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**ALPHA & OMEGA**  
SEMICONDUCTOR

**AON2240**

**40V N-Channel MOSFET**

### General Description

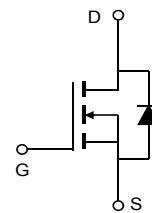
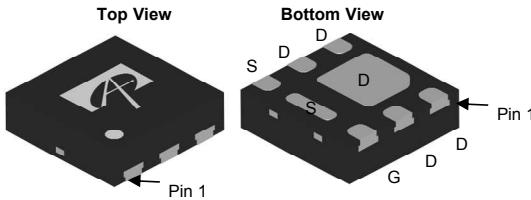
The AON2240 combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . This device is ideal for load switch and battery protection applications.

### Product Summary

$V_{DS}$	40V
$I_D$ (at $V_{GS}=10V$ )	8A
$R_{DS(ON)}$ (at $V_{GS}=10V$ )	< 21mΩ
$R_{DS(ON)}$ (at $V_{GS}=4.5V$ )	< 29mΩ



DFN 2x2B



### 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 <sup>G</sup>	$I_D$	8	A
		6	
Pulsed Drain Current <sup>C</sup>	$I_{DM}$	32	
Power Dissipation <sup>A</sup>	$P_D$	2.8	W
		1.8	
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	°C

### Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>A</sup>   $t \leq 10s$	$R_{\theta JA}$	37	45	°C/W
Maximum Junction-to-Ambient <sup>AD</sup>   Steady-State		66	80	°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 T <sub>J</sub> =55°C			1 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	1.4	1.9	2.4	V
I <sub>D(ON)</sub>	On state drain current	V <sub>GS</sub> =10V, V <sub>DS</sub> =5V	32			A
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =8A T <sub>J</sub> =125°C	16.8	21		mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A	24.5	31		
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =8A	33			S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1A, V <sub>GS</sub> =0V	0.75	1		V
I <sub>S</sub>	Maximum Body-Diode Continuous Current				3.5	A
<b>DYNAMIC PARAMETERS</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =20V, f=1MHz		415		pF
C <sub>oss</sub>	Output Capacitance			112		pF
C <sub>rss</sub>	Reverse Transfer Capacitance			11		pF
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	1	2.2	3.5	Ω
<b>SWITCHING PARAMETERS</b>						
Q <sub>g</sub> (10V)	Total Gate Charge	V <sub>GS</sub> =10V, V <sub>DS</sub> =20V, I <sub>D</sub> =8A		6.5	12	nC
Q <sub>g</sub> (4.5V)	Total Gate Charge			3	6	nC
Q <sub>gs</sub>	Gate Source Charge			1.2		nC
Q <sub>gd</sub>	Gate Drain Charge			1.1		nC
t <sub>D(on)</sub>	Turn-On Delay Time	V <sub>GS</sub> =10V, V <sub>DS</sub> =20V, R <sub>L</sub> =2.5Ω, R <sub>GEN</sub> =3Ω		4		ns
t <sub>r</sub>	Turn-On Rise Time			3		ns
t <sub>D(off)</sub>	Turn-Off Delay Time			15		ns
t <sub>f</sub>	Turn-Off Fall Time			2		ns
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =8A, dI/dt=100A/μs		12.5		ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge	I <sub>F</sub> =8A, dI/dt=100A/μs		3.5		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> t ≤ 10s value 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>θJC</sub> is the sum of the thermal impedance from junction to case R<sub>θJC</sub> and case to ambient.

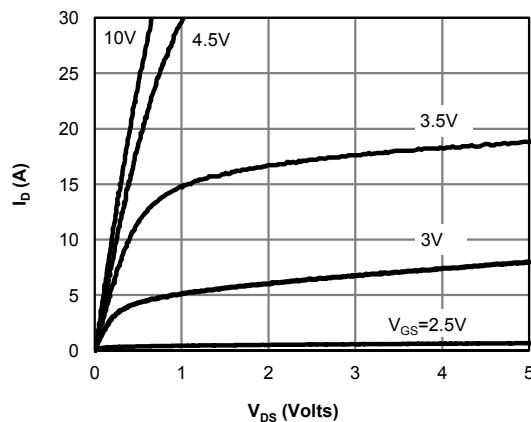
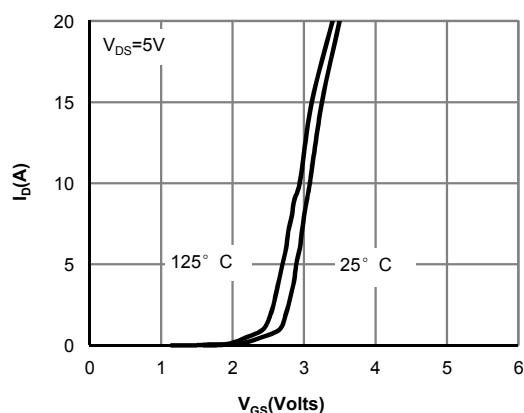
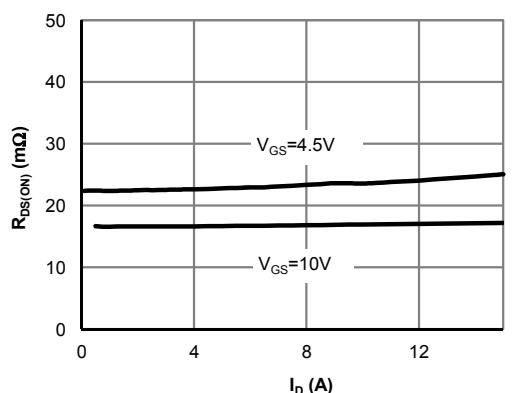
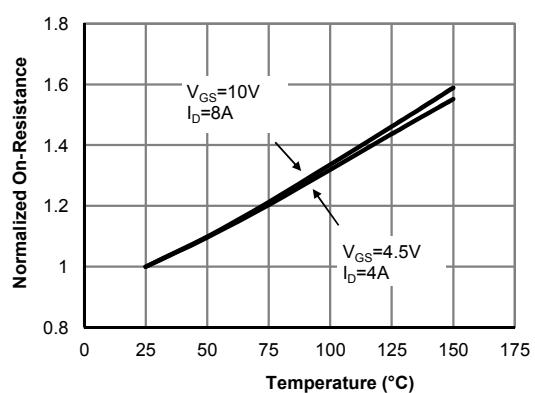
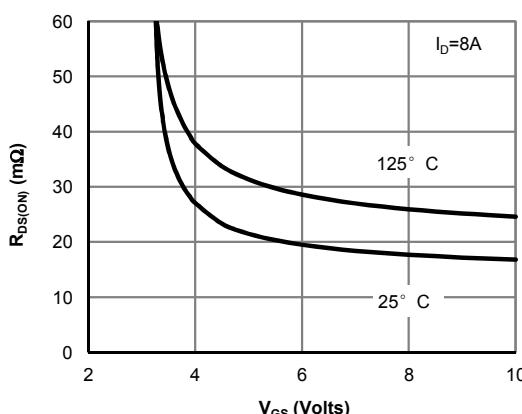
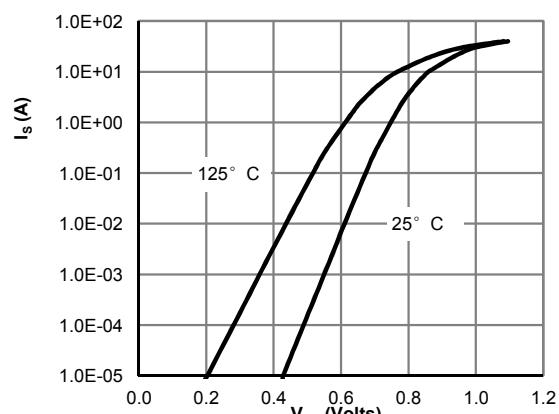
E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

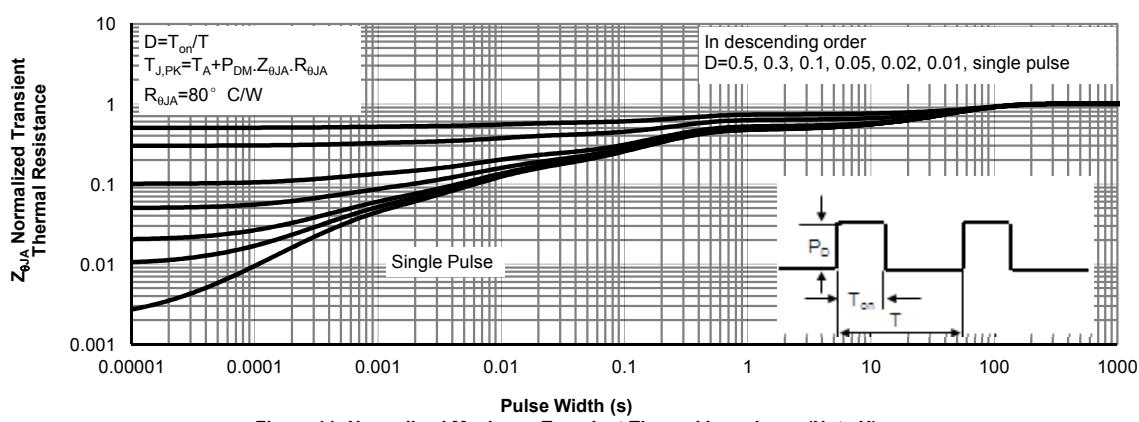
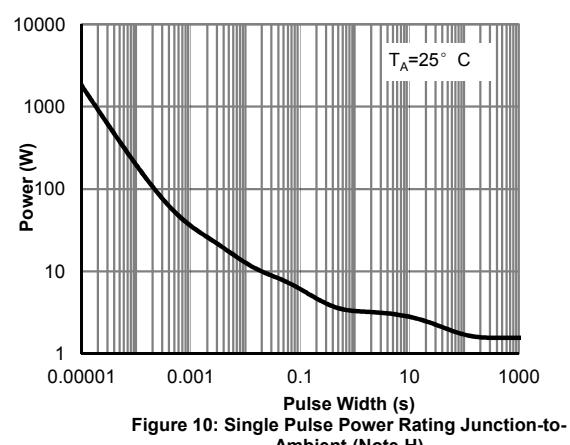
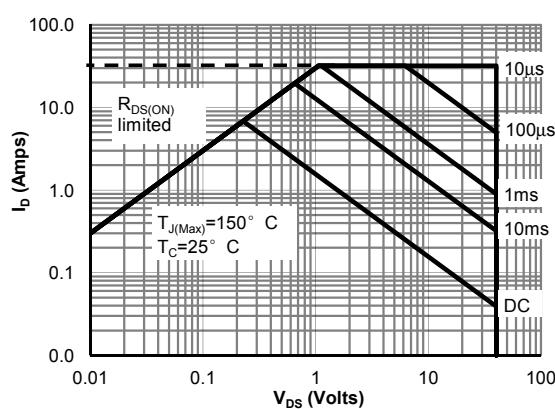
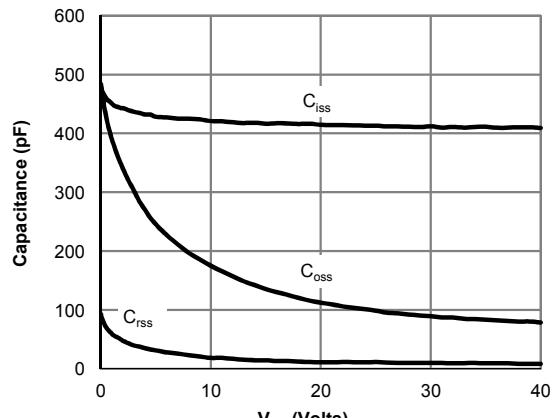
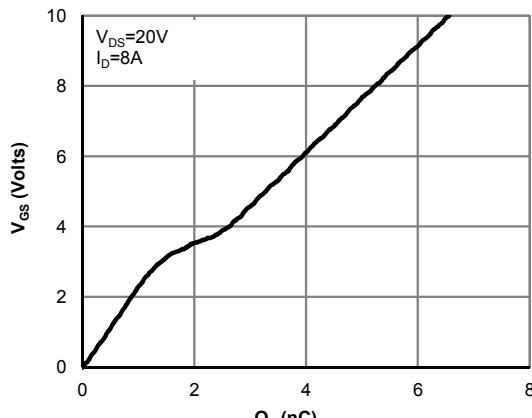
F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T<sub>J(MAX)</sub>=150° C. The SOA curve provides a single pulse rating.

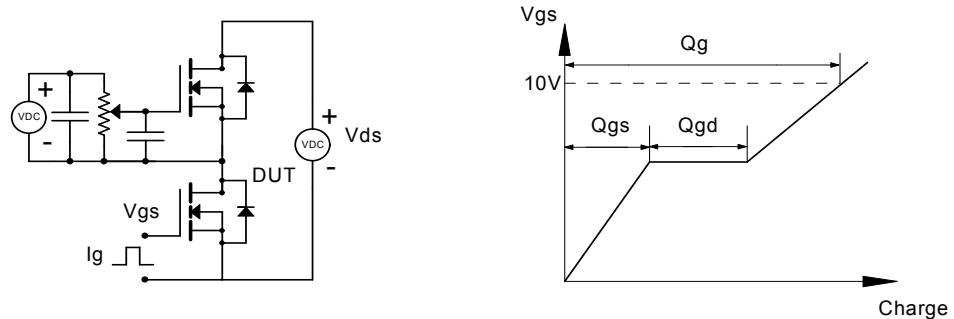
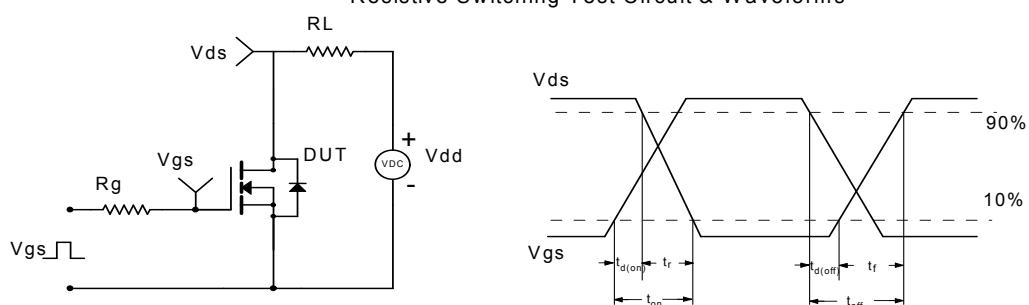
G. The maximum current rating is package limited.

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.

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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**


**Gate Charge Test Circuit & Waveform**

**Resistive Switching Test Circuit & Waveforms**

**Diode Recovery Test Circuit & Waveforms**
