

### General Description

- Trench Power MOSFET technology
- Low  $R_{SS(ON)}$
- With ESD protection to improve battery performance and safety
- Common drain configuration for design simplicity
- RoHS 2.0 and Halogen-Free Compliant

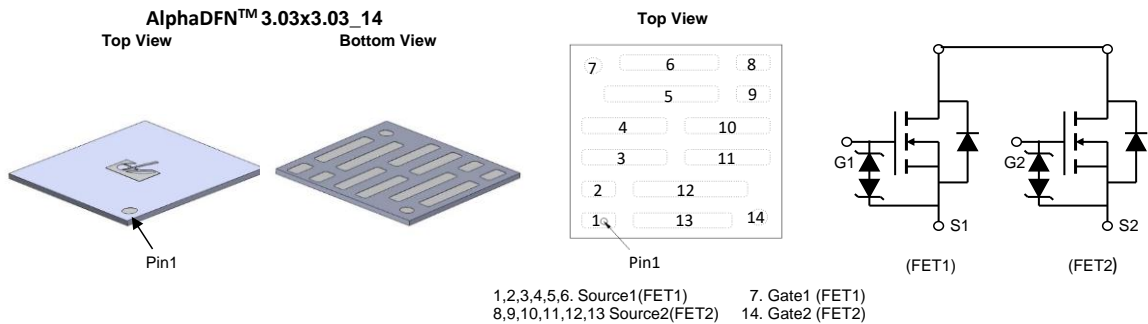
### Applications

- Battery protection switch
- Mobile device battery charging and discharging

### Product Summary

$V_{SS}$	24V
$R_{SS(ON)}$ (at $V_{GS}=10V$ )	< 2m $\Omega$
$R_{SS(ON)}$ (at $V_{GS}=8V$ )	< 2.2m $\Omega$
$R_{SS(ON)}$ (at $V_{GS}=4.5V$ )	< 3.5m $\Omega$

### Typical ESD protection

**HBM Class 2**


Orderable Part Number	Package Type	Form	Minimum Order Quantity
AOCA35212E	AlphaDFN™3.03x3.03_14	Tape & Reel	5000

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

Parameter	Symbol	Rating	Units
Source-Source Voltage	$V_{SS}$	24	V
Gate-Source Voltage	$V_{GS}$	$\pm 16$	V
Source Current (DC) <sup>Note1</sup>	$I_S$	34	A
Source Current (Pulse) <sup>Note2</sup>	$I_{SM}$	170	
Power Dissipation <sup>Note1</sup>	$P_D$	3.1	W
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$

#### Thermal Characteristics

Parameter	Symbol	Typical	Units
Maximum Junction-to-Ambient <sup>t ≤ 10s</sup>	$R_{\theta JA}$	30	$^\circ\text{C/W}$
Maximum Junction-to-Ambient <sup>Steady-State</sup>		40	$^\circ\text{C/W}$

**Note 1.**  $I_S$  rated value is based on bare silicon. Mounted on 70mmx70mm FR-4 board.

**Note 2.**  $PW < 10 \mu\text{s}$  pulses, duty cycle 1% max.

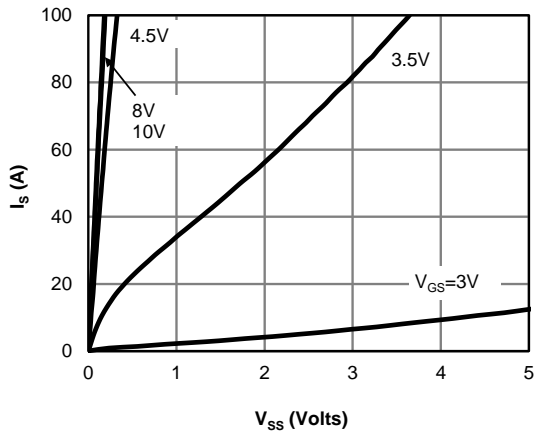
**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
B <sub>VSSS</sub>	Source-Source Breakdown Voltage	I <sub>S</sub> =250μA, V <sub>GS</sub> =0V Test Circuit 6	24			V
I <sub>SSS</sub>	Zero Gate Voltage Source Current	V <sub>SS</sub> =24V, 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> =±16V 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	1.5	1.95	2.4	V
R <sub>SS(ON)</sub>	Static Source to Source On-Resistance	V <sub>GS</sub> =10V, I <sub>S</sub> =5A Test Circuit 4 T <sub>J</sub> =125°C	1.1	1.6	2	mΩ
		V <sub>GS</sub> =8V, I <sub>S</sub> =5A Test Circuit 4	1.2	1.68	2.2	mΩ
		V <sub>GS</sub> =4.5V, I <sub>S</sub> =5A Test Circuit 4	1.8	2.6	3.5	mΩ
g <sub>FS</sub>	Forward Transconductance	V <sub>SS</sub> =5V, I <sub>S</sub> =5A Test Circuit 3		40		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		1.4		KΩ
<b>SWITCHING PARAMETERS</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>G1S1</sub> =10V, V <sub>SS</sub> =12V, I <sub>S</sub> =5A		88		nC
t <sub>D(on)</sub>	Turn-On DelayTime	V <sub>G1S1</sub> =10V, V <sub>SS</sub> =12V, R <sub>L</sub> =1.2Ω, R <sub>GEN</sub> =3Ω Test Circuit8		2.2		μs
t <sub>r</sub>	Turn-On Rise Time			3.6		μs
t <sub>D(off)</sub>	Turn-Off DelayTime			2.8		μs
t <sub>f</sub>	Turn-Off Fall Time			8.9		μs

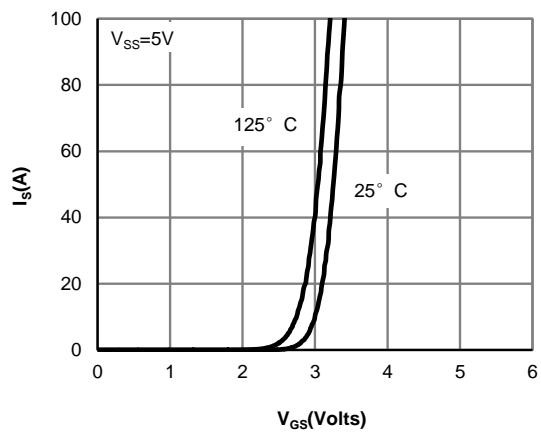
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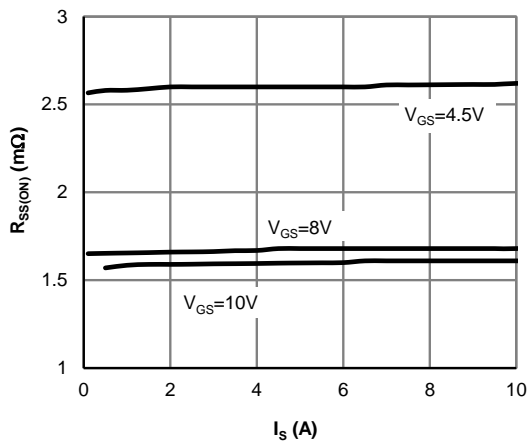
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**



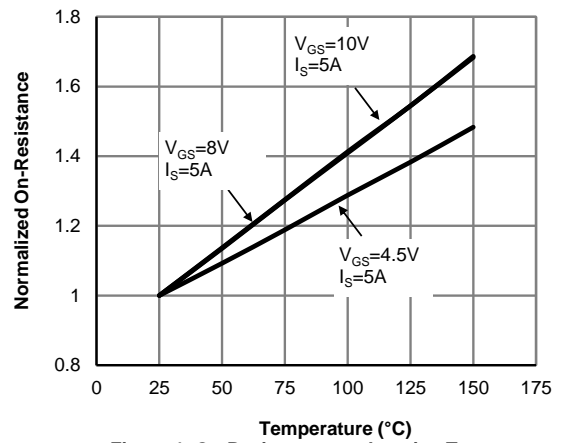
**Figure 1: On-Region Characteristics**



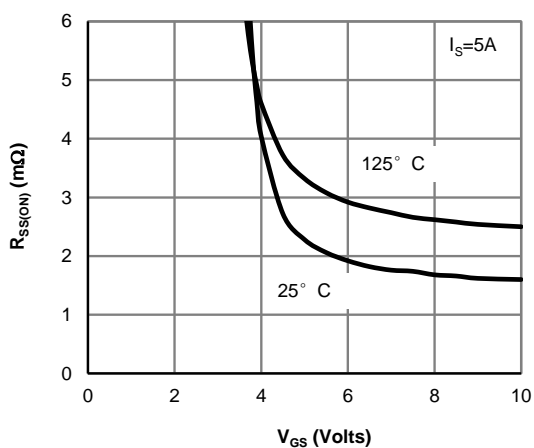
**Figure 2: Transfer Characteristics**



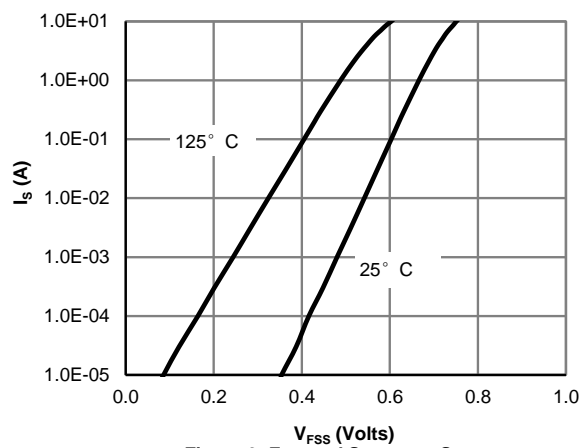
**Figure 3: On-Resistance vs. Source Current and Gate Voltage**



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

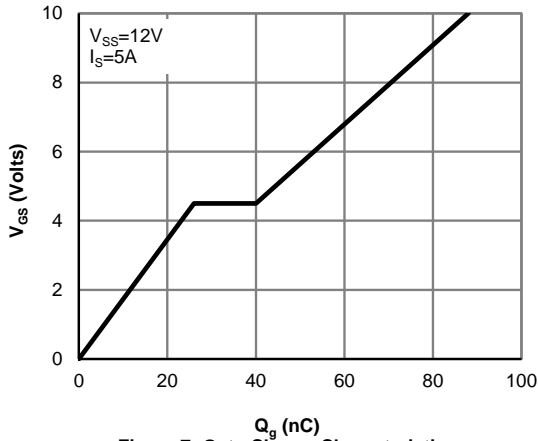


**Figure 5: On-Resistance vs. Gate-Source Voltage**

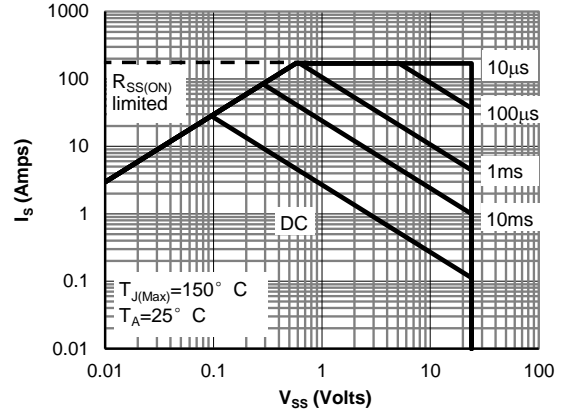


**Figure 6: Forward Source to Source Characteristics**

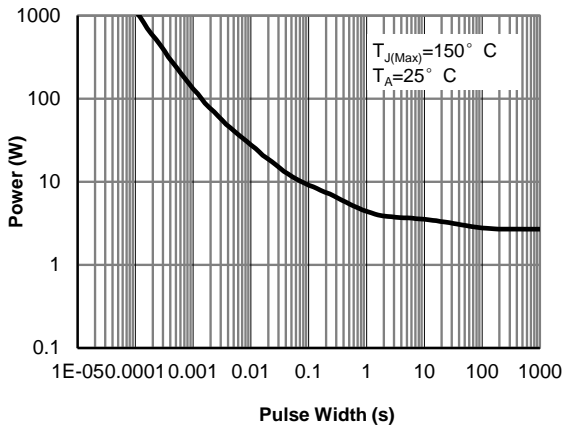
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**



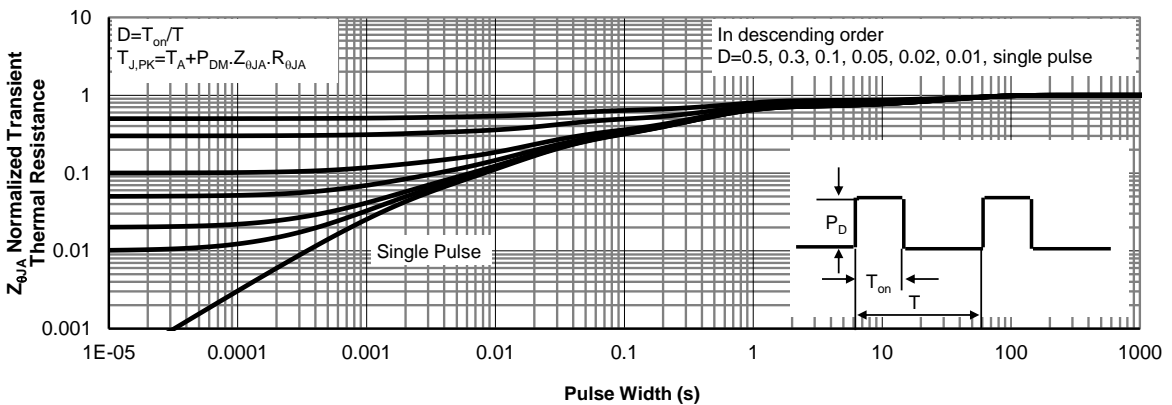
**Figure 7: Gate-Charge Characteristics**



**Figure 8: Maximum Forward Biased Safe Operating Area (Note1)**



**Figure 9: Single Pulse Power Rating Junction-to-Ambient (Note1)**



**Figure 10: Normalized Maximum Transient Thermal Impedance (Note1)**

