

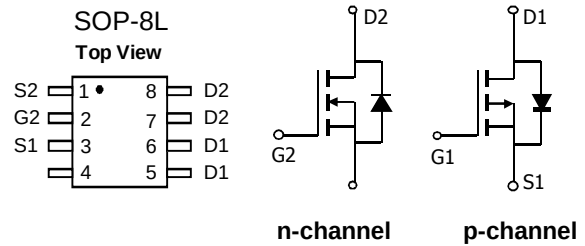
General Description

The AO4616 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.

Features

n-channel	p-channel
$V_{DS} (V) = 30V$	$-30V$
$I_D = 8A (V_{GS}=10V)$	$-10A (V_{GS} = -10V)$
$R_{DS(ON)}$	$R_{DS(ON)}$
$< 20m\Omega (V_{GS}=10V)$	$< 20m\Omega (V_{GS} = -10V)$
$< 30m\Omega (V_{GS}=4.5V)$	$< 30m\Omega (V_{GS} = -4.5V)$

100% UIS tested
100% Rg tested



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	8	-10	A	
	T _A =70°C		6.2	-7.5		
Pulsed Drain Current ^B			I _{DM}	44		-60
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}	9	17	A	
Repetitive avalanche energy 0.3mH ^B		E _{AR}	12	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 _{θJA}	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 _{θJL}	n-ch	32	40	°C/W
Maximum Junction-to-Ambient ^A	t ≤ 10s	R _{θJA}	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 _{θJL}	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 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	1.0	1.8	2.6	V
I _{D(ON)}	On state drain current	V _{GS} =10V, V _{DS} =5V	64			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =8A T _J =125°C		17 25	20 32	mΩ
		V _{GS} =4.5V, I _D =5A		24.8	30	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =7.2A		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
I _{SM}	Pulsed Body-Diode Current ^B				64	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		1.8	2.8	Ω
SWITCHING PARAMETERS						
Q _g (10V)	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =7.2A		7.2	11	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 =2.1Ω, 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 =7.2A, dI/dt=100A/μs		10.5	12.6	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =7.2A, 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. 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 <300 μs 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.

N-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

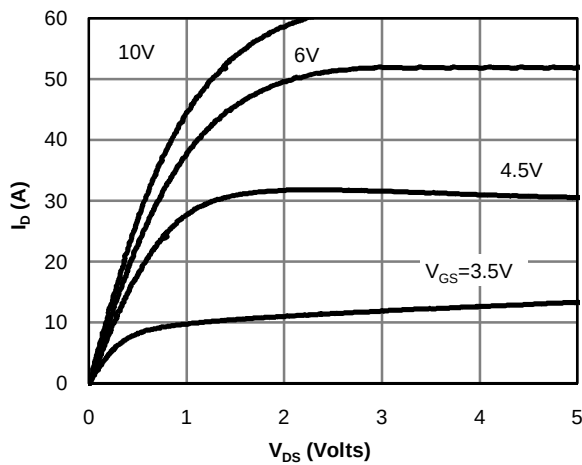


Fig 1: On-Region Characteristics

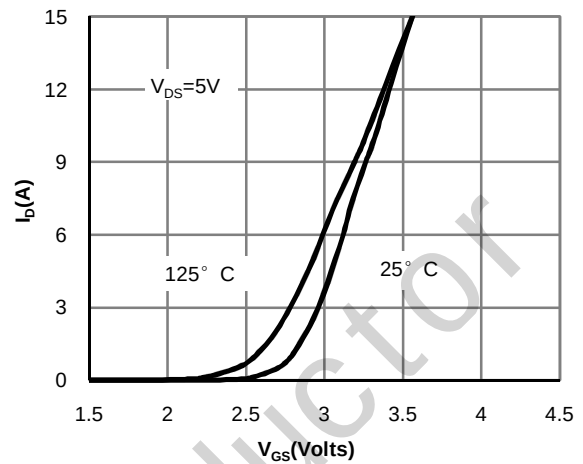


Figure 2: Transfer Characteristics

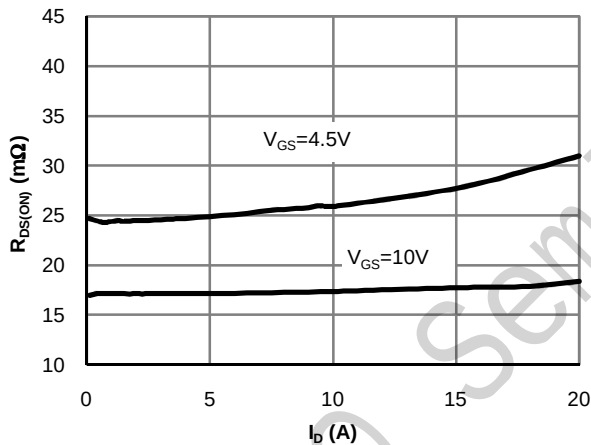


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

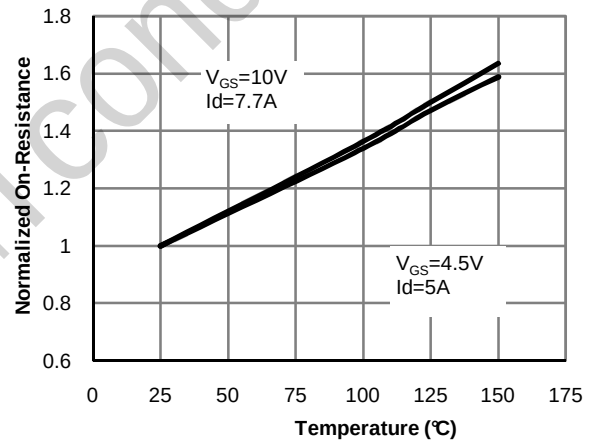


Figure 4: On-Resistance vs. Junction Temperature

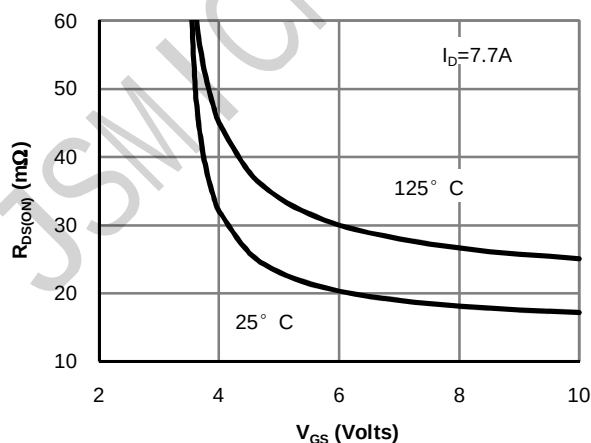


Figure 5: On-Resistance vs. Gate-Source Voltage

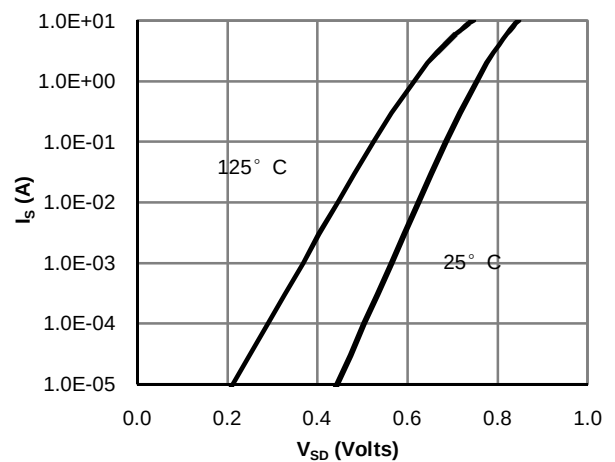
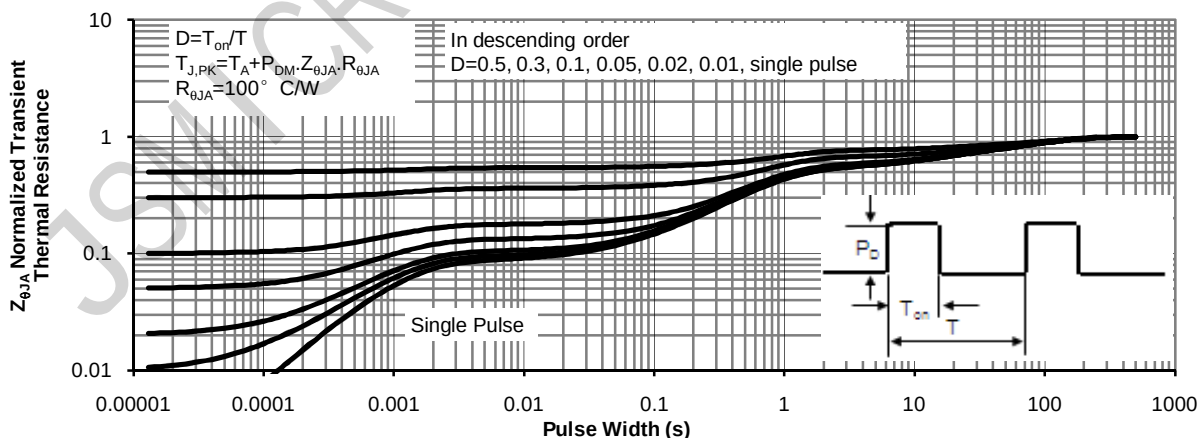
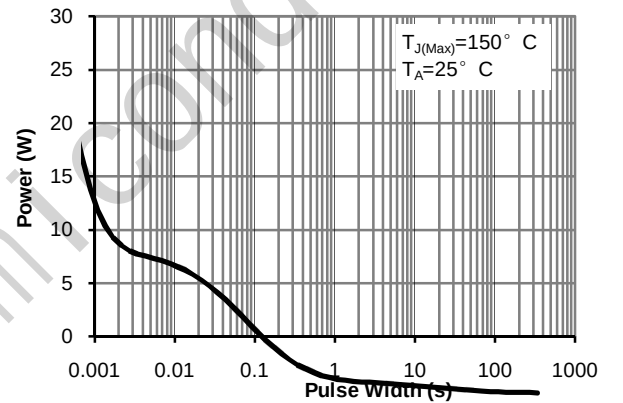
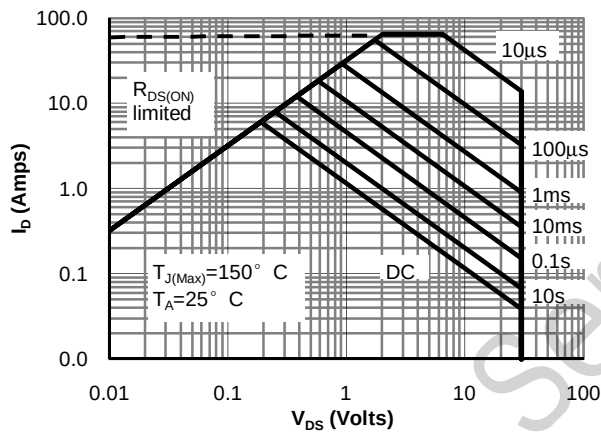
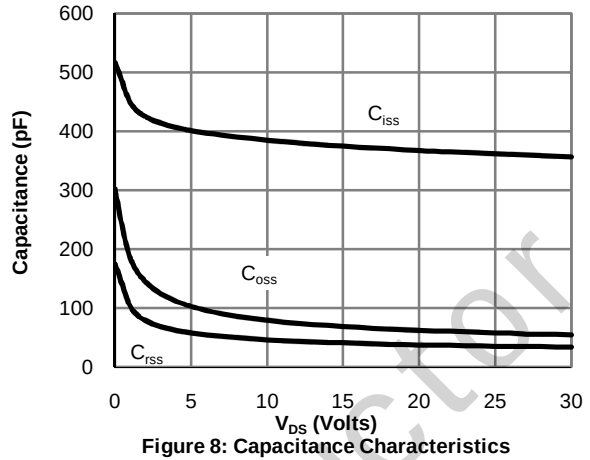
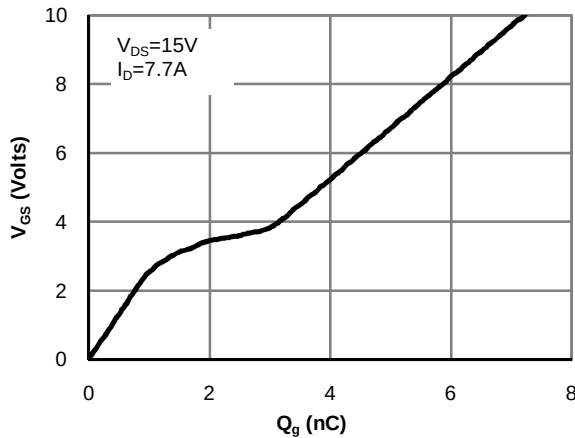


Figure 6: Body-Diode Characteristics

N-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
	Drain-Source Breakdown Voltage	I _D =-250μA, V _{GS} =0V				
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-30V, V _{GS} =0V				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	-1.0	-1.50	-2.4	V
I _{D(ON)}	On state drain current	V _{GS} =-10V, V _{DS} =-5V	-40			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-6.3A		15	20	mΩ
		T _J =125°C		26.5		
		V _{GS} =-4.5V, I _D =-4.5A		25	30	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-5.3A		19		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
I _{SM}	Pulsed Body-Diode Current ^B				-40	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-15V, f=1MHz		760		pF
C _{oss}	Output Capacitance			140		pF
C _{rss}	Reverse Transfer Capacitance			95		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		3.2	5	Ω
SWITCHING PARAMETERS						
Q _{g(10V)}	Total Gate Charge (10V)	V _{GS} =-10V, V _{DS} =-15V, I _D =-5.3A		13.6	16	nC
Q _{g(4.5V)}	Total Gate Charge (4.5V)			6.7		nC
Q _{gs}	Gate Source Charge			2.5		nC
Q _{gd}	Gate Drain Charge			3.2		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =-10V, V _{DS} =-15V, R _L =2.8Ω, R _{GEN} =3Ω		8		ns
t _r	Turn-On Rise Time			6		ns
t _{D(off)}	Turn-Off DelayTime			17		ns
t _f	Turn-Off Fall Time			5		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-5.3A, dI/dt=100A/μs		15		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-5.3A, dI/dt=100A/μs		9.7		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 <300 μs 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 current rating is based on the t ≤ 10s thermal resistance rating.

P-CHANNEL TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

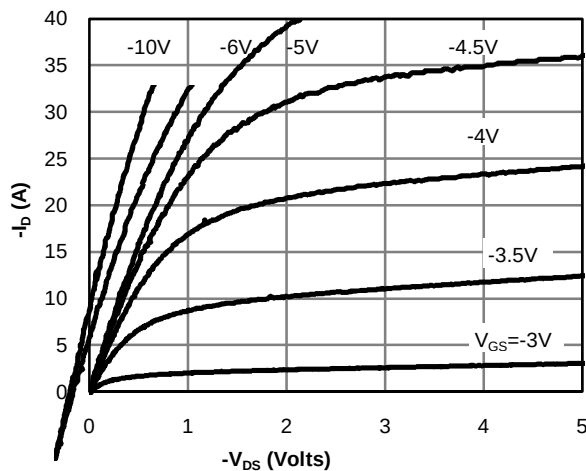


Fig 1: On-Region Characteristics

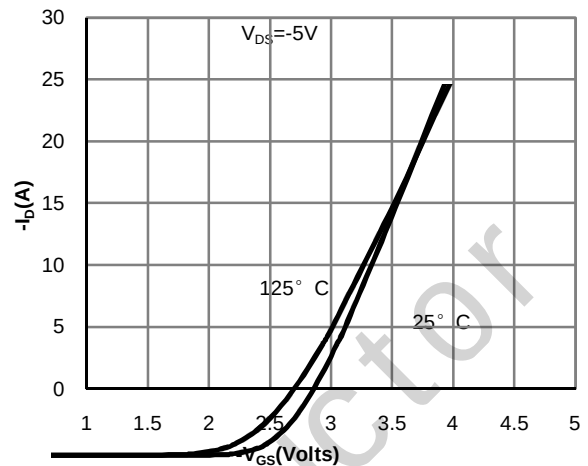


Figure 2: Transfer Characteristics

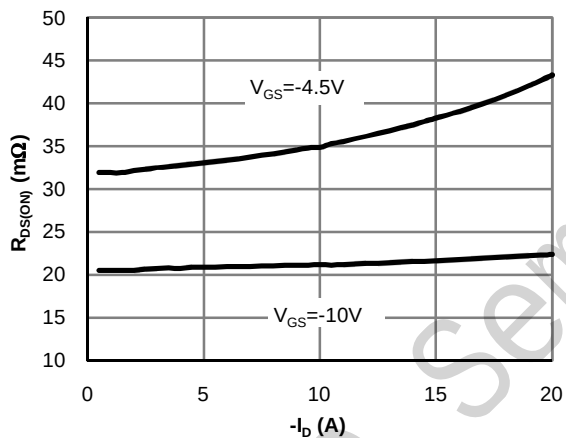


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

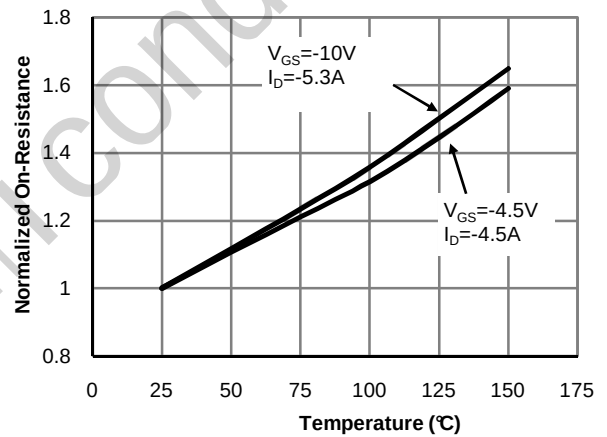


Figure 4: On-Resistance vs. Junction Temperature

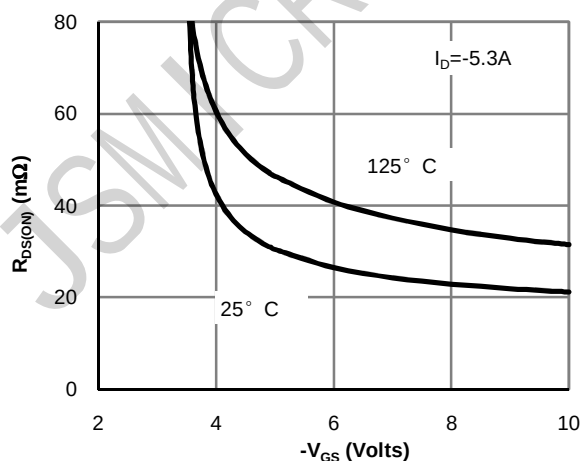


Figure 5: On-Resistance vs. Gate-Source Voltage

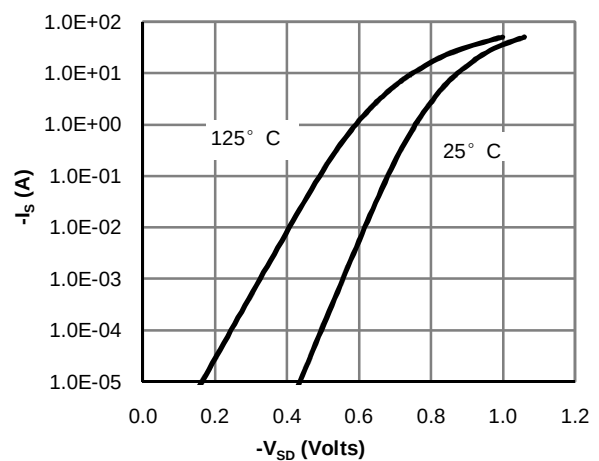
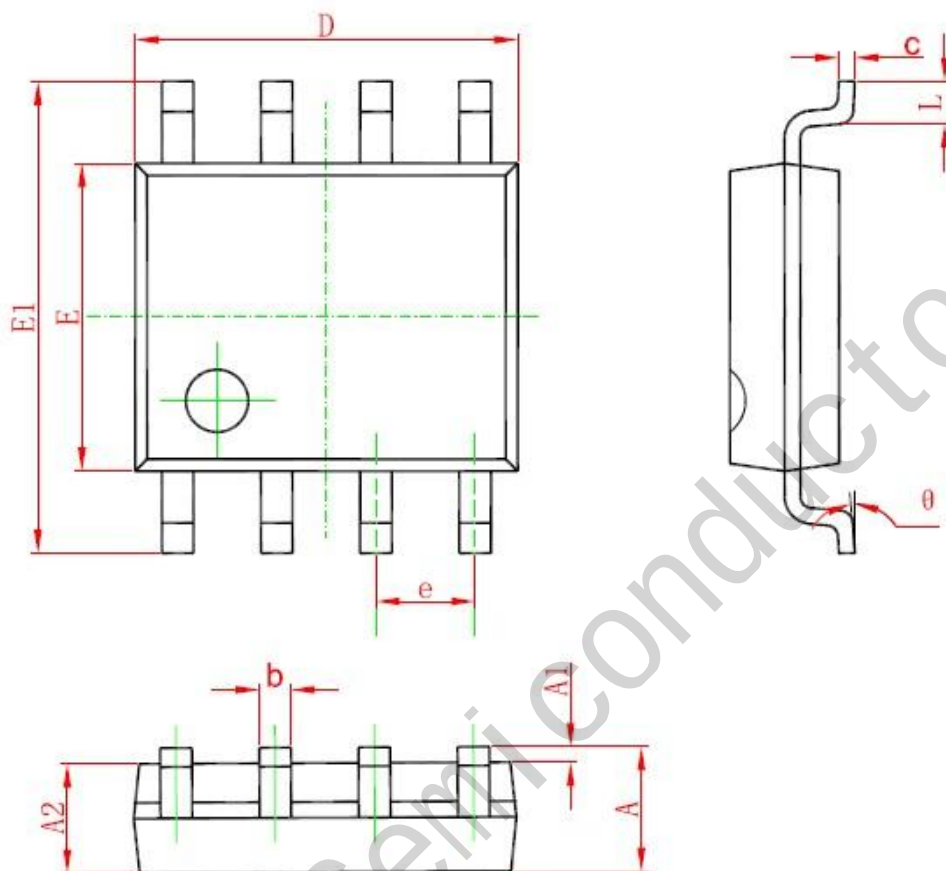


Figure 6: Body-Diode Characteristics

■ SOP8 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°