150V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D T_A = +25°C
150V	310mΩ @ V_{GS} = 10V	2.0A
	330mΩ @ V_{GS} = 5.0V	1.9A

Description

This new generation MOSFET is 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

- Motor Control
- Transformer Driving Switch
- DC-DC Converters
- Power Management Functions
- Uninterrupted Power Supply

Features

- 100% Unclamped Inductive Switch (UIS) Test in Production
- Fast Switching Speed
- Low On-Resistance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

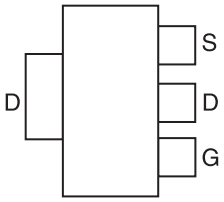
Mechanical Data

- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.112 grams (Approximate)

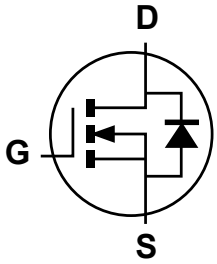
SOT223



Top View



Pin Out - Top View



Equivalent Circuit

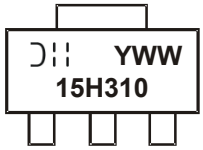
Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMN15H310SE-13	Standard	SOT223	2,500 / Tape & Reel

Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
2. See http://www.diodes.com/quality/lead_free.html 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/products/packages.html.

Marking Information

SOT223



= Manufacturer's Marking
15H310 = Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Year (ex: 4 = 2014)
WW = Week (01 - 53)

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

Characteristic		Symbol	Value	Units
Drain-Source Voltage		V_{DSS}	150	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (Note 5) V_{GS} = 10V	T_A = +25°C T_A = +70°C	I_D	2.0 1.6	A
	T_C = +25°C T_C = +70°C	I_D	7.1 5.6	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)		I_{DM}	10	A
Maximum Body Diode Continuous Current		I_S	2.5	A
Avalanche Energy (Note 6) L=26mH		E_{AS}	1.45	mJ
Avalanche Current (Note 6) L=26mH		I_{AS}	0.2	A
Peak Diode Recovery dv/dt ($I_{SD} \leq$ 7.3A, di/dt $\leq$ 300A/µs)		dv/dt	5	V/ns

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	TA = +25°C	P_D	1.9	W
	TA = +70°C		1.2	
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\theta JA}$	64	°C/W
Total Power Dissipation (Note 5)	TC = +25°C	P_D	23.5	W
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	5.3	°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 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	150	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 120V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	1	2.2	3	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	—	178	310	mΩ	V_{GS} = 10V, I_D = 1.5A
		—	190	330		V_{GS} = 5.0V, I_D = 1.0A
Diode Forward Voltage	V_{SD}	—	0.76	1.2	V	V_{GS} = 0V, I_S = 1.7A
DYNAMIC CHARACTERISTICS (Note 6)						
Input Capacitance	C_{iss}	—	405	—	pF	V_{DS} = 25V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	40	—		
Reverse Transfer Capacitance	C_{rss}	—	20	—		
Gate Resistance	R_G	—	2.88	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 5.0V)	Q_g	—	4.6	—	nC	V_{DS} = 80V, I_D = 7.3A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	8.7	—		
Gate-Source Charge	Q_{gs}	—	1.7	—		
Gate-Drain Charge	Q_{gd}	—	1.8	—		
Turn-On Delay Time	$t_{D(on)}$	—	3.5	—	nS	V_{DD} = 50V, V_{GS} = 10V, R_G = 25Ω, I_D = 7.3A
Turn-On Rise Time	t_r	—	7.8	—		
Turn-Off Delay Time	$t_{D(off)}$	—	22	—		
Turn-Off Fall Time	t_f	—	11	—		
Reverse Recovery Time	t_{rr}	—	38	—	ns	I_F = 7.3A, di/dt = 100A/µs
Reverse Recovery Charge	Q_{rr}	—	53	—	nC	I_F = 7.3A, di/dt = 100A/µs

Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.
6. Guaranteed by design. Not subject to product testing.
7. Short duration pulse test used to minimize self-heating effect.

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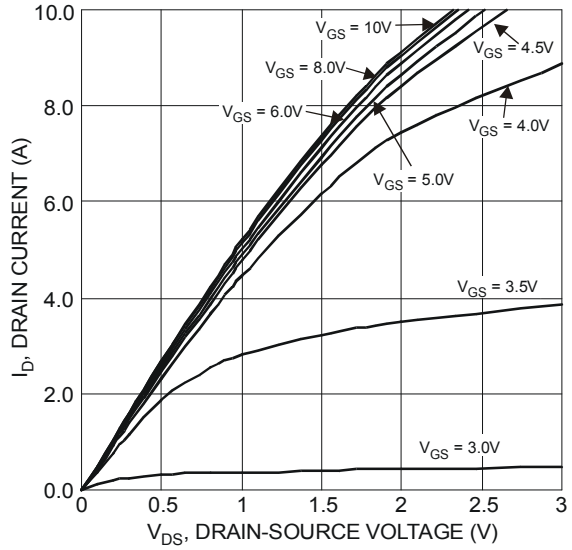


Figure 1 Typical Output Characteristics

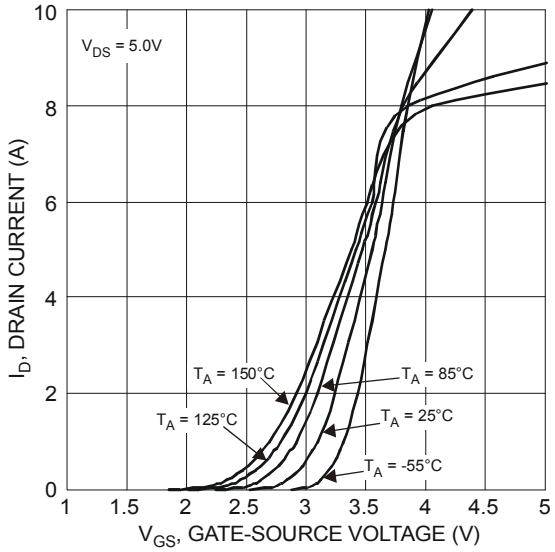


Figure 2 Typical Transfer Characteristics

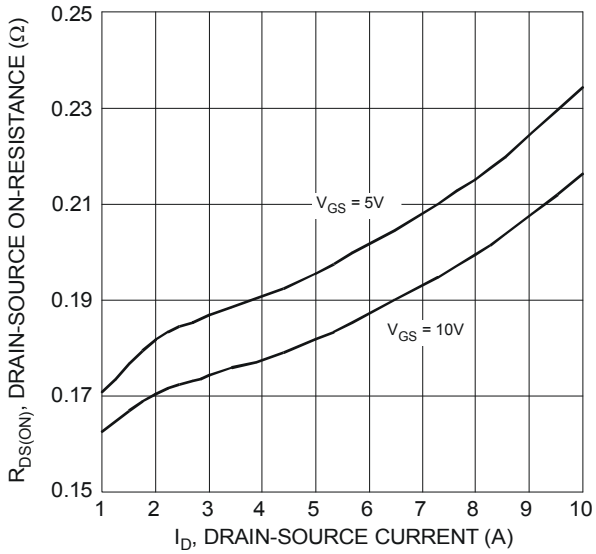


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

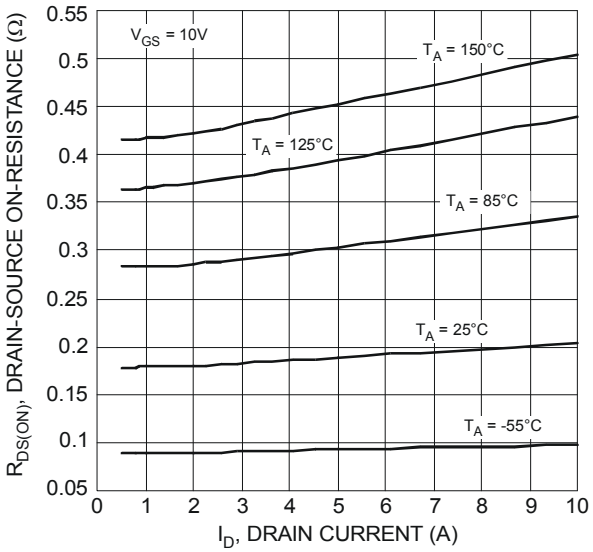


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

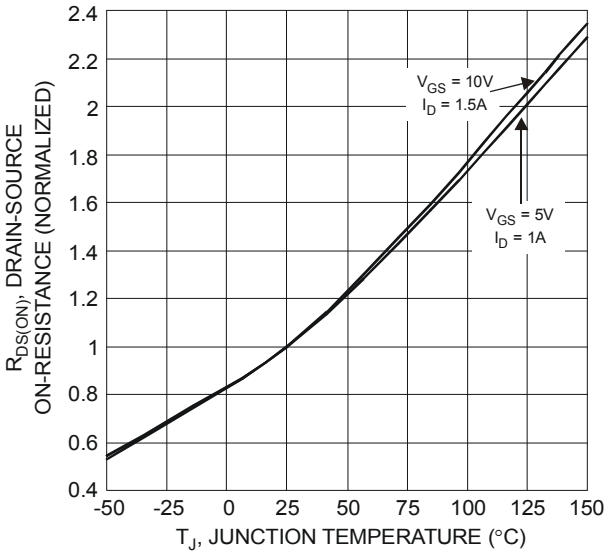


Figure 5 On-Resistance Variation with Temperature

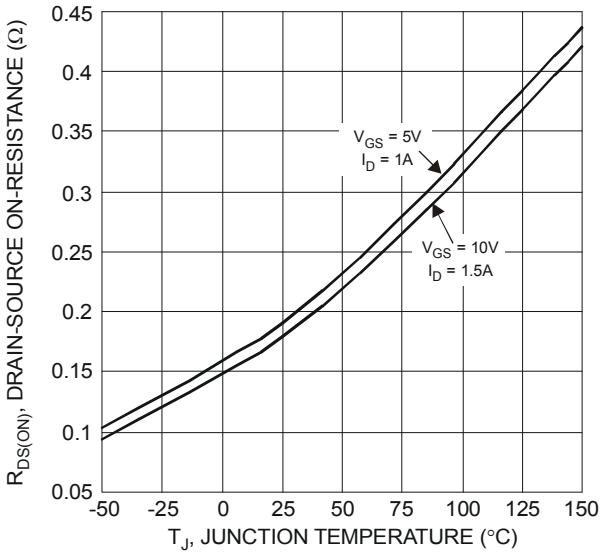


Figure 6 On-Resistance Variation with Temperature

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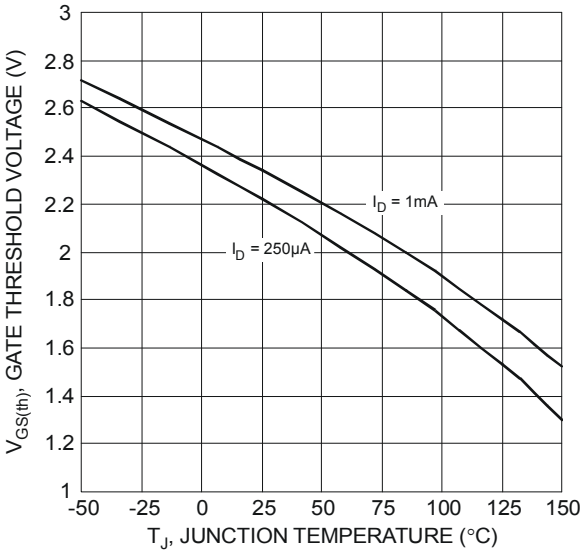


Figure 7 Gate Threshold Variation vs. Ambient Temperature

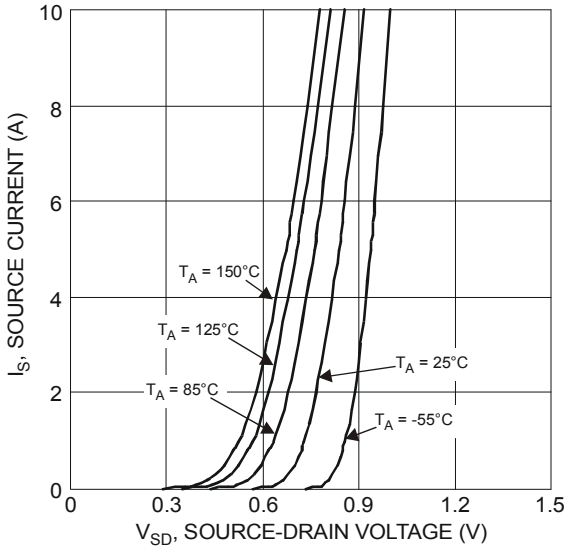


Figure 8 Diode Forward Voltage vs. Current

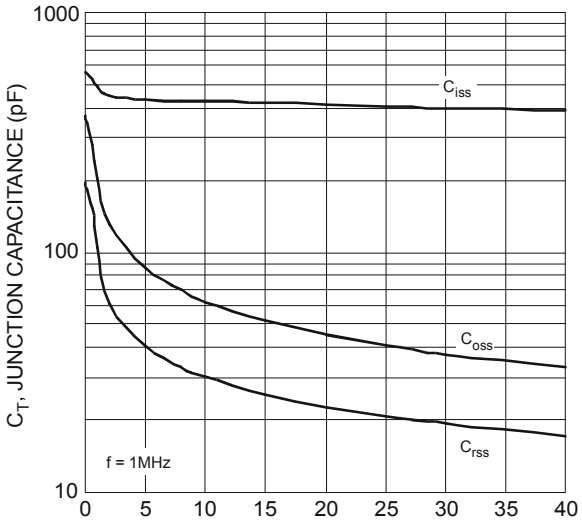


Figure 9 Typical Junction Capacitance

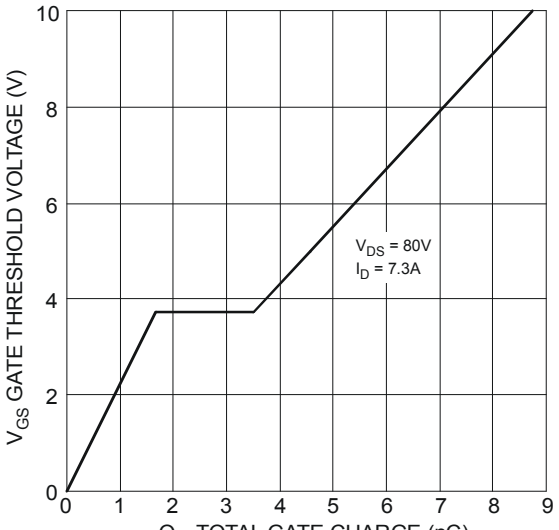


Figure 10 Gate Charge

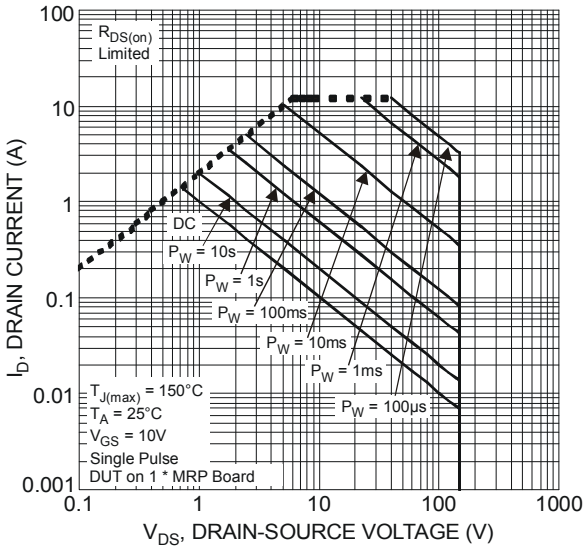


Figure 11 SOA, Safe Operation Area

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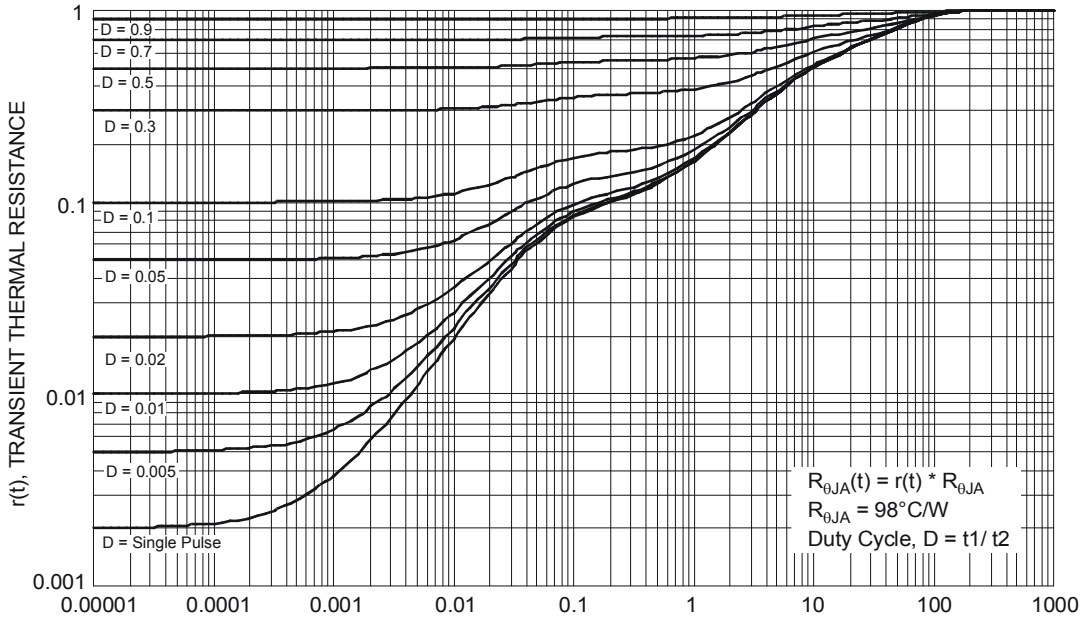
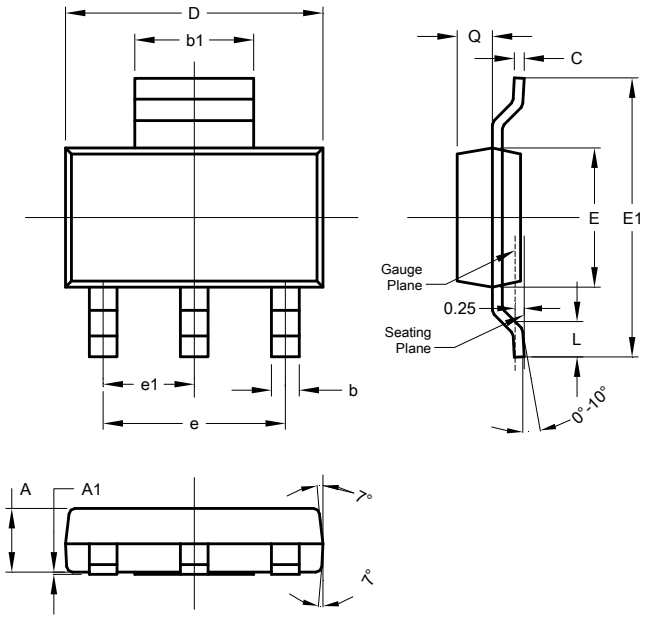


Figure 12 Transient Thermal Resistance

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Package Outline Dimensions

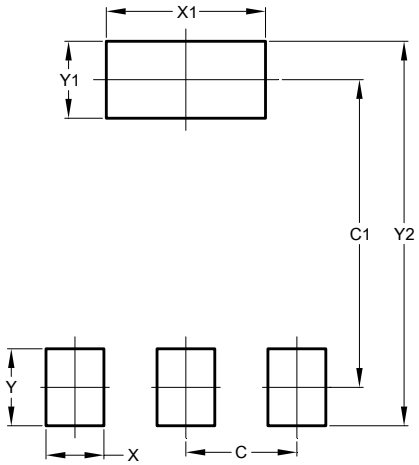
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



SOT223			
Dim	**Min**	**Max**	**Typ**
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
C2	8.00

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