SOT23 N-CHANNEL ENHANCEMENT MODE VERTICAL MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max
200V	25Ω @ V_{GS} = 10V	60mA

Features and Benefits

- Low Input Capacitance
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Description and Applications

This MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

- DC-DC converters
- Power-management functions
- Battery-operated systems and solid-state relays
- Drivers: relays, solenoids, lamps, hammers, displays, memories, transistors, etc.

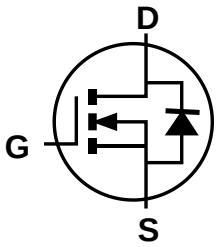
Mechanical Data

- Package: SOT23
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (Approximate)

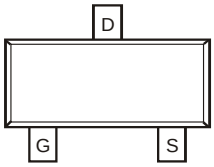
SOT23



Top View



Internal Schematic



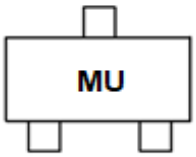
Top View
Pinout

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
ZVN3320FTA	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



MU = Product Type Marking Code

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	200	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current	I_D	60	mA
Maximum Body Diode Forward Current	I_S	60	mA
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I_{DM}	1	A
Pulsed Source Current (10µs Pulse, Duty Cycle = 1%)	I_{SM}	1	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	330	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	380	°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}	200	—	—	V	V_{GS} = 0V, I_D = 1mA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	10 50	µA	V_{DS} = 200V, V_{GS} = 0V V_{DS} = 160V, V_{GS} = 0V, T_A = +125°C
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
On-State Drain Current	$I_{D(on)}$	250	—	—	mA	V_{GS} = 10V, V_{DS} = 25V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	3.0	V	V_{DS} = V_{GS}, I_D = 1mA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	17	25	Ω	V_{GS} = 10V, I_D = 100mA
Forward Transconductance	g_{fs}	75	—	—	mS	V_{DS} = 25V, I_D = 100mA
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	—	45	pF	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	—	18		
Reverse Transfer Capacitance	C_{rss}	—	—	5		
Turn-On Delay Time (Note 8)	$t_{D(ON)}$	—	—	5	ns	V_{DS} = 25V, I_D = 100mA
Turn-On Rise Time (Note 8)	t_R	—	—	7		
Turn-Off Delay Time (Note 8)	$t_{D(OFF)}$	—	—	6		
Turn-Off Fall Time (Note 8)	t_F	—	—	6		

Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to product testing.
8. Switching times measured with 50Ω source impedance and <5ns rise time on a pulse generator.

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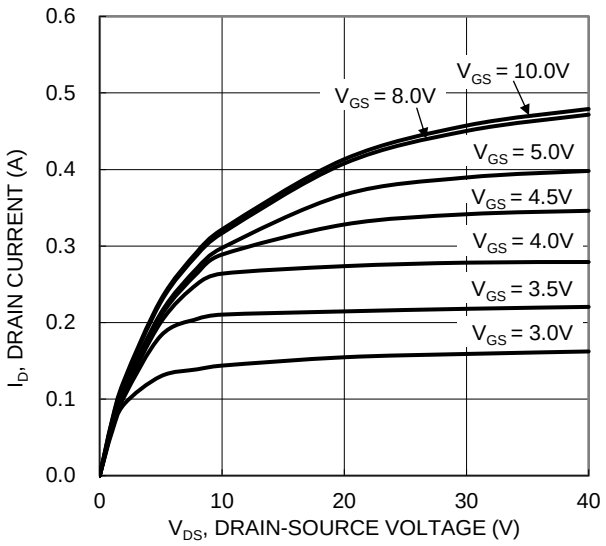


Figure 1. Typical Output Characteristic

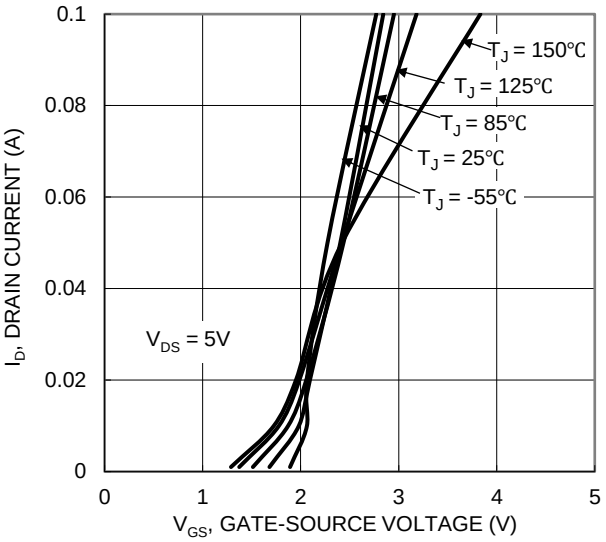


Figure 2. Typical Transfer Characteristic

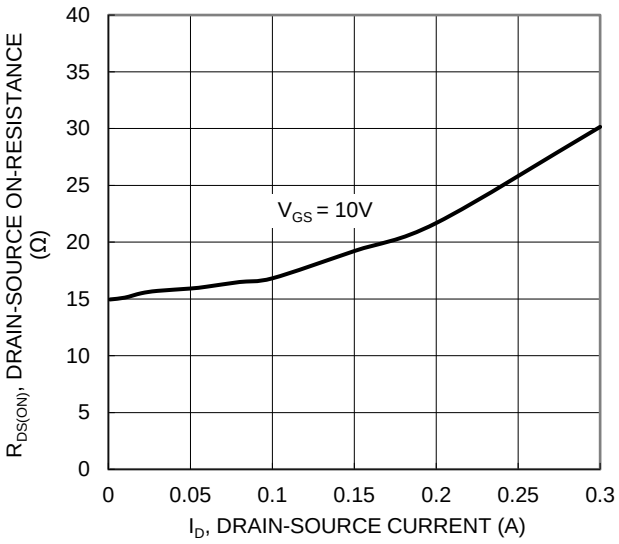


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

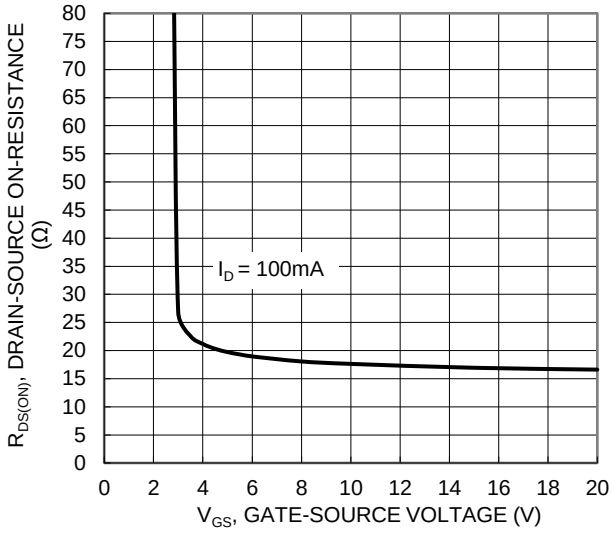


Figure 4. Typical Transfer Characteristic

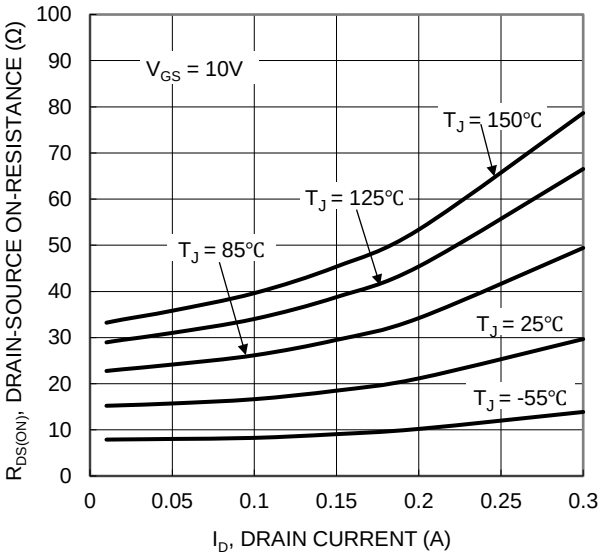


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

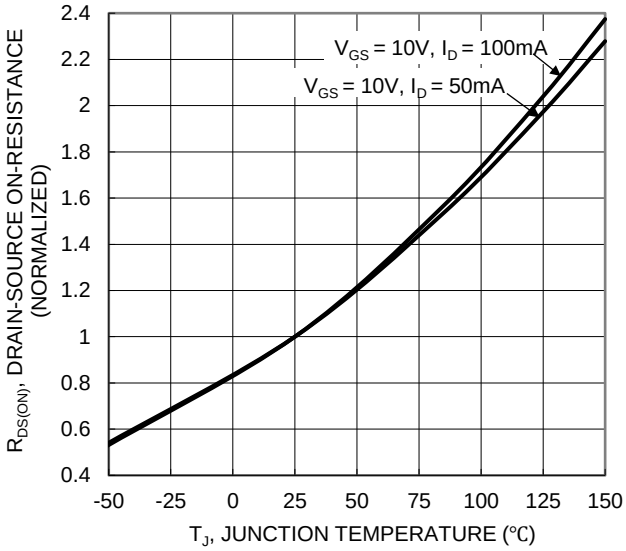


Figure 6. On-Resistance Variation with Temperature

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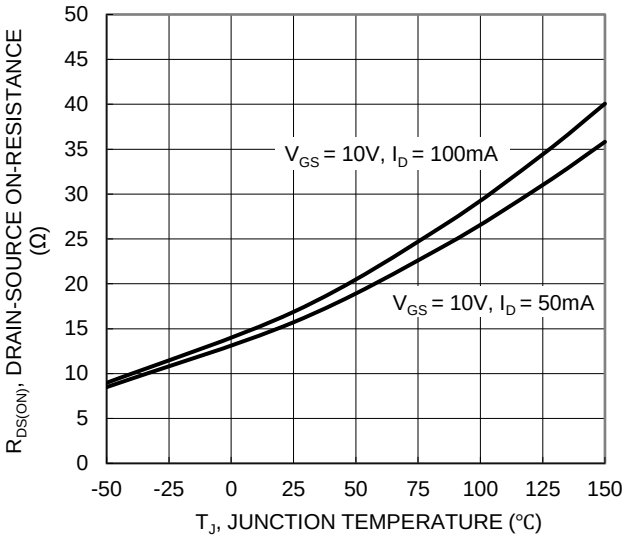


Figure 7. On-Resistance Variation with Temperature

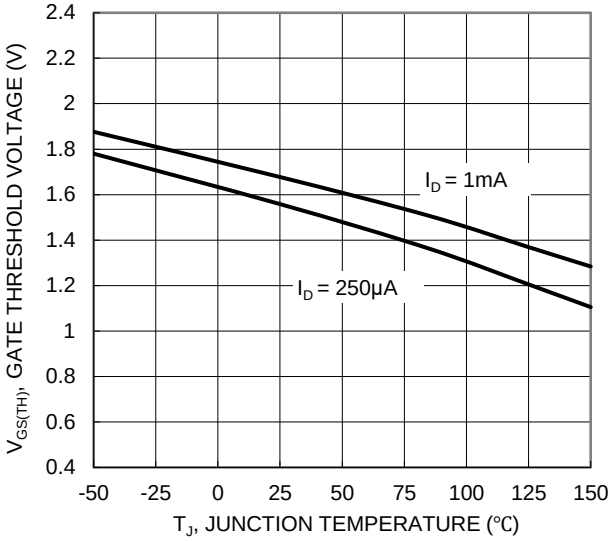


Figure 8. Gate Threshold Variation vs. Junction Temperature

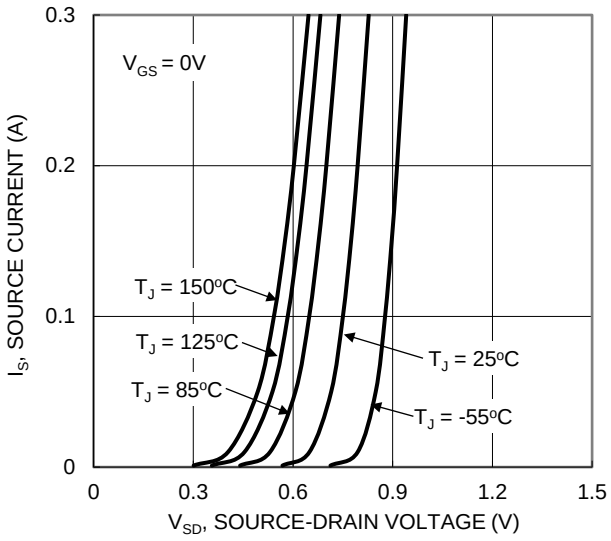


Figure 9. Diode Forward Voltage vs. Current

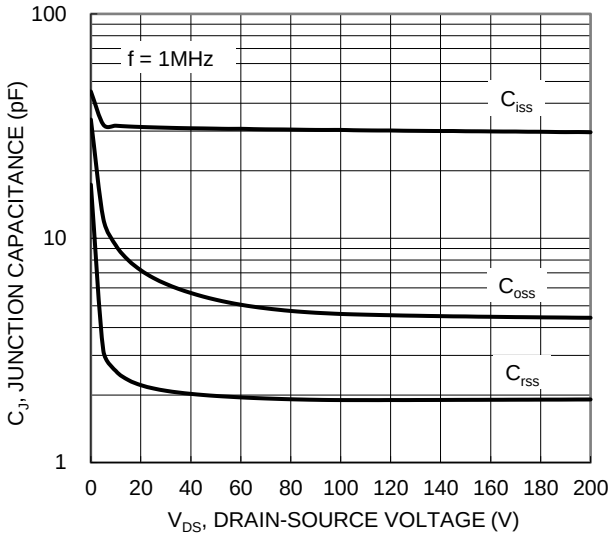


Figure 10. Typical Junction Capacitance

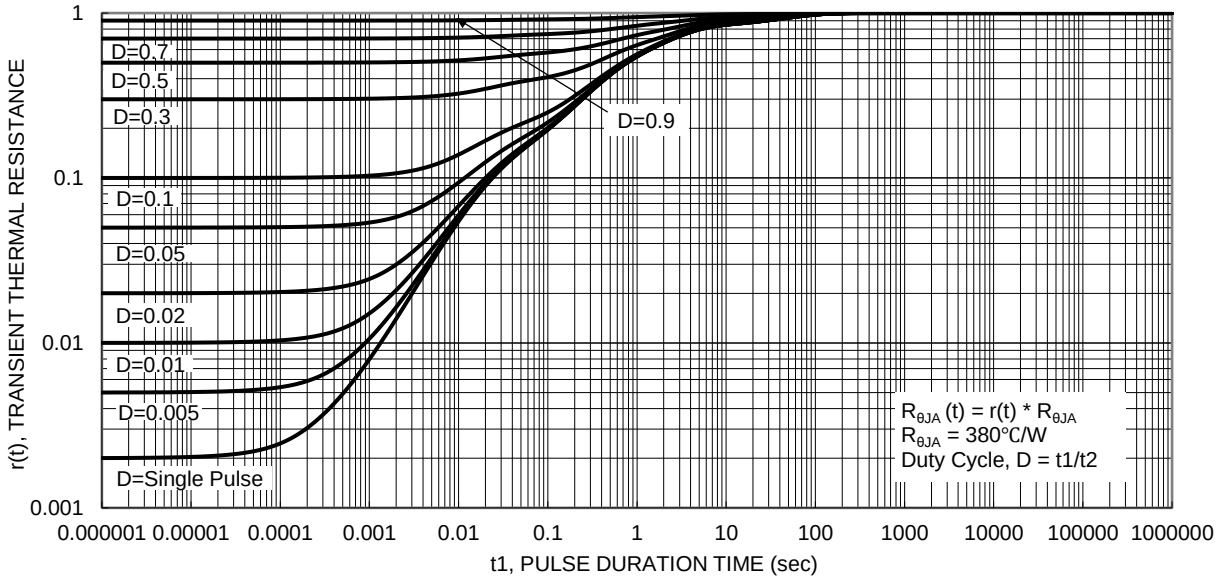


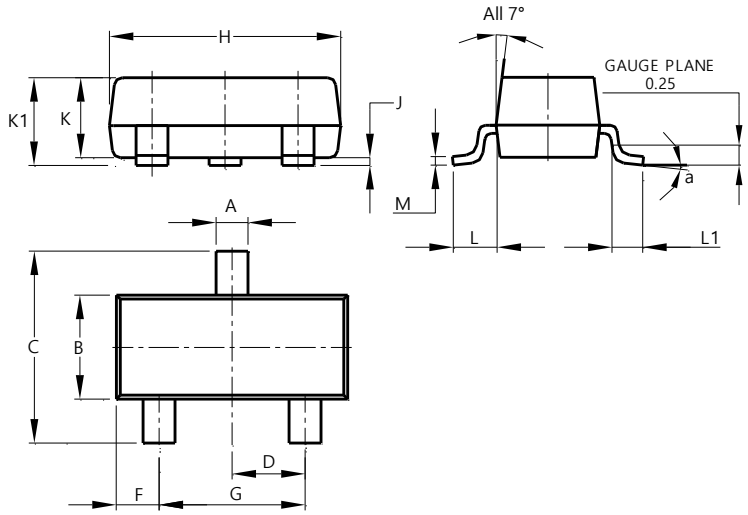
Figure 11. Transient Thermal Resistance

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Package Outline Dimensions

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

SOT23

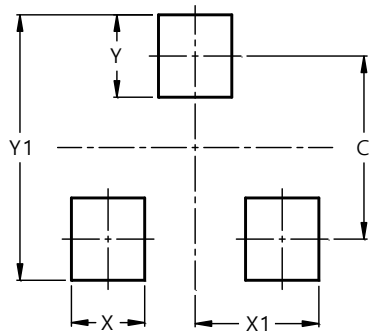


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

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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