



# BSS138AKDW

## Dual N-Channel MOSFET

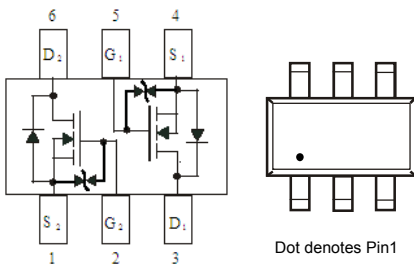
### Features

- Halogen free available upon request by adding suffix "-HF"
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- High dense cell design for extremely low  $R_{DS(ON)}$
- ESD protected:1500V

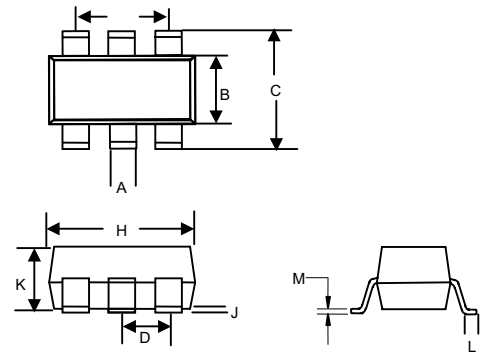
### Maximum Ratings @ 25°C Unless Otherwise Specified

| Symbol          | Parameter                              | Rating      | Unit          |
|-----------------|--|-------------|---------------|
| $V_{DS}$        | Drain-source Voltage                   | 50          | V             |
| $I_D$           | Drain Current-Continuous               | 0.22        | A             |
| $V_{GS}$        | Gate-source Voltage                    | $\pm 20$    | V             |
| $P_D$           | Total Power Dissipation                | 0.35        | W             |
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient | 357         | $^{\circ}C/W$ |
| $T_J$           | Operating Junction Temperature         | -55 to +150 | $^{\circ}C$   |
| $T_{STG}$       | Storage Temperature                    | -55 to +150 | $^{\circ}C$   |

### Equivalent Circuit



### SOT-363



| DIM | DIMENSIONS |      |             |      | NOTE |
|-----|------------|------|-------------|------|------|
|     | INCHES     |      | MM          |      |      |
|     | MIN        | MAX  | MIN         | MAX  |      |
| A   | .006       | .014 | 0.15        | 0.35 |      |
| B   | .045       | .053 | 1.15        | 1.35 |      |
| C   | .085       | .096 | 2.15        | 2.45 |      |
| D   | .026       |      | 0.65Nominal |      |      |
| G   | .047       | .055 | 1.20        | 1.40 |      |
| H   | .071       | .087 | 1.80        | 2.20 |      |
| J   | ---        | .004 | ---         | 0.10 |      |
| K   | .031       | .043 | 0.80        | 1.10 |      |
| L   | .010       | .018 | 0.26        | 0.46 |      |
| M   | .003       | .006 | 0.08        | 0.15 |      |

**Electrical characteristics (T<sub>A</sub>=25 °C, unless otherwise noted)**

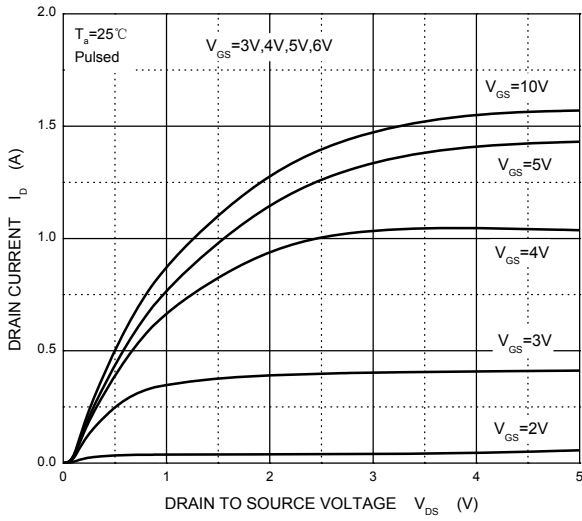
| Parameter                                     | Symbol               | Test Condition   | Min. | Typ. | Max. | Unit |
|---|----------------------|--|------|------|------|------|
| <b>Static Characteristics</b>                 |                      |  |      |      |      |      |
| Drain-source breakdown voltage                | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA   | 50   |      |      | V    |
| Zero gate voltage drain current               | I <sub>DSS</sub>     | V <sub>DS</sub> = 48V, V <sub>GS</sub> = 0V  |      |      | 1    | μA   |
| Gate-body leakage current                     | I <sub>GSS</sub>     | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V   |      |      | ±10  | μA   |
| Gate threshold voltage <sup>1)</sup>          | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA   | 0.8  | 1    | 1.45 | V    |
| Drain-source on-resistance <sup>1)</sup>      | R <sub>DS(on)</sub>  | V <sub>GS</sub> = 10V, I <sub>D</sub> = 500mA  |      | 1.9  | 3    | Ω    |
|   |                      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 200mA   |      | 2.4  | 4    |      |
| Forward transconductance <sup>1)</sup>        | g <sub>FS</sub>      | V <sub>DS</sub> = 25V, I <sub>D</sub> = 0.2A   | 100  |      |      | S    |
| <b>Dynamic characteristics</b>                |                      |  |      |      |      |      |
| Input Capacitance                             | C <sub>iss</sub>     | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz  |      | 22.8 |      | pF   |
| Output Capacitance                            | C <sub>oss</sub>     |  |      | 3.5  |      |      |
| Reverse Transfer Capacitance                  | C <sub>rss</sub>     |  |      | 2.9  |      |      |
| <b>Switching Characteristics<sup>1)</sup></b> |                      |  |      |      |      |      |
| Turn-on delay time                            | t <sub>d(on)</sub>   | V <sub>DD</sub> = 30 V, V <sub>GEN</sub> = 10 V,<br>R <sub>G</sub> = 25Ω, R <sub>L</sub> = 60Ω,<br>I <sub>D</sub> = 500 mAdc |      | 3.8  |      | nS   |
| Turn-off delay time                           | t <sub>d(off)</sub>  |  |      | 19   |      |      |
| <b>Source-Drain Diode characteristics</b>     |                      |  |      |      |      |      |
| Diode Forward voltage                         | V <sub>SD</sub>      | V <sub>GS</sub> = 0V, I <sub>S</sub> = 500mA   | 0.5  |      | 1.3  | V    |

**Notes:**

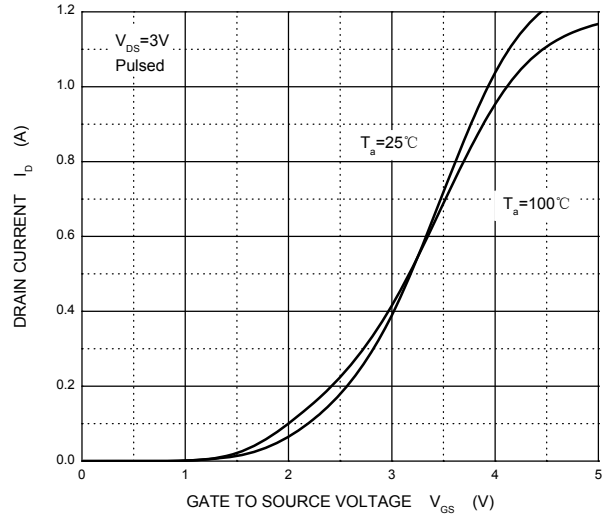
1) Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

## Typical Characteristics

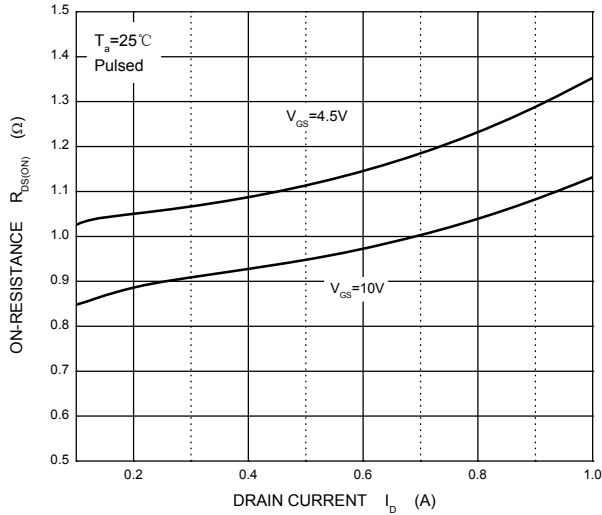
**Output Characteristics**



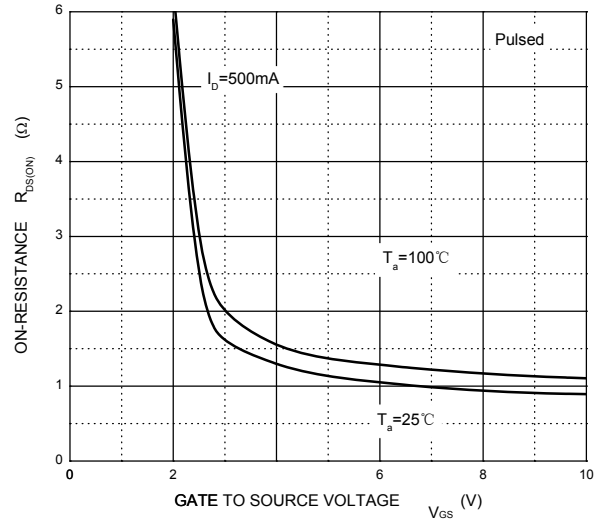
**Transfer Characteristics**



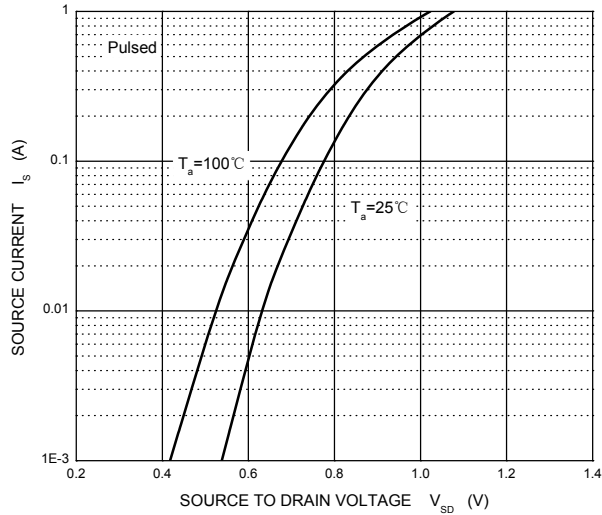
**$R_{DS(ON)}$  —  $I_D$**



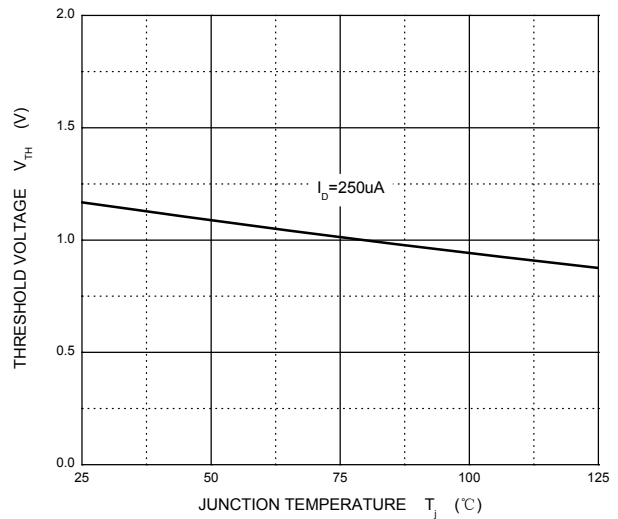
**$R_{DS(ON)}$  —  $V_{GS}$**



**$I_S$  —  $V_{SD}$**



**Threshold Voltage**





Micro Commercial Components

Ordering Information :

| Device         | Packing               |
|----------------|-----------------------|
| Part Number-TP | Tape&Reel: 3Kpcs/Reel |

Note : Adding "-HF" suffix for halogen free, eg. Part Number-TP-HF

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