

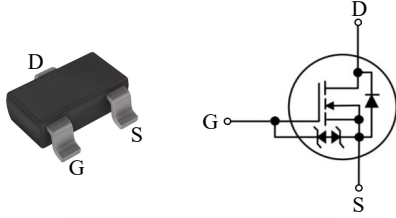


BSS138KH

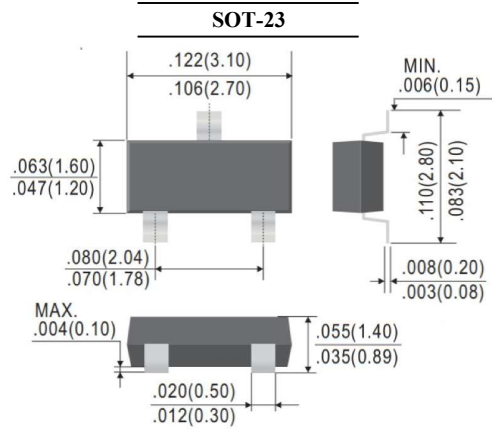
N-Channel Enhancement Mode Field Effect Transistor

FEATURES

- For low voltage, low current switching applications
- ESD Protection >2KV
- Suffix "H" indicates Halogen-free parts, ex. BSS138KH



| Pin | Description |
|-----|-------------|
| G | Gate |
| S | Source |
| D | Drain |



Dimensions in inch and (millimeter)

Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|-----------------|--|------------------|
| Drain-Source Voltage | V_{DSS} | 60 | V |
| Gate-Source Voltage | V_{GSS} | ± 20 | V |
| Drain Current (Note 1) | I_D | at $V_{GS}=10\text{V}$, $T_A=25^\circ\text{C}$ | 360 |
| | | at $V_{GS}=10\text{V}$, $T_A=100^\circ\text{C}$ | 230 |
| Pulsed Drain Current | I_{DM} | 1.2 | A |
| Total Power Dissipation | P_{tot} | (Note 2) | 350 |
| | | (Note 1) | 420 |
| Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | (Note 2) | 370 |
| | | (Note 1) | 300 |
| Operating and Storage Temperature Range | T_j, T_{stg} | - 55 to + 150 | $^\circ\text{C}$ |

Note :

1. Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for drain 1 cm^2 .
1. Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.



BSS138KH

N-Channel Enhancement Mode Field Effect Transistor

Electrical Characteristics ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise specified)

| Parameter | Conditions | Symbol | Min. | Typ. | Max. | Unit |
|------------------------------------|---|--------------|------|------|----------|---------------|
| Static | | | | | | |
| Drain Source Breakdown Voltage | $I_D = 250\mu\text{A}$ | V_{DSS} | 60 | - | - | V |
| Gate Threshold Voltage | $V_{GS} = V_{DS}, I_D = 250\mu\text{A}$ | $V_{GS(th)}$ | 0.48 | - | 1.6 | V |
| Zero Gate Voltage Drain Current | $V_{DS} = 60\text{V}$ | I_{DSS} | - | - | 1 | μA |
| Gate-Body Leakage Current | $V_{GS} = \pm 20\text{V}$ | I_{GSS} | - | - | ± 10 | μA |
| | $V_{GS} = \pm 10\text{V}$ | | - | - | ± 1 | |
| Drain-Source On-State Resistance | $V_{GS} = 10\text{V}, I_D = 350\text{mA}$ | $R_{DS(on)}$ | - | - | 1.6 | Ω |
| | $V_{GS} = 4.5\text{V}, I_D = 200\text{mA}$ | | - | - | 2.2 | |
| | $V_{GS} = 2.5\text{V}, I_D = 10\text{mA}$ | | - | - | 6.5 | |
| Forward Transconductance | $V_{DS} = 10\text{V}, I_D = 200\text{mA}$ | g_{FS} | - | 700 | - | mS |
| Dynamic | | | | | | |
| Input Capacitance | $V_{DS} = 10\text{V}, f = 1\text{MHz}$ | C_{iss} | - | - | 56 | pF |
| Output Capacitance | | C_{oss} | - | 7 | - | |
| Reverse Transfer Capacitance | | C_{rss} | - | 4 | - | |
| Turn-On Delay Time | $V_{DD} = 40\text{V}, V_{GS} = 10\text{V},$ $R_L = 250\Omega, R_G = 6\Omega$ | $t_{d(on)}$ | - | - | 10 | nS |
| Turn-On Rise Time | | t_r | - | 5 | - | |
| Turn-Off Delay Time | | $t_{d(off)}$ | - | - | 76 | |
| Turn-Off Fall Time | | t_f | - | 20 | - | |
| Drain-Source Body Diode | | | | | | |
| Drain-Source Diode Forward Voltage | $I_S = 300\text{mA}$ | V_{SD} | 0.47 | - | 1.20 | V |



BSS138KH

N-Channel Enhancement Mode Field Effect Transistor

RATINGS AND CHARACTERISTIC CURVES

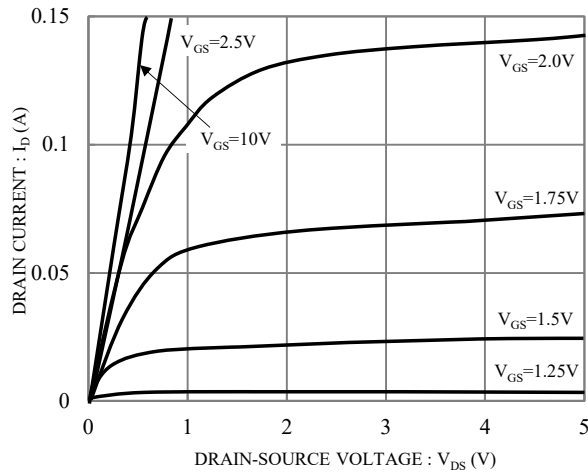


Fig.1 Typical output characteristics

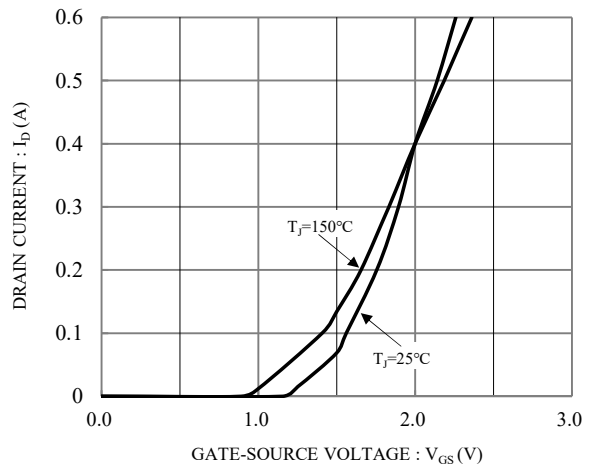


Fig.2 Typical transfer characteristics

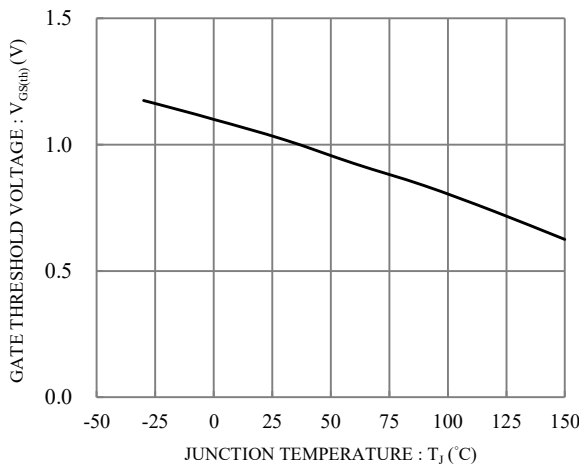


Fig.3 Gate threshold voltage vs. Junction temperature

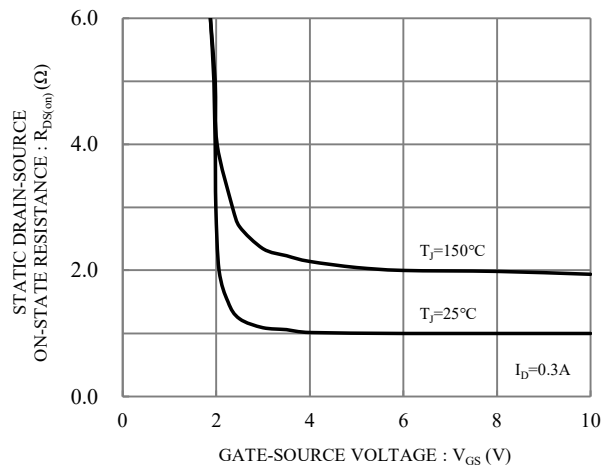


Fig.4 Static drain-source on-state resistance vs. gate-source voltage

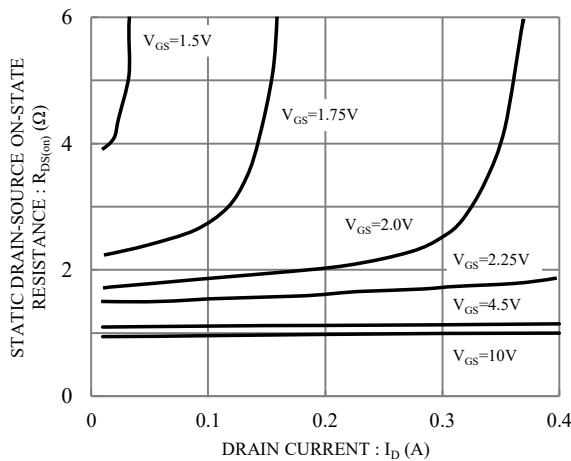


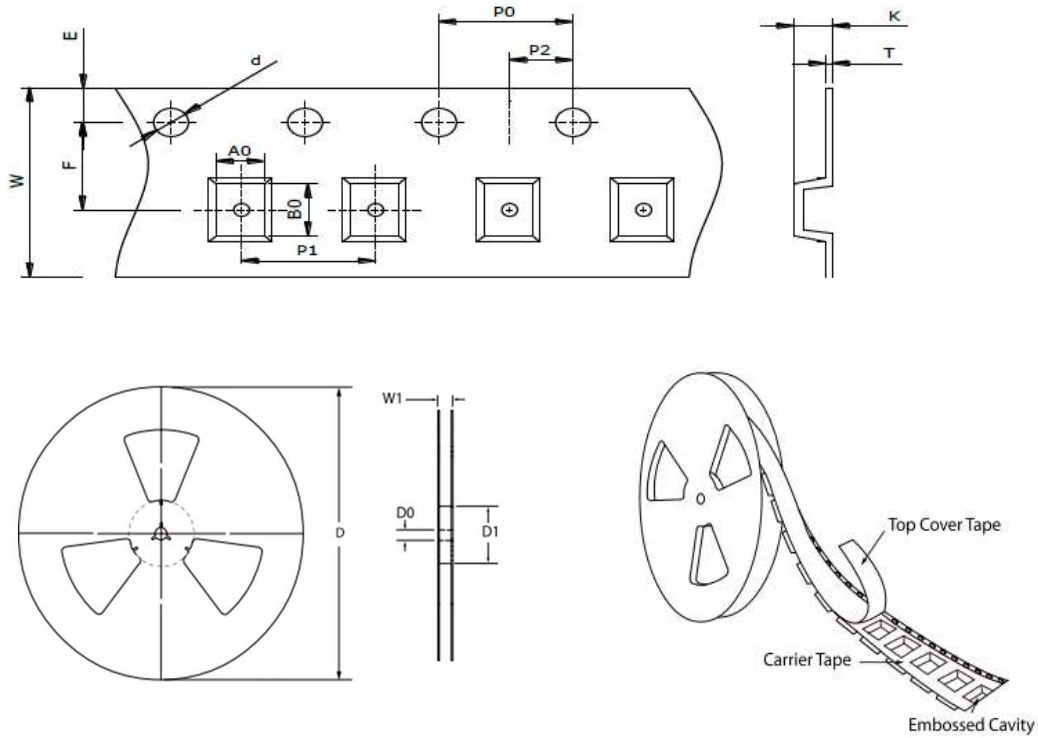
Fig.5 Static drain-source on-state resistance vs. drain current



BSS138KH

N-Channel Enhancement Mode Field Effect Transistor

TAPE & REEL SPECIFICATION



| Item | Symbol | SOT-23 |
|------------------------|----------------|---------------|
| Carrier width | A ₀ | 3.30 ± 0.10 |
| Carrier length | B ₀ | 3.00 ± 0.10 |
| Carrier depth | K | 1.70 ± 0.10 |
| Sprocket hole | d | 1.50 ± 0.10 |
| Reel outside diameter | D | 178.00 ± 2.00 |
| Feed hole width | D ₀ | 13.00 ± 0.50 |
| Reel inner diameter | D ₁ | MIN. 50.00 |
| Sprocket hole position | E | 1.75 ± 0.10 |
| Punch hole position | F | 3.50 ± 0.10 |
| Sprocket hole pitch | P ₀ | 4.00 ± 0.10 |
| Punch hole pitch | P ₁ | 4.00 ± 0.10 |
| Embossment center | P ₂ | 2.00 ± 0.10 |
| Overall tape thickness | T | 0.20 ± 0.05 |
| Tape width | W | 8.00 ± 0.20 |
| Reel width | W1 | MAX. 14.50 |

ORDER INFORMATION

| Package | Reel Size | Quantity |
|---------|-----------|----------|
| SOT-23 | 7" | 3,000 |

MARKING CODE

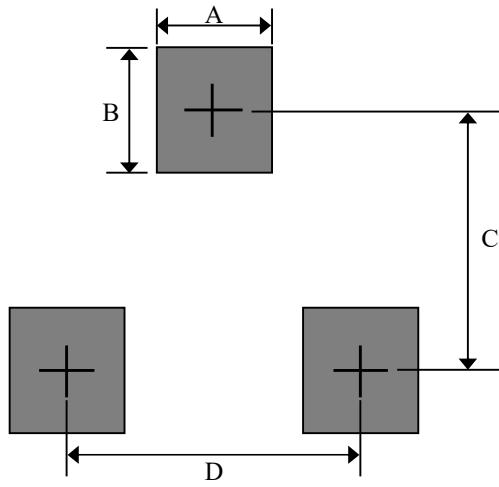
| Part Number | Marking Code |
|-------------|--------------|
| BSS138KH | VD |



BSS138KH

N-Channel Enhancement Mode Field Effect Transistor

SUGGESTED SOLDER PAD LAYOUT



Unit : mm

| PACKAGE | A | B | C | D |
|---------|------|------|------|------|
| SOT-23 | 0.80 | 1.00 | 2.40 | 1.90 |