

MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

MS3139KDFN

Product specification

Features

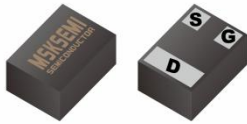
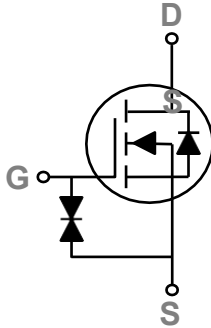

- -20V,-600mA, RDS(ON) =500mΩ@VGS = -4.5V
- Improved dv/dt capability
- Fast switching
- Green Device Available

Application

- Notebook
- Load Switch
- Battery Protection
- Hand-held Instruments

BVDSS	RDSON	ID
-20V	500mΩ	-600mA

Reference News

PACKAGE OUTLINE	Pin Configuration	Marking
 <p>DFN1006-3</p>		

Absolute Maximum Ratings Tc=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	-20	V
V _{GS}	Gate-Source Voltage	±10	V
I _D	Drain Current - Continuous (T _A =25°C)	-600	mA
	Drain Current - Continuous (T _A =100°C)	-250	mA
I _{DM}	Drain Current - Pulsed ¹	-1.6	A
P _D	Power Dissipation (T _A =25°C)	450	mW
	Power Dissipation - Derate above 25°C	3.6	mW/°C
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 125	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction to ambient	---	280	°C/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =-250uA	-20	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C , I _D =-1mA	---	-0.01	---	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-20V , V _{GS} =0V , T _J =25°C	---	---	-1	uA
		V _{DS} =-16V , V _{GS} =0V , T _J =125°C	---	---	-10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 10V , V _{DS} =0V	---	---	±20	uA

On Characteristics

R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =-4.5V , I _D =-0.3A	---	500	650	mΩ
		V _{GS} =-2.5V , I _D =-0.2A	---	650	900	
		V _{GS} =-1.8V , I _D =-0.1A	---	900	1400	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-0.3	-0.7	-1.0	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	3	---	mV/°C

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{2, 3}	V _{DS} =-10V , V _{GS} =-4.5V , I _D =-0.2A	---	1	---	nC
Q _{gs}	Gate-Source Charge ^{2, 3}		---	0.28	---	
Q _{gd}	Gate-Drain Charge ^{2, 3}		---	0.18	---	
T _{d(on)}	Turn-On Delay Time ^{2, 3}	V _{DD} =-10V , V _{GS} =-4.5V , R _G =10Ω I _D =-0.2A	---	8	---	ns
T _r	Rise Time ^{2, 3}		---	5.2	---	
T _{d(off)}	Turn-Off Delay Time ^{2, 3}		---	30	---	
T _f	Fall Time ^{2, 3}		---	18	---	
C _{iss}	Input Capacitance	V _{DS} =-10V , V _{GS} =0V , F=1MHz	---	40	---	pF
C _{oss}	Output Capacitance		---	15	---	
C _{rss}	Reverse Transfer Capacitance		---	6.5	---	

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	---	---	-0.6	A
I _{SM}	Pulsed Source Current		---	---	-1.2	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V , I _S =-0.2A , T _J =25°C	---	---	-1.3	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.

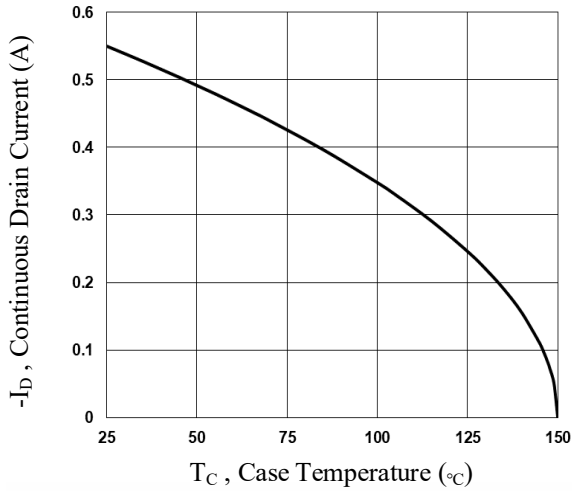


Fig.1 Continuous Drain Current vs. T_C

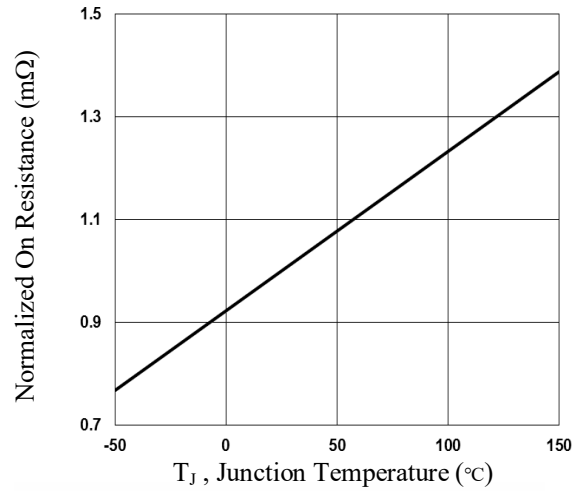


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

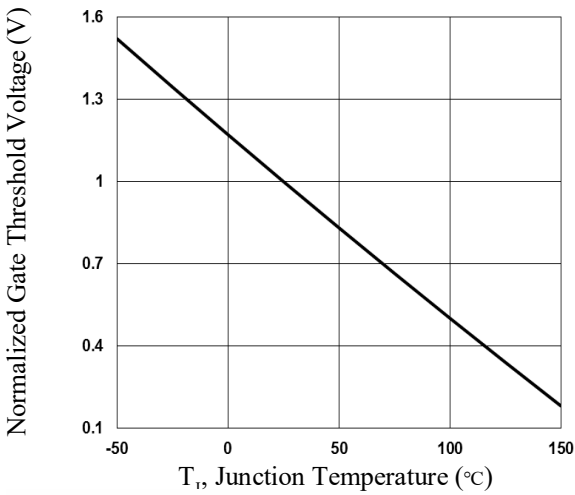


Fig.3 Normalized V_{th} vs. T_J

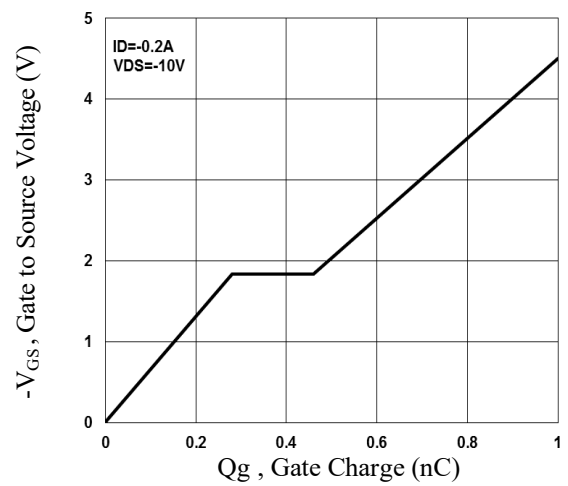


Fig.4 Gate Charge Waveform

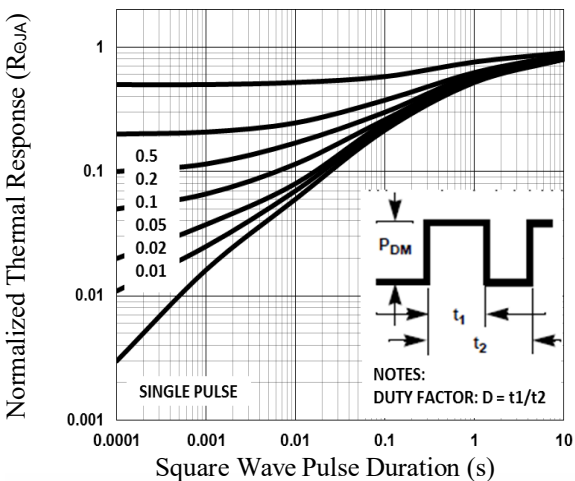


Fig.5 Normalized Transient Response

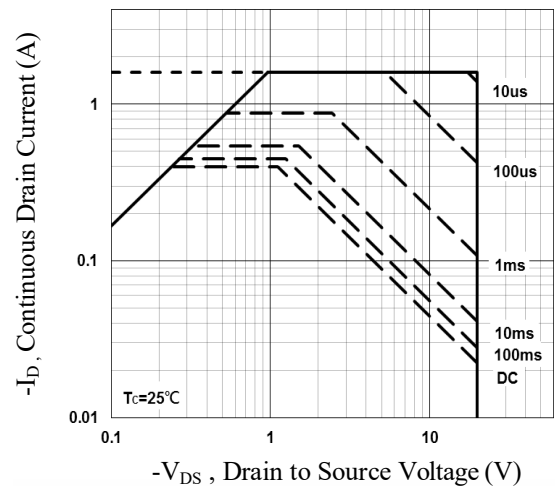


Fig.6 Maximum Safe Operation Area

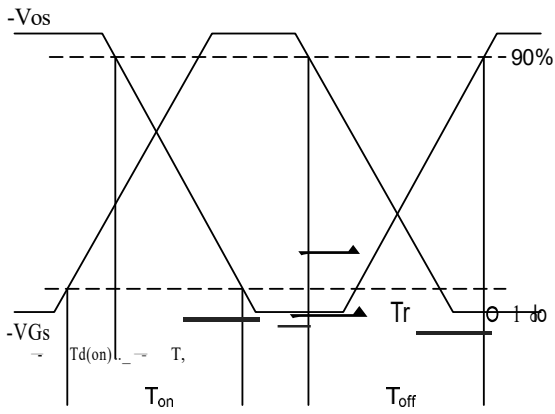


Fig.7 Switching Time Waveform

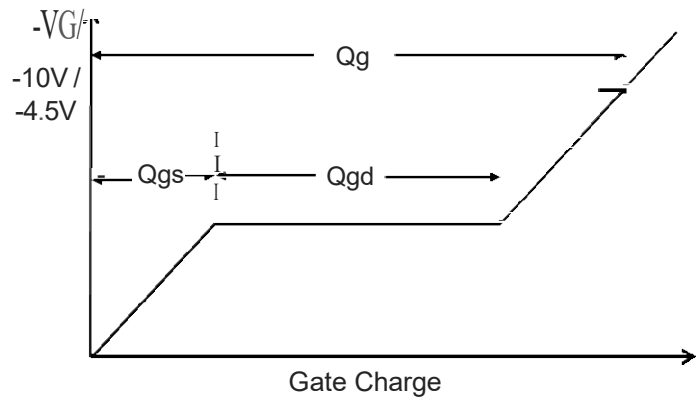
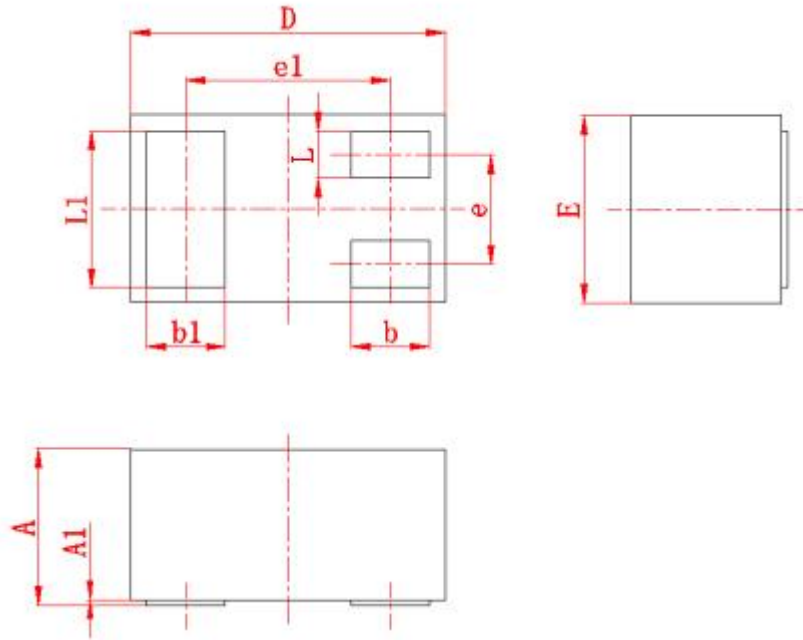


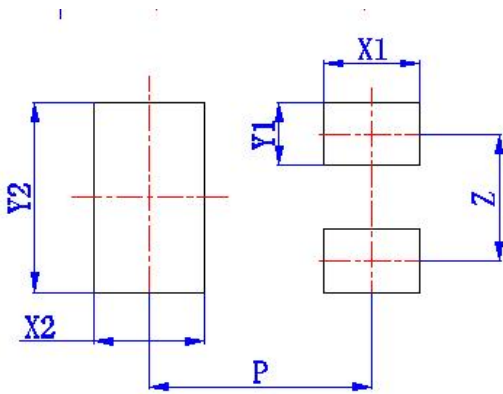
Fig.8 Gate Charge Waveform

Package mechanical data



Symbol	Millimeters	
	min	max
A	0.4	0.5
A1	0	0.05
D	0.9	1.1
E	0.55	0.65
e	(0.35)	
e1	(0.65)	
b	0.2	0.3
b1	0.2	0.3
L	0.1	0.2
L1	0.45	0.55

Suggested Land Pattern



Symbol	Dimension in Millimeters
	typ
X1	(0.3)
X2	(0.35)
Y1	(0.2)
Y2	(0.6)
Z	(0.4)
P	(0.7)

REEL SPECIFICATION

P/N	PKG	QTY
MS3139KDFN	DFN1006-3	10000

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