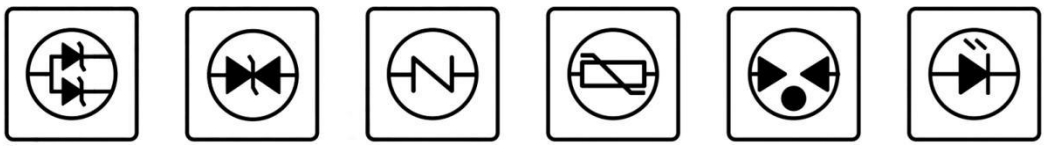
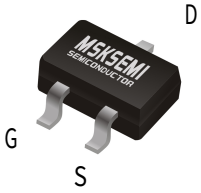
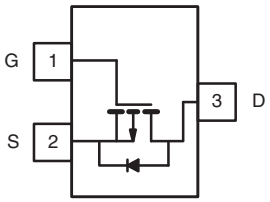
MSKSEMI
SEMICONDUCTOR



Product data sheet



SOT-23



Features

- *-20V,-3A, RDS(ON) =70mΩ@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	70mΩ	-3A

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	±12	V
I_D	Drain Current – Continuous (T_C=25°C)	-3.0	A
	Drain Current – Continuous (T_C=100°C)	-2.1	A
I_{DM}	Drain Current – Pulsed[1]	-13	A
P_D	Power Dissipation (T_C=25°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 ℃, 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
$\triangle BV_{DSS}/\triangle T_J$	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	---	---	±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	---	95	120	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-0.3	-0.65	-1.1	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ 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=-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	---	---	-3.0	A
I_{SM}	Pulsed Source Current		---	---	-13	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-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.

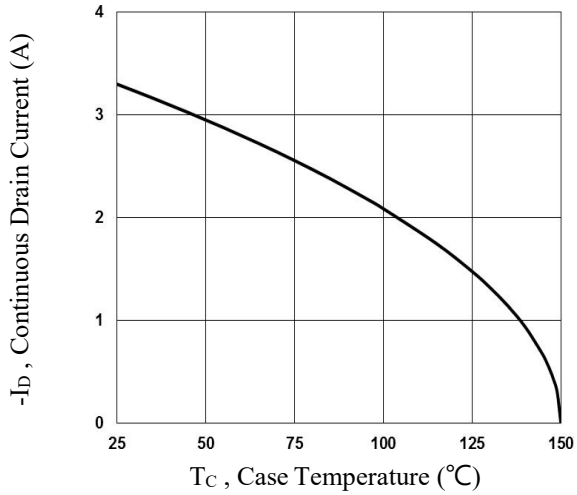


Fig.1 Continuous Drain Current vs. T_C

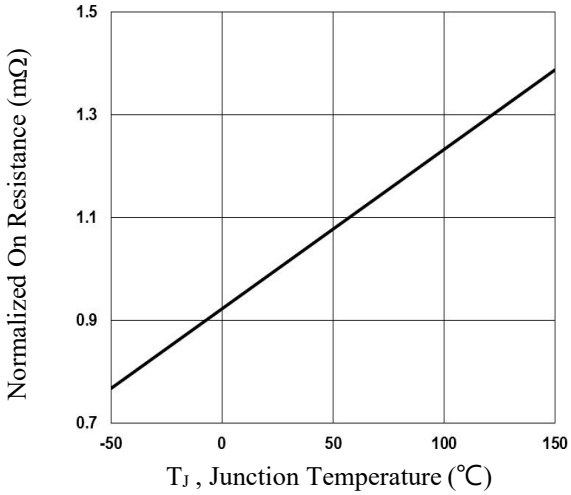


Fig.2 Normalized RDSON vs. T_J

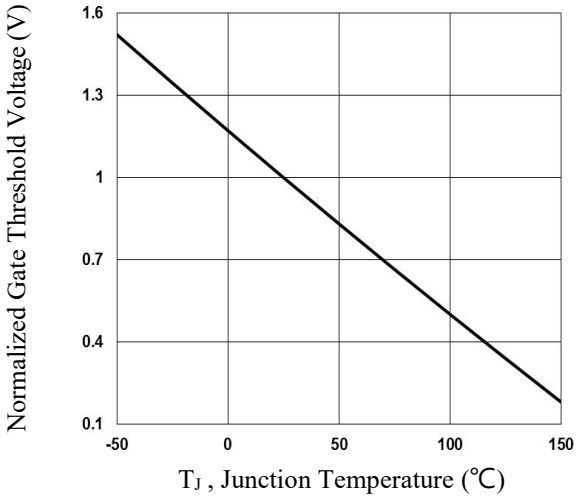


Fig.3 Normalized V_{th} vs. T_J

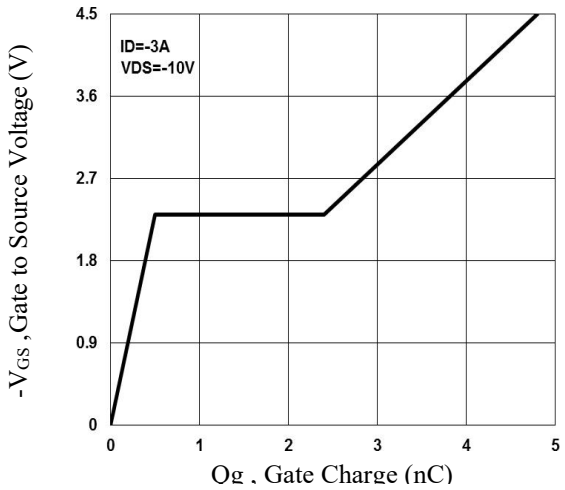


Fig.4 Gate Charge Waveform

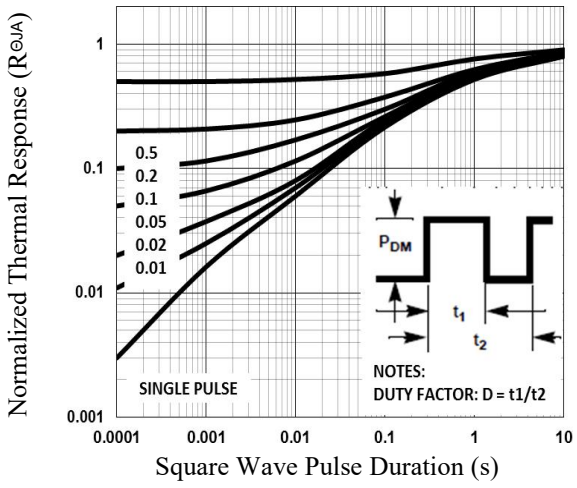


Fig.5 Normalized Transient Response

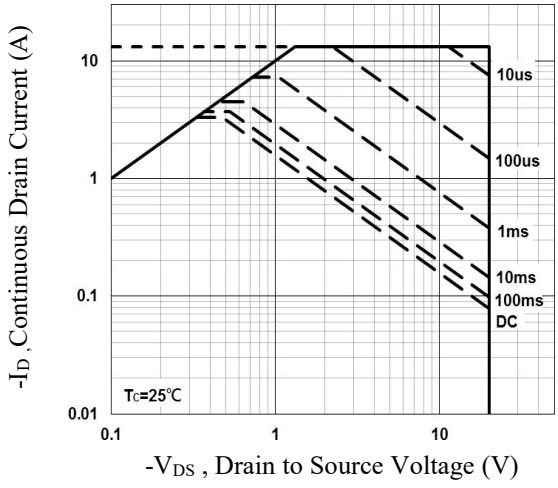


Fig.6 Maximum Safe Operation Area

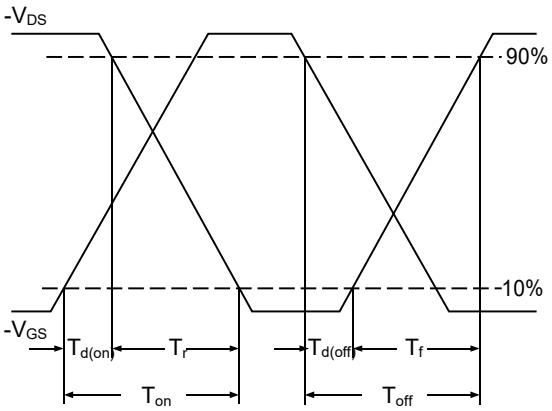


Fig.7 Switching Time Waveform

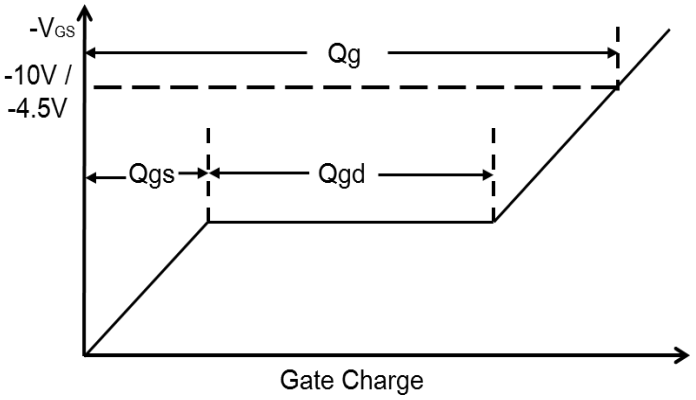
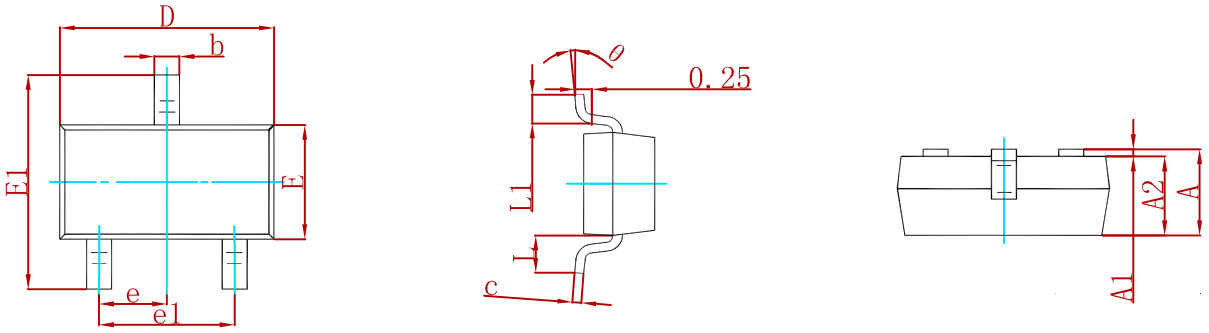


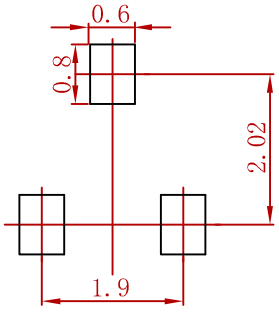
Fig.8 Gate Charge Waveform

PACKAGE MECHANICAL DATA



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	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
SI2301CDS-T1-GE3-MS	SOT-23	3000

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