



**General Description**

- Trench Power AlphaSGT™ technology
- Low R<sub>DS(ON)</sub>
- Low Gate Charge
- Optimized for Fast-Switching Applications
- RoHS and Halogen-Free Compliant

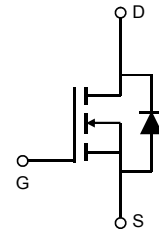
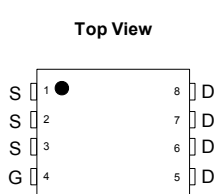
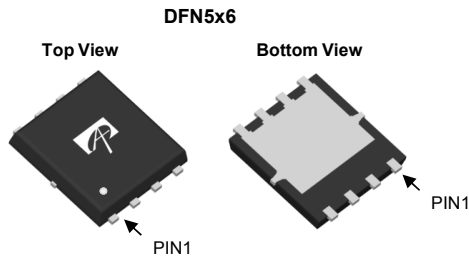
**Applications**

- Synchronous Rectification in DC/DC and AC/DC Converters
- Industrial and Motor Drive applications

**Product Summary**

V <sub>DS</sub>	60V
I <sub>D</sub> (at V <sub>GS</sub> =10V)	100A
R <sub>DS(ON)</sub> (at V <sub>GS</sub> =10V)	< 1.65mΩ
R <sub>DS(ON)</sub> (at V <sub>GS</sub> =6V)	< 2.5mΩ

100% UIS Tested  
100% Rg Tested



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AONS66612	DFN 5x6	Tape & Reel	3000

**Absolute Maximum Ratings T<sub>A</sub>=25°C unless otherwise noted**

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V <sub>DS</sub>	60	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current <sup>G</sup>	I <sub>D</sub>	T <sub>C</sub> =25°C	100
		T <sub>C</sub> =100°C	100
Pulsed Drain Current <sup>C</sup>	I <sub>DM</sub>	400	A
Continuous Drain Current	I <sub>DSM</sub>	T <sub>A</sub> =25°C	46
		T <sub>A</sub> =70°C	37
Avalanche Current <sup>C</sup>	I <sub>AS</sub>	48	A
Avalanche energy L=0.3mH <sup>C</sup>	E <sub>AS</sub>	346	mJ
Power Dissipation <sup>B</sup>	P <sub>D</sub>	T <sub>C</sub> =25°C	208
		T <sub>C</sub> =100°C	83
Power Dissipation <sup>A</sup>	P <sub>DSM</sub>	T <sub>A</sub> =25°C	6.2
		T <sub>A</sub> =70°C	4.0
Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C

**Thermal Characteristics**

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>A</sup> t ≤ 10s	R <sub>θJA</sub>	15	20	°C/W
Maximum Junction-to-Ambient <sup>A,D</sup> Steady-State		40	50	°C/W
Maximum Junction-to-Case Steady-State	R <sub>θJC</sub>	0.46	0.6	°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	60			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =60V, 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	2.3	2.85	3.5	V
R <sub>DS(on)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =20A T <sub>J</sub> =125°C		1.4	1.65	mΩ
		V <sub>GS</sub> =6V, I <sub>D</sub> =20A		2.25	2.7	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =20A		100		S
V <sub>SD</sub>	Diode Forward Voltage	I <sub>S</sub> =1A, V <sub>GS</sub> =0V		0.67	1	V
I <sub>S</sub>	Maximum Body-Diode Continuous Current <sup>G</sup>				100	A
<b>DYNAMIC PARAMETERS</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =30V, f=1MHz		5300		pF
C <sub>oss</sub>	Output Capacitance			1500		pF
C <sub>riss</sub>	Reverse Transfer Capacitance			50		pF
R <sub>g</sub>	Gate resistance	f=1MHz	0.4	0.9	1.4	Ω
<b>SWITCHING PARAMETERS</b>						
Q <sub>g(10V)</sub>	Total Gate Charge	V <sub>GS</sub> =10V, V <sub>DS</sub> =30V, I <sub>D</sub> =20A		78	110	nC
Q <sub>gs</sub>	Gate Source Charge			20		nC
Q <sub>gd</sub>	Gate Drain Charge			20		nC
Q <sub>oss</sub>	Output Charge	V <sub>GS</sub> =0V, V <sub>DS</sub> =30V		92		nC
t <sub>D(on)</sub>	Turn-On DelayTime	V <sub>GS</sub> =10V, V <sub>DS</sub> =30V, R <sub>L</sub> =1.5Ω, R <sub>GEN</sub> =3Ω		18		ns
t <sub>r</sub>	Turn-On Rise Time			10		ns
t <sub>D(off)</sub>	Turn-Off DelayTime			40		ns
t <sub>f</sub>	Turn-Off Fall Time			13		ns
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =20A, di/dt=500A/μs		30		ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge	I <sub>F</sub> =20A, di/dt=500A/μs		135		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> ≤ 10s 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. Single pulse width limited by junction temperature T<sub>J(MAX)</sub>=150° 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 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

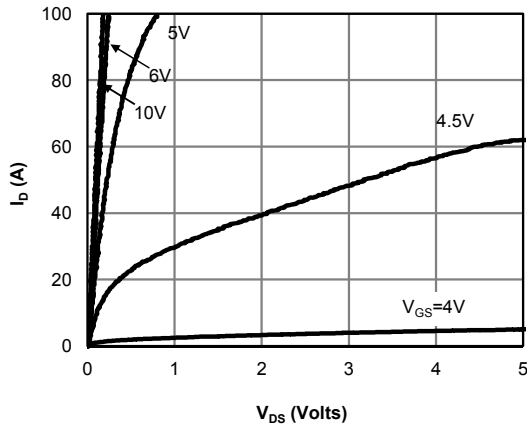


Figure 1: On-Region Characteristics (Note E)

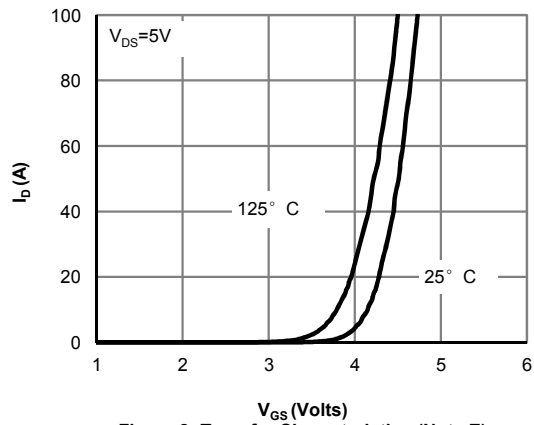


Figure 2: Transfer Characteristics (Note E)

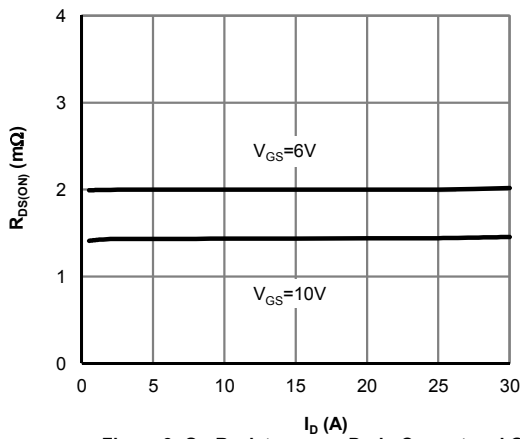


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

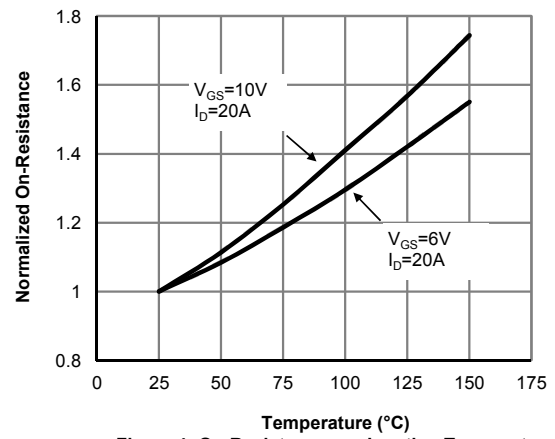


Figure 4: On-Resistance vs. Junction Temperature (Note E)

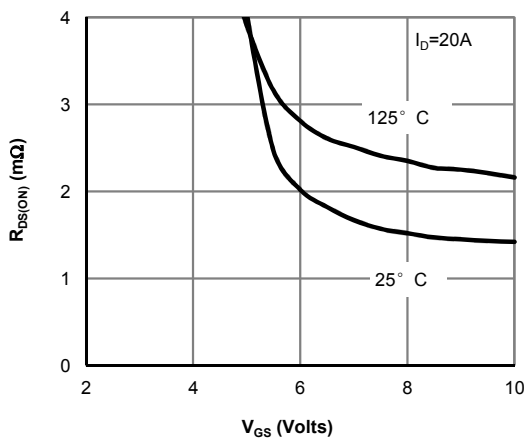


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

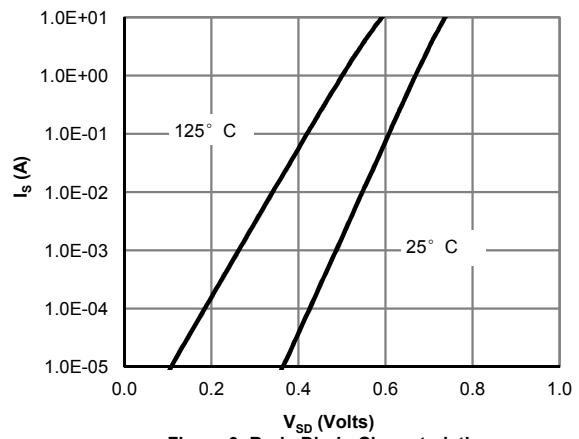


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

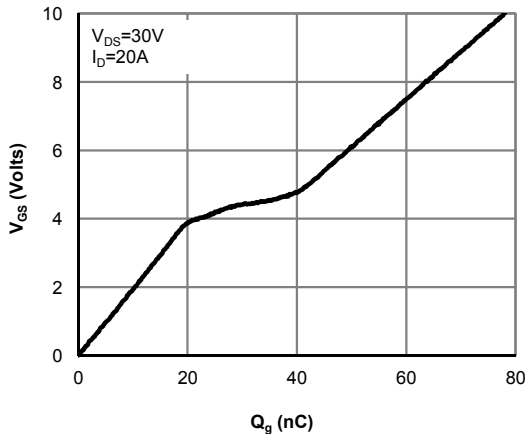


Figure 7: Gate-Charge Characteristics

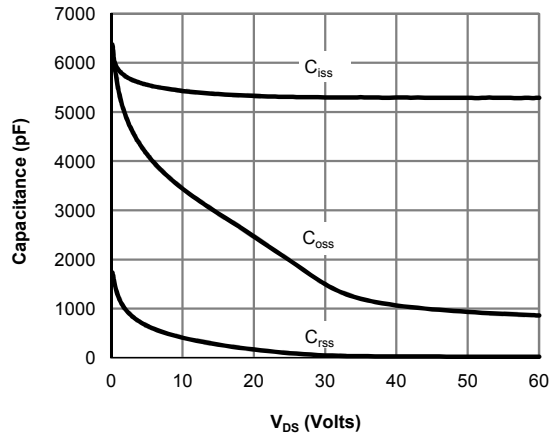


Figure 8: Capacitance Characteristics

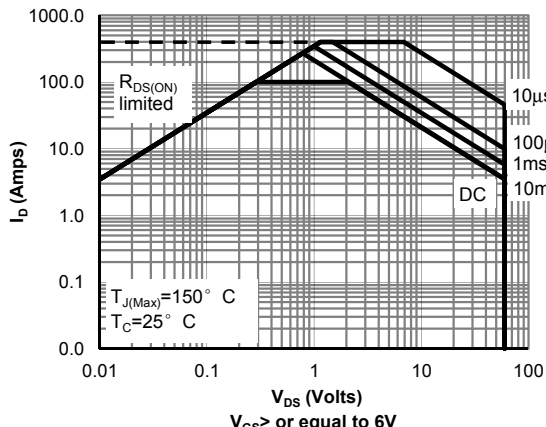


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

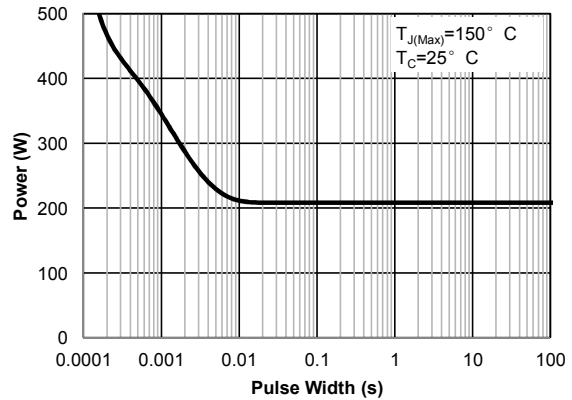


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

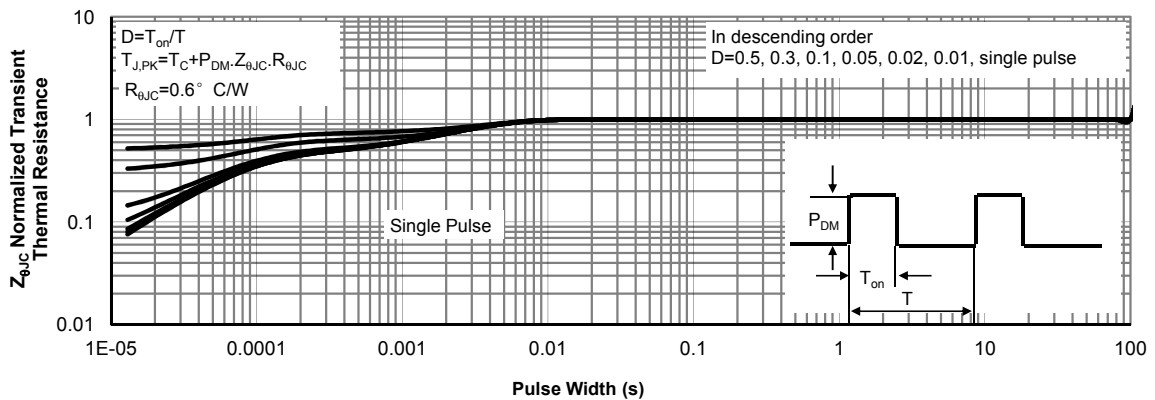


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

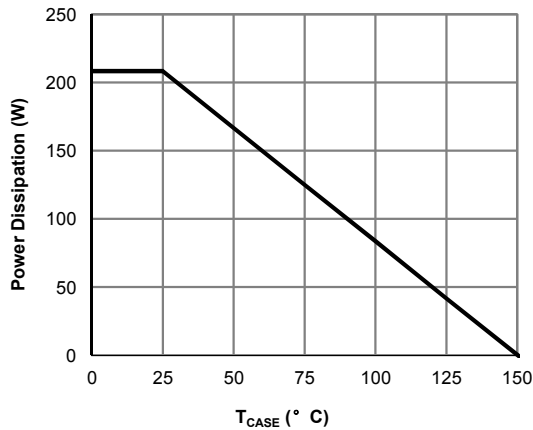


Figure 12: Power De-rating (Note F)

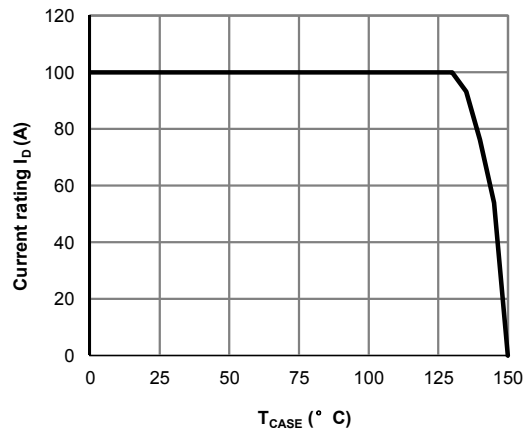


Figure 13: Current De-rating (Note F)

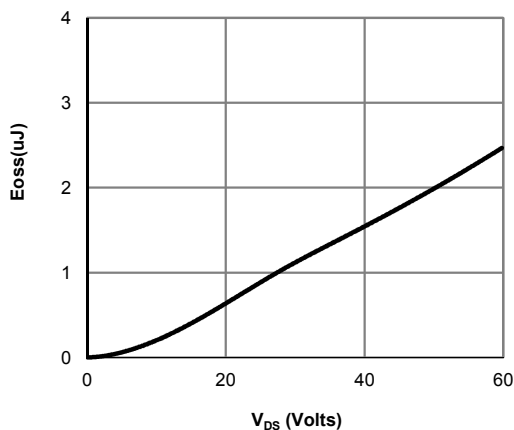


Figure 14: Coss stored Energy

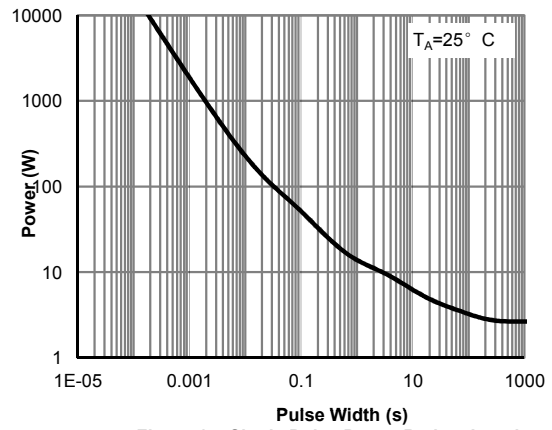


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

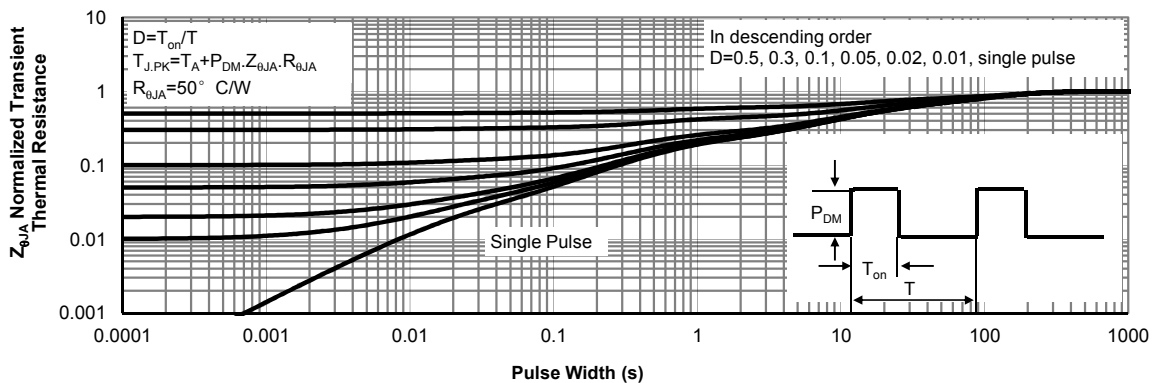


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

Figure A: Gate Charge Test Circuit & Waveforms



Figure B: Resistive Switching Test Circuit & Waveforms



Figure C: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Figure D: Diode Recovery Test Circuit & Waveforms

