# P-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | Package | $I_D$ $T_A$ = +25°C |
|---|---|---|---|
| -50V | 10Ω $V_{GS}$ = -5V | SOT323 | -130mA |

## Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**

## Description

This MOSFET has been 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

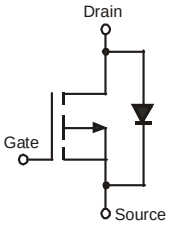
- General Purpose Interfacing Switch
- Power Management Functions
- Analog Switch

## Mechanical Data

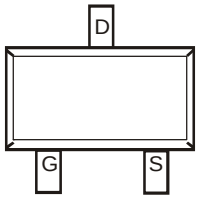
- Case: SOT323
- Case Material: Molded Plastic, "Green" Molding Compound, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminal Connections: See Diagram
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe). (e3)
- Weight: 0.006 grams (approximate)

SOT-323

TOP VIEW




Equivalent Circuit



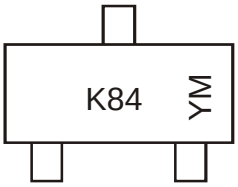

TOP VIEW

## Ordering Information (Notes 3)

| Part Number | Case | Packaging |
|---|---|---|
| BSS84W-7-F | SOT323 | 3000/Tape & Reel |

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
3. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

## Marking Information




K84 = Product Type Marking Code
YM = Date Code Marking
Y = Year ex: N = 2002
M = Month ex: 9 = September

Date Code Key

| Year | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | J | K | L | M | N | P | R | S | T | U | V | W | X | Y | Z |

| 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 | | $V_{DSS}$ | -50 | V |
| Drain-Gate Voltage (Note 4) | | $V_{DGR}$ | -50 | V |
| Gate-Source Voltage | Continuous | $V_{GSS}$ | ±20 | V |
| Drain Current (Note 4) | Continuous | $I_D$ | -130 | mA |
| Pulsed Drain Current (Note 4) | | $I_{DM}$ | -1 | A |

## Thermal Characteristics

| Characteristic | Symbol | Value | Units |
|---|---|---|---|
| Total Power Dissipation (Note 4) | $P_d$ | 200 | mW |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 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 5)** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | -50 | -75 | — | V | $V_{GS}$ = 0V, $I_D$ = -250μA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | —<br>—<br>— | —<br>—<br>— | -15<br>-60<br>-100 | μA<br>μA<br>nA | $V_{DS}$ = -50V, $V_{GS}$ = 0V, $T_J$ = 25°C<br>$V_{DS}$ = -50V, $V_{GS}$ = 0V, $T_J$ = 125°C<br>$V_{DS}$ = -25V, $V_{GS}$ = 0V, $T_J$ = 25°C |
| Gate-Body Leakage | $I_{GSS}$ | — | — | ±10 | nA | $V_{GS}$ = ±20V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 5)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | -0.8 | -1.6 | -2.0 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = -1mA |
| Static Drain-Source On-Resistance | $R_{DS\ (ON)}$ | — | 6 | 10 | Ω | $V_{GS}$ = -5V, $I_D$ = -0.100A |
| Forward Transconductance | $g_{FS}$ | .05 | — | — | S | $V_{DS}$ = -25V, $I_D$ = -0.1A |
| **DYNAMIC CHARACTERISTICS** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | — | 45 | pF | $V_{DS}$ = -25V, $V_{GS}$ = 0V, f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | — | 25 | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | — | 12 | pF | |
| **SWITCHING CHARACTERISTICS** | | | | | | |
| Turn-On Delay Time | $t_{D(ON)}$ | — | 10 | — | ns | $V_{DD}$ = -30V, $I_D$ = -0.27A, |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 18 | — | ns | $R_{GEN}$ = 50Ω, $V_{GS}$ = -10V |

Notes: 4. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.
5. Short duration pulse test used to minimize self-heating effect.

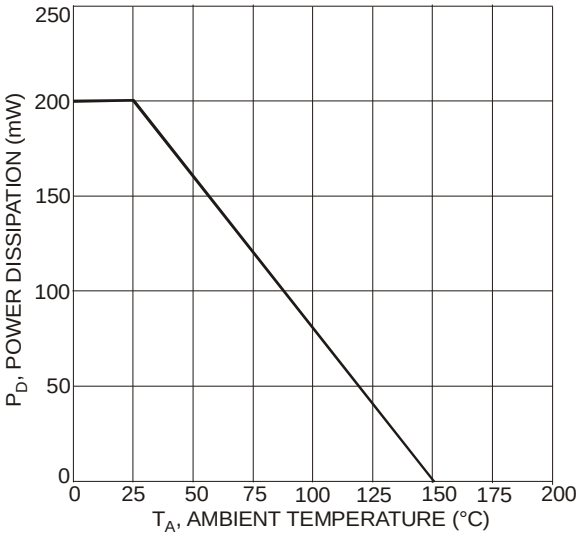



Fig. 1 Max Power Dissipation vs. Ambient Temperature

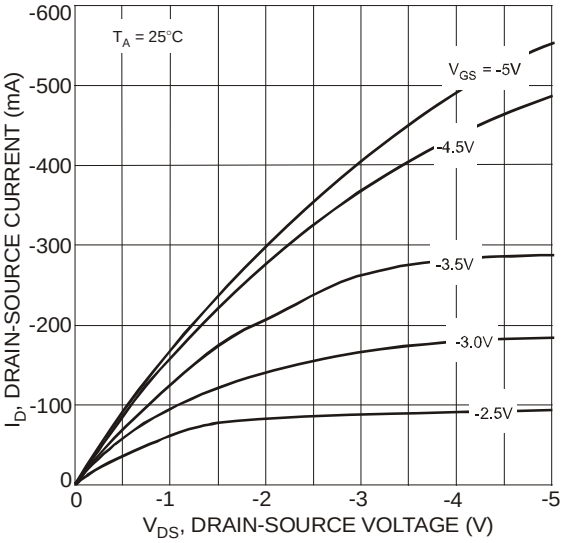



Fig. 2 Drain-Source Current vs.Drain-Source Voltage

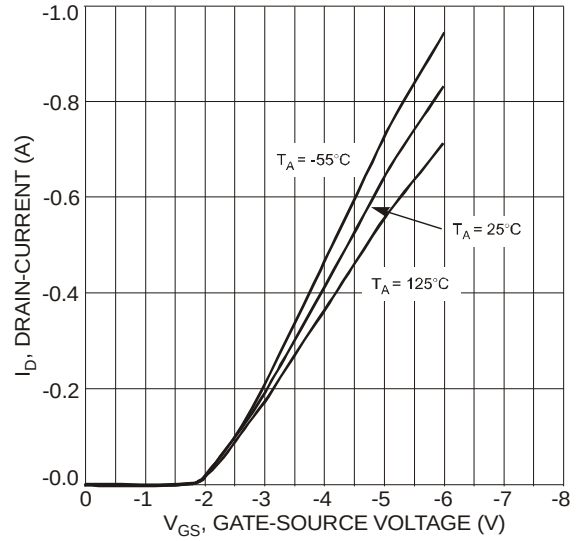



Fig. 3 Drain-Current vs. Gate-Source Voltage

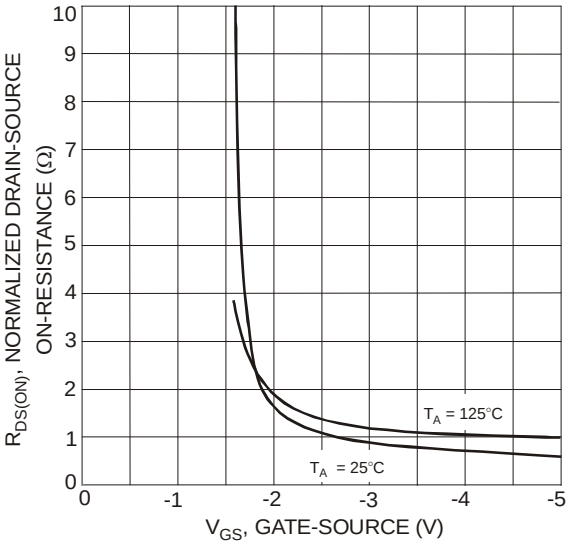



Fig. 4 On-Resistance vs. Gate-Source Voltage

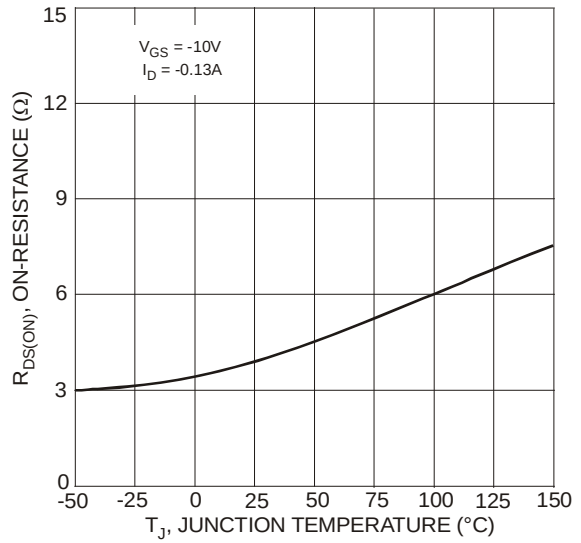



Fig. 5 On-Resistance vs. Junction Temperature

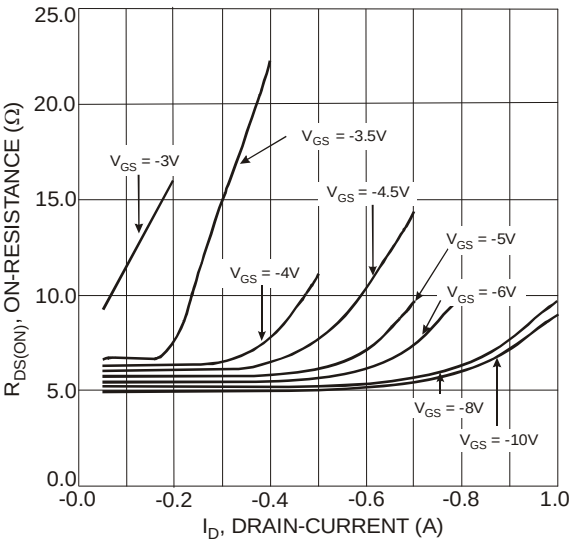
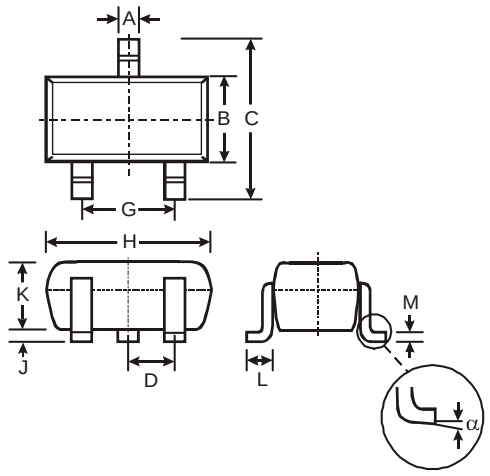


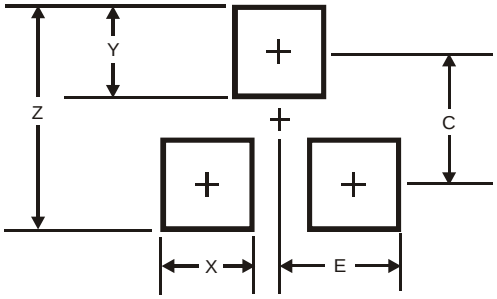

Fig. 6 On-Resistance vs. Drain-Current

## Package Outline Dimensions




| 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** | - | - | 0.65 |
| **G** | 1.20 | 1.40 | 1.30 |
| **H** | 1.80 | 2.20 | 2.15 |
| **J** | 0.0 | 0.10 | 0.05 |
| **K** | 0.90 | 1.00 | 1.00 |
| **L** | 0.25 | 0.40 | 0.30 |
| **M** | 0.10 | 0.18 | 0.11 |
| **α** | 0° | 8° | - |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout




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

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