

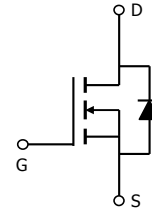
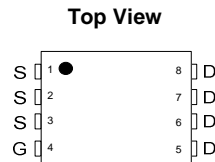
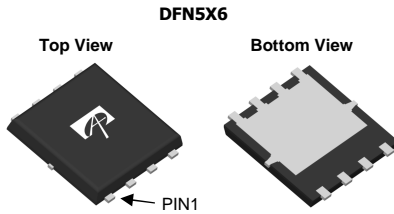
**General Description**

The AON6202 uses trench MOSFET technology that is uniquely optimized to provide the most efficient high frequency switching performance. Power losses are minimized due to an extremely low combination of  $R_{DS(ON)}$  and  $C_{rss}$ . In addition, switching behavior is well controlled with a "Schottky style" soft recovery body diode.

**Product Summary**

|                                    |                 |
|------------------------------------|-----------------|
| $V_{DS}$                           | 30V             |
| $I_D$ (at $V_{GS}=10V$ )           | 24A             |
| $R_{DS(ON)}$ (at $V_{GS}=10V$ )    | < 5.5m $\Omega$ |
| $R_{DS(ON)}$ (at $V_{GS} = 4.5V$ ) | < 7.5m $\Omega$ |

100% UIS Tested  
 100%  $R_g$  Tested


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

| Parameter                                      | Symbol           | Maximum                 | Units            |
|------------------------------------------------|------------------|-------------------------|------------------|
| Drain-Source Voltage                           | $V_{DS}$         | 30                      | V                |
| Gate-Source Voltage                            | $V_{GS}$         | $\pm 20$                | V                |
| Continuous Drain Current <sup>G</sup>          | $I_D$            | $T_C=25^\circ\text{C}$  | 24               |
|                                                |                  | $T_C=100^\circ\text{C}$ | 19               |
| Pulsed Drain Current <sup>C</sup>              | $I_{DM}$         | 150                     | A                |
| Continuous Drain Current                       | $I_{DSM}$        | $T_A=25^\circ\text{C}$  | 21               |
|                                                |                  | $T_A=70^\circ\text{C}$  | 17               |
| Avalanche Current <sup>C</sup>                 | $I_{AS}, I_{AR}$ | 38                      | A                |
| Avalanche energy $L=0.1\text{mH}$ <sup>C</sup> | $E_{AS}, E_{AR}$ | 72                      | mJ               |
| Power Dissipation <sup>B</sup>                 | $P_D$            | $T_C=25^\circ\text{C}$  | 35               |
|                                                |                  | $T_C=100^\circ\text{C}$ | 14               |
| Power Dissipation <sup>A</sup>                 | $P_{DSM}$        | $T_A=25^\circ\text{C}$  | 4.2              |
|                                                |                  | $T_A=70^\circ\text{C}$  | 2.7              |
| Junction and Storage Temperature Range         | $T_J, T_{STG}$   | -55 to 150              | $^\circ\text{C}$ |

**Thermal Characteristics**

| Parameter                                  | Symbol          | Typ          | Max | Units                     |
|--------------------------------------------|-----------------|--------------|-----|---------------------------|
| Maximum Junction-to-Ambient <sup>A</sup>   | $R_{\theta JA}$ | 25           | 30  | $^\circ\text{C}/\text{W}$ |
| Maximum Junction-to-Ambient <sup>A D</sup> |                 | Steady-State | 55  | 65                        |
| Maximum Junction-to-Case                   | $R_{\theta JC}$ | 2.6          | 3.5 | $^\circ\text{C}/\text{W}$ |

**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                                                 | 30   |          |            | V     |
| I <sub>DSS</sub>            | Zero Gate Voltage Drain Current       | V <sub>DS</sub> =30V, 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                                     | 1.3  | 1.8      | 2.3        | V     |
| I <sub>D(ON)</sub>          | On state drain current                | V <sub>GS</sub> =10V, V <sub>DS</sub> =5V                                                  | 150  |          |            | A     |
| R <sub>DS(ON)</sub>         | Static Drain-Source On-Resistance     | V <sub>GS</sub> =10V, I <sub>D</sub> =20A<br>T <sub>J</sub> =125°C                         |      | 4.5<br>7 | 5.5<br>8.5 | mΩ    |
|                             |                                       | V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A                                                 |      | 5.8      | 7.5        |       |
| g <sub>FS</sub>             | Forward Transconductance              | V <sub>DS</sub> =5V, I <sub>D</sub> =20A                                                   |      | 66       |            | 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 |                                                                                            |      |          | 40         | A     |
| <b>DYNAMIC PARAMETERS</b>   |                                       |                                                                                            |      |          |            |       |
| C <sub>iss</sub>            | Input Capacitance                     | V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, f=1MHz                                          | 1450 | 1840     | 2200       | pF    |
| C <sub>oss</sub>            | Output Capacitance                    |                                                                                            | 500  | 720      | 940        | pF    |
| C <sub>rss</sub>            | Reverse Transfer Capacitance          |                                                                                            | 38   | 63       | 110        | pF    |
| R <sub>g</sub>              | Gate resistance                       | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz                                           | 0.3  | 0.7      | 1.1        | Ω     |
| <b>SWITCHING PARAMETERS</b> |                                       |                                                                                            |      |          |            |       |
| Q <sub>g(10V)</sub>         | Total Gate Charge                     | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, I <sub>D</sub> =20A                            | 21   | 27       | 33         | nC    |
| Q <sub>g(4.5V)</sub>        | Total Gate Charge                     |                                                                                            | 10   | 12       | 15         | nC    |
| Q <sub>gs</sub>             | Gate Source Charge                    |                                                                                            | 3    | 4.2      | 5          | nC    |
| Q <sub>gd</sub>             | Gate Drain Charge                     |                                                                                            | 2.5  | 4.2      | 6          | nC    |
| t <sub>D(on)</sub>          | Turn-On DelayTime                     | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, R <sub>L</sub> =0.75Ω,<br>R <sub>GEN</sub> =3Ω |      | 6.5      |            | ns    |
| t <sub>r</sub>              | Turn-On Rise Time                     |                                                                                            |      | 7        |            | ns    |
| t <sub>D(off)</sub>         | Turn-Off DelayTime                    |                                                                                            |      | 21       |            | ns    |
| t <sub>f</sub>              | Turn-Off Fall Time                    |                                                                                            |      | 3.5      |            | ns    |
| t <sub>rr</sub>             | Body Diode Reverse Recovery Time      | I <sub>F</sub> =20A, dI/dt=500A/μs                                                         | 12   | 15       | 18         | ns    |
| Q <sub>rr</sub>             | Body Diode Reverse Recovery Charge    | I <sub>F</sub> =20A, dI/dt=500A/μs                                                         | 25   | 32       | 38         | 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.

B. The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=150°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>=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 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.

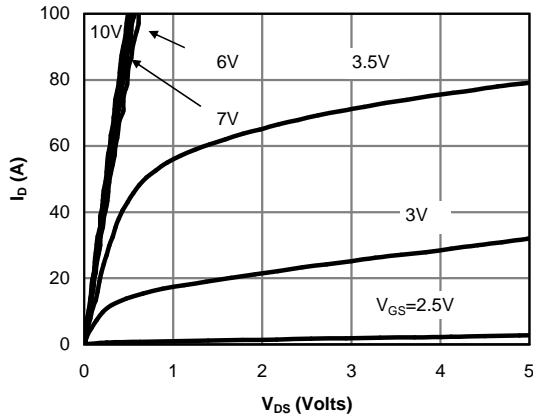
F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T<sub>J(MAX)</sub>=150°C. The SOA curve provides a single pulse rating.

G. The maximum current rating is limited by bond-wires.

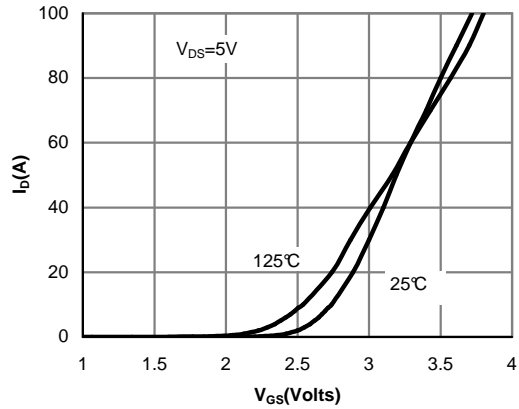
H. These tests are performed with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C.

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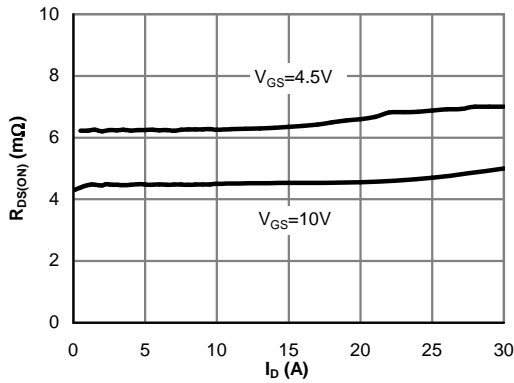
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**



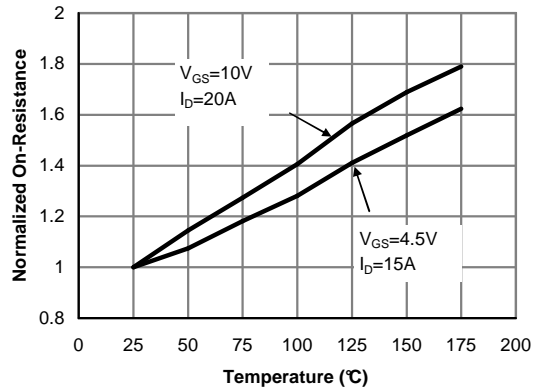
**Fig 1: On-Region Characteristics (Note E)**



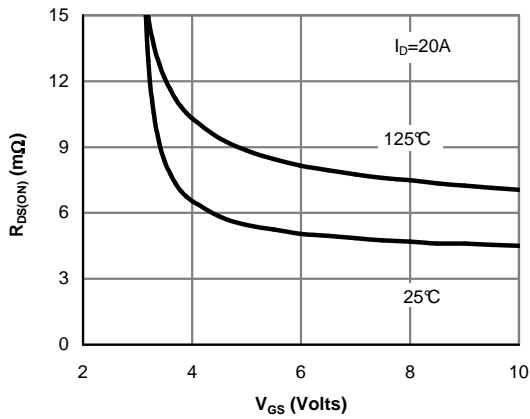
**Figure 2: Transfer Characteristics (Note E)**



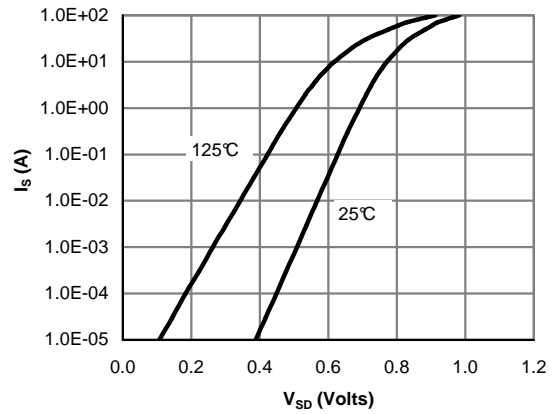
**Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)**



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

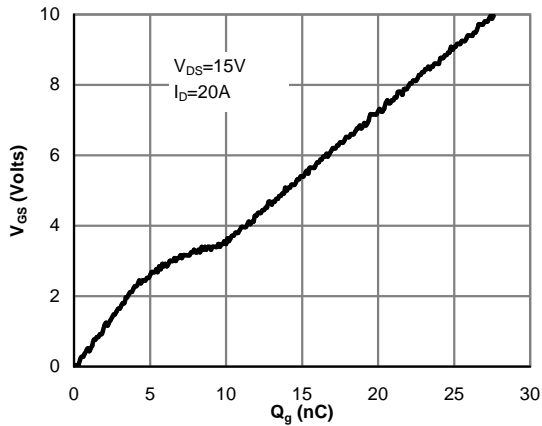


**Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)**

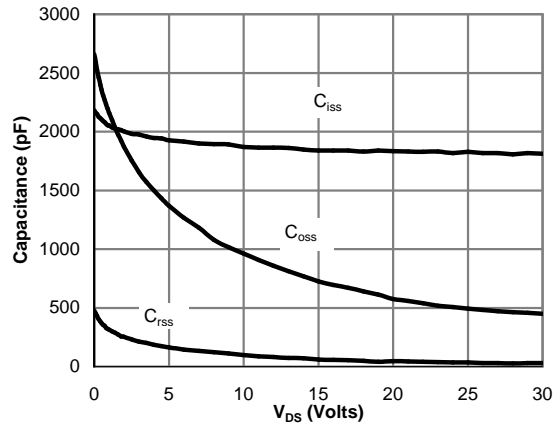


**Figure 6: Body-Diode Characteristics (Note E)**

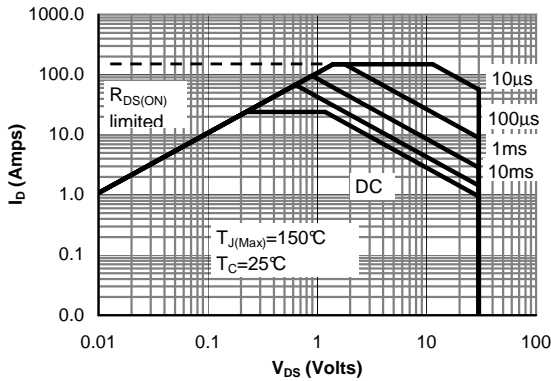
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**



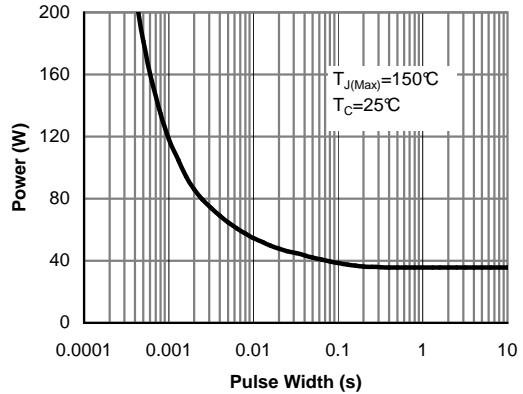
**Figure 7: Gate-Charge Characteristics**



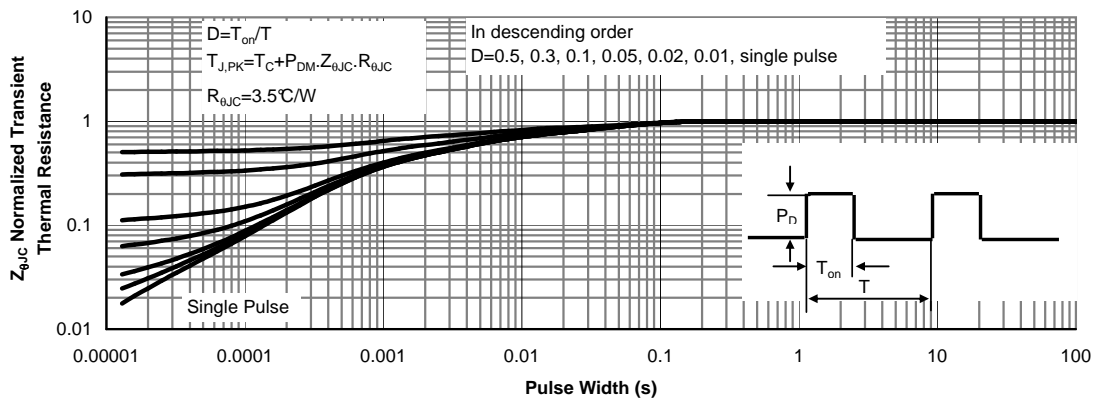
**Figure 8: Capacitance Characteristics**



**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**

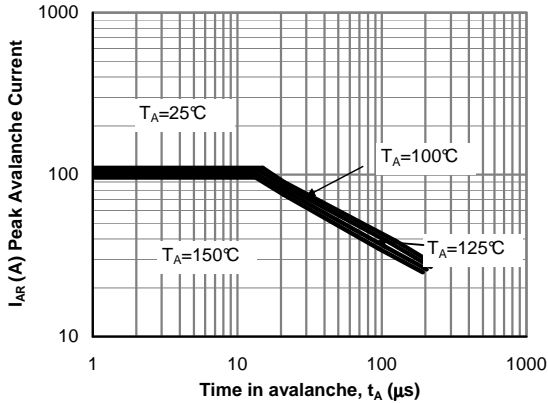


Figure 12: Single Pulse Avalanche capability (Note C)

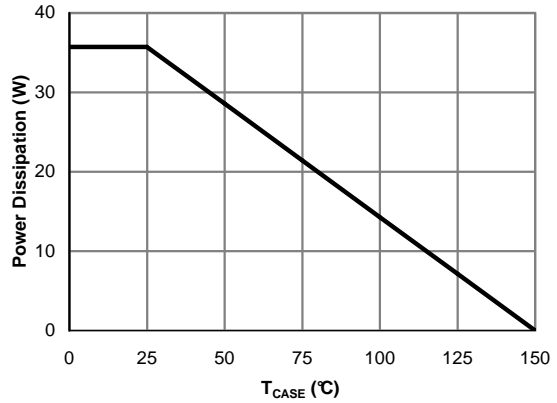


Figure 13: Power De-rating (Note F)

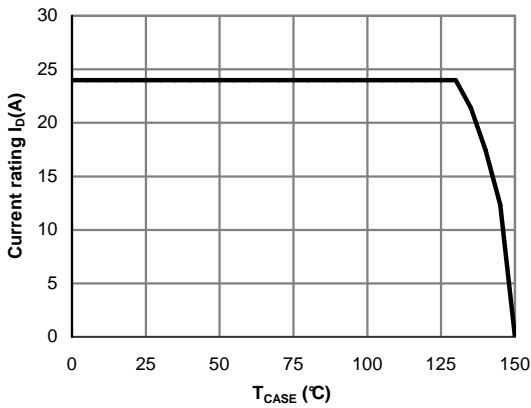


Figure 14: Current De-rating (Note F)

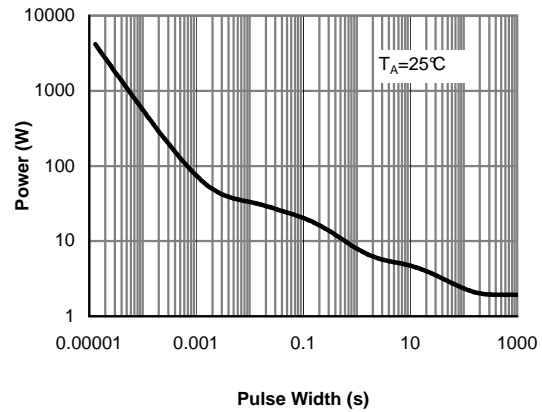


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

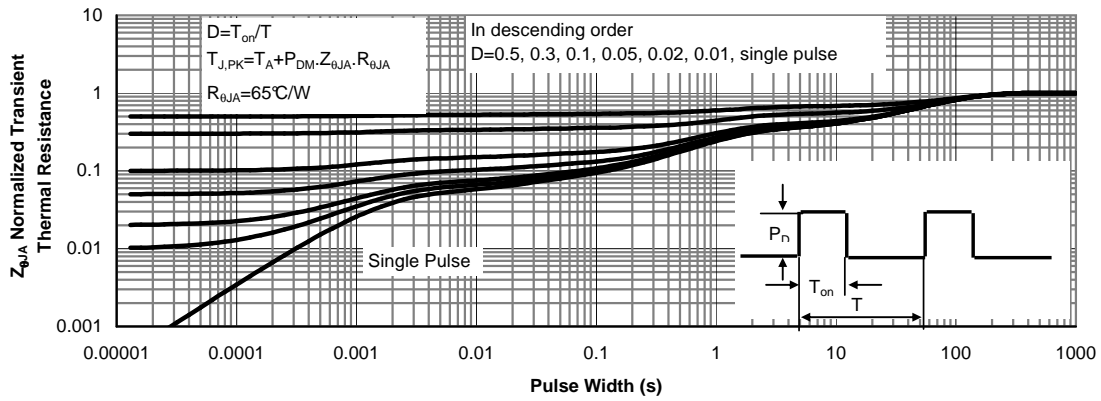


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

**Gate Charge Test Circuit & Waveform**



**Resistive Switching Test Circuit & Waveforms**



**Unclamped Inductive Switching (UIS) Test Circuit & Waveforms**



**Diode Recovery Test Circuit & Waveforms**

