

# MSKSEMI

SEMICONDUCTOR



ESD



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TSS



MOV

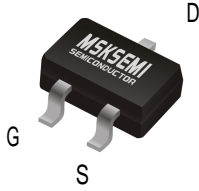


GDT

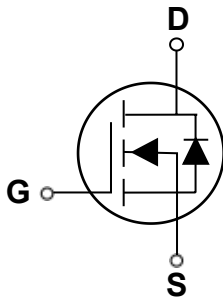


PLED

Product data sheet



SOT-23-3L



**Features**

- 30V, 3.8A ,  $R_{DS(ON)}=45m\Omega@V_{GS}=10V$
- Improved  $dv/dt$  capability
- Fast switching
- Green Device Available

**Applications**

- MB / VGA / Vcore
- Load Switch
- Hand-Held Instrument

|       |       |      |
|-------|-------|------|
| BVDSS | RDSON | ID   |
| 30V   | 45mΩ  | 3.8A |

**Absolute Maximum Ratings**  $T_c=25\text{ }^\circ\text{C}$  unless otherwise noted

| Symbol    | Parameter   | Rating     | Units                |
|-----------|---|------------|----------------------|
| $V_{DS}$  | Drain-Source Voltage                                  | 30         | V                    |
| $V_{GS}$  | Gate-Source Voltage                                   | $\pm 12$   | V                    |
| $I_D$     | Drain Current – Continuous ( $T_A=25^\circ\text{C}$ ) | 3.8        | A                    |
|           | Drain Current – Continuous ( $T_A=70^\circ\text{C}$ ) | 3.0        | A                    |
| $I_{DM}$  | Drain Current – Pulsed <sup>1</sup>                   | 15         | A                    |
| $P_D$     | Power Dissipation ( $T_A=25^\circ\text{C}$ )          | 278        | mW                   |
|           | Power Dissipation – Derate above 25C                  | 2.22       | mW/ $^\circ\text{C}$ |
| $T_{STG}$ | Storage Temperature Range                             | -50 to 150 | $^\circ\text{C}$     |
| $T_J$     | Operating Junction Temperature Range                  | -50 to 150 | $^\circ\text{C}$     |

**Thermal Characteristics**

| Symbol          | Parameter                              | Typ. | Max. | Unit                      |
|-----------------|--|------|------|---------------------------|
| $R_{\theta JA}$ | Thermal Resistance Junction to ambient | ---  | 450  | $^\circ\text{C}/\text{W}$ |

**Off Characteristics**

| Symbol                       | Parameter                          | Conditions                         | Min. | Typ.  | Max.      | Unit    |
|------------------------------|------------------------------------|------------------------------------|------|-------|-----------|---------|
| $BV_{DSS}$                   | Drain-Source Breakdown Voltage     | $V_{GS}=0V, I_D=250\mu A$          | 30   | ---   | ---       | V       |
| $\Delta BV_{DSS}/\Delta T_J$ | $BV_{DSS}$ Temperature Coefficient | Reference to 25°C, $I_D=1mA$       | ---  | 0.018 | ---       | V/°C    |
| $I_{DSS}$                    | Drain-Source Leakage Current       | $V_{DS}=30V, V_{GS}=0V, T_J=25°C$  | ---  | ---   | 1         | $\mu A$ |
|                              |                                    | $V_{DS}=24V, V_{GS}=0V, T_J=125°C$ | ---  | ---   | 10        | $\mu A$ |
| $I_{GSS}$                    | Gate-Source Leakage Current        | $V_{GS}=\pm 12V, V_{DS}=0V$        | ---  | ---   | $\pm 100$ | nA      |

**On Characteristics**

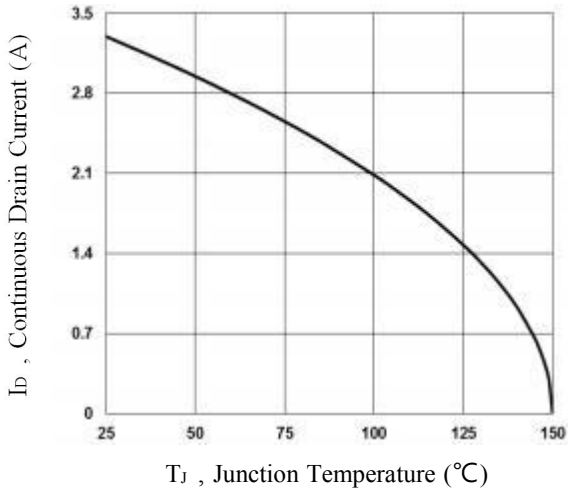
|                     |                                      |                               |     |      |     |            |
|---------------------|--------------------------------------|-------------------------------|-----|------|-----|------------|
| $R_{DS(ON)}$        | Static Drain-Source On-Resistance    | $V_{GS}=10V, I_D=3A$          | --- | 45   | 60  | m $\Omega$ |
|                     |                                      | $V_{GS}=4.5V, I_D=2A$         | --- | 50   | 70  | m $\Omega$ |
| $V_{GS(th)}$        | Gate Threshold Voltage               | $V_{GS}=V_{DS}, I_D=250\mu A$ | 0.5 | 1.0  | 2.5 | V          |
| $\Delta V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient |                               | --- | -3.2 | --- | mV/°C      |
| $g_{fs}$            | Forward Transconductance             | $V_{DS}=10V, I_D=2A$          | --- | 2.3  | --- | S          |

**Dynamic and switching Characteristics**

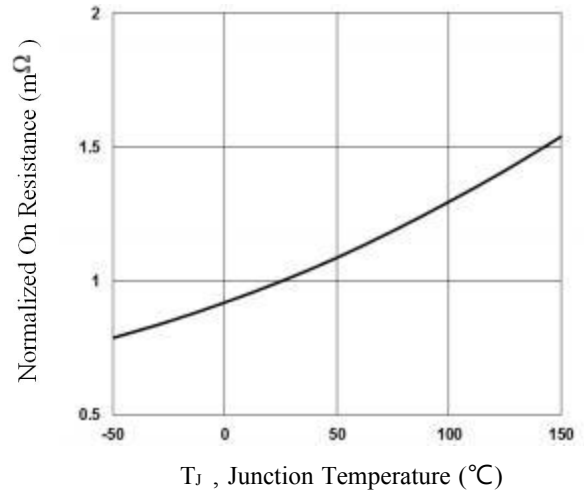
|              |                                     |   |     |      |     |    |
|--------------|-------------------------------------|---|-----|------|-----|----|
| $Q_g$        | Total Gate Charge <sup>2, 3</sup>   | $V_{DS}=24V, V_{GS}=10V, I_D=1A$                | --- | 3.1  | --- | nC |
| $Q_{gs}$     | Gate-Source Charge <sup>2, 3</sup>  |   | --- | 0.1  | --- |    |
| $Q_{gd}$     | Gate-Drain Charge <sup>2, 3</sup>   |   | --- | 1.7  | --- |    |
| $T_{d(on)}$  | Turn-On Delay Time <sup>2, 3</sup>  | $V_{DD}=24V, V_{GS}=10V, R_G=3.3\Omega, I_D=1A$ | --- | 2.2  | --- | ns |
| $T_r$        | Rise Time <sup>2, 3</sup>           |   | --- | 6.9  | --- |    |
| $T_{d(off)}$ | Turn-Off Delay Time <sup>2, 3</sup> |   | --- | 15.2 | --- |    |
| $T_f$        | Fall Time <sup>2, 3</sup>           |   | --- | 4.5  | --- |    |
| $C_{iss}$    | Input Capacitance                   | $V_{DS}=25V, V_{GS}=0V, F=1MHz$                 | --- | 245  | --- | pF |
| $C_{oss}$    | Output Capacitance                  |   | --- | 40   | --- |    |
| $C_{rss}$    | Reverse Transfer Capacitance        |   | --- | 78   | --- |    |
| $Z_{ISM}$    | Pulsed Source Current               |   | --- | ---  | 7.6 | A  |
| $V_{SD}$     | Diode Forward Voltage               | $V_{GS}=0V, I_S=1A, T_J=25°C$                   | --- | ---  | 1.3 | V  |

## Note :

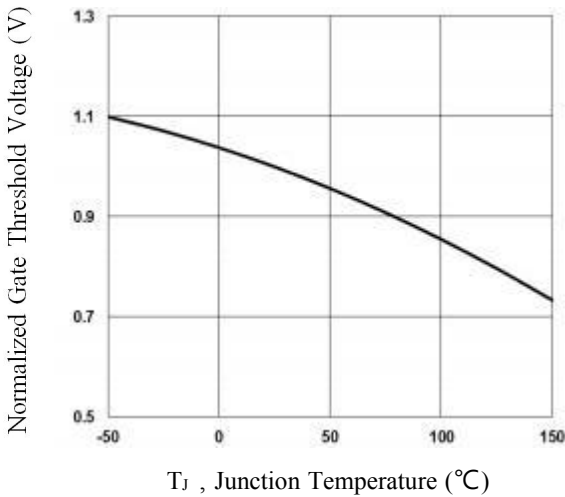
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.



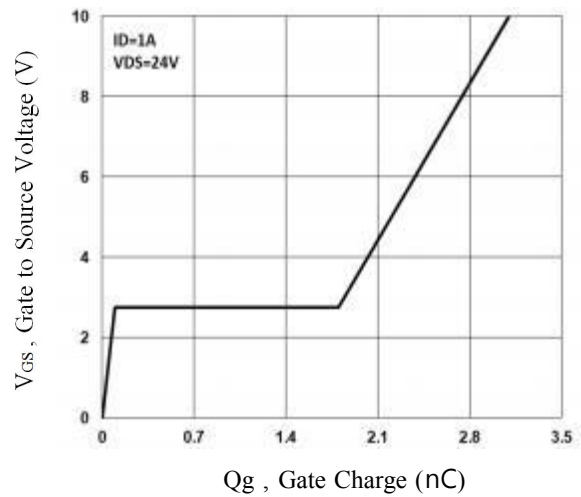
**Fig. 1 Continuous Drain Current vs.  $T_J$**



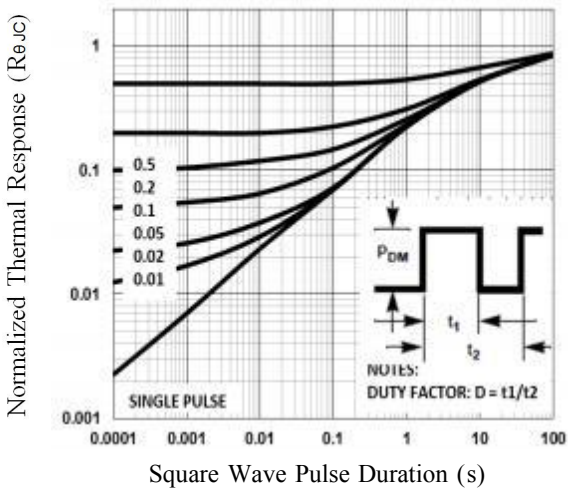
**Fig. 2 Normalized  $R_{DS(on)}$  vs.  $T_J$**



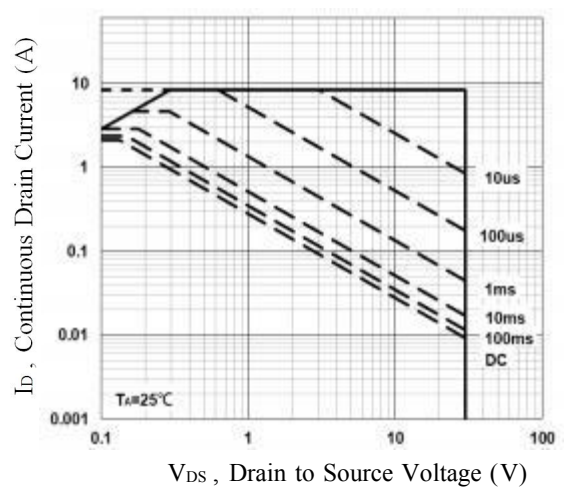
**Fig. 3 Normalized  $V_{th}$  vs.  $T_J$**



**Fig. 4 Gate Charge Waveform**



**Fig. 5 Normalized Transient Impedance**



**Fig. 6 Maximum Safe Operation Area**

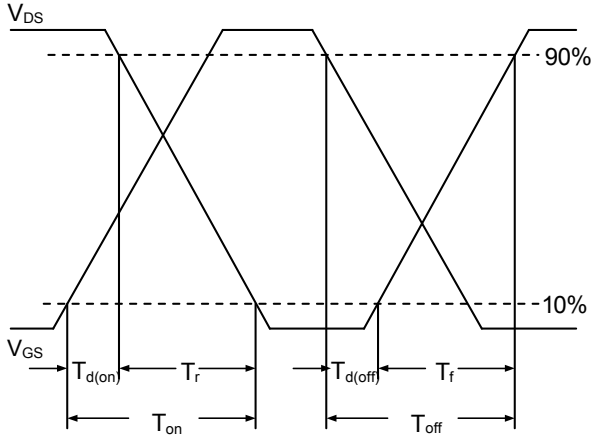


Fig. 7 Switching Time Waveform

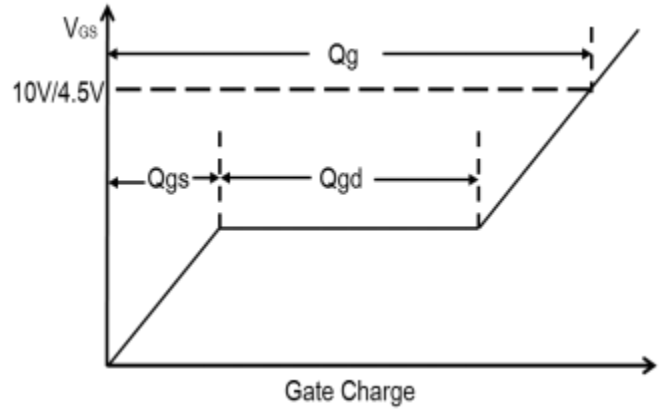
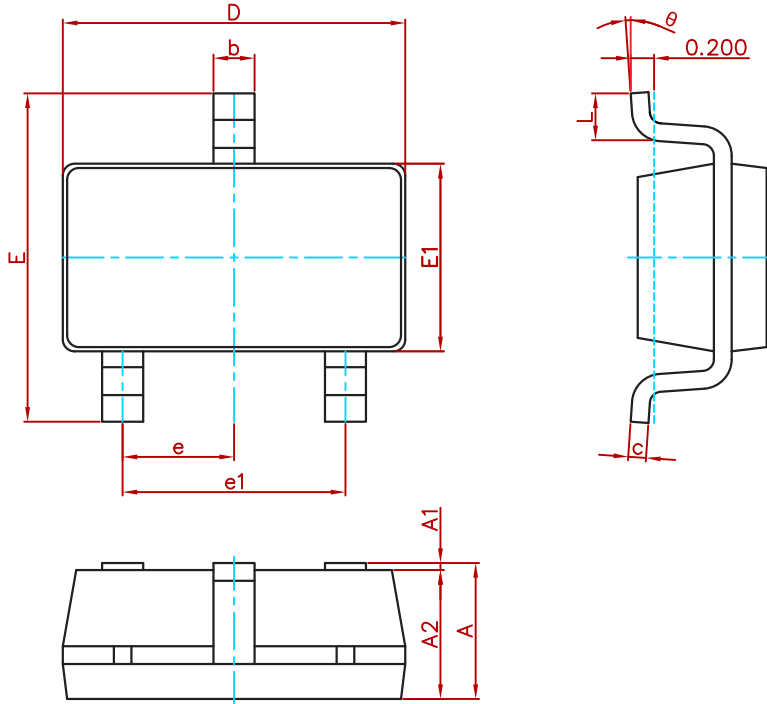


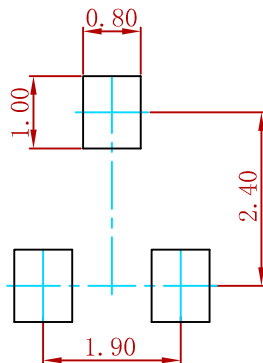
Fig. 8 Gate Charge Waveform

**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  |
|--------|-----------|------|
| AO3418 | SOT-23-3L | 3000 |

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