



**THE DATASHEET OF  
AOC2804**



### General Description

- Trench Power AlphaMOS (αMOS LV) technology
- Low  $R_{SS(ON)}$
- With ESD protection to improve battery performance and safety
- Common drain configuration for design simplicity
- RoHS and Halogen-Free Compliant

### Applications

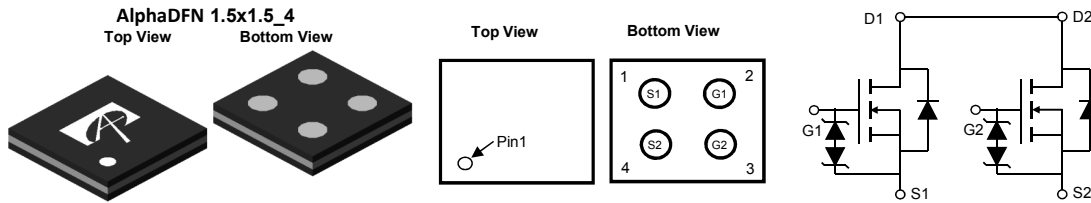
- Battery protection switch
- Mobile device battery charging and discharging

### Product Summary

$V_{SS}$	20V
$I_S$ (at $V_{GS}=4.5V$ )	4A
$R_{SS(ON)}$ (at $V_{GS}=4.5V$ )	< 22mΩ
$R_{SS(ON)}$ (at $V_{GS}=4.0V$ )	< 24mΩ
$R_{SS(ON)}$ (at $V_{GS}=3.7V$ )	< 25mΩ
$R_{SS(ON)}$ (at $V_{GS}=3.1V$ )	< 29mΩ
$R_{SS(ON)}$ (at $V_{GS}=2.5V$ )	< 36mΩ

### Typical ESD protection

**HBM Class 3A**



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AOC2804	AlphaDFN 1.5x1.5_4	Tape & Reel	3000

### Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Source-Source Voltage	$V_{SS}$	20	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Source Current(DC) <sup>Note1</sup>	$I_S$	4	A
Source Current(Pulse) <sup>Note2</sup>	$I_{SM}$	16	A
Power Dissipation <sup>Note1</sup>	$P_D$	0.7	W
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ C$

### Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient	$R_{\theta JA}$	115	140	$^\circ C/W$
Maximum Junction-to-Ambient		145	180	$^\circ C/W$

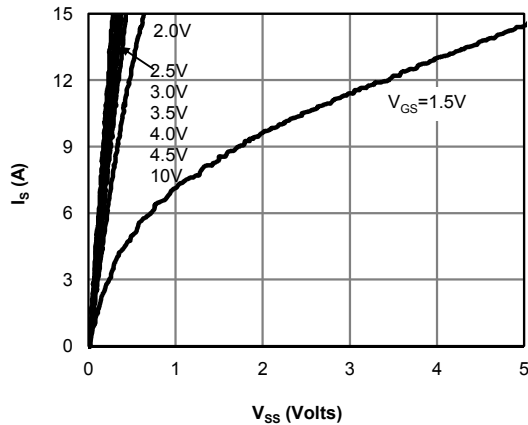
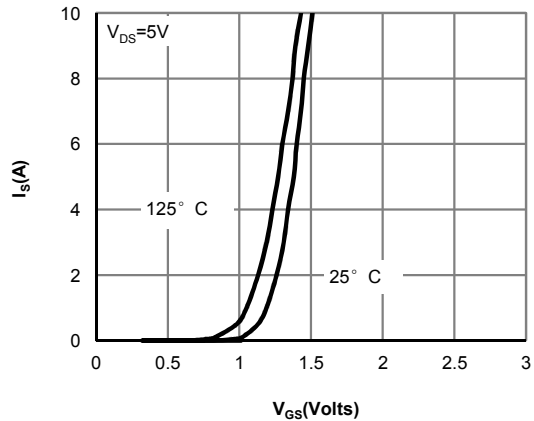
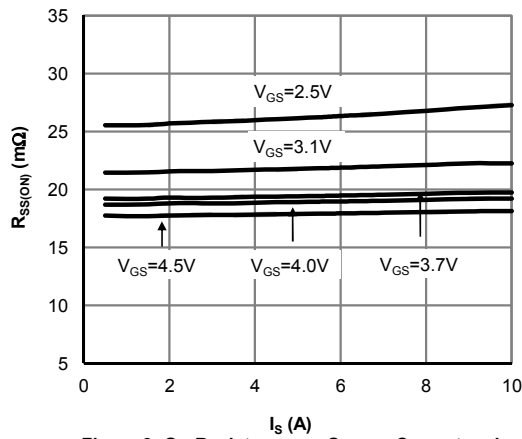
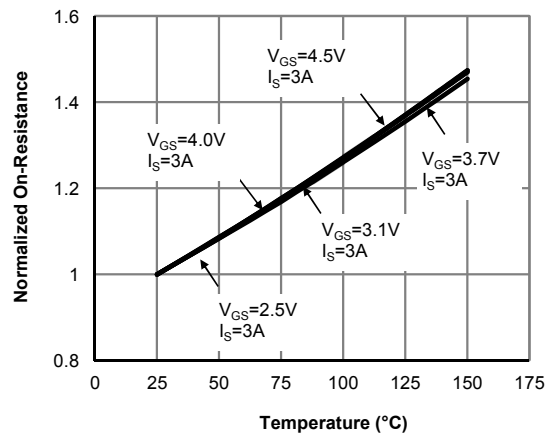
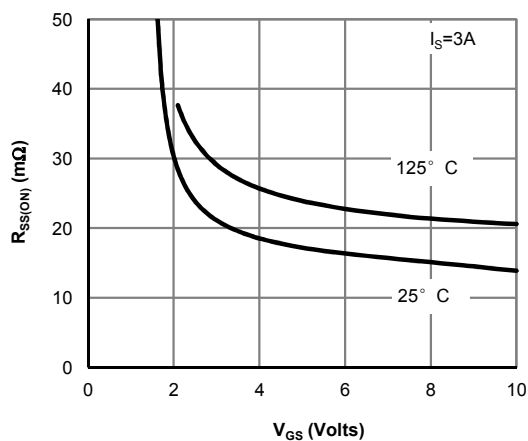
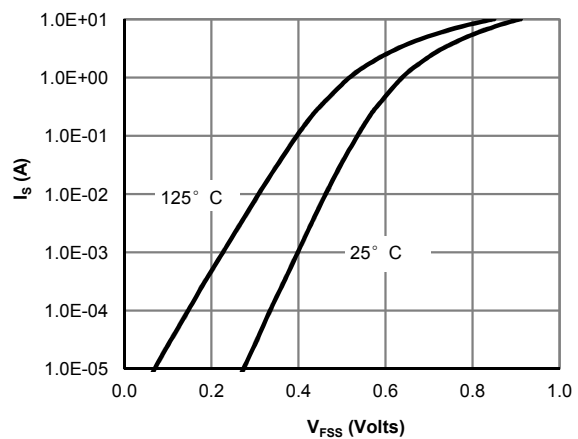
**Note 1.** Mounted on 1in2 FR-4 board with 2oz. Copper.

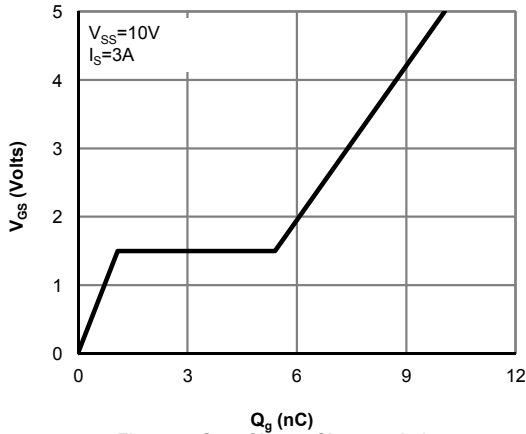
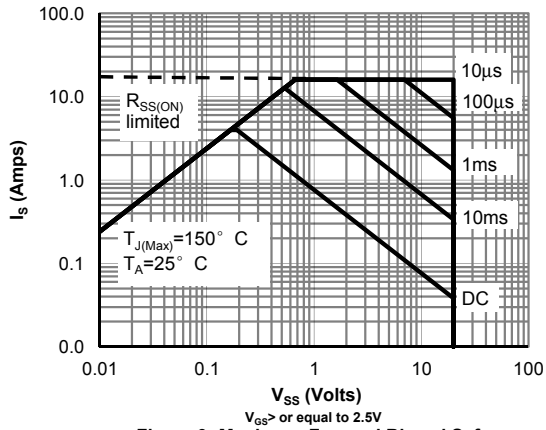
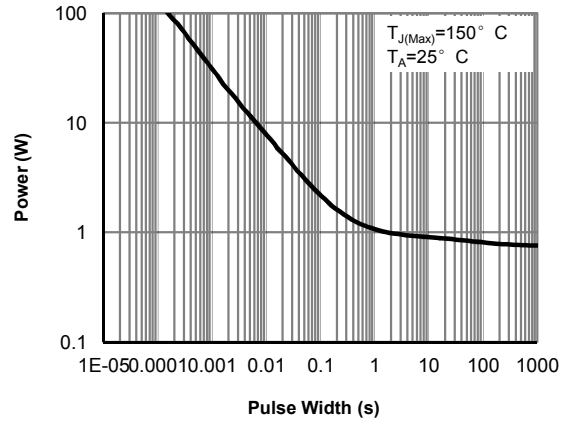
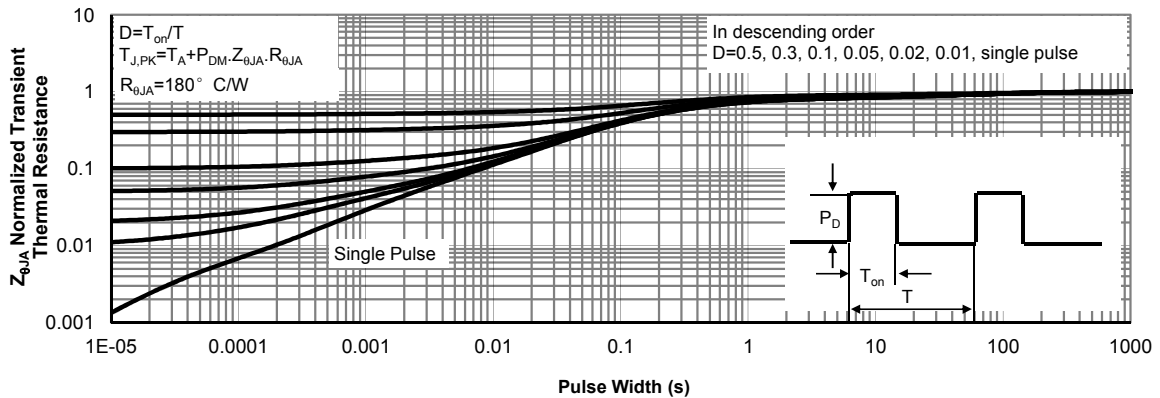
**Note 2.** PW <300 μs pulses, duty cycle 0.5% max

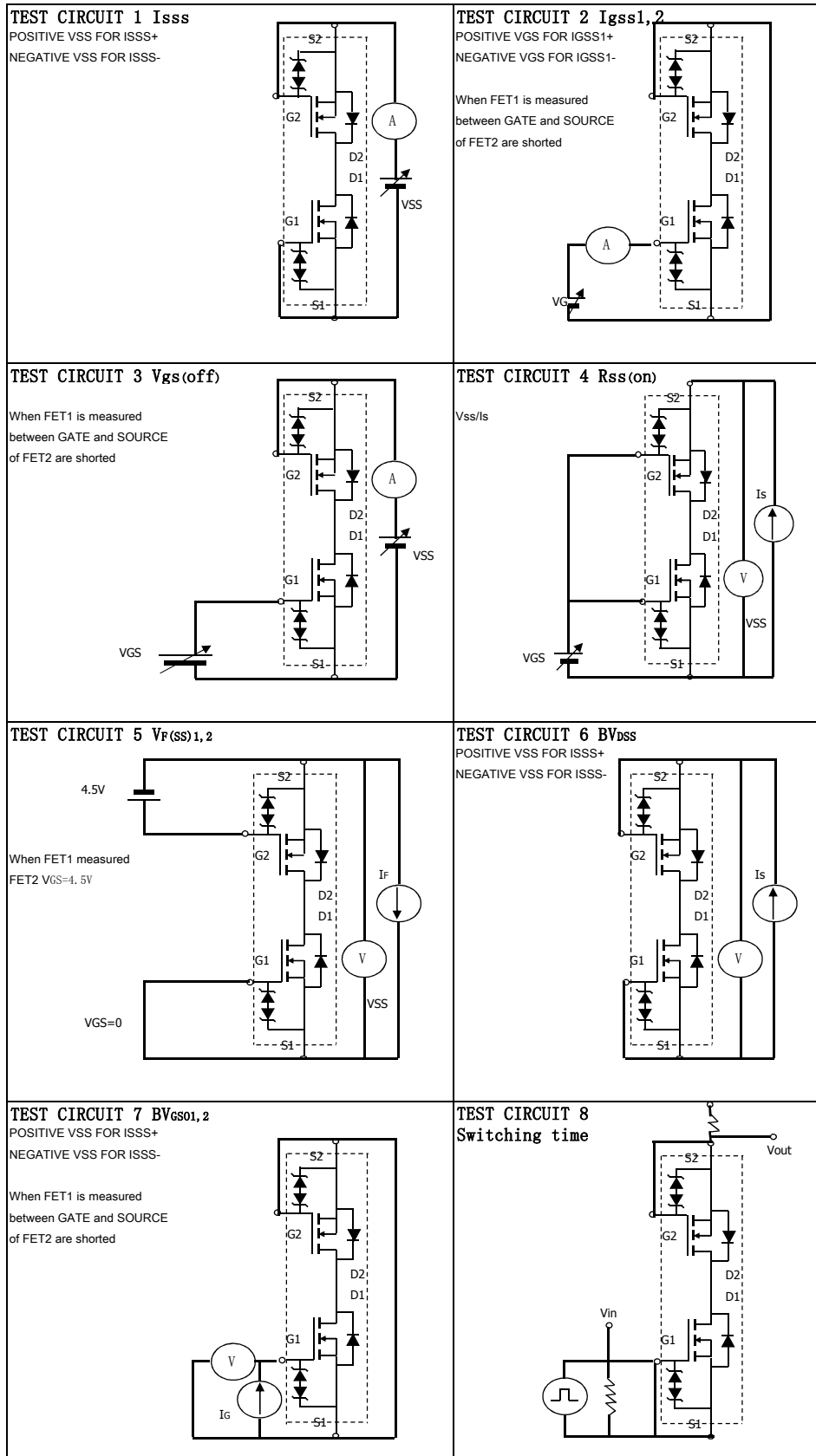
**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
BV <sub>SSS</sub>	Source-Source Breakdown Voltage	I <sub>S</sub> =250μA, V <sub>GS</sub> =0V Test Circuit 6	20			V
I <sub>SSS</sub>	Zero Gate Voltage Source Current	V <sub>SS</sub> =20V, V <sub>GS</sub> =0V Test Circuit 1 T <sub>J</sub> =55°C			1 5	μA
I <sub>GSS</sub>	Gate leakage current	V <sub>SS</sub> =0V, V <sub>GS</sub> =±10V Test Circuit 2			±10	μA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>SS</sub> =V <sub>GS</sub> , I <sub>S</sub> =250μA Test Circuit 3	0.5	0.85	1.3	V
R <sub>SS(ON)</sub>	Static Source to Source On-Resistance	V <sub>GS</sub> =4.5V, I <sub>S</sub> =3A Test Circuit 4 T <sub>J</sub> =125°C	12	17.8	22	mΩ
			16	24.7	31	
		V <sub>GS</sub> =4.0V, I <sub>S</sub> =3A Test Circuit 4	12.5	18.8	24	mΩ
		V <sub>GS</sub> =3.7V, I <sub>S</sub> =3A Test Circuit 4	13	19.3	25	mΩ
		V <sub>GS</sub> =3.1V, I <sub>S</sub> =3A Test Circuit 4	14.5	21.6	29	mΩ
	V <sub>GS</sub> =2.5V, I <sub>S</sub> =3A Test Circuit 4	17.5	25.8	36	mΩ	
g <sub>FS</sub>	Forward Transconductance	V <sub>SS</sub> =5V, I <sub>S</sub> =3A Test Circuit 3		20		S
V <sub>FSS</sub>	Forward Source to Source Voltage	I <sub>S</sub> =1A, V <sub>GS</sub> =0V Test Circuit 5		0.65	1	V
<b>DYNAMIC PARAMETERS</b>						
R <sub>g</sub>	Gate resistance	f=1MHz		2		KΩ
<b>SWITCHING PARAMETERS</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>G1S1</sub> =4.5V, V <sub>SS</sub> =10V, I <sub>S</sub> =3A		9.5		nC
t <sub>D(on)</sub>	Turn-On DelayTime	V <sub>G1S1</sub> =4.5V, V <sub>SS</sub> =10V, R <sub>L</sub> =3.3Ω, R <sub>GEN</sub> =3Ω Test Circuit8		0.8		μs
t <sub>r</sub>	Turn-On Rise Time			2.2		μs
t <sub>D(off)</sub>	Turn-Off DelayTime			2.5		μs
t <sub>f</sub>	Turn-Off Fall Time			6.5		μs

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**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

**Figure 1: On-Region Characteristics**

**Figure 2: Transfer Characteristics**

**Figure 3: On-Resistance vs. Source Current and Gate Voltage**

**Figure 4: On-Resistance vs. Junction Temperature**

**Figure 5: On-Resistance vs. Gate-Source Voltage**

**Figure 6: Forward Source to Source Characteristics**

**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**

**Figure 7: Gate-Charge Characteristics**

**Figure 9: Maximum Forward Biased Safe Operating Area (Note1)**

**Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note1)**

**Figure 11: Normalized Maximum Transient Thermal Impedance (Note1)**



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