

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

## BSS138PW

Product specification

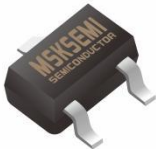
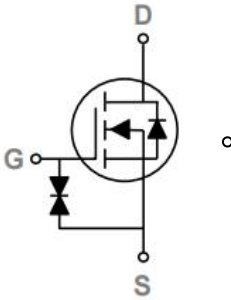
### General Features

- 55V,300mA,  $R_{DS(ON)} = 1.2\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

### Application

- Notebook
- Load Switch
- Battery Protection
- Hand-held Instruments

### Reference News

| PACKAGE OUTLINE                                                                    | Pin Configuration                                                                  | Marking         |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------|
|  |  | <div>138W</div> |
| SOT-323                                                                            |                                                                                    |                 |

**Absolute Maximum Ratings Tc=25°C unless otherwise noted**

| Symbol           | Parameter                                         | Rating     | Units |
|------------------|---------------------------------------------------|------------|-------|
| V <sub>DS</sub>  | Drain-Source Voltage                              | 55         | V     |
| V <sub>GS</sub>  | Gate-Source Voltage                               | ±20        | V     |
| I <sub>D</sub>   | Drain Current – Continuous (T <sub>A</sub> =25°C) | 300        | mA    |
|                  | Drain Current – Continuous (T <sub>A</sub> =70°C) | 240        | mA    |
| I <sub>DM</sub>  | Drain Current – Pulsed <sup>1</sup>               | 1.2        | A     |
| P <sub>D</sub>   | Power Dissipation (T <sub>A</sub> =25°C)          | 313        | mW    |
|                  | Power Dissipation – Derate above 25°C             | 2.5        | mW/°C |
| T <sub>STG</sub> | Storage Temperature Range                         | -55 to 150 | °C    |
| T <sub>J</sub>   | Operating Junction Temperature Range              | -55 to 150 | °C    |

**Thermal Characteristics**

| Symbol           | Parameter                              | Typ. | Max. | Unit |
|------------------|----------------------------------------|------|------|------|
| R <sub>θJA</sub> | Thermal Resistance Junction to ambient | ---  | 450  | °C/W |

**Electrical Characteristics (T<sub>J</sub>=25°C , unless otherwise noted)**
**Off Characteristics**

| Symbol                              | Parameter                                 | Conditions                                                        | Min. | Typ. | Max. | Unit |
|-------------------------------------|-------------------------------------------|-------------------------------------------------------------------|------|------|------|------|
| BV <sub>DSS</sub>                   | Drain-Source Breakdown Voltage            | V <sub>GS</sub> =0V , I <sub>D</sub> =250uA                       | 55   | ---  | ---  | V    |
| ΔBV <sub>DSS</sub> /ΔT <sub>J</sub> | BV <sub>DSS</sub> Temperature Coefficient | Reference to 25°C , I <sub>D</sub> =1mA                           | ---  | 0.05 | ---  | V/°C |
| I <sub>DSS</sub>                    | Drain-Source Leakage Current              | V <sub>DS</sub> =48V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C | ---  | ---  | 1    | uA   |
|                                     |                                           | V <sub>DS</sub> =55V , V <sub>GS</sub> =0V , T <sub>J</sub> =85°C | ---  | ---  | 400  | A    |
| I <sub>GSS</sub>                    | Gate-Source Leakage Current               | V <sub>GS</sub> = ±20V , V <sub>DS</sub> =0V                      | ---  | ---  | ±6   | uA   |

### On Characteristics

|                     |                                      |                               |     |     |     |          |
|---------------------|--------------------------------------|-------------------------------|-----|-----|-----|----------|
| $R_{DS(ON)}$        | Static Drain-Source On-Resistance    | $V_{GS}=10V, I_D=0.3A$        | --- | 1.2 | 1.5 | $\Omega$ |
|                     |                                      | $V_{GS}=4.5V, I_D=0.2A$       | --- | 1.5 | 2.3 |          |
| $V_{GS(th)}$        | Gate Threshold Voltage               | $V_{GS}=V_{DS}, I_D=250\mu A$ | 0.8 | 1.1 | 1.6 | V        |
| $\Delta V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient |                               | --- | 3   | --- | mV/°C    |

### On Characteristics

|                     |                                      |                               |     |     |     |          |
|---------------------|--------------------------------------|-------------------------------|-----|-----|-----|----------|
| $R_{DS(ON)}$        | Static Drain-Source On-Resistance    | $V_{GS}=10V, I_D=0.3A$        | --- | 1.2 | 1.5 | $\Omega$ |
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| $\Delta V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient |                               | --- | 3   | --- | mV/°C    |

### Dynamic and switching Characteristics

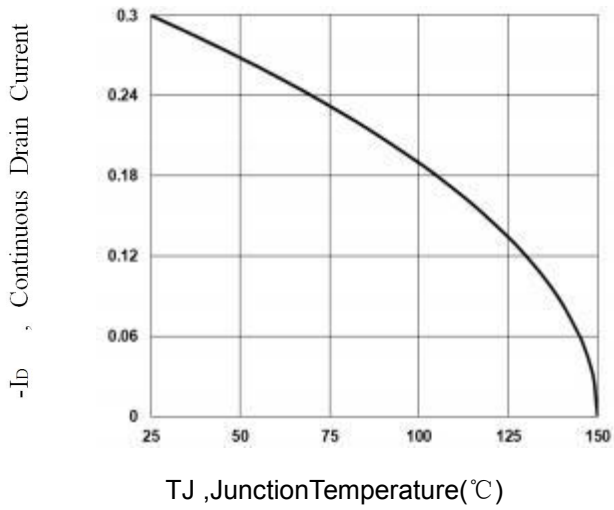
|           |                              |                                 |     |    |     |    |
|-----------|------------------------------|---------------------------------|-----|----|-----|----|
| $C_{iss}$ | Input Capacitance            | $V_{DS}=30V, V_{GS}=0V, F=1MHz$ | --- | 23 | --- | pF |
| $C_{oss}$ | Output Capacitance           |                                 | --- | 16 | --- |    |
| $C_{rss}$ | Reverse Transfer Capacitance |                                 | --- | 10 | --- |    |

### Drain-Source Diode Characteristics and Maximum Ratings

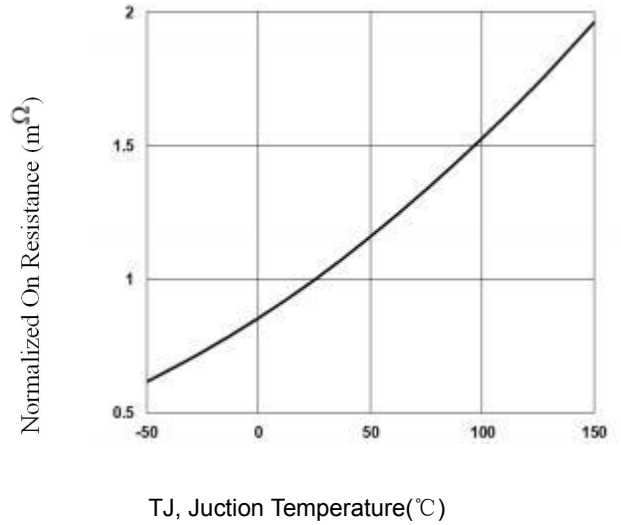
| Symbol   | Parameter                 | Conditions                            | Min. | Typ. | Max. | Unit |
|----------|---------------------------|---------------------------------------|------|------|------|------|
| $I_S$    | Continuous Source Current | $V_G=V_D=0V, \text{ Force Current}$   | ---  | ---  | 300  | mA   |
| $I_{SM}$ | Pulsed Source Current     |                                       | ---  | ---  | 600  | mA   |
| $V_{SD}$ | Diode Forward Voltage     | $V_{GS}=0V, I_S=0.3A, T_J=25^\circ C$ | ---  | ---  | 1.4  | V    |

Note :

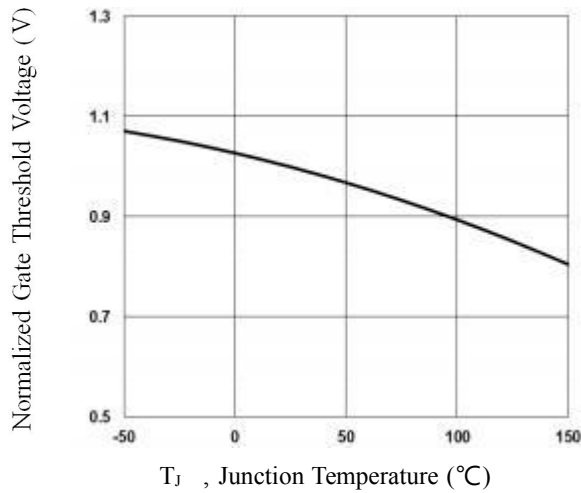
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$  .
3. Essentially independent of operating temperature.



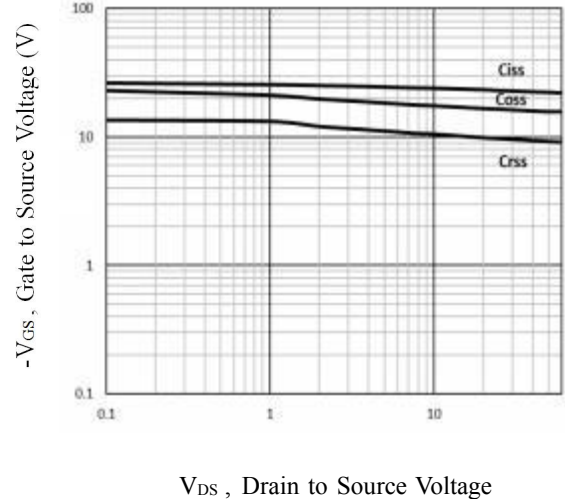
**Fig. 1 Continuous Drain Current vs. TC**



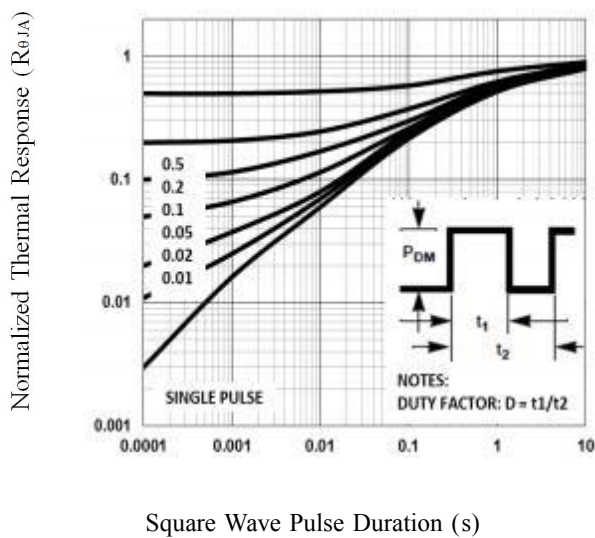
**Fig. 2 Normalized  $R_{DS(on)}$  vs.  $T_J$**



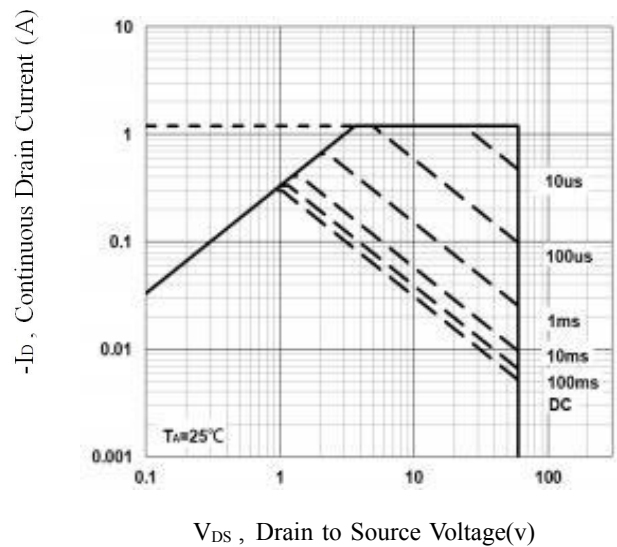
**Fig. 3 Normalized  $V_{th}$  vs.  $T_J$**



**Fig. 4 Capacitance Characteristics**

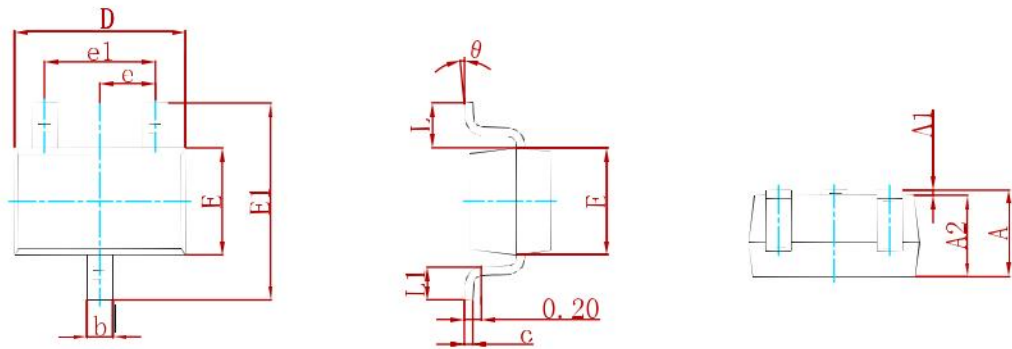


**Fig. 5 Normalized Transient Response**



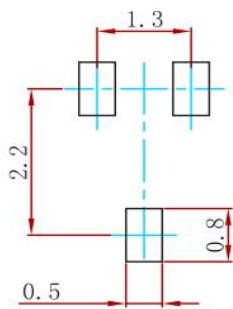
**Fig. 6 Maximum Safe Operation Area**

**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 |
| g      | 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  |
|----------|---------|------|
| BSS138PW | SOT-323 | 3000 |

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