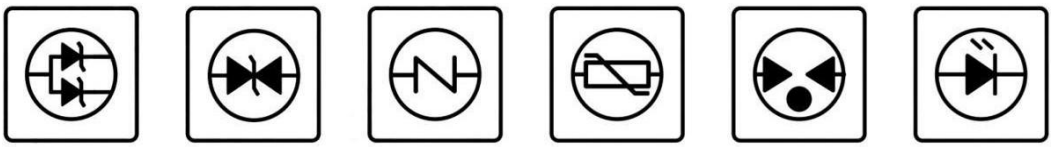
MSKSEMI 美森科
SEMICONDUCTOR




# BSS138PS

## Product specification

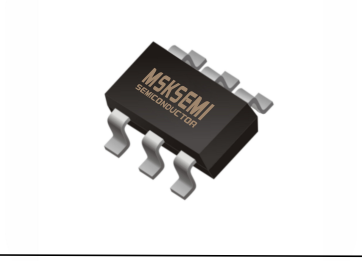
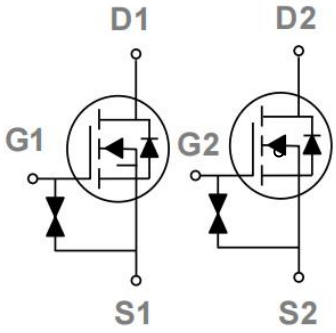
## General Features

- 55V,0.3A, RDS(ON) =1.2Ω@VGS=10V
- Improved dv/dt capability
- Fast switching
- Green Device Available
- G-S ESD Protection Diode Embedded
- ESD protected up to 2KV

## Application

- Motor Drive
- Power Tools
- LED Lighting

## Reference News

| PACKAGE OUTLINE | Pin Configuration | Marking |
|---|---|---|
|  SOT-363 |  |  |

## Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 55 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$ | Drain Current – Continuous ($T_A$=25℃) | 0.3 | A |
| | Drain Current – Continuous ($T_A$=70℃) | 0.2 | A |
| $I_{DM}$ | Drain Current – Pulsed[1] | 0.9 | A |
| $P_D$ | Power Dissipation ($T_A$=25℃) | 0.28 | W |
| | Power Dissipation – Derate above 25℃ | 0.002 | W/ ℃ |
| $T_{STG}$ | Storage Temperature Range | -50 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -50 to 150 | ℃ |

## Thermal Characteristics

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

## Electrical Characteristics (TJ=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 | 55 | --- | --- | V |
| $\triangle BV_{DSS}/\triangle T_J$ | $BV_{DSS}$ Temperature Coefficient | Reference to 25℃ , $I_D$=1mA | --- | 0.04 | --- | V/ ℃ |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=55V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$= ±20V , $V_{DS}$=0V | --- | --- | ±10 | uA |

## On Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| RDS(ON) | Static Drain-Source On-Resistance | VGS=10V , ID=0.3A | --- | 1.2 | 1.5 | Ω |
| | | VGS=4.5V , ID=0.2A | --- | 1.3 | 2.2 | Ω |
| VGS(th) | Gate Threshold Voltage | VGS=VDS , ID =250uA | 0.8 | 1.1 | 1.6 | V |
| △VGS(th) | VGS(th) Temperature Coefficient | | --- | -4 | --- | mV/ C |
| gfs | Forward Transconductance | VDS=10V , ID=0.1A | --- | 0.24 | --- | S |

## Dynamic and switching Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $Q_g$ | Total Gate Charge[2,3] | $V_{DS}$=55V , $V_{GS}$=10V , $I_D$=0.2A | --- | 1.1 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge[2,3] | | --- | 0.1 | --- | |
| $Q_{gd}$ | Gate-Drain Charge[2,3] | | --- | 0.23 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time[2,3] | $V_{DD}$=55V , $V_{GS}$=10V , $R_G$=6Ω $I_D$=0.2A | --- | 3 | --- | ns |
| $T_r$ | Rise Time[2,3] | | --- | 5 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time[2,3] | | --- | 14 | --- | |
| $T_f$ | Fall Time[2,3] | | --- | 9 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=10V , $V_{GS}$=0V , F=1MHz | --- | 30.6 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 5.5 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 4 | --- | |

## 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 | --- | --- | 0.3 | A |
| $I_{SM}$ | Pulsed Source Current | | --- | --- | 0.6 | A |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V , $I_S$=1A , $T_J$=25C | --- | --- | 1.4 | 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.

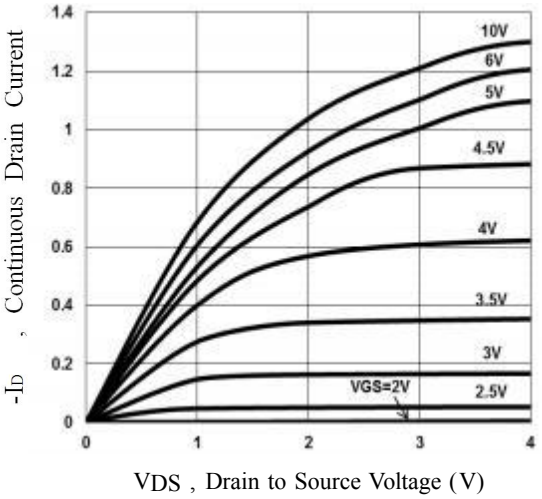



**Fig. 1 Output Characteristics**

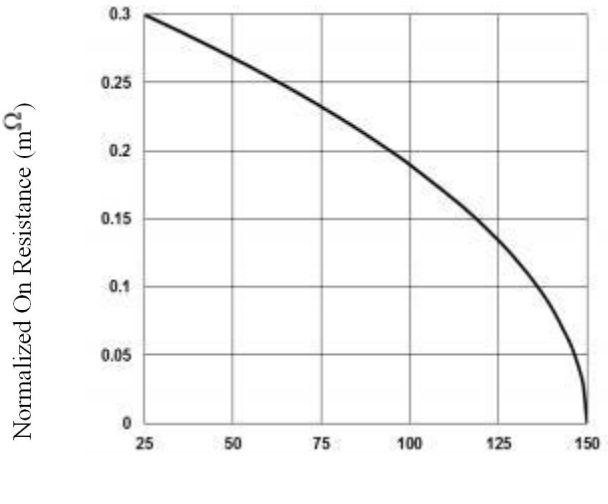



**Fig. 2 Continuous Drain Current vs. TJ**

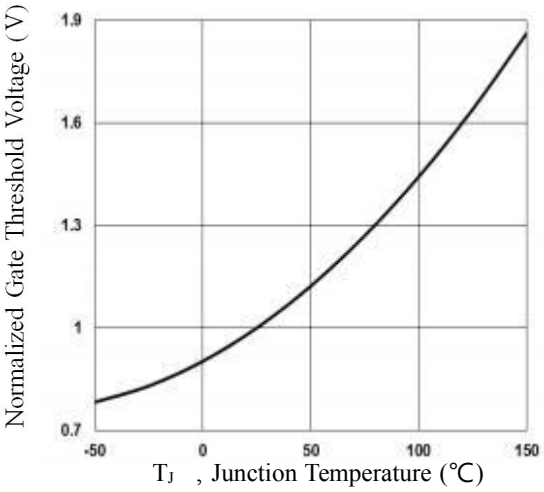



**Fig. 3 Normalized RDSON vs. TJ**

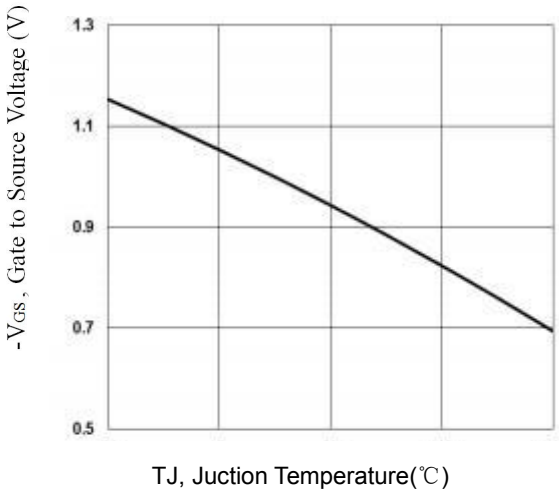



**Fig. 4 Normalized Vth vs. TJ**

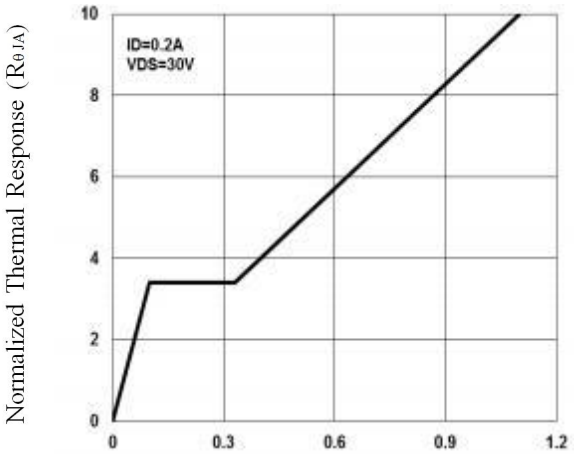



**Fig. 5 Gate Charge Waveform**

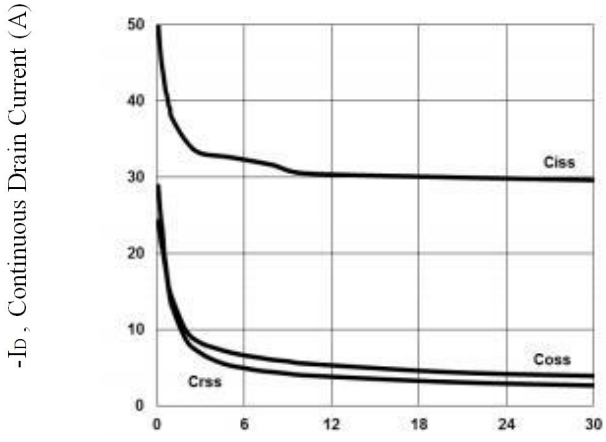



**Fig. 6 Capacitance Characteristics**

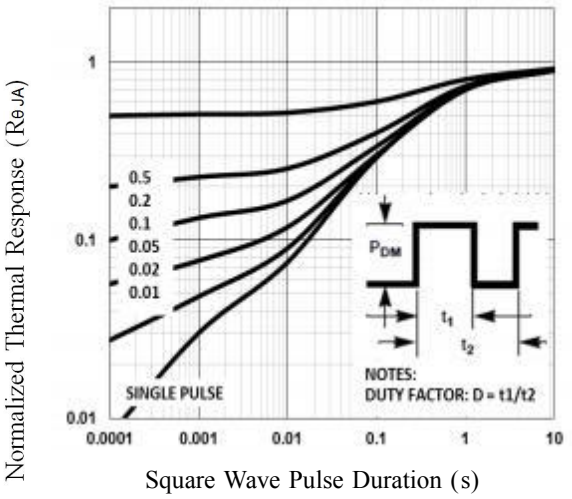



**Fig. 7 Normalized Transient Impedance**

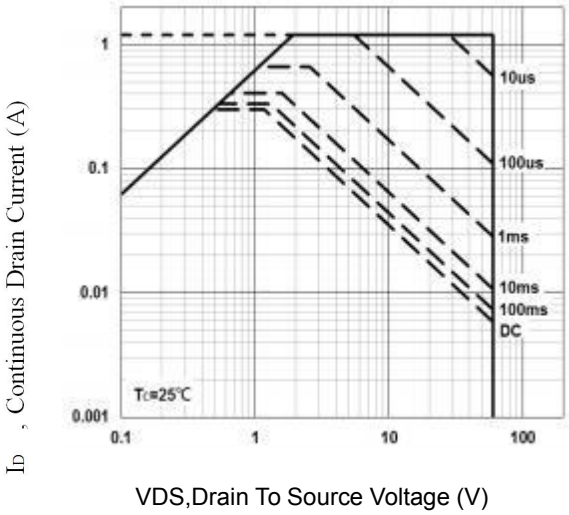



**Fig. 8 Maximum Safe Operation Area**

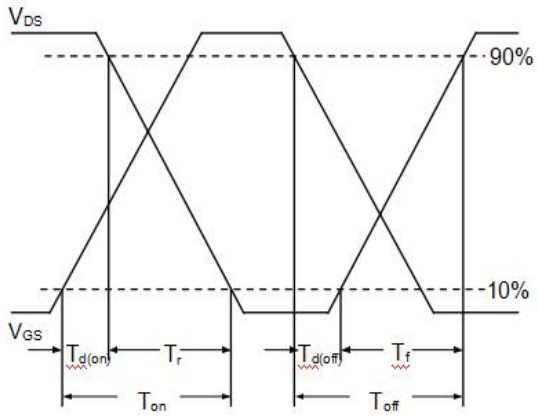
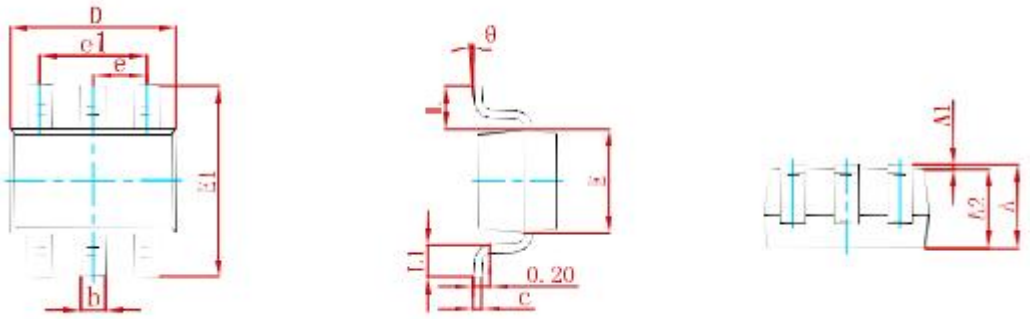


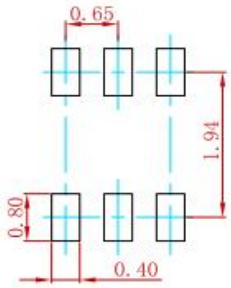

**Fig. 9 Switching Time Waveform**

## 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 | 0.150 | 0.350 | 0.006 | 0.014 |
| c | 0.100 | 0.150 | 0.004 | 0.006 |
| D | 2.000 | 2.200 | 0.079 | 0.087 |
| E | 1.150 | 1.350 | 0.045 | 0.053 |
| E1 | 2.150 | 2.400 | 0.085 | 0.094 |
| 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 |
| 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 |
|---|---|---|
| BSS138PS | SOT-363 | 3000 |

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