



**THE DATASHEET OF  
DMN33D8LT-13**



## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub> T <sub>A</sub> = +25°C
30V	5Ω @ V <sub>GS</sub> = 4V	200mA
	7Ω @ V <sub>GS</sub> = 2.5V	115mA

## Description

This new generation MOSFET has been designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) 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

- 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)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability.** <https://www.diodes.com/quality/product-definitions/>
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMN33D8LTQ](#))**

## Mechanical Data

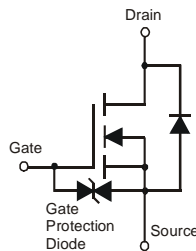
- Case: SOT523
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed Over Alloy 42 Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Terminal Connections: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



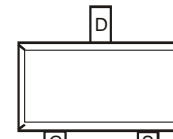
SOT523



Top View



Equivalent Circuit



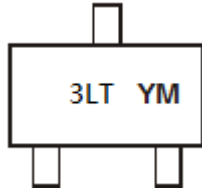
Top View

## 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) & 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



3LT = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: I = 2021)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2014	...	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	B	...	I	J	K	L	M	N	O	P	R	S

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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	30	V
Gain-Source Voltage	V <sub>GSS</sub>	±20	V
Drain Current (Note 5)	I <sub>D</sub>	115	mA

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P <sub>D</sub>	240	mW
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	521	°C/W
Total Power Dissipation (Note 6)	P <sub>D</sub>	300	mW
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	420	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.  
 6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

**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>	30	—	—	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> = 30V, V <sub>GS</sub> = 0V
Gate-Body Leakage	I <sub>GSS</sub>	—	—	±10	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>	0.8	—	1.5	V	V <sub>DS</sub> = 3V, I <sub>D</sub> = 100μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	—	5	Ω	V <sub>GS</sub> = 4V, I <sub>D</sub> = 10mA
		—	—	7	Ω	V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 5mA
Diode Forward Voltage	V <sub>SD</sub>	—	—	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>	—	48	—	pF	V <sub>DS</sub> = 5V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oSS</sub>	—	11	—		
Reverse Transfer Capacitance	C <sub>rSS</sub>	—	8	—		
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	0.55	—	nC	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250mA
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	1.23	—		
Gate-Source Charge	Q <sub>gs</sub>	—	0.14	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	0.14	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	2.9	—	ns	V <sub>DD</sub> = 30V, I <sub>D</sub> = 0.2A, V <sub>GEN</sub> = 10V, R <sub>GEN</sub> = 25Ω
Turn-On Rise Time	t <sub>R</sub>	—	2.6	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	18.2	—		
Turn-Off Fall Time	t <sub>F</sub>	—	13.6	—		

Notes: 7. Short duration pulse test used to minimize self-heating effect.  
8. Guaranteed by design. Not subject to product testing.

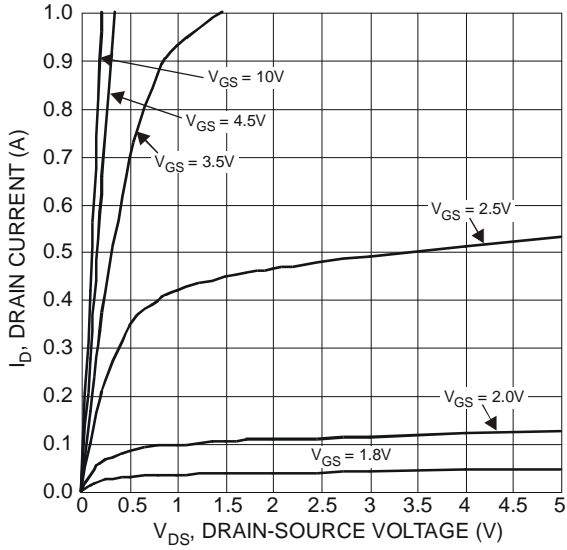


Figure 1 Typical Output Characteristics

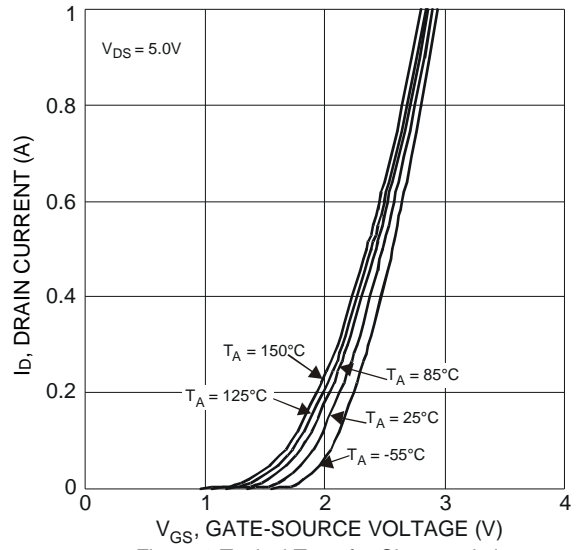


Figure 2 Typical Transfer Characteristics

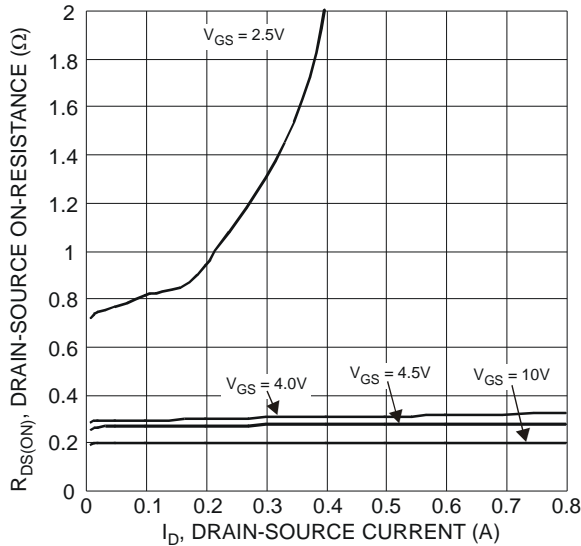


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

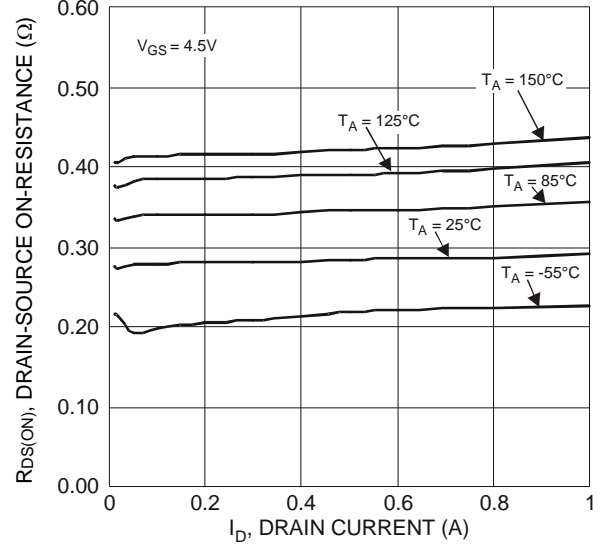


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

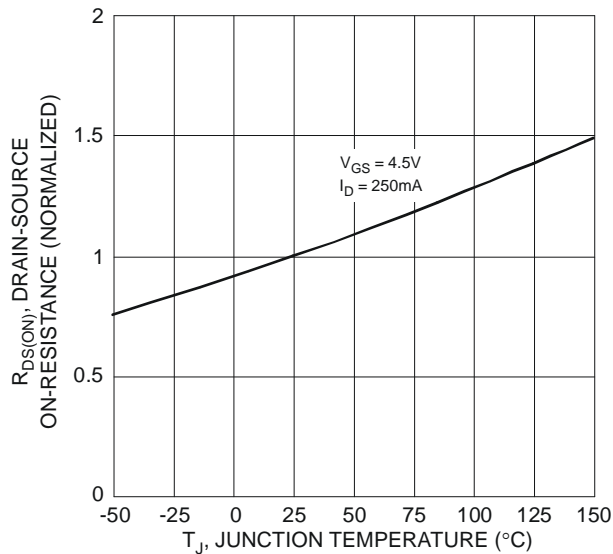


Figure 5 On-Resistance Variation with Temperature

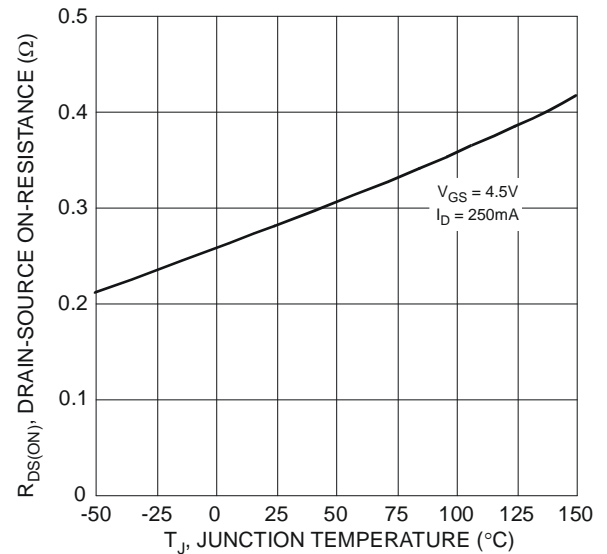


Figure 6 On-Resistance Variation with Temperature

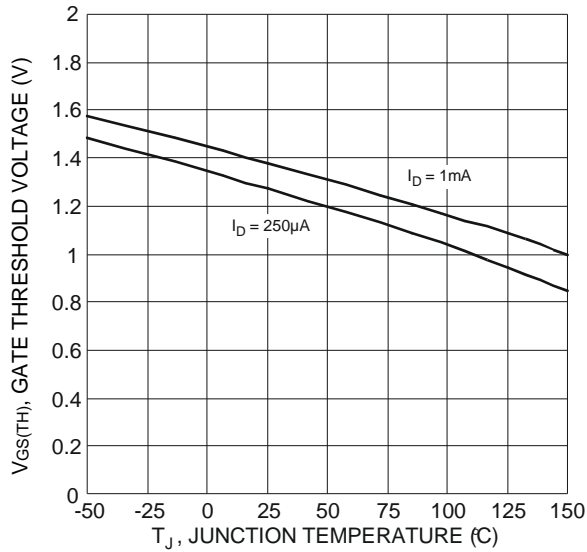


Figure 7 Gate Threshold Variation vs. Junction Temperature

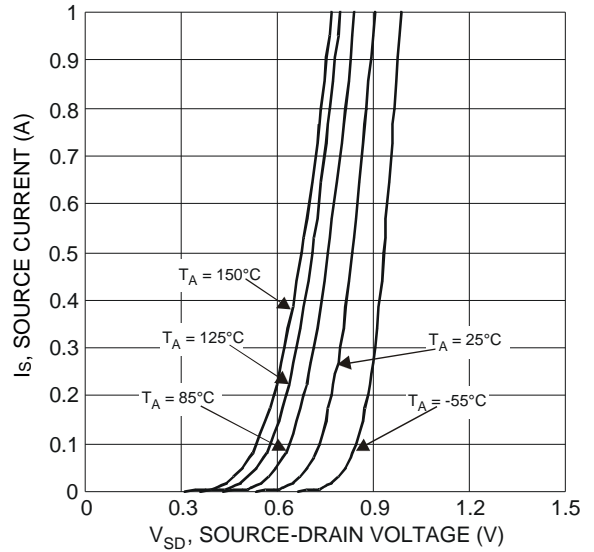


Figure 8 Diode Forward Voltage vs. Current

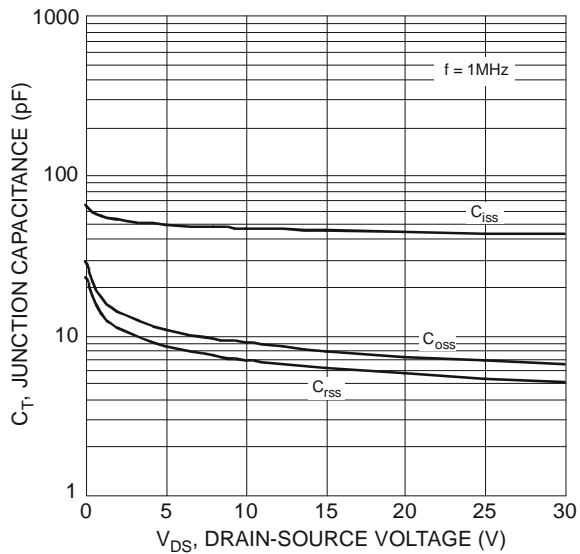


Figure 9 Typical Junction Capacitance

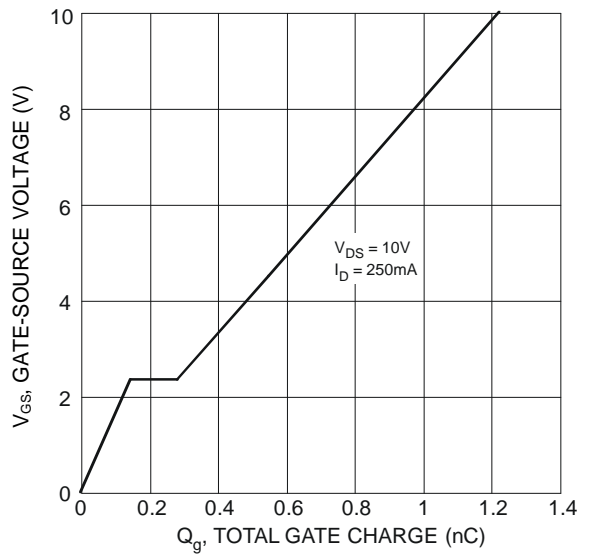
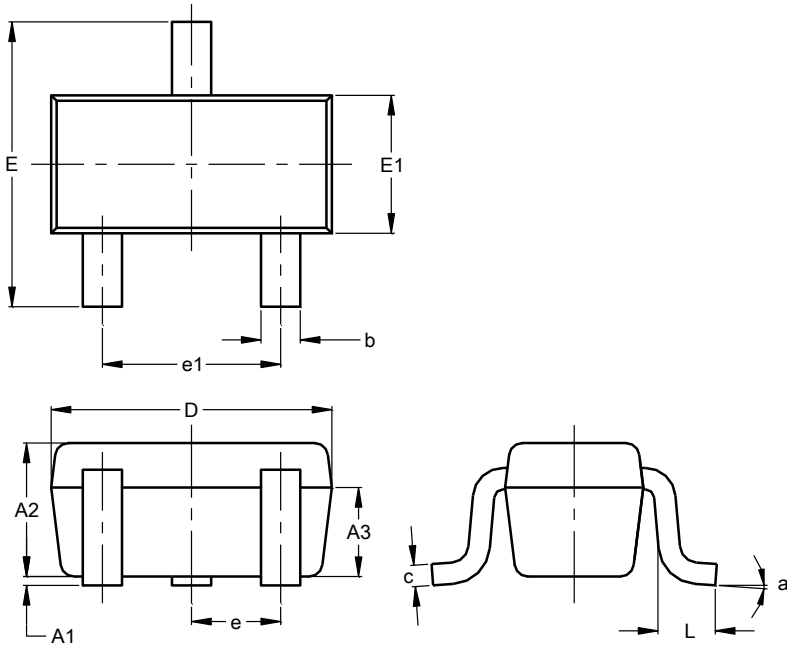


Figure 10 Gate Charge

**Package Outline Dimensions**

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

**SOT523**

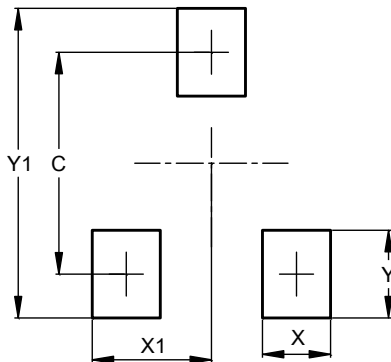


SOT523			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.60	0.80	0.75
A3	0.45	0.65	0.50
b	0.15	0.30	0.22
c	0.10	0.20	0.12
D	1.50	1.70	1.60
E	1.45	1.75	1.60
E1	0.75	0.85	0.80
e	0.50 BSC		
e1	0.90	1.10	1.00
L	0.20	0.40	0.33
a	0°	--	8°
All Dimensions in mm			

**Suggested Pad Layout**

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

**SOT523**



Dimensions	Value (in mm)
C	1.29
X	0.40
X1	0.70
Y	0.51
Y1	1.80

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