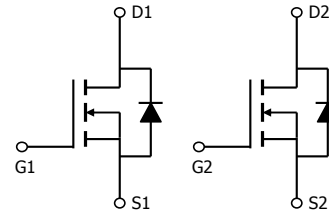


Dual N-Channel MOSFET

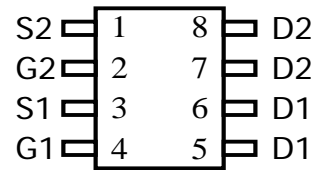
General Description

The AO4884 uses advanced trench technology to provide excellent  $R_{DS(ON)}$  with low gate charge. This is an all purpose device that is suitable for use in a wide range of power conversion applications.



Product Summary

|                                    |                |
|------------------------------------|----------------|
| $V_{DS}$                           | 40V            |
| $I_D$ (at $V_{GS}=10V$ )           | 10A            |
| $R_{DS(ON)}$ (at $V_{GS}=10V$ )    | < 13m $\Omega$ |
| $R_{DS(ON)}$ (at $V_{GS} = 4.5V$ ) | < 16m $\Omega$ |



Absolute Maximum Ratings  $T_A=25^\circ C$  unless otherwise noted

| Parameter                               | Symbol           | Maximum          | Units      |
|---|------------------|------------------|------------|
| Drain-Source Voltage                    | $V_{DS}$         | 40               | V          |
| Gate-Source Voltage                     | $V_{GS}$         | $\pm 20$         | V          |
| Continuous Drain Current                | $I_D$            | $T_A=25^\circ C$ | 10         |
|   |                  | $T_A=70^\circ C$ | 8          |
| Pulsed Drain Current <sup>C</sup>       | $I_{DM}$         | 50               | A          |
| Avalanche Current <sup>C</sup>          | $I_{AS}, I_{AR}$ | 35               | A          |
| Avalanche energy $L=0.1mH$ <sup>C</sup> | $E_{AS}, E_{AR}$ | 61               | mJ         |
| Power Dissipation <sup>B</sup>          | $P_D$            | $T_A=25^\circ C$ | 2          |
|   |                  | $T_A=70^\circ C$ | 1.3        |
| Junction and Storage Temperature Range  | $T_J, T_{STG}$   | -55 to 150       | $^\circ C$ |

Thermal Characteristics

| Parameter                                  | Symbol          | Typ          | Max  | Units        |
|--|-----------------|--------------|------|--------------|
| Maximum Junction-to-Ambient <sup>A</sup>   | $R_{\theta JA}$ | 48           | 62.5 | $^\circ C/W$ |
| Maximum Junction-to-Ambient <sup>A D</sup> |                 | Steady-State | 74   | 90           |
| Maximum Junction-to-Lead                   | $R_{\theta JL}$ | 32           | 40   | $^\circ C/W$ |

**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

| Symbol                      | Parameter                             | Conditions  | Min  | Typ  | Max    | Units |
|-----------------------------|---------------------------------------|---|------|------|--------|-------|
| <b>STATIC PARAMETERS</b>    |                                       |   |      |      |        |       |
| BV <sub>DSS</sub>           | Drain-Source Breakdown Voltage        | I <sub>D</sub> =250μA, V <sub>GS</sub> =0V  | 40   |      |        | V     |
| I <sub>DSS</sub>            | Zero Gate Voltage Drain Current       | V <sub>DS</sub> =40V, V <sub>GS</sub> =0V<br>T <sub>J</sub> =55°C                       |      |      | 1<br>5 | μA    |
| I <sub>GSS</sub>            | Gate-Body leakage current             | V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V   |      |      | ±100   | nA    |
| V <sub>GS(th)</sub>         | Gate Threshold Voltage                | V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =250μA                                  | 1.2  | 1.5  | 2.5    | V     |
| I <sub>D(ON)</sub>          | On state drain current                | V <sub>GS</sub> =10V, V <sub>DS</sub> =5V   | 50   |      |        | A     |
| R <sub>DS(ON)</sub>         | Static Drain-Source On-Resistance     | V <sub>GS</sub> =10V, I <sub>D</sub> =10A   |      | 11   | 13     | mΩ    |
|                             |                                       | V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A  |      | 12   | 16     | mΩ    |
| g <sub>FS</sub>             | Forward Transconductance              | V <sub>DS</sub> =5V, I <sub>D</sub> =10A  |      | 50   |        | S     |
| V <sub>SD</sub>             | Diode Forward Voltage                 | I <sub>S</sub> =1A, V <sub>GS</sub> =0V   |      | 0.7  | 1      | V     |
| I <sub>S</sub>              | Maximum Body-Diode Continuous Current |   |      |      | 2.5    | A     |
| <b>DYNAMIC PARAMETERS</b>   |                                       |   |      |      |        |       |
| C <sub>iss</sub>            | Input Capacitance                     | V <sub>GS</sub> =0V, V <sub>DS</sub> =20V, f=1MHz                                       | 1200 | 1500 | 1950   | pF    |
| C <sub>oss</sub>            | Output Capacitance                    |   | 150  | 215  | 280    | pF    |
| C <sub>riss</sub>           | Reverse Transfer Capacitance          |   | 80   | 135  | 190    | pF    |
| R <sub>g</sub>              | Gate resistance                       | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz  | 1.7  | 3.5  | 5.3    | Ω     |
| <b>SWITCHING PARAMETERS</b> |                                       |   |      |      |        |       |
| Q <sub>g(10V)</sub>         | Total Gate Charge                     | V <sub>GS</sub> =10V, V <sub>DS</sub> =20V, I <sub>D</sub> =10A                         | 22   | 27.2 | 33     | nC    |
| Q <sub>g(4.5V)</sub>        | Total Gate Charge                     |   | 10   | 13.6 | 16     | nC    |
| Q <sub>gs</sub>             | Gate Source Charge                    |   | 3.6  | 4.5  | 5.4    | nC    |
| Q <sub>gd</sub>             | Gate Drain Charge                     |   | 3.8  | 6.4  | 9      | nC    |
| t <sub>D(on)</sub>          | Turn-On DelayTime                     | V <sub>GS</sub> =10V, V <sub>DS</sub> =20V, R <sub>L</sub> =2Ω,<br>R <sub>GEN</sub> =3Ω |      | 6.4  |        | ns    |
| t <sub>r</sub>              | Turn-On Rise Time                     |   |      | 17.2 |        | ns    |
| t <sub>D(off)</sub>         | Turn-Off DelayTime                    |   |      | 29.6 |        | ns    |
| t <sub>f</sub>              | Turn-Off Fall Time                    |   |      | 16.8 |        | ns    |
| t <sub>rr</sub>             | Body Diode Reverse Recovery Time      | I <sub>F</sub> =10A, dI/dt=500A/μs  | 9    | 13   | 17     | ns    |
| Q <sub>rr</sub>             | Body Diode Reverse Recovery Charge    | I <sub>F</sub> =10A, dI/dt=500A/μs  | 25   | 35   | 45     | nC    |

A. The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The value in any given application depends on the user's specific board design.

B. The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=150°C, using ≤ 10s junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150°C. Ratings are based on low frequency and duty cycles to keep initial T<sub>J</sub>=25°C.

D. The R<sub>θJA</sub> is the sum of the thermal impedance from junction to lead R<sub>θJL</sub> and lead to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, assuming a maximum junction temperature of T<sub>J(MAX)</sub>=150°C. The SOA curve provides a single pulse rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

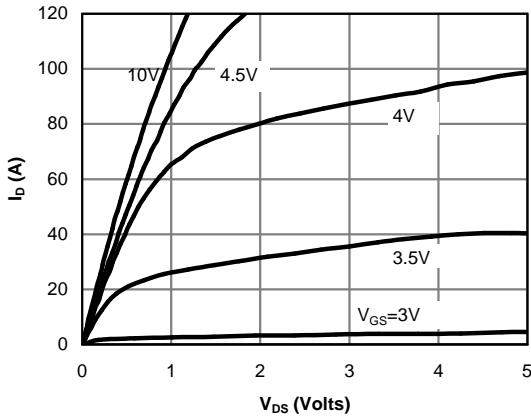


Fig 1: On-Region Characteristics (Note E)

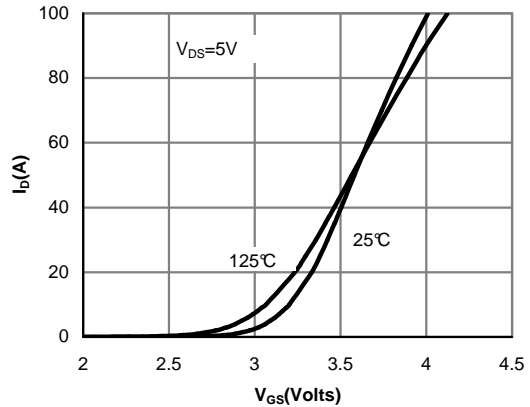


Figure 2: Transfer Characteristics (Note E)

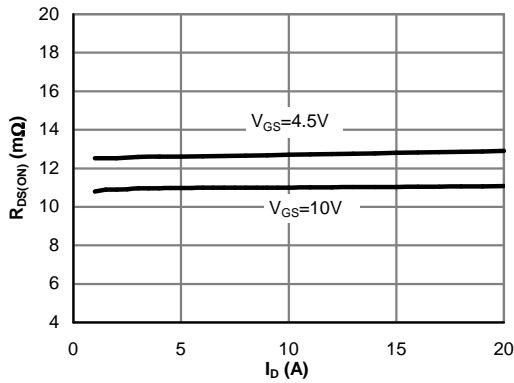


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

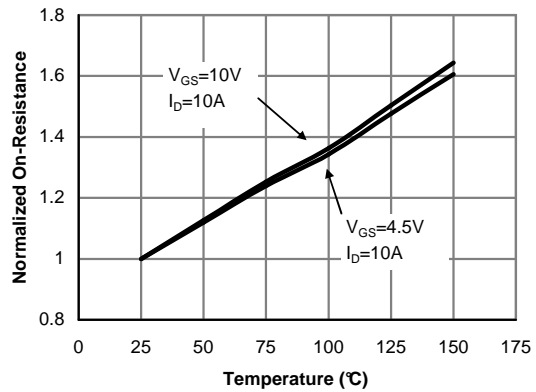


Figure 4: On-Resistance vs. Junction Temperature (Note E)

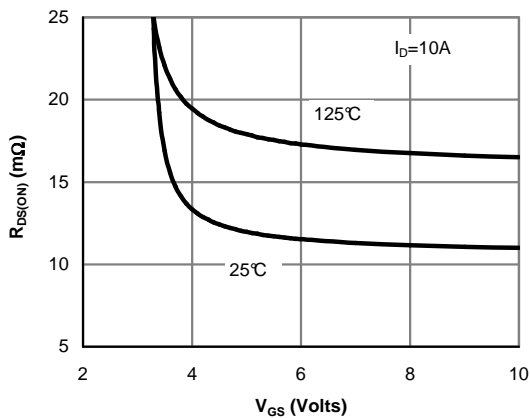


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

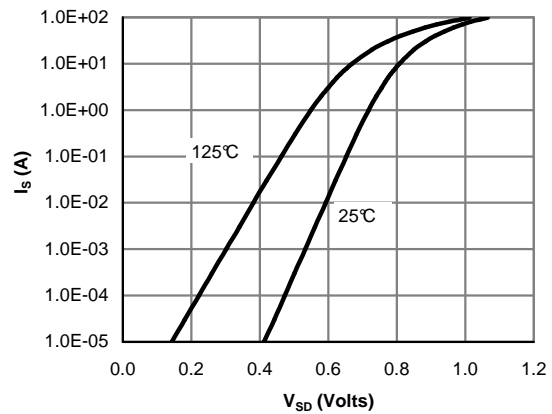


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

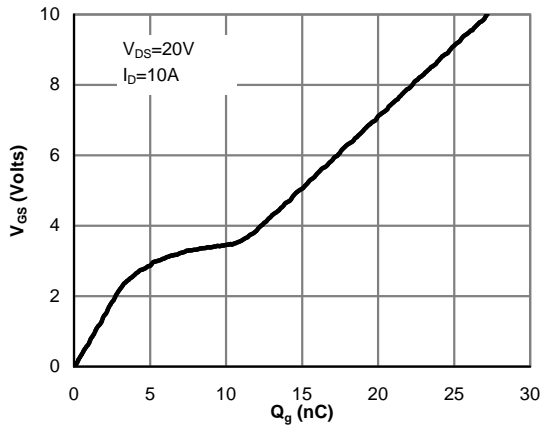


Figure 7: Gate-Charge Characteristics

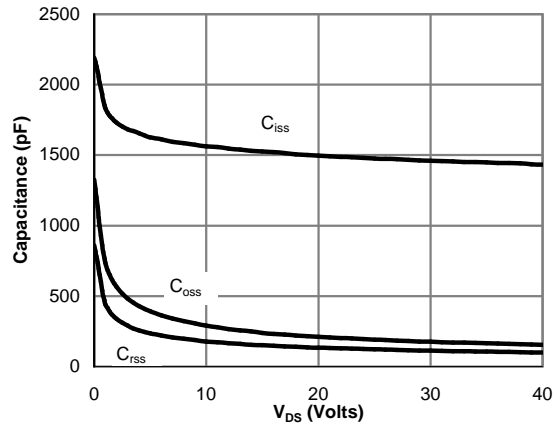


Figure 8: Capacitance Characteristics

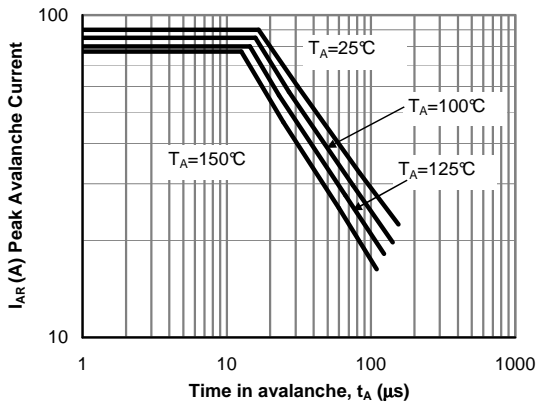


Figure 9: Single Pulse Avalanche capability (Note C)

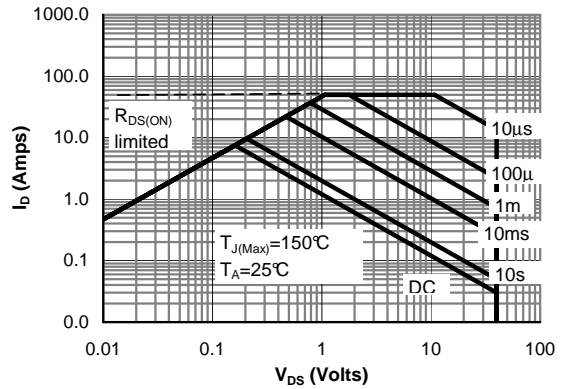


Figure 10: Maximum Forward Biased Safe Operating Area (Note F)

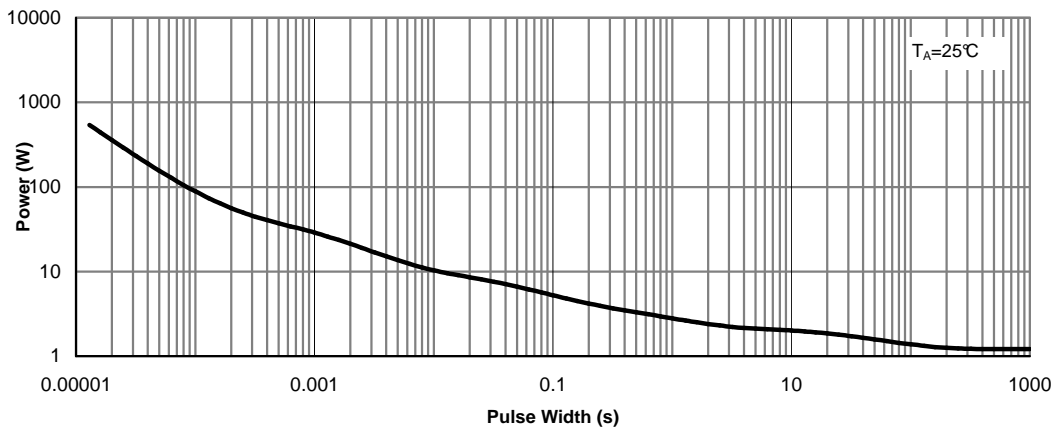


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

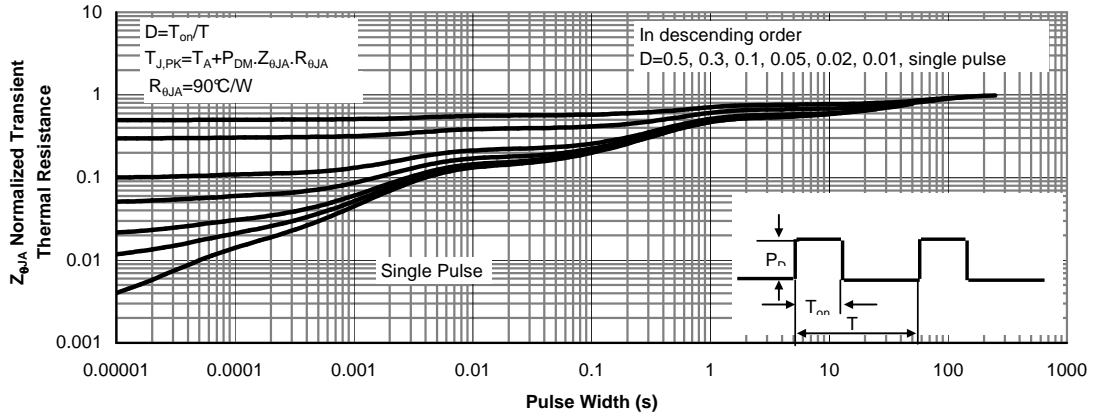
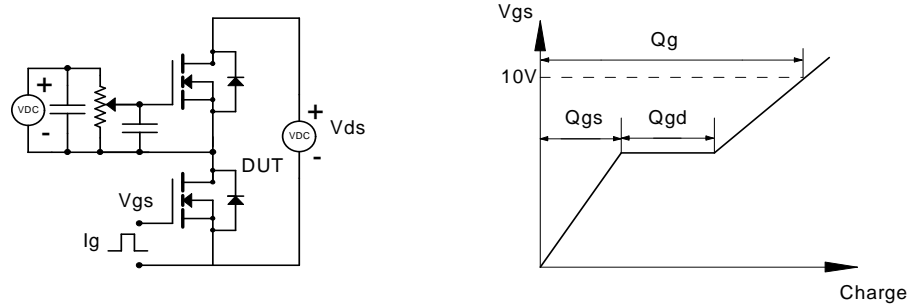
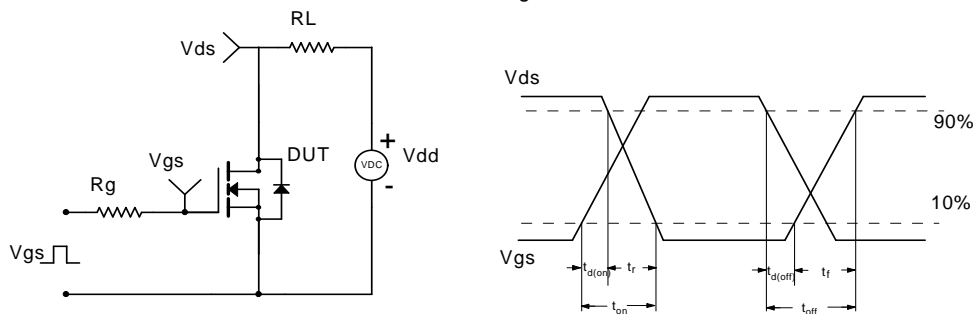


Figure 12: Normalized Maximum Transient Thermal Impedance (Note F)

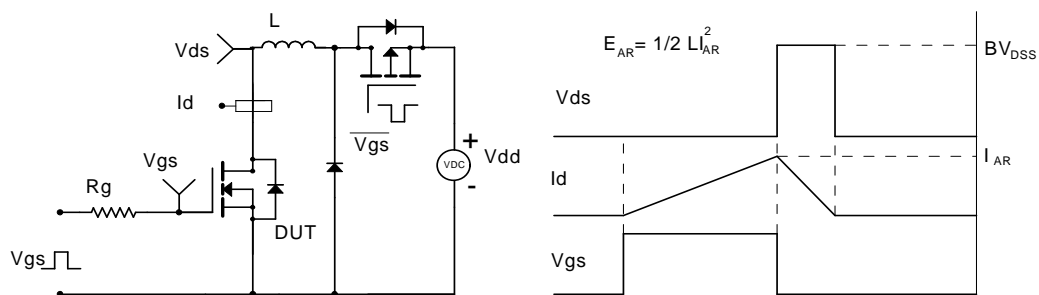
Gate Charge Test Circuit & Waveform



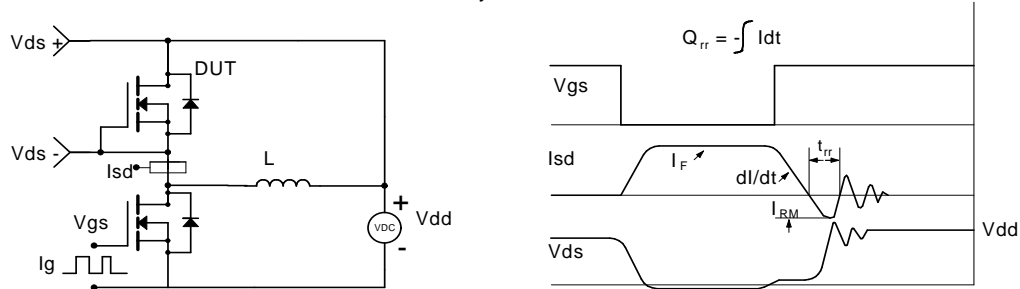
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

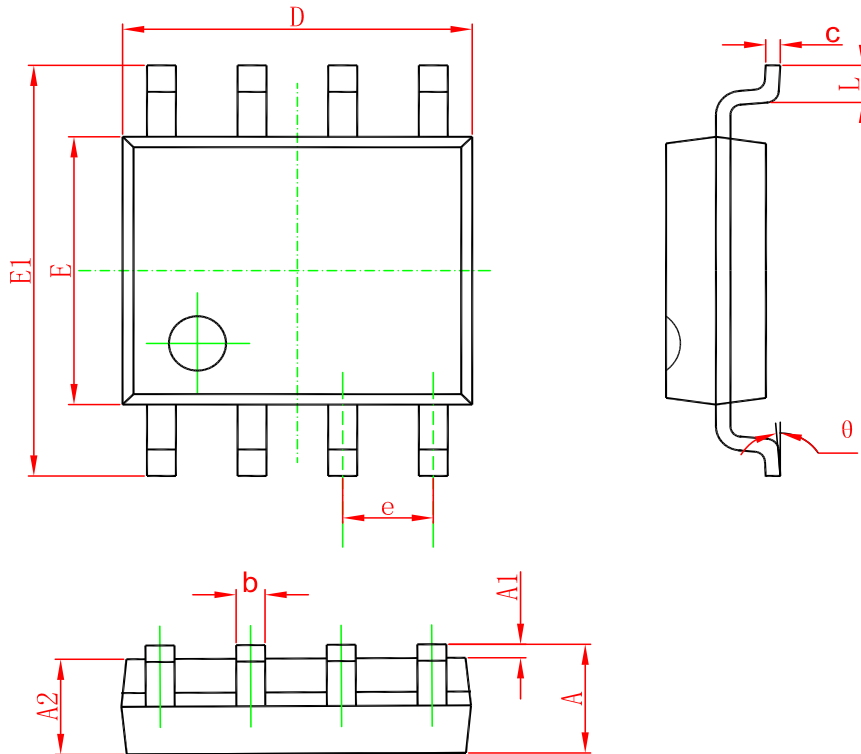


Diode Recovery Test Circuit & Waveforms



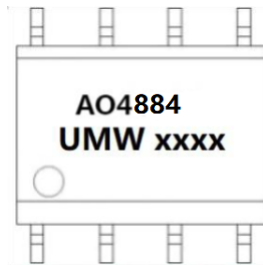
PACKAGE OUTLINE DIMENSIONS

SOP-8



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.350                     | 1.750 | 0.053                | 0.069 |
| A1     | 0.100                     | 0.250 | 0.004                | 0.010 |
| A2     | 1.350                     | 1.550 | 0.053                | 0.061 |
| b      | 0.330                     | 0.510 | 0.013                | 0.020 |
| c      | 0.170                     | 0.250 | 0.006                | 0.010 |
| D      | 4.700                     | 5.100 | 0.185                | 0.200 |
| E      | 3.800                     | 4.000 | 0.150                | 0.157 |
| E1     | 5.800                     | 6.200 | 0.228                | 0.244 |
| e      | 1.270(BSC)                |       | 0.050(BSC)           |       |
| L      | 0.400                     | 1.270 | 0.016                | 0.050 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

**Marking**



("xxxx"代表年份周期)

**Ordering information**

| Order code | Package | Baseqty | Deliverymode  |
|------------|---------|---------|---------------|
| UMW AO4884 | SOP-8   | 3000    | Tape and reel |