



**THE DATASHEET OF
BSS123W-7-F**



Product Summary

| | | |
|---------------|-----------------------|------------------------------|
| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | I_D $T_A = +25^\circ C$ |
| 100V | 6.0Ω @ $V_{GS} = 10V$ | 170mA |

Description

This MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

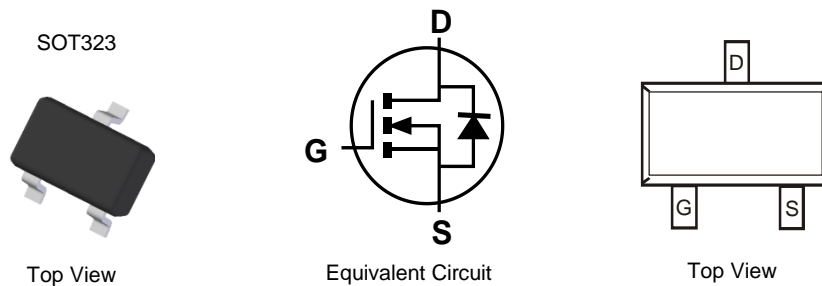
- Small Servo Motor Control
- Power MOSFET Gate Drivers
- Switching Applications

Features

- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- High Drain-Source Voltage Rating
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q101, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q101) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**

Mechanical Data

- Case: SOT323
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Matte Tin Finish Annealed over Alloy 42 Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208③
- Weight: 0.006 grams (Approximate)

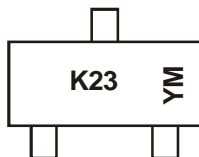


Ordering Information (Note 4)

| Part Number | Compliance | Case | Packaging |
|-------------|------------|--------|------------------|
| BSS123W-7-F | Standard | SOT323 | 3000/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



K23 = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: A = 2013)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2002 | 2003 | 2004 | 2005 | 2006 | ... | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|------|------|------|------|------|------|-----|------|------|------|------|------|------|------|------|
| Code | N | P | R | S | T | ... | Z | A | B | C | D | E | F | G |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Units |
|---|------------------|-------|-------|
| Drain-Source Voltage | V _{DSS} | 100 | V |
| Drain-Gate Voltage R _{GS} ≤ 20KΩ | V _{DGR} | 100 | V |
| Gate-Source Voltage | V _{GSS} | ±20 | V |
| Drain Current (Note 5) | I _D | 170 | mA |
| | I _{DM} | 680 | |

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Units |
|--|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 5) | P _D | 200 | mW |
| Thermal Resistance, Junction to Ambient (Note 5) | R _{θJA} | 625 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---------------------|-----|------|-----------|----------|--|
| OFF CHARACTERISTICS (Note 6) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 100 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1.0 10 | μA nA | V _{DS} = 100V, V _{GS} = 0V V _{DS} = 20V, V _{GS} = 0V |
| Gate-Body Leakage, Forward | I _{GSSF} | — | — | 50 | nA | V _{GS} = 20V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 6) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 0.8 | 1.4 | 2.0 | V | V _{DS} = V _{GS} , I _D = 1mA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | — | 6.0 10 | Ω | V _{GS} = 10V, I _D = 0.17A V _{GS} = 4.5V, I _D = 0.17A |
| Forward Transconductance | g _{FS} | 80 | 370 | — | mS | V _{DS} = 10V, I _D = 0.17A, f = 1.0KHz |
| Drain-Source Diode Forward Voltage | V _{SD} | — | 0.84 | 1.3 | V | V _{GS} = 0V, I _S = 0.34A |
| DYNAMIC CHARACTERISTICS (Note 7) | | | | | | |
| Input Capacitance | C _{iss} | — | 29 | 60 | pF | V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 10 | 15 | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 2 | 6 | pF | |
| SWITCHING CHARACTERISTICS (Note 7) | | | | | | |
| Turn-On Rise Time | t _r | — | — | 8 | ns | V _{DD} = 30V, I _D = 0.28A, R _{GEN} = 6.0Ω, V _{GS} = 10V |
| Turn-Off Fall Time | t _f | — | — | 16 | ns | |
| Turn-On Delay Time | t _{D(ON)} | — | — | 8 | ns | |
| Turn-Off Delay Time | t _{D(OFF)} | — | — | 13 | ns | |

Notes: 5. Part mounted on FR-4 board with recommended pad layout, which can be found on our website at <http://www.diodes.com>.
 6. Short duration pulse test used to minimize self-heating effect.
 7. Guaranteed by design. Not subject to production testing.

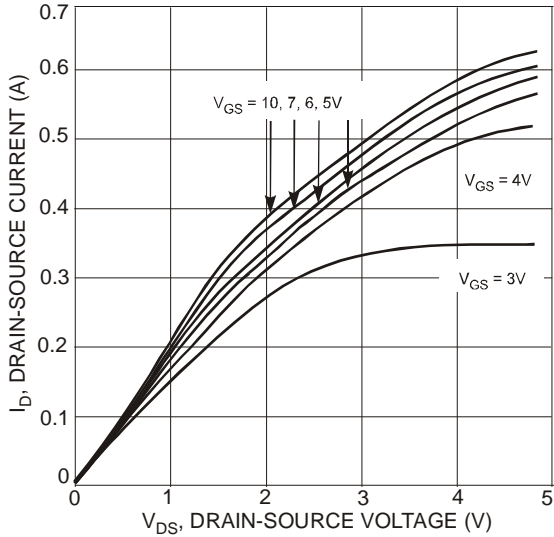


Fig. 1 On-Region Characteristics

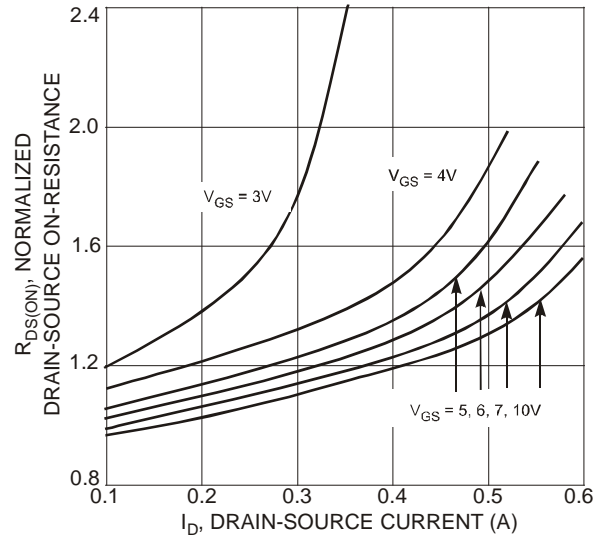


Fig. 2 On-Resistance Variation with Gate Voltage and Drain-Source Current

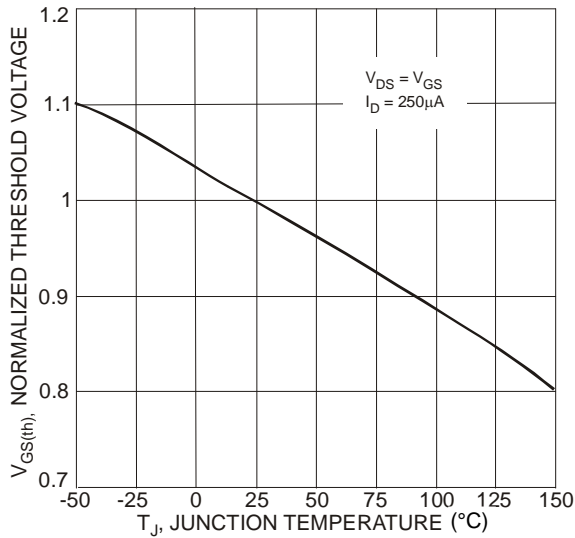


Fig. 3 Gate Threshold Variation with Temperature

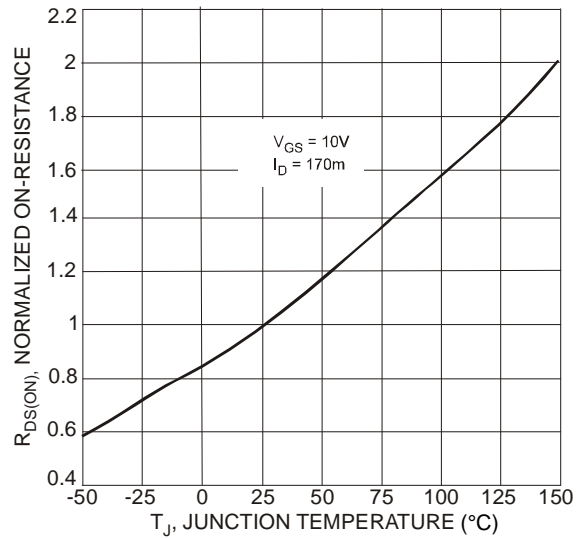


Fig. 4 On-Resistance Variation with Temperature

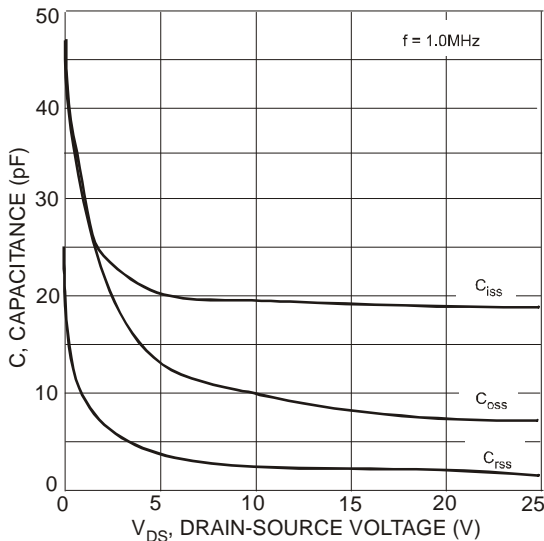


Fig. 5 Typical Capacitance

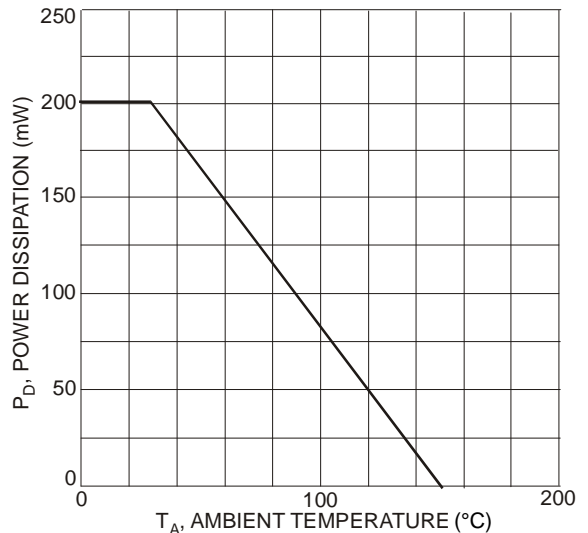
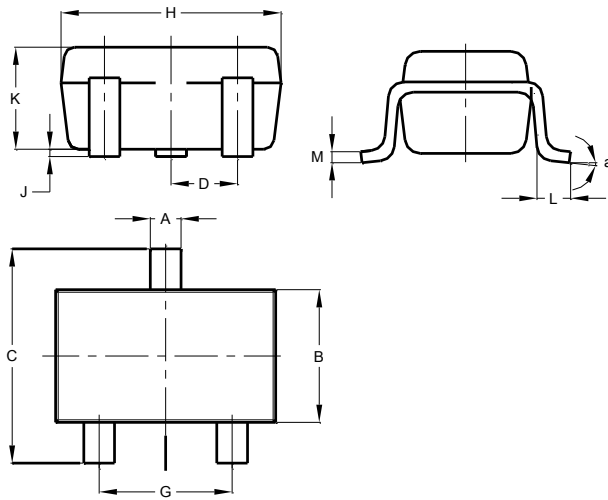


Fig. 6 Power Derating Curve, Total Package

Package Outline Dimensions

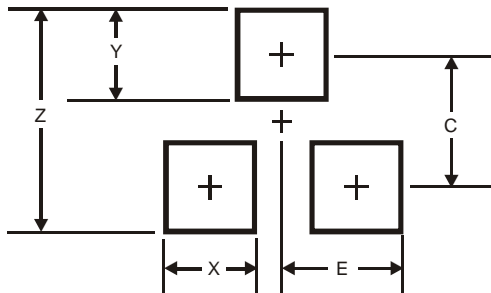
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



| SOT323 | | | |
|----------------------|-----------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.25 | 0.40 | 0.30 |
| B | 1.15 | 1.35 | 1.30 |
| C | 2.00 | 2.20 | 2.10 |
| D | 0.650 BSC | | |
| F | 0.375 | 0.475 | 0.425 |
| G | 1.20 | 1.40 | 1.30 |
| H | 1.80 | 2.20 | 2.15 |
| J | 0.00 | 0.10 | 0.05 |
| K | 0.90 | 1.00 | 0.95 |
| L | 0.25 | 0.40 | 0.30 |
| M | 0.10 | 0.18 | 0.11 |
| a | 8° C | | |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 2.8 |
| X | 0.7 |
| Y | 0.9 |
| C | 1.9 |
| E | 1.0 |

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