

**SuperMOS – SOP8 40V 20mΩ R<sub>DS(ON)</sub>, N-channel MOSFET**

**1. Description**

The AO4840-ES is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent R<sub>DS(ON)</sub> with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product AO4840-ES is Pb-free.

**2. Features**

- 40V R<sub>DS(ON)</sub>=20mΩ(Typ.) @V<sub>GS</sub>=10V  
R<sub>DS(ON)</sub>=28mΩ(Typ.) @V<sub>GS</sub>=4.5V
- Fast Switching
- High density cell design for low R<sub>DS(on)</sub>
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

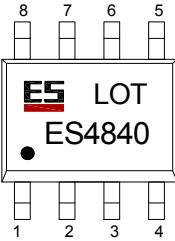
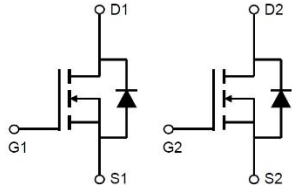
**3. Applications**

- 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
AO4840-ES	SOP8	ES4840/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	Limited	Unit
Drain-Source Voltage	$BV_{DSS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$T_A=25^\circ\text{C}$	6.8
		$T_A=75^\circ\text{C}$	5.2
Maximum Power Dissipation	$P_D$	$T_A=25^\circ\text{C}$	2
		$T_A=75^\circ\text{C}$	1.2
Pulsed Drain Current	$I_{DM}$	27.2	A
Avalanche Current, Single Pulsed <sup>a</sup>	$I_{AS}$	11	A
Avalanche Energy, Single Pulsed <sup>a</sup>	$E_{AS}$	18	mJ
Operating Junction Temperature	$T_J$	150	°C
Storage Temperature Range	$T_{stg}$	-55 to +150	°C

#### Thermal resistance ratings

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

Note:

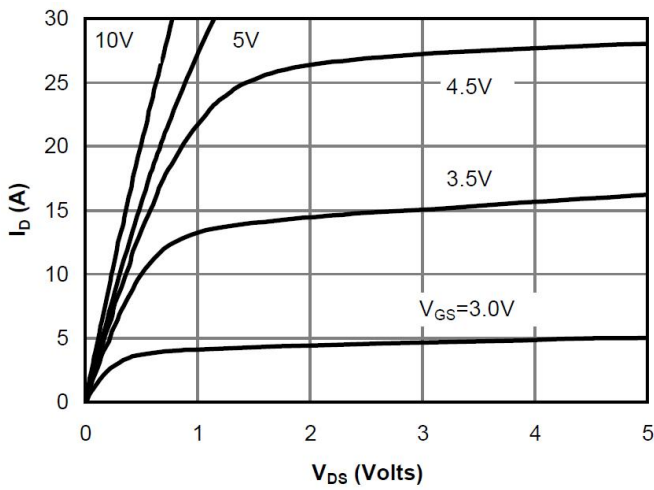
a:  $T_J=25^\circ\text{C}$ ,  $V_{DD}=40\text{V}$ ,  $V_G=10\text{V}$ ,  $L=0.3\text{mH}$ ,  $R_g=25\Omega$

## N-channel Electrical Characteristics

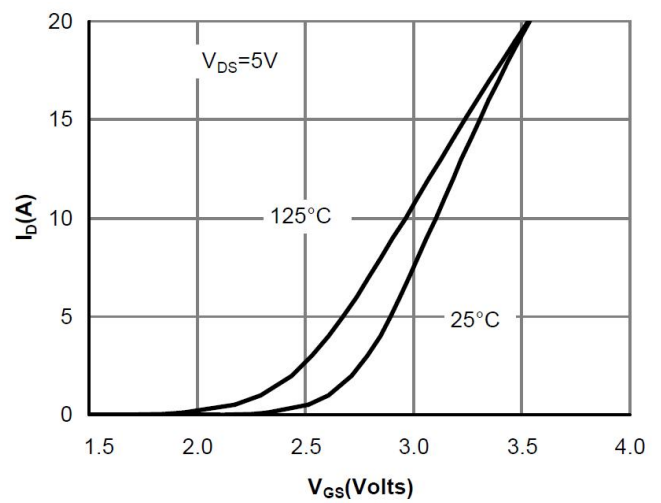
At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	40			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V$			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	$R_{DS(on)}$	$V_{GS}=10V, I_D=6A$		20	25	m $\Omega$
		$V_{GS}=4.5V, I_D=5A$		28	38	
Forward Trans conductance	$g_{FS}$	$V_{DS}=5.0V, I_D=6A$			40	S
<b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b>						
Input Capacitance	$C_{ISS}$	$V_{GS}=0V, f=1MHz,$ $V_{DS}=20V$		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		
<b>SWITCHING CHARACTERISTICS</b>						
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		
<b>BODY DIODE CHARACTERISTICS</b>						
Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1.0A$	0.45		1.5	V

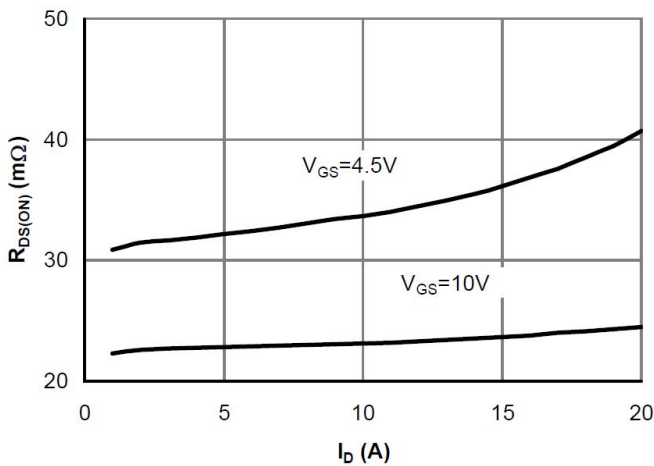
**7. N-channel Typical Characteristic**



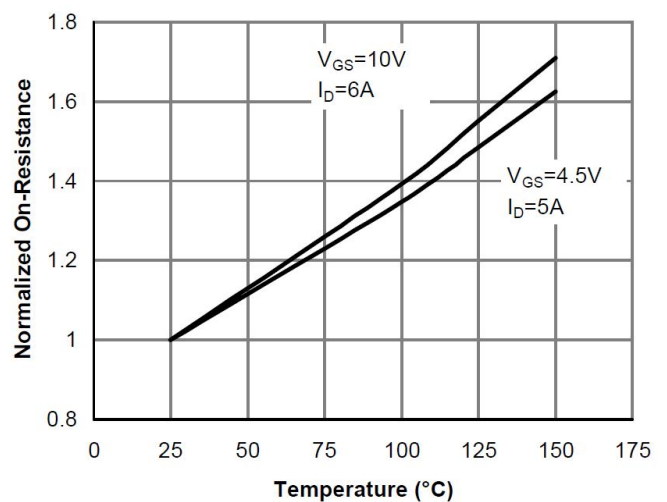
**Fig 1: On-Region Characteristics**



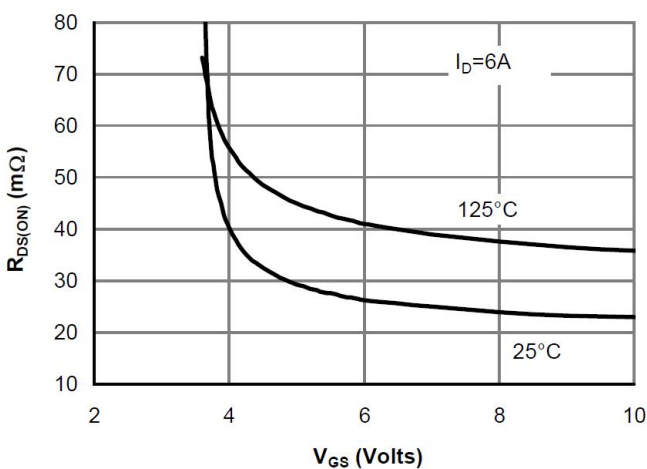
**Figure 2: Transfer Characteristics**



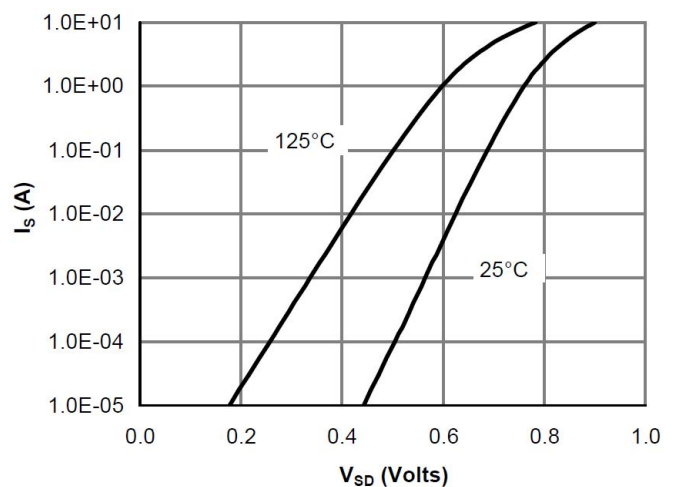
**Figure 3: On-Resistance vs. Drain Current and Gate Voltage**



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



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



**Figure 6: Body-Diode Characteristics**

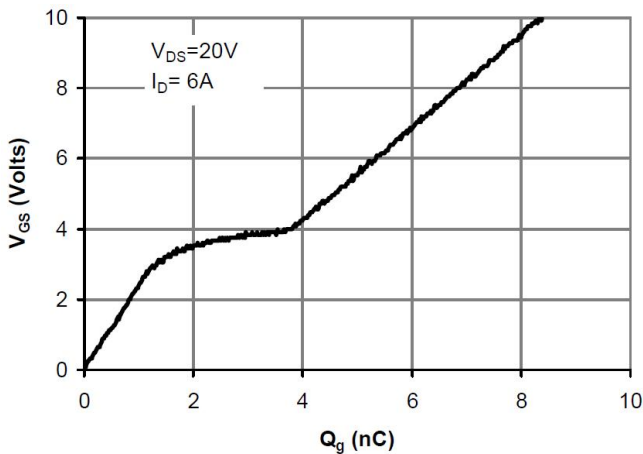


Figure 7: Gate-Charge Characteristics

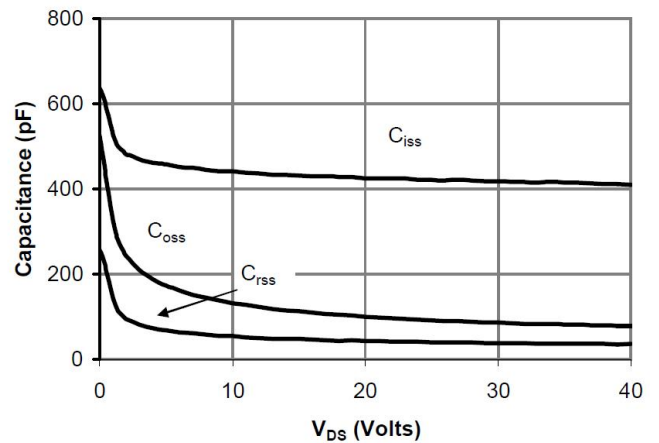


Figure 8: Capacitance Characteristics

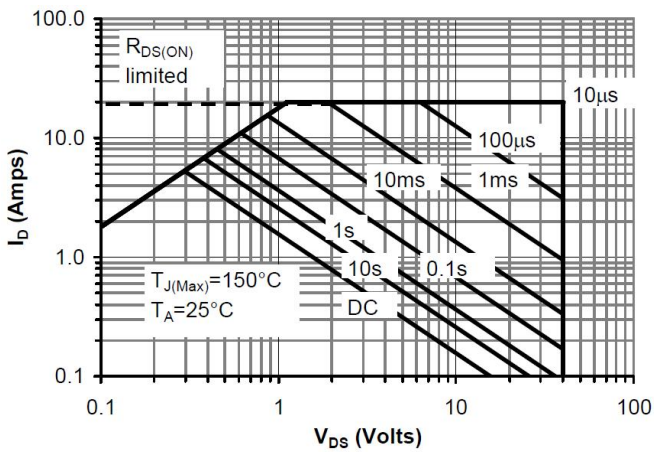


Figure 9: Maximum Forward Biased Safe Operating Area

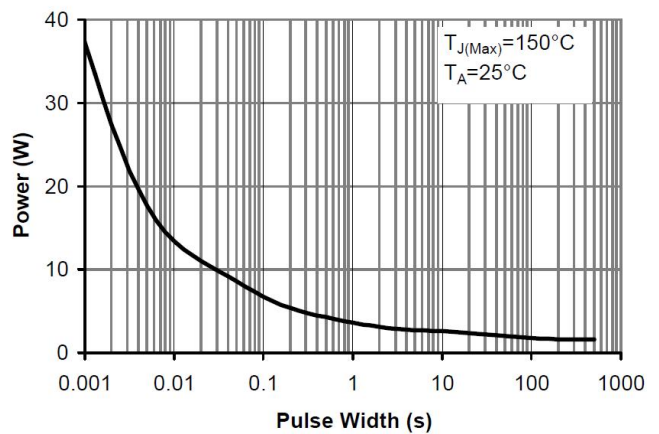


Figure 10: Single Pulse Power Rating Junction-to-Ambient

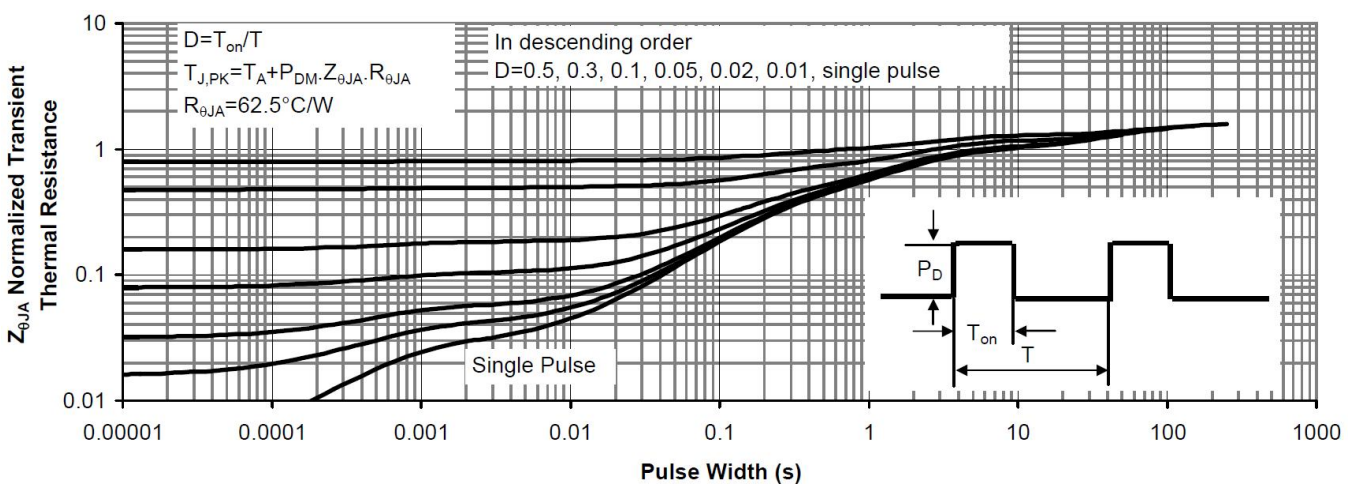
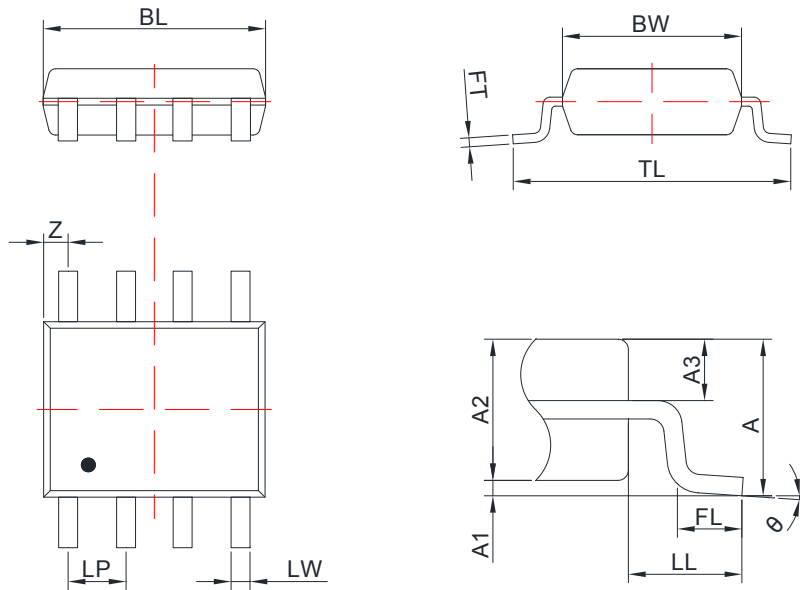


Figure 11: Normalized Maximum Transient Thermal Impedance

**8. 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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