

# MSKSEMI

SEMICONDUCTOR



ESD



TVS



TSS



MOV



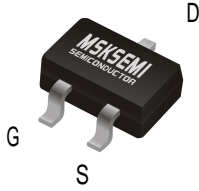
GDT



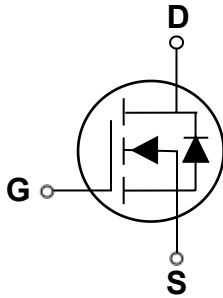
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Product data sheet

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SOT-23-3L



**Features**

- 20 V, 3A,  $R_{DS(ON)} = 50m\Omega$  @  $V_{GS} = 4.5V$
- Improved  $dv/dt$  capability
- Fast switching
- Green Device Available

**Applications**

- Notebook
- Load Switch
- Hand-Held Instruments

BVDSS	$R_{DS(ON)}$	ID
20V	50m $\Omega$	3A

**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	$\pm 10$	V
$I_D$	Drain Current – Continuous ( $T_c=25^\circ C$ )	3	A
	Drain Current – Continuous ( $T_c=100^\circ C$ )	2.5	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	16	A
$P_D$	Power Dissipation ( $T_c=25^\circ C$ )	1.56	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	$\mu A$
		$V_{DS}=16V, V_{GS}=0V, T_J=125°C$	---	---	10	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 10V, V_{DS}=0V$	---	---	$\pm 100$	nA

**On Characteristics**

$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=4.5V, I_D=2A$	---	50	60	m $\Omega$
		$V_{GS}=2.5V, I_D=1A$	---	55	70	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.4	0.7	1	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	2	---	mV/°C
gfs	Forward Transconductance	$V_{DS}=10V, I_S=2A$	---	4.4	---	S

**Dynamic and switching Characteristics**

$Q_g$	Total Gate Charge <sup>2, 3</sup>	$V_{DS}=10V, V_{GS}=4.5V, I_D=1A$	---	3.6	---	nC
$Q_{gs}$	Gate-Source Charge <sup>2, 3</sup>		---	0.38	---	
$Q_{gd}$	Gate-Drain Charge <sup>2, 3</sup>		---	0.6	---	
$T_{d(on)}$	Turn-On Delay Time <sup>2, 3</sup>	$V_{DD}=10V, V_{GS}=4.5V, R_G=25\Omega$ $I_D=1A$	---	1.8	---	nS
$T_r$	Rise Time <sup>2, 3</sup>		---	5.6	---	
$T_{d(off)}$	Turn-Off Delay Time <sup>2, 3</sup>		---	11.3	---	
$T_f$	Fall Time <sup>2, 3</sup>		---	3.2	---	
$C_{iss}$	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, F=1MHz$	---	180	---	PF
$C_{oss}$	Output Capacitance		---	32	---	
$C_{rss}$	Reverse Transfer Capacitance		---	26	---	

**Drain-Source Diode Characteristics and Maximum Ratings**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	3	A
$I_{SM}$	Pulsed Source Current		---	---	6	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.

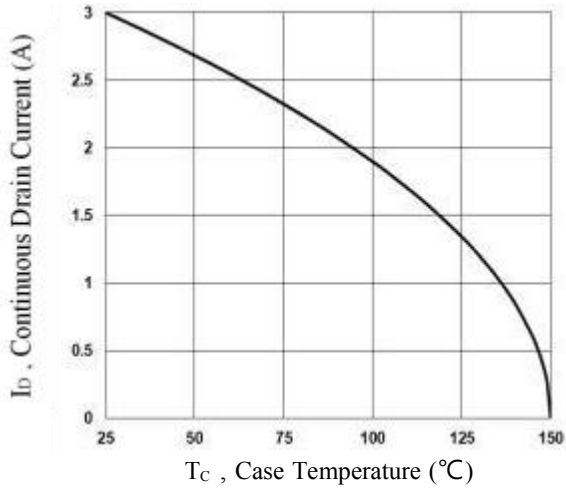


Fig. 1 Continuous Drain Current vs.  $T_C$

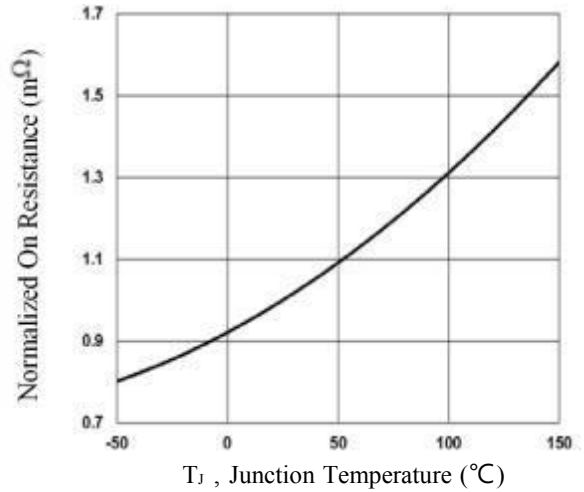


Fig. 2 Normalized RDSON vs.  $T_J$

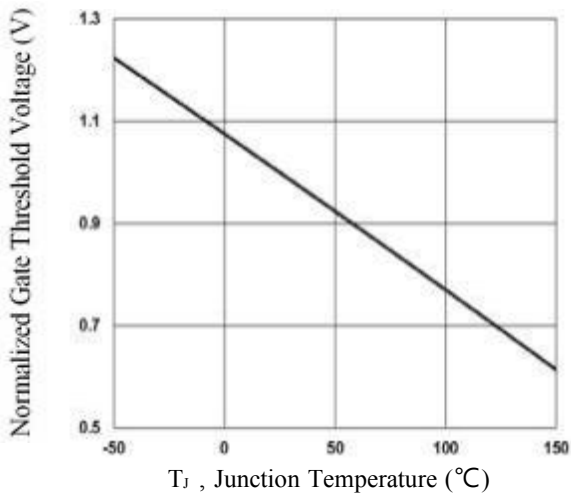


Fig. 3 Normalized  $V_{th}$  vs.  $T_J$

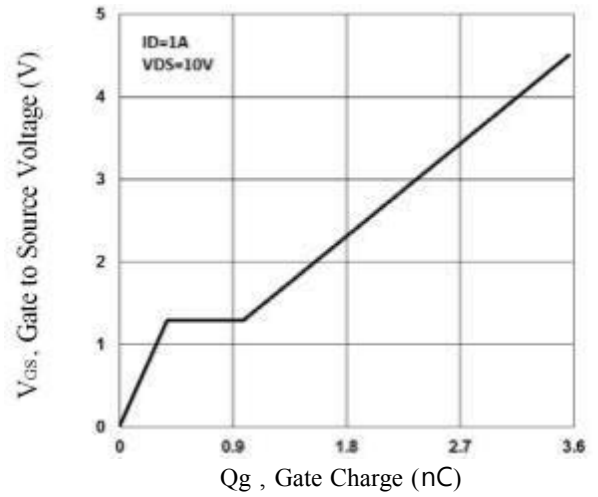


Fig. 4 Gate Charge Waveform

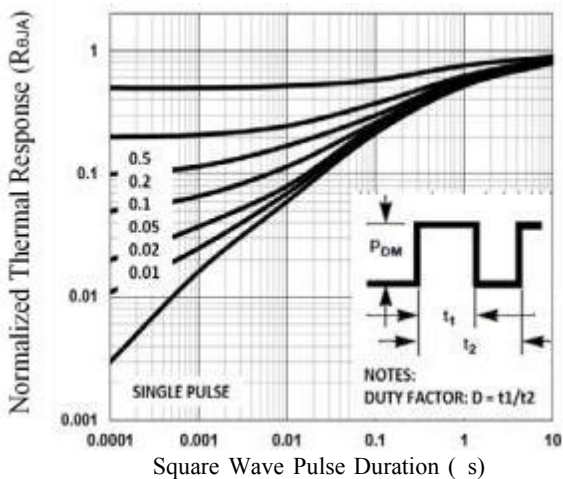


Fig. 5 Normalized Transient Impedance

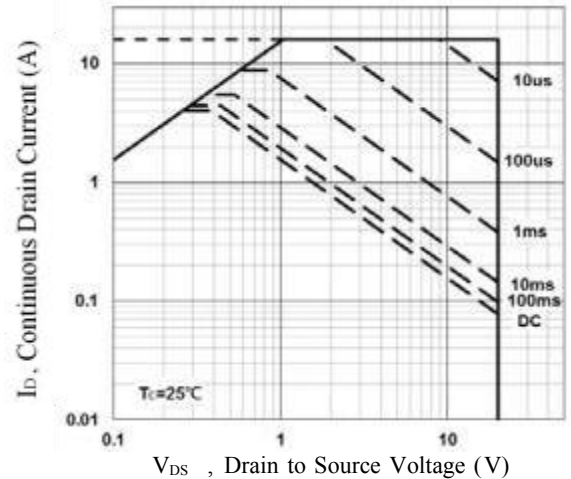


Fig. 6 Maximum Safe Operation Area

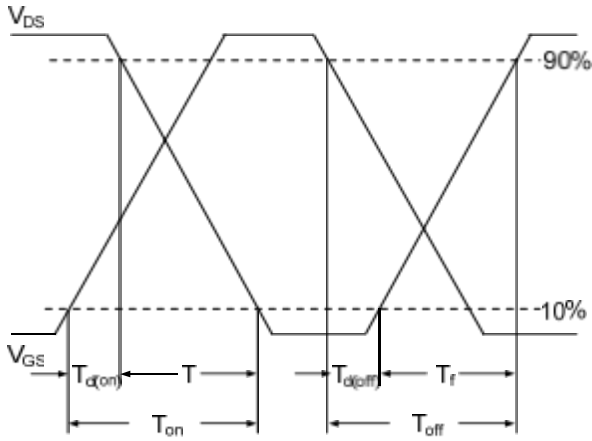


Fig. 7 Switching Time Waveform

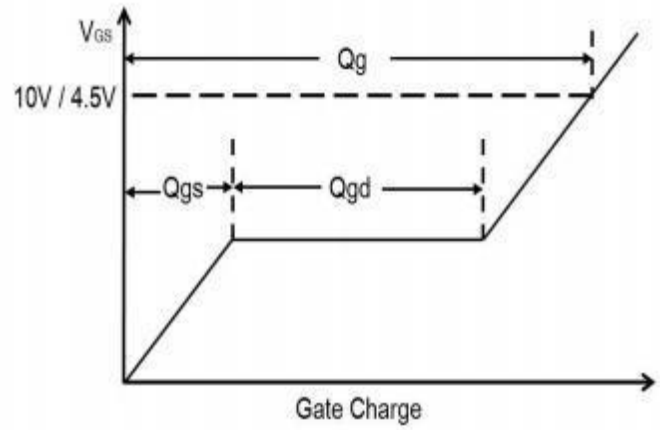
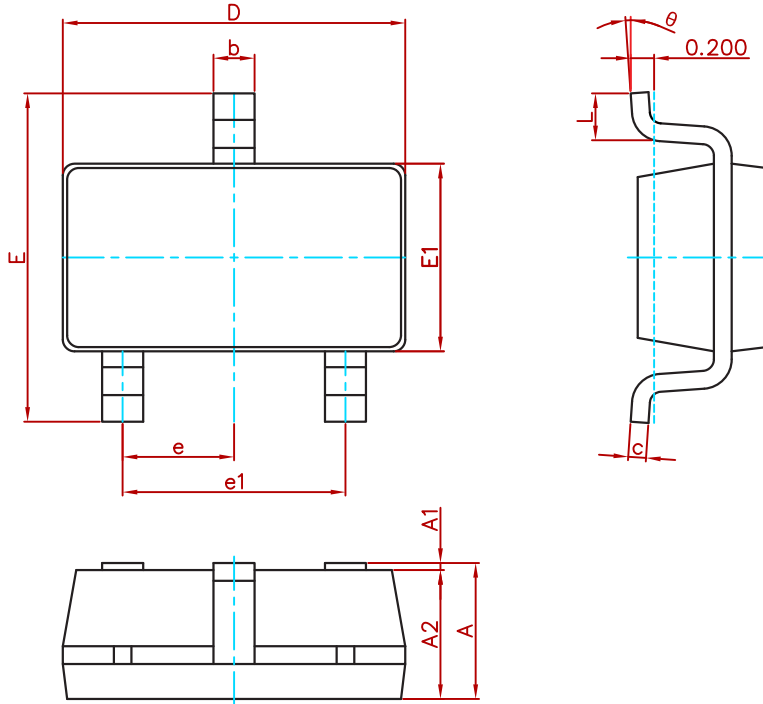


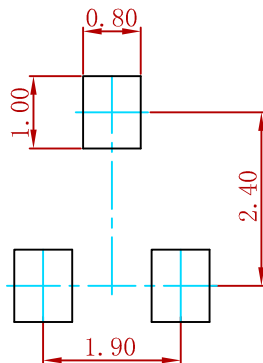
Fig. 8 Gate Charge Waveform

**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
AO3414	SOT-23-3L	3000

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