MSKSEMI
SEMICONDUCTOR

ESD	TVS	TSS	MOV	GDT	PLED

Product data sheet

MSKSEMI SEMICONDUCTOR

TO252-4 Pin Configuration

D1/D2

S2 G2
S1 G1

D1/D2

G1   G2

S1   S2
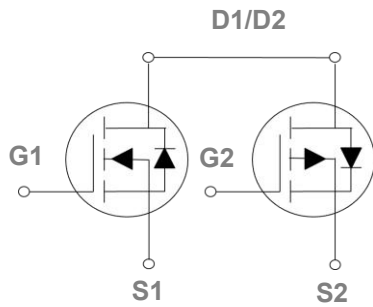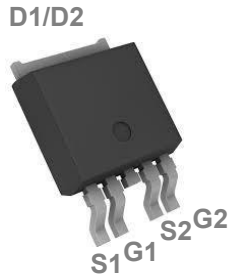
Features

- Fast switching
- Green Device Available
- Suit for 4.5V Gate Drive Applications

Applications

- DC Fan
- Motor Drive Applications
- Networking
- Half / Full Bridge Topology

BVDSS	RDSON	ID
30V	15mΩ	16A
-30V	30mΩ	-12A

Symbol	Parameter	Rating		Units
V_{DS}	Drain-Source Voltage	30	-30	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	16	-12	A
	Drain Current – Continuous (T_C=100℃)	10.1	-7.6	A
I_{DM}	Drain Current – Pulsed[1]	64	-48	A
P_D	Power Dissipation (T_C=25℃)	32.5		W
	Power Dissipation – Derate above 25℃	0.26		W/℃
T_{STG}	Storage Temperature Range	-55 to 150		℃
T_J	Operating Junction Temperature Range	-55 to 150		℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction to ambient	---	62.5	℃/W
$R_{θJC}$	Thermal Resistance Junction to Case	---	3.84	℃/W

N-CH 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	30	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=30V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=24V , V_{GS}=0V , T_J=125℃	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm$20V , V_{DS}=0V	---	---	$\pm$100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=10A	---	15	30	mΩ
		V_{GS}=4.5V , I_D=5A	---	30	40	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.5	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4	---	mV/℃
gfs	Forward Transconductance	V_{DS}=10V , I_D=3A	---	6	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[3 , 4]	V_{DS}=15V , V_{GS}=4.5V , I_D=5A	---	7.4		nC
Q_{gs}	Gate-Source Charge[3 , 4]		---	2.3		
Q_{gd}	Gate-Drain Charge[3 , 4]		---	3		
$T_{d(on)}$	Turn-On Delay Time[3 , 4]	V_{DD}=15V , V_{GS}=10V , R_G=6Ω I_D=1A	---	3.8		ns
T_r	Rise Time[3 , 4]		---	10		
$T_{d(off)}$	Turn-Off Delay Time[3 , 4]		---	22		
T_f	Fall Time[3 , 4]		---	6.6		
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , F=1MHz	---	620		pF
C_{oss}	Output Capacitance		---	85		
C_{rss}	Reverse Transfer Capacitance		---	60		
Rg	Gate resistance	V_{GS}=0V, V_{DS}=0V, f=1MHz	---	2.8		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	---	---	16	A
I_{SM}	Pulsed Source Current		---	---	32	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	V

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
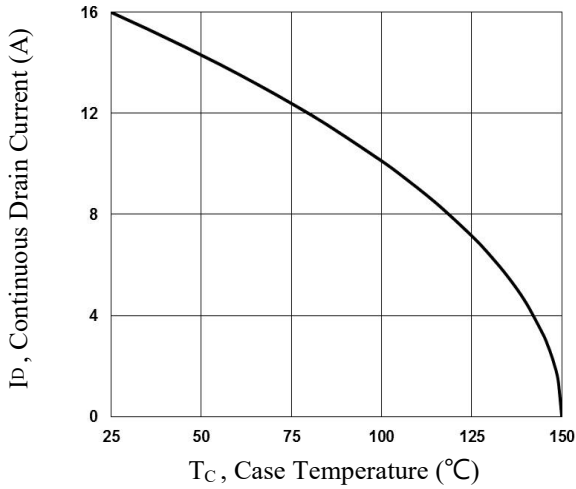3. Essentially independent of operating temperature.

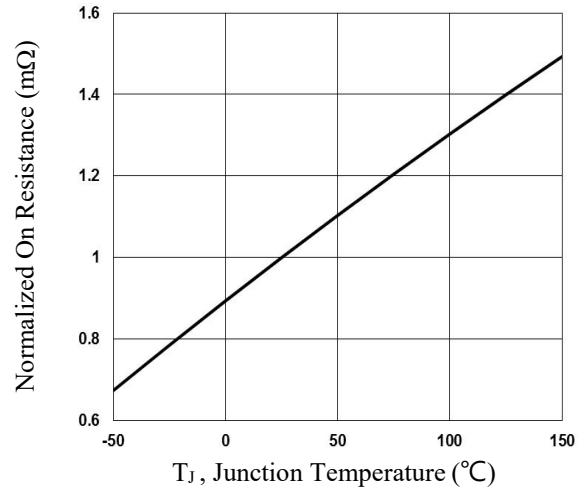**Fig.1   Continuous Drain Current vs. T$_C$**
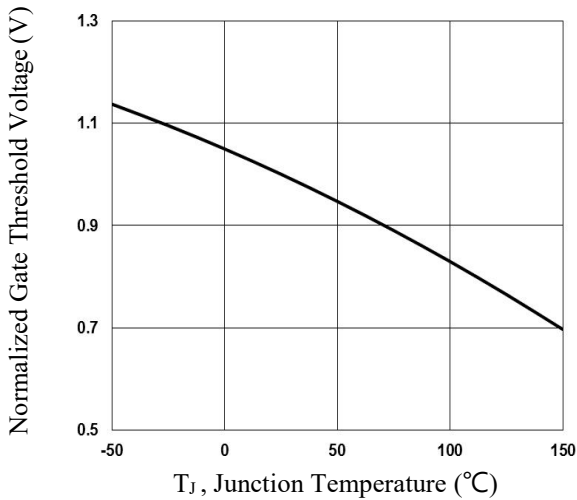

Fig.2   Normalized RDSON vs. T$_J$

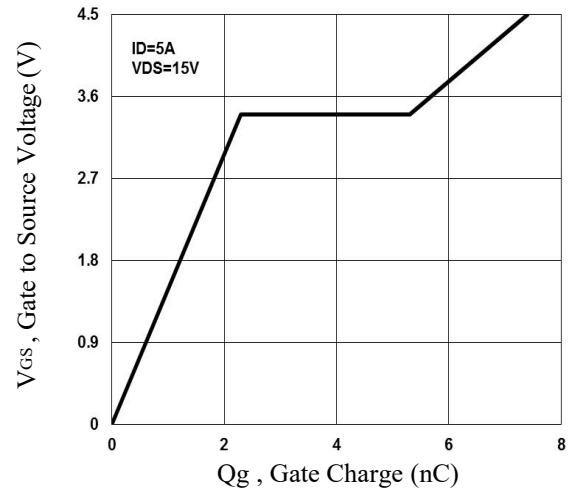**Fig.3   Normalized V$_{th}$ vs. T$_J$**
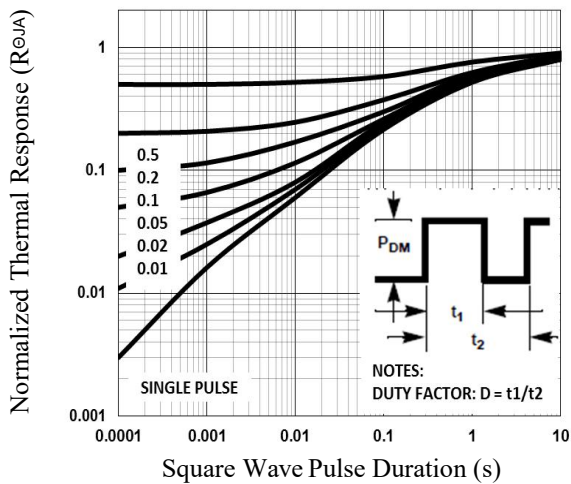

Fig.4   Gate Charge Waveform

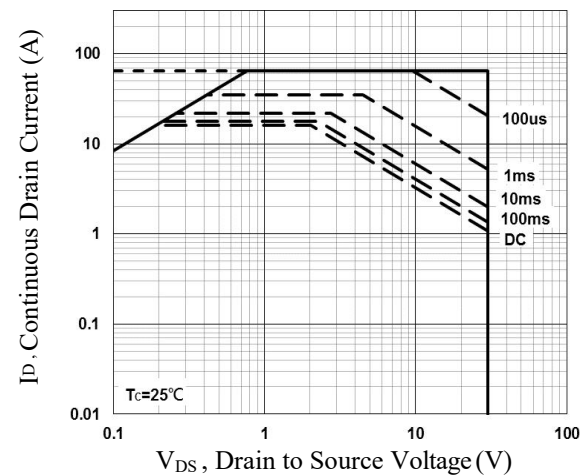

Fig.5   Normalized Transient Response

Fig.6   Maximum Safe Operation Area

P-CH 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	-30	---	---	V
$\triangle$BV$_{DSS}$/$\triangle$T$_J$	BV$_{DSS}$ Temperature Coefficient	Reference to 25℃ , I$_D$=-1mA	---	-0.03	---	V/℃
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=-30V , V$_{GS}$=0V , T$_J$=25℃	---	---	-1	uA
		V$_{DS}$=-24V , V$_{GS}$=0V , T$_J$=125℃	---	---	-10	uA
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=$\pm$20V , V$_{DS}$=0V	---	---	$\pm$100	nA

On Characteristics

R$_{DS(ON)}$	Static Drain-Source On-Resistance	V$_{GS}$=-10V , I$_D$=-7A	---	30	40	mΩ
		V$_{GS}$=-4.5V , I$_D$=-4A	---	45	68	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =-250uA	-1	-1.5	-2.5	V
$\triangle$V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	4	---	mV/℃
gfs	Forward Transconductance	V$_{DS}$=-10V , I$_D$=-3A	---	9	---	S

Dynamic and switching Characteristics

Q$_g$	Total Gate Charge[2,3]	V$_{DS}$=-15V , V$_{GS}$=-4.5V , I$_D$=-5A	---	8		nC
Q$_{gs}$	Gate-Source Charge[2,3]		---	3.3		
Q$_{gd}$	Gate-Drain Charge[2,3]		---	2.3		
T$_{d(on)}$	Turn-On Delay Time[2,3]	V$_{DD}$=-15V , V$_{GS}$=-10V , R$_G$=6Ω I$_D$=-1A	---	4.6		ns
T$_r$	Rise Time[2,3]		---	14		
T$_{d(off)}$	Turn-Off Delay Time[2,3]		---	34		
T$_f$	Fall Time[2,3]		---	18		
C$_{iss}$	Input Capacitance	V$_{DS}$=-15V , V$_{GS}$=0V , F=1MHz	---	757		pF
C$_{oss}$	Output Capacitance		---	122		
C$_{rss}$	Reverse Transfer Capacitance		---	88		

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 :
4.   Repetitive Rating : Pulsed width limited by maximum junction temperature.

5.   The data tested by pulsed , pulse width $\leqq$ 300us , duty cycle $\leqq$ 2%.
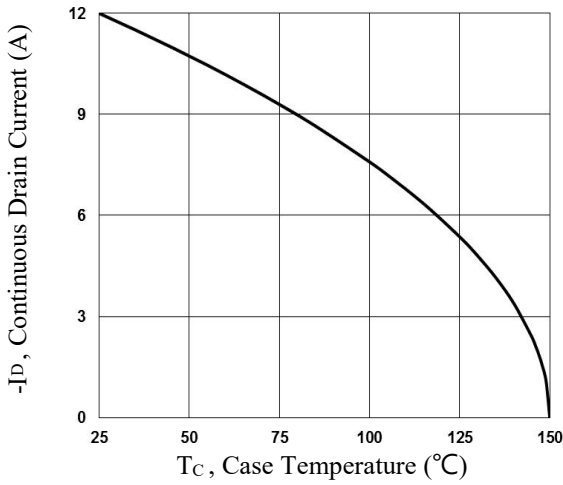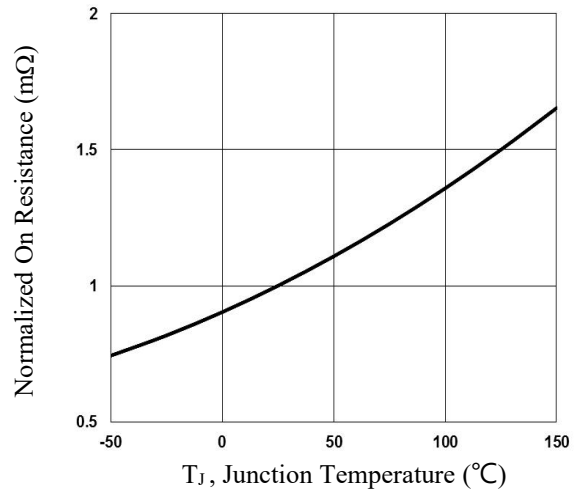6.   Essentially independent of operating temperature.

Fig.1   Continuous Drain Current vs. T$_C$
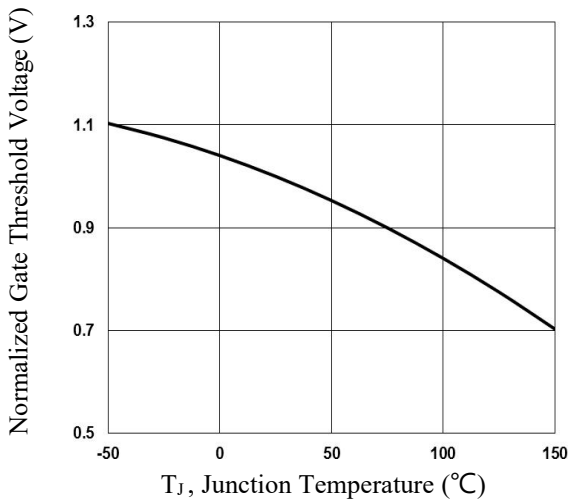

Fig.2   Normalized RDSON vs. T$_J$
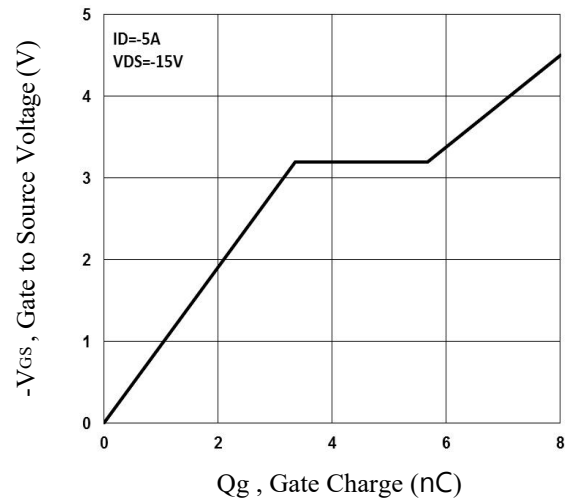

Fig.3   Normalized V$_{th}$ vs. T$_J$

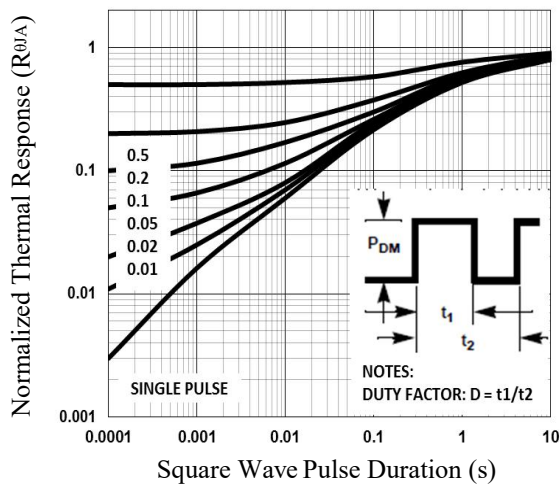**Fig.4   Gate Charge Waveform**
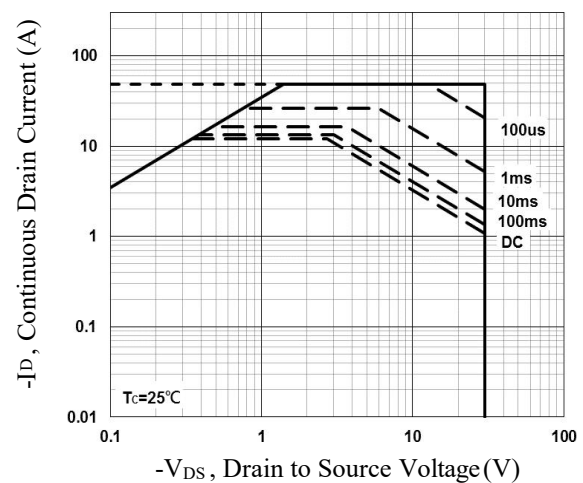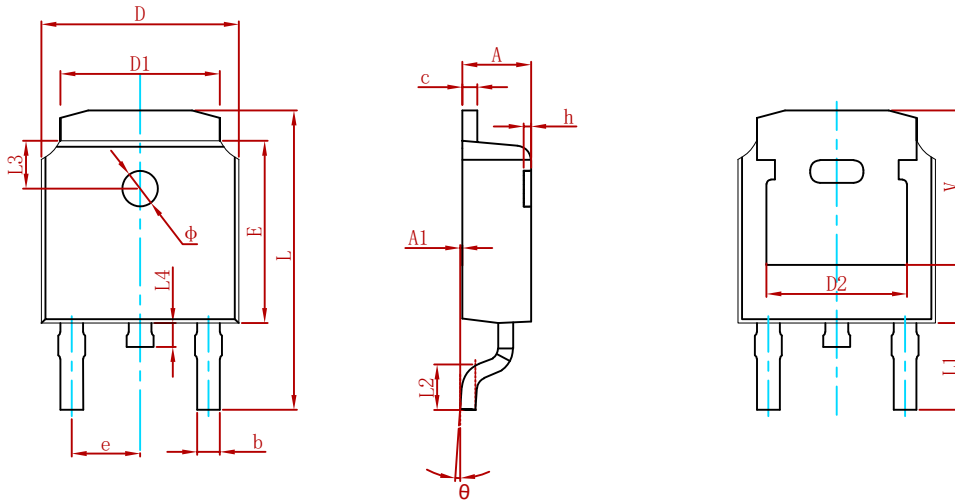

Fig.5   Normalized Transient Impedance

Fig.6   Maximum Safe Operation Area

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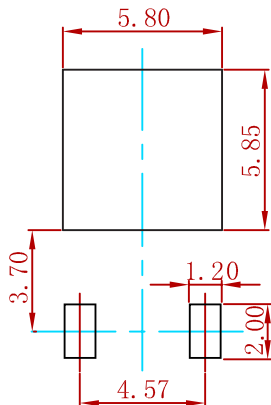
Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

REEL SPECIFICATION

P/N	PKG	QTY
AOD607-MS	TO-252-4	2500

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