



BSS123Q

N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(ON)}	I _D T _A = +25°C
100\/	6Ω @ V _{GS} = 10V	0.17A
100V	10Ω @ V _{GS} = 4.5V	0.14A

Features and Benefits

- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- High Drain-Source Voltage Rating
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- The BSS123Q is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.

https://www.diodes.com/quality/product-definitions/

Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Small Servo Motor Control
- Power MOSFET Gate Drivers
- Switching Applications

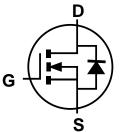
Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Alloy 42 Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208³
- Terminal Connections: See Diagram
- Weight: 0.008 grams (Approximate)

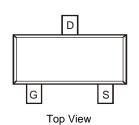




Top View



Equivalent Circuit



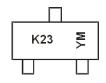
Ordering Information (Note 4)

Part Number	Case	Packaging
BSS123Q-7	SOT23	3,000 / Tape & Reel
BSS123Q-13	SOT23	10,000 / 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



K23 = Product Type Marking Code YM = Date Code Marking Y = Year (ex: I = 2021) M = Month (ex: 9 = September)

Date Code Key

•												
Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code		J	K	L	М	N	0	Р	R	S	Т	U
		1	I	I	I	I	I	I	I	I		I
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec



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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		VDSS	100	V
Gate-Source Voltage	Continuous	V _{GSS}	±20	V
Continuous Dunin Courset (Note 5) // 40//	Continuous	ΙD	0.17	^
Continuous Drain Current (Note 5) V _{GS} = 10V	Pulsed	I _{DM}	0.68	A

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

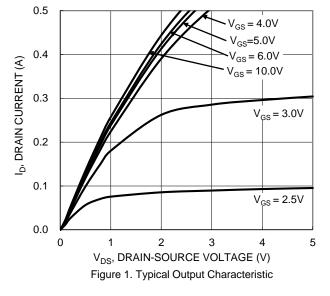
Characteristic	Symbol	Max	Unit
Power Dissipation (Note 5)	PD	300	mW
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 5)	$R_{\theta JA}$	417	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@TA = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 6)							
Drain-Source Breakdown Voltage	BVDSS	100	_		V	$V_{GS} = 0V$, $I_{D} = 250 \mu A$	
		_	_	0.1	μΑ	V _{DS} = 100V, V _{GS} = 0V	
Zero Gate Voltage Drain Current	IDSS	_	_	30	μА	V _{DS} = 100V, V _{GS} = 0V	
				10	nA	@ T _A = +150°C (Note 7) V _{DS} = 20V, V _{GS} = 0V	
Gate-Source Leakage , Forward	Igssf		_	50	nA	V _{GS} = 20V, V _{GS} = 0V	
ON CHARACTERISTICS (Note 6)	1000.		ı	ı		1.00 =0.1, 1.50 =1.	
Gate Threshold Voltage	Vgs(TH)	0.8	1.4	2.0	V	V _{DS} = V _{GS} , I _D = 1mA	
Static Drain-Source On-Resistance		_	4.0	6	Ω	V _G S = 10V, I _D = 0.17A	
Static Diain-Source On-Resistance	RDS(ON)	_	3.6	10	22	$V_{GS} = 4.5V, I_D = 0.17A$	
Forward Transfer Admittance	g FS	80	370	_	ms	$V_{DS} = 10V$, $I_{D} = 0.17A$, $f = 1.0kHz$	
Diode Forward Voltage	VsD	_	0.84	1.3	V	VGS = 0V, IS = 0.34A	
DYNAMIC CHARACTERISTICS (Note 7)							
Input Capacitance	Ciss		22	60			
Output Capacitance	Coss	-	_	15	pF	$V_{DS} = 25V$, $V_{GS} = 0V$, $f = 1.0MHz$	
Reverse Transfer Capacitance	Crss	_	2.0	6			
SWITCHING CHARACTERISTICS (Note 7)							
Turn-On Delay Time	tD(ON)		_	8	ns		
Turn-On Rise Time	t _R	_	_	8	ns	$V_{GS} = 10V, V_{DD} = 30V,$	
Turn-Off Delay Time	t _{D(OFF)}	_	_	13	ns	$I_D = 0.28A, R_{GEN} = 50\Omega$	
Turn-Off Fall Time	tF	_	_	16	ns		

- 5. Part mounted on FR-4 board with recommended 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.
- 7. Guaranteed by design. Not subject to production testing.





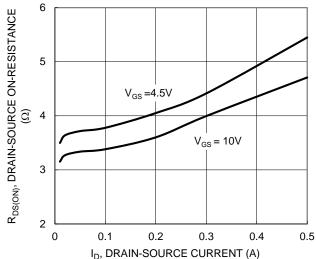


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

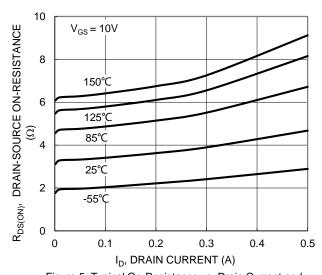
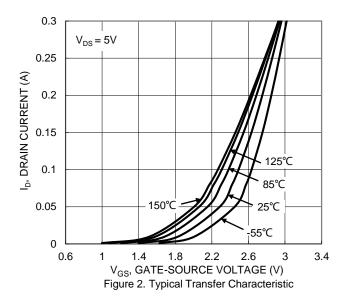
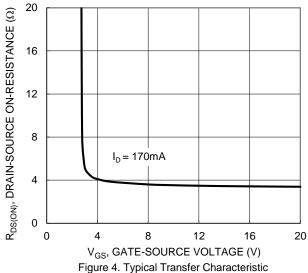


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature





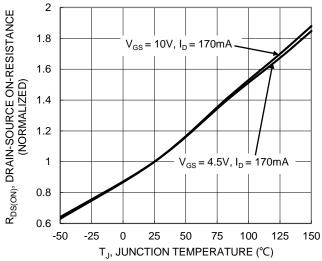


Figure 6. On-Resistance Variation with Junction Temperature



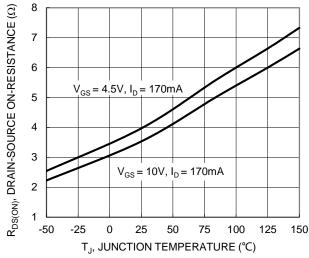


Figure 7. On-Resistance Variation with Junction Temperature

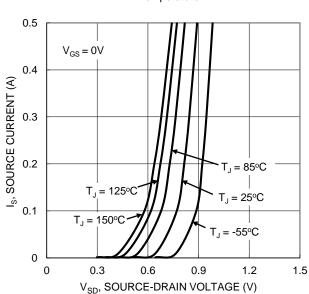
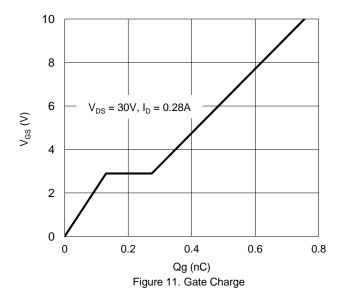


Figure 9. Diode Forward Voltage vs. Current



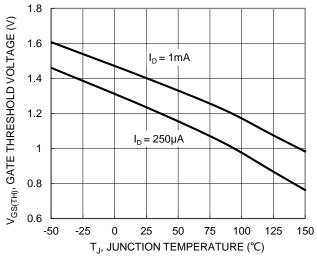
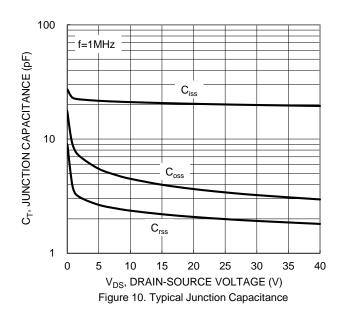


Figure 8. Gate Threshold Variation vs. Junction Temperature



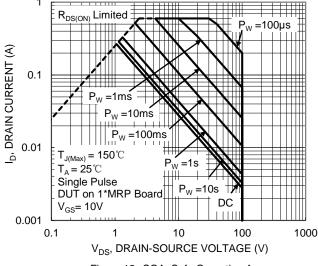


Figure 12. SOA, Safe Operation Area



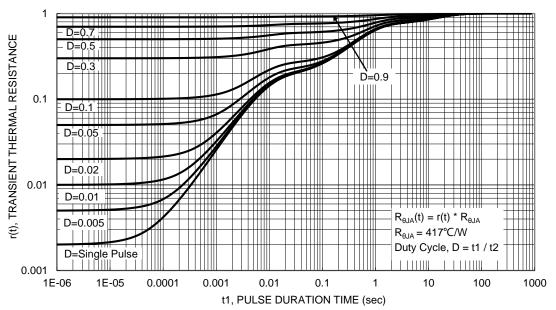


Figure 13. Transient Thermal Resistance

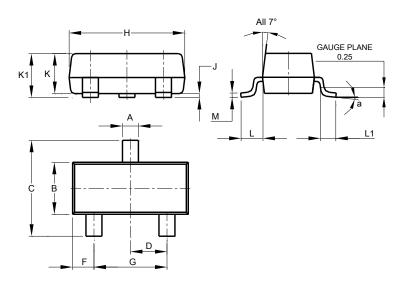
5 of 7



Package Outline Dimensions

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

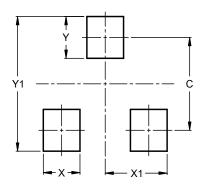
SOT23



SOT23						
Dim	Min	Max	Тур			
Α	0.37	0.51	0.40			
В	1.20	1.40	1.30			
С	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			
Н	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			
М	0.085	0.150	0.110			
а	0°	8°				
All	Dimens	ions in	mm			

Suggested Pad Layout

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



SOT23

Dimensions	Value (in mm)
С	2.0
Х	0.8
X1	1.35
Υ	0.9
Y1	2.9



IMPORTANT NOTICE

- 1. DIODES INCORPORATED AND ITS SUBSIDIARIES ("DIODES") MAKE NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO ANY INFORMATION CONTAINED IN THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).
- The Information contained herein is for informational purpose only and is provided only to illustrate the operation of Diodes products described herein and application examples. Diodes does not assume any liability arising out of the application or use of this document or any product described herein. This document is intended for skilled and technically trained engineering customers and users who design with Diodes products. Diodes products may be used to facilitate safety-related applications; however, in all instances customers and users are responsible for (a) selecting the appropriate Diodes products for their applications, (b) evaluating the suitability of the Diodes products for their intended applications, (c) ensuring their applications, which incorporate Diodes products, comply the applicable legal and regulatory requirements as well as safety and functional-safety related standards, and (d) ensuring they design with appropriate safeguards (including testing, validation, quality control techniques, redundancy, malfunction prevention, and appropriate treatment for aging degradation) to minimize the risks associated with their applications.
- Diodes assumes no liability for any application-related information, support, assistance or feedback that may be provided by Diodes from time to time. Any customer or user of this document or products described herein will assume all risks and liabilities associated with such use, and will hold Diodes and all companies whose products are represented herein or on Diodes' websites, harmless against all damages and
- Products described herein may be covered by one or more United States, international or foreign patents and pending patent applications. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks and trademark applications. Diodes does not convey any license under any of its intellectual property rights or the rights of any third parties (including third parties whose products and services may be described in this document or on Diodes' website) under this document.
- products provided subject to Diodes' Standard Terms and Conditions of Sale Diodes are (https://www.diodes.com/about/company/terms-and-conditions/terms-and-conditions-of-sales/) or other applicable terms. This document does not alter or expand the applicable warranties provided by Diodes. Diodes does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.
- Diodes products and technology may not be used for or incorporated into any products or systems whose manufacture, use or sale is prohibited under any applicable laws and regulations. Should customers or users use Diodes products in contravention of any applicable laws or regulations, or for any unintended or unauthorized application, customers and users will (a) be solely responsible for any damages, losses or penalties arising in connection therewith or as a result thereof, and (b) indemnify and hold Diodes and its representatives and agents harmless against any and all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim relating to any noncompliance with the applicable laws and regulations, as well as any unintended or unauthorized application.
- While efforts have been made to ensure the information contained in this document is accurate, complete and current, it may contain technical inaccuracies, omissions and typographical errors. Diodes does not warrant that information contained in this document is error-free and Diodes is under no obligation to update or otherwise correct this information. Notwithstanding the foregoing, Diodes reserves the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes.
- Any unauthorized copying, modification, distribution, transmission, display or other use of this document (or any portion hereof) is prohibited. Diodes assumes no responsibility for any losses incurred by the customers or users or any third parties arising from any such unauthorized use.

Copyright © 2021 Diodes Incorporated

www.diodes.com

BSS123Q February 2021 www.diodes.com © Diodes Incorporated Document number: DS43455 Rev. 1 - 2