Product Summary

Device	BV_{DSS}	$R_{DS(ON)}$ Max	I_D T_A = +25°C
Q1	60V	13.5Ω @ V_{GS} = 10V	115mA
Q2	-50V	10Ω @ V_{GS} = -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

Features and Benefits

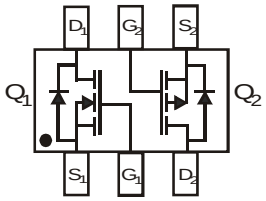
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Complementary Pair
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The BSS8402DWQ is suitable for automotive 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 e3
- Terminal Connections: See Diagram
- Weight: 0.006 grams (Approximate)

SOT363

Top View



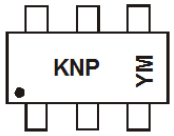
Top View
Internal Schematic

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

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



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	P	R	S	T	~	F	G	H	I	J	K	L	M	N

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	Unit
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	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 Pulsed	V_{GSS}	±20 ±40	V
Drain Current (Note 5)	Continuous Continuous @ +100°C Pulsed	I_D	115 73 800	mA

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

Characteristic		Symbol	Value	Unit
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

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 – 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	$R_{DS(ON)}$	—	3.2	7.5	Ω	V_{GS} = 5.0V, I_D = 0.05A
@ T_J = +125°C			4.4	13.5		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}	— — —	— — —	-1 -2 -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}	0.05	—	—	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

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

N-CHANNEL – 2N7002 Section

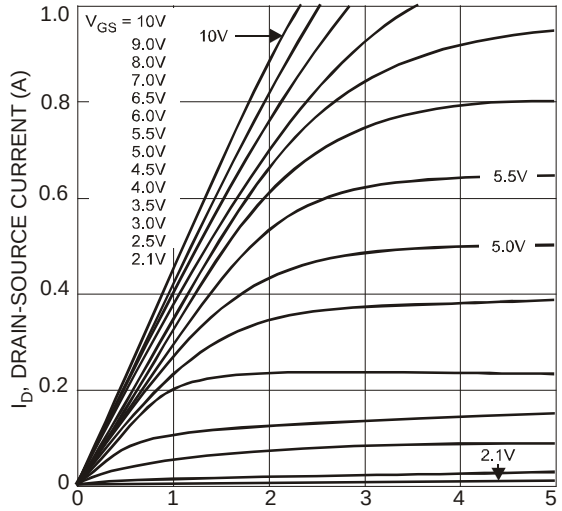


Figure 1 On-Region Characteristics

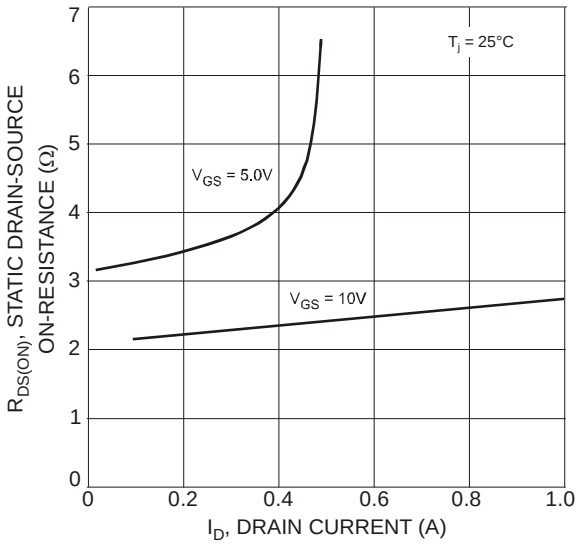


Figure 2 On-Resistance vs. Drain Current

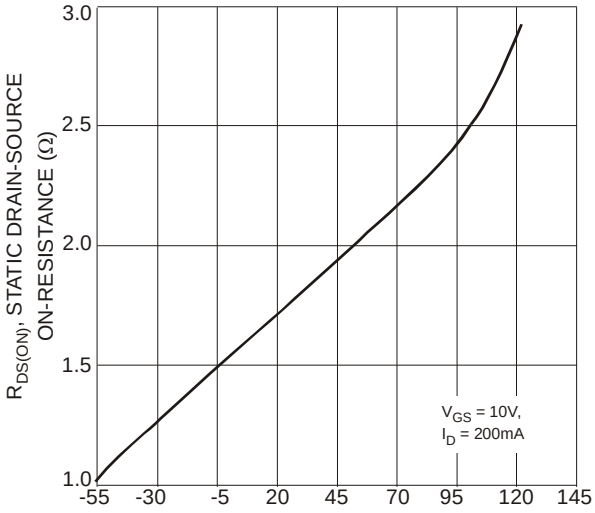


Figure 3 On-Resistance vs. Junction Temperature

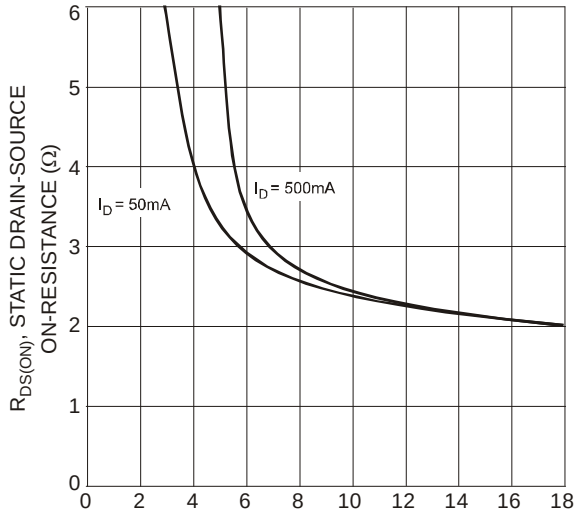


Figure 4 On-Resistance vs. Gate-Source Voltage

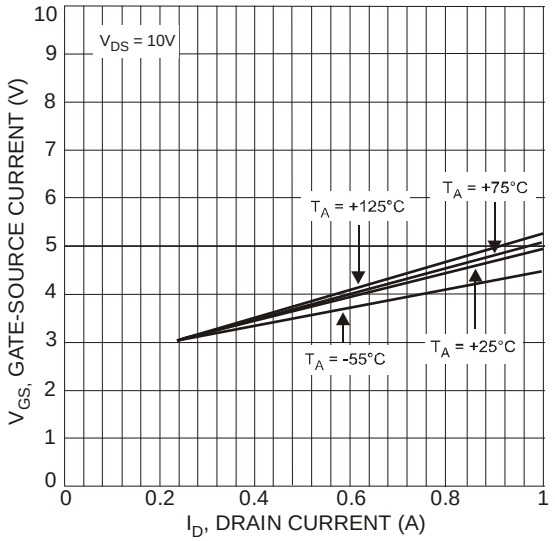


Figure 5 Typical Transfer Characteristics

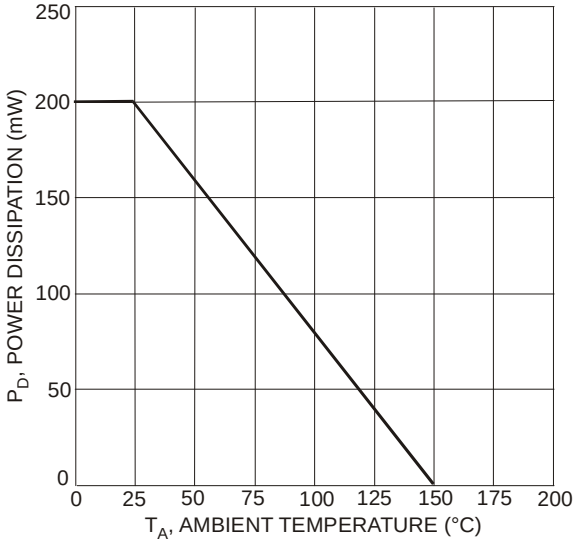


Figure 6 Max Power Dissipation vs. Ambient Temperature

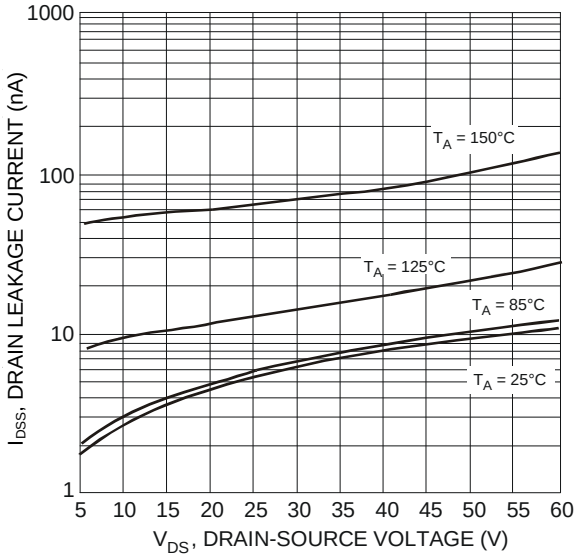


Figure 7 Typical Drain-Source Leakage Current vs. Voltage

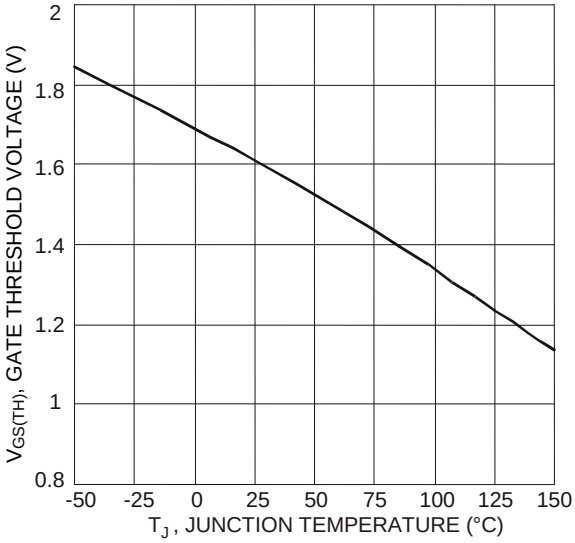


Figure 8 Gate Threshold Variation vs. Junction Temperature

P-CHANNEL – BSS84 Section

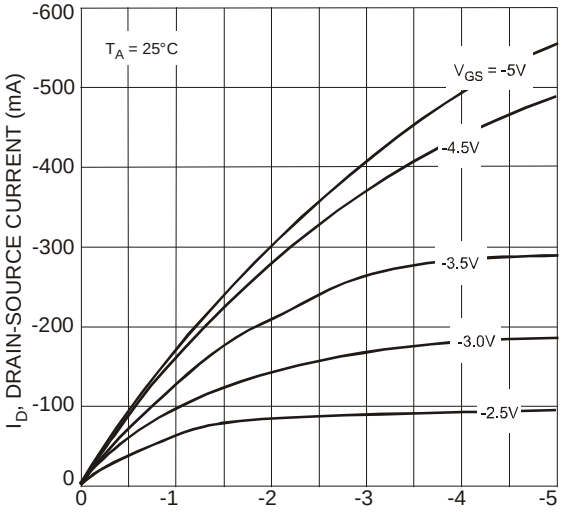


Figure 9 Drain-Source Current vs. Drain-Source Voltage

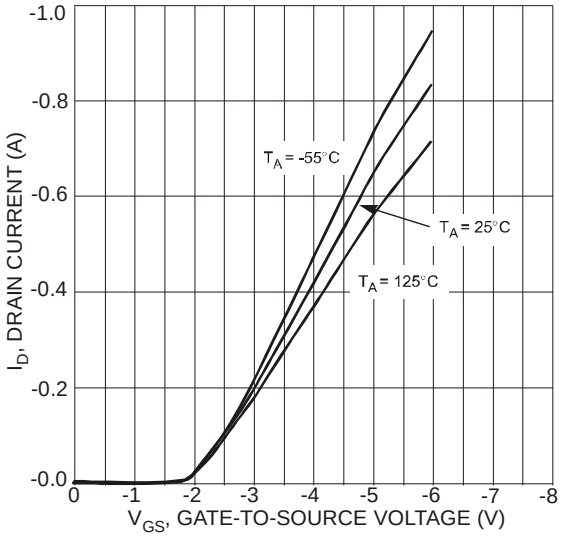


Figure 10 Drain Current vs. Gate-Source Voltage

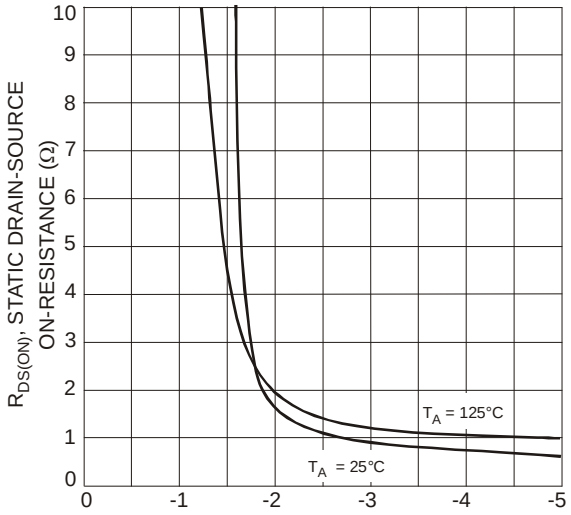


Figure 11 On-Resistance vs. Gate-Source Voltage

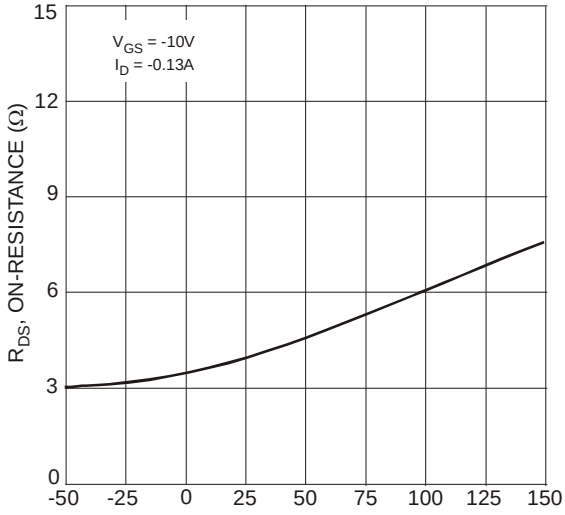


Figure 12 On-Resistance vs. Junction Temperature

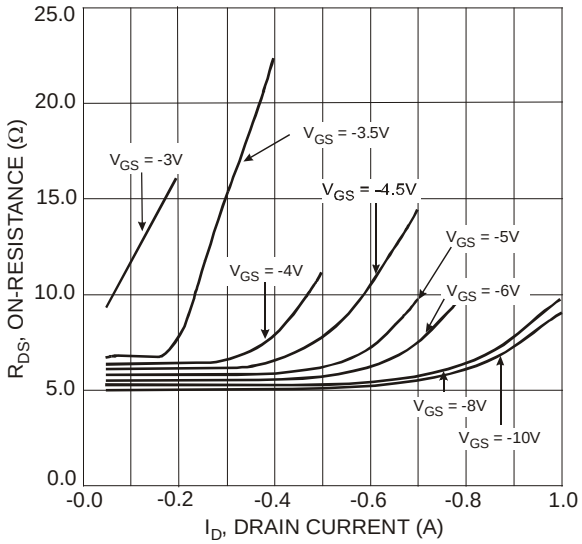


Figure 13 On-Resistance vs. Drain Current

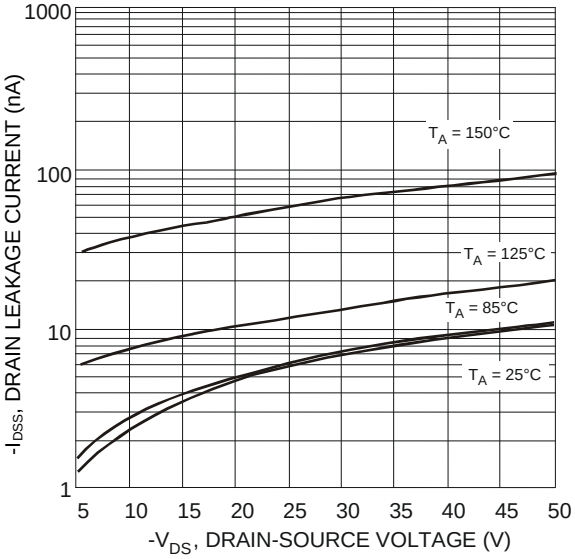


Figure 14 Typical Drain-Source Leakage Current vs. Voltage

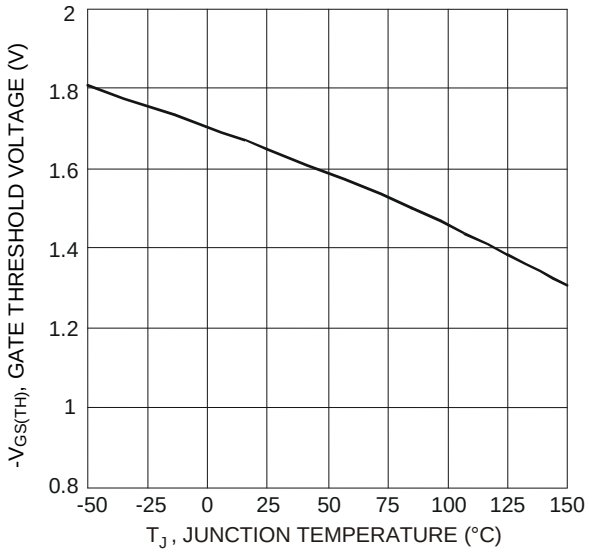
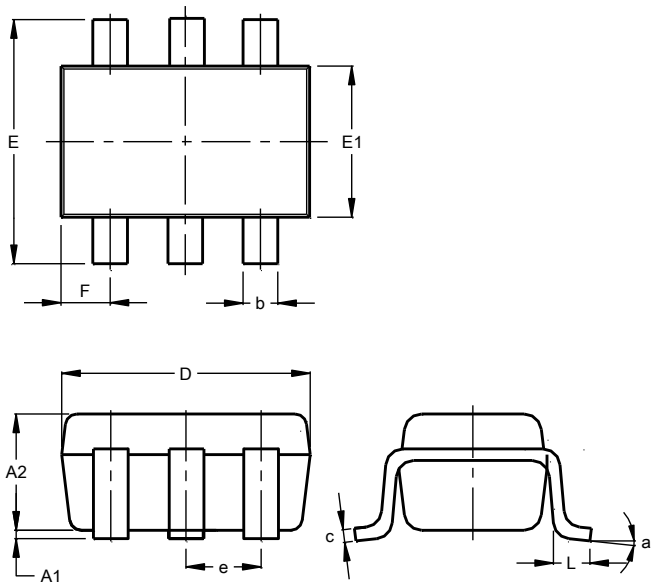


Figure 15 Gate Threshold Variation vs. Junction Temperature

Package Outline Dimensions

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

SOT363

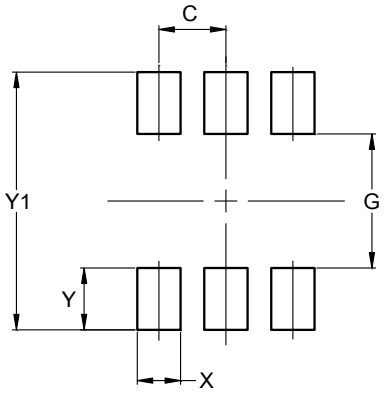


SOT363			
Dim	**Min**	**Max**	**Typ**
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT363



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

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2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

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