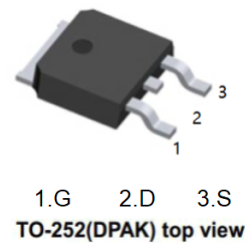


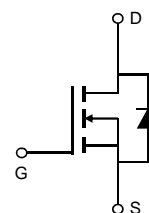
### General Description

The AOD478 is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.



### Product Summary

- $V_{DS}=100V$
- $I_D$ (at  $V_{GS}=10V$ ) 11A
- $R_{DS(ON)}$ (at  $V_{GS}=10V$ ) < 140m $\Omega$
- $R_{DS(ON)}$ (at  $V_{GS} = 5V$ ) < 152m $\Omega$



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

| Parameter                               | Symbol           | Maximum            | Units       |
|---|------------------|--------------------|-------------|
| Drain-Source Voltage                    | $V_{DS}$         | 100                | V           |
| Gate-Source Voltage                     | $V_{GS}$         | $\pm 20$           | V           |
| Continuous Drain Current                | $I_D$            | $T_C=25^{\circ}C$  | 11          |
|   |                  | $T_C=100^{\circ}C$ | 8           |
| Pulsed Drain Current <sup>C</sup>       | $I_{DM}$         | 24                 | A           |
| Continuous Drain Current                | $I_{DSM}$        | $T_A=25^{\circ}C$  | 2.5         |
|   |                  | $T_A=70^{\circ}C$  | 2           |
| Avalanche Current <sup>C</sup>          | $I_{AS}, I_{AR}$ | 10                 | A           |
| Avalanche energy $L=0.1mH$ <sup>C</sup> | $E_{AS}, E_{AR}$ | 5                  | mJ          |
| Power Dissipation <sup>B</sup>          | $P_D$            | $T_C=25^{\circ}C$  | 45          |
|   |                  | $T_C=100^{\circ}C$ | 23          |
| Power Dissipation <sup>A</sup>          | $P_{DSM}$        | $T_A=25^{\circ}C$  | 2.1         |
|   |                  | $T_A=70^{\circ}C$  | 1.3         |
| Junction and Storage Temperature Range  | $T_J, T_{STG}$   | -55 to 175         | $^{\circ}C$ |

| Thermal Characteristics                  |              |                 |     |     |               |
|--|--------------|-----------------|-----|-----|---------------|
| Parameter                                |              | Symbol          | Typ | Max | Units         |
| Maximum Junction-to-Ambient <sup>A</sup> | $t \leq 10s$ | $R_{\theta JA}$ | 17  | 25  | $^{\circ}C/W$ |
|  | Steady-State |                 | 55  | 60  | $^{\circ}C/W$ |
| Maximum Junction-to-Case                 | Steady-State | $R_{\theta JC}$ | 2.7 | 3.3 | $^{\circ}C/W$ |

**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  | 100                                 |      |     | V     |
| I <sub>DSS</sub>            | Zero Gate Voltage Drain Current                    | V <sub>DS</sub> =100V, V <sub>GS</sub> =0V  |                                     |      | 1   | 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                                  | 1.7                                 | 2.2  | 2.8 | V     |
| I <sub>D(ON)</sub>          | On state drain current                             | V <sub>GS</sub> =10V, V <sub>DS</sub> =5V   | 24                                  |      |     | A     |
| R <sub>DS(ON)</sub>         | Static Drain-Source On-Resistance                  | V <sub>GS</sub> =10V, I <sub>D</sub> =4.5A  |                                     | 116  | 140 | mΩ    |
|                             |  | V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A   |                                     | 121  | 152 | mΩ    |
| g <sub>FS</sub>             | Forward Transconductance                           | V <sub>DS</sub> =5V, I <sub>D</sub> =4.5A   |                                     | 17   |     | S     |
| V <sub>SD</sub>             | Diode Forward Voltage                              | I <sub>S</sub> =1A, V <sub>GS</sub> =0V   |                                     | 0.76 | 1   | V     |
| I <sub>S</sub>              | Maximum Body-Diode Continuous Current <sup>G</sup> |   |                                     |      | 12  | A     |
| <b>DYNAMIC PARAMETERS</b>   |  |   |                                     |      |     |       |
| C <sub>iss</sub>            | Input Capacitance                                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =50V, f=1MHz   | 350                                 | 445  | 540 | pF    |
| C <sub>oss</sub>            | Output Capacitance                                 |   | 18                                  | 29   | 35  | pF    |
| C <sub>rss</sub>            | Reverse Transfer Capacitance                       |   | 9                                   | 16   | 23  | pF    |
| R <sub>g</sub>              | Gate resistance                                    | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz  | 1                                   | 2    | 3   | Ω     |
| <b>SWITCHING PARAMETERS</b> |  |   |                                     |      |     |       |
| Q <sub>g</sub> (10V)        | Total Gate Charge                                  | V <sub>GS</sub> =10V, V <sub>DS</sub> =50V, I <sub>D</sub> =4.5A                          | 8                                   | 10.3 | 13  | nC    |
| Q <sub>g</sub> (4.5V)       | Total Gate Charge                                  |   | 4                                   | 5.1  | 6.5 | nC    |
| Q <sub>gs</sub>             | Gate Source Charge                                 |   |                                     | 1.6  |     | nC    |
| Q <sub>gd</sub>             | Gate Drain Charge                                  |   |                                     | 2.4  |     | nC    |
| t <sub>D(on)</sub>          | Turn-On DelayTime                                  | V <sub>GS</sub> =10V, V <sub>DS</sub> =50V, R <sub>L</sub> =8.6Ω,<br>R <sub>GEN</sub> =3Ω |                                     | 8    |     | ns    |
| t <sub>r</sub>              | Turn-On Rise Time                                  |   |                                     | 3    |     | ns    |
| t <sub>D(off)</sub>         | Turn-Off DelayTime                                 |   |                                     | 17   |     | ns    |
| t <sub>f</sub>              | Turn-Off Fall Time                                 |   |                                     | 4.5  |     | ns    |
| t <sub>rr</sub>             | Body Diode Reverse Recovery Time                   |   | I <sub>F</sub> =4.5A, dI/dt=500A/μs | 14.5 | 21  | 27.5  |
| Q <sub>rr</sub>             | Body Diode Reverse Recovery Charge                 | I <sub>F</sub> =4.5A, dI/dt=500A/μs   | 68                                  | 97   | 126 | 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 Power dissipation P<sub>DSM</sub> is based on R<sub>θJA</sub> and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design, and the maximum temperature of 175° C may be used if the PCB allows it.

B. The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=175° C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=175° 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 case R<sub>θJC</sub> and case 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-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T<sub>J(MAX)</sub>=175° C. The SOA curve provides a single pulse rating.

G. The maximum current rating is package limited.

H. These tests are performed with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25° C.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

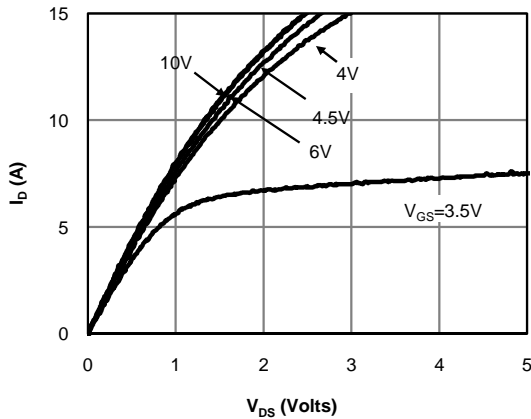


Fig 1: On-Region Characteristics (Note E)

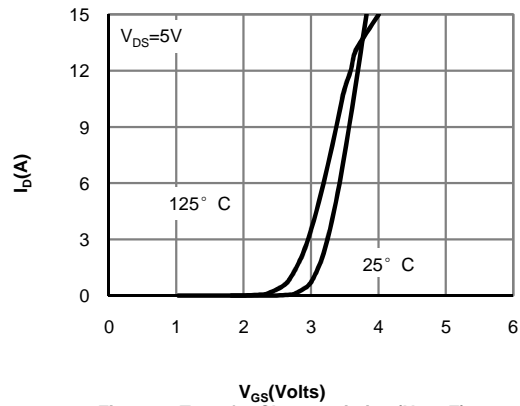


Figure 2: Transfer Characteristics (Note E)

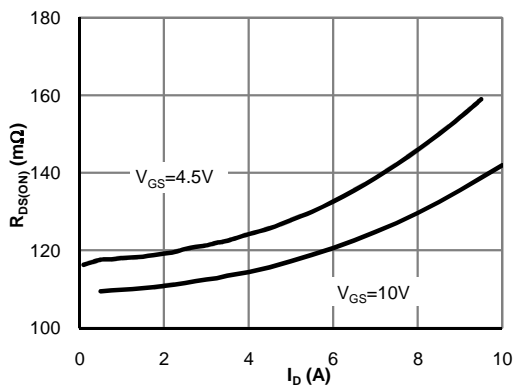


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

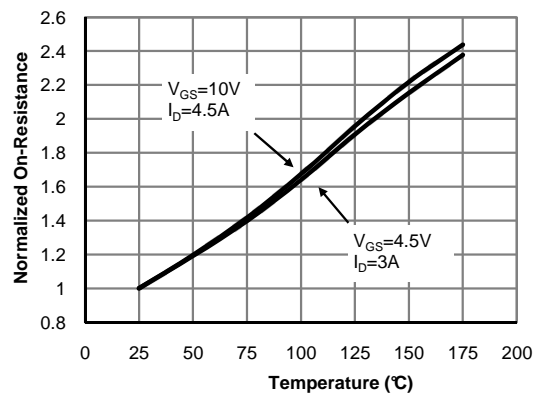


Figure 4: On-Resistance vs. Junction Temperature (Note E)

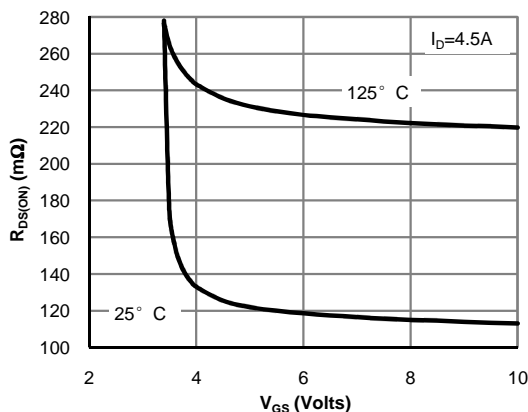


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

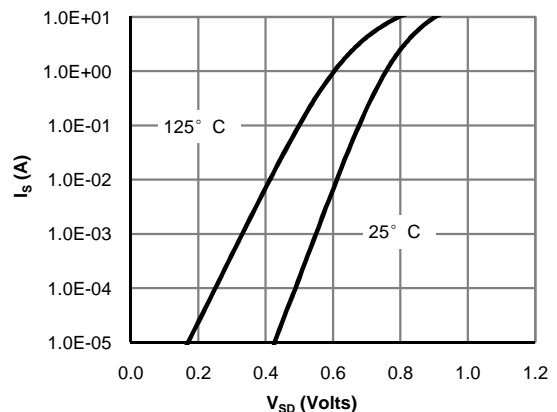


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

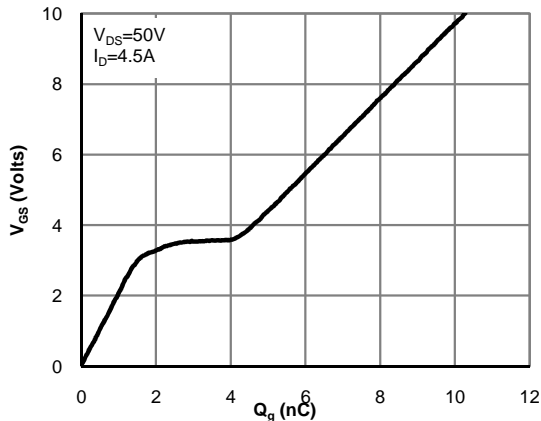


Figure 7: Gate-Charge Characteristics

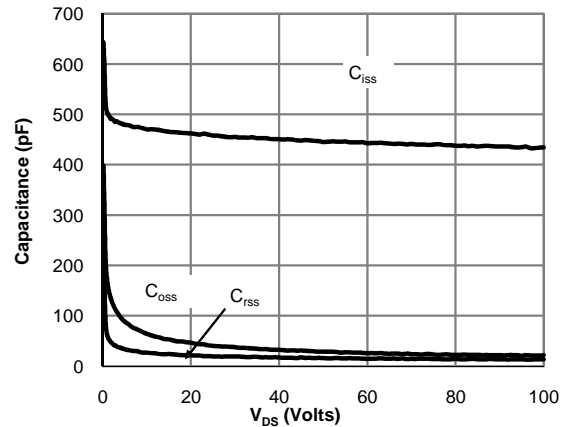


Figure 8: Capacitance Characteristics

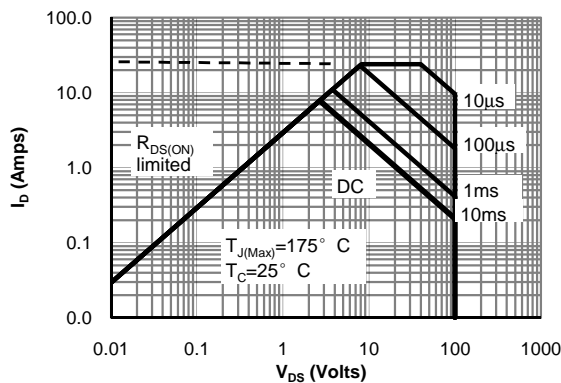


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

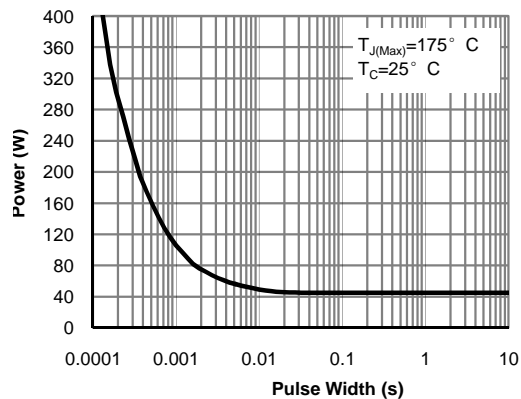


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

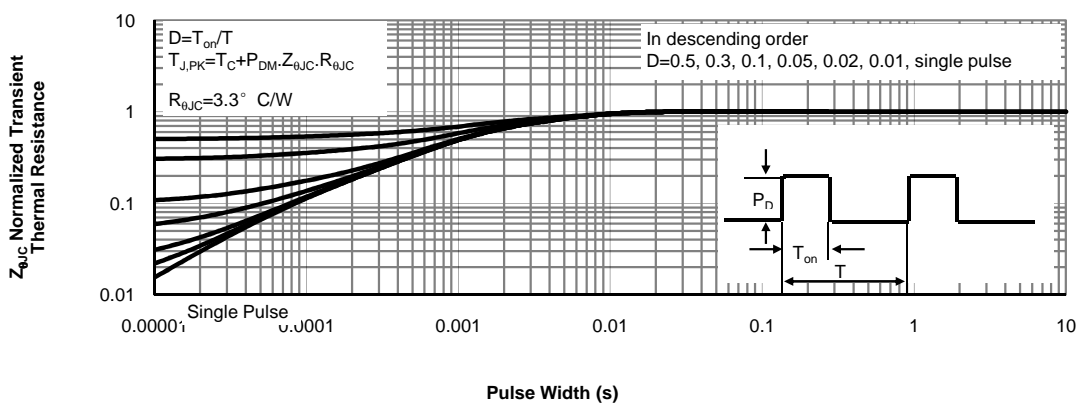


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

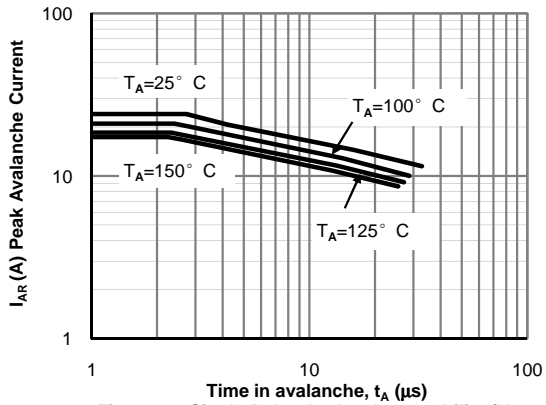


Figure 12: Single Pulse Avalanche capability (Note C)

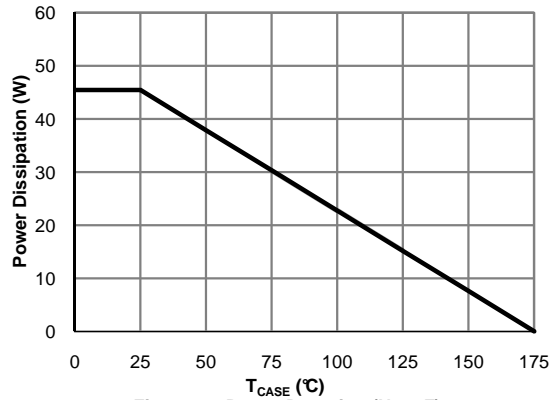


Figure 13: Power De-rating (Note F)

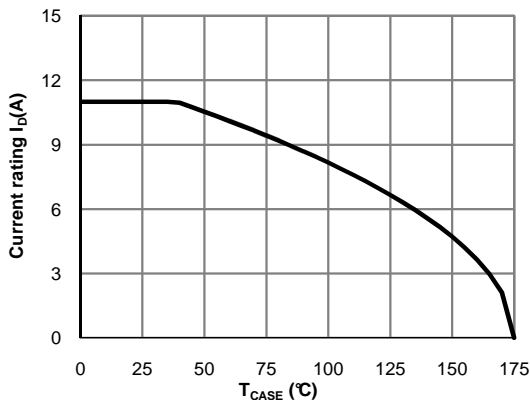


Figure 14: Current De-rating (Note F)

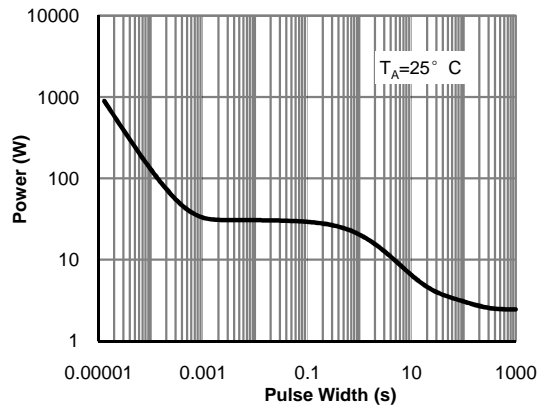


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

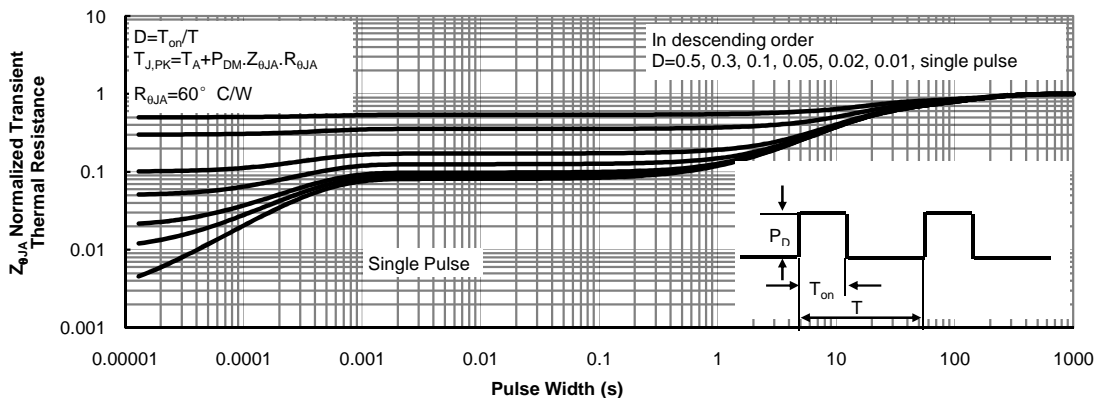
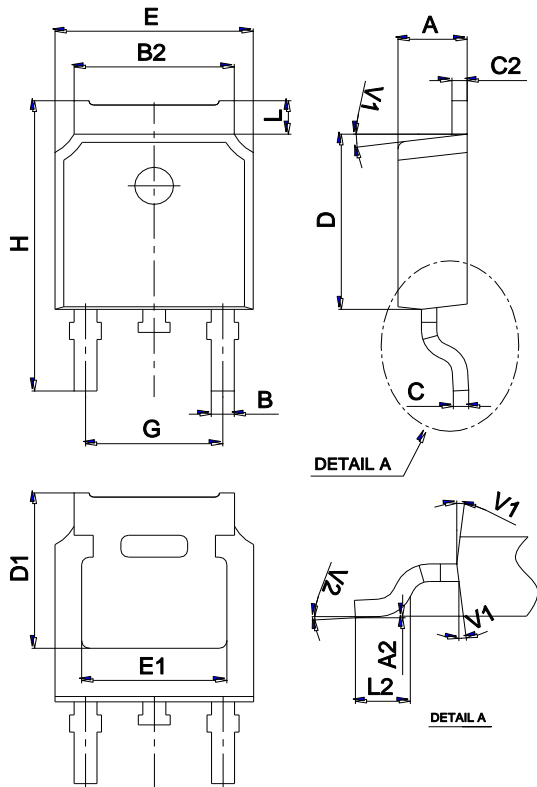


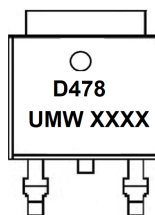
Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

Package Mechanical Data TO-252



| Ref. | Dimensions  |      |       |          |      |       |
|------|-------------|------|-------|----------|------|-------|
|      | Millimeters |      |       | Inches   |      |       |
|      | Min.        | Typ. | Max.  | Min.     | Typ. | Max.  |
| A    | 2.10        |      | 2.50  | 0.083    |      | 0.098 |
| A2   | 0           |      | 0.10  | 0        |      | 0.004 |
| B    | 0.66        |      | 0.86  | 0.026    |      | 0.034 |
| B2   | 5.18        |      | 5.48  | 0.202    |      | 0.216 |
| C    | 0.40        |      | 0.60  | 0.016    |      | 0.024 |
| C2   | 0.44        |      | 0.58  | 0.017    |      | 0.023 |
| D    | 5.90        |      | 6.30  | 0.232    |      | 0.248 |
| D1   | 5.30REF     |      |       | 0.209REF |      |       |
| E    | 6.40        |      | 6.80  | 0.252    |      | 0.268 |
| E1   | 4.63        |      |       | 0.182    |      |       |
| G    | 4.47        |      | 4.67  | 0.176    |      | 0.184 |
| H    | 9.50        |      | 10.70 | 0.374    |      | 0.421 |
| L    | 1.09        |      | 1.21  | 0.043    |      | 0.048 |
| L2   | 1.35        |      | 1.65  | 0.053    |      | 0.065 |
| V1   |             | 7°   |       |          | 7°   |       |
| V2   | 0°          |      | 6°    | 0°       |      | 6°    |

Marking



Ordering information

| Order code | Package | Baseqty | Deliverymode  |
|------------|---------|---------|---------------|
| UMW AOD478 | TO-252  | 2500    | Tape and reel |

## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [MOSFET](#) category:*

*Click to view products by [Youtai](#) manufacturer:*

Other Similar products are found below :

[IRFD120](#) [JANTX2N5237](#) [2SK2267\(Q\)](#) [BUK455-60A/B](#) [TK100A10N1,S4X\(S](#) [MIC4420CM-TR](#) [VN1206L](#) [NDP4060](#) [SI4482DY](#)  
[IRS2092STRPBF-EL](#) [IPS70R2K0CEAKMA1](#) [TK31J60W5,S1VQ\(O](#) [TK31J60W,S1VQ\(O](#) [TK16J60W,S1VQ\(O](#) [2SK2614\(TE16L1,Q\)](#)  
[DMN1017UCP3-7](#) [EFC2J004NUZTDG](#) [P85W28HP2F-7071](#) [DMN1053UCP4-7](#) [NTE2384](#) [DMC2700UDMQ-7](#) [DMN2080UCB4-7](#)  
[DMN61D9UWQ-13](#) [US6M2GTR](#) [DMN31D5UDJ-7](#) [DMP22D4UFO-7B](#) [IPS60R3K4CEAKMA1](#) [DMN1006UCA6-7](#) [DMN16M9UCA6-7](#)  
[STF5N65M6](#) [IRF40H233XTMA1](#) [STU5N65M6](#) [DMN6022SSD-13](#) [DMN13M9UCA6-7](#) [DMTH10H4M6SPS-13](#) [IPS60R360PFD7SAKMA1](#)  
[DMN2990UFB-7B](#) [SSM3K35CT,L3F](#) [IPLK60R1K0PFD7ATMA1](#) [2N7002W-G](#) [MCAC30N06Y-TP](#) [IPWS65R035CFD7AXKSA1](#)  
[MCQ7328-TP](#) [SSM3J143TU,LXHF](#) [DMN12M3UCA6-7](#) [PJMF280N65E1\\_T0\\_00201](#) [PJMF380N65E1\\_T0\\_00201](#)  
[PJMF280N60E1\\_T0\\_00201](#) [PJMF600N65E1\\_T0\\_00201](#) [PJMF900N65E1\\_T0\\_00201](#)