

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

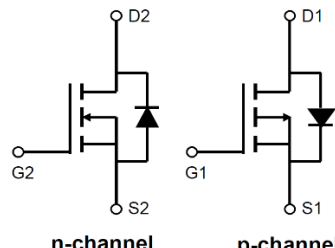
3. Applications

- PWM applications
 - 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
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	Note 1 	
1	Source2		
7/8	Drain2		
4	Gate1		
3	Source1		
5/6	Drain1		

Note1:

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

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}	± 20	± 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

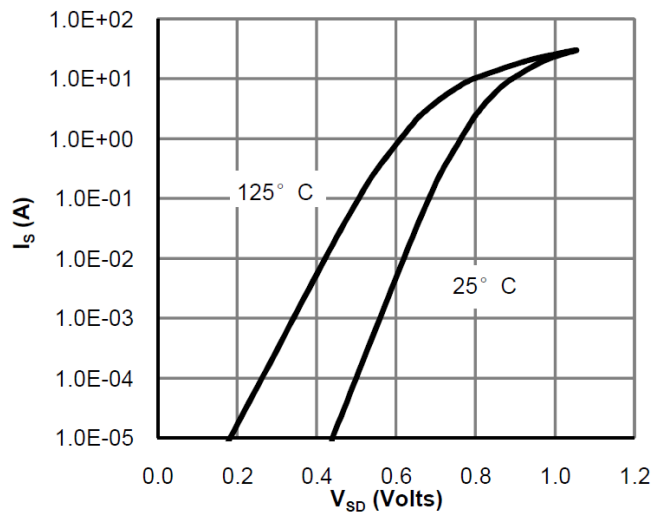
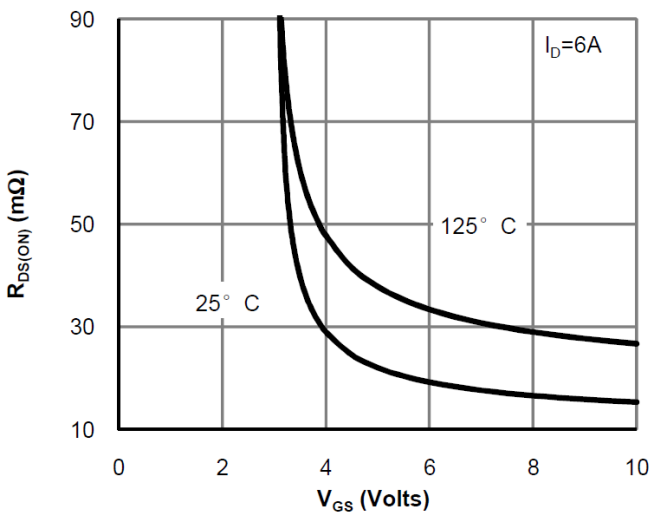
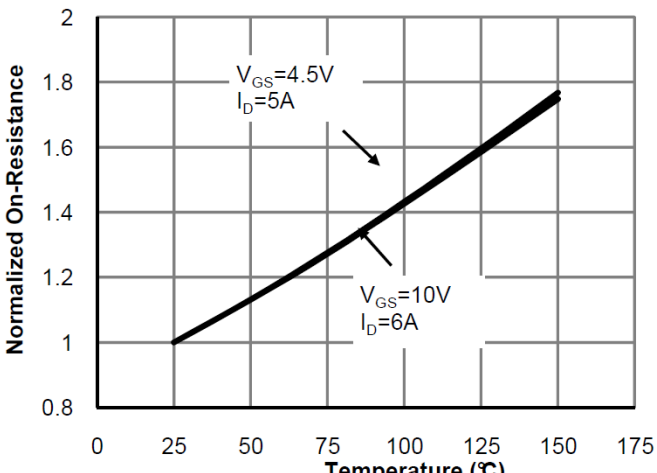
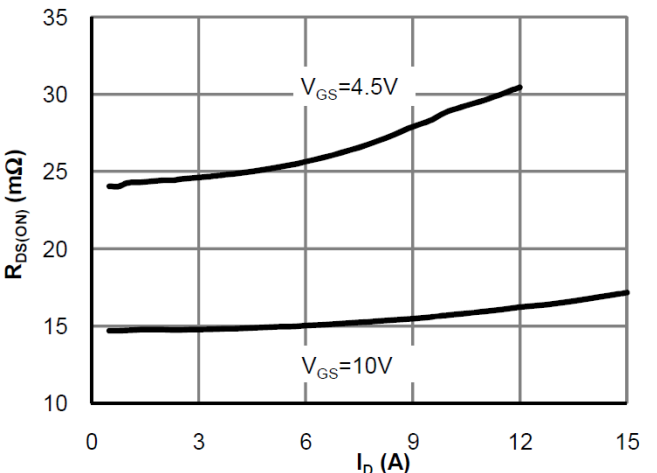
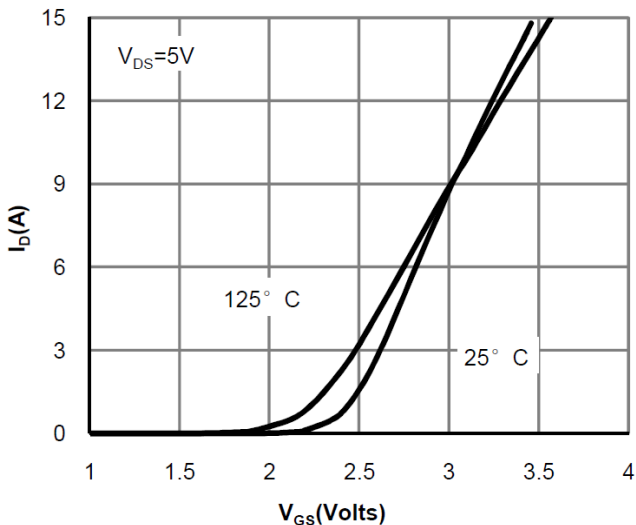
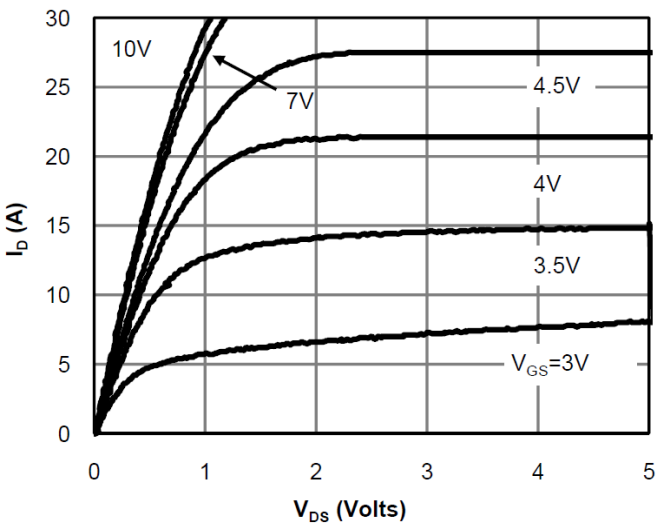
Single Operation				
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance ($t \leq 10\text{s}$)	$R_{\theta JA}$	48	62.5	$^{\circ}\text{C/W}$
Junction-to-Lead Thermal Resistance	$R_{\theta JL}$	32	40	

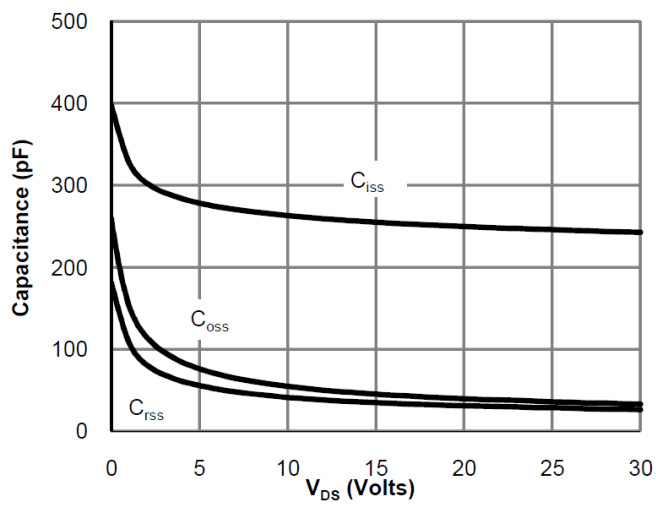
7. N-channel Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
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 _{DS} =30V, V _{GS} =0V			1.0	uA
Gate-to-source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250uA	1.0	1.5	2.2	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =10V, I _D =6A		15	22	mΩ
		V _{GS} =4.5V, I _D =5A		24	36	
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} =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		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =10V, V _{DS} =15V, R _L =25Ω, R _{GEN} =3Ω		4.5		ns
Rise Time	t _r			2.5		
Turn-Off Delay Time	t _{d(OFF)}			14.5		
Fall Time	t _f			3.5		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _S =1.0A	0.45		1.5	V

8. N-channel Typical Characteristic



**Figure 7: Capacitance Characteristics**

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 =-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	-1.5	-2.0	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =10V, I _D =-4.6A		44	58	mΩ
		V _{GS} =-4.5V, I _D =-4A		60	78	
Forward Transconductance	g _{FS}	V _{DS} =-5V, I _D =-4.3A			40	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
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		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =-10V, V _{DS} =-15V R _L =2.5Ω, R _G =3Ω		10		ns
Rise Time	t _r			8		
Turn-Off Delay Time	t _{d(OFF)}			18		
Fall Time	t _f			6		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _{SD} =-1A	-0.45		-1.5	V

10. Typical Characteristic

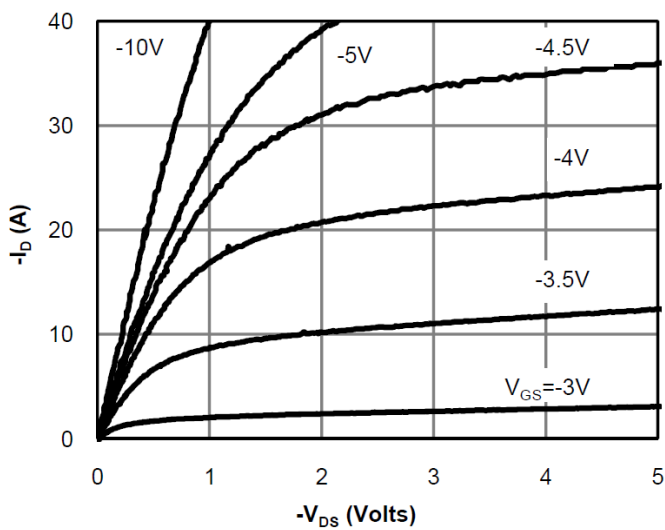


Fig 1: On-Region Characteristics

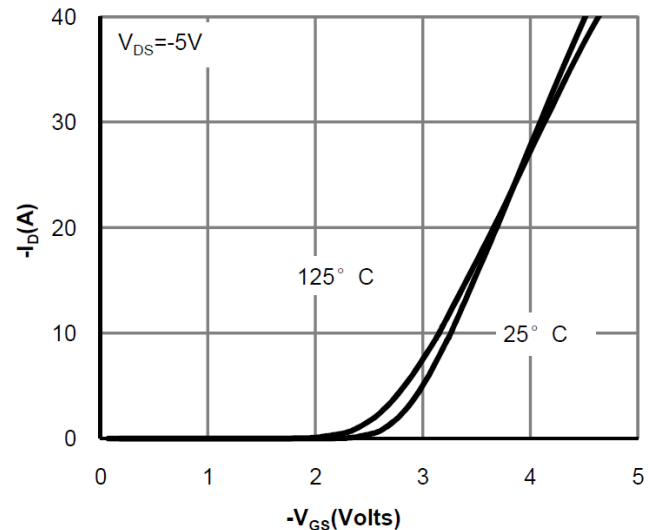


Figure 2: Transfer Characteristics

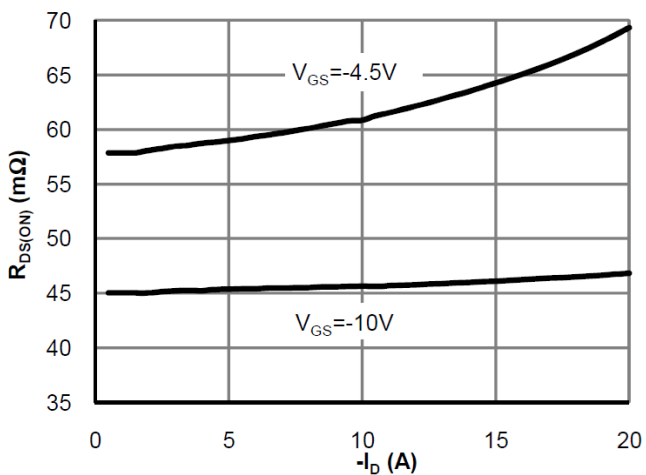


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

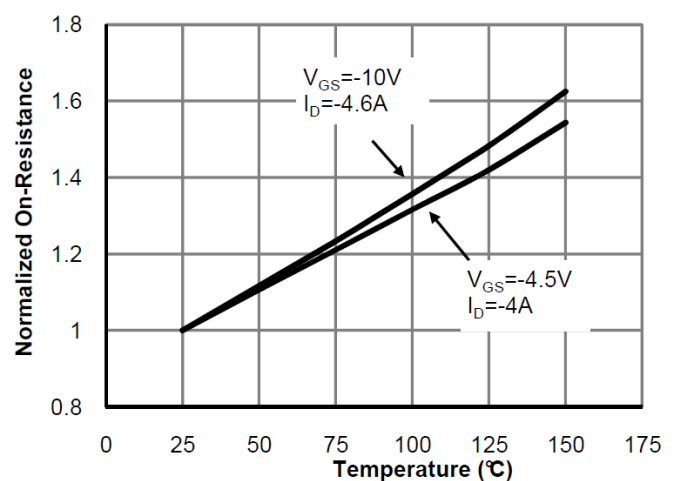


Figure 4: On-Resistance vs. Junction Temperature

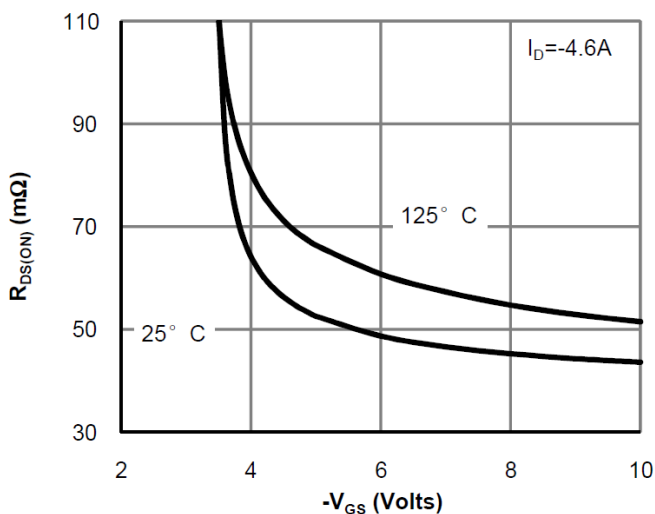


Figure 5: On-Resistance vs. Gate-Source Voltage

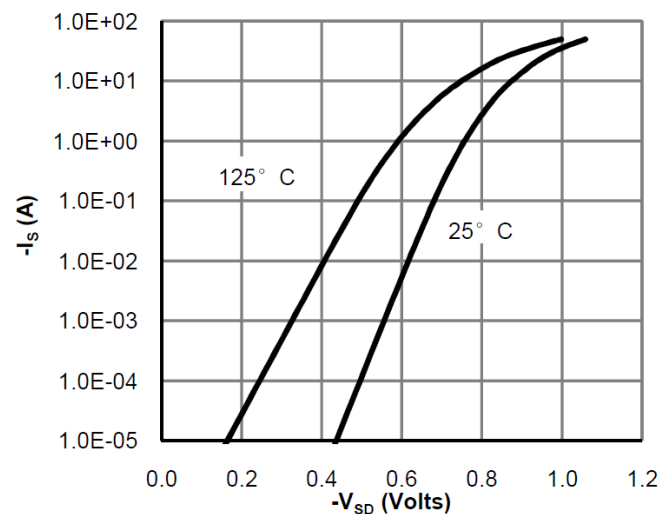
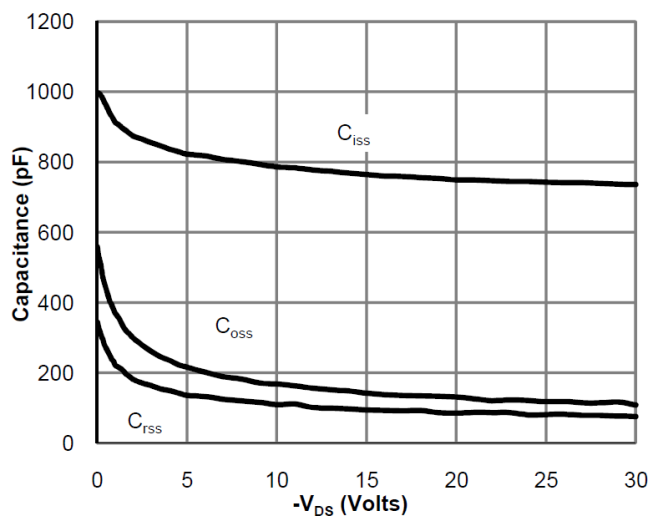
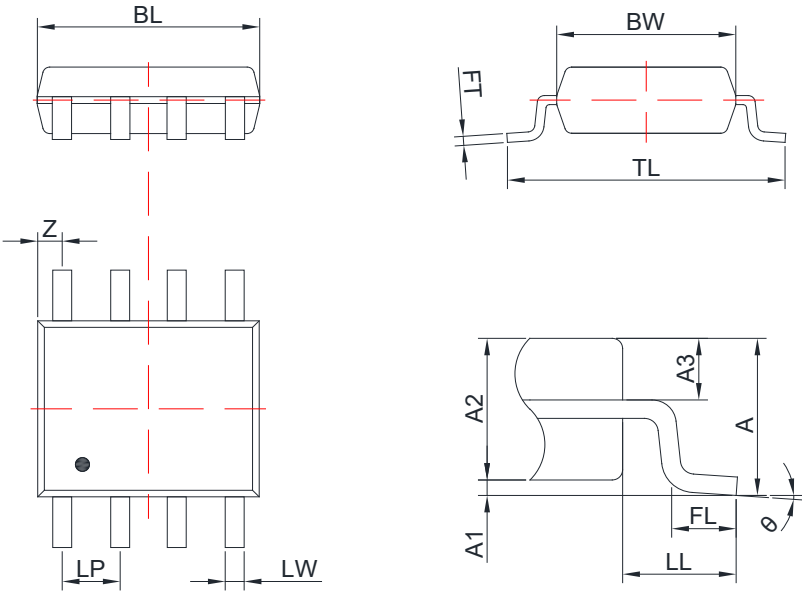


Figure 6: Body-Diode Characteristics

**Figure 7: Capacitance Characteristics**

11. Dimension (SOP8)

POD A(Y)



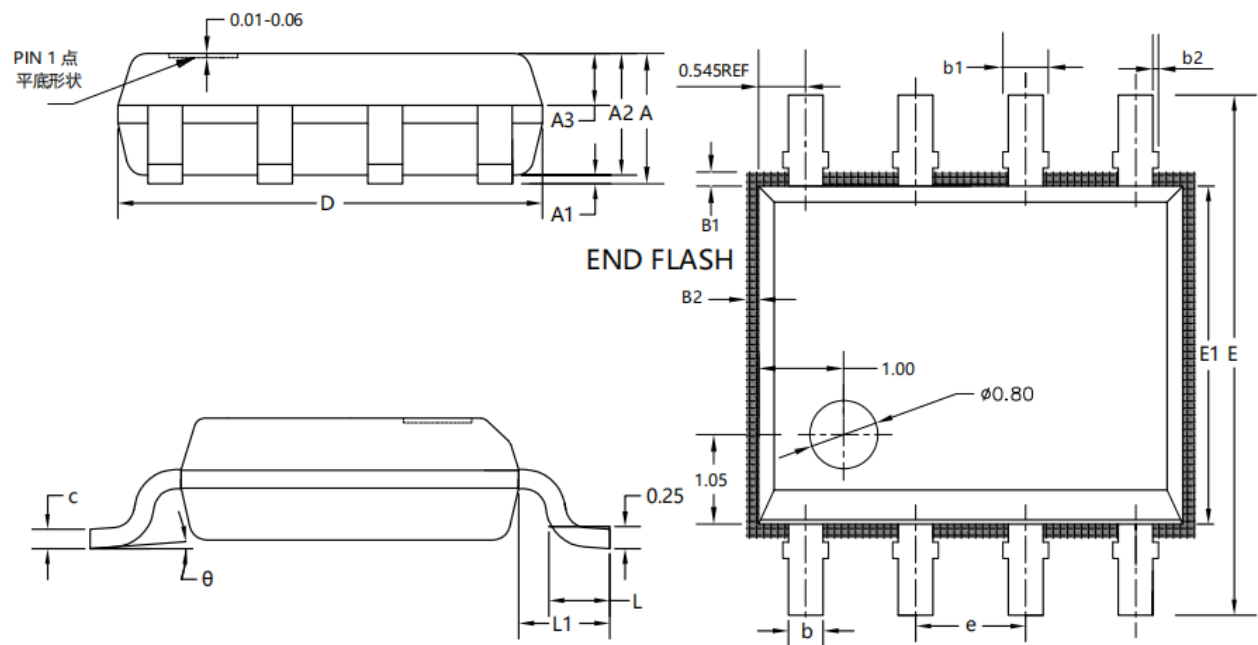
COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

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°

AO4606

Rev-1.5

POD B(C)



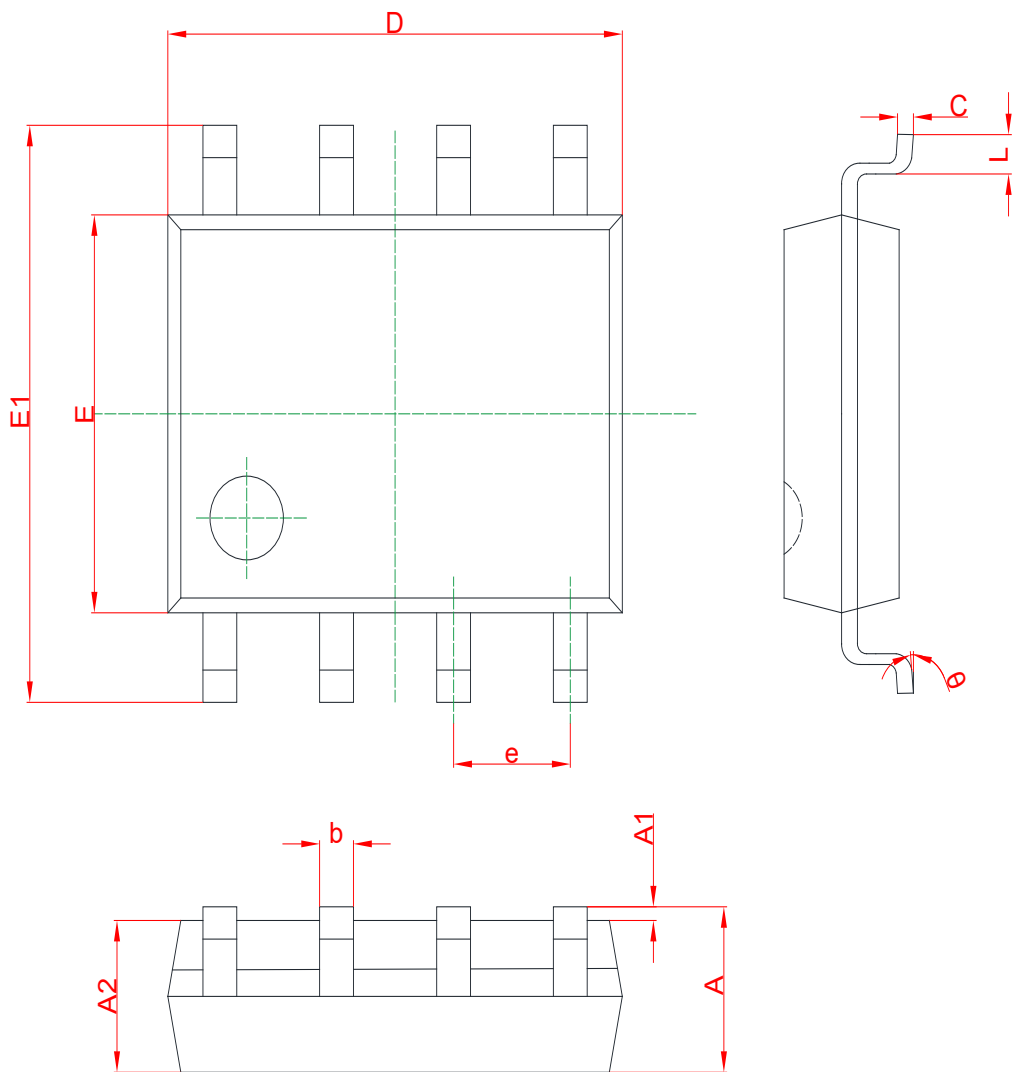
COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

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				

AO4606

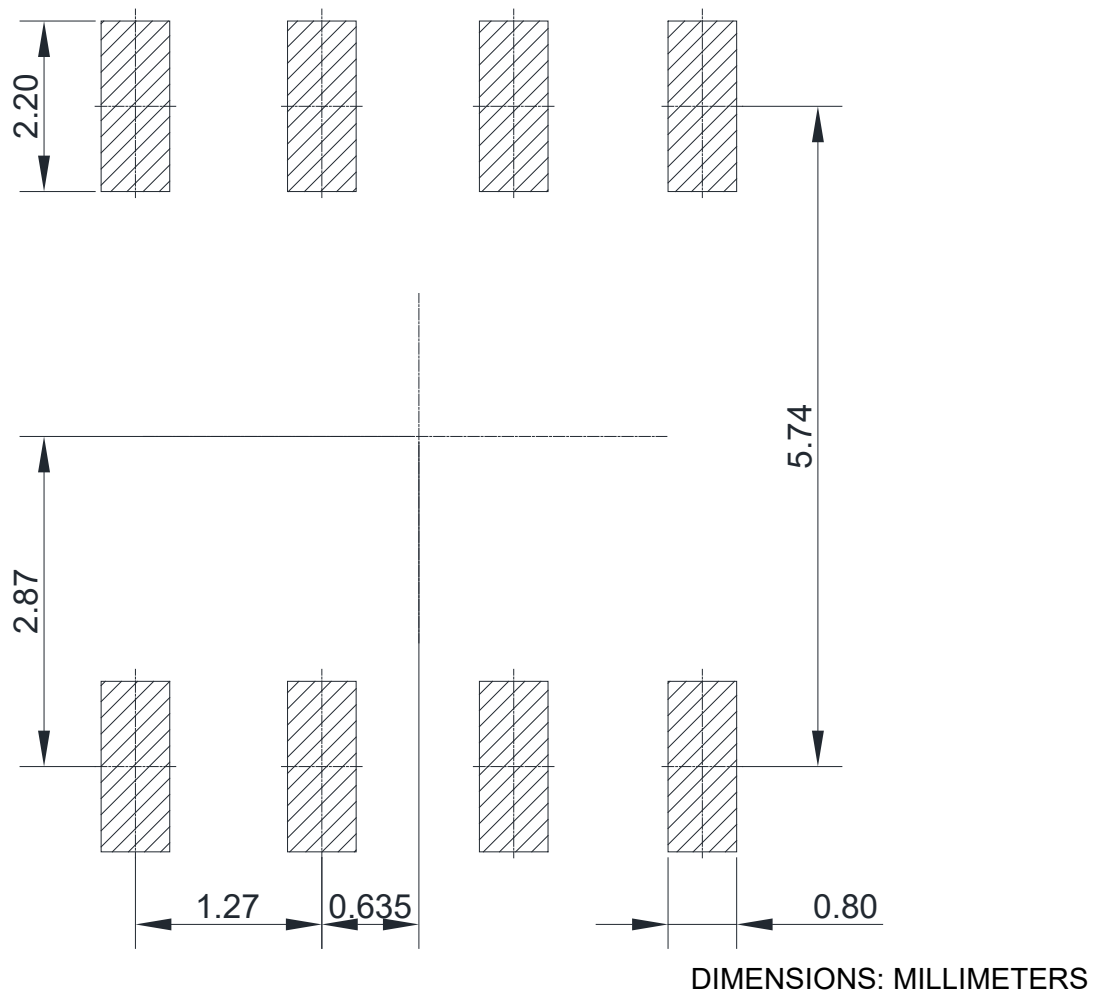
Rev-1.5

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°

12. Recommended Soldering Footprint



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