

## SuperMOS – SOP8 30V Complementary MOSFET

### 1. Description

The AO4606 uses advanced trench technology MOSFETs to provide excellent  $R_{DS(ON)}$  and low gate charge. The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications.

### 2. Features

- N-channel  
30V  $R_{DS(ON)}=15m\Omega(Typ)$ ,  $V_{GS}=10V$   
 $R_{DS(ON)}=24m\Omega(Typ)$ ,  $V_{GS}=4.5V$
- P-channel  
-30V  $R_{DS(ON)}=44m\Omega(Typ)$ ,  $V_{GS}=-10V$   
 $R_{DS(ON)}=60m\Omega(Typ)$ ,  $V_{GS}=-4.5V$
- Fast Switching
- High density cell design for low  $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

### 3. Applications

- PWM applications 100% UIS TESTED
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

### 4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
AO4606	SOP8	ES4606/LOT	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	13 inches

### 5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
2	Gate2		
1	Source2		
7/8	Drain2		
4	Gate1		
3	Source1		
5/6	Drain1		

## 6. Specification

### Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

Parameter	Symbol	Limit N-channel	Limit P-channel	Unit	
Drain-Source Voltage	$BV_{DSS}$	30	-30	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 20$	V	
Continuous Drain Current	$T_A=25^\circ\text{C}$	$I_D$	7.5	-4.6	A
	$T_A=75^\circ\text{C}$		5.8	-4	
Maximum Power Dissipation	$T_A=25^\circ\text{C}$	$P_D$	2	2	W
	$T_A=75^\circ\text{C}$		1.2	1.2	
Pulsed Drain Current	$I_{DM}$	30	-18.4	A	
Operating Junction Temperature	$T_J$	150		$^\circ\text{C}$	
Storage Temperature Range	$T_{stg}$	-55 to +150		$^\circ\text{C}$	

### Thermal resistance ratings

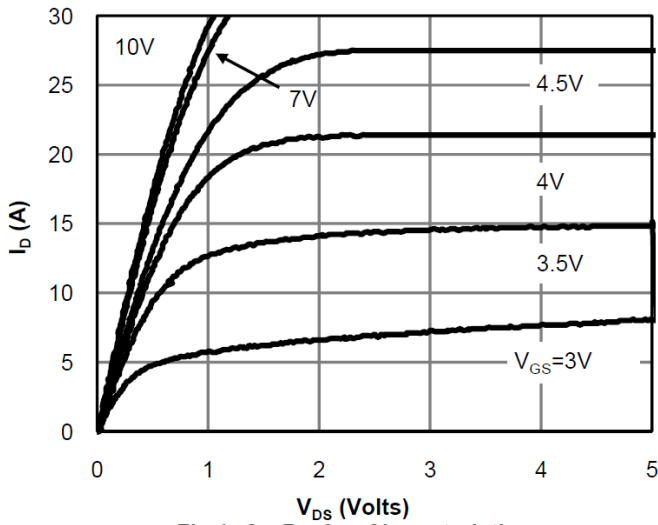
Single Operation				
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance ( $t \leq 10\text{s}$ )	$R_{\theta JA}$	48	62.5	$^\circ\text{C/W}$
Junction-to-Lead Thermal Resistance	$R_{\theta JL}$	32	40	

## 7. N-channel Electrical Characteristics

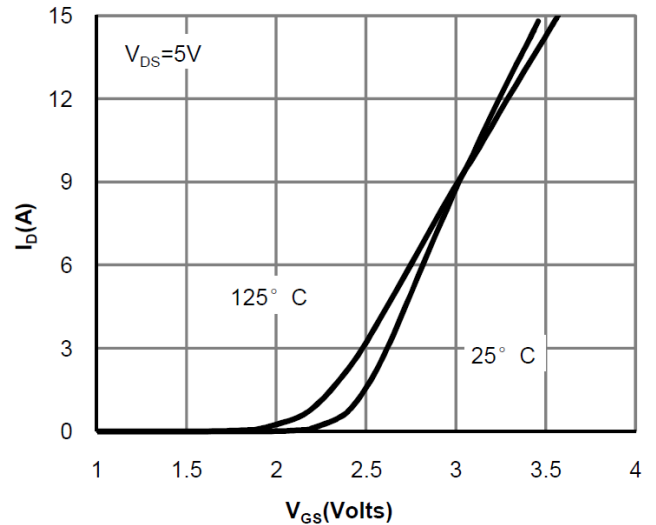
At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V$			1.0	$\mu A$
Gate-to-source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.5	2.2	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=6A$		15	22	m $\Omega$
		$V_{GS}=4.5V, I_D=5A$		24	36	
Forward Trans conductance	$g_{FS}$	$V_{DS}=5.0V, I_D=6A$			40	S
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, f=1MHz, V_{DS}=15V$		255		pF
Output Capacitance	$C_{OSS}$			45		
Reverse Transfer Capacitance	$C_{RSS}$			35		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=10V, V_{DS}=15V, I_D=6A$		5.2		nC
Gate-to-Source Charge	$Q_{GS}$			0.85		
Gate-to-Drain Charge	$Q_{GD}$			1.3		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=10V, V_{DS}=15V, R_L=25\Omega, R_{GEN}=3\Omega$		4.5		ns
Rise Time	$t_r$			2.5		
Turn-Off Delay Time	$t_{d(OFF)}$			14.5		
Fall Time	$t_f$			3.5		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1.0A$	0.45		1.2	V

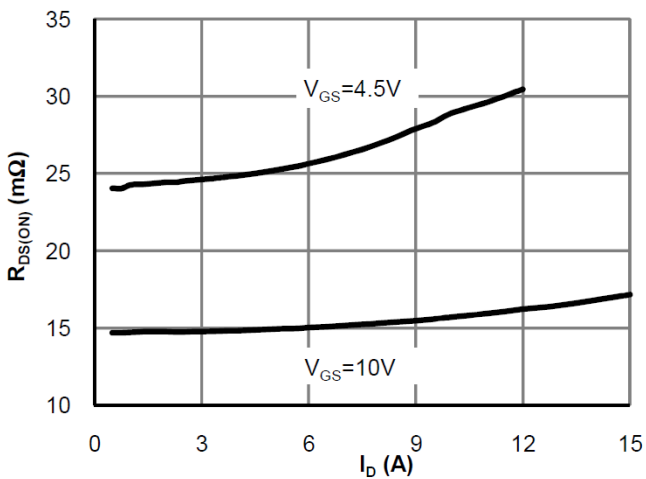
**8. N-channel Typical Characteristic**



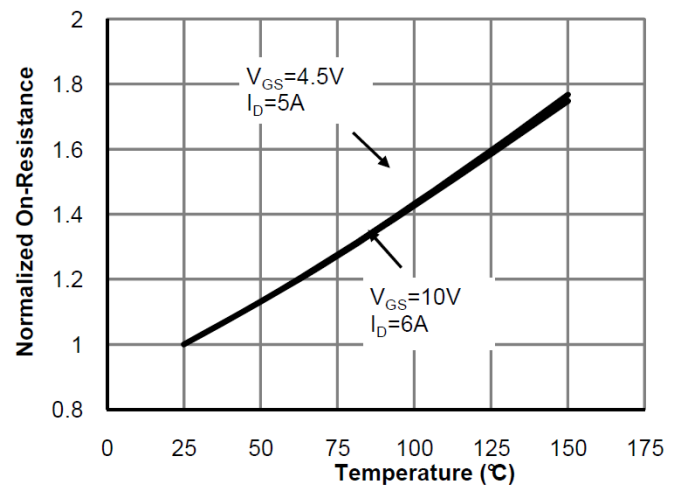
**Fig 1: On-Region Characteristics**



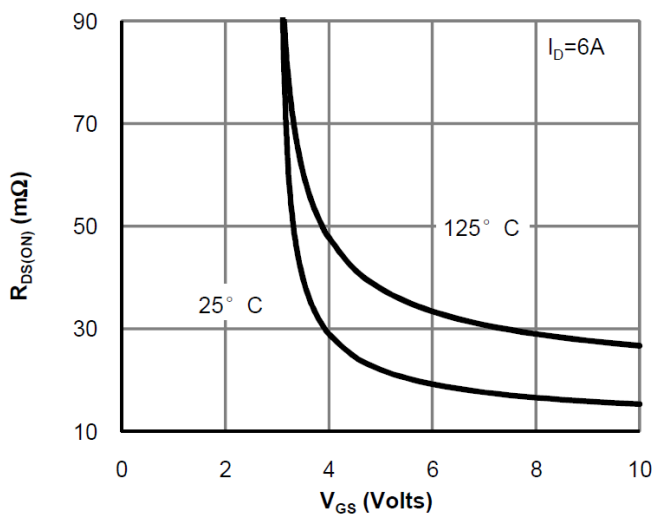
**Figure 2: Transfer Characteristics**



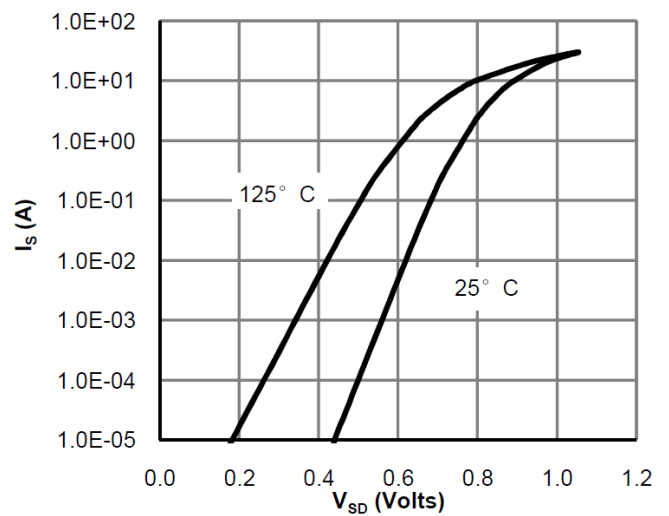
**Figure 3: On-Resistance vs. Drain Current and Gate Voltage**



**Figure 4: On-Resistance vs. Junction Temperature**



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



**Figure 6: Body-Diode Characteristics**

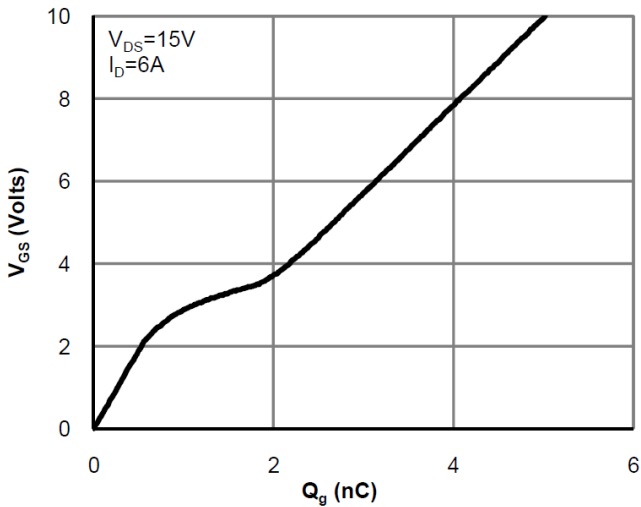


Figure 7: Gate-Charge Characteristics

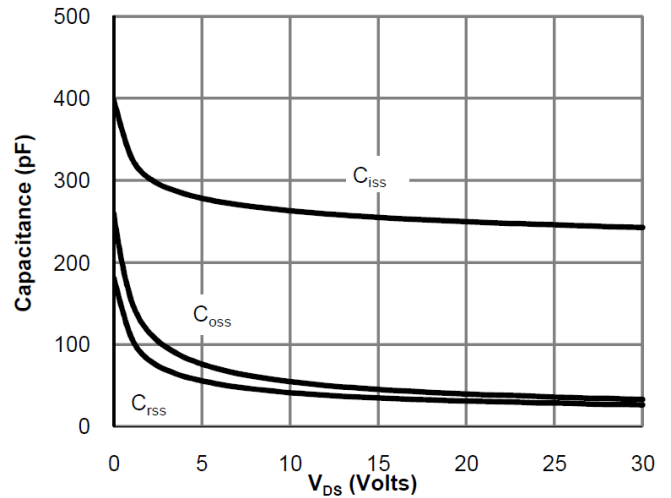


Figure 8: Capacitance Characteristics

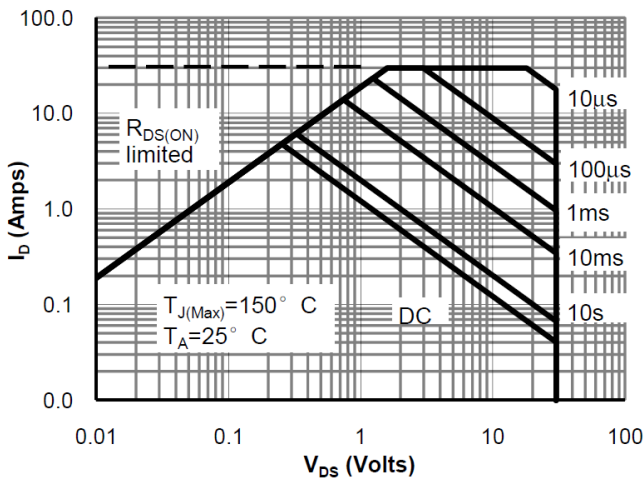


Figure 9: Maximum Forward Biased Safe Operating Area

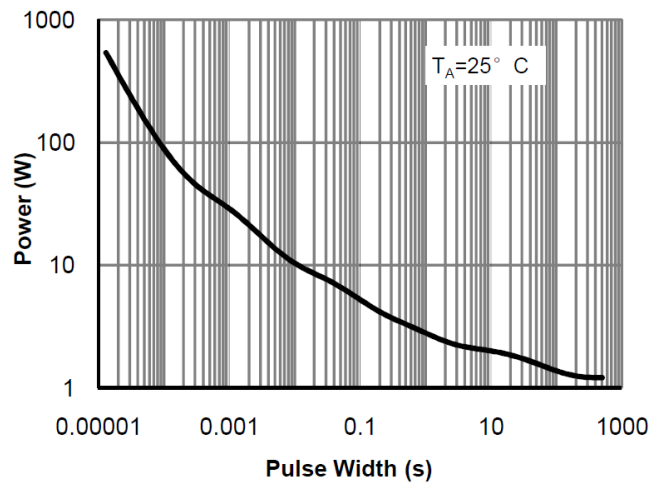


Figure 10: Single Pulse Power Rating Junction-to-Ambient

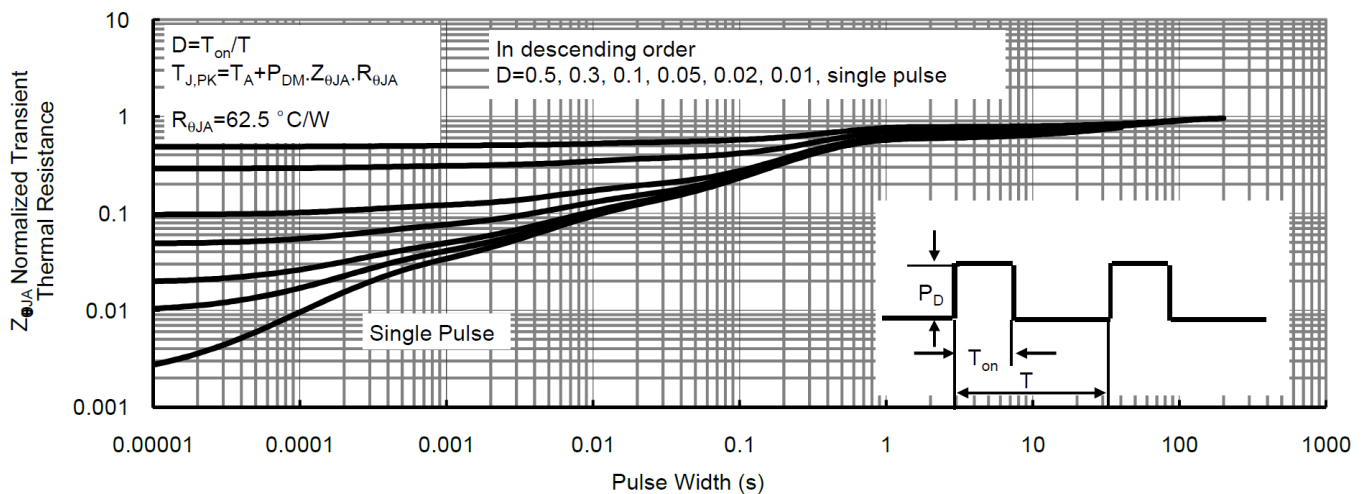


Figure 11: Normalized Maximum Transient Thermal Impedance

## 9. P-channel Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{GS}=0V, V_{DS}=-30V$			-1	$\mu A$
Gate-to-source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 1$	$\mu A$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.5	-2.0	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=-4.6A$		44	58	$m\Omega$
		$V_{GS}=-4.5V, I_D=-4A$		60	78	
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-4.6A$			40	S
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, V_{DS}=-15V$ $f=1MHz$		760		$pF$
Output Capacitance	$C_{OSS}$			140		
Reverse Transfer Capacitance	$C_{RSS}$			100		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=-10V, V_{DS}=-15V$ $I_D=-4.6A$		14		$nC$
Gate-to-Source Charge	$Q_{GS}$			2.5		
Gate-to-Drain Charge	$Q_{GD}$			3.4		
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=-10V, V_{DS}=-15V$ $R_L=2.5\Omega, R_G=3\Omega$		10		$ns$
Rise Time	$t_r$			8		
Turn-Off Delay Time	$t_{d(OFF)}$			18		
Fall Time	$t_f$			6		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_{SD}=-1.0A$	-4.5		-1.2	V

10. Typical Characteristic

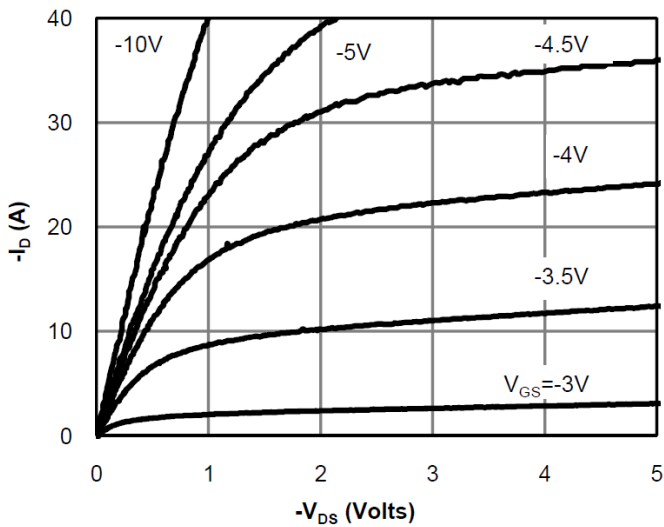


Fig 1: On-Region Characteristics

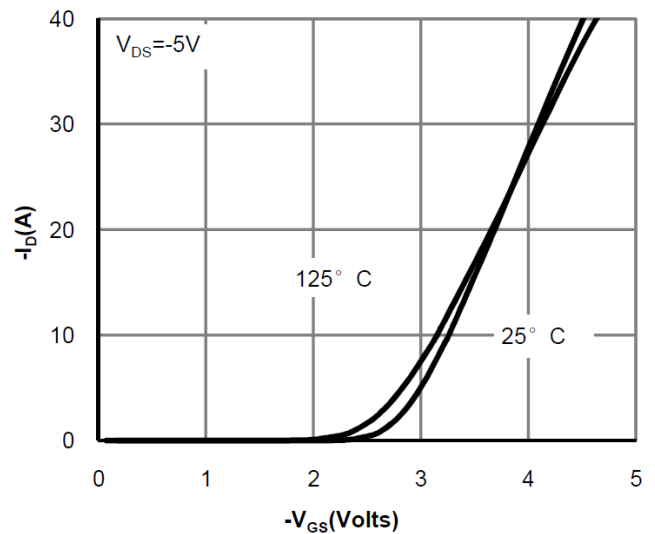


Figure 2: Transfer Characteristics

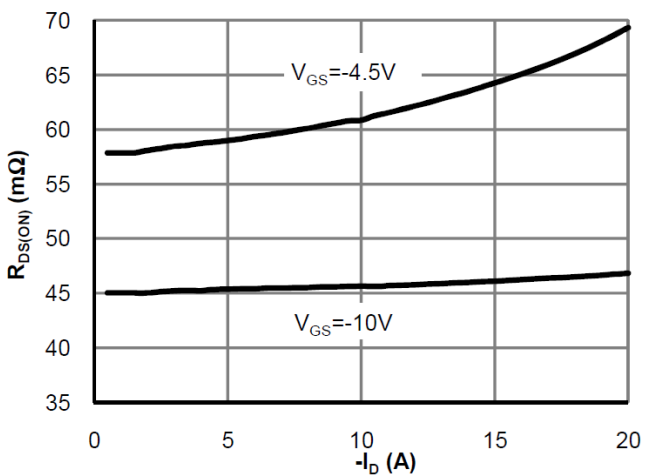


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

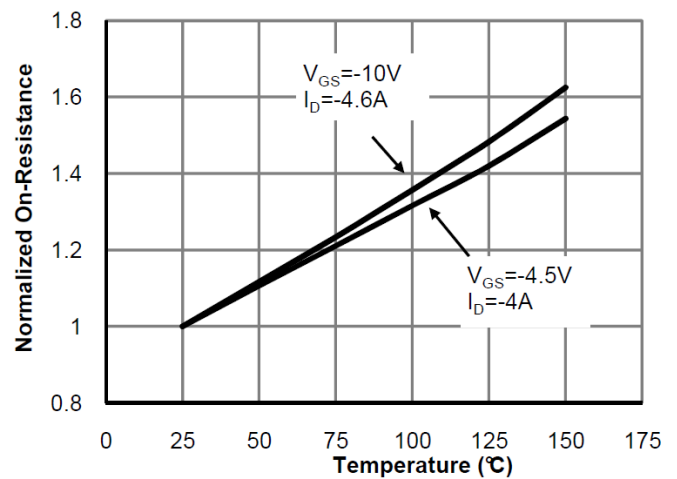


Figure 4: On-Resistance vs. Junction Temperature

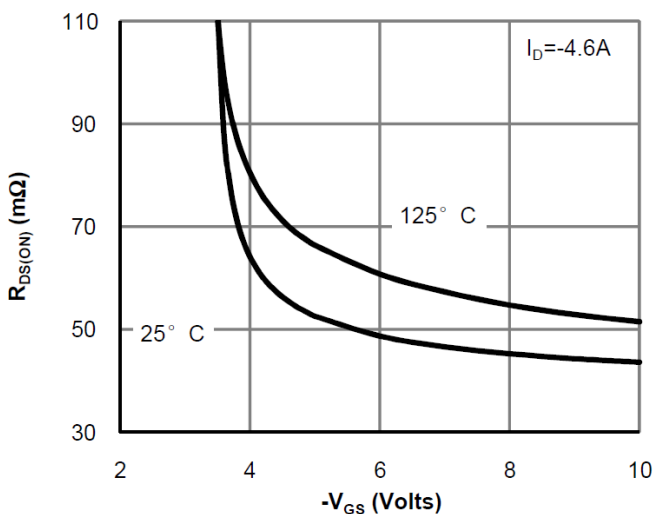


Figure 5: On-Resistance vs. Gate-Source Voltage

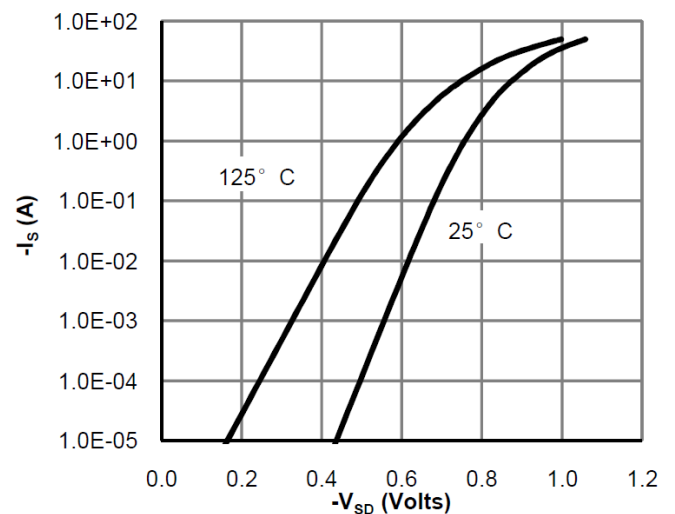


Figure 6: Body-Diode Characteristics

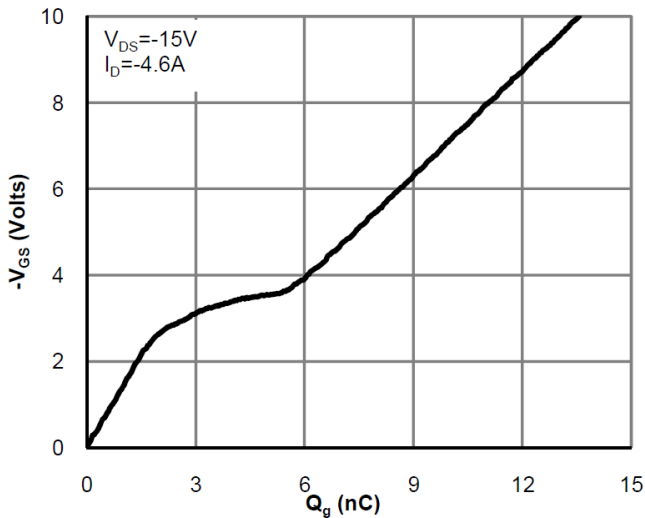


Figure 7: Gate-Charge Characteristics

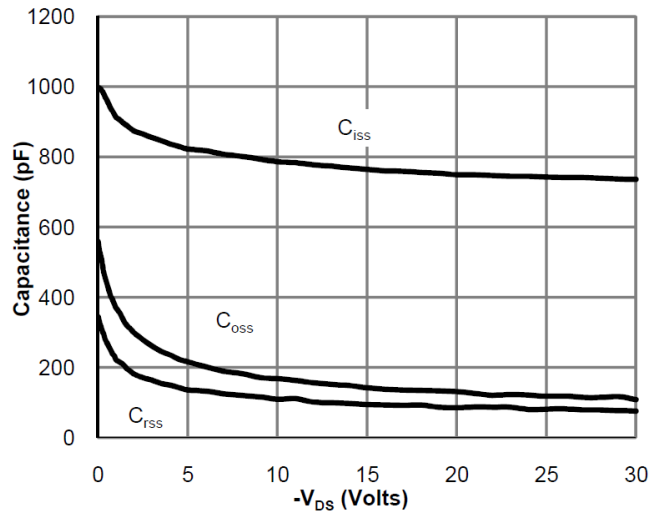


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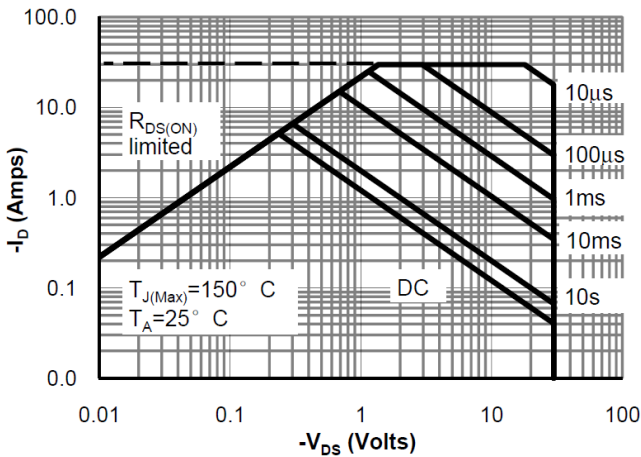


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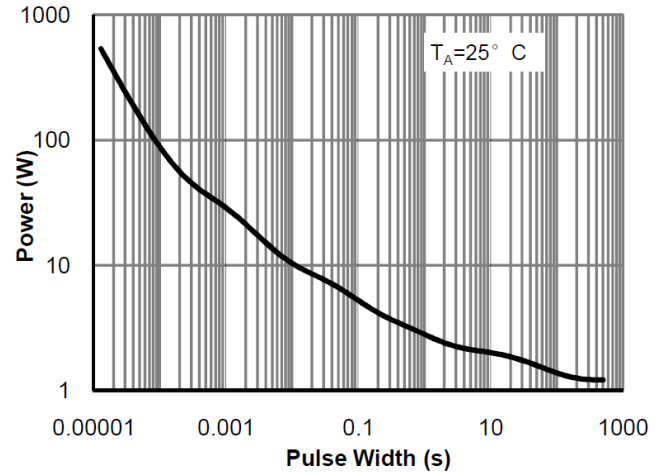


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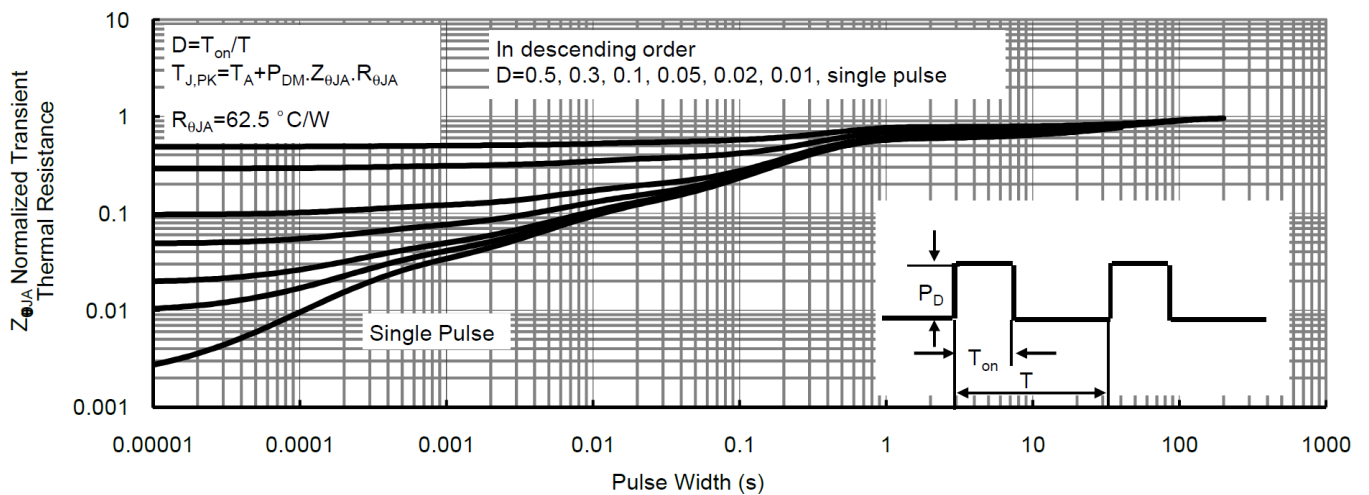
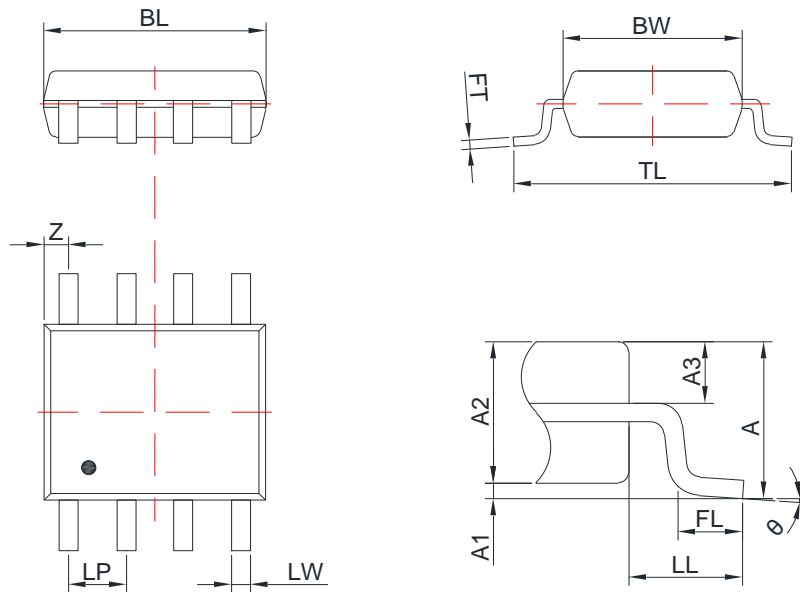


Figure 11: Normalized Maximum Transient Thermal Impedance



11. Dimension (SOP8)



COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
A	1.75		FL	0.50	0.80
A1	0.05	0.15	LP	1.25	1.30
A2	1.40	1.50	LL	1.1 BSC	
A3	0.623 BSC		LW	0.38	0.43
BL	4.92	5.80	TL	5.90	6.10
BW	3.70	4.10	Z	0.54	
FT	0.20	0.21	theta	0°	8°

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