

SuperMOS – SOP8 -30V 6.8mΩ R_{DS(ON)}, P-channel MOSFET

1. Description

The AO4409-ES uses advanced trench technology MOSFETs to provide excellent R_{DS(ON)} and low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product AO4409-ES Pb-free

2. Features

- -30V R_{DS(ON)}=6.8mΩ(Typ.) @V_{GS}=-10V
R_{DS(ON)}=9.5mΩ(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

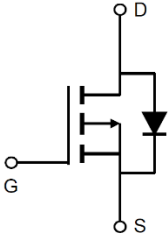
- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

100% UIS TESTED

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
AO4409-ES	SOP8	ES4409A/LOT	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	13 inches

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
4	Gate	Note b 	
1/2/3	Source		
5/6/7/8	Drain		

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}	-30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	$T_A=25^{\circ}\text{C}$	I_D	-14	A
	$T_A=100^{\circ}\text{C}$		-8.8	
Maximum Power Dissipation	$T_A=25^{\circ}\text{C}$	P_D	3	W
	$T_A=100^{\circ}\text{C}$		1.2	
Pulsed Drain Current		I_{DM}	-53	A
Single Pulse Avalanche Current ^a		I_{AS}	-40	A
Single Pulse Avalanche Energy ^a		E_{AS}	80	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	$R_{\theta JA}$		41.6	°C/W

Notes:

a: The EAS data shows Max. rating The test condition is $V_{DD} = -25\text{V}$, $V_{GS} = -10\text{V}$, $L = 0.1\text{mH}$

b: This diagram is only an electrical schematic, and the actual pin size is based on POD.

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 =-250uA	-30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} =0V, V _{DS} =-30V			-1	uA
Gate-to-source Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =-250uA	-1.0	-1.7	-2.5	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =-10V, I _D =-12A		6.8	9	mΩ
		V _{GS} =-4.5V, I _D =-10A		9.5	14	
Forward Transconductance	g _{FS}	V _{DS} =-10V, I _D =-10A		50		S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =-15V f=1MHz		3100		pF
Output Capacitance	C _{OSS}			430		
Reverse Transfer Capacitance	C _{RSS}			358		
Total Gate Charge	Q _{G(TOT)}	V _{GS} =-10V, V _{DS} =-15V I _D =-12A		35		nC
Gate-to-Source Charge	Q _{GS}			10		
Gate-to-Drain Charge	Q _{GD}			10.5		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =-10V, V _{DS} =-15V I _D =-12A, R _G =3Ω		11		ns
Rise Time	t _r			13.3		
Turn-Off Delay Time	t _{d(OFF)}			74		
Fall Time	t _f			35		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _{SD} =-10A	-0.45		-1.5	V

7. Typical Characteristic

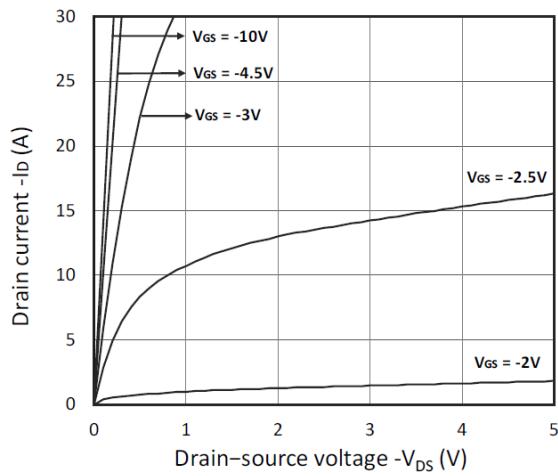


Figure 1. Output Characteristics

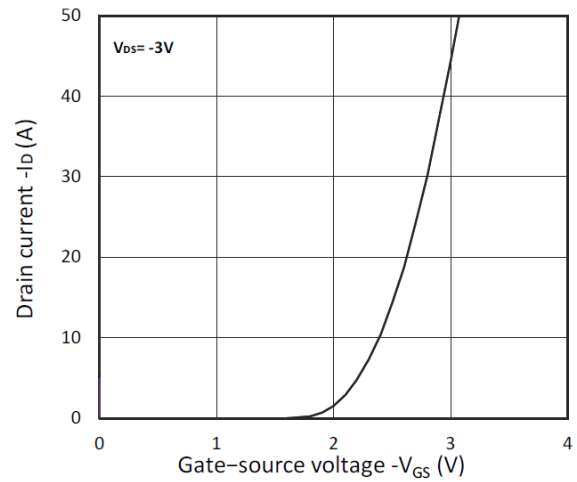


Figure 2. Transfer Characteristics

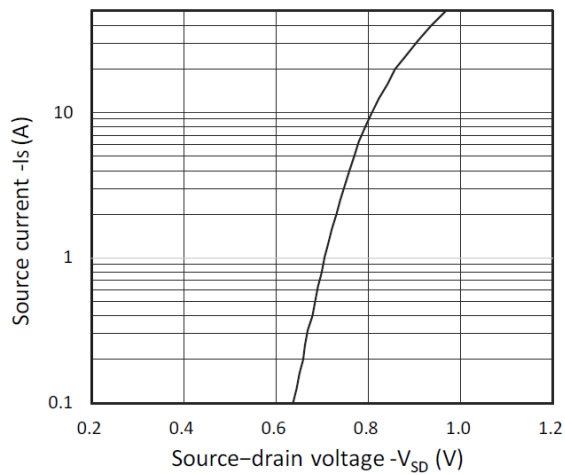
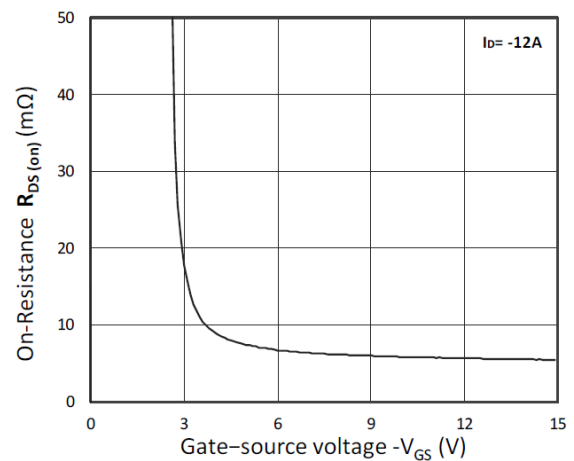
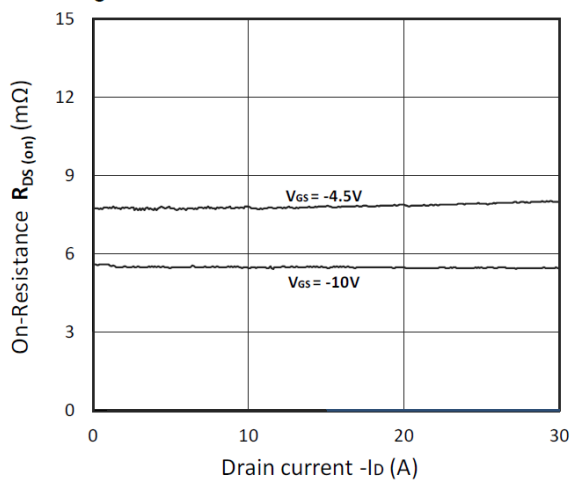
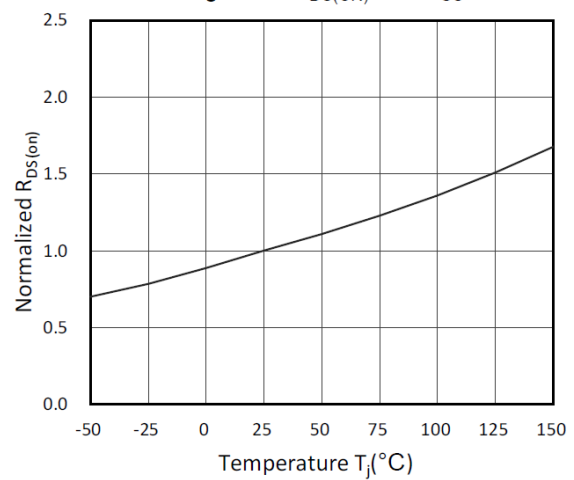


Figure 3. Forward Characteristics of Reverse

Figure 4. $R_{DS(on)}$ vs. V_{GS} Figure 5. $R_{DS(on)}$ vs. I_D Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

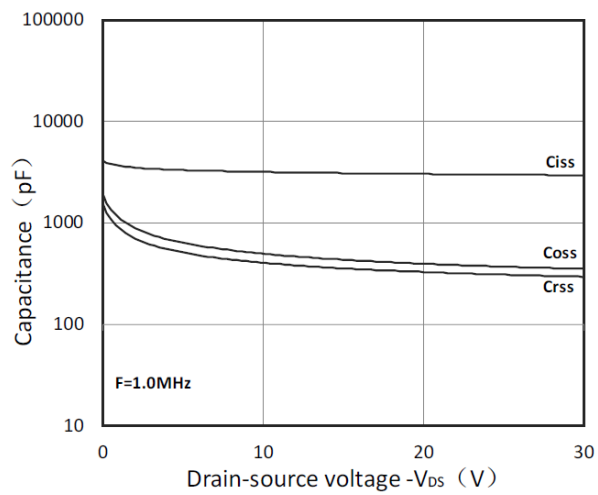
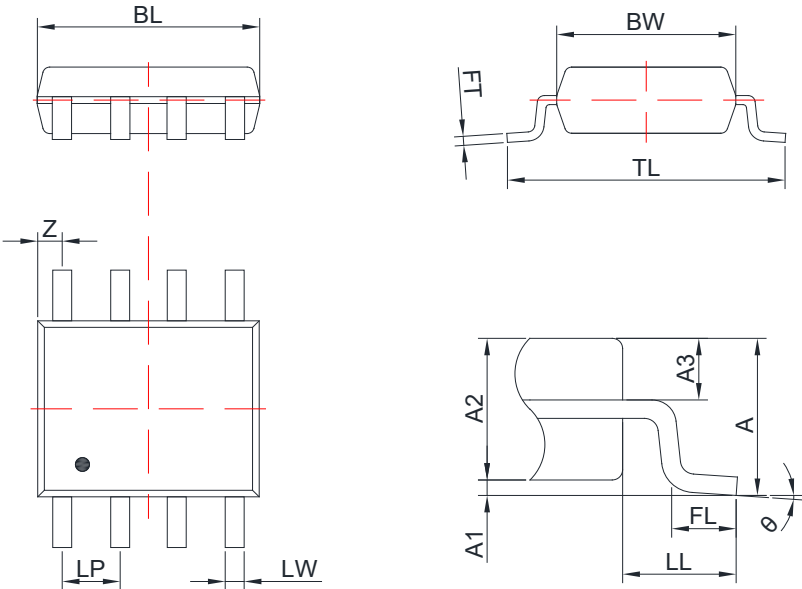


Figure 7. Capacitance Characteristics

8. Dimension (SOP8)

POD A(Y)



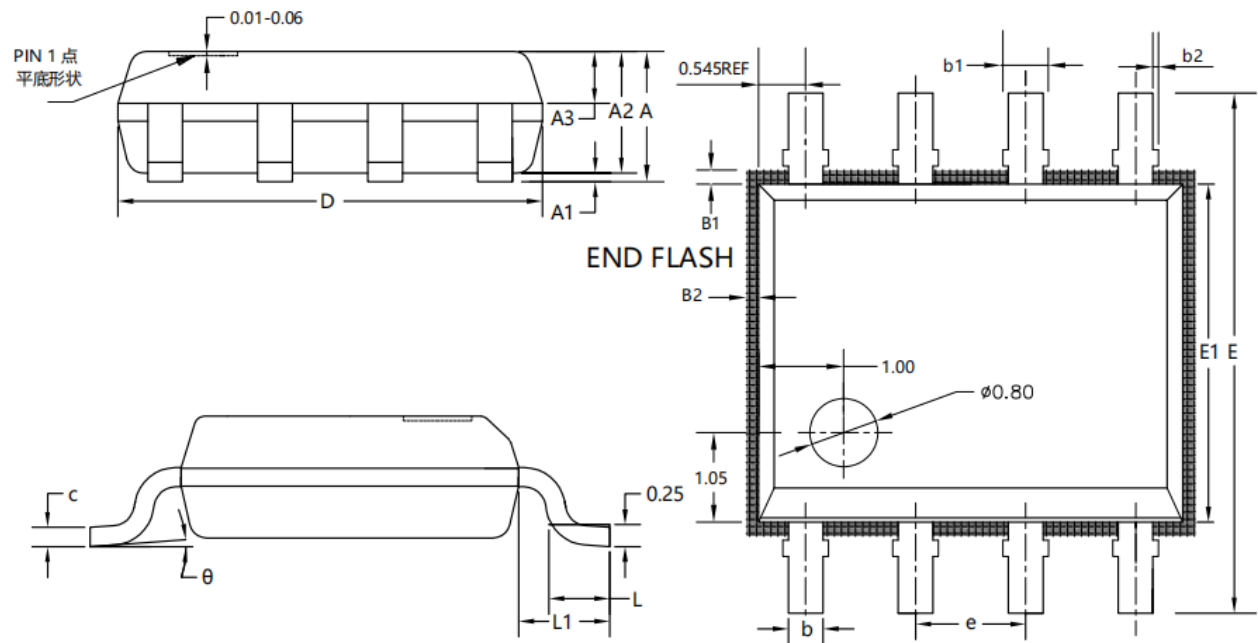
COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

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

AO4409-ES

Rev-1.3

POD B(C)



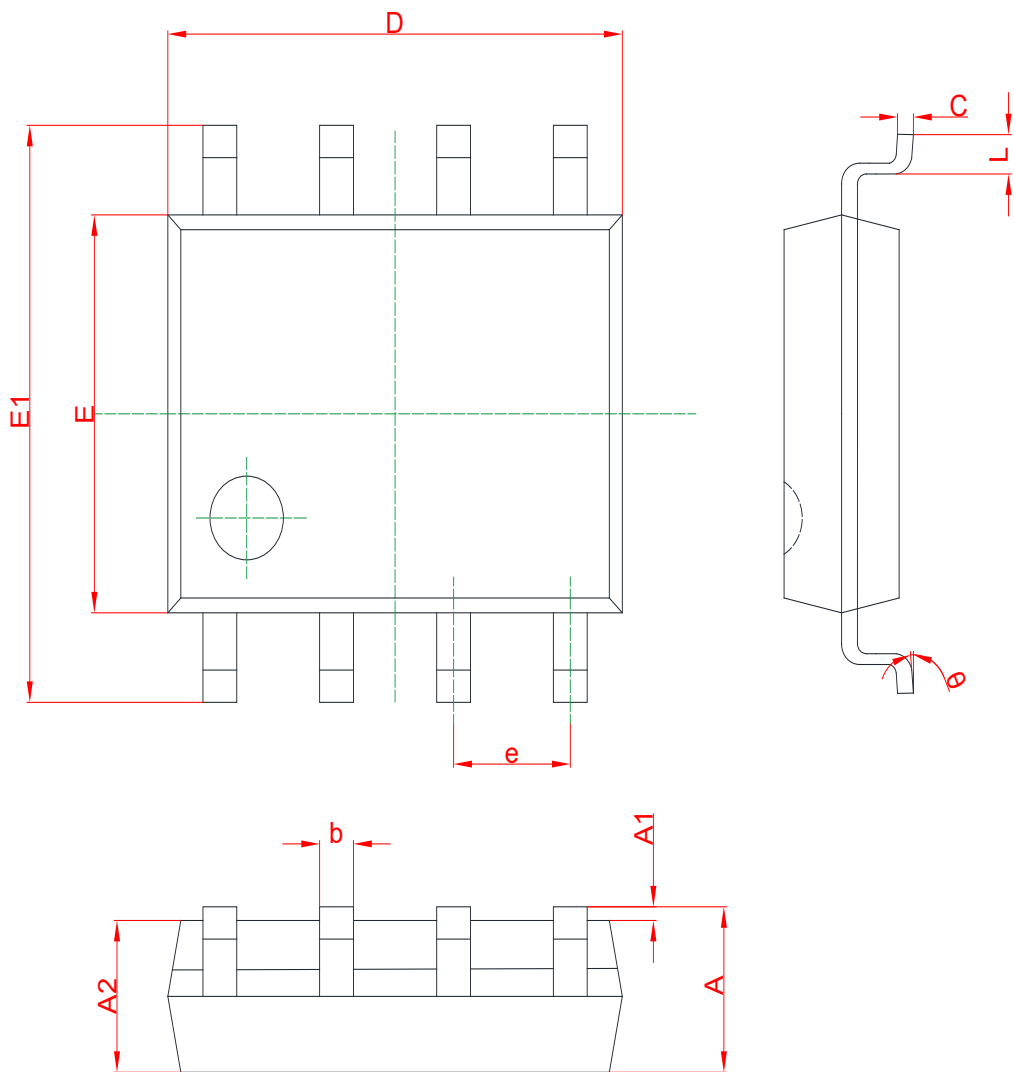
COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

Symbol	Dimensions			Symbol	Dimensions		
	Min.	NOM.	Max.		Min.	NOM.	Max.
A	1.55	1.65	1.75	L	0.50	0.60	0.70
A1	0.06	0.11	0.16	L1	0.90	1.05	1.20
A2	1.35	1.45	1.55	θ	0°	4°	8°
A3	0.60	0.70	0.80	B1	0.14MAX		
b	0.30	0.40	0.50	B2	0.12MAX		
c	0.17	0.20	0.25	b1	0.66MAX		
D	4.80	4.90	5.00	b2	0	0.04	0.08
E	5.80	6.00	6.20	e	1.27BSC		
E1	3.80	3.90	4.00				

AO4409-ES

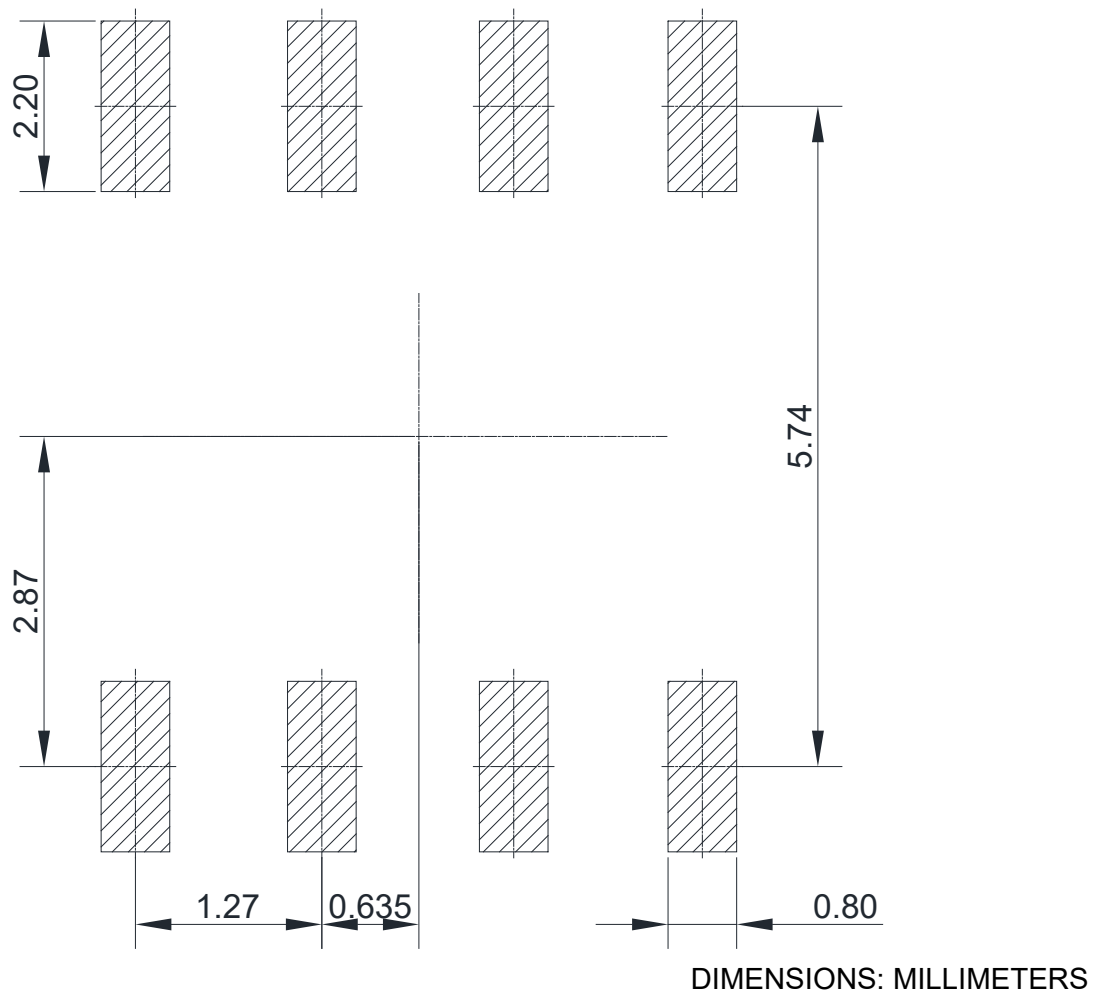
Rev-1.3

POD C(X)



Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
L	0.40	0.60	e	1.27 TYP	
D	4.95	5.05	c	0.15	0.25
E	3.8	4.0	A2	1.33	1.50
E1	5.80	6.20	A1	0.04	0.20
b	0.4 TYP		θ	0°	8°

9. Recommended Soldering Footprint



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