ALPHA & OMEGA
## SEMICONDUCTOR

AON2260
60V N-Channel MOSFET

General Description

The AON2260 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

Product Summary

V_{DS}	60V
I_D (at V_{GS}=10V)	6A
$R_{DS(ON)}$ (at V_{GS} = 10V)	< 44mΩ
$R_{DS(ON)}$ (at V_{GS} = 4.5V)	< 53mΩ

Green Product

DFN 2x2B

Top View   Bottom View

Pin 1
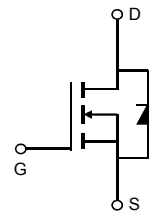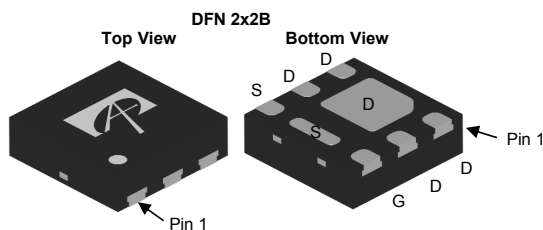
Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_A=25°C	I_D	6	A
	T_A=70°C		4.7	
Pulsed Drain Current [C]		I_{DM}	30	A
Power Dissipation [A]	T_A=25°C	P_D	2.8	W
	T_A=70°C		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 [A]	t ≤ 10s	$R_{\theta JA}$	37	45	°C/W
Maximum Junction-to-Ambient [A D]	Steady-State		66	80	°C/W

Electrical Characteristics (T$_J$=25°C unless otherwise noted)

Symbol	Parameter	Conditions		Min	Typ	Max	Units
STATIC PARAMETERS							
BV$_{DSS}$	Drain-Source Breakdown Voltage	I$_D$=250µA, V$_{GS}$=0V		60			V
I$_{DSS}$	Zero Gate Voltage Drain Current	V$_{DS}$=60V, V$_{GS}$=0V				1	µA
			T$_J$=55°C			5	
I$_{GSS}$	Gate-Body leakage current	V$_{DS}$=0V, V$_{GS}$=±20V				±100	nA
V$_{GS(th)}$	Gate Threshold Voltage	V$_{DS}$=V$_{GS}$, I$_D$=250µA		1.5	2	2.5	V
I$_{D(ON)}$	On state drain current	V$_{GS}$=10V, V$_{DS}$=5V		30			A
R$_{DS(ON)}$	Static Drain-Source On-Resistance	V$_{GS}$=10V, I$_D$=6A			36	44	mΩ
			T$_J$=125°C		61.5	75	
		V$_{GS}$=4.5V, I$_D$=4A			42	53	mΩ
g$_{FS}$	Forward Transconductance	V$_{DS}$=5V, I$_D$=6A			21		S
V$_{SD}$	Diode Forward Voltage	I$_S$=1A, V$_{GS}$=0V			0.75	1	V
I$_S$	Maximum Body-Diode Continuous Current					3.5	A
DYNAMIC PARAMETERS							
C$_{iss}$	Input Capacitance	V$_{GS}$=0V, V$_{DS}$=30V, f=1MHz			426		pF
C$_{oss}$	Output Capacitance				50		pF
C$_{rss}$	Reverse Transfer Capacitance				5		pF
R$_g$	Gate resistance	V$_{GS}$=0V, V$_{DS}$=0V, f=1MHz		1	2.3	3.5	Ω
SWITCHING PARAMETERS							
Q$_{g}$(10V)	Total Gate Charge	V$_{GS}$=10V, V$_{DS}$=30V, I$_D$=6A			6.1	12	nC
Q$_{g}$(4.5V)	Total Gate Charge				2.6	6	nC
Q$_{gs}$	Gate Source Charge				1.2		nC
Q$_{gd}$	Gate Drain Charge				0.8		nC
t$_{D(on)}$	Turn-On DelayTime	V$_{GS}$=10V, V$_{DS}$=30V, R$_L$=5Ω, R$_{GEN}$=3Ω			3		ns
t$_r$	Turn-On Rise Time				2.5		ns
t$_{D(off)}$	Turn-Off DelayTime				15		ns
t$_f$	Turn-Off Fall Time				1.5		ns
t$_{rr}$	Body Diode Reverse Recovery Time	I$_F$=6A, dI/dt=100A/µs			27		ns
Q$_{rr}$	Body Diode Reverse Recovery Charge	I$_F$=6A, dI/dt=100A/µs			12		nC

A. The value of R$_{θJA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T$_A$ =25° C. The Power dissipation P$_{DSM}$ is based on R$_{θJA}$ 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$_D$ is based on T$_{J(MAX)}$=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$_{J(MAX)}$=150° C. Ratings are based on low frequency and duty cycles to keep initial T$_J$ =25° C.
D. The R$_{θJA}$ is the sum of the thermal impedance from junction to case R$_{θJC}$ and case to ambient.
E. The static characteristics in Figures 1 to 6 are obtained using <300µs pulses, duty cycle 0.5% max.
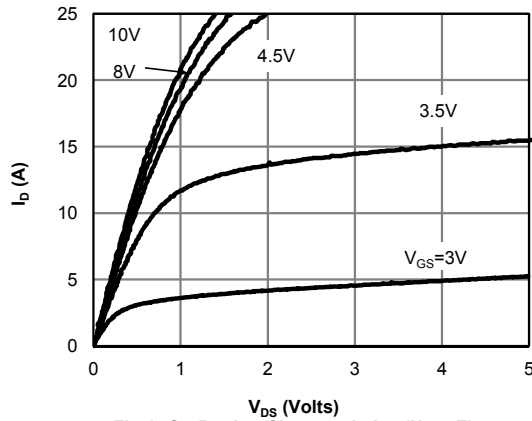F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T$_{J(MAX)}$=150° C. The SOA curve provides a single pulse rating.
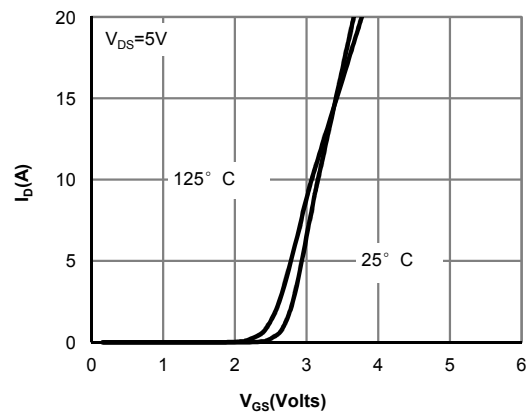G. The maximum current rating is package limited.
H. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T$_A$=25° C.
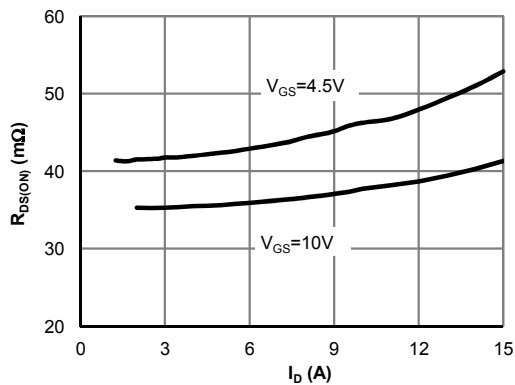
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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS
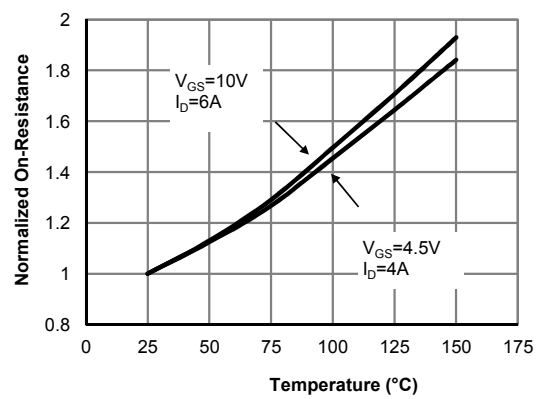

Fig 1: On-Region Characteristics (Note E)
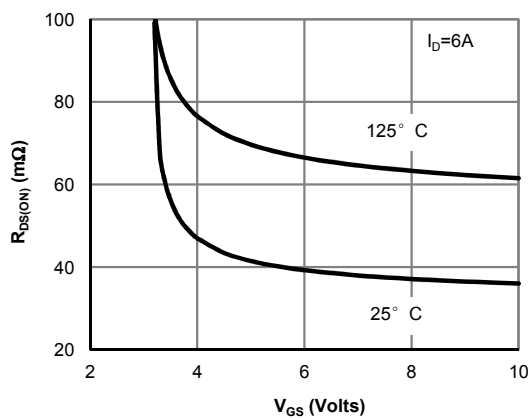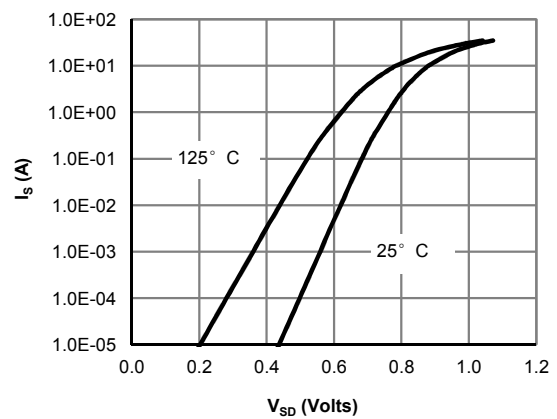

Figure 2: Transfer Characteristics (Note E)

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)
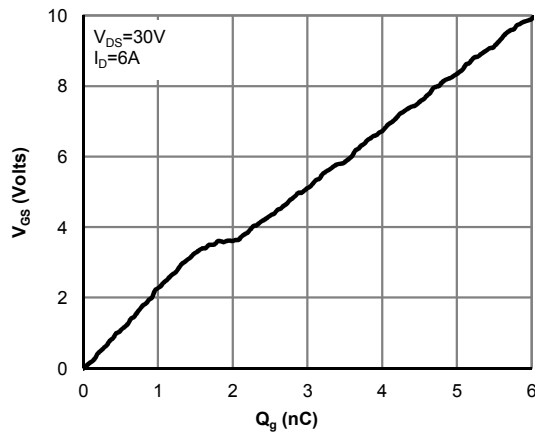
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7: Gate-Charge Characteristics

V_{DS}=30V
I_D=6A
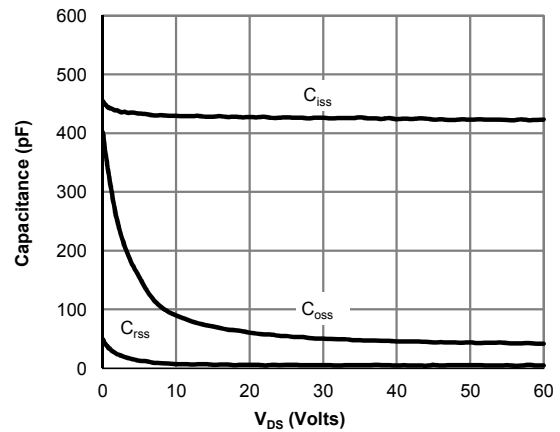
Figure 8: Capacitance Characteristics

C_{iss}
C_{oss}
C_{rss}
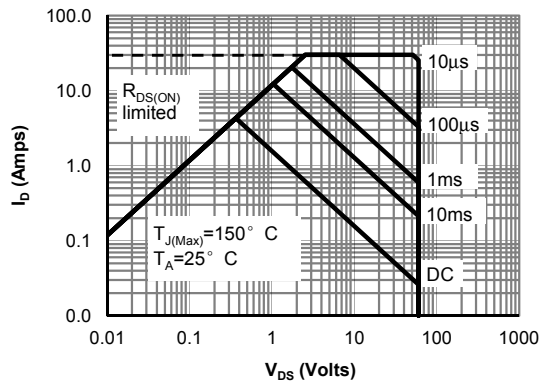
Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

$R_{DS(ON)}$ limited
10µs
100µs
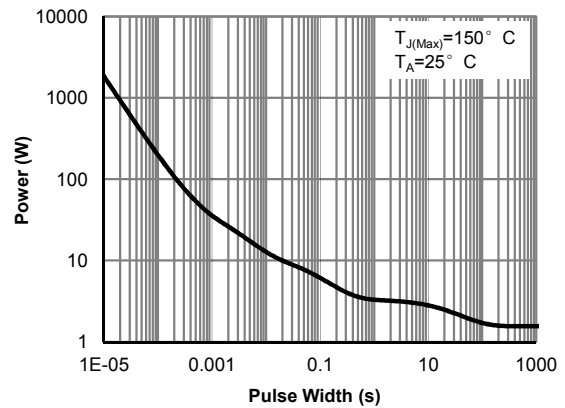1ms
10ms
DC
$T_{J(Max)}$=150° C
T_A=25° C

Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)
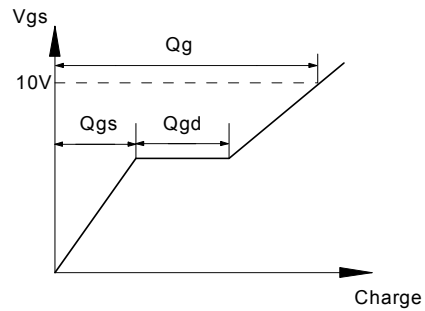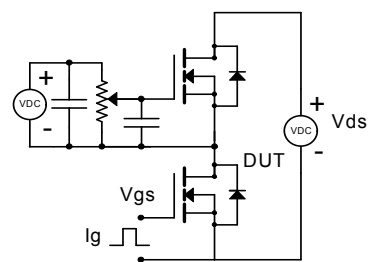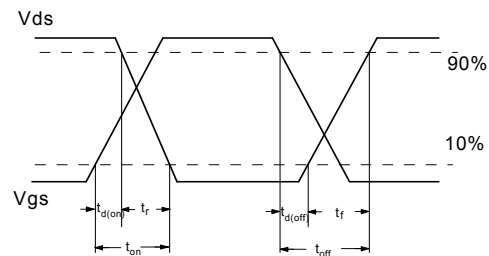
$T_{J(Max)}$=150° C
T_A=25° C
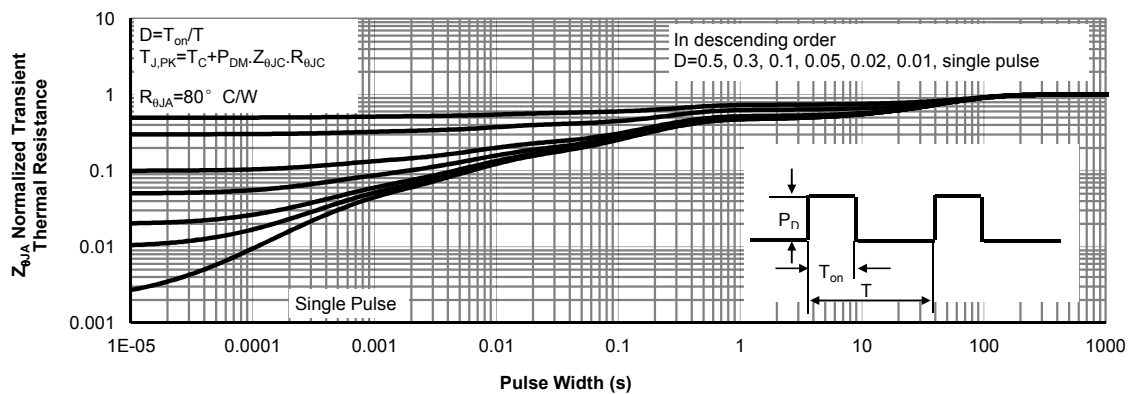
Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

D=T_{on}/T
$T_{J,PK}$=T_C+P_{DM}·$Z_{\theta JC}$·$R_{\theta JC}$
$R_{\theta JA}$=80° C/W

In descending order
D=0.5, 0.3, 0.1, 0.05, 0.02, 0.01, single pulse
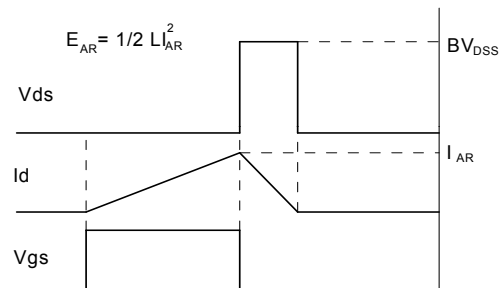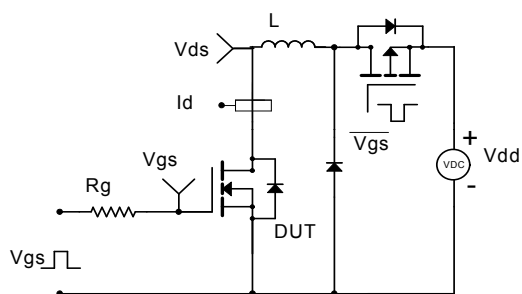
P_D
T_{on}
T

Single Pulse

Gate Charge Test Circuit & Waveform

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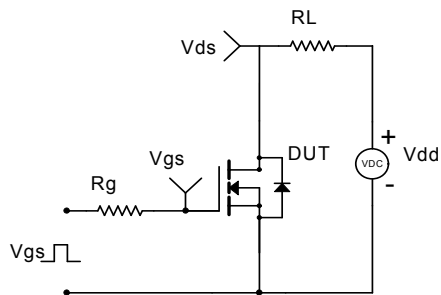
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

$E_{AR} = 1/2 \, LI_{AR}^2$

Diode Recovery Test Circuit & Waveforms

$Q_{rr} = -\int Idt$