



**General Description**

- Trench Power MOSFET - AlphaSGT™ technology
- Extremely Low R<sub>DS(ON)</sub>
- Optimized switching performance
- 175°C operating temperature
- RoHS and Halogen-Free Compliant

**Applications**

- Telecom DC-DC
- Industrial power
- Load switch

**Product Summary**

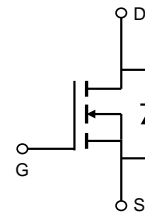
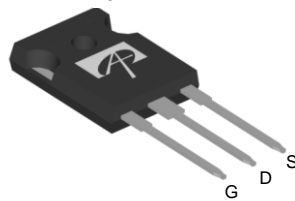
V <sub>DS</sub>	100V
I <sub>D</sub> (at V <sub>GS</sub> =10V)	120A
R <sub>DS(ON)</sub> (at V <sub>GS</sub> =10V)	< 2.8mΩ
R <sub>DS(ON)</sub> (at V <sub>GS</sub> =6V)	< 3.7mΩ

100% UIS Tested  
100% R<sub>g</sub> Tested

Max T<sub>J</sub>=175°C



Top View  
TO-247



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AOK66914	TO-247	Tube	240

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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V <sub>DS</sub>	100	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current <sup>G</sup>	I <sub>D</sub>	120	A
Current <sup>G</sup>		T <sub>C</sub> =25°C	
Pulsed Drain Current <sup>C</sup>	I <sub>DM</sub>	480	
Continuous Drain Current	I <sub>DSM</sub>	56	A
		48	
Avalanche Current <sup>C</sup>	I <sub>AS</sub>	90	A
Avalanche energy	E <sub>AS</sub>	405	mJ
Power Dissipation <sup>B</sup>	P <sub>D</sub>	500	W
		250	
Power Dissipation <sup>A</sup>	P <sub>DSM</sub>	18	W
		13	
Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to 175	°C

**Thermal Characteristics**

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>A</sup>	R <sub>θJA</sub>	5	8	°C/W
Maximum Junction-to-Ambient <sup>A,D</sup>		t ≤ 10s		
Maximum Junction-to-Case	R <sub>θJC</sub>	0.22	0.30	°C/W

**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

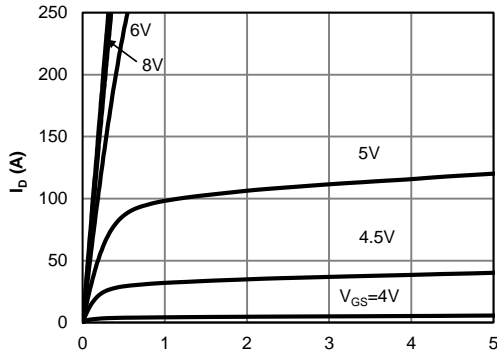
Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> =250μA, V <sub>GS</sub> =0V	100			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V T <sub>J</sub> =55°C			1 5	μA
I <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	2.5	3.0	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		2.3	2.8	mΩ
		V <sub>GS</sub> =6V, I <sub>D</sub> =20A		3.7	4.5	
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =20A		68		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 <sup>G</sup>				120	A
<b>DYNAMIC PARAMETERS</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =50V, f=1MHz		12500		pF
C <sub>oss</sub>	Output Capacitance			3190		pF
C <sub>riss</sub>	Reverse Transfer Capacitance			55		pF
R <sub>g</sub>	Gate resistance	f=1MHz	0.8	1.75	2.7	Ω
<b>SWITCHING PARAMETERS</b>						
Q <sub>g(10V)</sub>	Total Gate Charge	V <sub>GS</sub> =10V, V <sub>DS</sub> =50V, I <sub>D</sub> =20A		155	220	nC
Q <sub>gs</sub>	Gate Source Charge			48		nC
Q <sub>gd</sub>	Gate Drain Charge			31		nC
Q <sub>oss</sub>	Output Charge	V <sub>GS</sub> =0V, V <sub>DS</sub> =50V		269		nC
t <sub>D(on)</sub>	Turn-On DelayTime	V <sub>GS</sub> =10V, V <sub>DS</sub> =50V, R <sub>L</sub> =2.5Ω, R <sub>GEN</sub> =3Ω		36		ns
t <sub>r</sub>	Turn-On Rise Time			25		ns
t <sub>D(off)</sub>	Turn-Off DelayTime			90		ns
t <sub>f</sub>	Turn-Off Fall Time			40		ns
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =20A, di/dt=500A/μs		55		ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge	I <sub>F</sub> =20A, di/dt=500A/μs		335		nC

- A. The value of R<sub>θJA</sub> is measured 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 175° 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>=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. Single pulse width limited by junction temperature T<sub>J(MAX)</sub>=175° 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 in a still air environment with T<sub>A</sub>=25° C.

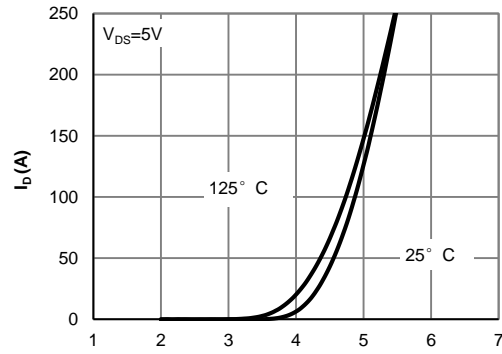
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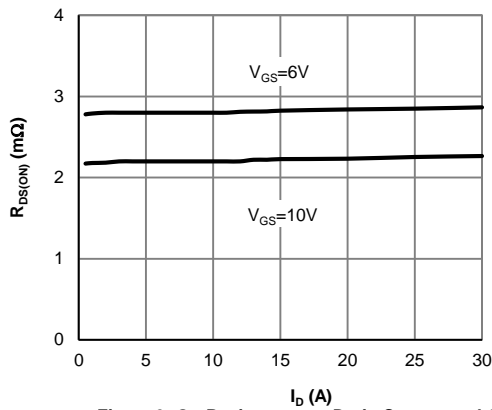
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**



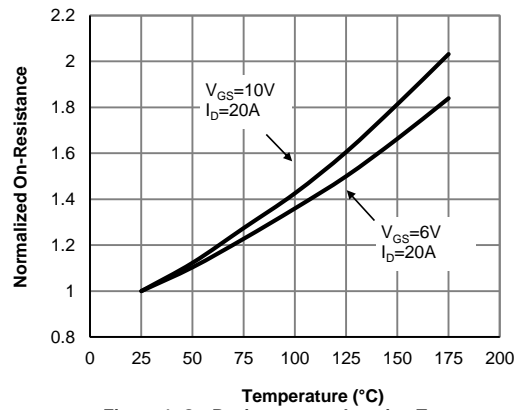
**Figure 1: On-Region Characteristics (Note E)**



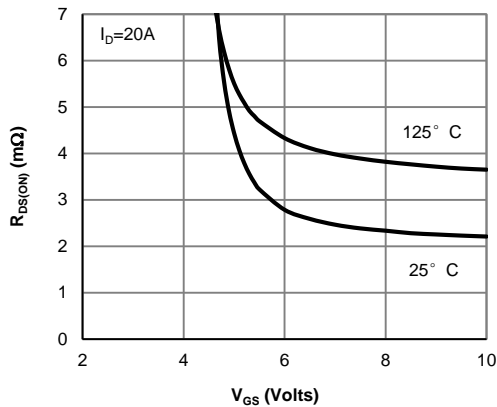
**Figure 2: Transfer Characteristics (Note E)**



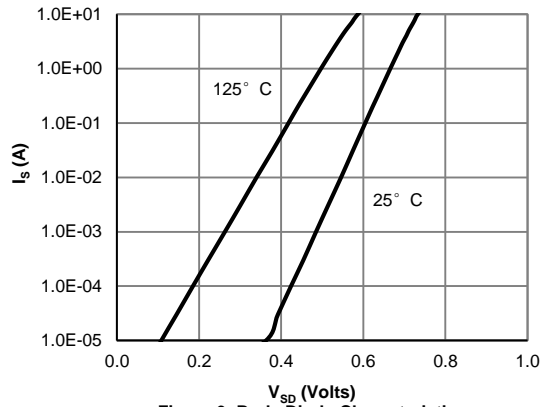
**Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)**



**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**

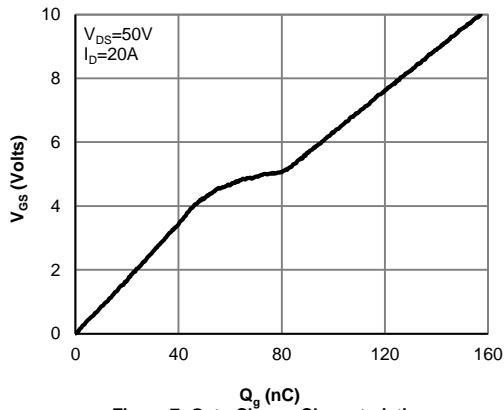


Figure 7: Gate-Charge Characteristics

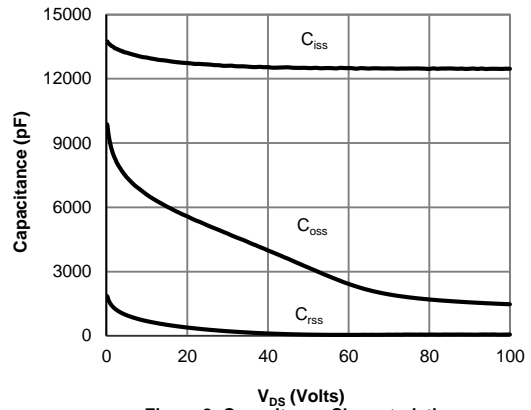


Figure 8: Capacitance Characteristics

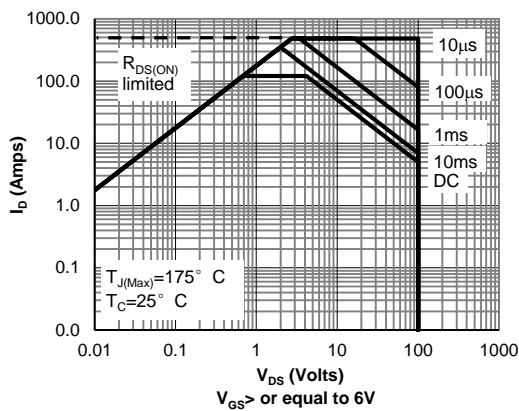


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

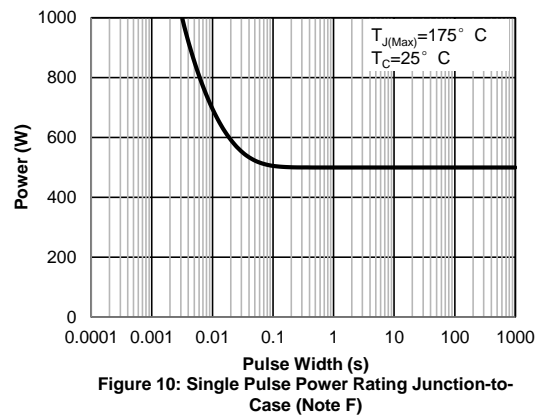


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

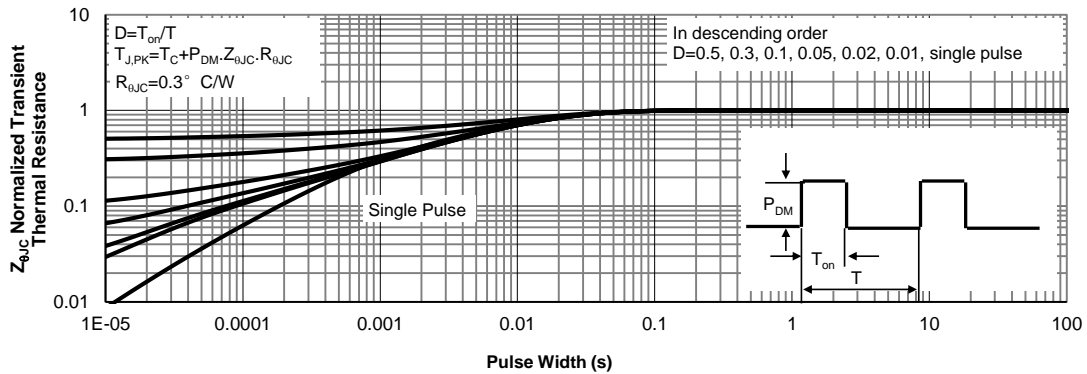


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

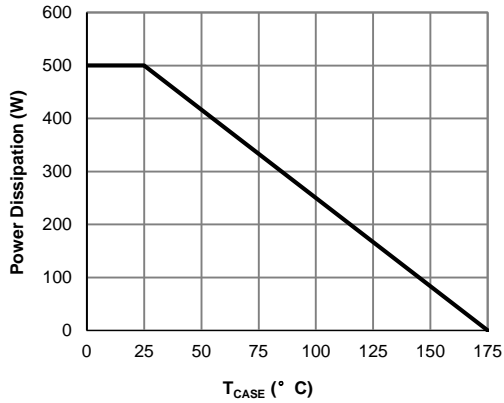


Figure 12: Power De-rating (Note F)

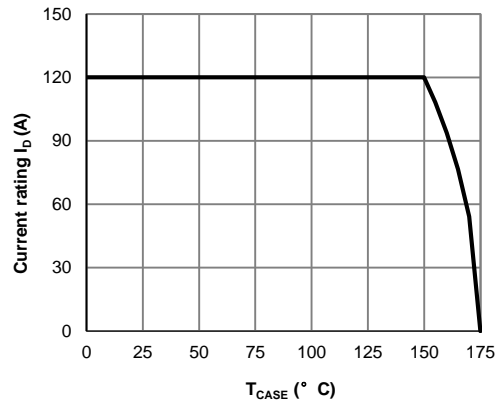


Figure 13: Current De-rating (Note F)

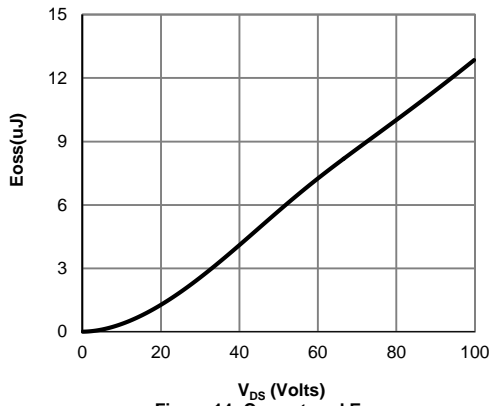


Figure 14: Coss stored Energy

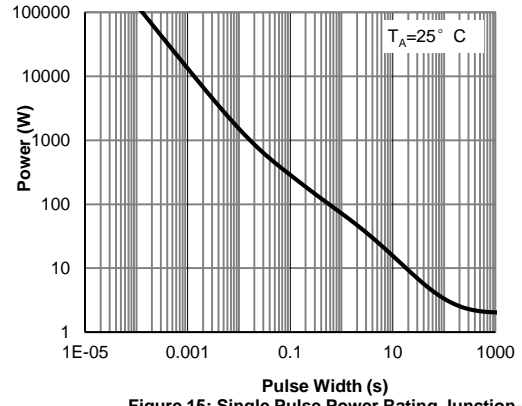


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

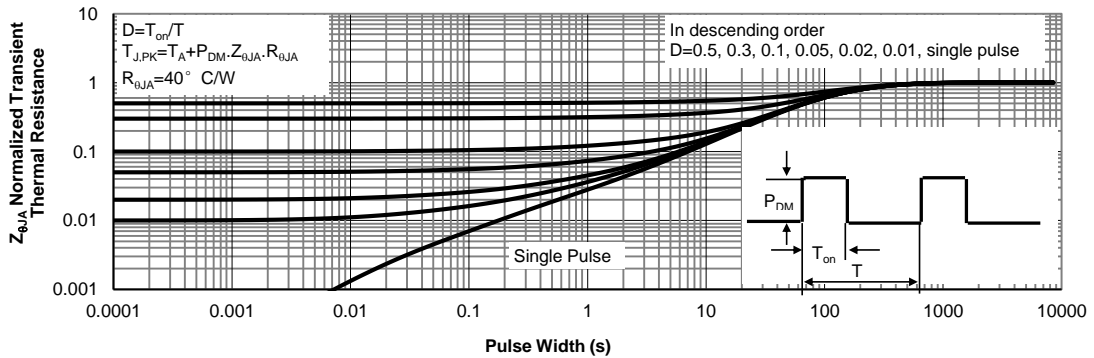


Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)

Figure A: Gate Charge Test Circuit & Waveforms

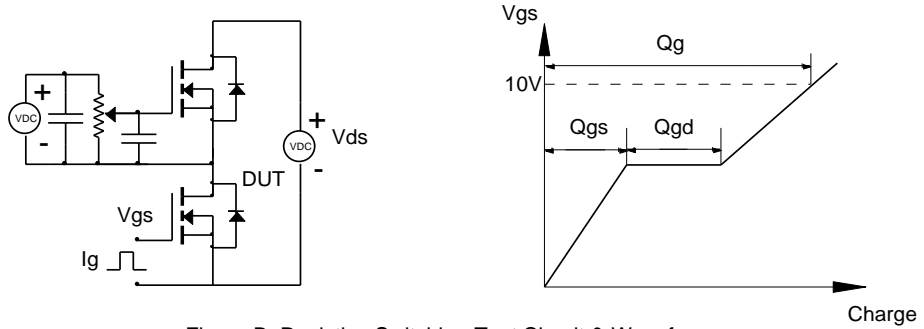


Figure B: Resistive Switching Test Circuit & Waveforms

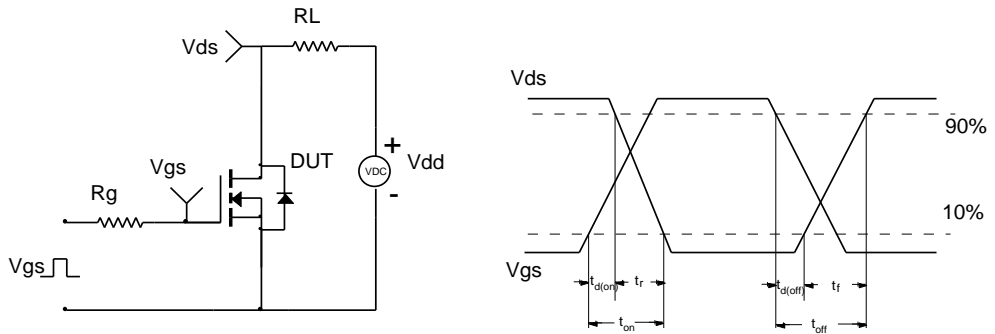


Figure C: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

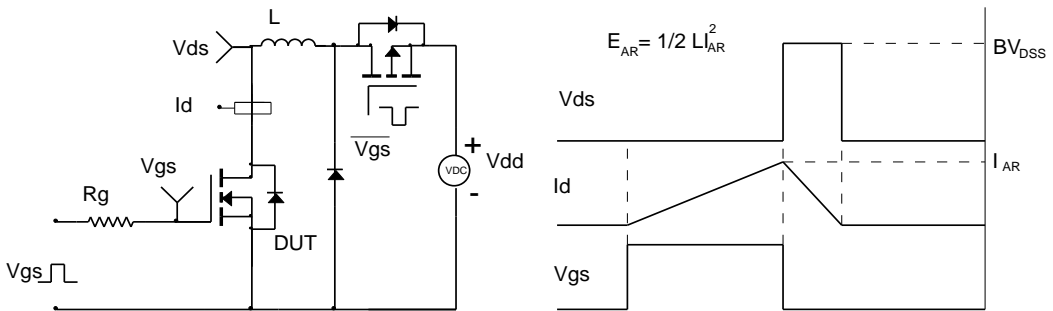


Figure D: Diode Recovery Test Circuit & Waveforms

