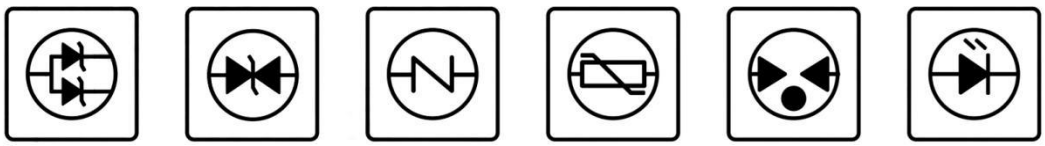
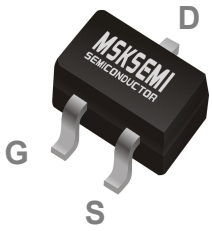
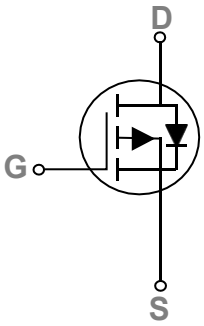
MSKSEMI
SEMICONDUCTOR



Product data sheet

SOT-323 Pin Configuration





Features

- *-20V,-1.5A, RDS(ON) =90mΩ@VGS = -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 Tc=25℃ 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℃)	-1.5	A
	Drain Current – Continuous (T_C=100℃)	-0.95	A
I_{DM}	Drain Current – Pulsed[1]	-6	A
P_D	Power Dissipation (T_C=25℃)	312	mW
	Power Dissipation – Derate above 25℃	2.5	mW/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

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

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	-20	---	---	V
BV_{DSS} T_J	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.01	---	V/℃
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/℃
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℃	---	---	-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.

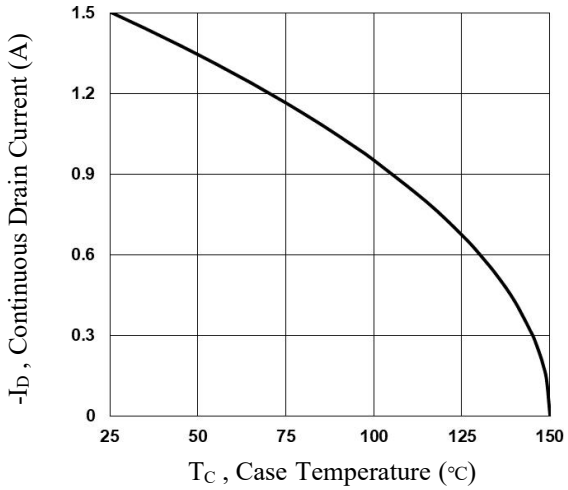


Fig.1 Continuous Drain Current vs. T_C

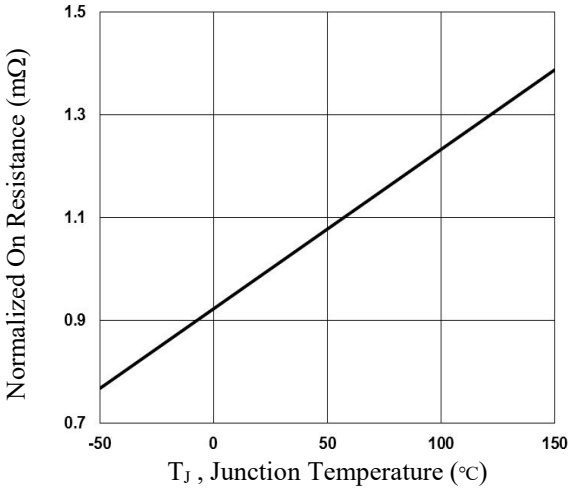


Fig.2 Normalized RDSON vs. T_J

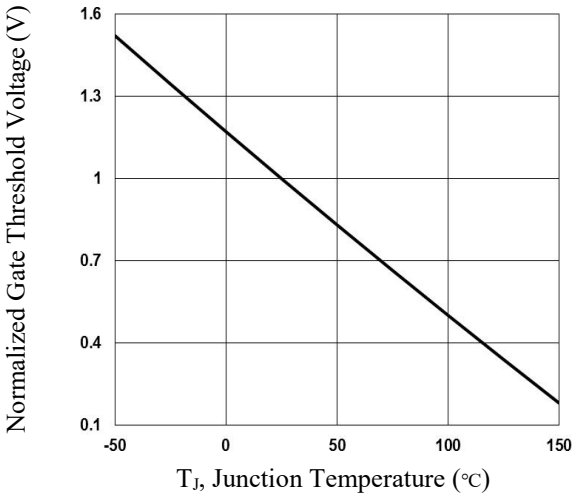


Fig.3 Normalized V_{th} vs. T_J

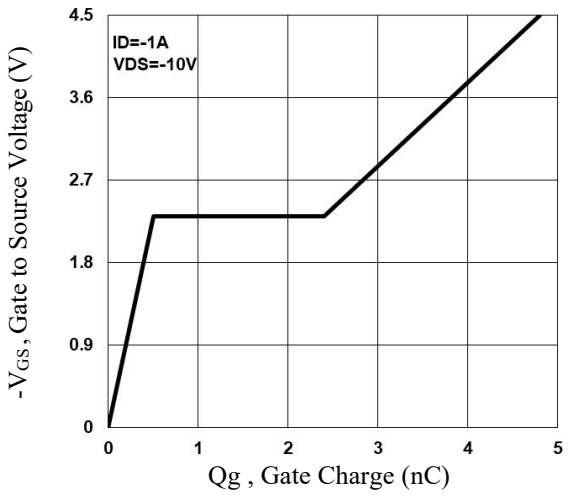


Fig.4 Gate Charge Waveform

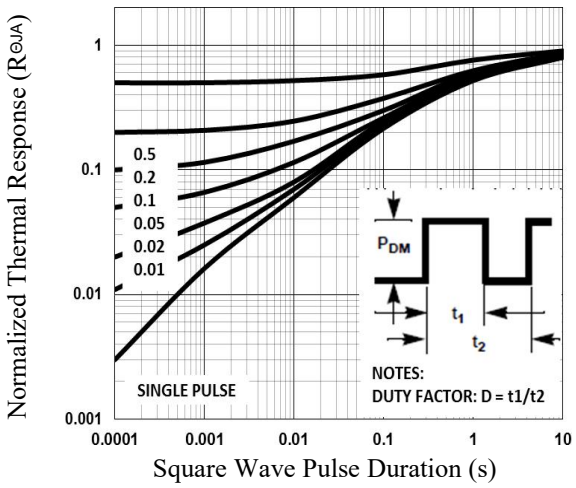


Fig.5 Normalized Transient Response

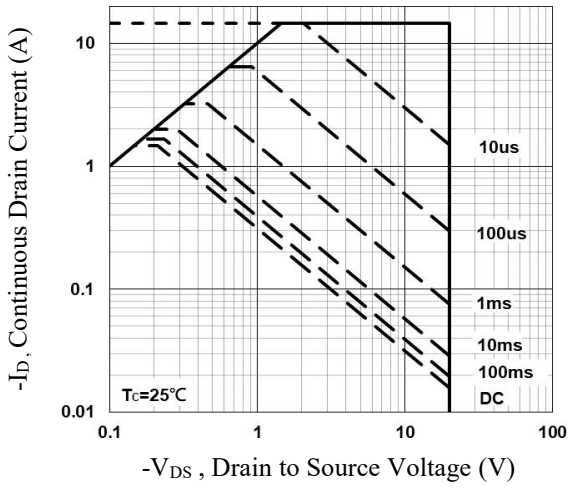


Fig.6 Maximum Safe Operation Area

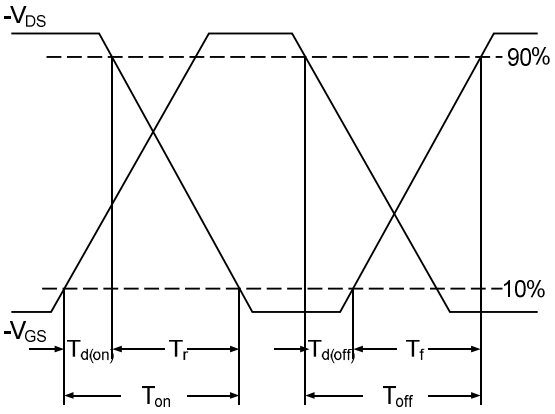


Fig.7 Switching Time Waveform

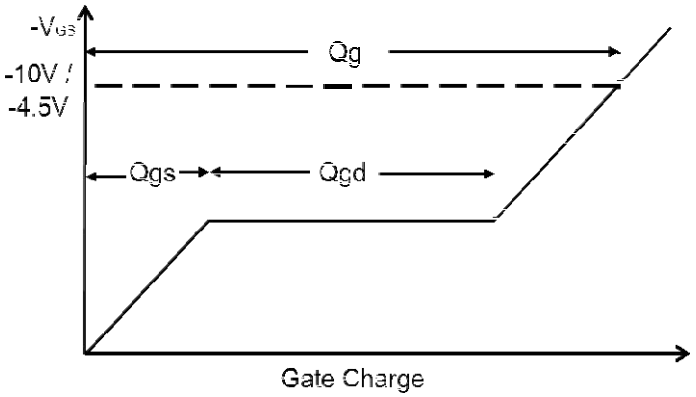
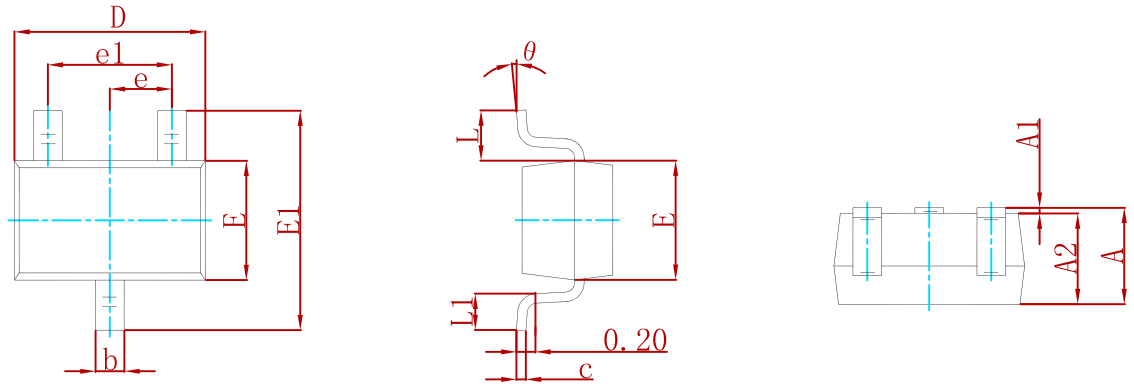


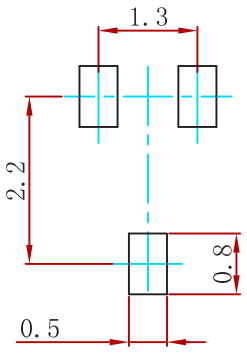
Fig.8 Gate Charge Waveform

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

Attention

■ Any and all MSKSEMI Semiconductor products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your MSKSEMI Semiconductor representative nearest you before using any MSKSEMI Semiconductor products described or contained herein in such applications.

■ MSKSEMI Semiconductor assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specificationsof any andall MSKSEMI Semiconductor products described orcontained herein.

■ Specifications of any and all MSKSEMI Semiconductor products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer’s products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer’sproducts orequipment.

■ MSKSEMI Semiconductor. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with someprobability. It is possiblethat these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits anderror prevention circuitsfor safedesign, redundant design, and structural design.

■ In the event that any or all MSKSEMI Semiconductor products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from theauthorities concerned in accordance with the above law.

■ No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of MSKSEMI Semiconductor.

■ Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. MSKSEMI Semiconductor believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringementsof intellectual property rights or other rightsof third parties.

■ Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. Whendesigning equipment, referto the "Delivery Specification" for the MSKSEMI Semiconductor productthat you intend to use.

Unikeyic Electronics

Global Electronic Components Distributor

Click to view pricing, inventory, delivery, and lifecycle information:

MSKSEMI:

PESD5V0S1BLN-MS PTVS6V5S1UR-MS 1SMA4736A-MS AMS1117-1.5(MS) MM3Z3V9-MS MURS240T3G-MS 1SMA5925BT3G-MS LNZ8F12VT5G-MS MS0603ESDA-24 SMBJ5358B-MS XC6206P332PR-MS ZMM6B2 DS16W-MS ESDBW712C2-MS MCP1700T-1802E/TT(MS) SMBJ5349B-MS HT7233-MS ZMM5242B 1SMA4750A-MS SPX3819M5-L-5-0(MS) XC6219B282MR-MS BZV55C13-MS MCP1700T-3002E/TT(MS) MMST5551 BAS19W ESD3Z5.0T1G-MS ESD5B5CU F1M MS78L06 XC6228D122VR-G(MS)