

MSKSEMI

SEMICONDUCTOR



ESD



TVS



TSS



MOV

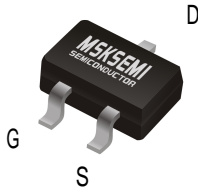


GDT

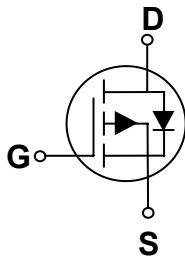


PLED

Product data sheet



SOT-23-3L



Features

- -20 V, -4.5A, $R_{DS(ON)}=40m\Omega@V_{GS}=-4.5V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

Applications

- Notebook
- Load Switch
- Hand-Held Instruments

BVDSS	$R_{DS(ON)}$	ID
-20V	40m Ω	-4.5A

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 ($T_c=25^\circ C$)	-4.5	A
	Drain Current – Continuous ($T_c=100^\circ C$)	-2.7	A
I_{DM}	Drain Current – Pulsed ¹	-18	A
P_D	Power Dissipation ($T_c=25^\circ C$)	1.5	W
	Power Dissipation – Derate above 25 $^\circ C$	0.012	W/ $^\circ C$
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	---	80	$^\circ C/ W$

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-20	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C, $I_D=-1mA$	---	-0.02	---	V/°C
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-20V, V_{GS}=0V, T_J=25°C$	---	---	-1	μA
		$V_{DS}=-16V, V_{GS}=0V, T_J=125°C$	---	---	-10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	± 100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-4.5V, I_D=-3A$	---	40	52	mΩ
		$V_{GS}=-2.5V, I_D=-2A$	---	47	65	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-0.3	-0.65	-1.0	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	2	---	mV/°C
g_{fs}	Forward Transconductance	$V_{DS}=-10V, I_S=-3A$	---	7	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge ^{2,3}	$V_{DS}=-10V, V_{GS}=-4.5V, I_D=-3A$	---	9.6	---	nC
Q_{gs}	Gate-Source Charge ^{2,3}		---	1.6	---	
Q_{gd}	Gate-Drain Charge ^{2,3}		---	2	---	
$T_{d(on)}$	Turn-On Delay Time ^{2,3}	$V_{DD}=-10V, V_{GS}=-4.5V, R_G=25\Omega$ $I_D=-1A$	---	6	---	nS
T_r	Rise Time ^{2,3}		---	21.6	---	
$T_{d(off)}$	Turn-Off Delay Time ^{2,3}		---	51	---	
T_f	Fall Time ^{2,3}		---	13.8	---	
C_{iss}	Input Capacitance	$V_{DS}=-10V, V_{GS}=0V, F=1MHz$	---	850	---	pF
C_{oss}	Output Capacitance		---	70	---	
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	$V_G=V_D=0V, \text{Force Current}$	---	---	-4.5	A
I_{SM}	Pulsed Source Current		---	---	-9.0	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 $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.

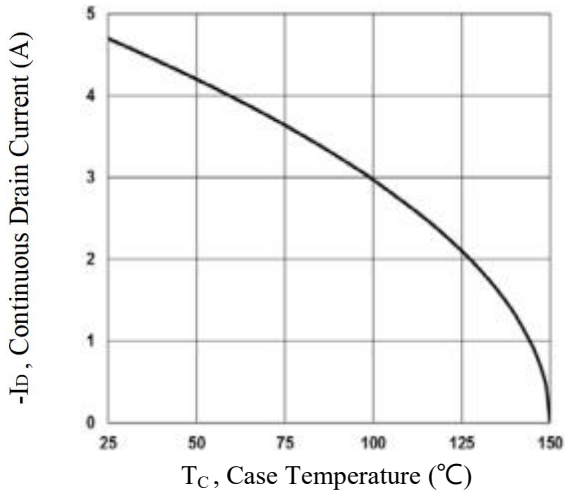


Fig.1 Continuous Drain Current vs. T_C

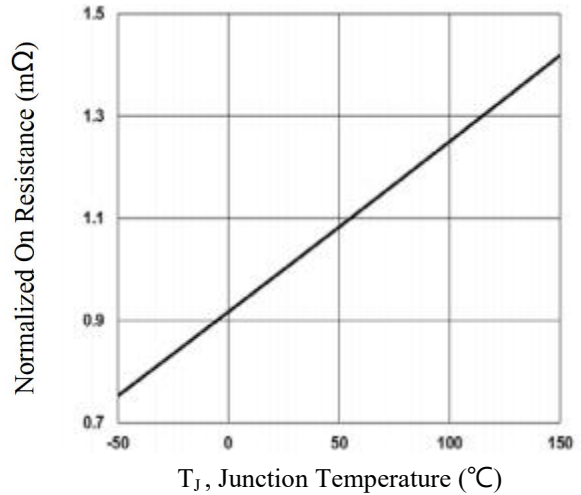


Fig.2 Normalized R_{DSON} vs. T_J

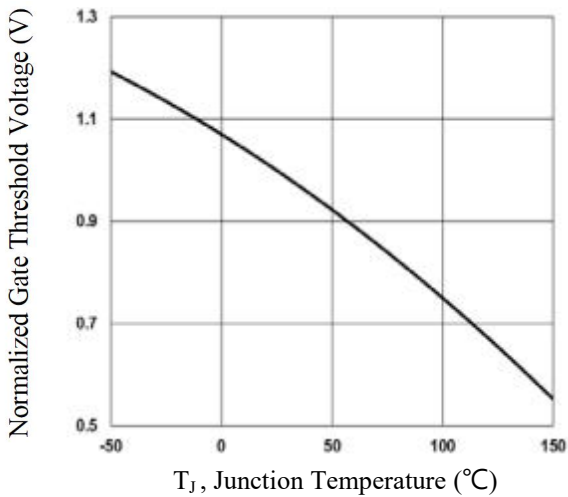


Fig.3 Normalized V_{th} vs. T_J

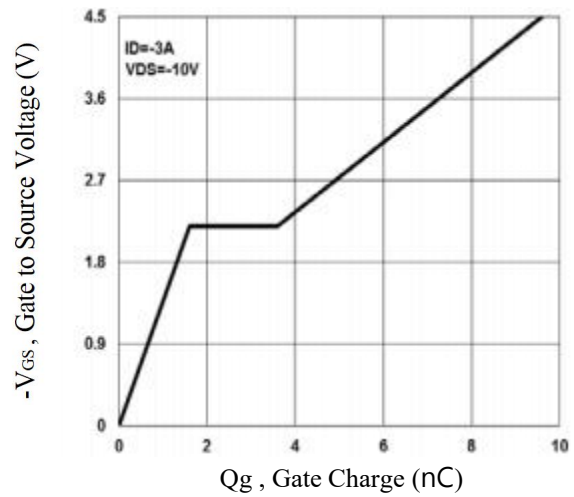


Fig.4 Gate Charge Waveform

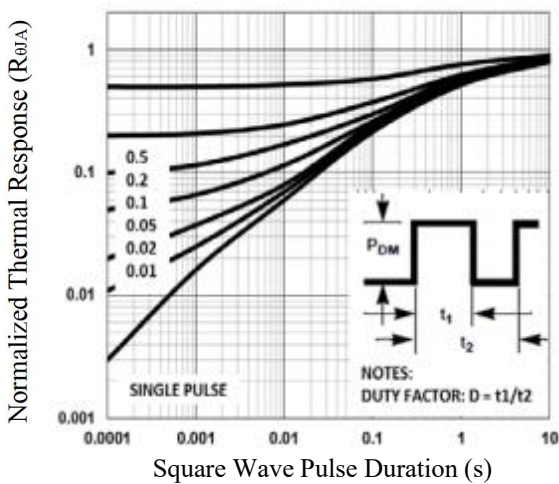


Fig.5 Normalized Transient Impedance

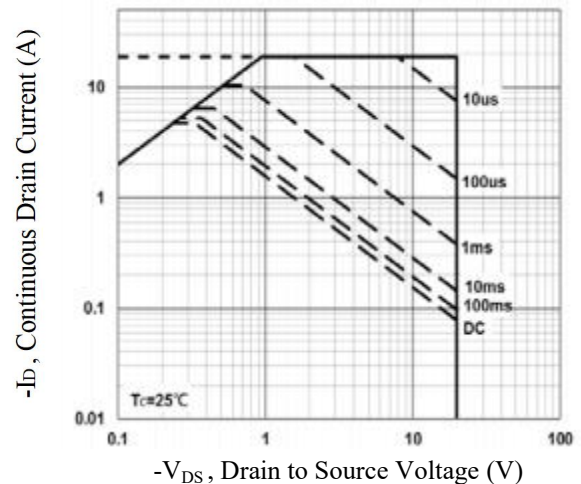


Fig.6 Maximum Safe Operation Area

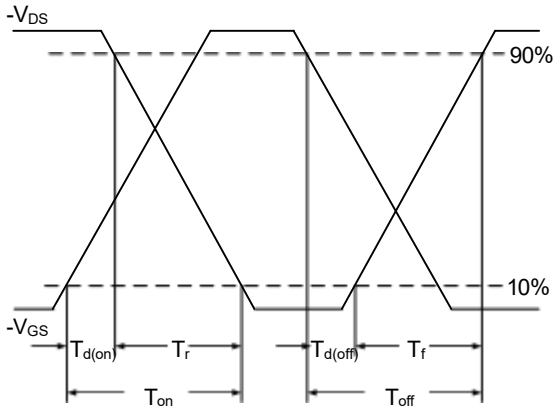


Fig. 7 Switching Time Waveform

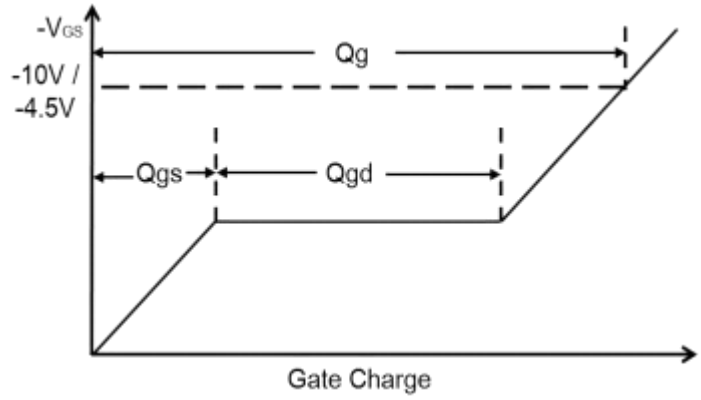
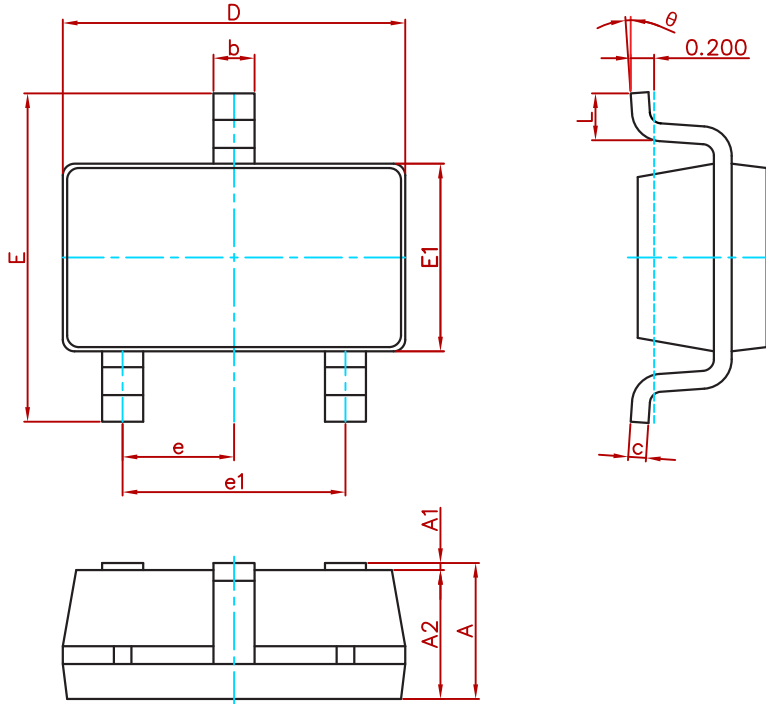


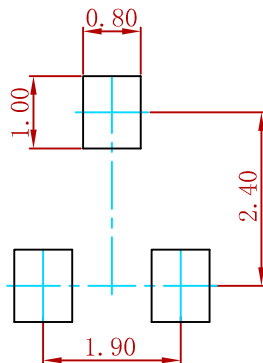
Fig. 8 Gate Charge Waveform

PACKAGE MECHANICAL DATA



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
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
AO3415	SOT-23-3L	3000

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