



### **Product Summary**

Device	BV <sub>DSS</sub>	RDS(ON) Max	I <sub>D</sub> T <sub>A</sub> = +25°C
Q1	60V	13.5Ω @ V <sub>GS</sub> = 10V	115mA
Q2	-50V	10Ω @ V <sub>GS</sub> = -5V	-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

### COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET

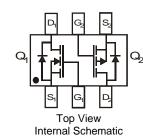
### **Features and Benefits**

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Complementary Pair
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- The BSS8402DWQ 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/

# Mechanical Data

- Case: SOT363
- Case Material: Molded Plastic. "Green" Molding Compound. 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 208 (3)
- Terminal Connections: See Diagram
- Weight: 0.006 grams (Approximate)



## Ordering Information (Note 4)

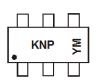
Part Number	Compliance	Case	Packaging			
BSS8402DW-7-F	Standard	SOT363	3,000/Tape & Reel			
BSS8402DW-13-F	Standard	SOT363	10,000/Tape & Reel			
BSS8402DWQ-7	Automotive	SOT363	3,000/Tape & Reel			
BSS8402DWQ-13	Automotive	SOT363	10,000/Tape & Reel			
BSS8402DVVQ-13       Automotive       SO1363       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.						

No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 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.</p>

4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/

## **Marking Information**



SOT363

Top View

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

#### Date Code Key

Year	2003	2004	2005	2006	~	2018	2019	2020	2021	2022	2023	2024	2025	2026
Code	Р	R	S	Т	2	F	G	Н	I	J	К	L	М	Ν
Month	Jan	Feb	M	ar	Apr	May	Jun	Jul	Aug	Se	р (	Oct	Nov	Dec
Code	1	2	3	3	4	5	6	7	8	9		0	Ν	D



### **Maximum Ratings – Total Device** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	PD	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

# Maximum Ratings N-CHANNEL – Q1, 2N7002 Section (@TA = +25°C, unless otherwise specified.)

Characteri	stic	Symbol	Value	Unit
Drain-Source Voltage		V <sub>DSS</sub>	60	V
Drain-Gate Voltage $R_{GS} \le 1.0M\Omega$		V <sub>DGR</sub>	60	V
Gate-Source Voltage	Continuous Pulsed	V <sub>GSS</sub>	±20 ±40	V
Drain Current (Note 5)	Continuous Continuous @ +100°C Pulsed	ID	115 73 800	mA

# Maximum Ratings P-CHANNEL – Q2, BSS84 Section (@TA = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage		V <sub>DSS</sub>	-50	V
Drain-Gate Voltage $R_{GS} \le 20 K\Omega$		V <sub>DGR</sub>	-50	V
Gate-Source Voltage	Continuous	V <sub>GSS</sub>	±20	V
Drain Current (Note 5)	Continuous	I <sub>D</sub>	-130	mA

Note: 5. 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.



# Electrical Characteristics N-CHANNEL – Q1, 2N7002 Section (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Min	Тур	Мах	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)		Symbol		тур	IVIAX	Unit	Test condition
Drain-Source Breakdown Voltage		BV <sub>DSS</sub>	60	70	_	V	$V_{GS} = 0V, I_{D} = 10\mu A$
Zero Gate Voltage Drain Current	@ T <sub>C</sub> = +25°C @ T <sub>C</sub> = +125°C	I <sub>DSS</sub>		_	1.0 500	μA	$V_{DS} = 60V, V_{GS} = 0V$
Gate-Body Leakage		I <sub>GSS</sub>	_	_	±10	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 6)					•		•
Gate Threshold Voltage		V <sub>GS(TH)</sub>	1.0	_	2.5	V	$V_{DS} = V_{GS}$ , $I_D = 250 \mu A$
Static Drain-Source On-Resistance	@ T <sub>J</sub> = +25°C	D		3.2	7.5	Ω	$V_{GS} = 5.0V, I_D = 0.05A$
	@ T <sub>J</sub> = +125°C	R <sub>DS(ON)</sub>	<sup>DN)</sup> 4.4	13.5	1	V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.5A	
On-State Drain Current		I <sub>D(ON)</sub>	0.5	1.0	_	А	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 7.5V
Forward Transconductance		<b>g</b> fs	80	_	_	mS	$V_{DS} = 10V, I_D = 0.2A$
DYNAMIC CHARACTERISTICS							·
Input Capacitance		Ciss		22	50	pF	
Output Capacitance		Coss	_	11	25	pF	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$
Reverse Transfer Capacitance		C <sub>rss</sub>	_	2.0	5.0	pF	]
SWITCHING CHARACTERISTICS				-	•	•	•
Turn-On Delay Time		t <sub>D(ON)</sub>		7.0	20	ns	$V_{DD} = 30V, I_D = 0.2A,$
Turn-Off Delay Time		t <sub>D(OFF)</sub>		11	20	ns	$R_L = 150\Omega$ , $V_{GEN} = 10V$ , $R_{GEN} = 25\Omega$

# Electrical Characteristics P-CHANNEL – Q<sub>2</sub>, BSS84 Section (@T<sub>A</sub> = +25°C, unless otherwise specified.)

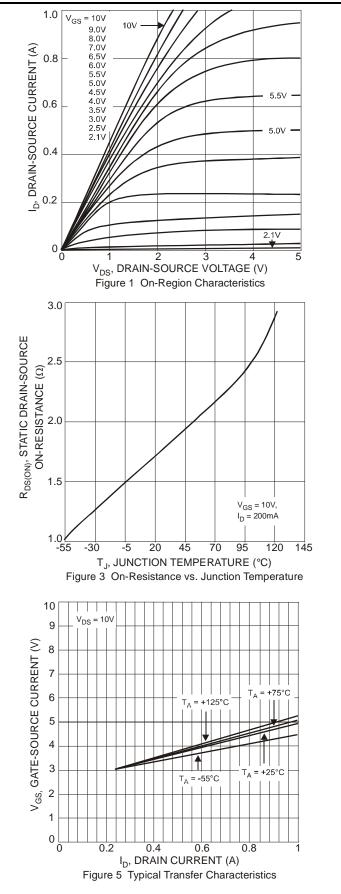
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 6)				•			
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-50			V	$V_{GS} = 0V, I_D = -250\mu A$	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>			-1 -2 -100	μA		
Gate-Body Leakage	I <sub>GSS</sub>	_	_	±10	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 6)							
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-0.8		-2.0	V	$V_{DS} = V_{GS}, I_D = -1mA$	
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	_	_	10	Ω	$V_{GS} = -5V, I_D = -0.100A$	
Forward Transconductance	<b>g</b> fs	0.05	_	_	S	$V_{DS} = -25V, I_D = -0.1A$	
DYNAMIC CHARACTERISTICS							
Input Capacitance	C <sub>iss</sub>			45	pF		
Output Capacitance	C <sub>oss</sub>	_	_	25	pF	$V_{DS} = -25V, V_{GS} = 0V, f = 1.0MHz$	
Reverse Transfer Capacitance	C <sub>rss</sub>			12	pF		
SWITCHING CHARACTERISTICS				·	·		
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			$R_{GEN} = 50\Omega$ , $V_{GS} = -10V$	

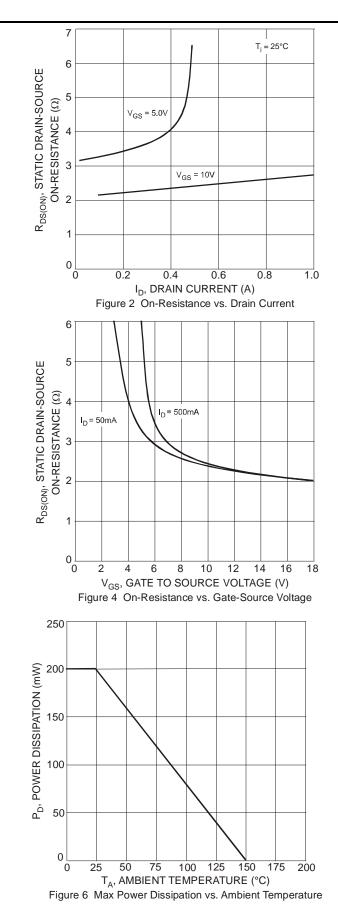
Note: 6. Short duration pulse test used to minimize self-heating effect.



BSS8402DW

### N-CHANNEL - 2N7002 Section



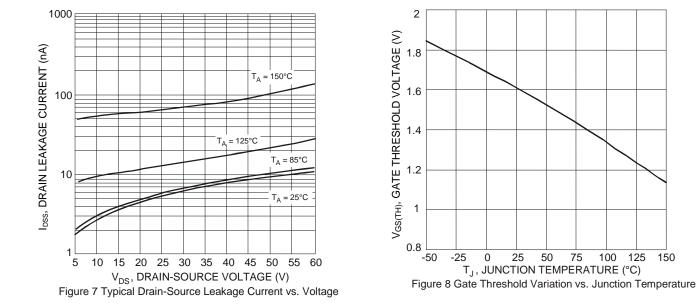




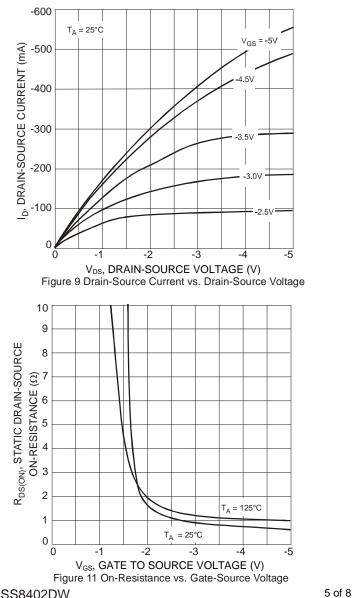
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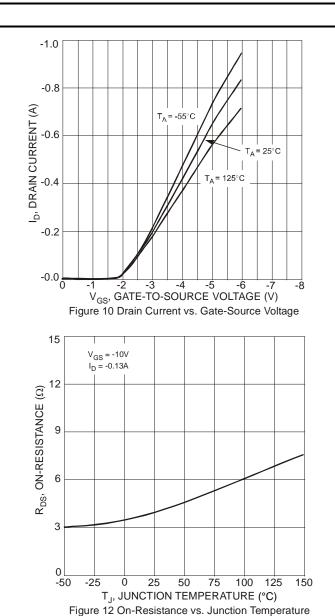
125

150



### P-CHANNEL – BSS84 Section

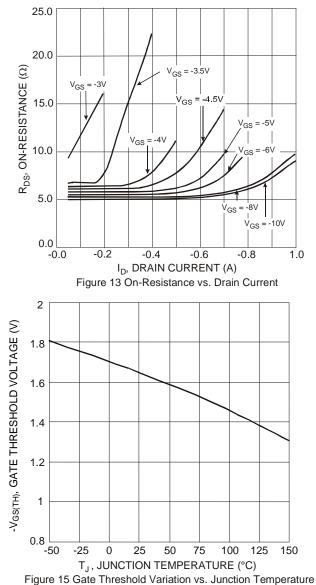


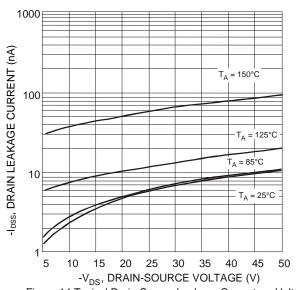


BSS8402DW Document number: DS30380 Rev. 23 - 2

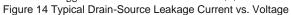
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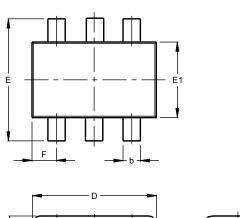
**BSS8402DW** 

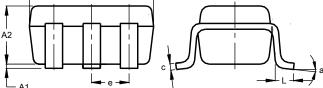




### **Package Outline Dimensions**

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





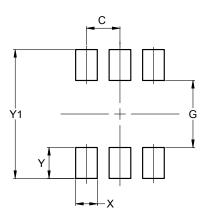
SOT363

SOT363

	SOT363						
Dim	Min	Max	Тур				
A1	0.00	0.10	0.05				
A2	0.90	1.00	0.95				
b	0.10	0.30	0.25				
С	0.10	0.22	0.11				
D	1.80	2.20	2.15				
E	2.00	2.20	2.10				
E1	1.15	1.35	1.30				
е	C	).650 E	SC				
F	0.40	0.45	0.425				
L	0.25	0.40	0.30				
а	0°	8°					
All I	Dimen	sions	in mm				

# **Suggested Pad Layout**

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



 
 Dimensions
 Value (in mm)

 C
 0.650

 G
 1.300

 X
 0.420

 Y
 0.600

 Y1
 2.500



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