

**P-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR**

**Product Summary**

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

**Description and Applications**

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

- General purpose interfacing switches
- Power-management functions
- Analog switches

**Features and Benefits**

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- 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 a separate datasheet ([BSS84WQ](#))

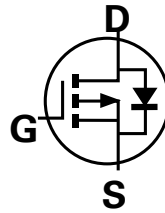
**Mechanical Data**

- Package: SOT323
- Package 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: Lead Free Plating (Matte Tin Finish Annealed over Alloy 42 Leadframe). Solderable per MIL-STD-202, Method 208 <sup>(e3)</sup>
- Weight: 0.006 grams (Approximate)

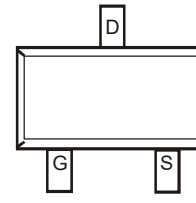
SOT323 (Standard)



Top View



Equivalent Circuit



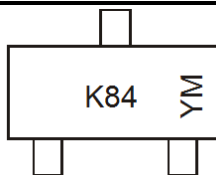
Top View

**Ordering Information** (Note 4)

| Orderable Part Number | Package           | Packing |             |
|-----------------------|-------------------|---------|-------------|
|                       |                   | Qty.    | Carrier     |
| BSS84W-7-F            | SOT323 (Standard) | 3,000   | 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  $\bar{Y}$  = Year (ex: N = 2026)  
M or  $\bar{M}$  = Month (ex: 9 = September)

**Date Code Key**

| Year | 2007 | - | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 |
|------|------|---|------|------|------|------|------|------|------|------|------|------|
| Code | U    | - | N    | P    | R    | S    | T    | U    | V    | W    | X    | Y    |

| 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 (Note 5)   | 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 (Note 5) | I <sub>DM</sub>  | -1    | A    |

**Thermal Characteristics**

| Characteristic                          | Symbol                            | Value       | Unit |
|-----------------------------------------|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5)        | P <sub>D</sub>                    | 200         | mW   |
| Thermal Resistance, Junction to Ambient | R <sub>θJA</sub>                  | 625         | °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                                                                |
|------------------------------------|---------------------|------|------|------|------|-------------------------------------------------------------------------------|
| OFF CHARACTERISTICS (Note 6)       |                     |      |      |      |      |                                                                               |
| Drain-Source Breakdown Voltage     | BV <sub>DSS</sub>   | -50  | -75  | —    | V    | V <sub>GS</sub> = 0, 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> = 0, T <sub>J</sub> = +25°C           |
|                                    |                     | —    | —    | -2   | μA   | V <sub>DS</sub> = -50V, V <sub>GS</sub> = 0, T <sub>J</sub> = +125°C (Note 7) |
|                                    |                     | —    | —    | -100 | nA   | V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0, T <sub>J</sub> = +25°C           |
| Gate-Body Leakage                  | I <sub>GSS</sub>    | —    | —    | ±10  | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0                                   |
| ON CHARACTERISTICS (Note 6)        |                     |      |      |      |      |                                                                               |
| Gate Threshold Voltage             | V <sub>GS(TH)</sub> | -0.8 | -1.6 | -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> | —    | 6    | 10   | Ω    | V <sub>GS</sub> = -5V, I <sub>D</sub> = -0.1A                                 |
| Forward Transconductance           | g <sub>FS</sub>     | 0.05 | —    | —    | S    | V <sub>DS</sub> = -25V, I <sub>D</sub> = -0.1A                                |
| DYNAMIC CHARACTERISTICS (Note 7)   |                     |      |      |      |      |                                                                               |
| Input Capacitance                  | C <sub>iSS</sub>    | —    | —    | 45   | pF   | V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0, f = 1.0MHz                       |
| Output Capacitance                 | C <sub>oSS</sub>    | —    | —    | 25   | pF   |                                                                               |
| Reverse Transfer Capacitance       | C <sub>rSS</sub>    | —    | —    | 12   | pF   |                                                                               |
| SWITCHING CHARACTERISTICS (Note 7) |                     |      |      |      |      |                                                                               |
| 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 on Diodes Incorporated's suggested pad layout document, 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.

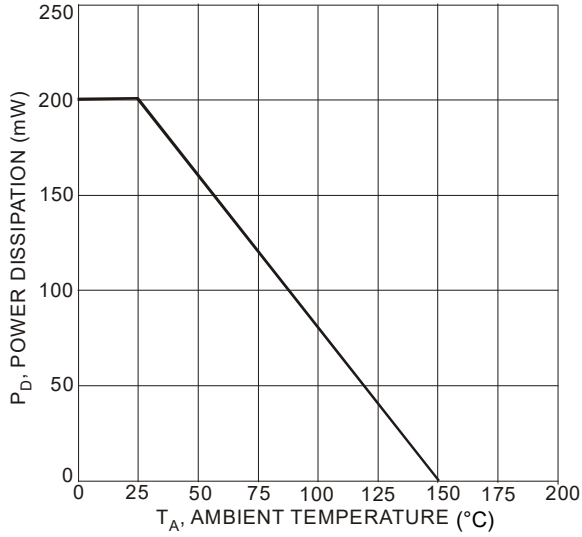


Fig. 1 Max Power Dissipation vs. Ambient Temperature

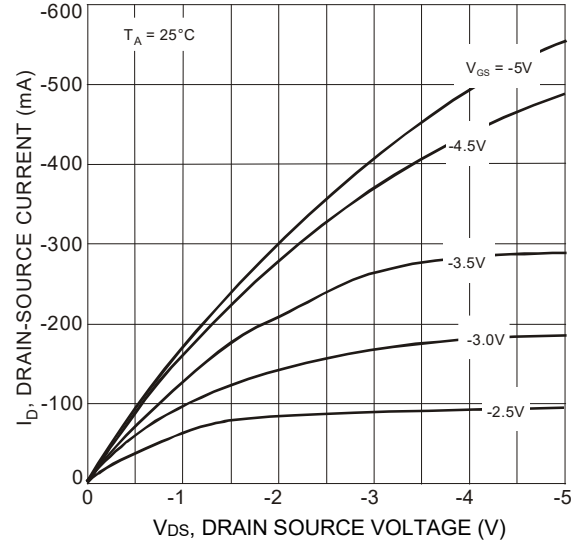


Fig. 2 Drain Source Current vs. Drain Source Voltage

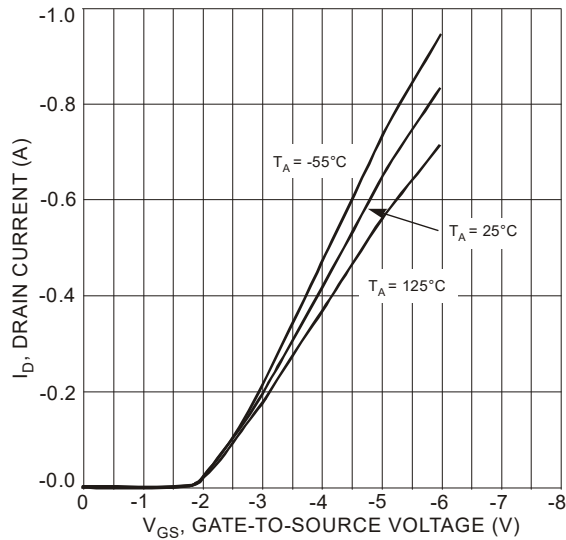


Fig. 3 Drain Current vs. Gate Source Voltage

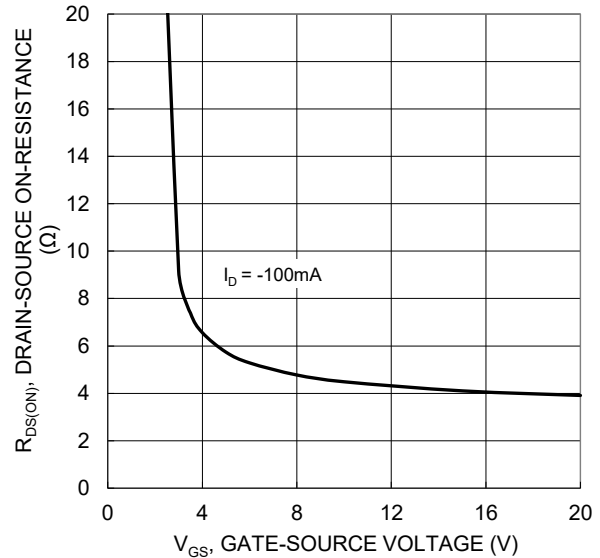


Fig. 4 Typical Transfer Characteristic

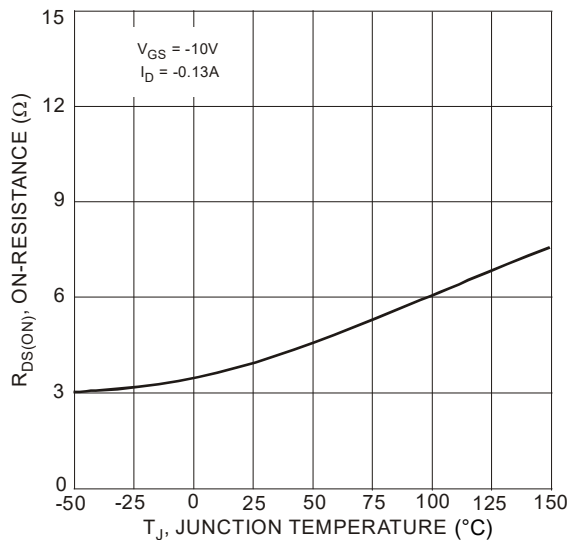


Fig. 5 On-Resistance vs. Junction Temperature

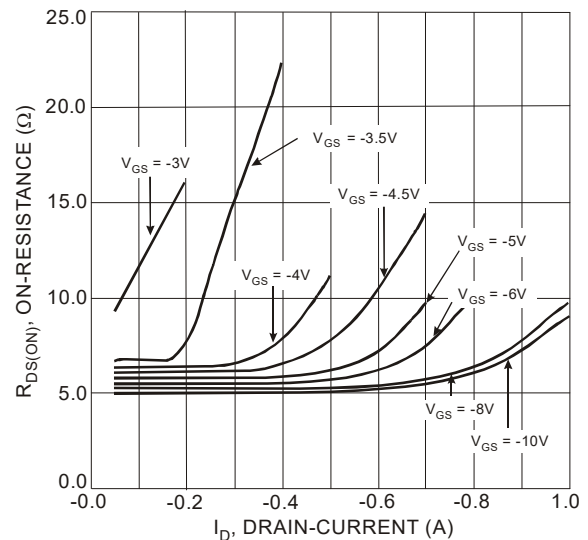
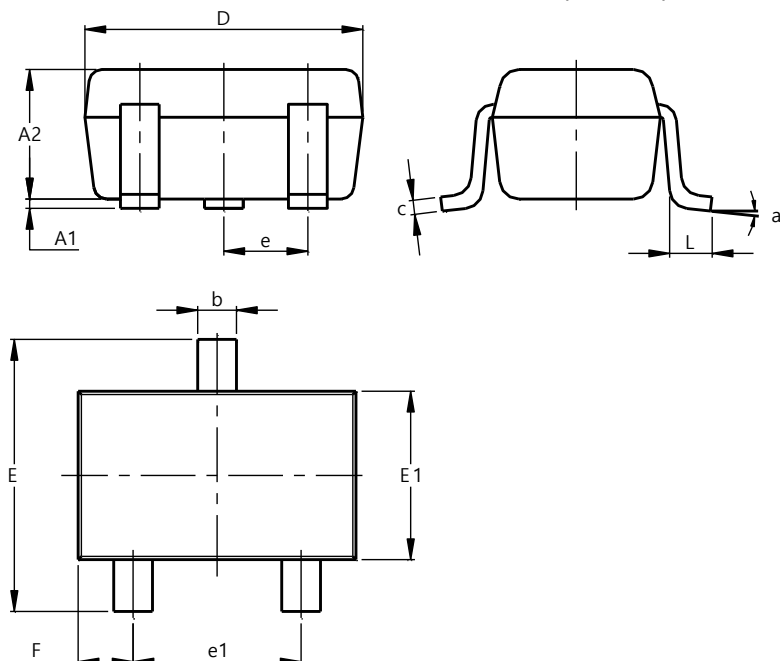


Fig. 6 On-Resistance vs. Drain-Current

## Package Outline Dimensions

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

**SOT323 (Standard)**

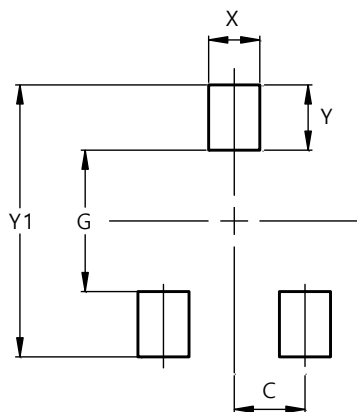


| SOT323 (Standard)    |      |       |        |
|----------------------|------|-------|--------|
| Dim                  | Min  | Max   | Typ    |
| A1                   | 0.00 | 0.10  | 0.05   |
| A2                   | 0.80 | 1.00  | 0.90   |
| b                    | 0.20 | 0.40  | 0.30   |
| c                    | 0.08 | 0.18  | 0.13   |
| D                    | 1.80 | 2.20  | 2.00   |
| E                    | 2.00 | 2.45  | 2.225  |
| E1                   | 1.15 | 1.35  | 1.25   |
| e                    | --   | --    | 0.65   |
| e1                   | 1.20 | 1.40  | 1.30   |
| F                    | 0.25 | 0.475 | 0.3625 |
| L                    | 0.25 | 0.46  | 0.355  |
| a                    | 0°   | 8°    | --     |
| All Dimensions in mm |      |       |        |

## Suggested Pad Layout

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

**SOT323 (Standard)**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.650         |
| G          | 1.300         |
| X          | 0.470         |
| Y          | 0.600         |
| Y1         | 2.500         |

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