

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

**Product Summary**

<b>BV<sub>DSS</sub></b>	<b>R<sub>DS(ON)</sub></b>	<b>I<sub>D</sub></b> <b>T<sub>A</sub> = +25°C</b>
-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 Switch
- Power Management Functions
- Analog Switch

**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)**
- **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 (BSS84WQ)**

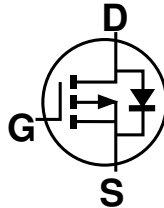
**Mechanical Data**

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

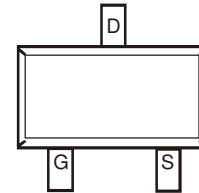
SOT323 (Standard)



Top View



Equivalent Circuit



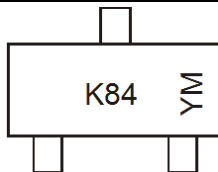
Top View

**Ordering Information** (Note 4)

Part Number	Case	Packaging
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: I = 2021)  
 M or  $\bar{M}$  = Month (ex: 9 = September)

Date Code Key

Year	2007	...	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	U	...	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 (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
<b>OFF CHARACTERISTICS (Note 6)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-50	-75	—	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
		—	—	-2	μA	V <sub>DS</sub> = -50V, V <sub>GS</sub> = 0V, T <sub>J</sub> = +125°C
		—	—	-100	nA	V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0V, T <sub>J</sub> = +25°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	-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
<b>DYNAMIC CHARACTERISTICS (Note 7)</b>						
Input Capacitance	C <sub>iss</sub>	—	—	45	pF	V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	—	25	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	—	12	pF	
<b>SWITCHING CHARACTERISTICS (Note 7)</b>						
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.
  - Guarantee by design. Not subject to production testing.

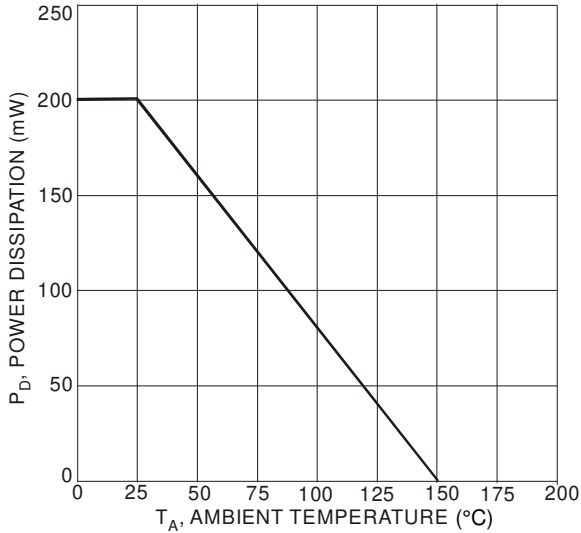


Fig. 1 Max Power Dissipation vs. Ambient Temperature

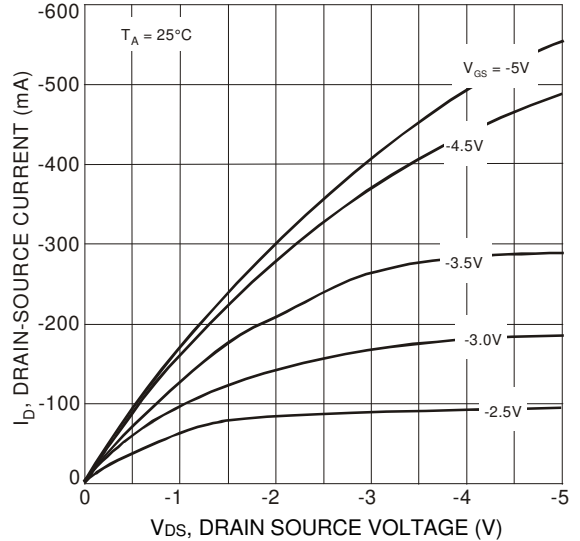


Fig. 2 Drain Source Current vs. Drain Source Voltage

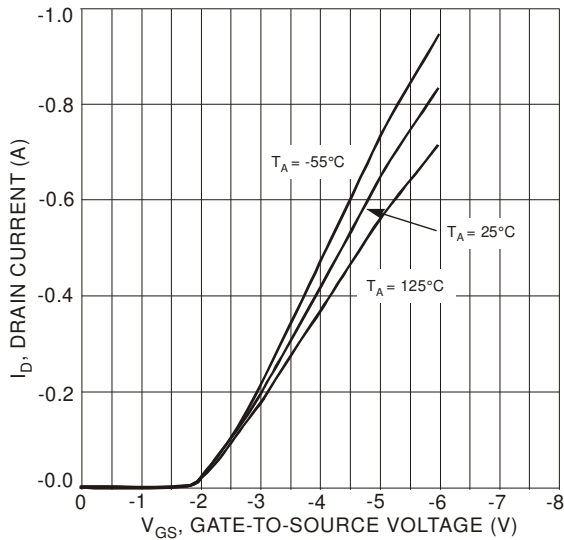


Fig. 3 Drain Current vs. Gate Source Voltage

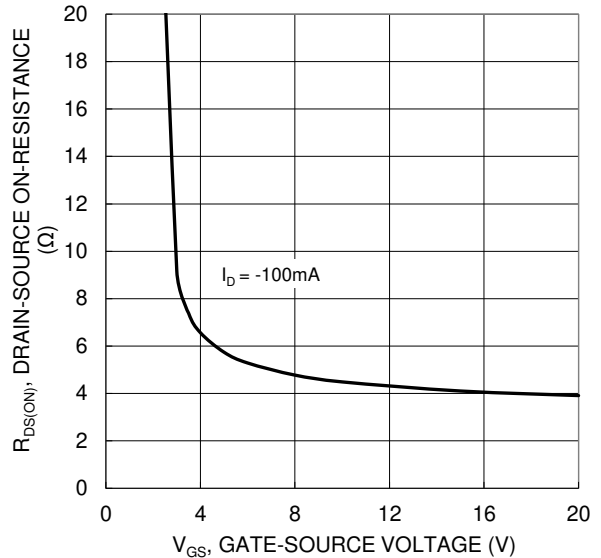


Fig. 4 Typical Transfer Characteristic

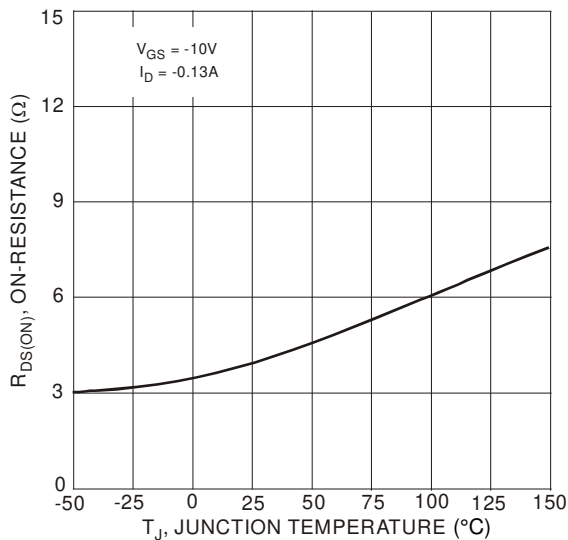


Fig. 5 On-Resistance vs. Junction Temperature

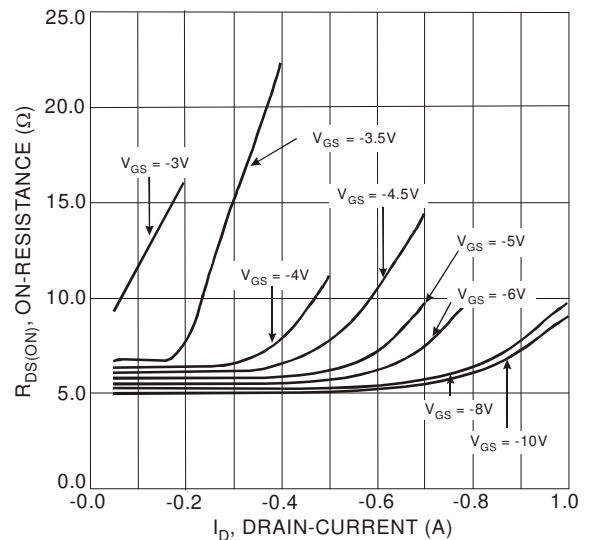
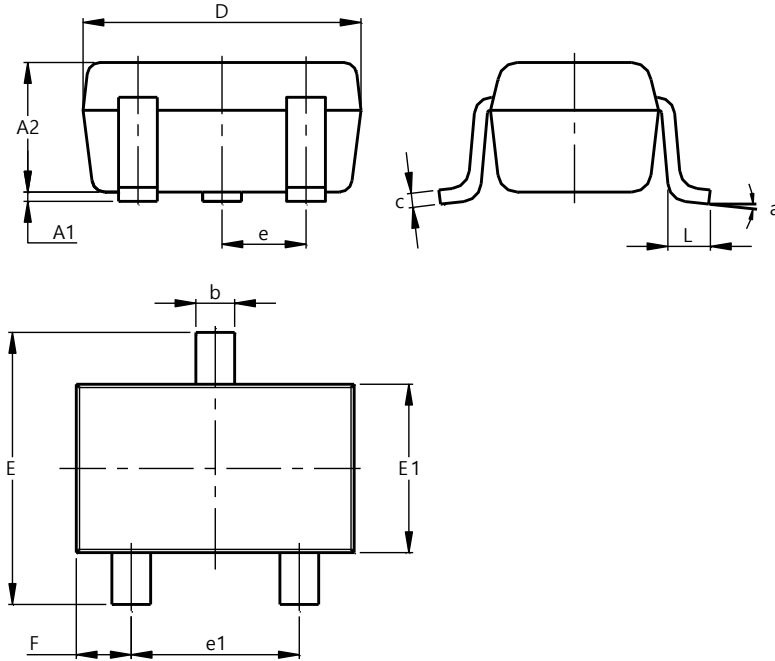


Fig. 6 On-Resistance vs. Drain-Current

**Package Outline Dimensions**

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

**SOT323 (Standard)**

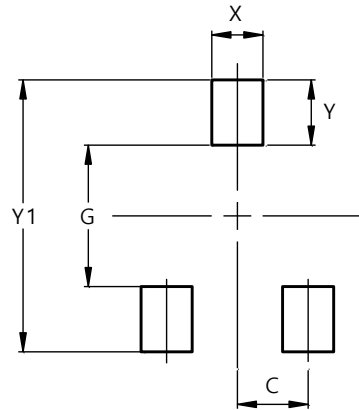


SOT323 (Standard)			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.80	1.00	0.90
b	0.20	0.40	0.30
c	0.08	0.18	0.13
D	1.80	2.20	2.00
E	2.00	2.45	2.225
E1	1.15	1.35	1.25
e	--	--	0.65
e1	1.20	1.40	1.30
F	0.25	0.475	0.3625
L	0.25	0.46	0.355
a	0°	8°	--
<b>All Dimensions in mm</b>			

**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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