

SuperMOS – SOP8 ±40V Complementary MOSFET

1. Description

The AO4614-ES 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
40V $R_{DS(ON)}=20m\Omega(Typ.) @V_{GS}=10V$
 $R_{DS(ON)}=28m\Omega(Typ.) @V_{GS}=4.5V$
- P-channel
-40V $R_{DS(ON)}=38m\Omega(Typ.) @V_{GS}=-10V$
 $R_{DS(ON)}=48m\Omega(Typ.) @V_{GS}=-4.5V$
- Fast Switching
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

3. Applications

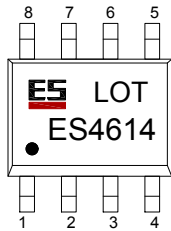
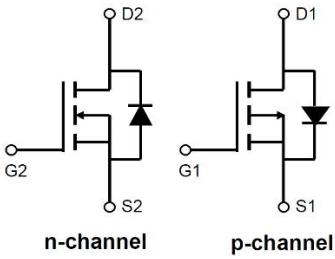
- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

100% UIS TESTED

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
AO4614-ES	SOP8	ES4614/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}	40	-40	V	
Gate-Source Voltage	V_{GS}	± 20	± 20	V	
Continuous Drain Current	I_D	$T_A=25^\circ\text{C}$	6.8	-5.0	A
		$T_A=75^\circ\text{C}$	5.2	-3.9	
Maximum Power Dissipation	P_D	$T_A=25^\circ\text{C}$	2	2	W
		$T_A=75^\circ\text{C}$	1.2	1.2	
Pulsed Drain Current	I_{DM}	27.2	-20	A	
Avalanche Current, Single Pulsed	I_{AS}	11 ^a	-16.5 ^b	A	
Avalanche Energy, Single Pulsed	E_{AS}	18 ^a	40 ^b	mJ	
Operating Junction Temperature	T_J	150		°C	
Storage Temperature Range	T_{stg}	-55 to +150		°C	

Thermal resistance ratings

Single Operation					
Parameter	Symbol	Device	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance ($t \leq 10\text{s}$)	$R_{\theta JA}$	n-ch	48	62.5	°C/W
Junction-to-Lead Thermal Resistance	$R_{\theta JL}$	n-ch	35	50	
Junction-to-Ambient Thermal Resistance ($t \leq 10\text{s}$)	$R_{\theta JA}$	p-ch	48	62.5	°C/W
Junction-to-Lead Thermal Resistance	$R_{\theta JL}$	p-ch	35	50	

Note:

a: $T_J=25^\circ\text{C}$, $V_{DD}=40\text{V}$, $V_G=10\text{V}$, $L=0.3\text{mH}$, $R_g=25\Omega$

b: $T_J=25^\circ\text{C}$, $V_{DD}=-40\text{V}$, $V_G=-10\text{V}$, $L=0.3\text{mH}$, $R_g=25\Omega$

7. N-channel Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=40V, V_{GS}=0V$			1.0	μA
Gate-to-source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
ON CHARACTERISTICS						
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	$R_{DS(on)}$	$V_{GS}=10V, I_D=6A$		20	25	m Ω
		$V_{GS}=4.5V, I_D=5A$		28	38	
Forward Trans conductance	g_{FS}	$V_{DS}=5.0V, I_D=6A$			40	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS}=0V, f=1MHz,$ $V_{DS}=20V$		410		pF
Output Capacitance	C_{OSS}			100		
Reverse Transfer Capacitance	C_{RSS}			35		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=10V, V_{DS}=20V,$ $I_D=6A$		8.5		nC
Gate-to-Source Charge	Q_{GS}			1.2		
Gate-to-Drain Charge	Q_{GD}			2.4		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=10V, V_{DS}=20V,$ $R_L=3.3\Omega, R_{GEN}=3\Omega$		4.4		ns
Rise Time	t_r			3.3		
Turn-Off Delay Time	$t_{d(OFF)}$			15.8		
Fall Time	t_f			3.2		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=1.0A$	0.45		1.5	V

8. N-channel Typical Characteristic

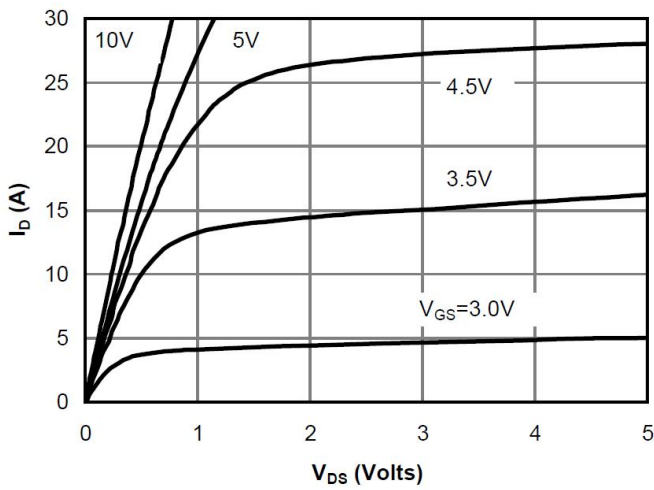


Fig 1: On-Region Characteristics

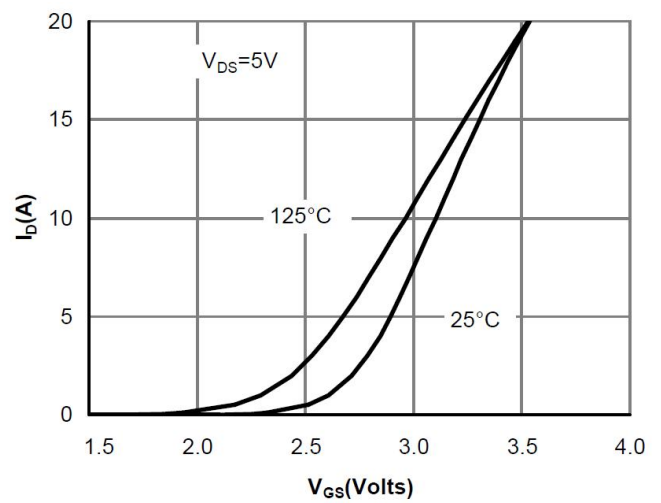


Figure 2: Transfer Characteristics

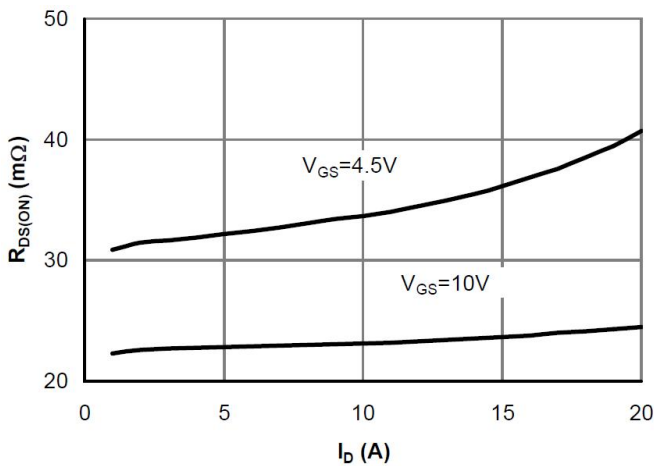


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

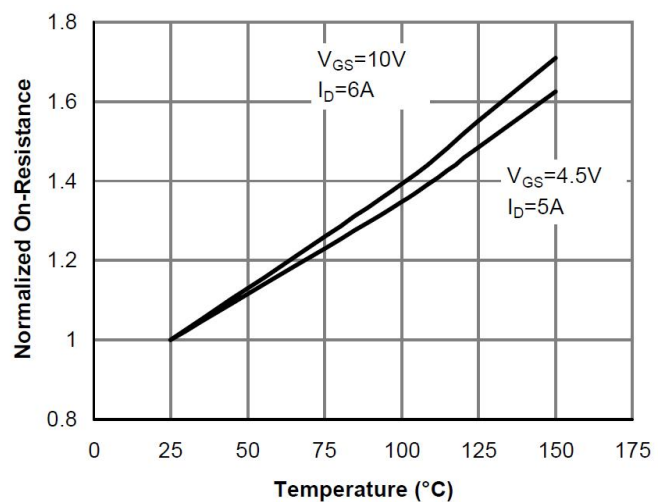


Figure 4: On-Resistance vs. Junction Temperature

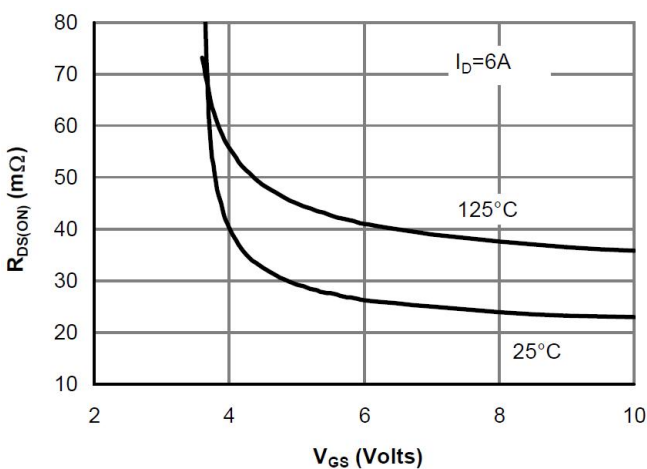


Figure 5: On-Resistance vs. Gate-Source Voltage

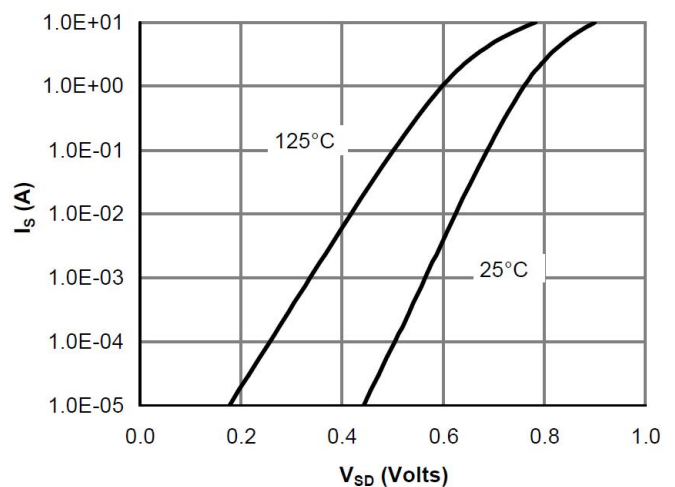


Figure 6: Body-Diode Characteristics

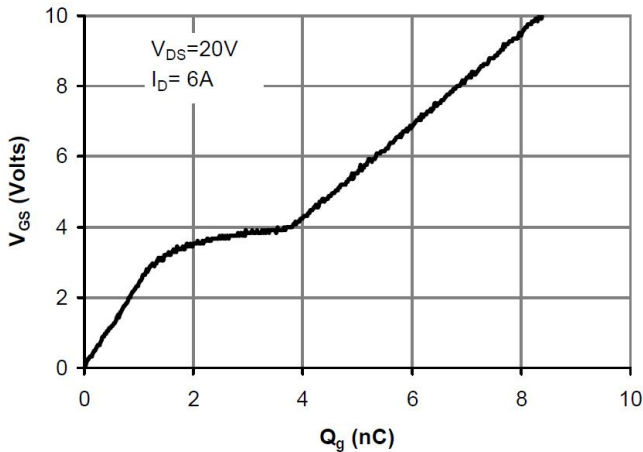


Figure 7: Gate-Charge Characteristics

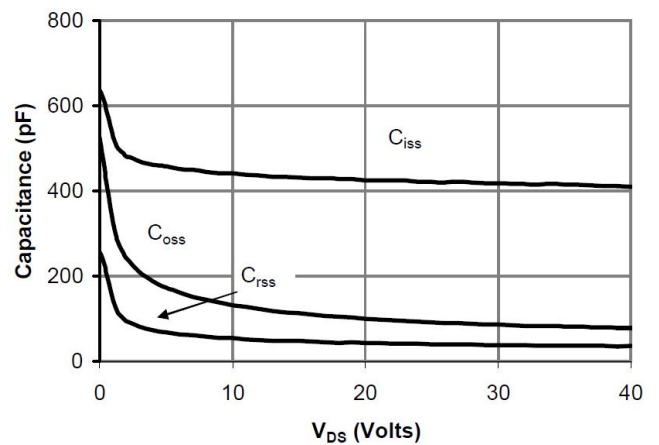


Figure 8: Capacitance Characteristics

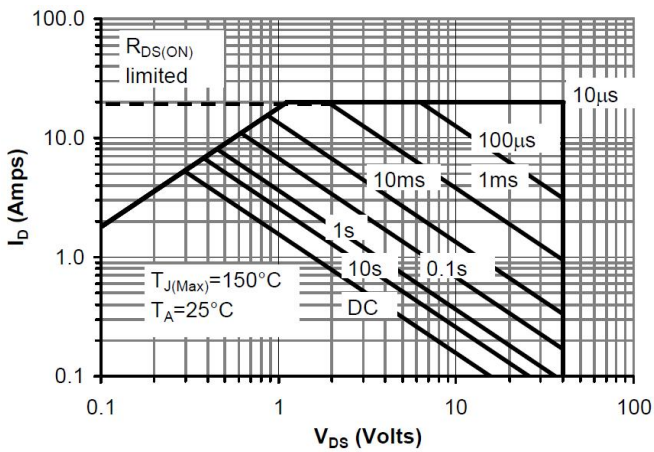


Figure 9: Maximum Forward Biased Safe Operating Area

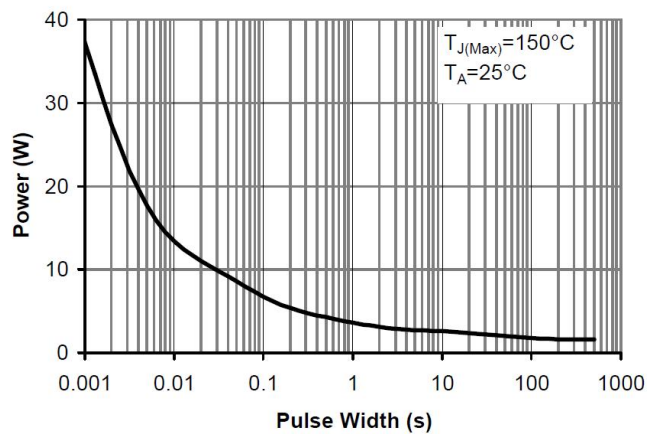


Figure 10: Single Pulse Power Rating Junction-to-Ambient

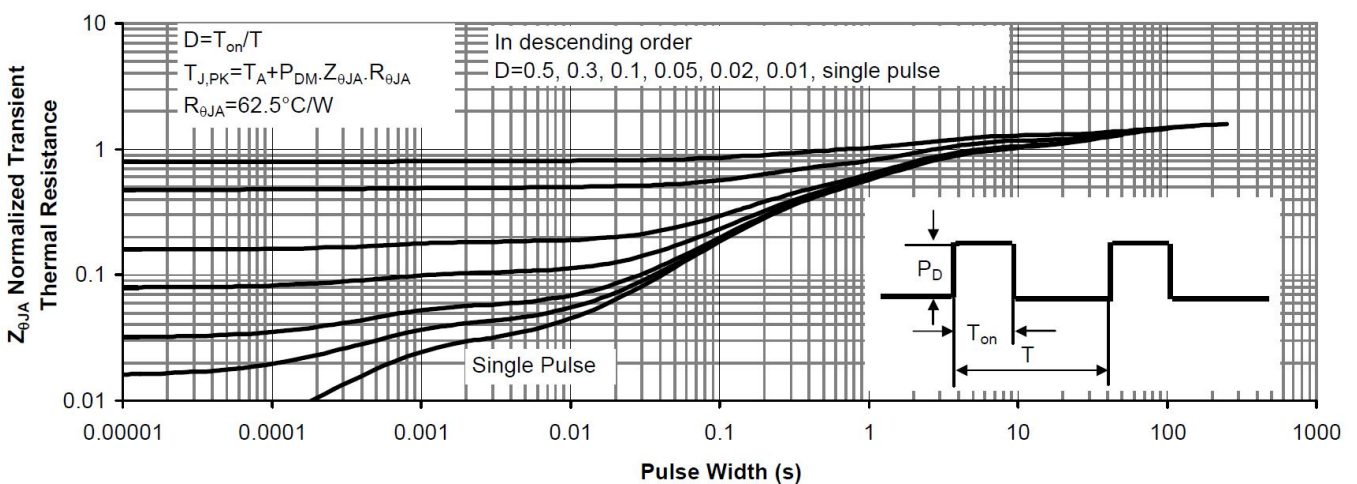


Figure 11: Normalized Maximum Transient Thermal Impedance

9. P-channel Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-40			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0V, V_{DS}=-40V$			-1	μA
Gate-to-source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 1	μA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.55	-2.5	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=-5A$		38	52	$m\Omega$
		$V_{GS}=-4.5V, I_D=-4A$		48	64	
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-5A$			40	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=-20V$ $f=1MHz$		660		pF
Output Capacitance	C_{OSS}			140		
Reverse Transfer Capacitance	C_{RSS}			65		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=-10V, V_{DS}=-20V$ $I_D=-5A$		13.5		nC
Gate-to-Source Charge	Q_{GS}			2		
Gate-to-Drain Charge	Q_{GD}			4		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=-10V, V_{DS}=-20V$ $R_L=4\Omega, R_G=3\Omega$		7.5		ns
Rise Time	t_r			6.6		
Turn-Off Delay Time	$t_{d(OFF)}$			26		
Fall Time	t_f			11.5		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS}=0V, I_{SD}=-1.0A$	-4.5		-1.5	V

10. Typical Characteristic

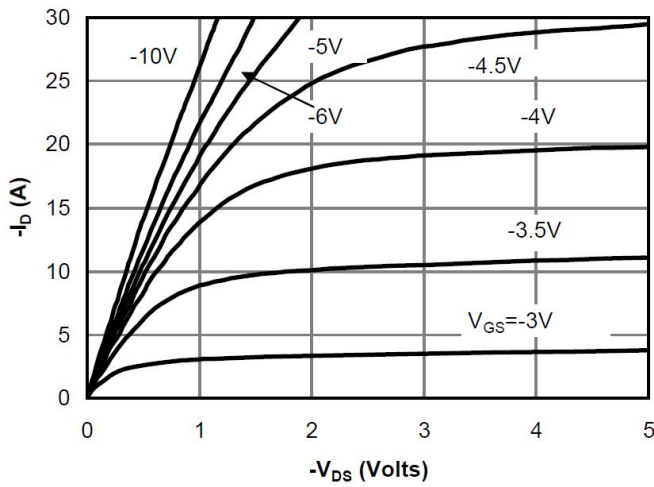


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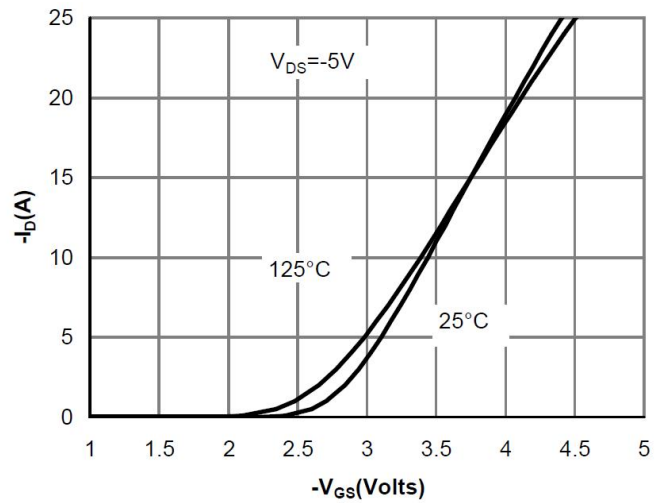


Figure 2: Transfer Characteristics

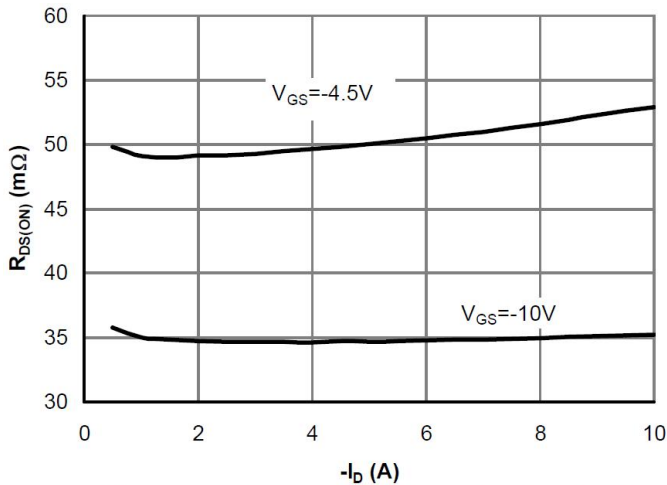


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

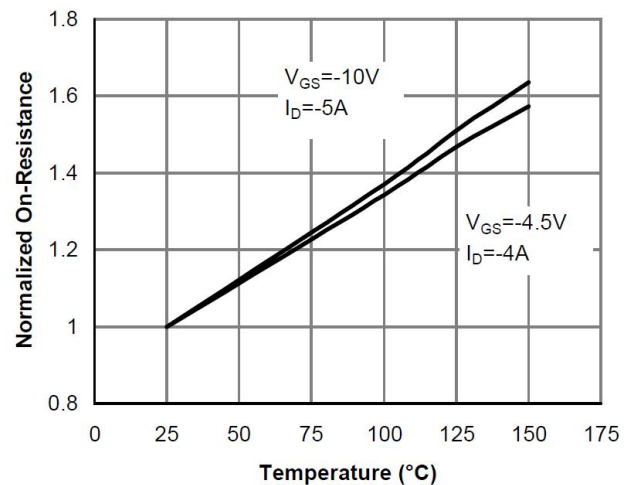


Figure 4: On-Resistance vs. Junction Temperature

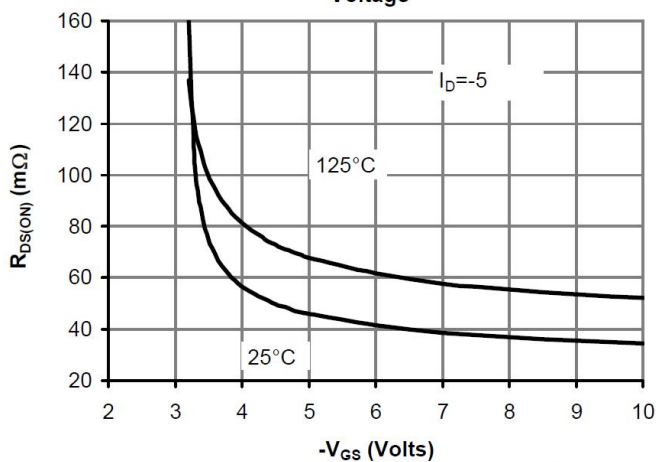


Figure 5: On-Resistance vs. Gate-Source Voltage

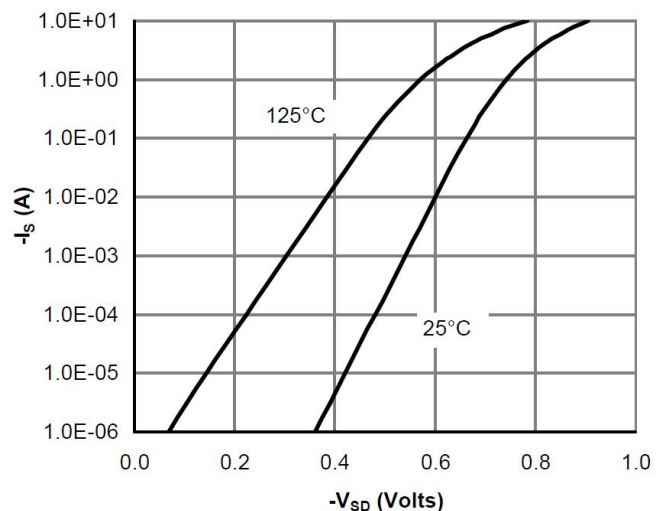


Figure 6: Body-Diode Characteristics

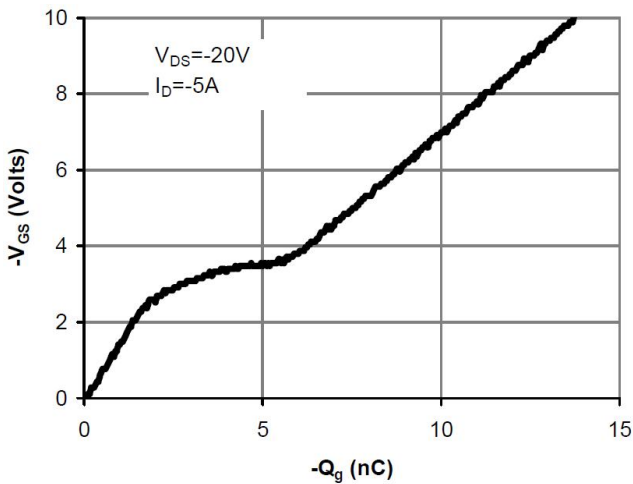


Figure 7: Gate-Charge Characteristics

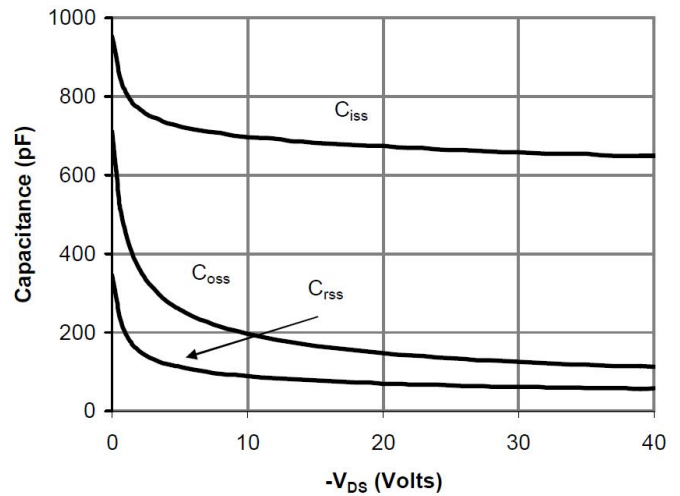


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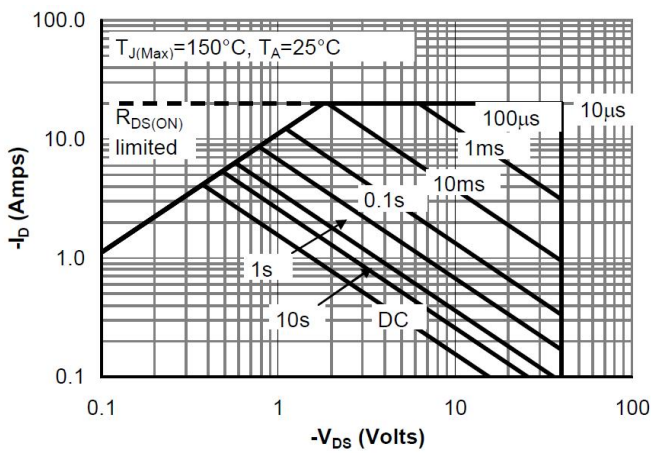


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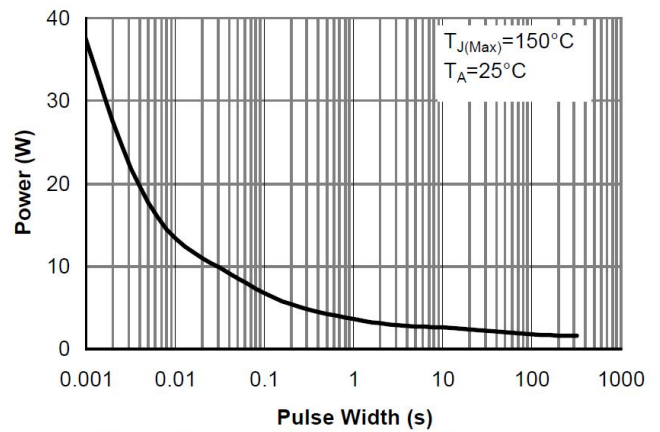


Figure 10: Single Pulse Power Rating Junction-to-Ambient

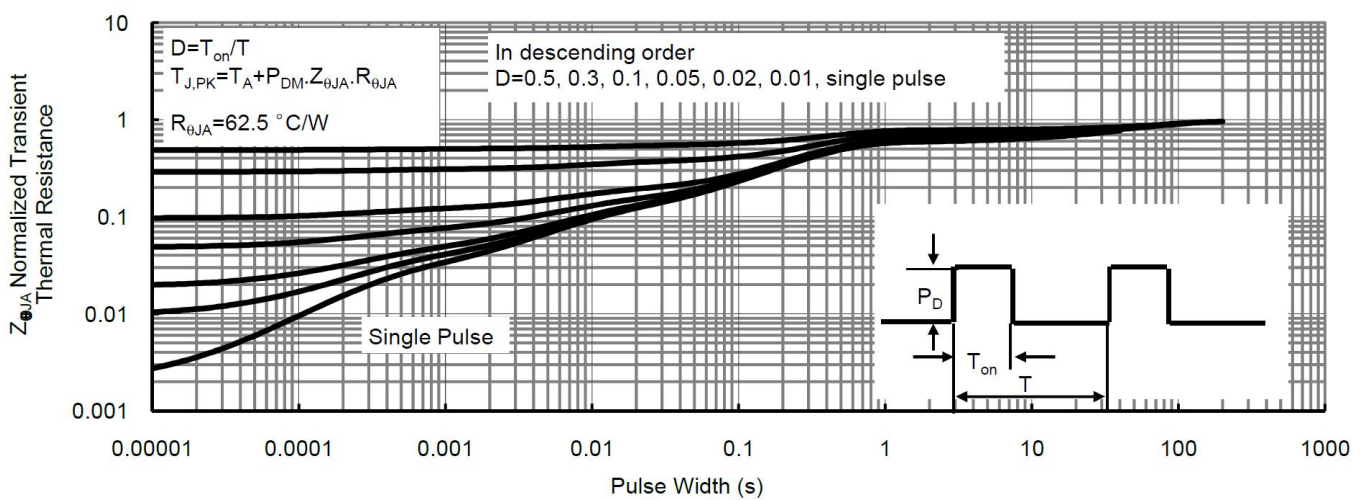
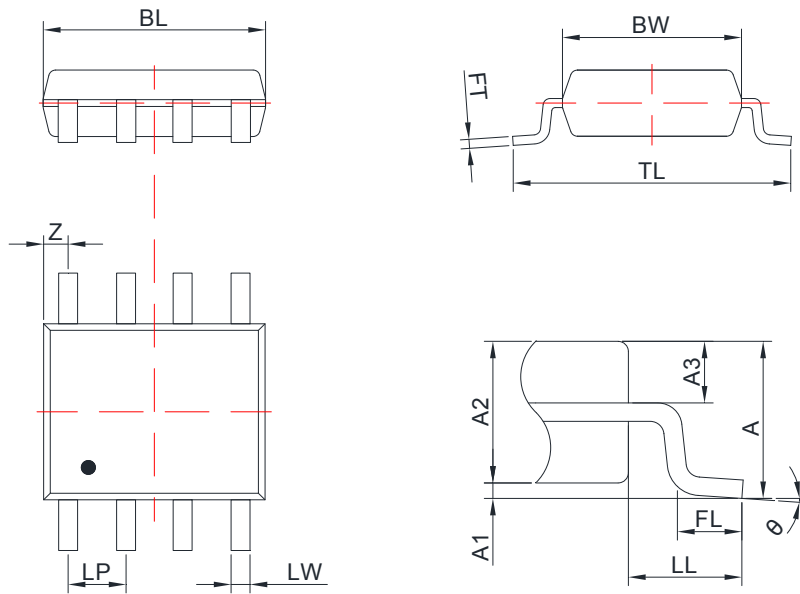


Figure 11: Normalized Maximum Transient Thermal Impedance

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	4.80	5.00	TL	5.90	6.10
BW	3.70	4.10	Z	0.54	
FT	0.20	0.21	θ	0°	8°

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