# BSS123LT1

Preferred Device

# Power MOSFET 170 mAmps, 100 Volts

## N−Channel SOT−23

ON Semiconductor®

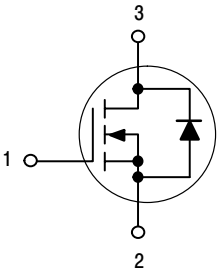
http://onsemi.com

**170 mAMPS**
**100 VOLTS**
**$R_{DS(on)}$ = 6 Ω**

### Features

- Pb−Free Packages are Available

N−Channel




### MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Drain−Source Voltage | $V_{DSS}$ | 100 | Vdc |
| Gate−Source Voltage<br>− Continuous<br>− Non−repetitive ($t_p \le 50$ μs) | <br>$V_{GS}$<br>$V_{GSM}$ | <br>±20<br>±40 | <br>Vdc<br>Vpk |
| Drain Current<br>− Continuous (Note 1)<br>− Pulsed (Note 2) | <br>$I_D$<br>$I_{DM}$ | <br>0.17<br>0.68 | Adc |

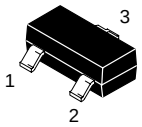
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

### THERMAL CHARACTERISTICS

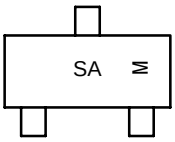
| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Total Device Dissipation FR−5 Board<br>(Note 3) $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | <br>225<br>1.8 | <br>mW<br>mW/°C |
| Thermal Resistance,<br>Junction−to−Ambient | $R_{\theta JA}$ | 556 | °C/W |
| Junction and Storage Temperature | $T_J$, $T_{stg}$ | −55 to +150 | °C |

1. The Power Dissipation of the package may result in a lower continuous drain current.
2. Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
3. FR−5 = 1.0 × 0.75 × 0.062 in.

### MARKING DIAGRAM

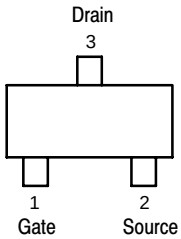



**SOT−23**
**CASE 318**
**STYLE 21**




SA = Device Code
M = Date Code

### PIN ASSIGNMENT




### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

**Preferred** devices are recommended choices for future use and best overall value.

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**ELECTRICAL CHARACTERISTICS** ($T_A$ = 25°C unless otherwise noted)

| Characteristic | | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Drain−Source Breakdown Voltage ($V_{GS}$ = 0, $I_D$ = 250 μAdc) | | $V_{(BR)DSS}$ | 100 | − | − | Vdc |
| Zero Gate Voltage Drain Current ($V_{GS}$ = 0, $V_{DS}$ = 100 Vdc) | $T_J$ = 25°C | $I_{DSS}$ | − | − | 15 | μAdc |
| | $T_J$ = 125°C | | − | − | 60 | |
| Gate−Body Leakage Current ($V_{GS}$ = 20 Vdc, $V_{DS}$ = 0) | | $I_{GSS}$ | − | − | 50 | nAdc |
| **ON CHARACTERISTICS** (Note 4) | | | | | | |
| Gate Threshold Voltage ($V_{DS}$ = $V_{GS}$, $I_D$ = 1.0 mAdc) | | $V_{GS(th)}$ | 0.8 | − | 2.8 | Vdc |
| Static Drain−Source On−Resistance ($V_{GS}$ = 10 Vdc, $I_D$ = 100 mAdc) | | $r_{DS(on)}$ | − | 5.0 | 6.0 | Ω |
| Forward Transconductance ($V_{DS}$ = 25 Vdc, $I_D$ = 100 mAdc) | | $g_{fs}$ | 80 | − | − | mmhos |
| **DYNAMIC CHARACTERISTICS** | | | | | | |
| Input Capacitance ($V_{DS}$ = 25 Vdc, $V_{GS}$ = 0, f = 1.0 MHz) | | $C_{iss}$ | − | 20 | − | pF |
| Output Capacitance ($V_{DS}$ = 25 Vdc, $V_{GS}$ = 0, f = 1.0 MHz) | | $C_{oss}$ | − | 9.0 | − | pF |
| Reverse Transfer Capacitance ($V_{DS}$ = 25 Vdc, $V_{GS}$ = 0, f = 1.0 MHz) | | $C_{rss}$ | − | 4.0 | − | pF |
| **SWITCHING CHARACTERISTICS**[4] | | | | | | |
| Turn−On Delay Time | ($V_{CC}$ = 30 Vdc, $I_C$ = 0.28 Adc, $V_{GS}$ = 10 Vdc, $R_{GS}$ = 50 Ω) | $t_{d(on)}$ | − | 20 | − | ns |
| Turn−Off Delay Time | | $t_{d(off)}$ | − | 40 | − | ns |
| **REVERSE DIODE** | | | | | | |
| Diode Forward On−Voltage ($I_D$ = 0.34 Adc, $V_{GS}$ = 0 Vdc) | | $V_{SD}$ | − | − | 1.3 | V |

4. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

**ORDERING INFORMATION**

| Device | Package | Shipping† |
|---|---|---|
| BSS123LT1 | SOT−23 | 3,000 Tape & Reel |
| BSS123LT1G | SOT−23 (Pb−Free) | 3,000 Tape & Reel |
| BSS123LT3 | SOT−23 | 10,000 Tape & Reel |
| BSS123LT3G | SOT−23 (Pb−Free) | 10,000 Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

## TYPICAL ELECTRICAL CHARACTERISTICS

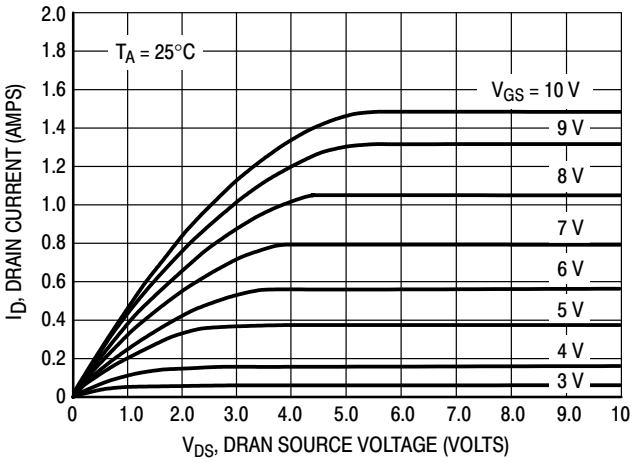



**Figure 1. Ohmic Region**

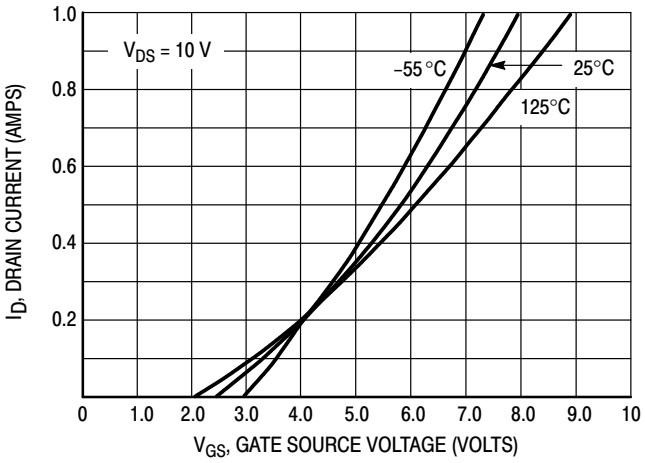



**Figure 2. Transfer Characteristics**

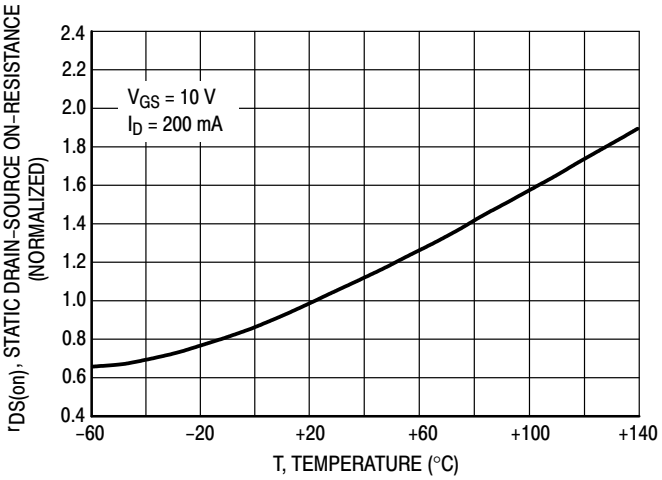



**Figure 3. Temperature versus Static Drain−Source On−Resistance**

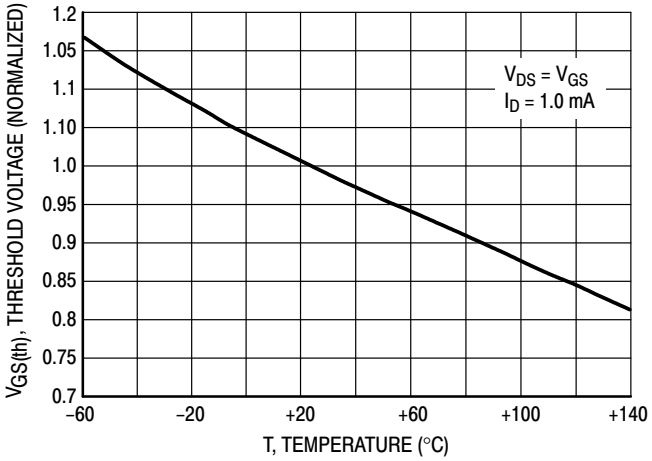
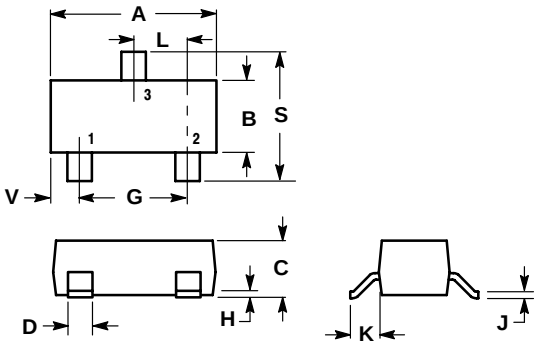



**Figure 4. Temperature versus Gate Threshold Voltage**

# BSS123LT1

## PACKAGE DIMENSIONS

**SOT−23**
**(TO−236)**
CASE 318−08
ISSUE AK

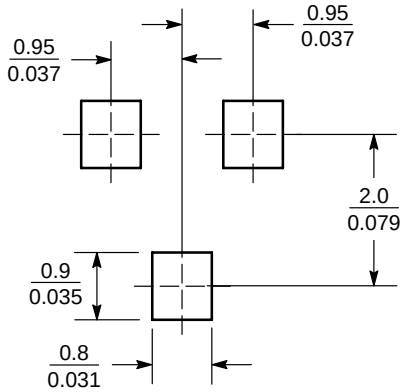



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318−01 THRU −07 AND −09 OBSOLETE, NEW STANDARD 318−08.

| | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| DIM | MIN | MAX | MIN | MAX |
| A | 0.1102 | 0.1197 | 2.80 | 3.04 |
| B | 0.0472 | 0.0551 | 1.20 | 1.40 |
| C | 0.0350 | 0.0440 | 0.89 | 1.11 |
| D | 0.0150 | 0.0200 | 0.37 | 0.50 |
| G | 0.0701 | 0.0807 | 1.78 | 2.04 |
| H | 0.0005 | 0.0040 | 0.013 | 0.100 |
| J | 0.0034 | 0.0070 | 0.085 | 0.177 |
| K | 0.0140 | 0.0285 | 0.35 | 0.69 |
| L | 0.0350 | 0.0401 | 0.89 | 1.02 |
| S | 0.0830 | 0.1039 | 2.10 | 2.64 |
| V | 0.0177 | 0.0236 | 0.45 | 0.60 |

STYLE 21:
PIN 1. GATE
2. SOURCE
3. DRAIN

## SOLDERING FOOTPRINT*




*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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