AOCA32301

30V Common-Drain Dual N-Channel MOSFET

General Description

- Trench Power MOSFET technology
- Low $R_{SS(ON)}$
- ESD protection
- Common drain configuration for design simplicity
- RoHS and Halogen-Free Compliant

Applications

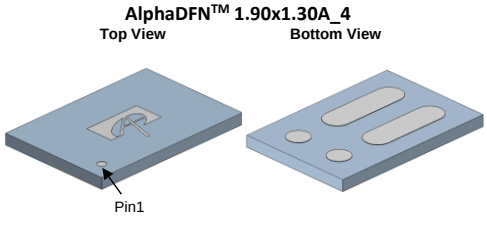
- Battery protection switch
- Type C - PD load switch

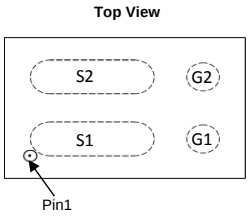
Product Summary

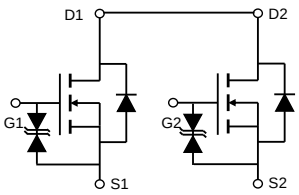
V_{SS}	30V
$R_{SS(ON)}$ (at V_{GS}=10V)	< 18mΩ
$R_{SS(ON)}$ (at V_{GS}=8V)	< 19mΩ
$R_{SS(ON)}$ (at V_{GS}=4.5V)	< 24mΩ
Typical ESD protection	**HBM Class 2**

Green Product

AlphaDFN™ 1.90x1.30A_4







Orderable Part Number	Package Type	Form	Minimum Order Quantity
AOCA32301	AlphaDFN™ 1.90x1.30A _4	Tape & Reel	8000

Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Rating	Units
Source-Source Voltage		V_{SS}	30	V
Gate-Source Voltage		V_{GS}	±16	V
Source Current(DC) Note1	T_A=25°C	I_S	9	A
Source Current(Pulse) Note2		I_{SM}	50	
Power Dissipation Note1	T_A=25°C	P_D	1.9	W
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Typical	Units
Maximum Junction-to-Ambient	t ≤ 10s	$R_{\theta JA}$	55	°C/W
Maximum Junction-to-Ambient	Steady-State		65	°C/W

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

Note 2. PW <10 µs pulses, duty cycle 1% max.

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{SSS}	Source-Source Breakdown Voltage	I_S=250µA, V_{GS}=0V Test Circuit 6	30			V
I_{SSS}	Zero Gate Voltage Source Current	V_{SS}=30V, V_{GS}=0V Test Circuit 1			1	µA
		T_J=55°C			5	
I_{GSS}	Gate leakage current	V_{SS}=0V, V_{GS}=±16V Test Circuit 2			±10	µA
$V_{GS(th)}$	Gate Threshold Voltage	V_{SS}=V_{GS}, I_S=250µA Test Circuit 3	1.1	1.5	1.9	V
$R_{SS(ON)}$	Static Source to Source On-Resistance	V_{GS}=10V, I_S=4A Test Circuit 4	10	14.5	18	mΩ
		T_J=125°C	14	21	26	
		V_{GS}=8V, I_S=4A Test Circuit 4	11	15.2	19	mΩ
		V_{GS}=4.5V, I_S=4A Test Circuit 4	13	18.6	24	mΩ
g_{FS}	Forward Transconductance	V_{SS}=5V, I_S=4A Test Circuit 3		22		S
V_{FSS}	Forward Source to Source Voltage	I_S=1A,V_{GS}=0V Test Circuit 5		0.7	1	V
DYNAMIC PARAMETERS						
R_g	Gate resistance	f=1MHz		1.5		Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	V_{G1S1}=10V, V_{SS}=15V, I_S=4A		24.5		nC
$t_{D(on)}$	Turn-On DelayTime	V_{G1S1}=10V, V_{SS}=15V, R_L=3.75Ω, R_{GEN}=3Ω Test Circuit8		9		ns
t_r	Turn-On Rise Time			23		ns
$t_{D(off)}$	Turn-Off DelayTime			30.5		ns
t_f	Turn-Off Fall Time			13		ns

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

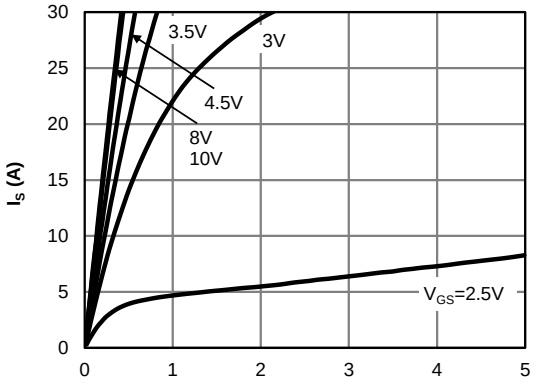


Figure 1: On-Region Characteristics

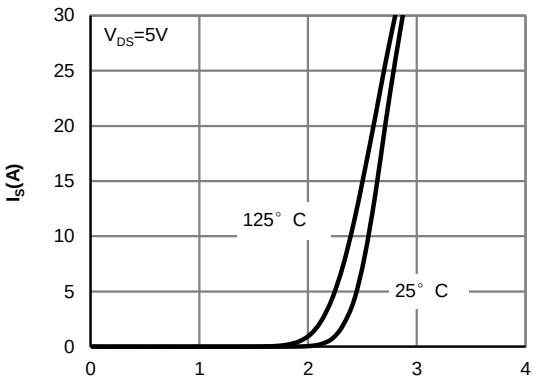


Figure 2: Transfer Characteristics

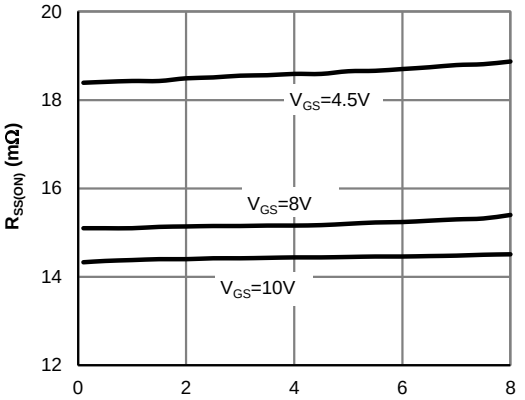


Figure 3: On-Resistance vs. Source Current and Gate Voltage

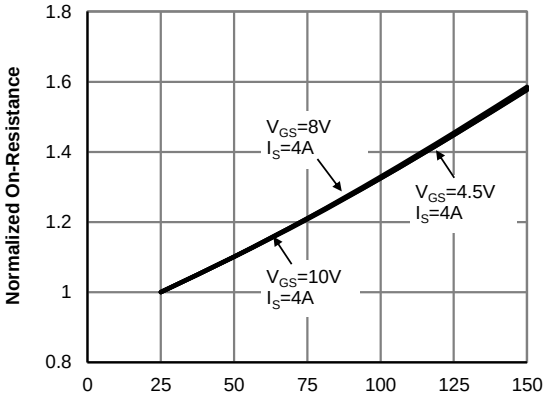


Figure 4: On-Resistance vs. Junction Temperature

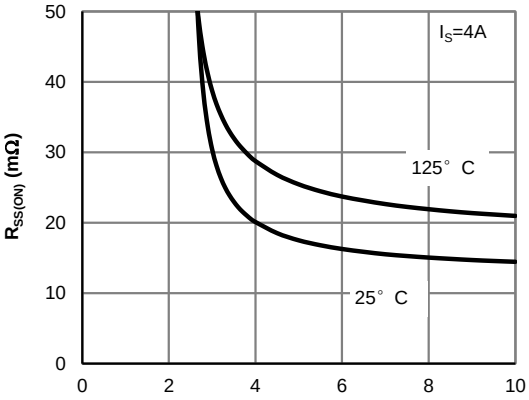


Figure 5: On-Resistance vs. Gate-Source Voltage

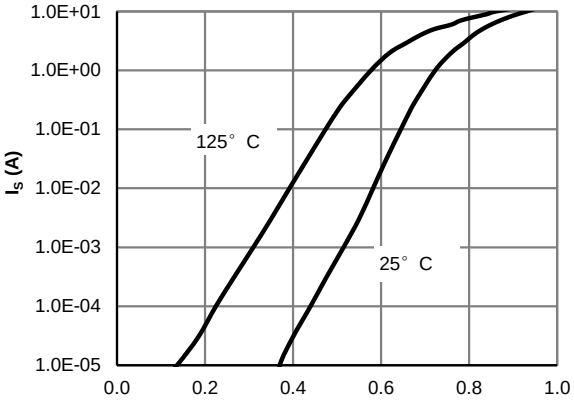


Figure 6: Forward Source to Source Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

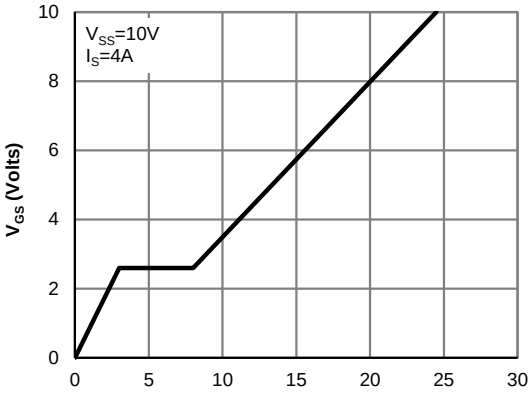


Figure 7: Gate-Charge Characteristics

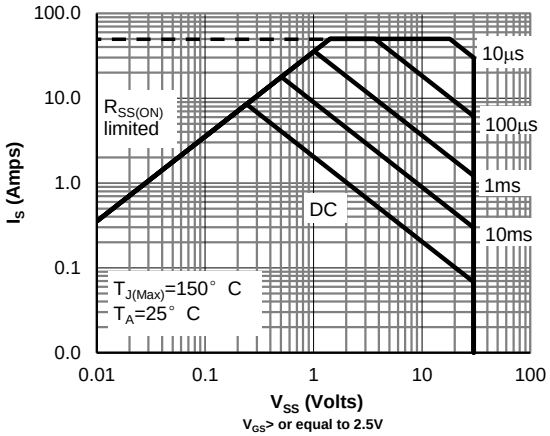


Figure 8: Maximum Forward Biased Safe Operating Area (Note1)

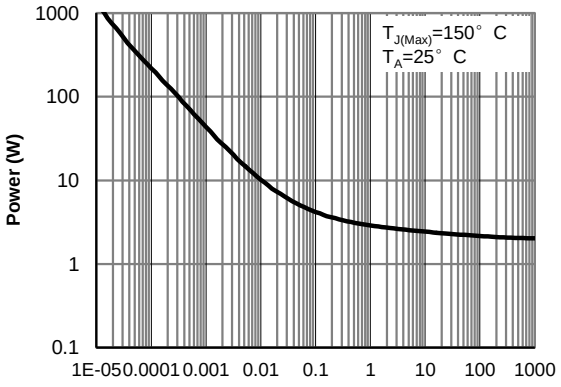


Figure 9: Single Pulse Power Rating Junction-to-Ambient (Note1)

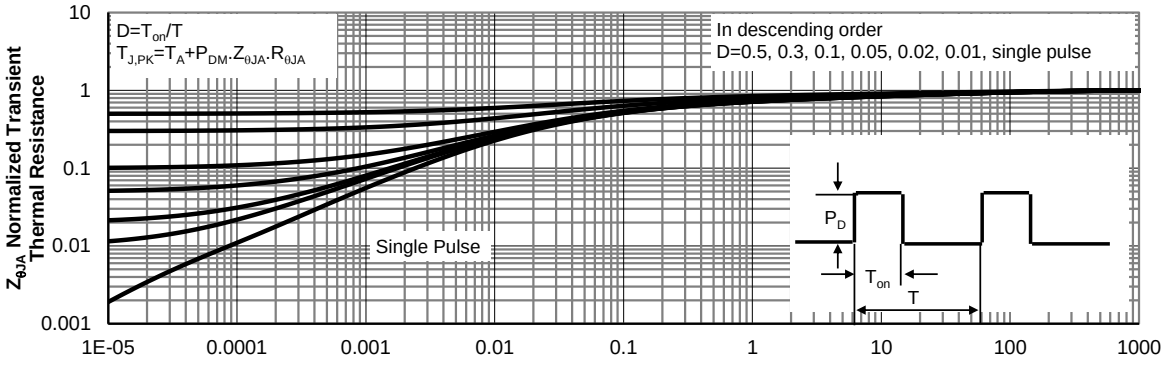
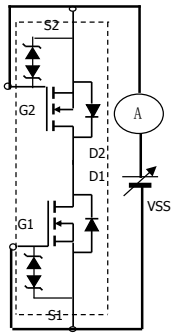


Figure 10: Normalized Maximum Transient Thermal Impedance (Note1)

TEST CIRCUIT 1 Isss

POSITIVE VSS FOR ISSS+

NEGATIVE VSS FOR ISSS-

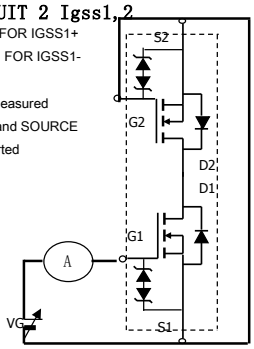


TEST CIRCUIT 2 Igss1, 2

POSITIVE VGS FOR IGSS1+

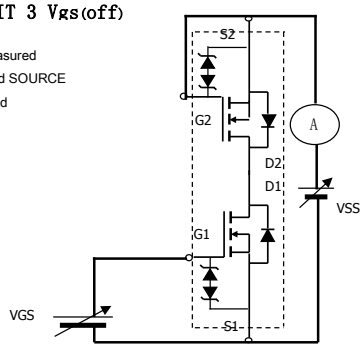
NEGATIVE VGS FOR IGSS1-

When FET1 is measured between GATE and SOURCE of FET2 are shorted



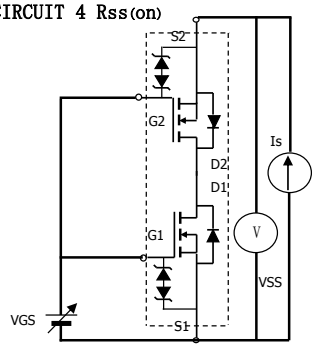
TEST CIRCUIT 3 Vgs(off)

When FET1 is measured between GATE and SOURCE of FET2 are shorted



TEST CIRCUIT 4 Rss(on)

Vss/Is

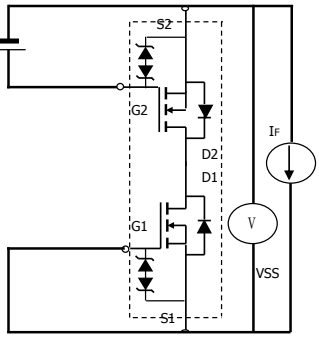


TEST CIRCUIT 5 $V_{F(SS)1,2}$

4.5V

When FET1 measured FET2 VGS=4.5V

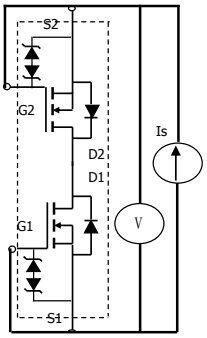
VGS=0



TEST CIRCUIT 6 BV_{DSS}

POSITIVE VSS FOR ISSS+

NEGATIVE VSS FOR ISSS-

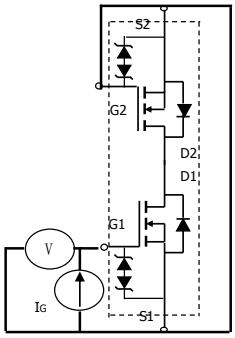


TEST CIRCUIT 7 $BV_{GS01,2}$

POSITIVE VSS FOR ISSS+

NEGATIVE VSS FOR ISSS-

When FET1 is measured between GATE and SOURCE of FET2 are shorted



TEST CIRCUIT 8 Switching time