

## Product Summary

|                         |                               |  |
|-------------------------|-------------------------------|--|
| <b>BV<sub>DSS</sub></b> | <b>R<sub>DS(ON)</sub> max</b> | <b>I<sub>D</sub></b><br>T <sub>A</sub> = +25°C |
| -50V                    | 10Ω @ V <sub>GS</sub> = -5V   | -130mA   |

## Features and Benefits

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **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-Q100/101/200, 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-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([BSS84Q](#))**

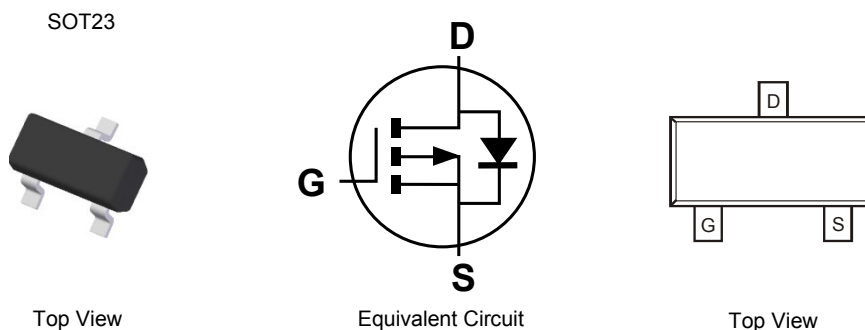
## Description and Applications

This MOSFET has been designed to minimize on-state resistance (R<sub>DS(ON)</sub>) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- General Purpose Interfacing Switch
- Power Management Functions
- Analog Switch

## Mechanical Data

- Case: SOT23
- Case Material: UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish (Lead Free Plating) Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.009 grams (Approximate)

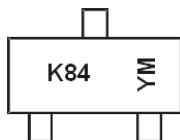


## Ordering Information (Note 4)

| Part Number | Case  | Packaging         |
|-------------|-------|-------------------|
| BSS84-7-F   | SOT23 | 3000/Tape & Reel  |
| BSS84-13-F  | SOT23 | 10000/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



K84 = Product Type Marking Code  
 YM = Date Code Marking  
 Y or Y = Year (ex: I = 2021)  
 M or M = Month (ex: 9 = September)

Date Code Key

| Year  | 1998 | ..... | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|-------|------|-------|------|------|------|------|------|------|------|------|------|------|
| Code  | J    | ..... | I    | J    | K    | L    | M    | N    | O    | P    | R    | S    |
| 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<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                            | Symbol           | Value | Unit |
|---|------------------|-------|------|
| Drain-Source Voltage                      | V <sub>DSS</sub> | -50   | V    |
| Drain-Gate Voltage R <sub>GS</sub> ≤ 20kΩ | V <sub>DGR</sub> | -50   | V    |
| Gate-Source Voltage                       | V <sub>GSS</sub> | ±20   | V    |
| Drain Current (Note 5)                    | I <sub>D</sub>   | -130  | mA   |
| Pulsed Drain Current                      | I <sub>DM</sub>  | -1.2  | A    |

## Thermal Characteristics (@ T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                          | Symbol                            | Value       | Unit |
|---|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5)        | P <sub>D</sub>                    | 300         | mW   |
| Thermal Resistance, Junction to Ambient | R <sub>θJA</sub>                  | 417         | °C/W |
| Operating and Storage Temperature Range | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

## Electrical Characteristics (@ T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                              | Symbol              | Min  | Typ  | Max  | Unit | Test Condition  |
|---|---------------------|------|------|------|------|---|
| <b>OFF CHARACTERISTICS (Note 6)</b>         |                     |      |      |      |      |   |
| Drain-Source Breakdown Voltage              | BV <sub>DSS</sub>   | -50  | —    | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA                         |
| Zero Gate Voltage Drain Current             | I <sub>DSS</sub>    | —    | —    | -1   | μA   | V <sub>DS</sub> = -50V, V <sub>GS</sub> = 0V, T <sub>J</sub> = +25°C  |
|   |                     | —    | —    | -100 | nA   | V <sub>DS</sub> = -50V, V <sub>GS</sub> = 0V, T <sub>J</sub> = +125°C |
| Gate-Body Leakage                           | I <sub>GSS</sub>    | —    | —    | ±10  | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                          |
| <b>ON CHARACTERISTICS (Note 6)</b>          |                     |      |      |      |      |   |
| Gate Threshold Voltage                      | V <sub>GS(TH)</sub> | -0.8 | —    | -2.0 | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -1mA             |
| Static Drain-Source On-Resistance           | R <sub>DS(ON)</sub> | —    | 3.2  | 10   | Ω    | V <sub>GS</sub> = -5V, I <sub>D</sub> = -0.100A                       |
| Forward Transconductance                    | g <sub>FS</sub>     | 0.05 | —    | —    | S    | V <sub>DS</sub> = -25V, I <sub>D</sub> = -0.1A                        |
| <b>DYNAMIC CHARACTERISTICS (Note 7)</b>     |                     |      |      |      |      |   |
| Input Capacitance                           | C <sub>iss</sub>    | —    | 24.6 | 45   | pF   | V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0V, f = 1.0MHz              |
| Output Capacitance                          | C <sub>oss</sub>    | —    | 4.7  | 25   | pF   |   |
| Reverse Transfer Capacitance                | C <sub>rss</sub>    | —    | 2.8  | 12   | pF   |   |
| Gate Resistance                             | R <sub>g</sub>      | —    | 916  | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz                  |
| Total Gate Charge (V <sub>GS</sub> = -4.5V) | Q <sub>g</sub>      | —    | 0.28 | —    | nC   | V <sub>DS</sub> = -10V, I <sub>D</sub> = -0.1A                        |
| Total Gate Charge (V <sub>GS</sub> = -10V)  | Q <sub>g</sub>      | —    | 0.59 | —    | nC   |   |
| Gate-Source Charge                          | Q <sub>gs</sub>     | —    | 0.09 | —    | nC   |   |
| Gate-Drain Charge                           | Q <sub>gd</sub>     | —    | 0.08 | —    | nC   |   |
| Turn-On Delay Time                          | t <sub>D(ON)</sub>  | —    | 10   | —    | ns   | V <sub>DD</sub> = -30V, I <sub>D</sub> = -0.27A,                      |
| Turn-Off Delay Time                         | t <sub>D(OFF)</sub> | —    | 18   | —    | ns   | R <sub>GEN</sub> = 50Ω, V <sub>GS</sub> = -10V                        |

- Notes:
- Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown in Diodes Incorporated's package outline PDFs, which can be found on our website at <http://www.diodes.com/package-outlines.html>.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

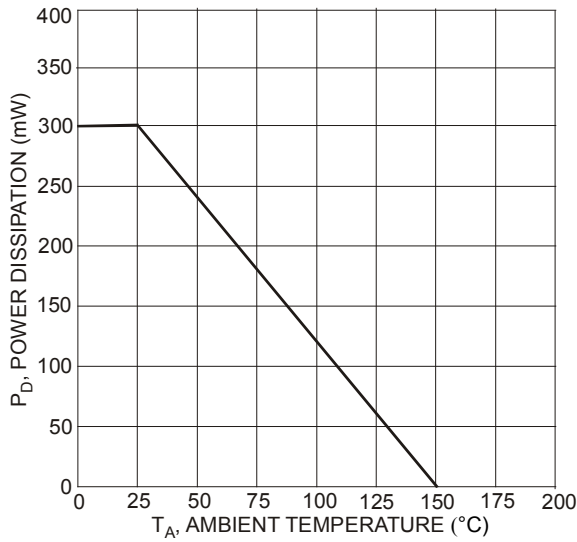


Fig. 1 Max Power Dissipation vs. Ambient Temperature

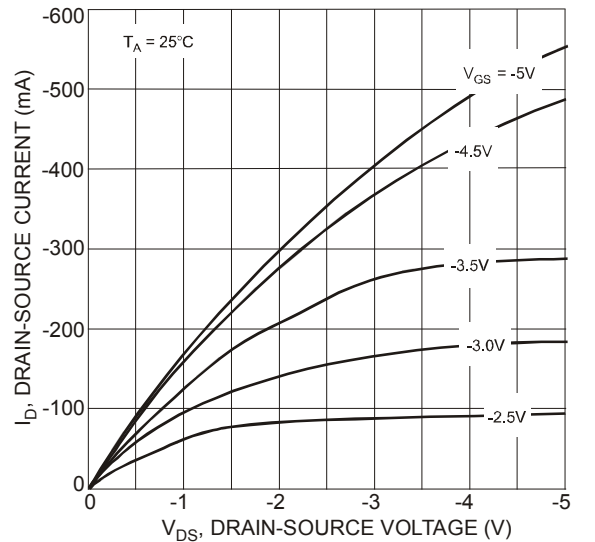


Fig. 2 Drain-Source Current vs. Drain-Source Voltage

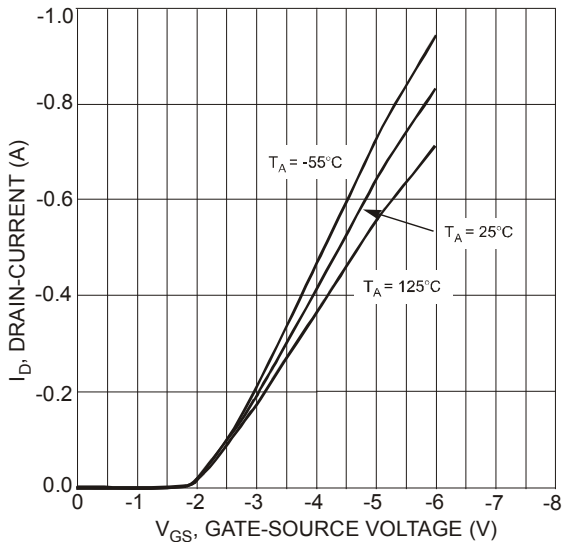


Fig. 3 Drain-Current vs. Gate-Source Voltage

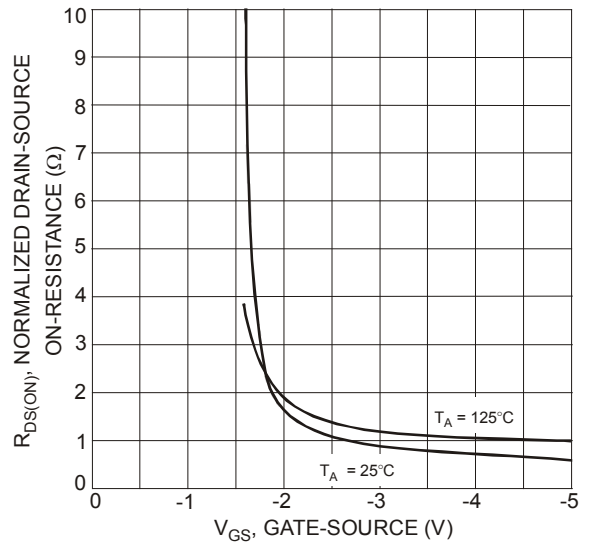


Fig. 4 On-Resistance vs. Gate-Source Voltage

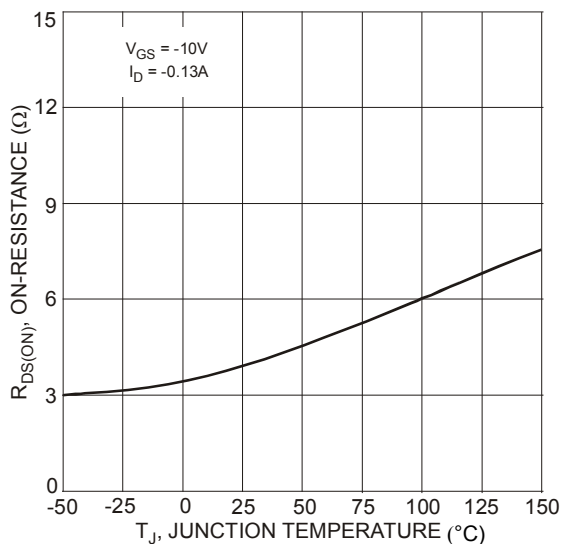


Fig. 5 On-Resistance vs. Junction Temperature

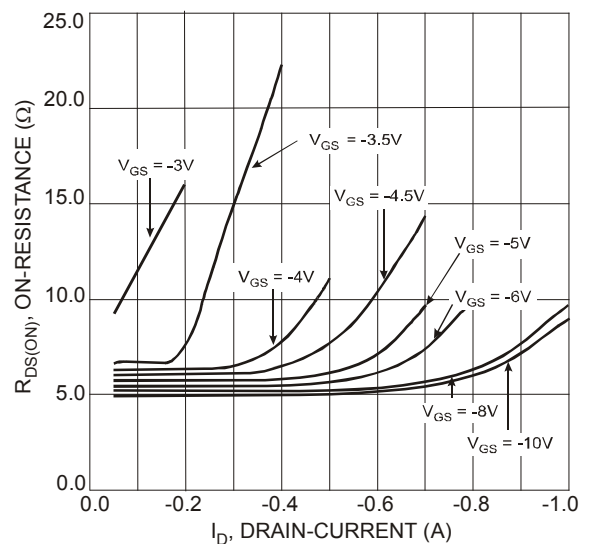
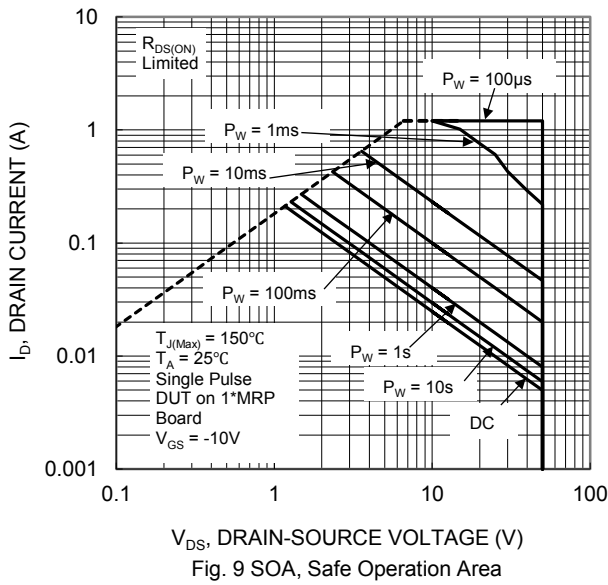
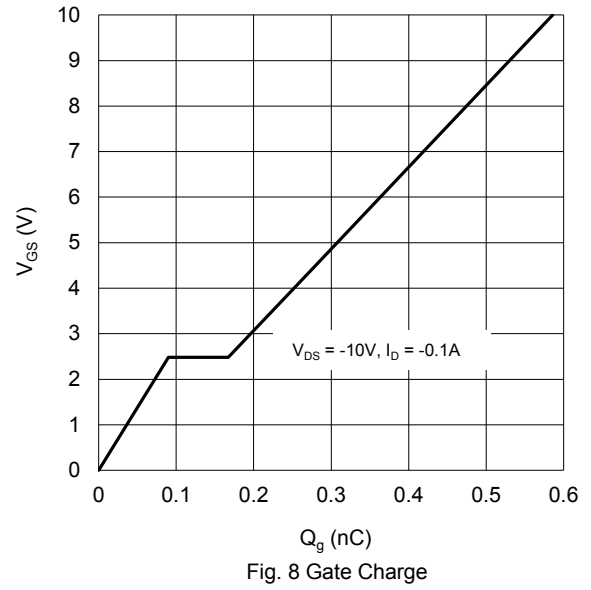
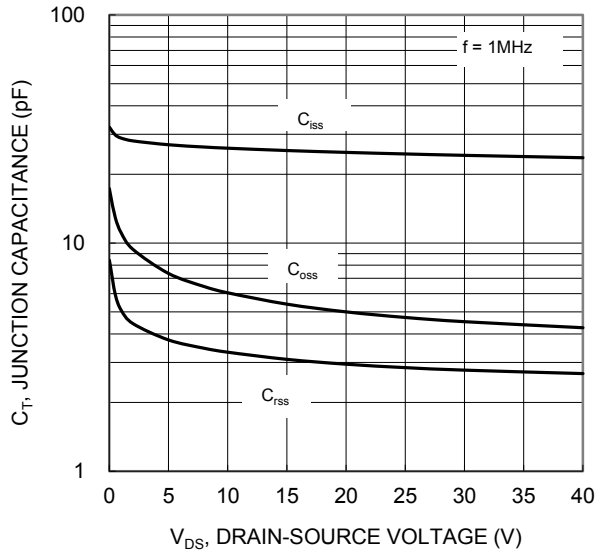


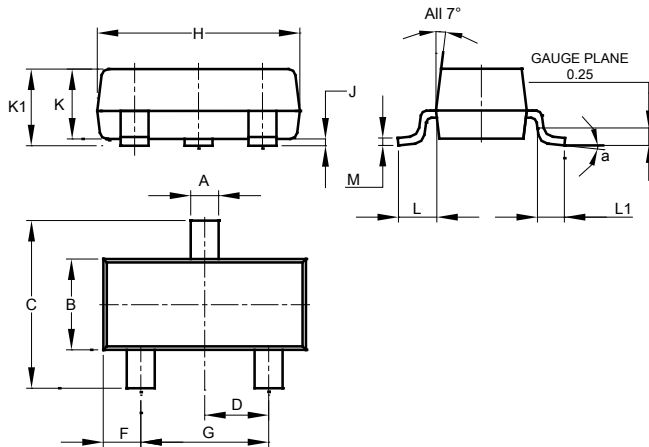
Fig. 6 On-Resistance vs. Drain-Current



## Package Outline Dimensions

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

**SOT23**

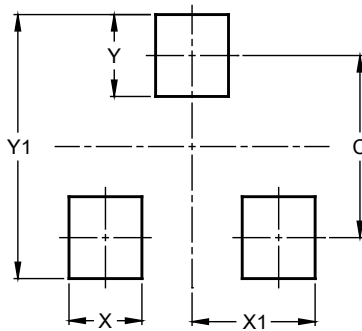


| SOT23                |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| A                    | 0.37  | 0.51  | 0.40  |
| B                    | 1.20  | 1.40  | 1.30  |
| C                    | 2.30  | 2.50  | 2.40  |
| D                    | 0.89  | 1.03  | 0.915 |
| F                    | 0.45  | 0.60  | 0.535 |
| G                    | 1.78  | 2.05  | 1.83  |
| H                    | 2.80  | 3.00  | 2.90  |
| J                    | 0.013 | 0.10  | 0.05  |
| K                    | 0.890 | 1.00  | 0.975 |
| K1                   | 0.903 | 1.10  | 1.025 |
| L                    | 0.45  | 0.61  | 0.55  |
| L1                   | 0.25  | 0.55  | 0.40  |
| M                    | 0.085 | 0.150 | 0.110 |
| a                    | 0°    | 8°    | --    |
| All Dimensions in mm |       |       |       |

## Suggested Pad Layout

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

**SOT23**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 2.0           |
| X          | 0.8           |
| X1         | 1.35          |
| Y          | 0.9           |
| Y1         | 2.9           |

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