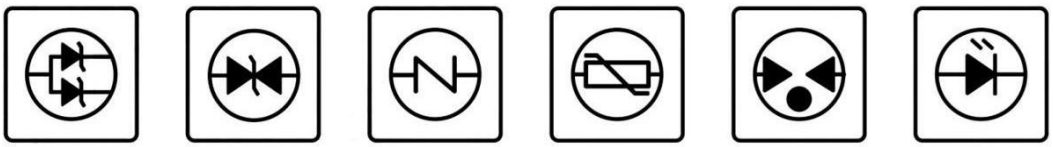
MSKSEMI 美森科
SEMICONDUCTOR



AOD413A-MS

Product specification

FEATURES

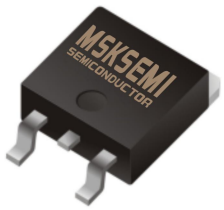
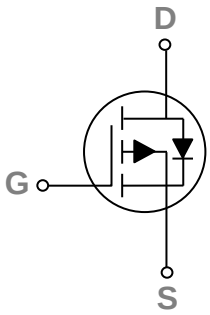
- -40V, -12A, RDS(ON) =34mΩ@VGS = -10V
- Improved dv/dt capability
- Fast switching
- 100% PB free and Green Device Available

Applications

- Motor Drive
- Power Tools
- LED Lighting

BVDSS	RDSON	ID
-40V	34mΩ	-12A

Reference News

PACKAGE OUTLINE	Pin Configuration	Marking
		MSKSEMI AOD413A MS XXX
TO-252		

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current - Continuous (T_C=25℃)	-12	A
	Drain Current - Continuous (T_C=100℃)	-10	A
I_{DM}	Drain Current - Pulsed[1]	-36	A
P_D	Power Dissipation (T_C=25℃)	50	W
	Power Dissipation - Derate above 25℃	0.28	W/℃
T_{STG}	Storage Temperature Range	-50 to 150	℃
T_J	Operating Junction Temperature Range	-50 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	3.6	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-40	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.02	---	V/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-40V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-32V , V_{GS}=0V , T_J=125℃	---	---	-10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V , I_D=-10A	---	34	44	mΩ
		V_{GS}=-4.5V , I_D=-5A	---	50	60	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=-250uA	-1.0	-1.6	-2.5	V
			---	4.18	---	mV/℃
gfs	Forward Transconductance	V_{DS}=-10V , I_D=-5A	---	7	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[3,4]	V_{DS}=-20V , V_{GS}=-4.5V , I_D=-5A	---	7.6	---	nC
Q_{gs}	Gate-Source Charge[3,4]		---	2.3	---	
Q_{gd}	Gate-Drain Charge[3,4]		---	3.1	---	
$T_{d(on)}$	Turn-On Delay Time[3,4]	V_{DD}=-20V , V_{GS}=-10V , R_G=6Ω I_D=-1A	---	12	---	ns
T_r	Rise Time[3,4]		---	13.2	---	
$T_{d(off)}$	Turn-Off Delay Time[3,4]		---	46.8	---	
T_f	Fall Time[3,4]		---	20.4	---	
C_{iss}	Input Capacitance	V_{DS}=-25V , V_{GS}=0V , F=1MHz	---	1076	---	pF
C_{oss}	Output Capacitance		---	83	---	
C_{rss}	Reverse Transfer Capacitance		---	64	---	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	16	---	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	-12	A
I_{SM}	Pulsed Source Current		---	---	-24	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1.2	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=-25V,V_{GS}=-10V,L=0.1mH,I_{AS}=-28.6A.,R_G=25Ω,Starting T_J=25℃
3. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
4. Essentially independent of operating temperature

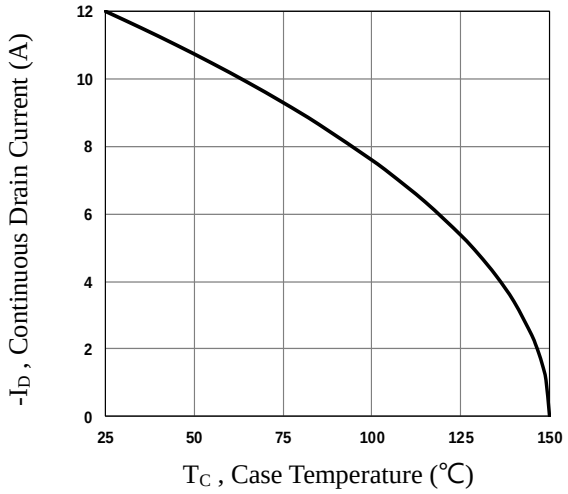


Fig.1 Continuous Drain Current vs. T_C

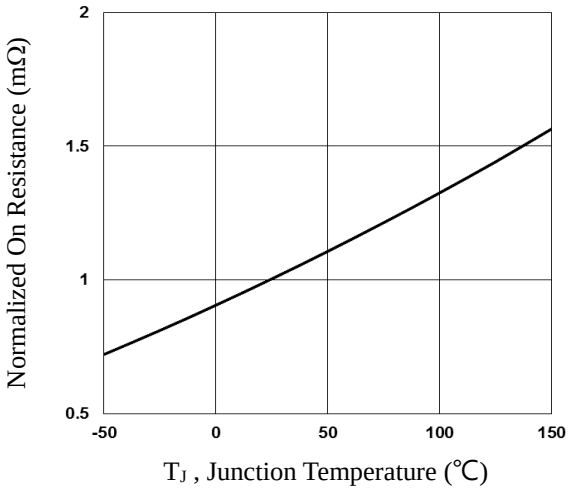


Fig.2 Normalized RDSON vs. T_J

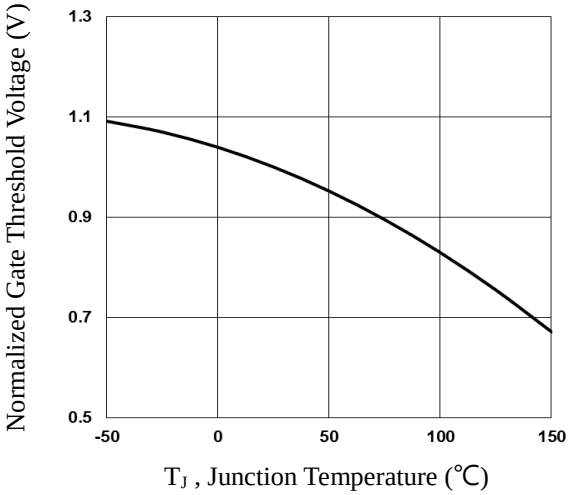


Fig.3 Normalized V_{th} vs. T_J

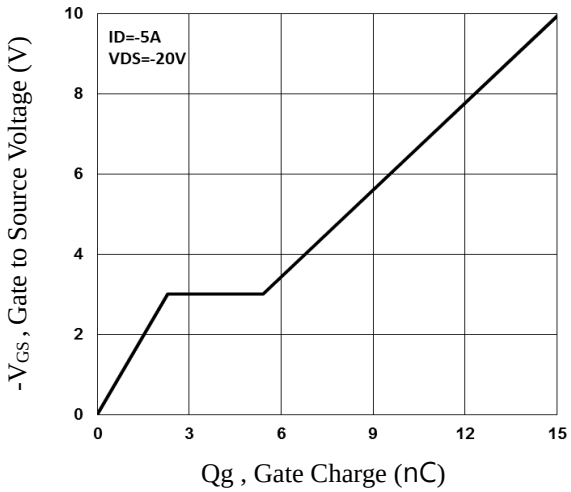


Fig.4 Gate Charge Waveform

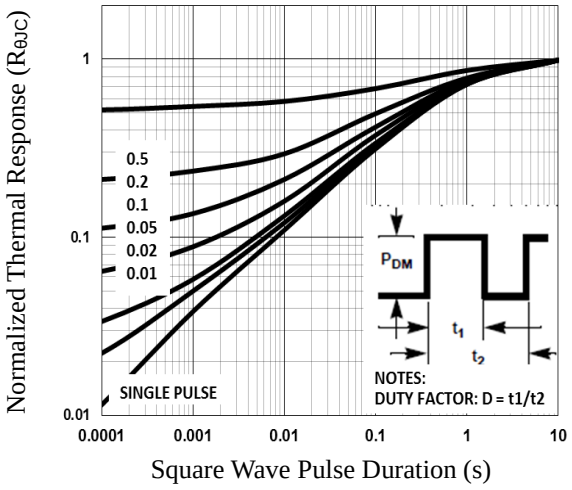


Fig.5 Normalized Transient Impedance

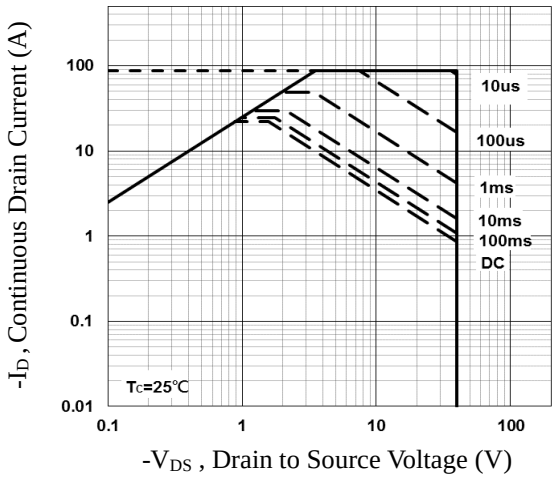


Fig.6 Maximum Safe Operation Area

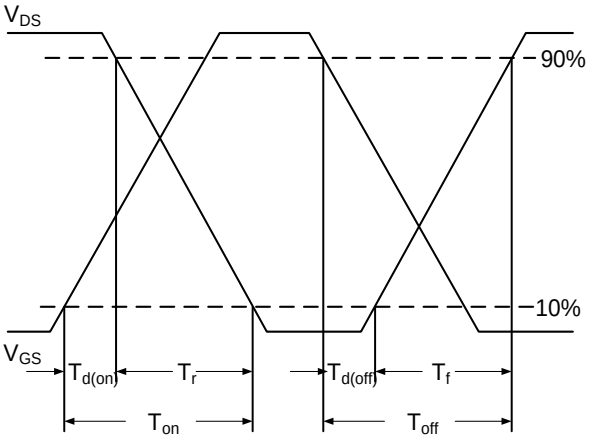
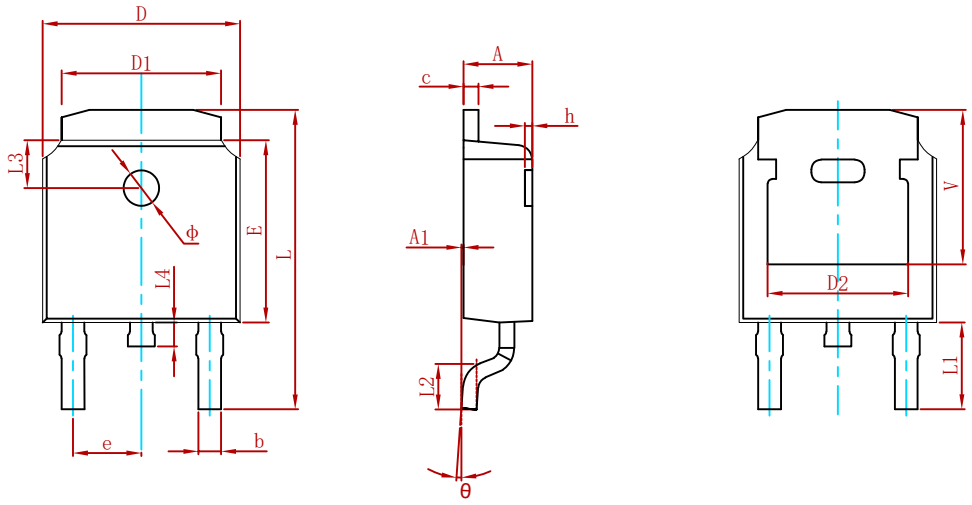


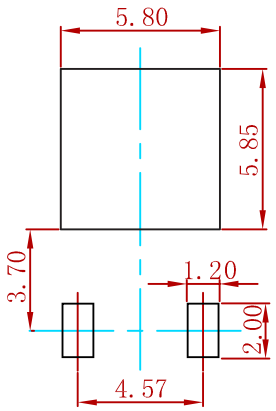
Fig.7 Switching Time Waveform

PACKAGE MECHANICAL DATA



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

Suggested Pad Layout



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

REELSPECIFICATION

P/N	PKG	QTY
AOD413A-MS	TO-252	2500

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