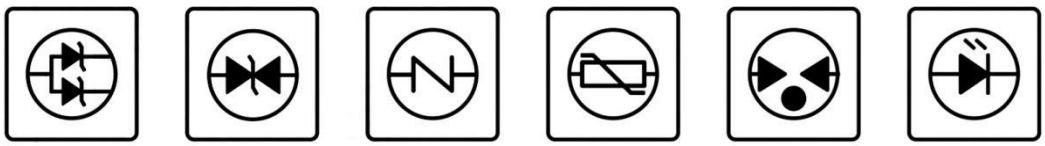
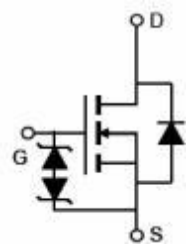
MSKSEMI
SEMICONDUCTOR



Product data sheet



Schematic diagram

SOT-23

Description

The AO3416AI-MS uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications .It is ESD protested.

General Features

- V_{DS} = 20V,I_D =6.5A
  $R_{DS(ON)}$ <40mΩ @ V_{GS}=1.8V
  $R_{DS(ON)}$ <33mΩ @ V_{GS}=2.5V
  $R_{DS(ON)}$ <27mΩ @ V_{GS}=4.5V
  ESD Rating: 2000V HBM
- High Power and current handing capability
- Lead free product is acquired
- Surface mount package

Application

- PWM application
- Load switch

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±8	V
Drain Current-Continuous	I_D	6.5	A
Drain Current-Pulsed (Note 1)	I_{DM}	30	A
Maximum Power Dissipation	P_D	1.4	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	89	℃/W

Electrical Characteristics (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250 μA	20		-	V

Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V,V_{GS}=0V	_	_	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±10V,V_{DS}=0V	_	_	±10	μA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.45	0.7	1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=6.5A	_	17	27	mΩ
		V_{GS}=2.5V, I_D=5.5A	_	21	33	mΩ
		V_{GS}=1.8V, I_D=5A	_	28	40	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=6.5A	8	_	_	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=10V,V_{GS}=0V, F=1.0MHz	_	660	_	PF
Output Capacitance	C_{oss}		_	160	_	PF
Reverse Transfer Capacitance	C_{rss}		_	87	_	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V,R_L=1. 5Ω V_{GS}=5V,R_{GEN}=3Ω	_	0.5		nS
Turn-on Rise Time	t_r		_	1		nS
Turn-Off Delay Time	$t_{d(off)}$		_	12		nS
Turn-Off Fall Time	t_f		_	4		nS
Total Gate Charge	Q_g	V_{DS}=10V,I_D=6.5A, V_{GS}=4.5V	_	8		nC
Gate-Source Charge	Q_{gs}		_	2.5	_	nC
Gate-Drain Charge	Q_{gd}		_	3	_	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=6.5A	_	_	1.2	V
Diode Forward Current (Note 2)	I_S		_	_	6.5	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics

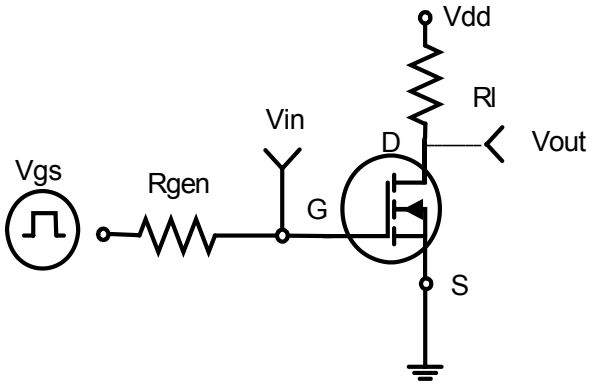


Figure 1:Switching Test Circuit

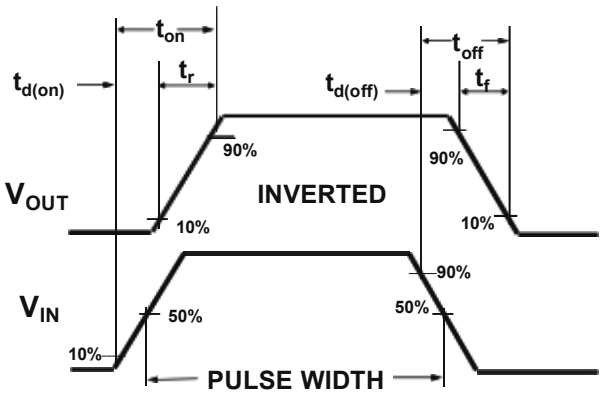


Figure 2:Switching Waveforms

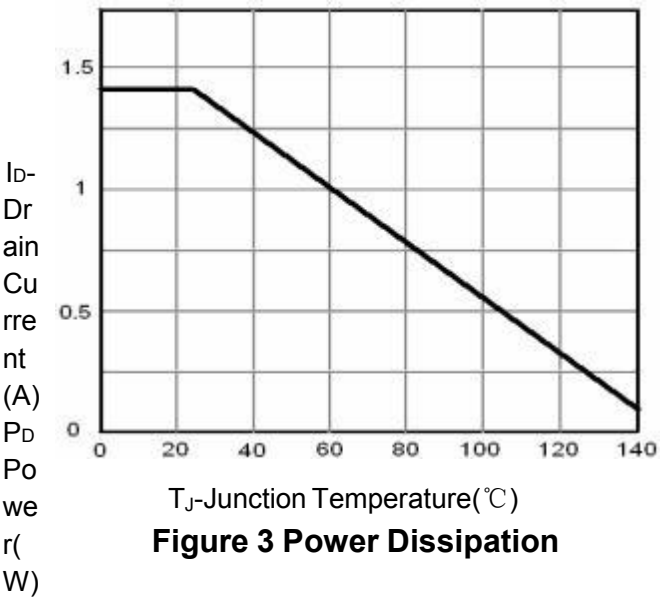


Figure 3 Power Dissipation

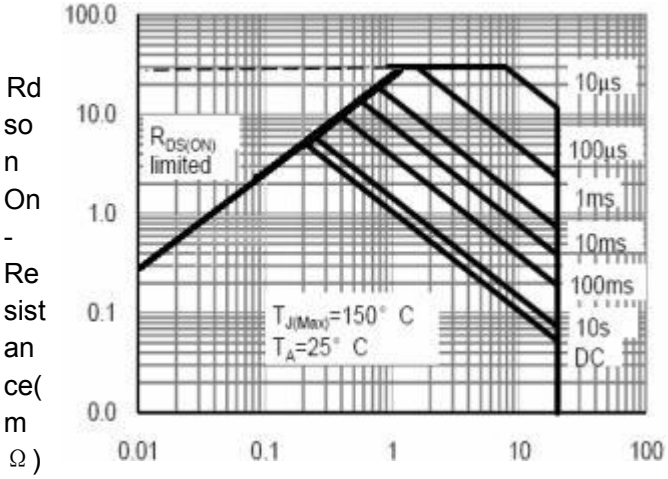


Figure 4 Safe Operation Area

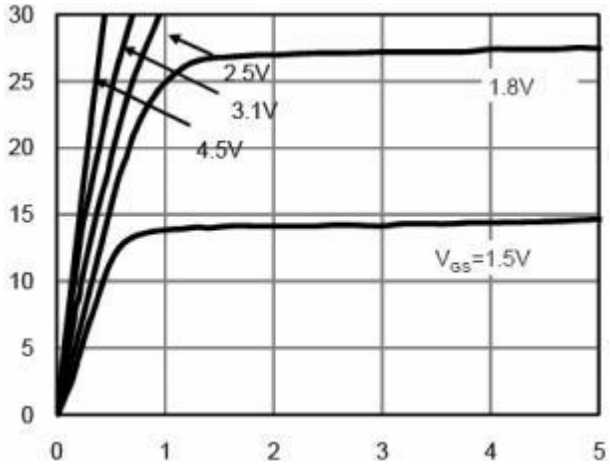


Figure 5 Output Characteristics

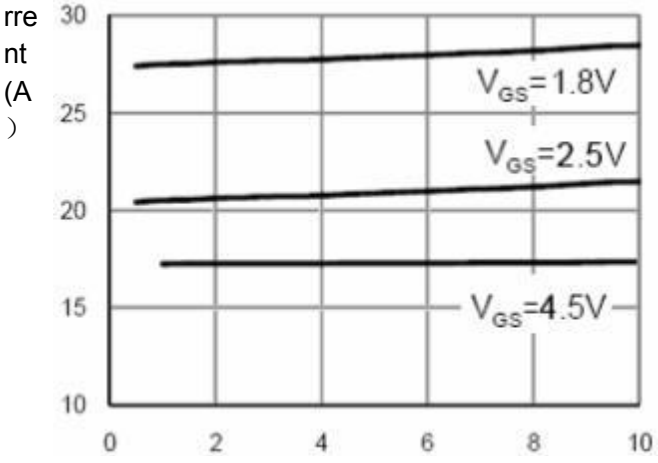


Figure 6 Drain-Source On-Resistance

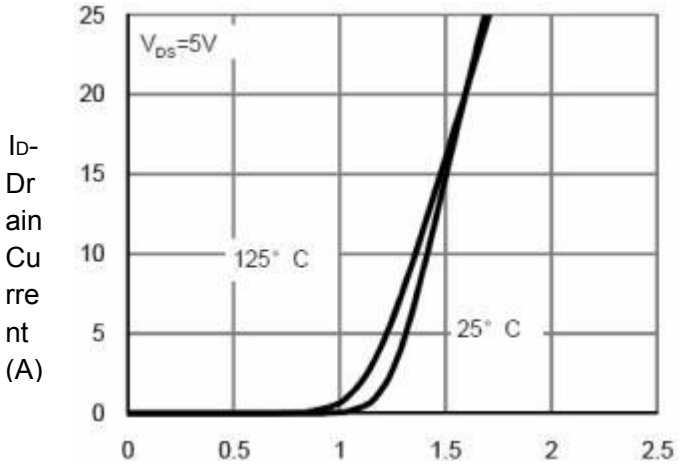


Figure 7 Transfer Characteristics

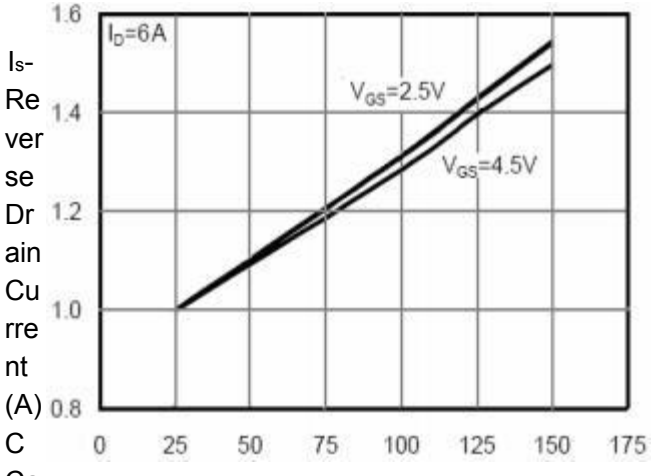


Figure 8 Drain-Source On-Resistance

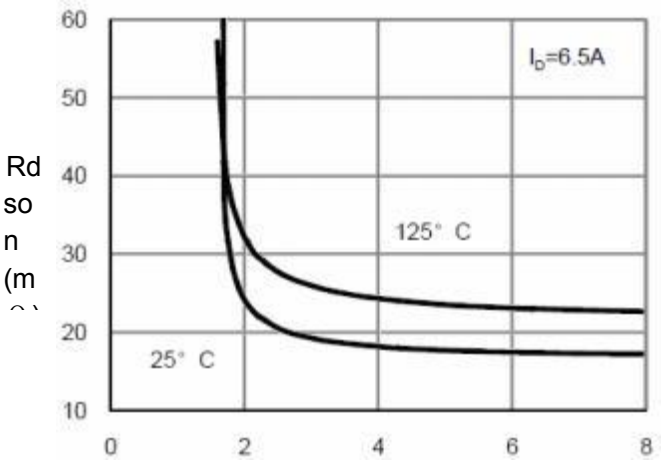


Figure 9 Rdson vs Vgs

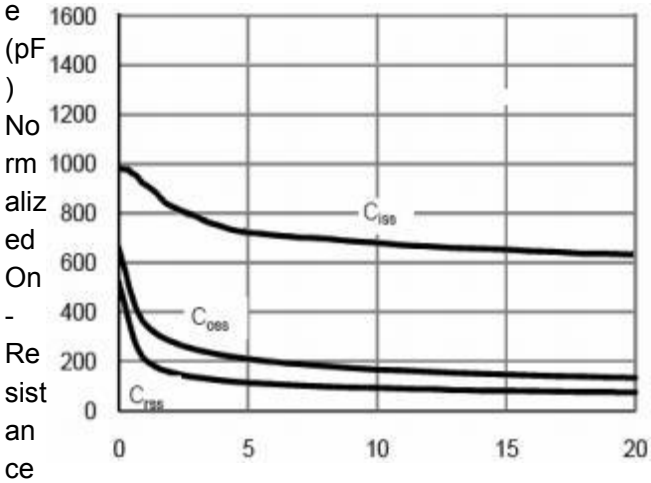


Figure 10 Capacitance vs Vds

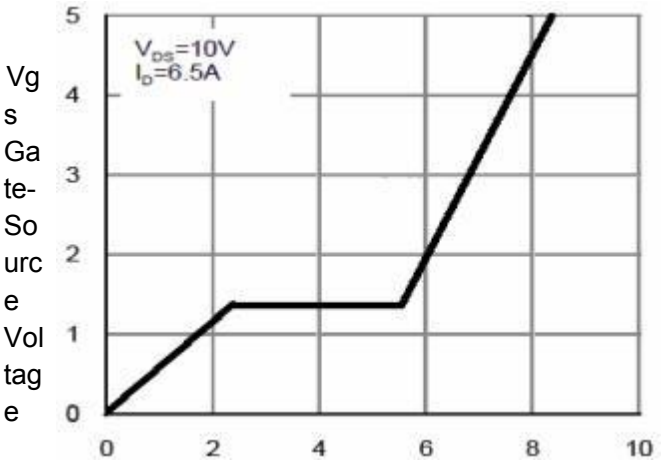


Figure 11 Gate Charge

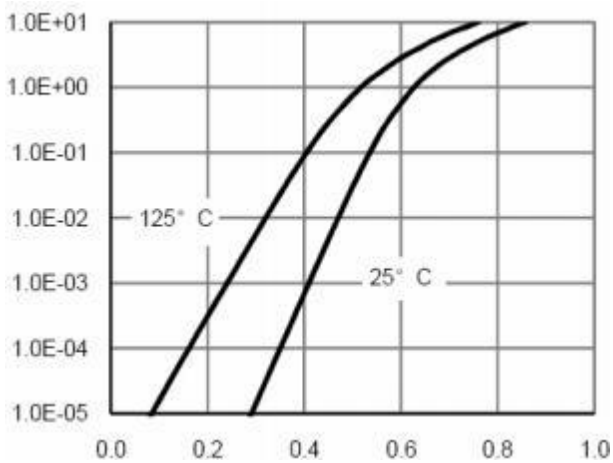


Figure 12 Source- Drain Diode Forward

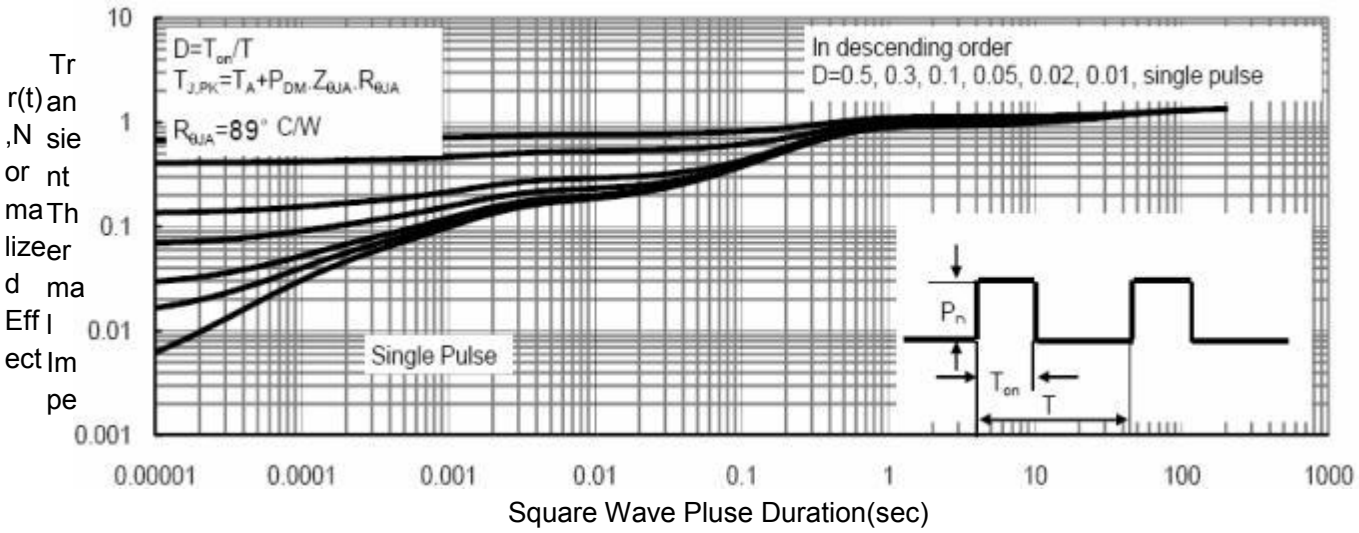
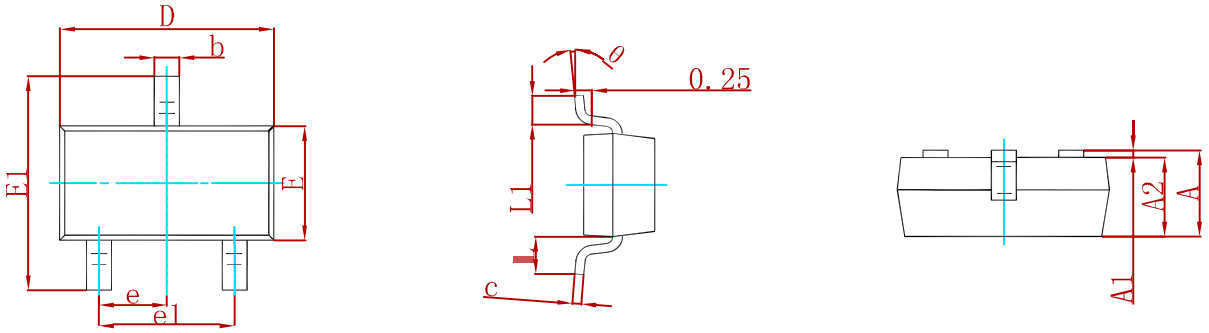


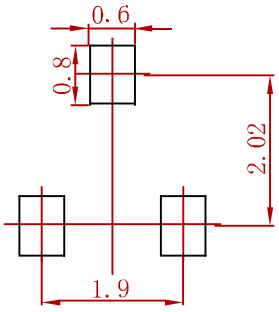
Figure 13 Normalized Maximum Transient Thermal Impedance

PACKAGE MECHANICAL DATA



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.550REF		0.022REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:±0.05mm.
3.The pad layout is for reference purposes only.

REEL SPECIFICATION

P/N	PKG	QTY
AO3416AI-MS	SOT-23	3000

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