BSS8402DW

COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET

Features

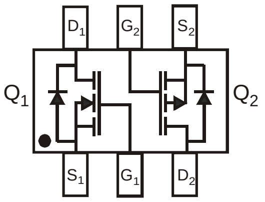
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Complementary Pair
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

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 e3
- Terminal Connections: See Diagram
- Weight: 0.006 grams (approximate)

SOT363

Top View



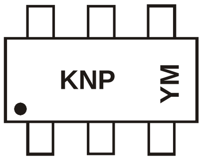
Top View
Internal Schematic

Ordering Information (Note 4)

Part Number	Qualification	Case	Packaging
BSS8402DW-7-F	Commercial	SOT363	3,000/Tape & Reel
BSS8402DW-13-F	Commercial	SOT363	10,000/Tape & Reel
BSS8402DWQ-7	Automotive	SOT363	3,000/Tape & Reel
BSS8402DWQ-13	Automotive	SOT363	10,000/Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com 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 http://www.diodes.com

Marking Information



KNP = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: R = 2004)
M = Month (ex: 9 = September)

Date Code Key

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Code	P	R	S	T	U	V	W	X	Y	Z	A	B	C	D

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 – Total Device (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Power Dissipation (Note 5)	P_D	200	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	625	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Maximum Ratings N-CHANNEL – Q_1, 2N7002 Section (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
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
	Pulsed		±40	
Drain Current (Note 5)	Continuous	I_D	115	mA
	Continuous @ 100°C		73	
	Pulsed		800	

Maximum Ratings P-CHANNEL – Q_2, BSS84 Section (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Drain-Source Voltage		V_{DSS}	-50	V
Drain-Gate Voltage $R_{GS} \leq 20K\Omega$		V_{DGR}	-50	V
Gate-Source Voltage	Continuous	V_{GSS}	±20	V
Drain Current (Note 5)	Continuous	I_D	-130	mA

Notes: 5. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com.

Electrical Characteristics N-CHANNEL – Q_1, 2N7002 Section (@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	70	—	V	V_{GS} = 0V, I_D = 10µA
Zero Gate Voltage Drain Current @ T_C = +25°C @ T_C = +125°C	I_{DSS}	—	—	1.0 500	µA	V_{DS} = 60V, V_{GS} = 0V
Gate-Body Leakage	I_{GSS}	—	—	±10	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	2.5	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance @ T_J = +25°C @ T_J = +125°C	$R_{DS(on)}$	—	3.2 4.4	7.5 13.5	Ω	V_{GS} = 5.0V, I_D = 0.05A V_{GS} = 10V, I_D = 0.5A
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} = 25V, 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	$t_{D(on)}$	—	7.0	20	ns	V_{DD} = 30V, I_D = 0.2A,
Turn-Off Delay Time	$t_{D(off)}$	—	11	20	ns	R_L = 150Ω, V_{GEN} = 10V, R_{GEN} = 25Ω

Electrical Characteristics P-CHANNEL – Q_2, BSS84 Section (@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}	-50	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current	I_{DSS}	— — —	— — —	-15 -60 -100	µA µA nA	V_{DS} = -50V, V_{GS} = 0V, T_J = 25°C V_{DS} = -50V, V_{GS} = 0V, T_J = 125°C V_{DS} = -25V, V_{GS} = 0V, T_J = 25°C
Gate-Body Leakage	I_{GSS}	—	—	±10	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.8	—	-2.0	V	V_{DS} = V_{GS}, I_D = -1mA
Static Drain-Source On-Resistance	$R_{DS\ (on)}$	—	—	10	Ω	V_{GS} = -5V, I_D = -0.100A
Forward Transconductance	g_{FS}	.05	—	—	S	V_{DS} = -25V, I_D = -0.1A
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	—	—	45	pF	V_{DS} = -25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	—	25	pF	
Reverse Transfer Capacitance	C_{rss}	—	—	12	pF	
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{D(on)}$	—	10	—	ns	V_{DD} = -30V, I_D = -0.27A,
Turn-Off Delay Time	$t_{D(off)}$	—	18	—	ns	R_{GEN} = 50Ω, V_{GS} = -10V

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

N-CHANNEL – 2N7002 Section

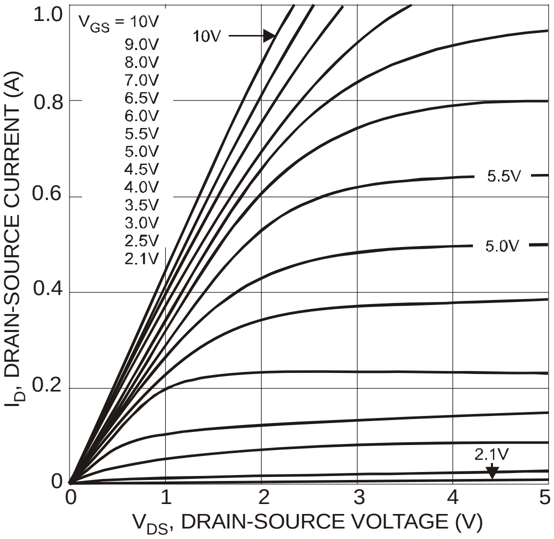


Figure 1 On-Region Characteristics

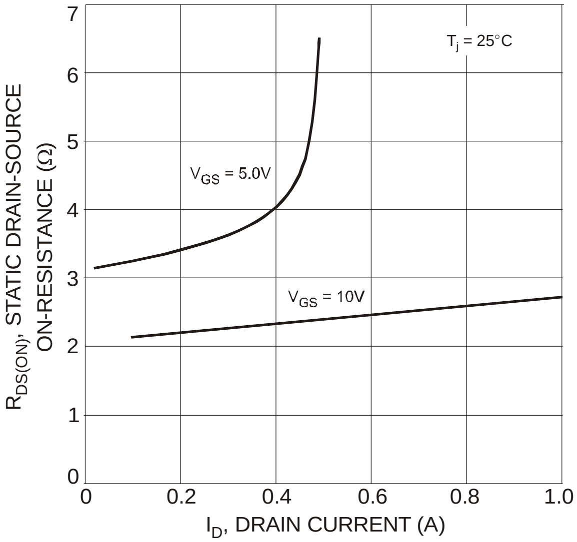


Figure 2 On-Resistance vs. Drain Current

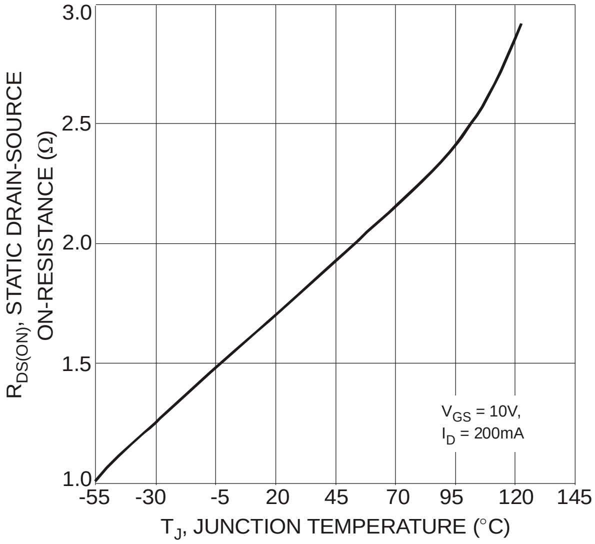


Figure 3 On-Resistance vs. Junction Temperature

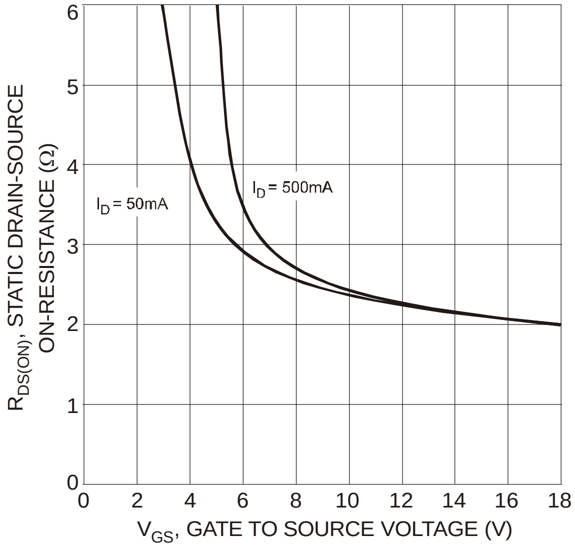


Figure 4 On-Resistance vs. Gate-Source Voltage

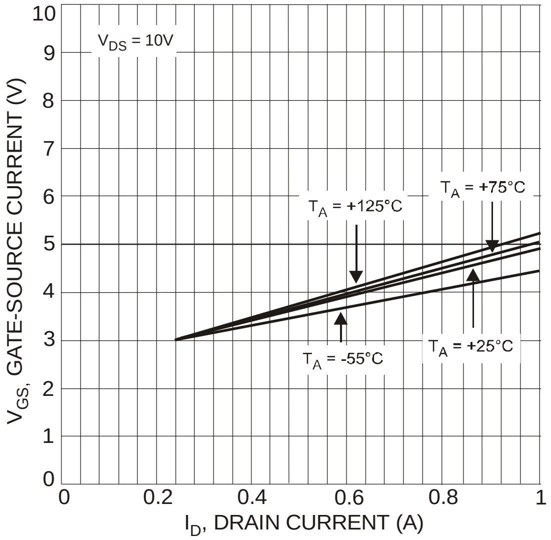


Figure 5 Typical Transfer Characteristics

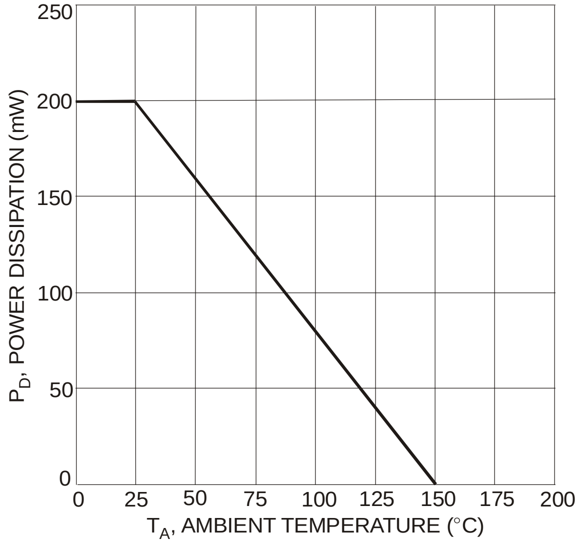


Figure 6 Max Power Dissipation vs. Ambient Temperature

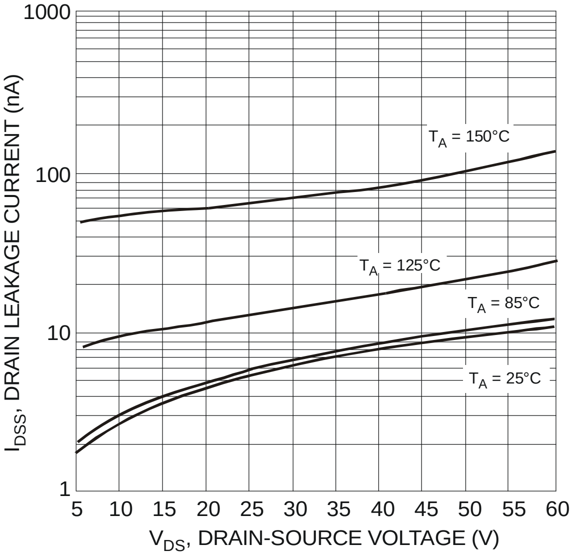


Figure 7 Typical Drain-Source Leakage Current vs. Voltage

P-CHANNEL – BSS84 Section

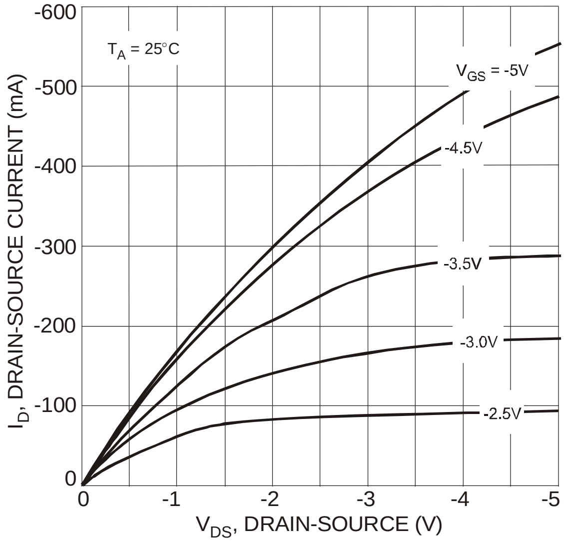


Figure 8 Drain-Source Current vs. Drain-Source Voltage

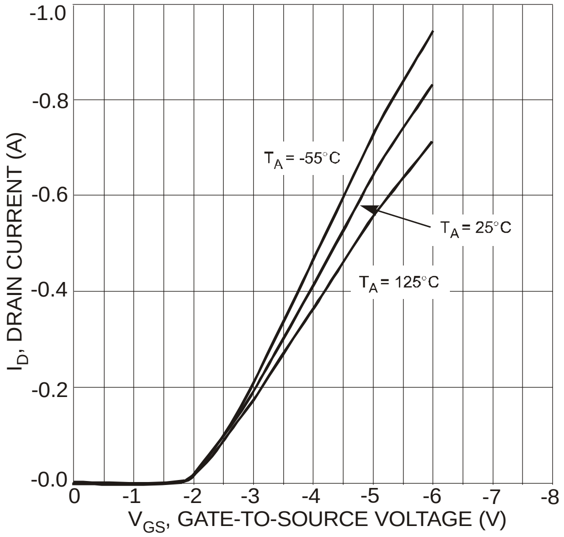


Figure 9 Drain Current vs. Gate-Source Voltage

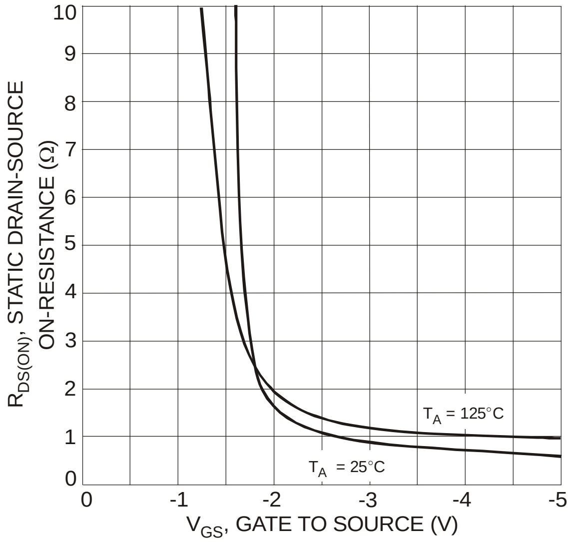


Figure 10 On-Resistance vs. Gate-Source Voltage

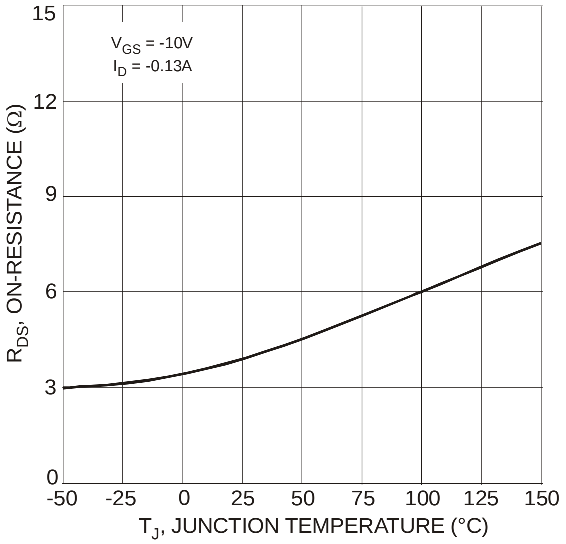


Figure 11 On-Resistance vs. Junction Temperature

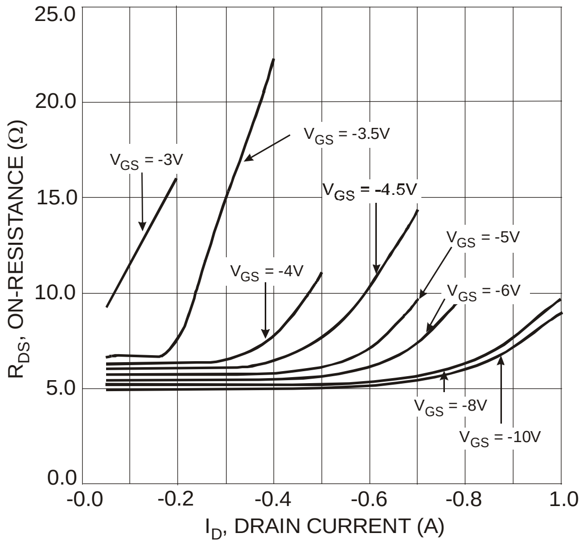


Figure 12 On-Resistance vs. Drain Current

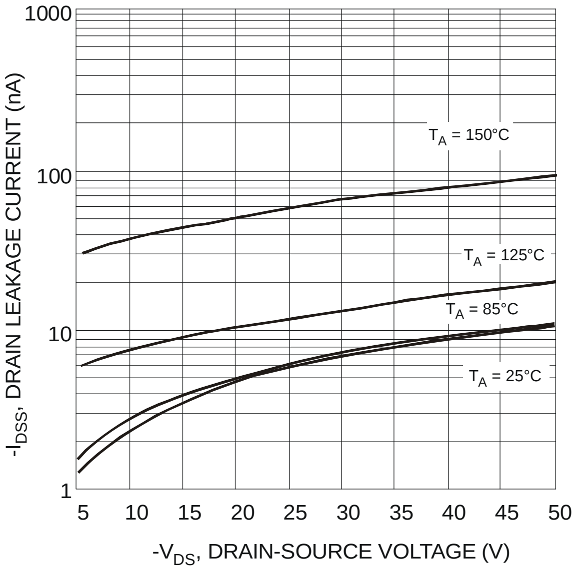
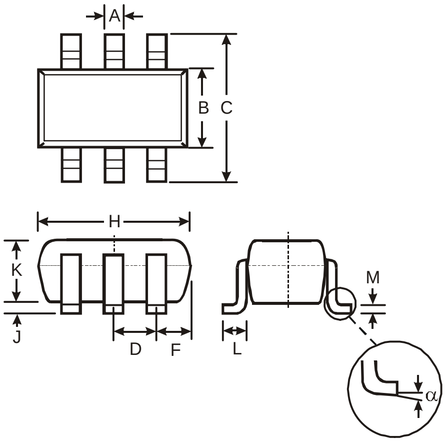


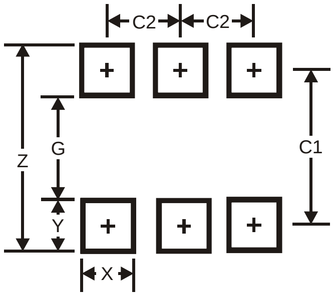
Figure 13 Typical Drain-Source Leakage Current vs. Voltage

Package Outline Dimensions



SOT363			
Dim	**Min**	**Max**	**Typ**
A	0.10	0.30	0.25
B	1.15	1.35	1.30
C	2.00	2.20	2.10
D	0.65 Typ		
F	0.40	0.45	0.425
H	1.80	2.20	2.15
J	0	0.10	0.05
K	0.90	1.00	1.00
L	0.25	0.40	0.30
M	0.10	0.22	0.11
α	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	2.5
G	1.3
X	0.42
Y	0.6
C1	1.9
C2	0.65

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