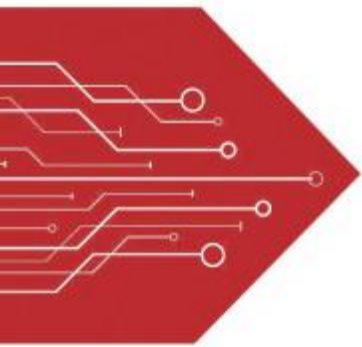


MSKSEMI

SEMICONDUCTOR



ESD



TVS



TSS



MOV



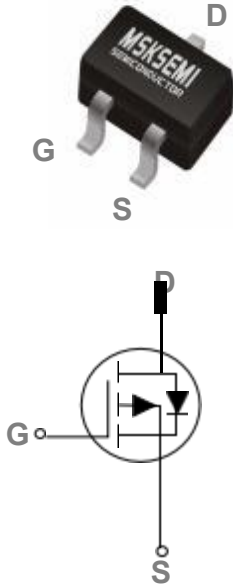
GDT



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 $25^\circ C$	2.5	mW/ $^\circ C$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	400	$^\circ C/W$

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
g _{fs}	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 ≤ 300 us , duty cycle ≤ 2%.
3. Essentially independent of operating temperature.

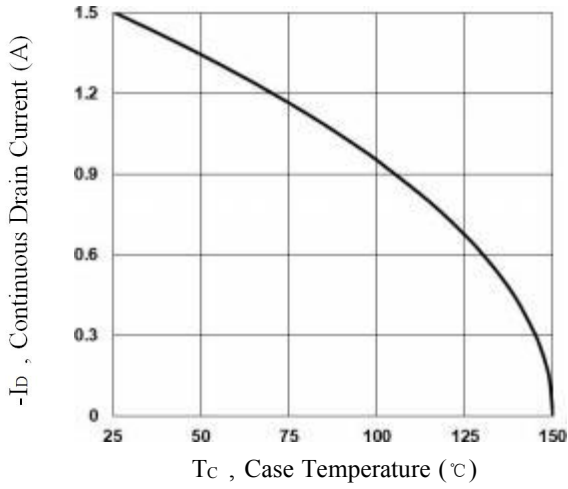


Fig. 1 Continuous Drain Current vs. T_C

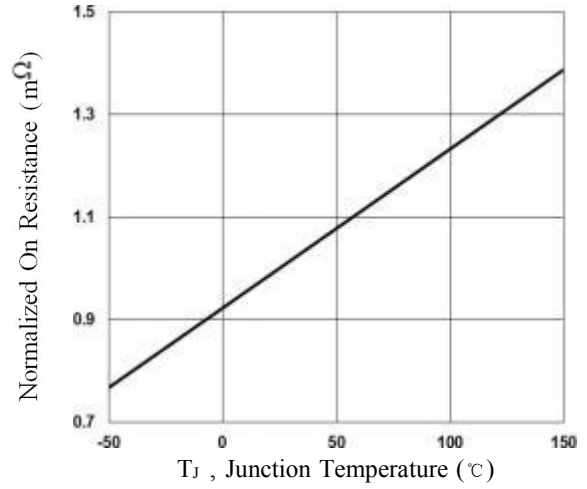


Fig. 2 Normalized R_{DSON} vs. T_J

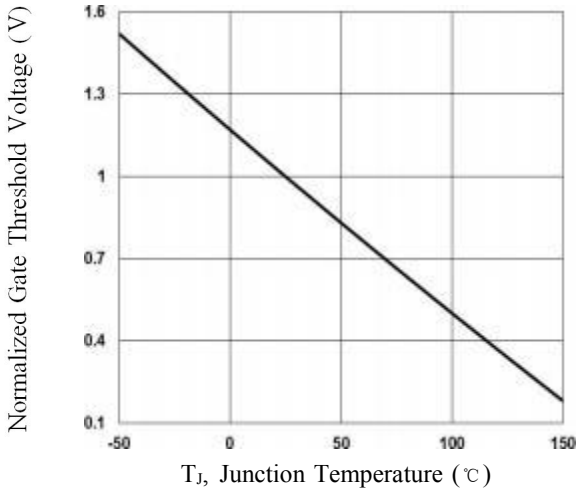


Fig. 3 Normalized V_{th} vs. T_J

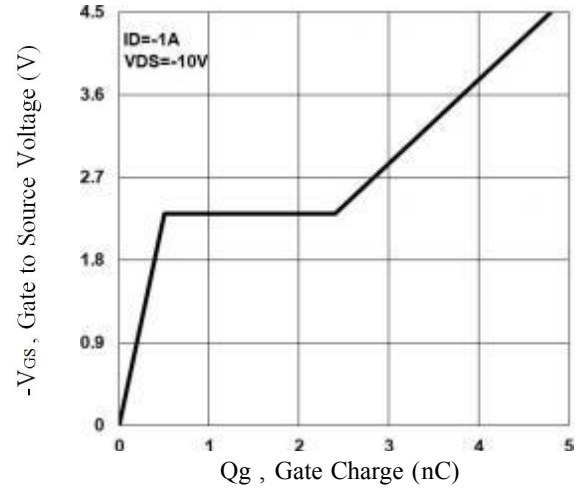


Fig. 4 Gate Charge Waveform

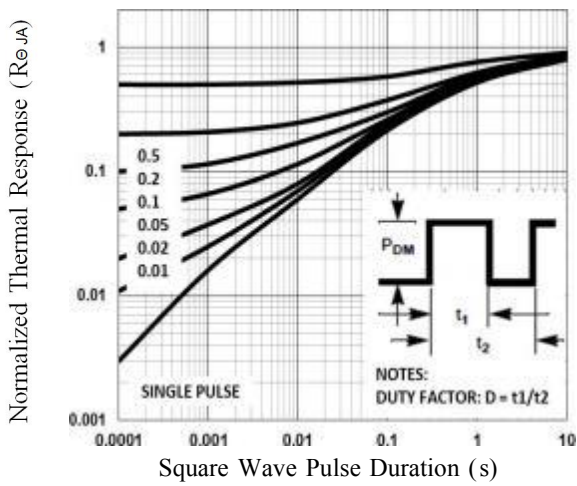


Fig. 5 Normalized Transient Response

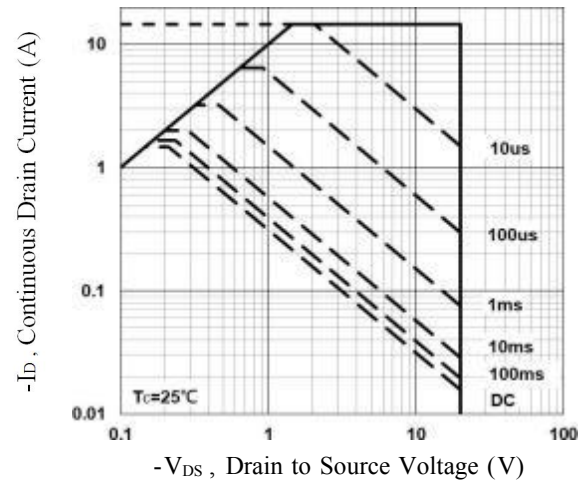


Fig. 6 Maximum Safe Operation Area

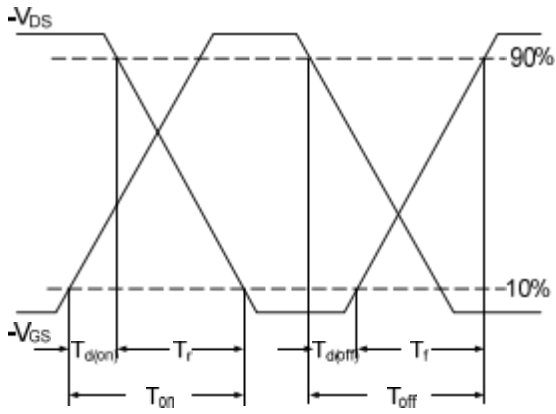


Fig. 7 Switching Time Waveform

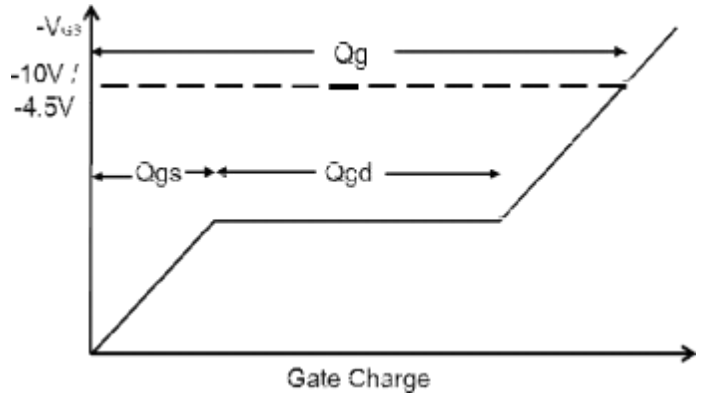
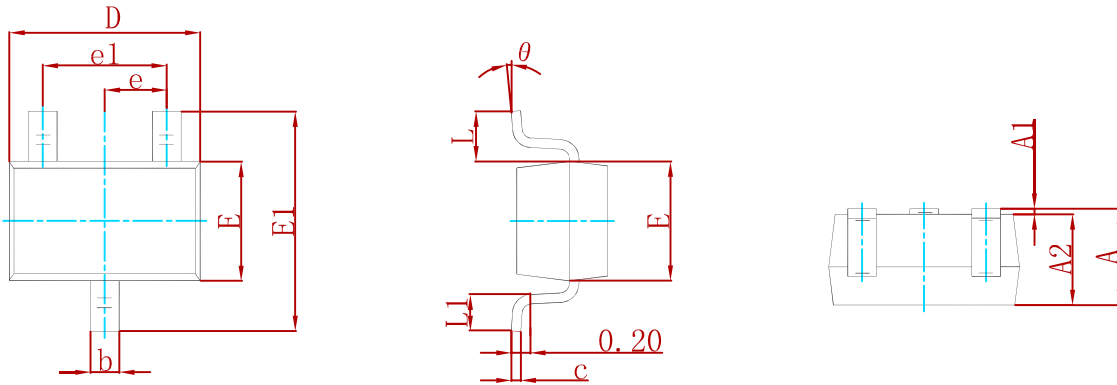


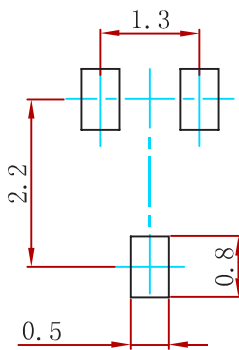
Fig. 8 Gate Charge Waveform

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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