

MSKSEMI

SEMICONDUCTOR



ESD



TVS



TSS



MOV

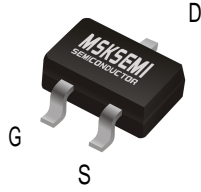


GDT

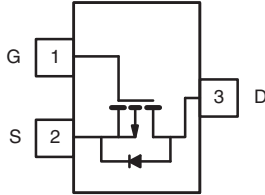


PLED

Product data sheet



SOT-23



Features

- -20V, -3.2A, $R_{DS(ON)} = 70m\Omega @ V_{GS} = -4.5V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

Applications

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

BVDSS	RDSON	ID
-20V	70mΩ	-3.2A

Absolute Maximum Ratings $T_c=25^\circ C$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Drain Current – Continuous ($T_c=25^\circ C$)	-3.2	A
	Drain Current – Continuous ($T_c=100^\circ C$)	-2.0	A
I_{DM}	Drain Current – Pulsed ¹	-12.8	A
P_D	Power Dissipation ($T_c=25^\circ C$)	1.56	W
	Power Dissipation – Derate above 25°C	0.012	W/°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	80	°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} = ± 12V, V _{DS} =0V	---	---	± 10	uA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-4.5V, I _D =-3A	---	70	85	mΩ
		V _{GS} =-2.5V, I _D =-2A	---	90	120	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-0.3	-0.7	-1.2	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	3	---	mV/°C
gfs	Forward Transconductance	V _{DS} =-10V, I _S =-1A	---	2.2	---	S

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{2, 3}	V _{DS} =-10V, V _{GS} =-4.5V, I _D =-3A	---	4.8	---	nC
Q _{gs}	Gate-Source Charge ^{2, 3}		---	0.5	---	
Q _{gd}	Gate-Drain Charge ^{2, 3}		---	1.9	---	
T _{d(on)}	Turn-On Delay Time ^{2, 3}	V _{DD} =-10V, V _{GS} =-4.5V, R _G =25Ω I _D =-1A	---	3.5	---	nS
T _r	Rise Time ^{2, 3}		---	12.6	---	
T _{d(off)}	Turn-Off Delay Time ^{2, 3}		---	32.6	---	
T _f	Fall Time ^{2, 3}		---	8.4	---	
C _{iss}	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, F=1MHz	---	550	---	pF
C _{oss}	Output Capacitance		---	65	---	
C _{rss}	Reverse Transfer Capacitance		---	55	---	

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	---	---	-3.2	A
I _{SM}	Pulsed Source Current		---	---	-6.4	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1.2	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.

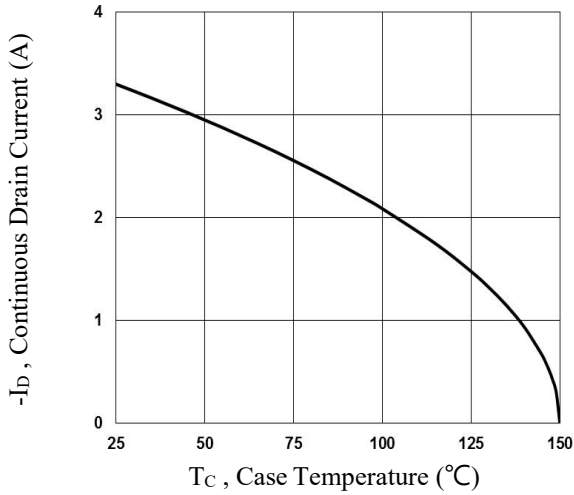


Fig.1 Continuous Drain Current vs. T_c

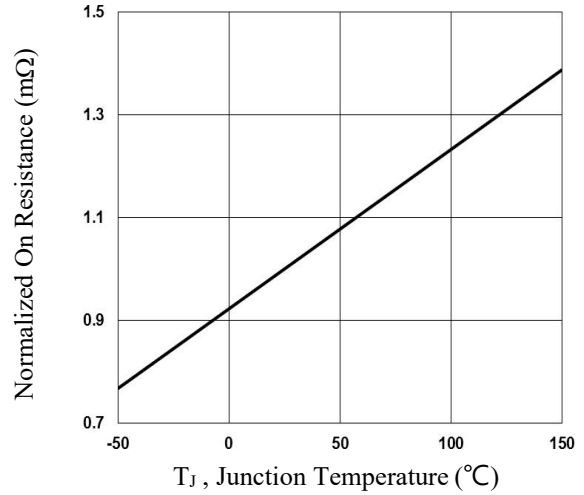


Fig.2 Normalized R_{DS(on)} vs. T_j

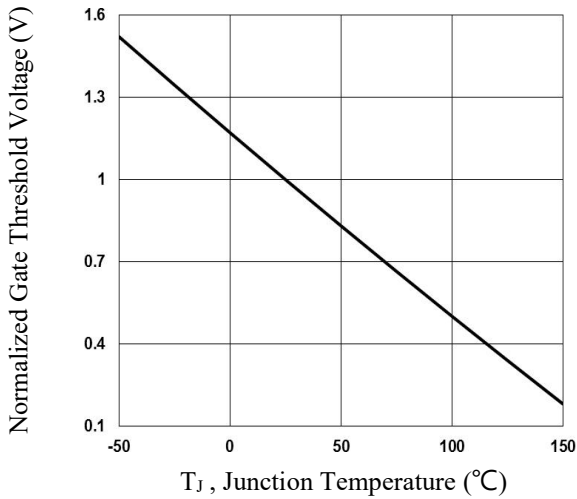


Fig.3 Normalized V_{th} vs. T_j

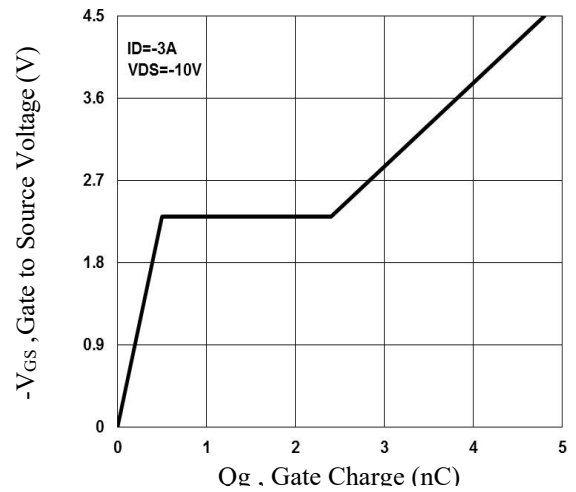


Fig.4 Gate Charge Waveform

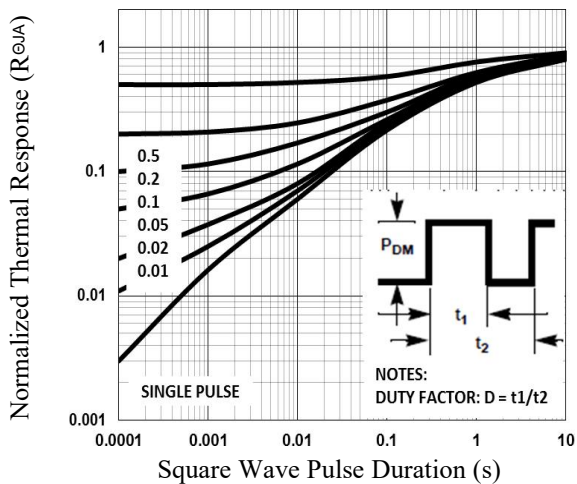


Fig.5 Normalized Transient Response

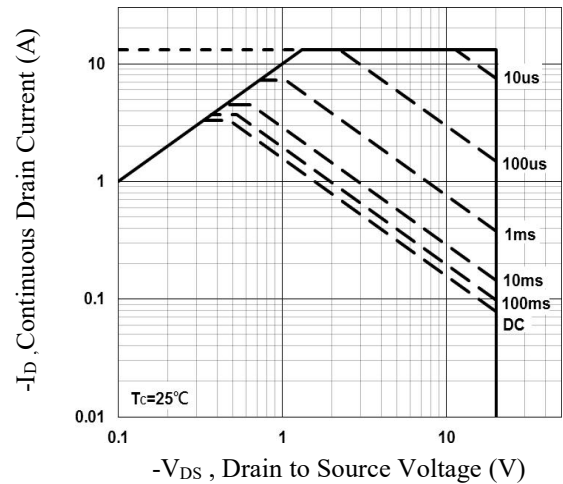


Fig.6 Maximum Safe Operation Area

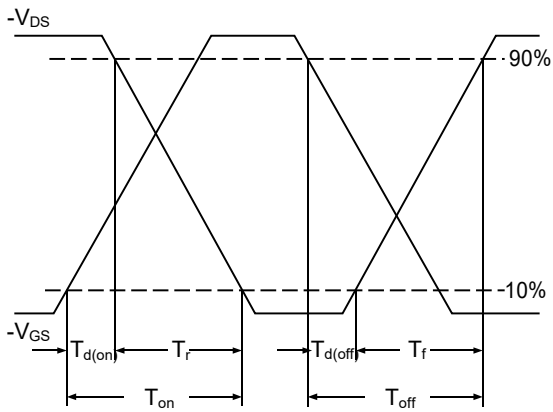


Fig.7 Switching Time Waveform

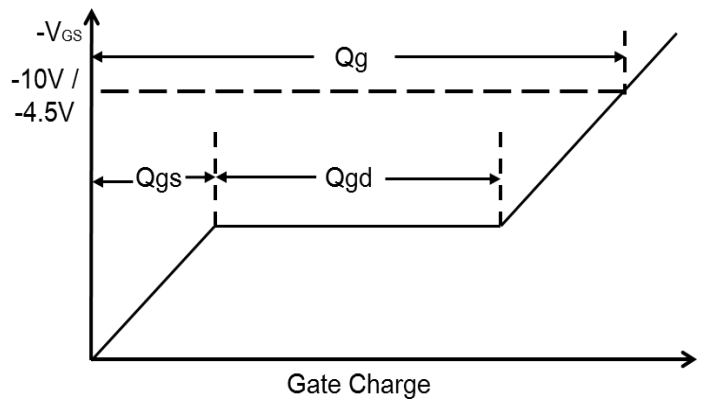
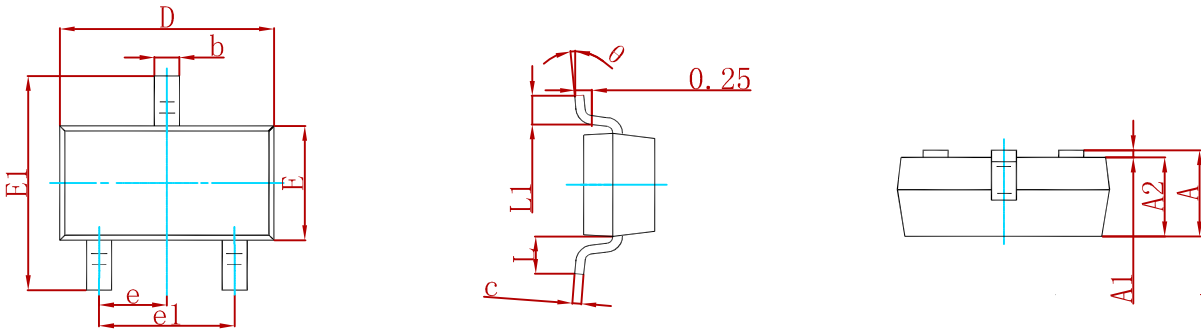


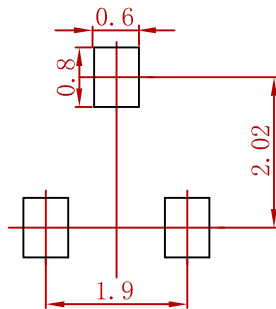
Fig.8 Gate Charge Waveform

PACKAGE MECHANICAL DATA



Symbol	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	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
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
NTR4101PT1G-MS	SOT-23	3000

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