

MSKSEMI

SEMICONDUCTOR



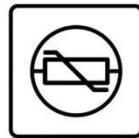
ESD



TVS



TSS



MOV



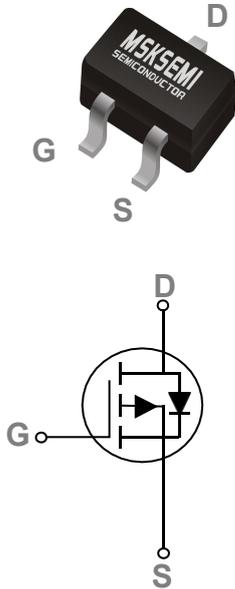
GDT



PLED

Product data sheet

SOT-323 Pin Configuration



Features

- -20V, -1.5A, $R_{DS(ON)} = 90m\Omega @ V_{GS} = -4.5V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

Applications

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

BVDSS	RDSON	ID
-20V	90mΩ	-1.5A

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 ($T_c=25^\circ C$)	-1.5	A
	Drain Current – Continuous ($T_c=100^\circ C$)	-0.95	A
I_{DM}	Drain Current – Pulsed ¹	-6	A
P_D	Power Dissipation ($T_c=25^\circ C$)	312	mW
	Power Dissipation – Derate above 25°C	2.5	mW/°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	---	400	°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
BV _{DSS} T _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	---	---	-1	uA
		V _{DS} =-16V, V _{GS} =0V, T _J =125	---	---	-10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} 12V, V _{DS} =0V	---	---	100	nA

On Characteristics

R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} =-4.5V, I _D =-1A	---	90	110	mΩ
		V _{GS} =-2.5V, I _D =-1A	---	110	135	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-0.3	-0.6	-1.0	V
V _{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 =-1A	---	4.8	8	nC
Q _{gs}	Gate-Source Charge ^{2, 3}		---	0.5	1	
Q _{gd}	Gate-Drain Charge ^{2, 3}		---	1.9	4	
T _{d(on)}	Turn-On Delay Time ^{2, 3}	V _{DD} =-10V, V _{GS} =-4.5V, R _G =25Ω I _D =-1A	---	3.5	7	ns
T _r	Rise Time ^{2, 3}		---	12.6	24	
T _{d(off)}	Turn-Off Delay Time ^{2, 3}		---	32.6	62	
T _f	Fall Time ^{2, 3}		---	8.4	16	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, F=1MHz	---	350	510	pF
C _{oss}	Output Capacitance		---	65	95	
C _{rss}	Reverse Transfer Capacitance		---	50	75	

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	---	---	-1.5	A
I _{SM}	Pulsed Source Current		---	---	-3	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-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.

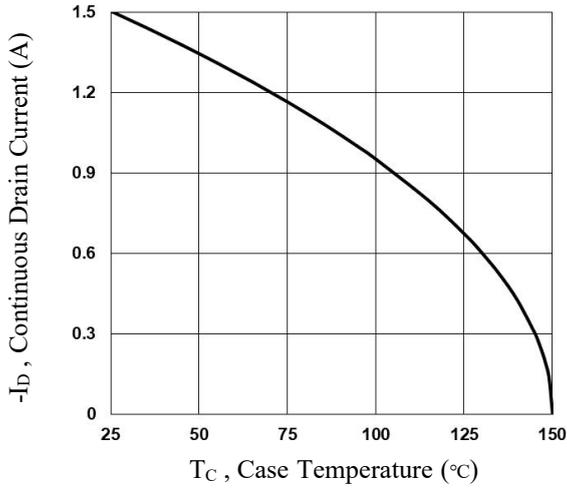


Fig.1 Continuous Drain Current vs. T_c

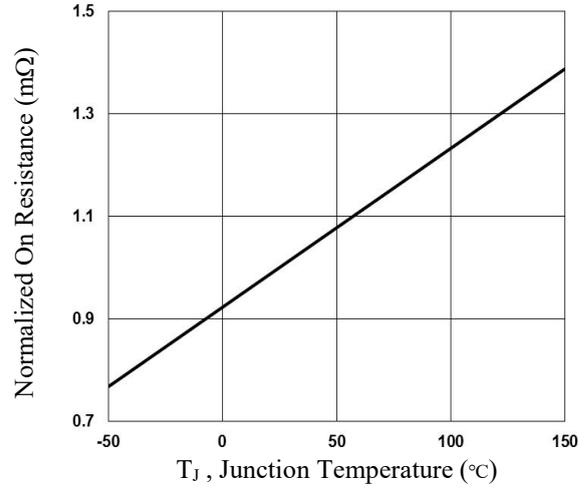


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

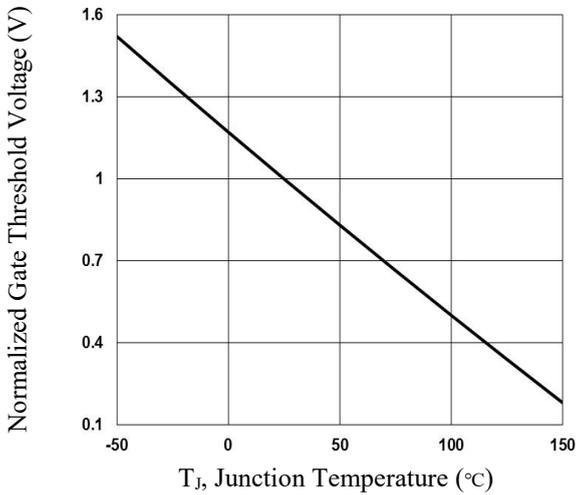


Fig.3 Normalized V_{th} vs. T_j

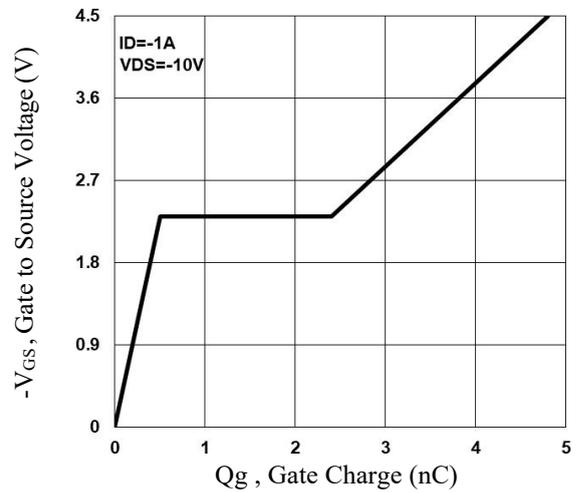


Fig.4 Gate Charge Waveform

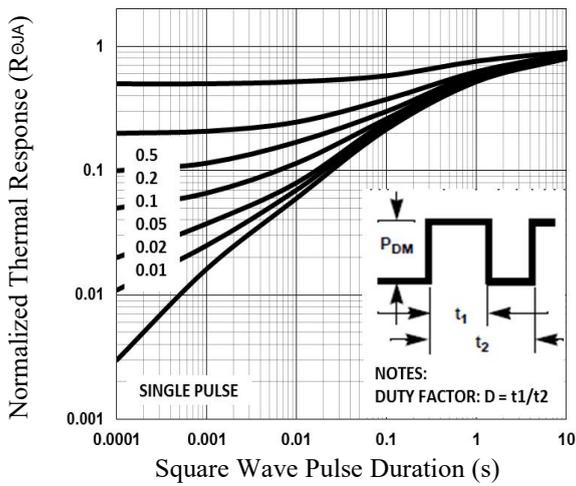


Fig.5 Normalized Transient Response

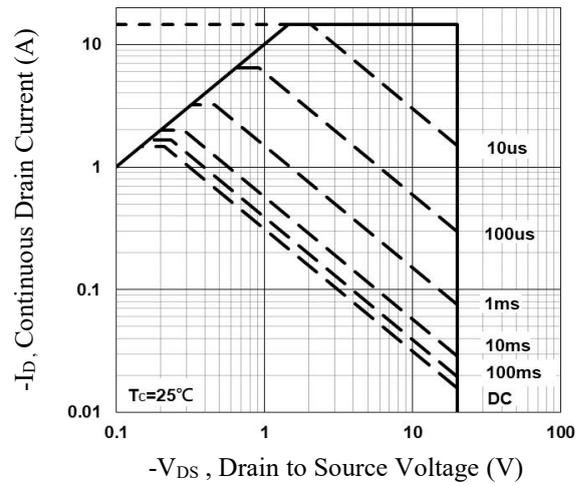


Fig.6 Maximum Safe Operation Area

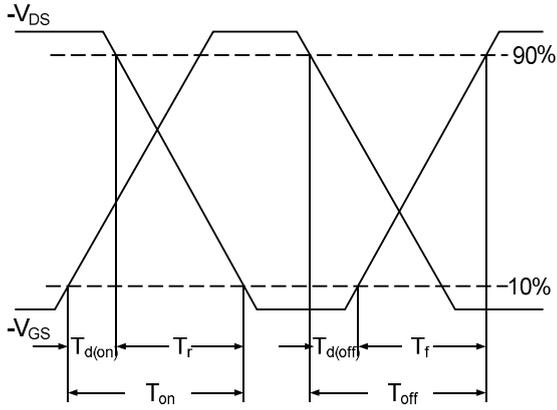


Fig.7 Switching Time Waveform

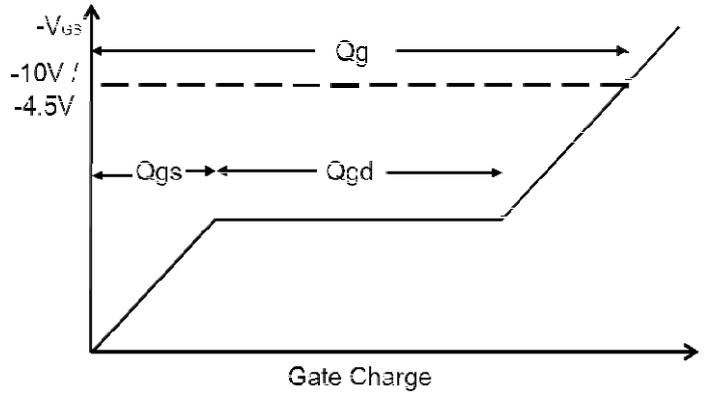
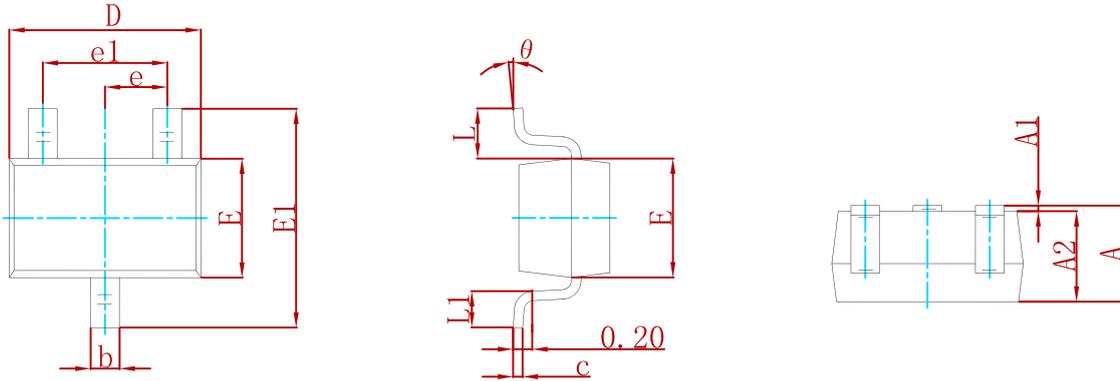


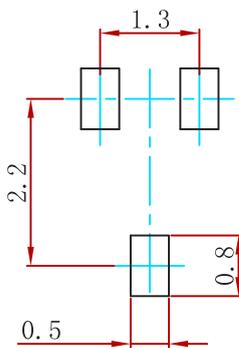
Fig.8 Gate Charge Waveform

PACKAGE MECHANICAL DATA



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
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
NTS2101PT1G-MS	SOT-323	3000

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