

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D$ $T_A = +25^\circ C$
30V	5 $\Omega$ @ $V_{GS} = 4V$	200 mA
	7 $\Omega$ @ $V_{GS} = 2.5V$	115 mA

## 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

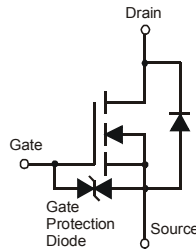
- DC-DC Converters
- Power Management Functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc



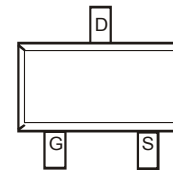
SOT523



Top View



Equivalent Circuit



Top View

## Features

- N-Channel MOSFET
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Small Surface Mount Package
- ESD Protected Gate 2KV
- **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

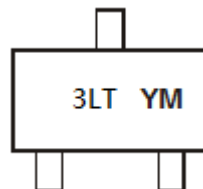
- Case: SOT523
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed Over Alloy 42 Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208 <sup>(e3)</sup>
- Terminal Connections: See Diagram
- Weight: 0.002 grams (approximate)

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN33D8LT-7	SOT523	3,000/Tape & Reel
DMN33D8LT-13	SOT523	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/quality/lead\\_free.html](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



3LT = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year ex: A = 2013  
 M = Month ex: 9 = September

### Date Code Key

Year	2012	2013	2014	2015	2016	2017	2018
Code	Z	A	B	C	D	E	F

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** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	30	V
Gain-Source Voltage	$V_{GSS}$	$\pm 20$	V
Drain Current (Note 5)	$I_D$	115	mA

**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$P_D$	240	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	521	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)	$P_D$	300	mW
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	420	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1.0	$\mu\text{A}$	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$
Gate-Body Leakage	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	0.8	—	1.5	V	$V_{DS} = 3\text{V}, I_D = 100\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	—	5	$\Omega$	$V_{GS} = 4\text{V}, I_D = 10\text{mA}$
		—	—	7	$\Omega$	$V_{GS} = 2.5\text{V}, I_D = 5\text{mA}$
Diode Forward Voltage	$V_{SD}$	—	—	1.2	V	$V_{GS} = 0\text{V}, I_S = 115\text{mA}$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	48	—	pF	$V_{DS} = 5\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	11	—		
Reverse Transfer Capacitance	$C_{rss}$	—	8	—		
Total Gate Charge $V_{GS} = 10\text{V}$	$Q_g$	—	0.55	—	nC	$V_{GS} = 10\text{V}, V_{DS} = 10\text{V}, I_D = 250\text{mA}$
Total Gate Charge $V_{GS} = 4.5\text{V}$	$Q_g$	—	1.23	—		
Gate-Source Charge	$Q_{gs}$	—	0.14	—		
Gate-Drain Charge	$Q_{gd}$	—	0.14	—		
Turn-On Delay Time	$t_{D(on)}$	—	2.9	—	nS	$V_{DD} = 30\text{V}, I_D = 0.2\text{A}, V_{GEN} = 10\text{V}, R_{GEN} = 25\Omega$
Turn-On Rise Time	$t_r$	—	2.6	—		
Turn-Off Delay Time	$t_{D(off)}$	—	18.2	—		
Turn-Off Fall Time	$t_f$	—	13.6	—		

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

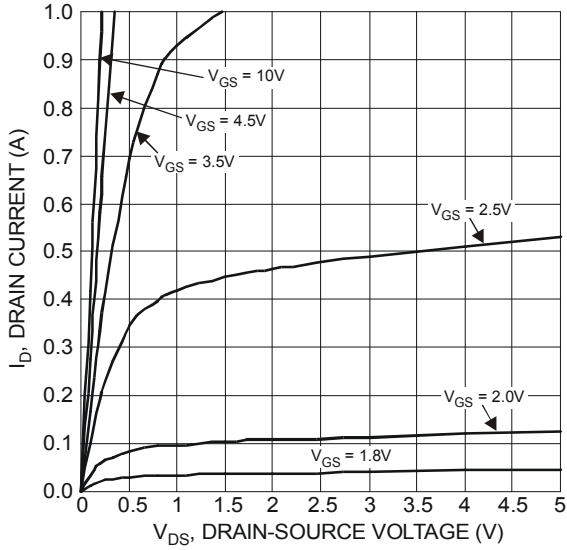


Figure 1 Typical Output Characteristics

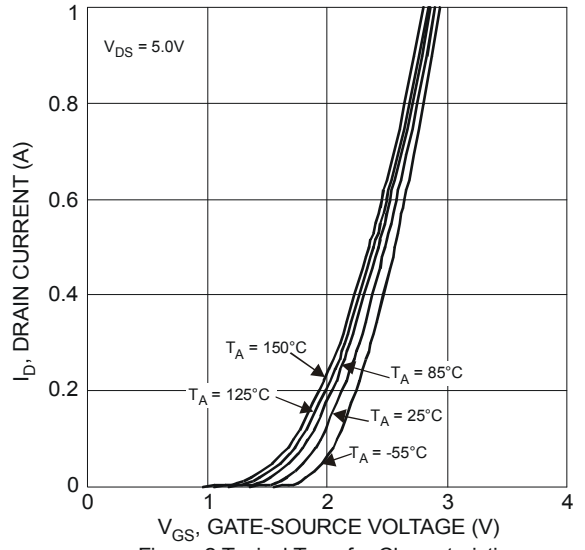


Figure 2 Typical Transfer Characteristics

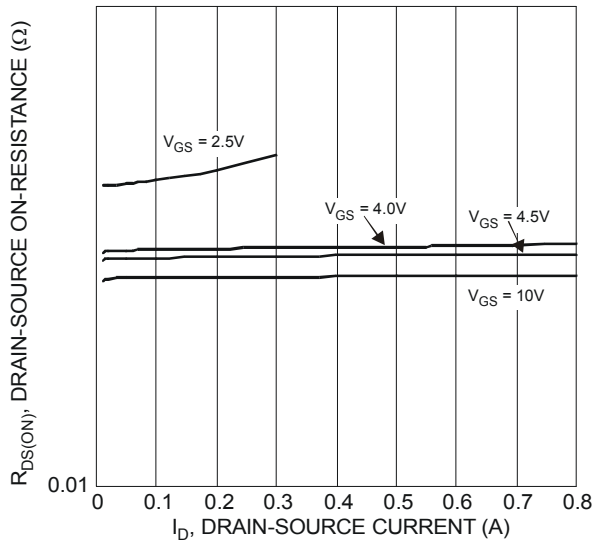


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

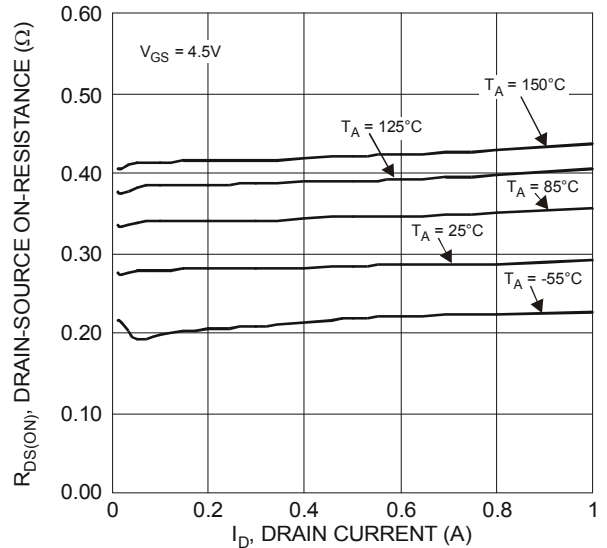


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

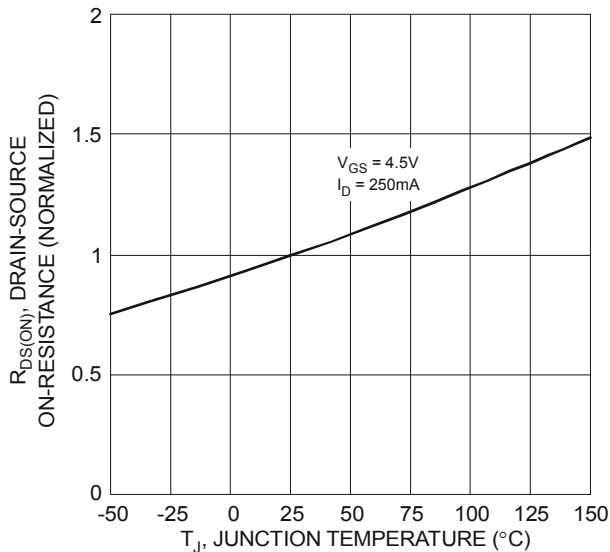


Figure 5 On-Resistance Variation with Temperature

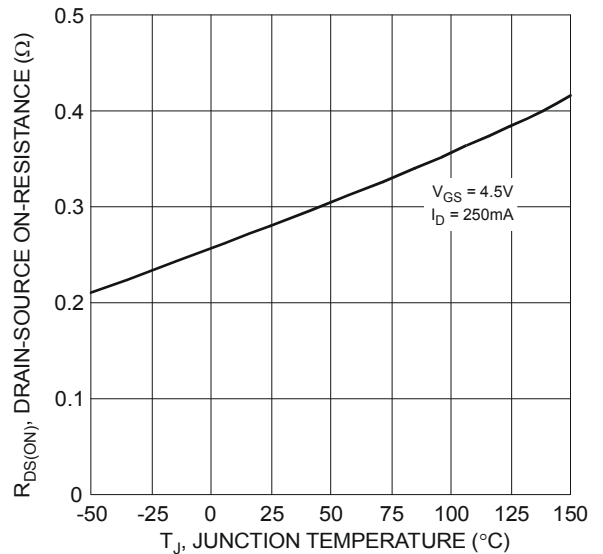


Figure 6 On-Resistance Variation with Temperature

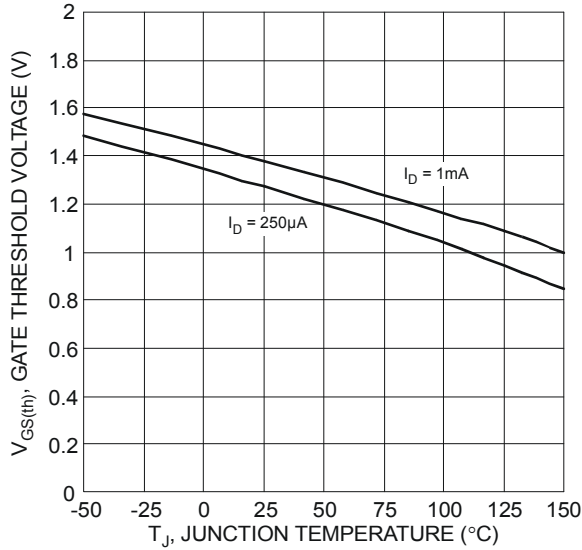


Figure 7 Gate Threshold Variation vs. Ambient Temperature

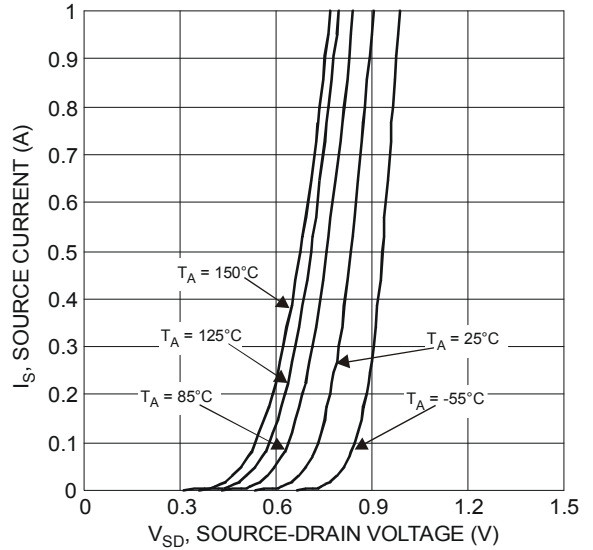


Figure 8 Diode Forward Voltage vs. Current

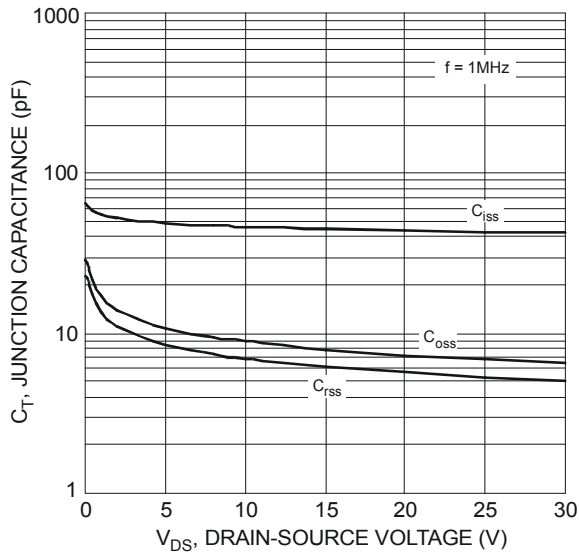


Figure 9 Typical Junction Capacitance

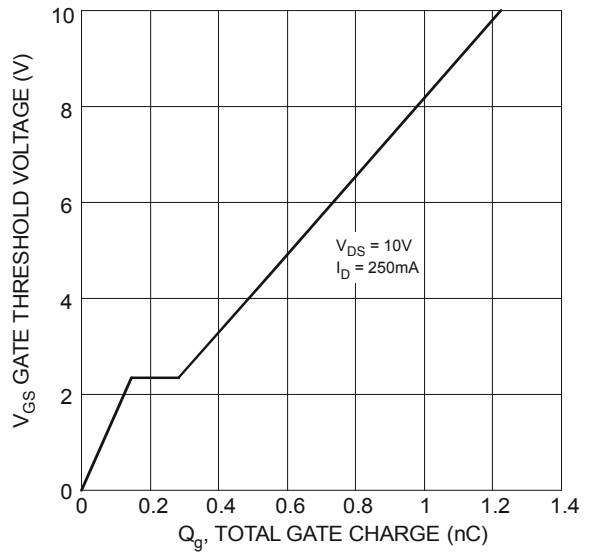
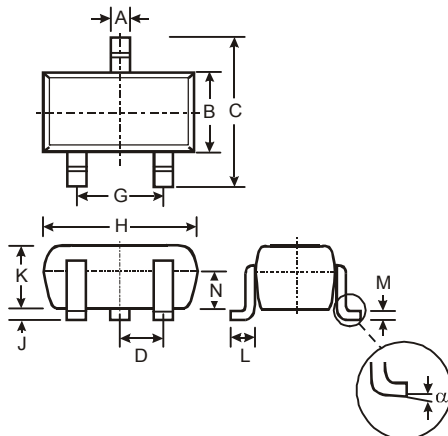


Figure 10 Gate Charge

## Package Outline Dimensions

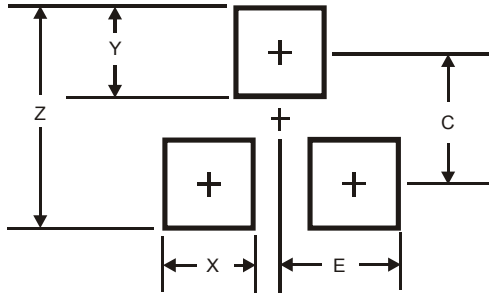
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT523			
Dim	Min	Max	Typ
A	0.15	0.30	0.22
B	0.75	0.85	0.80
C	1.45	1.75	1.60
D	—	—	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
J	0.00	0.10	0.05
K	0.60	0.80	0.75
L	0.10	0.30	0.22
M	0.10	0.20	0.12
N	0.45	0.65	0.50
α	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	1.8
X	0.4
Y	0.51
C	1.3
E	0.7

NEW PRODUCT

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