Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max
60V	5Ω @ V_{GS} = 10V	250mA

Description and Applications

This MOSFET is 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.

- Motor Control
- Power Management Functions
- Backlighting
- Logic Level Gate Drive Switching

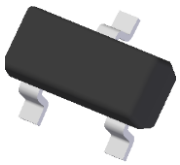
Features and Benefits

- 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 (Notes 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-Complaint Part is Available Under Separate Datasheet (BS870Q)**

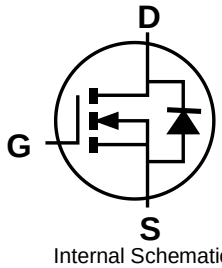
Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Matte Tin Finish Annealed over Alloy 42 Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.008 grams (Approximate)

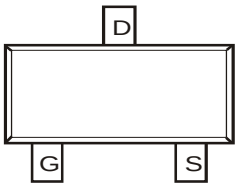
SOT23



Top View



Internal Schematic



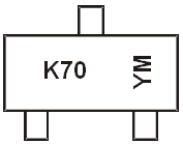
Top View

Ordering Information (Note 4)

Part Number	Case	Packaging
BS870-7-F	SOT23	3000/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



K70 = Product Type Marking Code
YM = Date Code Marking
Y or $\overline{Y}$ = Year (ex: G = 2019)
M = Month (ex: 9 = September)

Date Code Key

Year	1998	…	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Code	J	…	G	H	I	J	K	L	M	N	O	P

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

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Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	60	V
Drain-Gate Voltage $R_{GS} \leq 1.0M\Omega$		V_{DGR}	60	V
Gate-Source Voltage	Continuous	V_{GSS}	±20	V
Drain Current (Note 5)	Continuous	I_D	250	mA

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	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°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	80	—	V	V_{GS} = 0V, I_D = 100μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	0.5	μA	V_{DS} = 25V, V_{GS} = 0V
Gate-Body Leakage	I_{GSS}	—	—	±10	nA	V_{GS} = ±15V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.0	2.0	3.0	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	3.5	5.0	Ω	V_{GS} = 10V, I_D = 0.2A
On-State Drain Current	$I_{D(ON)}$	0.5	1.0	—	A	V_{GS} = 10V, V_{DS} = 7.5V
Forward Transconductance	g_{FS}	80	—	—	ms	V_{DS} =10V, I_D = 0.2A
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	—	22	50	pF	V_{DS} = 10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	11	25	pF	
Reverse Transfer Capacitance	C_{rss}	—	2.0	5.0	pF	
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{D(ON)}$	—	2.0	20	ns	V_{ES} = 10V, R_L = 150Ω,
Turn-Off Delay Time	$t_{D(OFF)}$	—	5.0	20	ns	V_{DS} = 10V, R_D = 100Ω

Notes: 5. Device mounted on FR-4 PCB 1.0 x 0.75 x 0.062 inch pad layout as shown on Diodes Incorporated's suggested pad layout, which can be found on our website at http://www.diodes.com/package-outlines.html.
6. Short duration pulse test used to minimize self-heating effect.

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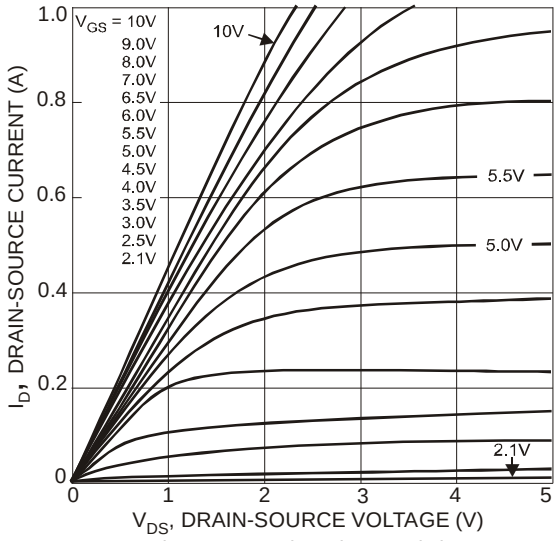


Fig. 1 On-Region Characteristics

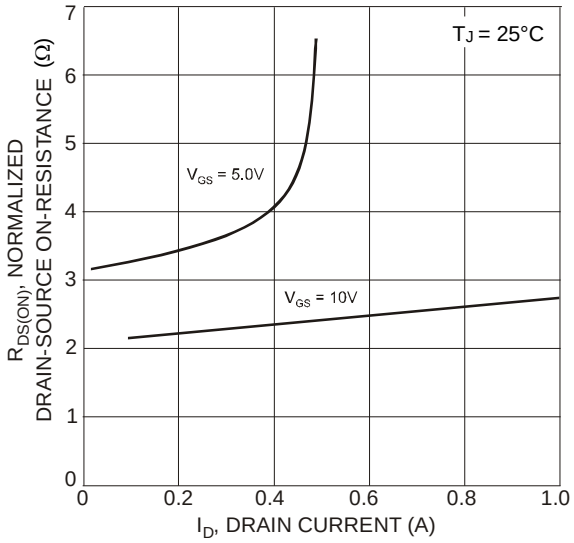


Fig. 2 On-Resistance vs. Drain Current

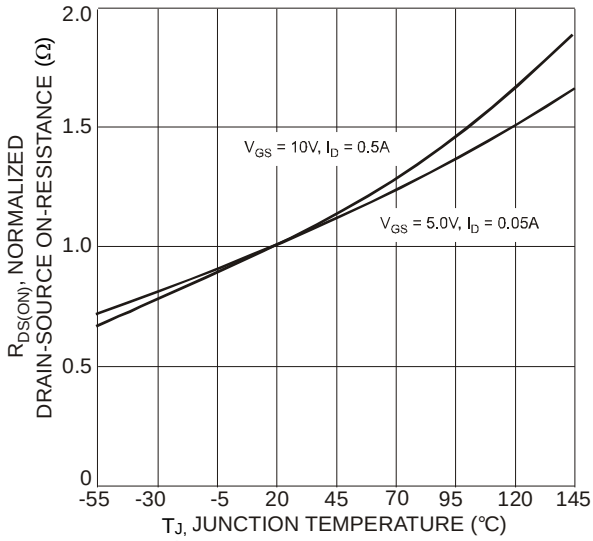


Fig. 3 On-Resistance vs. Junction Temperature

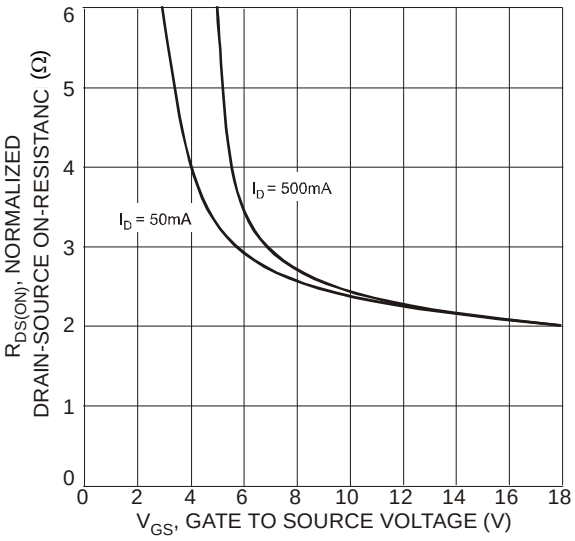


Fig. 4 On-Resistance vs. Gate-Source Voltage

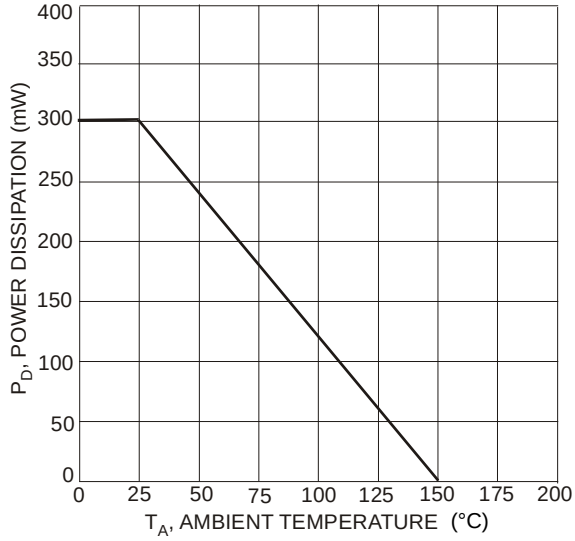


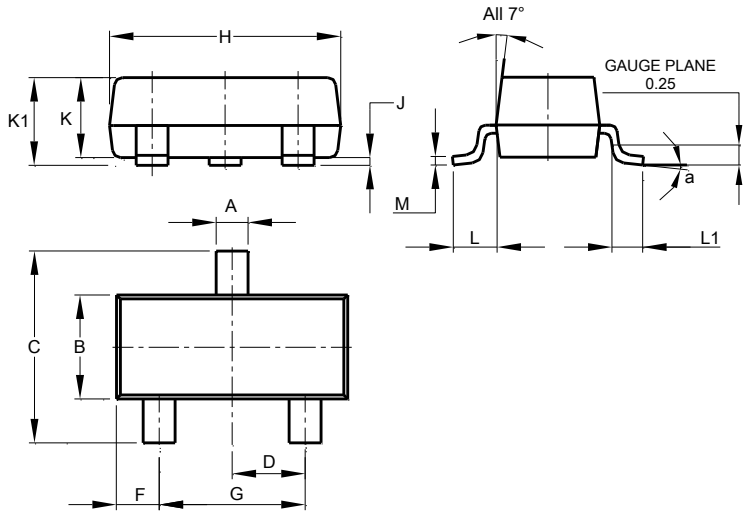
Fig. 5 Max Power Dissipation vs. Ambient Temperature

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Package Outline Dimensions

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

SOT23

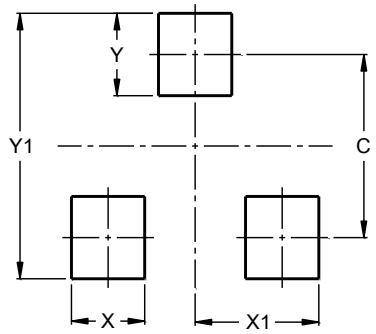


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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