

**DUAL N-CANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

$V_{(BR)DSS}$	$R_{DS(ON) \max}$	$I_D \max$ $T_A = +25^\circ C$
30V	3Ω @ $V_{GS} = 4.5V$	350 mA
	7Ω @ $V_{GS} = 2.5V$	

**Description**

This 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**

- Motor Control
- Power Management Functions
- DC-DC Converters
- Backlighting

**Features and Benefits**

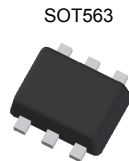
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- ESD Protected Gate to 2kV
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 standards for High Reliability**

**Mechanical Data**

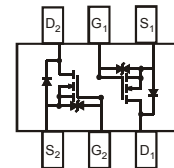
- Case: SOT563
- Case Material: Molded Plastic, "Green" Molding Compound UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin annealed over Copper leadframe Solderable per MIL-STD-202, Method 208 
- Weight: 0.006 grams (approximate)



ESD protected



Top View



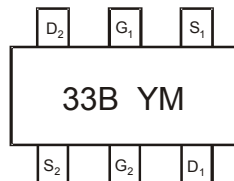
Equivalent Circuit

**Ordering Information** (Note 4)

Part Number	Case	Packaging
DMN33D8LV-7	SOT563	3K/Tape & Reel
DMN33D8LV-13	SOT563	10K/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**



33B = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year ex: V = 2008  
 M = Month ex: 9 = September

Date Code Key

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

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	Units
Drain-Source Voltage	$V_{DSS}$	30	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 5) $V_{GS} = 4.5\text{V}$	$I_D$	350	mA
Steady State $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$		200	
Maximum Continuous Body Diode Forward Current (Note 5)	$I_S$	0.5	A
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle=1%)	$I_{DM}$	0.8	A

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	$P_D$	$T_A = +25^\circ\text{C}$	0.43
		$T_A = +70^\circ\text{C}$	0.20
Thermal Resistance, Junction to Ambient (Note 5)	Steady State $R_{\theta JA}$	288	$^\circ\text{C/W}$
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 6)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 1\text{mA}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu\text{A}$	@ $T_C = +25^\circ\text{C}$ $V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 16\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 6)</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	$R_{DS(on)}$	—	—	2.4	$\Omega$	$V_{GS} = 10\text{V}, I_D = 250\text{mA}$
		—	—	3.0		$V_{GS} = 4.5\text{V}, I_D = 250\text{mA}$
		—	—	5.0		$V_{GS} = 4.0\text{V}, I_D = 10\text{mA}$
		—	—	7.0		$V_{GS} = 2.5\text{V}, I_D = 10\text{mA}$
		—	—	—		—
Forward Transfer Admittance	$ Y_{fs} $	10	—	—	mS	$V_{DS} = 3\text{V}, I_D = 10\text{mA}$
Diode Forward Voltage	$V_{SD}$	—	—	1.2	V	$V_{GS} = 0\text{V}, I_S = 115\text{mA}$
<b>DYNAMIC CHARACTERISTICS (Note 7)</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	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	8	—	pF	
Total Gate Charge ( $V_{GS} = 4.5\text{V}$ )	$Q_g$	—	0.55	—	nC	$V_{GS} = 10\text{V}, V_{DS} = 10\text{V},$ $I_D = 250\text{mA}$
Total Gate Charge ( $V_{GS} = 10\text{V}$ )	$Q_g$	—	1.23	—	nC	
Gate-Source Charge	$Q_{gs}$	—	0.14	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	0.14	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	2.9	—	ns	
Turn-On Rise Time	$t_r$	—	2.6	—	ns	$V_{DD} = 30\text{V}, V_{GS} = 10\text{V},$ $R_G = 25\Omega, I_D = 200\text{mA}$
Turn-Off Delay Time	$t_{D(off)}$	—	18.2	—	ns	
Turn-Off Fall Time	$t_f$	—	13.6	—	ns	

- 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.

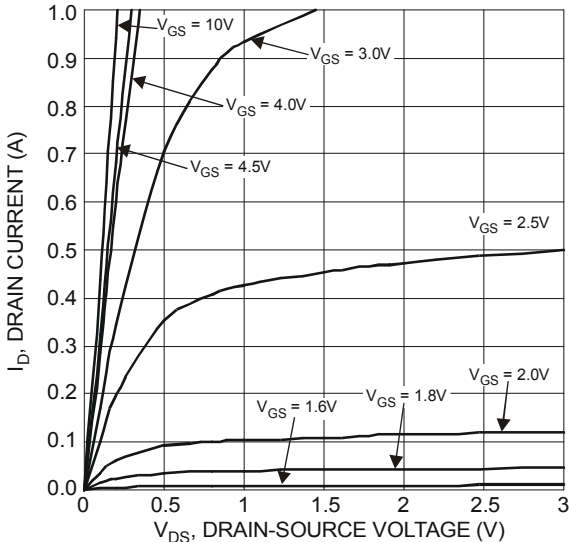


Figure 1 Typical Output Characteristics

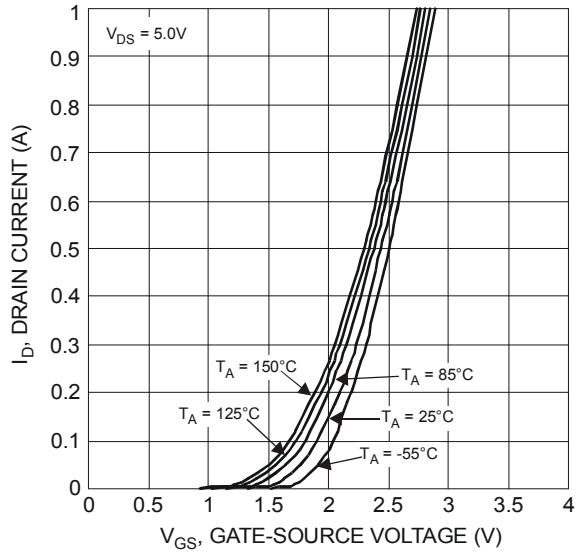


Figure 2 Typical Transfer Characteristics

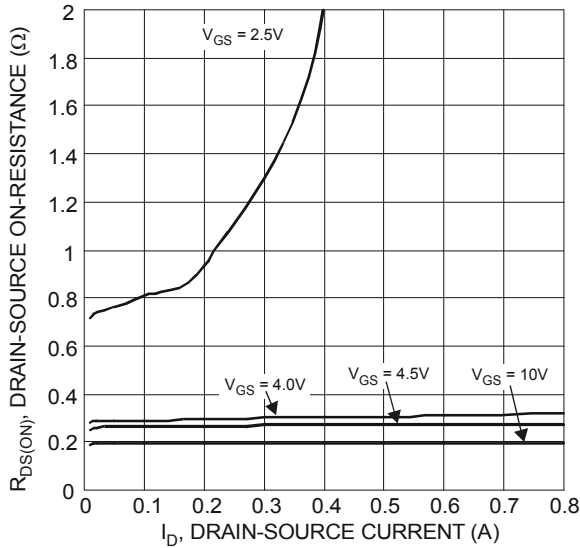


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

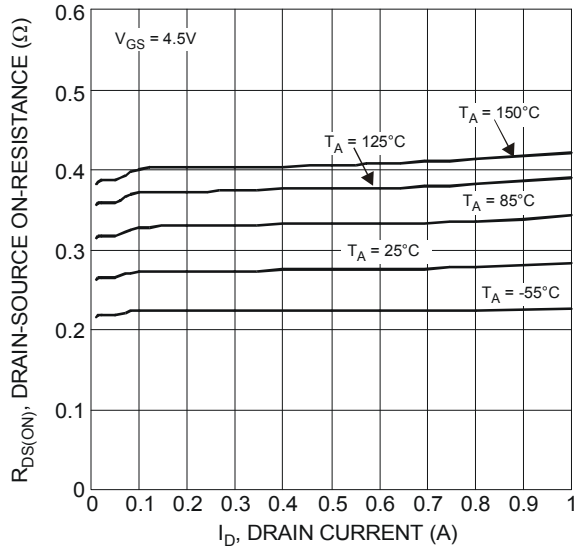


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

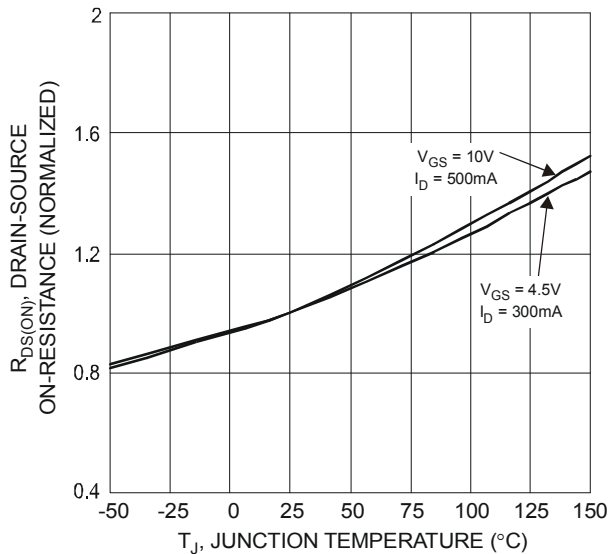


Figure 5 On-Resistance Variation with Temperature

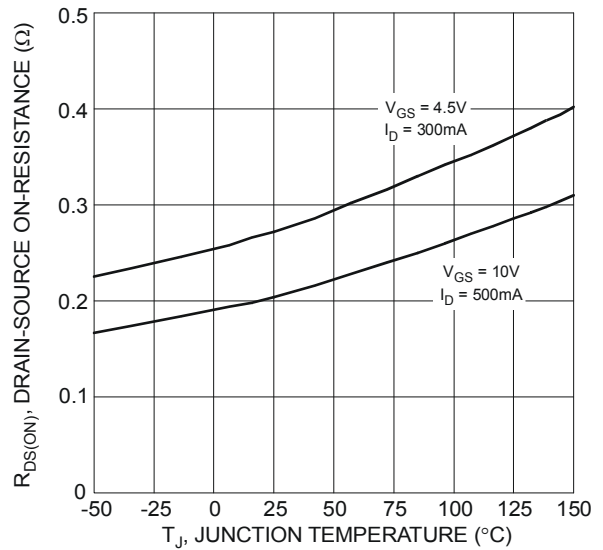


Figure 6 On-Resistance Variation with Temperature

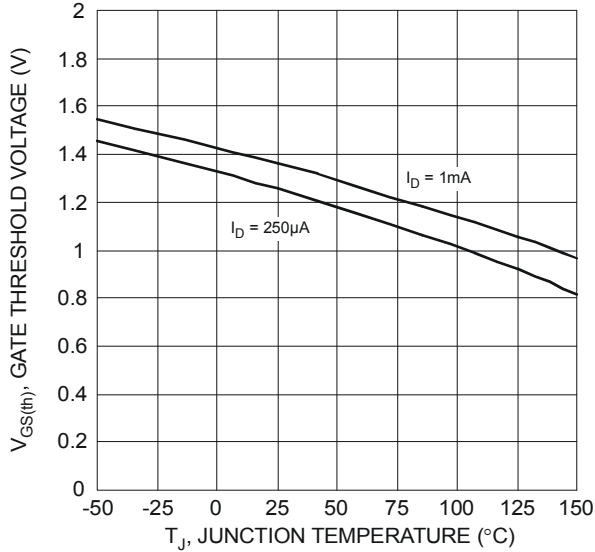


Figure 7 Gate Threshold Variation vs. Ambient Temperature

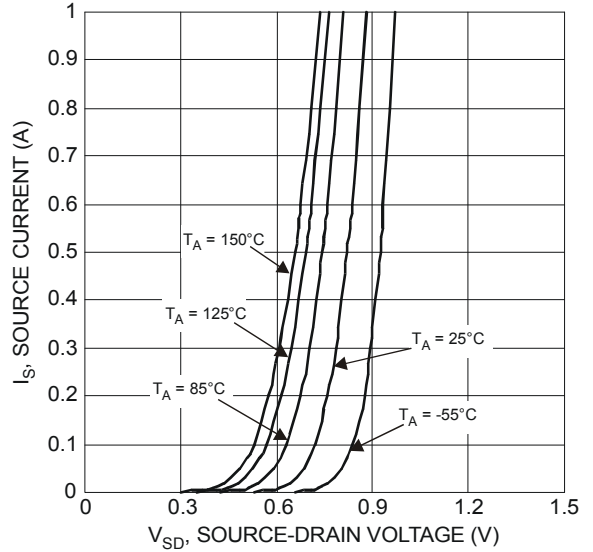


Figure 8 Diode Forward Voltage vs. Current

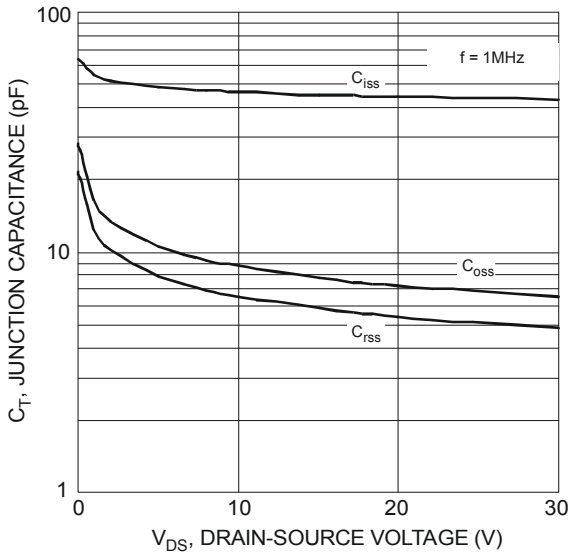


Figure 9 Typical Junction Capacitance

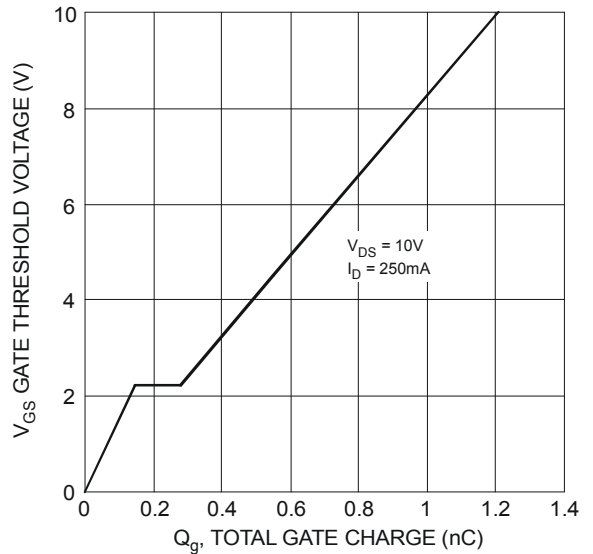


Figure 10 Gate Charge

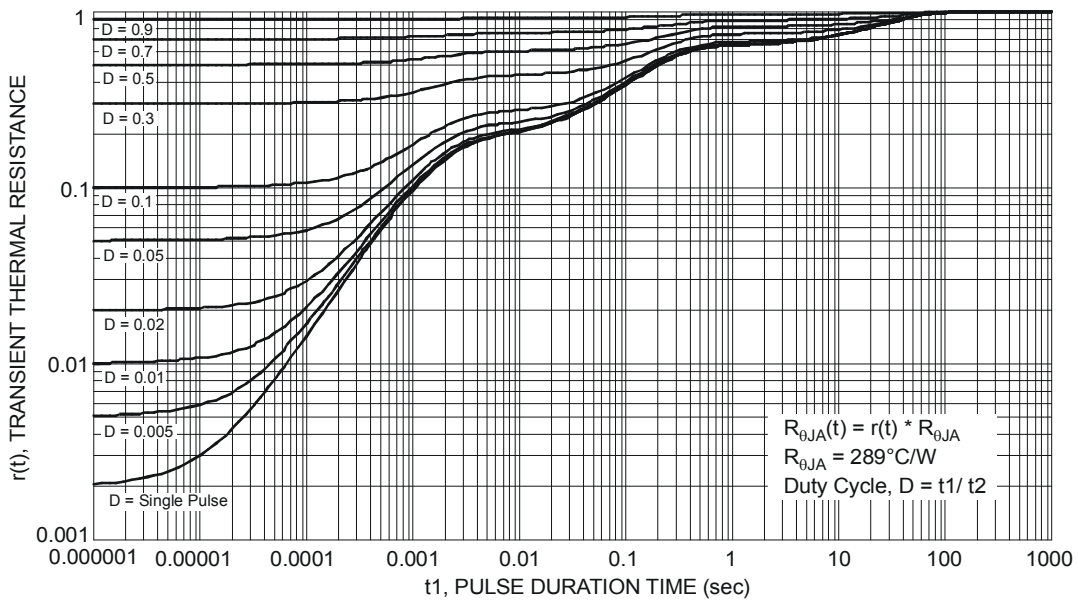


Figure 11 Transient Thermal Resistance

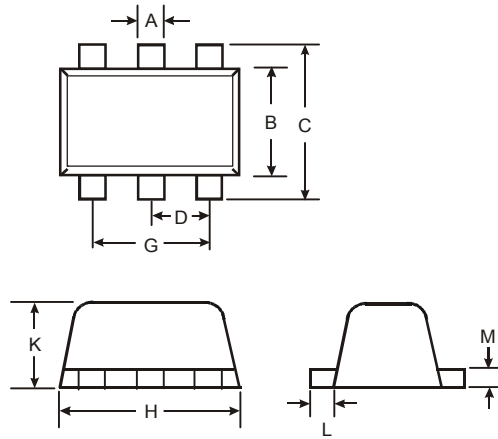
$$R_{\theta JA}(t) = r(t) * R_{\theta JA}$$

$$R_{\theta JA} = 289^{\circ}\text{C/W}$$

$$\text{Duty Cycle, } D = t1 / t2$$

**Package Outline Dimensions**

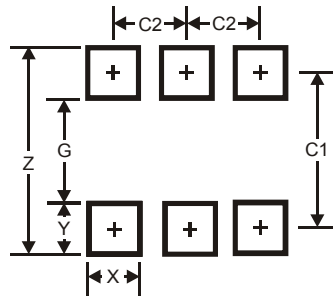
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT563			
Dim	Min	Max	Typ
A	0.15	0.30	0.20
B	1.10	1.25	1.20
C	1.55	1.70	1.60
D	-	-	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
K	0.55	0.60	0.60
L	0.10	0.30	0.20
M	0.10	0.18	0.11
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	2.2
G	1.2
X	0.375
Y	0.5
C1	1.7
C2	0.5

NEW PRODUCT

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