

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$	Package	$I_D$ $T_A = +25^\circ\text{C}$
60V	3Ω @ $V_{GS} = 10\text{V}$	SOT323	300mA
	4Ω @ $V_{GS} = 5\text{V}$		260mA

## Description

This new generation 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

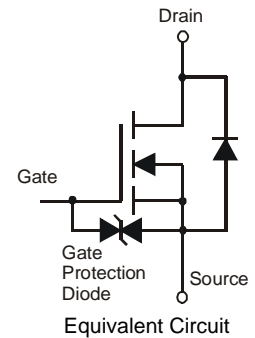
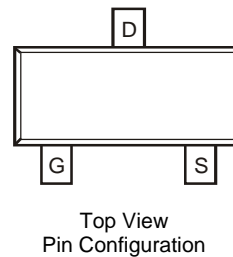
- DC-DC Converters
- Power Management Functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc

## Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Small Surface Mount Package
- ESD Protected Gate, 1KV (HBM)
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

- Case: SOT323
- Case Material: Molded Plastic. 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
- Terminal Connections: See Diagram
- Weight: 0.006 grams (approximate)

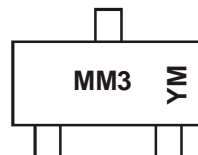


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN65D8LW-7	SOT323	3000/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> 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



MM3 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: Y = 2011)  
 M = Month (ex: 9 = September)

### Date Code Key

Year Code	2011	2012	2013	2014	2015	2016	2017
	Y	Z	A	B	C	D	E

Month Code	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	1	2	3	4	5	6	7	8	9	O	N	D

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	60	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	300	mA
		T <sub>A</sub> = +70°C		230	
Continuous Drain Current (Note 6) V <sub>GS</sub> = 5V	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	260	mA
		T <sub>A</sub> = +70°C		210	
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I <sub>DM</sub>	800	mA
Maximum Body Diode Continuous Current (Note 6)			I <sub>S</sub>	1	A

**Thermal Characteristics**

Characteristic		Symbol	Value	Units
Total Power Dissipation	(Note 5)	P <sub>D</sub>	300	mW
	(Note 6)		432	
Thermal Resistance, Junction to Ambient	(Note 5)	R <sub>θJA</sub>	398	°C/W
	(Note 6)		290	
Thermal Resistance, Junction to Case	(Note 5)	R <sub>θJC</sub>	142	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1.0	µA	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V
Gate-Body Leakage	I <sub>GSS</sub>	—	—	±5.0	µA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.2	—	2.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	—	2	3	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.115A
		—	2.5	4	Ω	V <sub>GS</sub> = 5V, I <sub>D</sub> = 0.115A
		—	—	—	—	—
Forward Transconductance	g <sub>FS</sub>	80	290	—	mS	V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.115A
Diode Forward Voltage	V <sub>SD</sub>	-	0.8	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 115mA
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>ISS</sub>	—	22.0	—	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>OSS</sub>	—	3.2	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	2.0	—		
Gate Resistance	R <sub>G</sub>	—	79.9	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge V <sub>GS</sub> = 10V	Q <sub>g</sub>	—	0.87	—	nC	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 30V, I <sub>D</sub> = 150mA
Total Gate Charge V <sub>GS</sub> = 4.5V	Q <sub>g</sub>	—	0.43	—		
Gate-Source Charge	Q <sub>gs</sub>	—	0.11	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	0.11	—		
Turn-On Delay Time	t <sub>D(on)</sub>	—	2.7	—	nS	V <sub>DD</sub> = 30V, I <sub>D</sub> = 0.115A, V <sub>GEN</sub> = 10V, R <sub>GEN</sub> = 25Ω
Turn-On Rise Time	t <sub>r</sub>	—	2.8	—		
Turn-Off Delay Time	t <sub>D(off)</sub>	—	12.6	—		
Turn-Off Fall Time	t <sub>f</sub>	—	7.3	—		

- Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
  7. Short duration pulse test used to minimize self-heating effect.
  8. Guaranteed by design. Not subject to production testing.

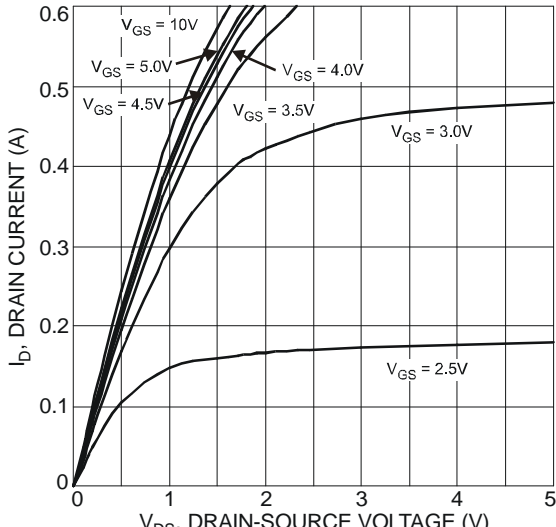


Figure 1 Typical Output Characteristic

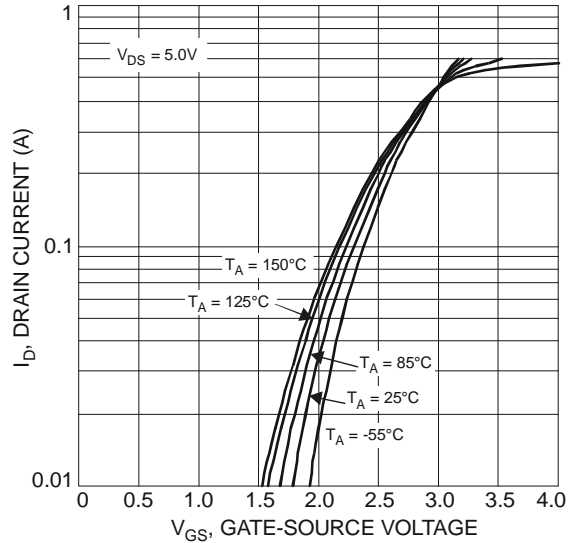


Figure 2 Typical Transfer Characteristics

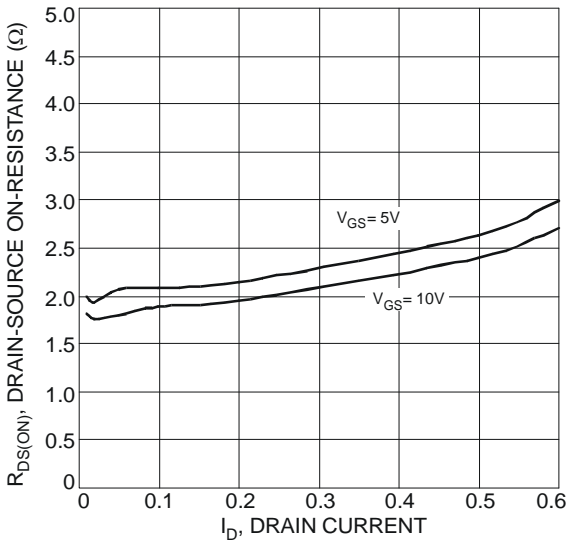


Figure 3 Typical On-Resistance vs. Drain Current and Temperature

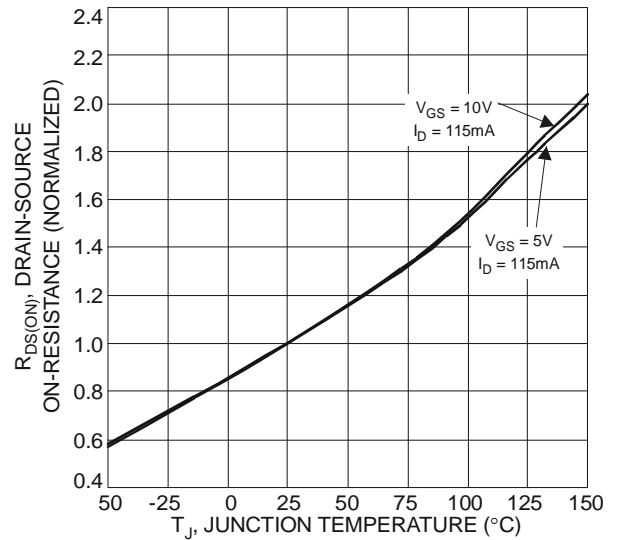


Figure 4 On-Resistance Variation with Temperature

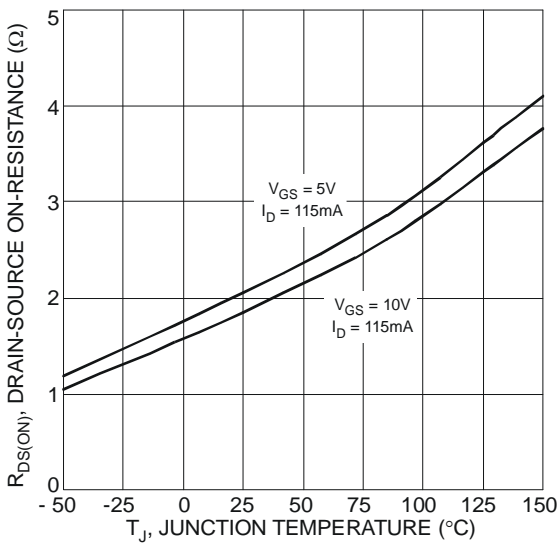


Figure 5 On-Resistance Variation with Temperature

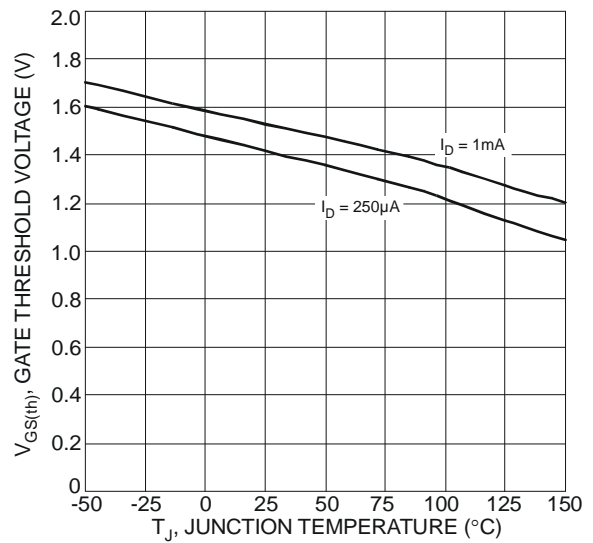


Figure 6 Gate Threshold Variation vs. Ambient Temperature

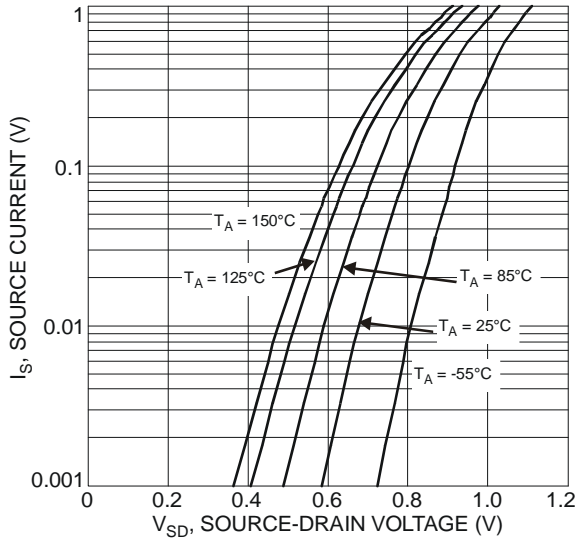


Figure 7 Diode Forward Voltage vs. Current

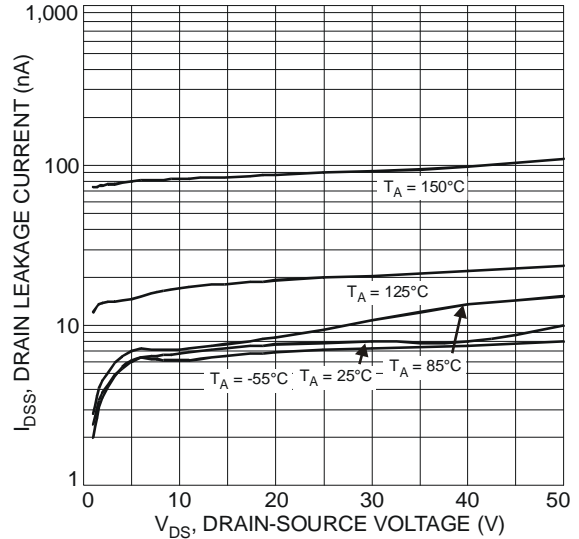


Figure 8 Typical Drain-Source Leakage Current vs. Voltage

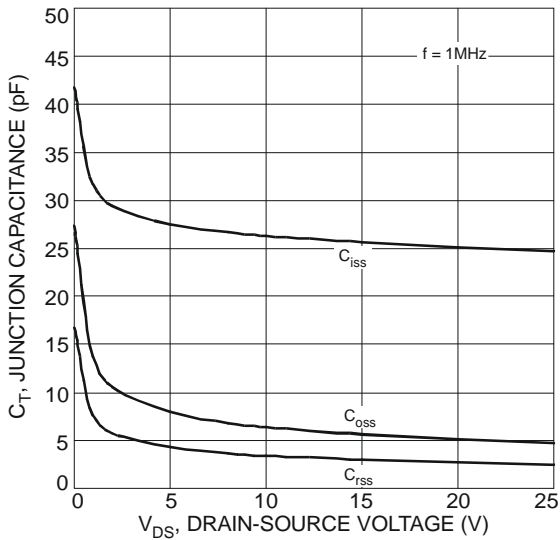


Figure 9 Typical Junction Capacitance

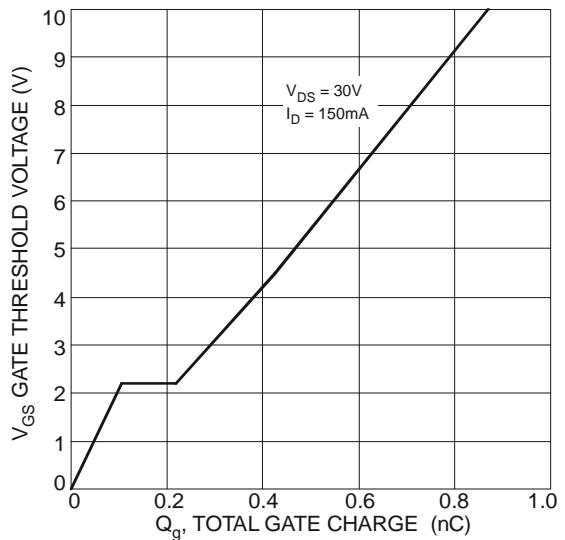
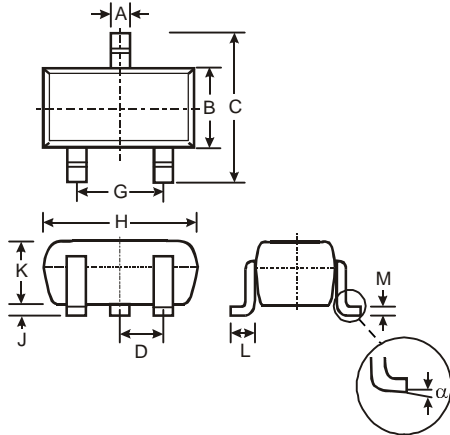


Figure 10 Gate Charge

## Package Outline Dimensions

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

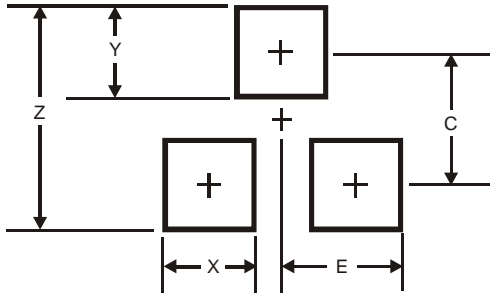


SOT323			
Dim	Min	Max	Typ
A	0.25	0.40	0.30
B	1.15	1.35	1.30
C	2.00	2.20	2.10
D	-	-	0.65
G	1.20	1.40	1.30
H	1.80	2.20	2.15
J	0.0	0.10	0.05
K	0.90	1.00	1.00
L	0.25	0.40	0.30
M	0.10	0.18	0.11
$\alpha$	0°	8°	-

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)
Z	2.8
X	0.7
Y	0.9
C	1.9
E	1.0

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