

SuperMOS – SOP8 -30V BV<sub>DSS</sub>, 39mΩ R<sub>DS(on)</sub>, P-channel MOSFET

1. Description

The AO4803A is P-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 AO4803A is Pb-free.

2. Features

- -30V, R<sub>DS(ON)</sub>=39mΩ(TYP.) @V<sub>GS</sub>=-10V  
R<sub>DS(ON)</sub>=55mΩ(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 Sizes |
|-------------|---------|-------------|--------------|-------------|-------------------|---------------------|------------|
| AO4803A     | SOP8    | ES4803A/lot | Halogen free | Tape & Reel | 3,000 PCS         | UL 94V-0            | 13 inches  |

Table-1    Ordering information

5. Pin Configuration and Functions

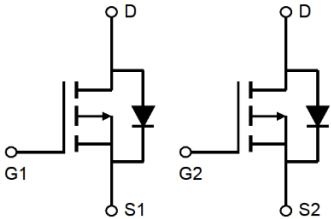
| Pin | Function | Outline                                                                                                          | Circuit Diagram                                                                                  |
|-----|----------|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 1   | Source1  | <div>Note b</div> <div></div> | <div></div> |
| 2   | Gate1    |                                                                                                                  |                                                                                                  |
| 7/8 | Drain1   |                                                                                                                  |                                                                                                  |
| 3   | Source2  |                                                                                                                  |                                                                                                  |
| 4   | Gate2    |                                                                                                                  |                                                                                                  |
| 5/6 | Drain2   |                                                                                                                  |                                                                                                  |

Table-2    Pin configuration

## 6. Specification

### Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

| Parameter                                     |                          | Symbol     | Limit       | Unit               |
|-----------------------------------------------|--------------------------|------------|-------------|--------------------|
| Drain-Source Voltage                          |                          | $BV_{DSS}$ | -30         | V                  |
| Gate-Source Voltage                           |                          | $V_{GS}$   | $\pm 20$    | V                  |
| Continuous Drain Current                      | $T_A=25^{\circ}\text{C}$ | $I_D$      | -5.8        | A                  |
|                                               | $T_A=75^{\circ}\text{C}$ |            | -4.5        |                    |
| Maximum Power Dissipation                     | $T_A=25^{\circ}\text{C}$ | $P_D$      | 3.2         | W                  |
|                                               | $T_A=75^{\circ}\text{C}$ |            | 1.9         |                    |
| Pulsed Drain Current                          |                          | $I_{DM}$   | -23.2       | A                  |
| Avalanche Current, Single Pulsed <sup>a</sup> |                          | $I_{AS}$   | -9          | A                  |
| Avalanche Energy, Single Pulsed <sup>a</sup>  |                          | $E_{AS}$   | 12          | mJ                 |
| 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 ( $t \leq 10\text{s}$ ) | $R_{\theta JA}$ | 32      | 40      | $^{\circ}\text{C/W}$ |

Note:

a:  $T_J=25^{\circ}\text{C}$ ,  $V_{DD}=-30\text{V}$ ,  $V_G=-10\text{V}$ ,  $L=0.3\text{mH}$ ,  $R_g=25\Omega$ .

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 <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA                                            | -30  |      |      | V    |
| Zero Gate Voltage Drain Current           | I <sub>DSS</sub>    | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V                                             |      |      | -1   | uA   |
| Gate-to-source Leakage Current            | I <sub>GSS</sub>    | V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V                                             |      |      | ±100 | nA   |
| ON CHARACTERISTICS                        |                     |                                                                                        |      |      |      |      |
| Gate Threshold Voltage                    | V <sub>GS(TH)</sub> | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA                              | -1.0 | -1.5 | -2.0 | V    |
| Drain-to-source On-resistance             | R <sub>DS(on)</sub> | V <sub>GS</sub> =-10V, I <sub>D</sub> =-5A                                             |      | 39   | 60   | mΩ   |
|                                           |                     | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4A                                            |      | 55   | 80   |      |
| Forward Transconductance                  | g <sub>FS</sub>     | V <sub>DS</sub> =-5V, I <sub>D</sub> =-5A                                              |      |      | 40   | S    |
| CHARGES, CAPACITANCES AND GATE RESISTANCE |                     |                                                                                        |      |      |      |      |
| Input Capacitance                         | C <sub>ISS</sub>    | V <sub>GS</sub> =0V, V <sub>DS</sub> =-15V<br>f=1MHz                                   |      | 520  |      | pF   |
| Output Capacitance                        | C <sub>OSS</sub>    |                                                                                        |      | 100  |      |      |
| Reverse Transfer Capacitance              | C <sub>RSS</sub>    |                                                                                        |      | 65   |      |      |
| Gate Resistance                           | R <sub>g</sub>      | f=1MHZ                                                                                 |      | 7.5  |      | Ω    |
| Total Gate Charge                         | Q <sub>G(TOT)</sub> | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V<br>I <sub>D</sub> =-5A                    |      | 9.2  | 11   | nC   |
| Gate-to-Source Charge                     | Q <sub>GS</sub>     |                                                                                        |      | 1.6  |      |      |
| Gate-to-Drain Charge                      | Q <sub>GD</sub>     |                                                                                        |      | 2.2  |      |      |
| SWITCHING CHARACTERISTICS                 |                     |                                                                                        |      |      |      |      |
| Turn-On Delay Time                        | t <sub>d(ON)</sub>  | V <sub>GS</sub> =-10V, V <sub>DS</sub> =-15V<br>R <sub>L</sub> =3Ω, R <sub>G</sub> =3Ω |      | 7.5  |      | ns   |
| Rise Time                                 | t <sub>r</sub>      |                                                                                        |      | 5.5  |      |      |
| Turn-Off Delay Time                       | t <sub>d(OFF)</sub> |                                                                                        |      | 19   |      |      |
| Fall Time                                 | t <sub>f</sub>      |                                                                                        |      | 7    |      |      |
| BODY DIODE CHARACTERISTICS                |                     |                                                                                        |      |      |      |      |
| Forward Voltage                           | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =-1.0A                                             |      | -0.7 | -1.5 | V    |

7. Typical Characteristic

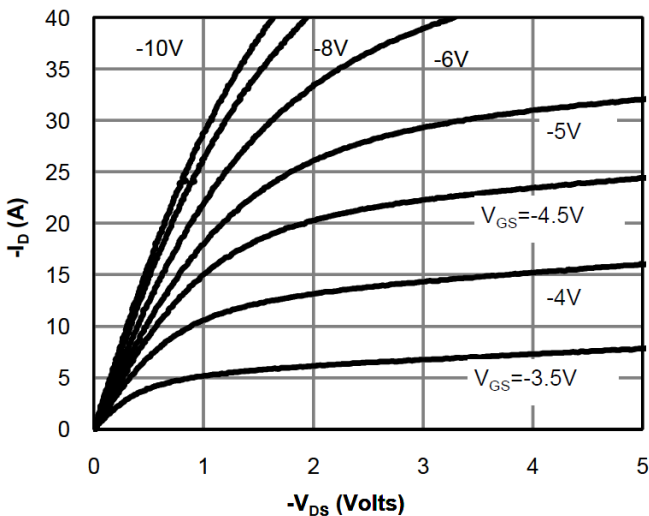


Fig 1: On-Region Characteristics

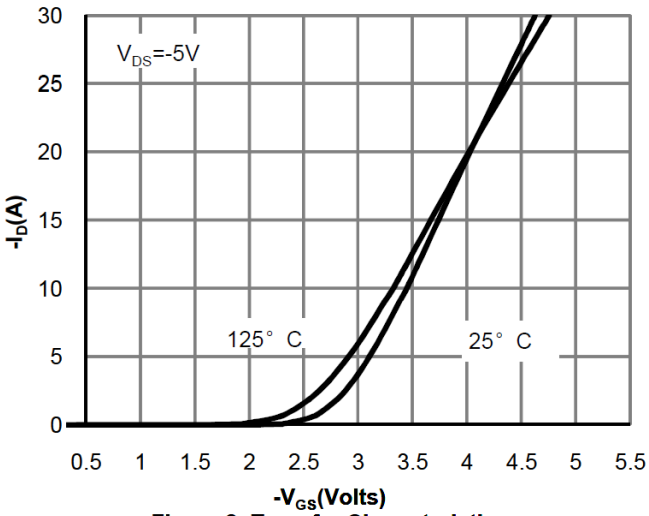


Figure 2: Transfer Characteristics

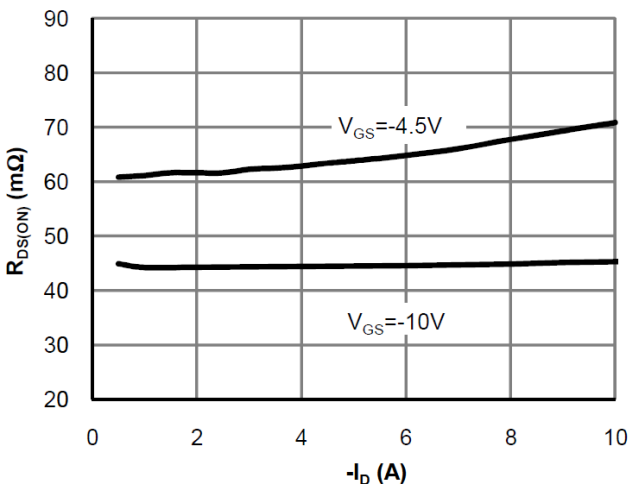


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

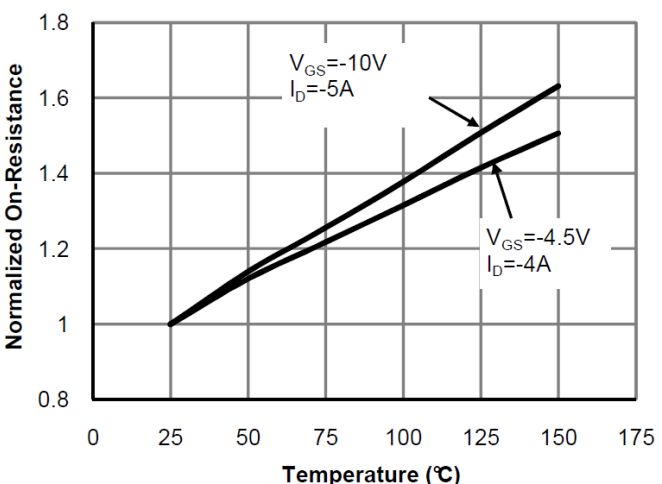


Figure 4: On-Resistance vs. Junction Temperature

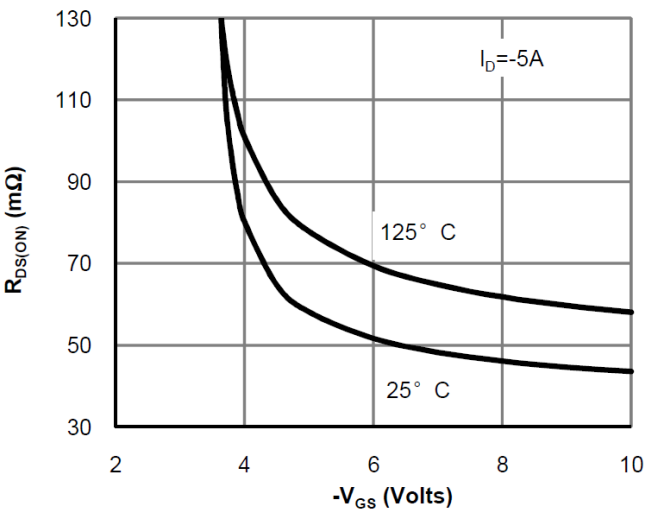


Figure 5: On-Resistance vs. Gate-Source Voltage

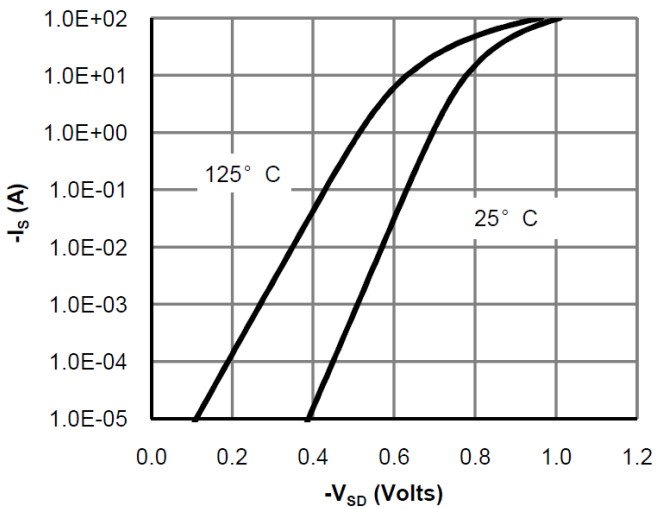


Figure 6: Body-Diode Characteristics

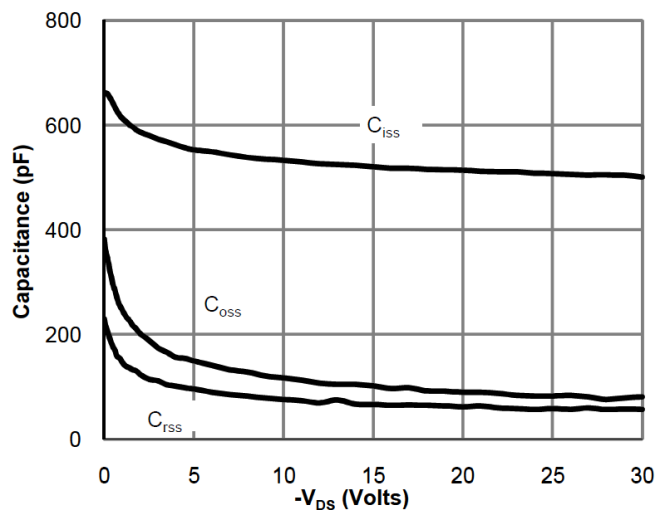
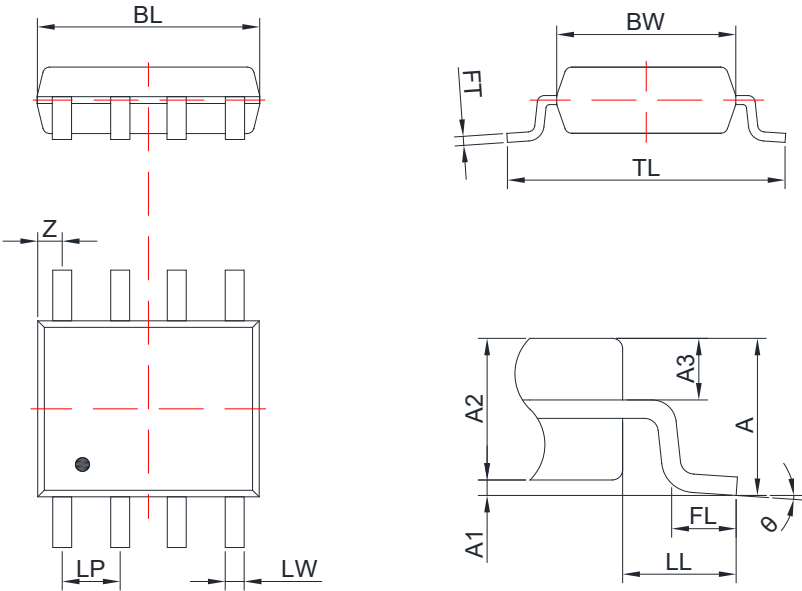


Figure 7: Capacitance Characteristics

8. Dimension (SOP8)

POD A(Y)



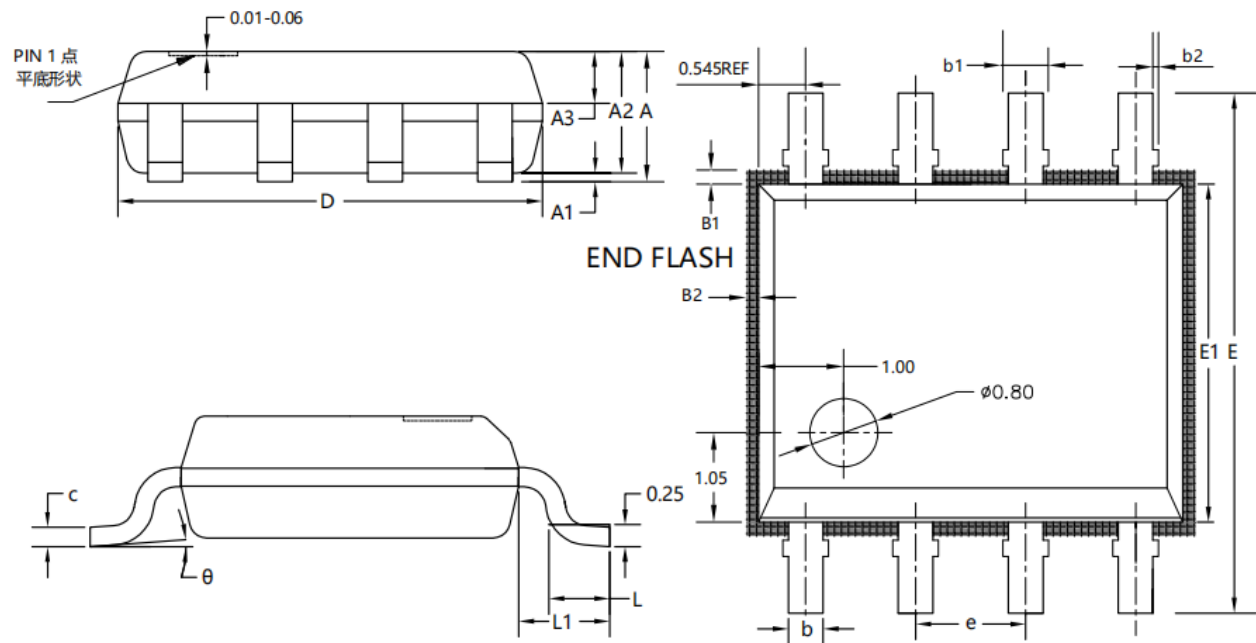
COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

| 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 | $\theta$ | 0°         | 8°   |

AO4803A

Rev-1.4

POD B(C)



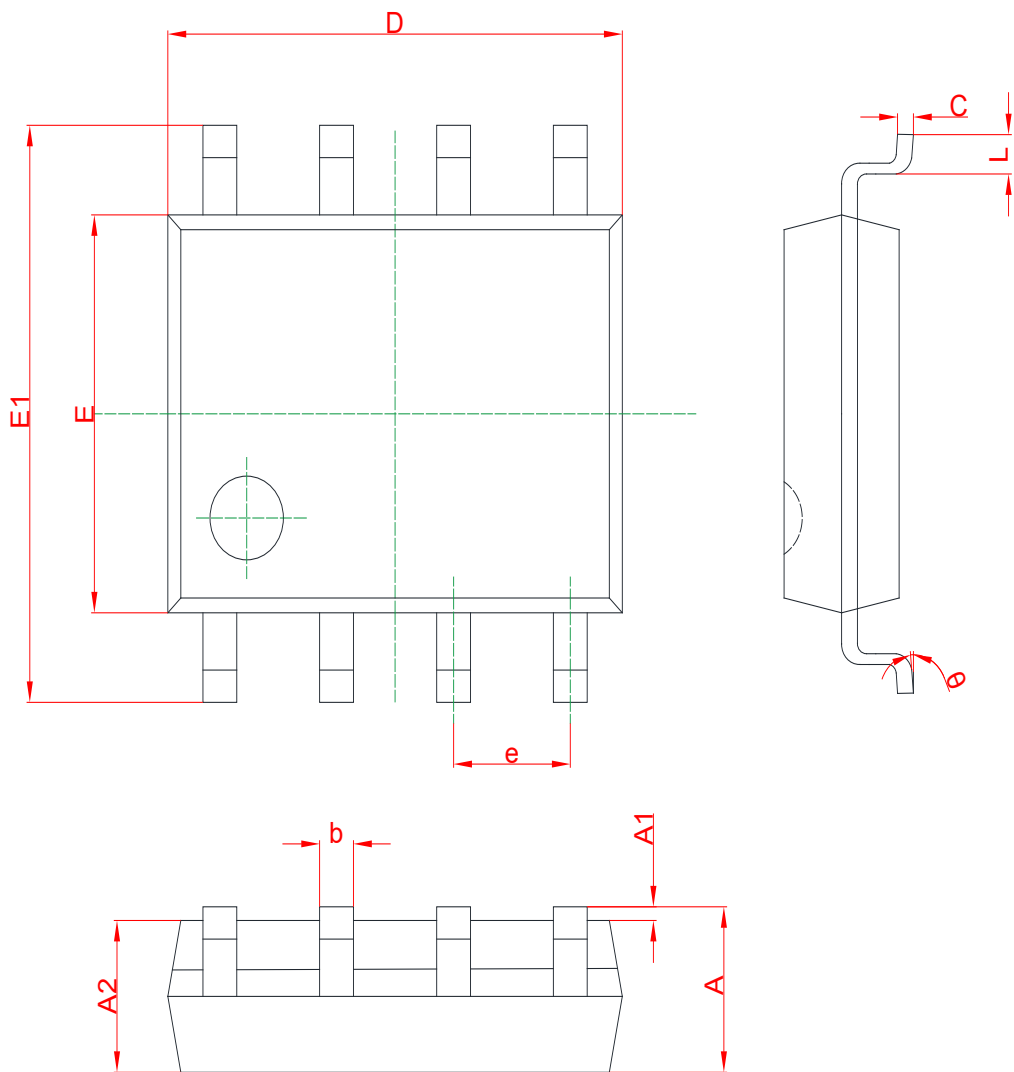
COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

| 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 |        |            |      |      |

**AO4803A**

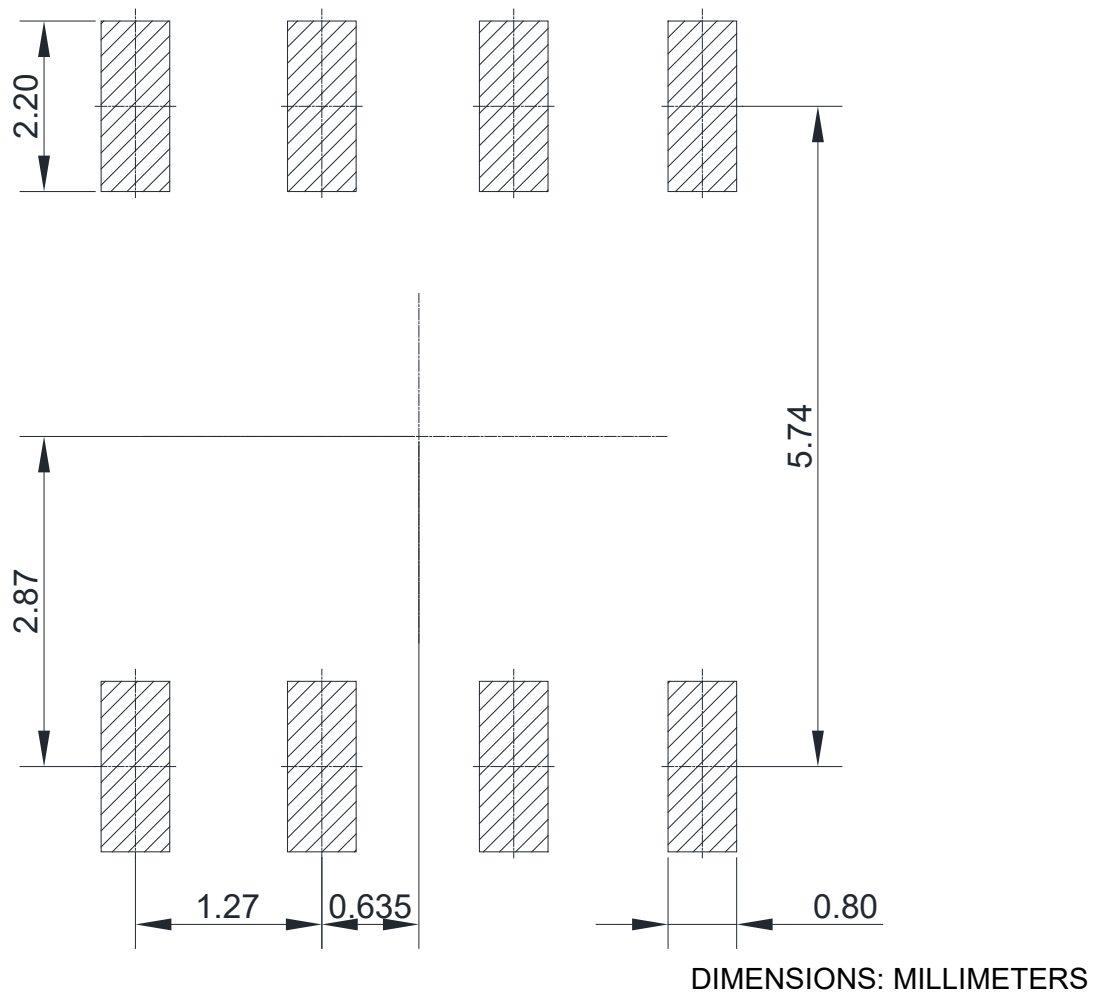
Rev-1.4

**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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