

## Product Summary

$BV_{DSS}$	$R_{DS(ON)} \text{ max}$	$I_D$ $T_A = +25^\circ\text{C}$
-50V	10Ω @ $V_{GS} = -5\text{V}$	-130mA

## 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

## 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)
- Qualified to AEC-Q101 Standards for High Reliability
- PPAP Capable (Note 4)

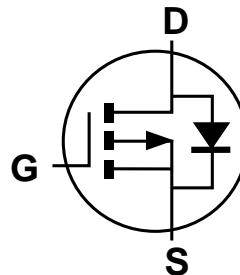
## Mechanical Data

- 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 e3
- Terminal Connections: See Diagram
- Weight: 0.009 grams (Approximate)

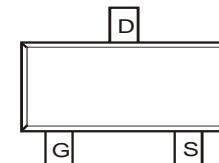
SOT23



Top View



Equivalent Circuit



Top View

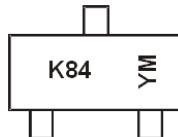
## Ordering Information (Note 5)

Part Number	Qualification	Case	Packaging
BSS84-7-F	Commercial	SOT23	3000/Tape & Reel
BSS84Q-7-F	Automotive	SOT23	3000/Tape & Reel
BSS84-13-F	Commercial	SOT23	10000/Tape & Reel
BSS84Q-13-F	Automotive	SOT23	10000/Tape & Reel

## Notes:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/product\\_compliance\\_definitions.html](http://www.diodes.com/product_compliance_definitions.html).
- 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 or YM = Date Code Marking  
 Y or Y = Year (ex: E = 2017)  
 M = Month (ex: 9 = September)

## Date Code Key

Year	1998	~	2016	2017	2018	2019	2020	2021	2022	2023		
Code	J	~	D	E	F	G	H	I	J	K		
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	0	N	D

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	-50	V
Drain-Gate Voltage $R_{GS} \leq 20\text{k}\Omega$	$V_{DGR}$	-50	V
Gate-Source Voltage	Continuous	$\pm 20$	V
Drain Current (Note 6)	Continuous	$I_D$	mA
Pulsed Drain Current		$I_{DM}$	A

**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	$P_D$	300	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	°C/W
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	°C

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	-50	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	-1	$\mu\text{A}$	$V_{DS} = -50\text{V}, V_{GS} = 0\text{V}, T_J = +25^\circ\text{C}$
		—	—	-2	$\mu\text{A}$	$V_{DS} = -50\text{V}, V_{GS} = 0\text{V}, T_J = +125^\circ\text{C}$
		—	—	-100	nA	$V_{DS} = -25\text{V}, V_{GS} = 0\text{V}, T_J = +25^\circ\text{C}$
Gate-Body Leakage	$I_{GSS}$	—	—	$\pm 10$	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(\text{TH})}$	-0.8	—	-2.0	V	$V_{DS} = V_{GS}, I_D = -1\text{mA}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	—	10	$\Omega$	$V_{GS} = -5\text{V}, I_D = -0.100\text{A}$
Forward Transconductance	$g_{FS}$	0.05	—	—	S	$V_{DS} = -25\text{V}, I_D = -0.1\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	24.6	45	pF	$V_{DS} = -25\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	4.7	25	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	2.8	12	pF	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Gate Resistance	$R_g$	—	916	—	$\Omega$	
Total Gate Charge ( $V_{GS} = -4.5\text{V}$ )	$Q_g$	—	0.28	—	nC	$V_{DS} = -10\text{V}, I_D = -0.1\text{A}$
Total Gate Charge ( $V_{GS} = -10\text{V}$ )	$Q_g$	—	0.59	—	nC	
Gate-Source Charge	$Q_{gs}$	—	0.09	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	0.08	—	nC	
Turn-On Delay Time	$t_{D(\text{ON})}$	—	10	—	ns	$V_{DD} = -30\text{V}, I_D = -0.27\text{A}, R_{\text{GEN}} = 50\Omega, V_{GS} = -10\text{V}$
Turn-Off Delay Time	$t_{D(\text{OFF})}$	—	18	—	ns	

Notes: 6. 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>.

7. Short duration pulse test used to minimize self-heating effect.

8. Guaranteed by design. Not subject to production testing.

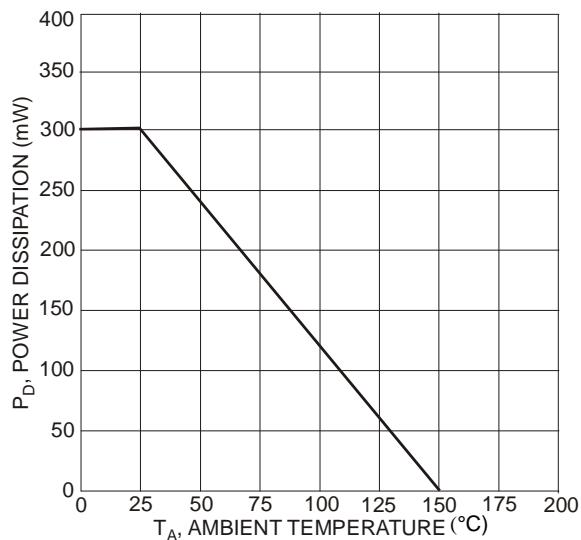


Fig. 1 Max Power Dissipation vs. Ambient Temperature

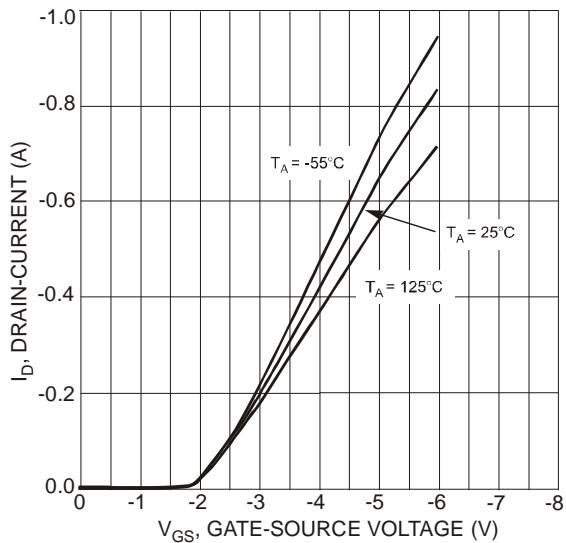


Fig. 3 Drain-Current vs. Gate-Source Voltage

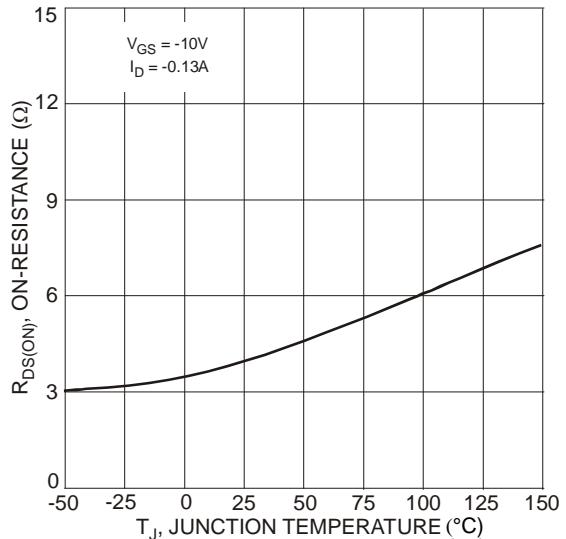


Fig. 5 On-Resistance vs. Junction Temperature

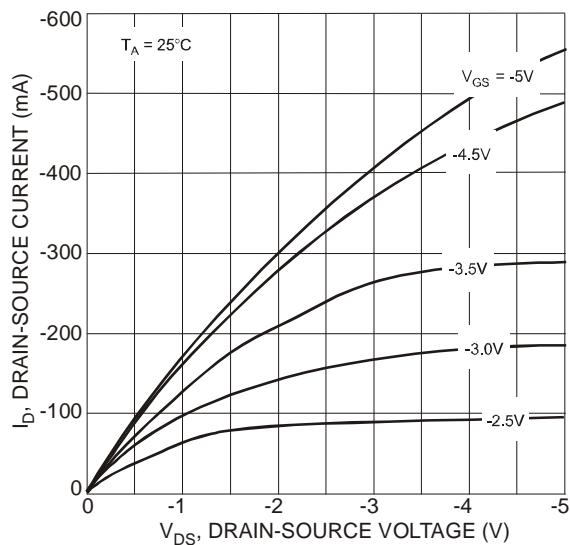


Fig. 2 Drain-Source Current vs. Drain-Source Voltage

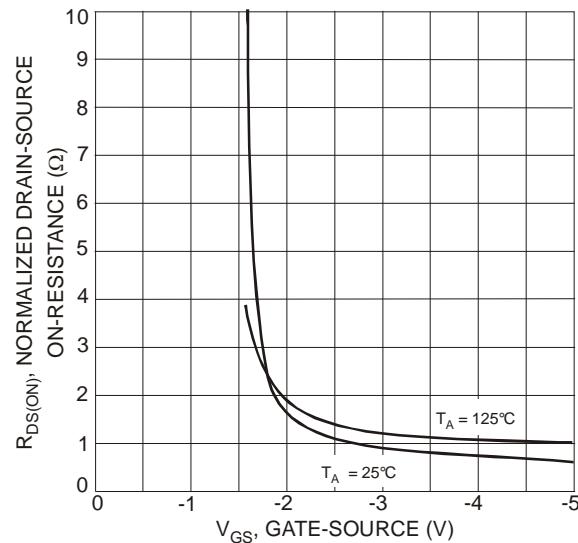


Fig. 4 On-Resistance vs. Gate-Source Voltage

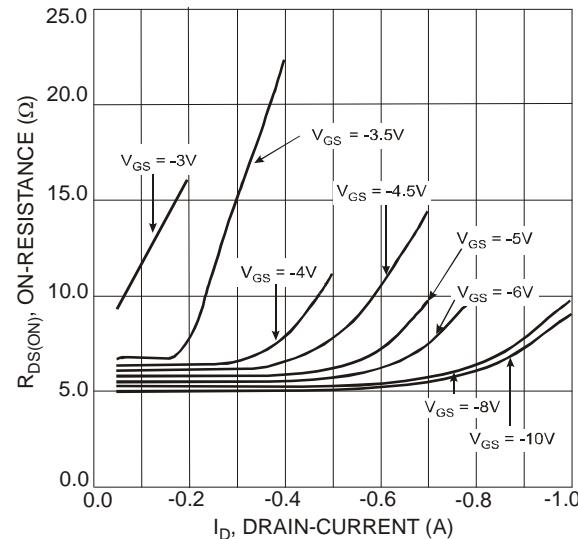
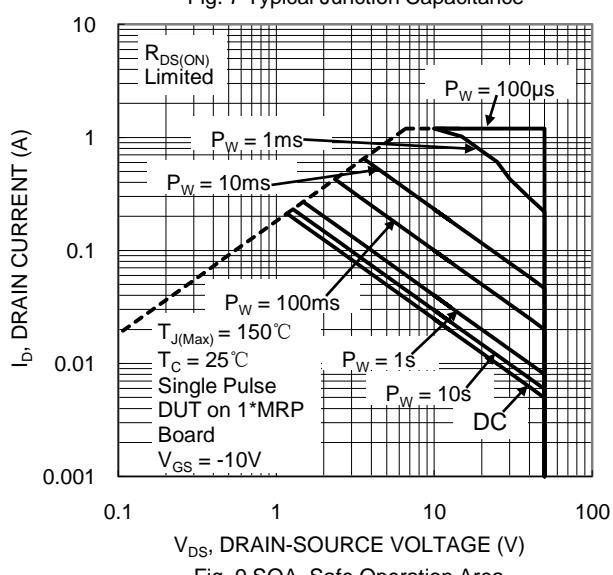
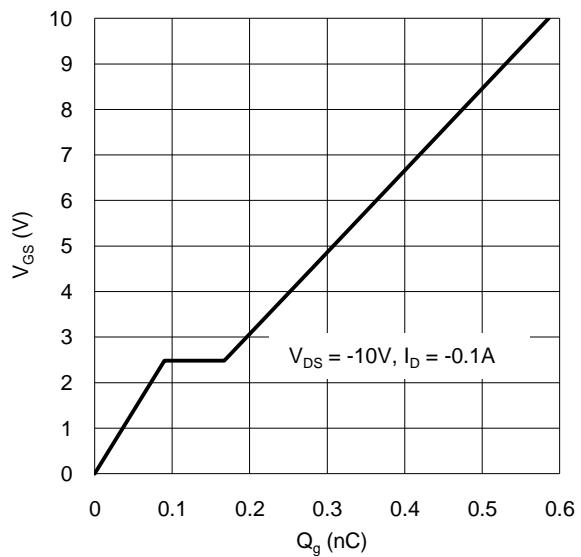
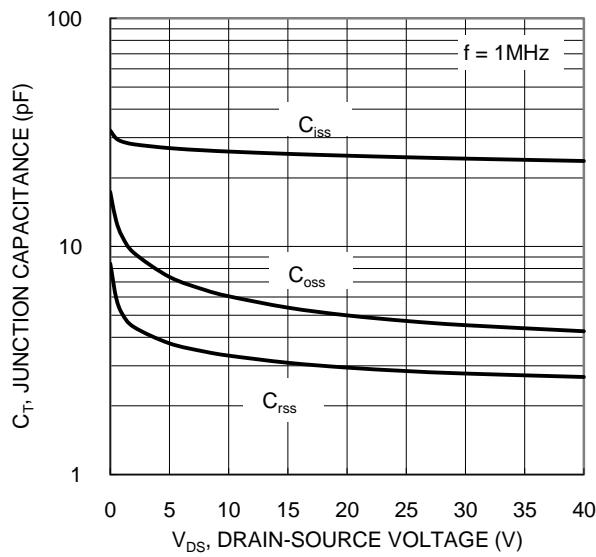


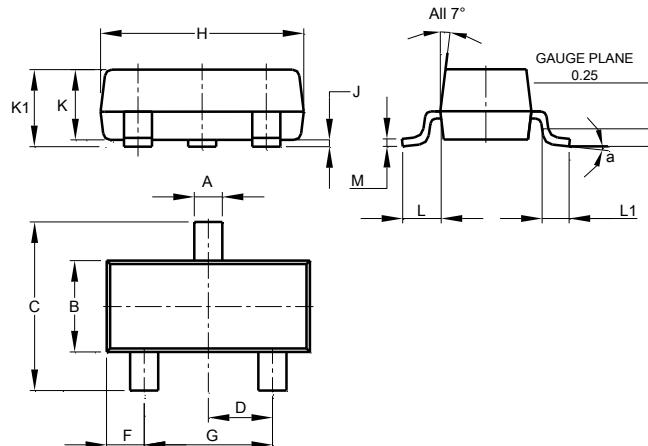
Fig. 6 On-Resistance vs. Drain-Current



## Package Outline Dimensions

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

**SOT23**



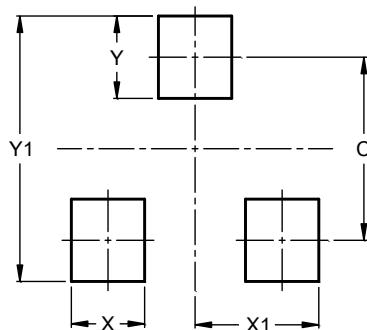
<b>SOT23</b>			
<b>Dim</b>	<b>Min</b>	<b>Max</b>	<b>Typ</b>
<b>A</b>	0.37	0.51	0.40
<b>B</b>	1.20	1.40	1.30
<b>C</b>	2.30	2.50	2.40
<b>D</b>	0.89	1.03	0.915
<b>F</b>	0.45	0.60	0.535
<b>G</b>	1.78	2.05	1.83
<b>H</b>	2.80	3.00	2.90
<b>J</b>	0.013	0.10	0.05
<b>K</b>	0.890	1.00	0.975
<b>K1</b>	0.903	1.10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

All Dimensions in mm

## Suggested Pad Layout

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

**SOT23**



<b>Dimensions</b>	<b>Value (in mm)</b>
<b>C</b>	2.0
<b>X</b>	0.8
<b>X1</b>	1.35
<b>Y</b>	0.9
<b>Y1</b>	2.9

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