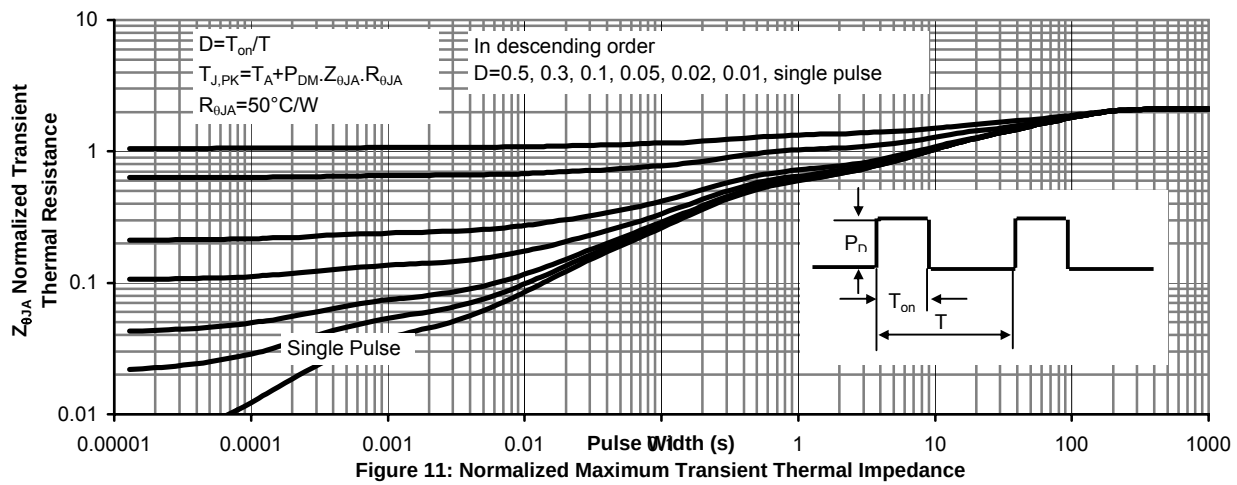


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