

**DUAL N-CHANNEL ENHANCEMENT MODE MOSFET**
**Product Summary**

$V_{(BR)DSS}$	$R_{DS(ON)}$ (MAX)	Package	$I_D$ (MAX) $T_A = +25^\circ\text{C}$
30V	190m $\Omega$ @ $V_{GS} = 10\text{V}$	SOT363	1A
	335m $\Omega$ @ $V_{GS} = 4.5\text{V}$		0.75A

**Description**

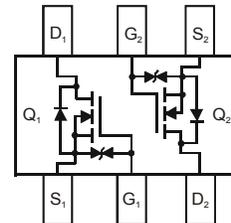
This MOSFET has been designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

**Applications**

- Motor Control
- Power Management Functions
- Load Switch



Top View


 Top View  
Internal Schematic

**Features and Benefits**

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- ESD Protected Gate
- **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**

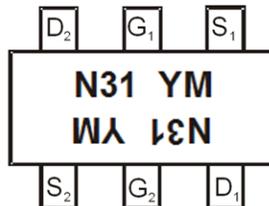
**Mechanical Data**

- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram
- Terminals: Finish — Matte Tin annealed over Alloy42 leadframe.  
Solderable per MIL-STD-202, Method 208  $\text{e3}$
- Weight: 0.006 grams (approximate)

**Ordering Information** (Note 4)

Part Number	Case	Packaging
DMN3190LDW-7	SOT363	3000K/Tape & Reel
DMN3190LDW-13	SOT363	10000K/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**


N31 = 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
Code	Y	Z	A	B	C	D	E

Month Code	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	Units
Drain-Source Voltage			V <sub>DSS</sub>	30	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 T <sub>A</sub> = +70°C	I <sub>D</sub>	1000 900	mA
	T < 5s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	1300 1000	mA
Maximum Continuous Body Diode Forward Current (Note 5)			I <sub>S</sub>	0.5	A
Pulsed Drain Current (10μs pulse, duty cycle=1%)			I <sub>DM</sub>	2.0	A

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	0.32	W
	T <sub>A</sub> = +70°C		0.19	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R <sub>θJA</sub>	395	°C/W
	T < 5s		320	
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	0.4	W
	T <sub>A</sub> = +70°C		0.25	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R <sub>θJA</sub>	320	°C/W
	T < 5s		250	
Thermal Resistance, Junction to Case		R <sub>θJC</sub>	143	
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>	30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 1mA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	μA	@T <sub>C</sub> = +25°C V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V
Gate-Source 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>	1.5	—	2.8	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	122	190	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 1.3A
		—	181	335		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 290mA
Forward Transfer Admittance	Y <sub>fs</sub>	—	0.7	—	mS	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250mA
Diode Forward Voltage	V <sub>SD</sub>	—	—	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 250mA
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	87	—	pF	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	17	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	12	—	pF	
Gate Resistance	R <sub>g</sub>	—	69.8	—	Ω	f = 1MHz, V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	0.9	—	nC	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250mA
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	2.0	—	nC	
Gate-Source Charge	Q <sub>gs</sub>	—	0.3	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	0.3	—	nC	
Turn-On Delay Time	t <sub>D(on)</sub>	—	4.5	—	ns	V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, R <sub>G</sub> = 10Ω, I <sub>D</sub> = 100mA
Turn-On Rise Time	t <sub>r</sub>	—	8.9	—	ns	
Turn-Off Delay Time	t <sub>D(off)</sub>	—	30.3	—	ns	
Turn-Off Fall Time	t <sub>f</sub>	—	15.6	—	ns	

- Notes:
5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
  6. Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.
  7. Short duration pulse test used to minimize self-heating effect.
  8. Guaranteed by design. Not subject to product testing.

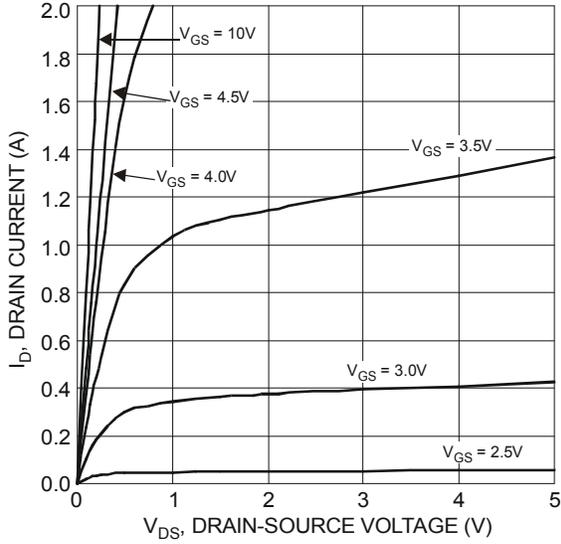


Figure 1 Typical Output Characteristic

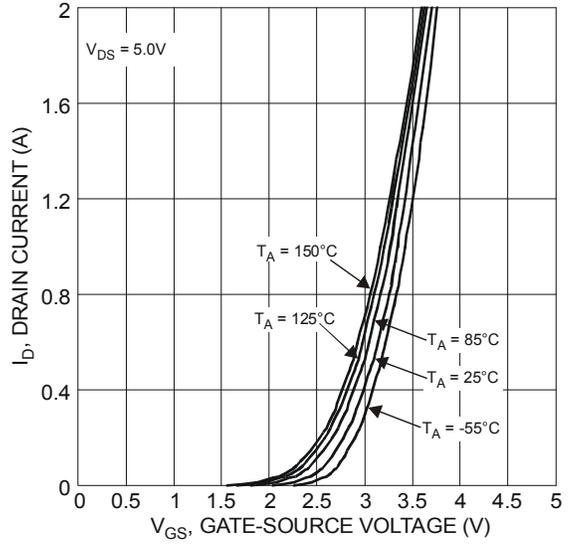


Figure 2 Typical Transfer Characteristics

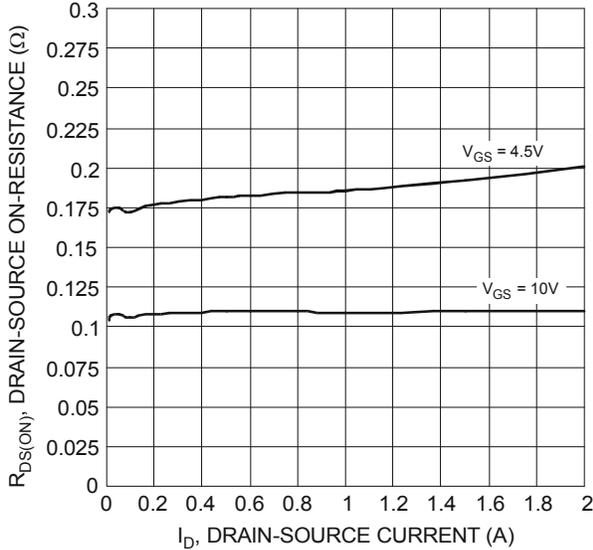


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

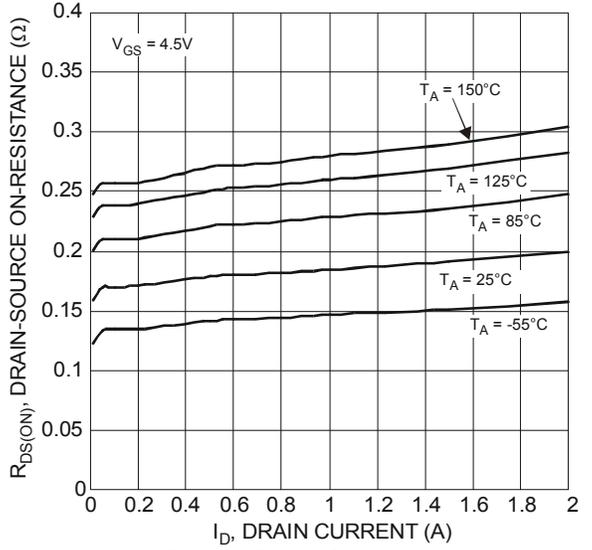


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

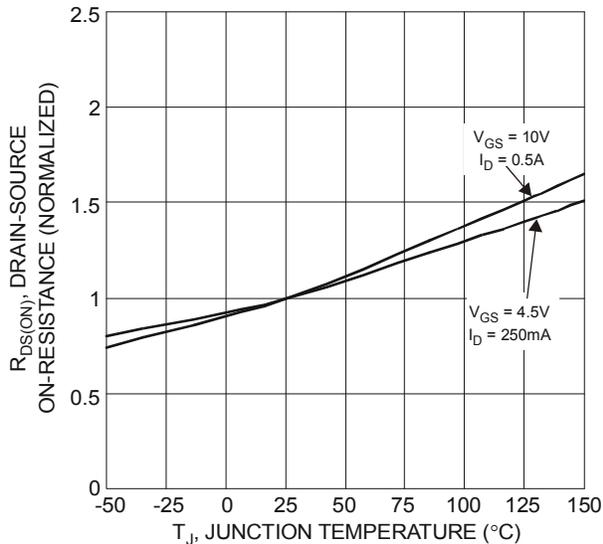


Figure 5 On-Resistance Variation with Temperature

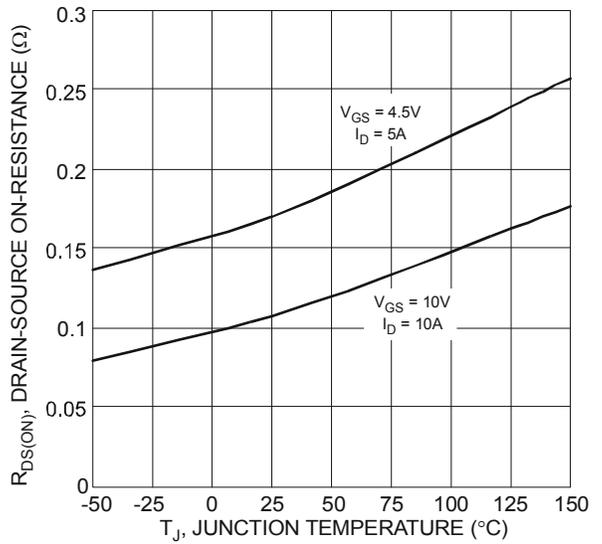


Figure 6 On-Resistance Variation with Temperature

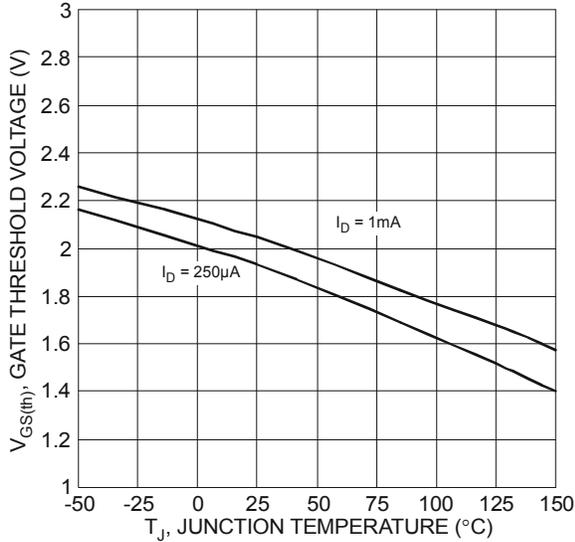


Figure 7 Gate Threshold Variation vs. Ambient Temperature

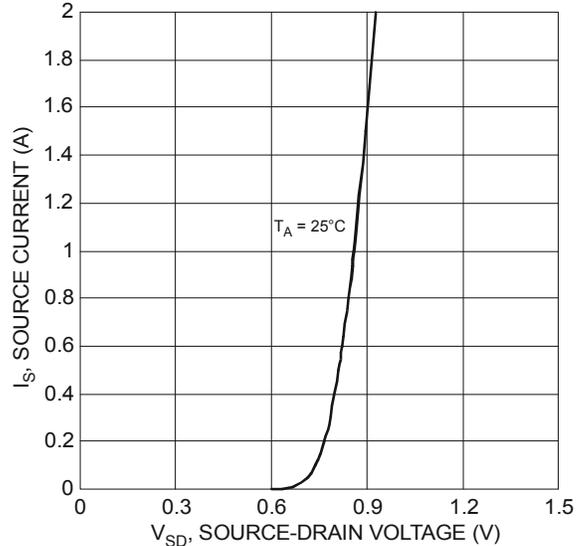


Figure 8 Diode Forward Voltage vs. Current

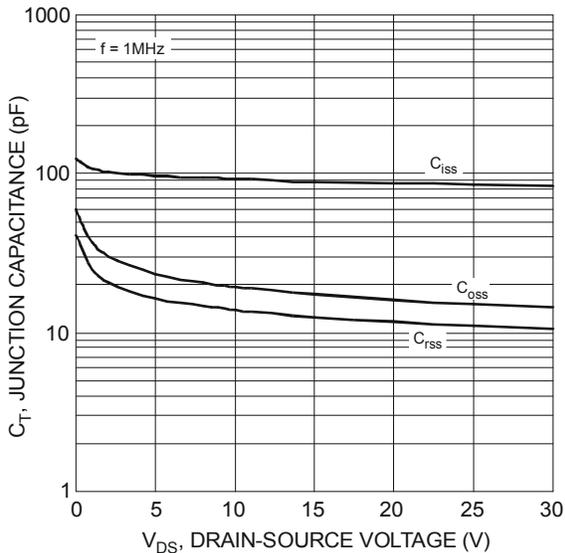


Figure 9 Typical Junction Capacitance

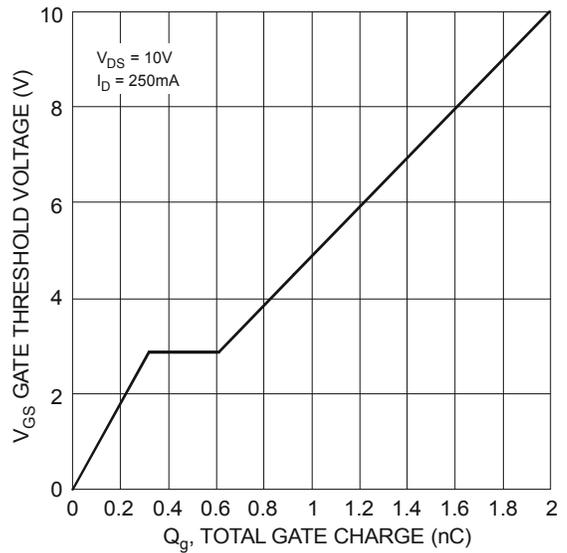
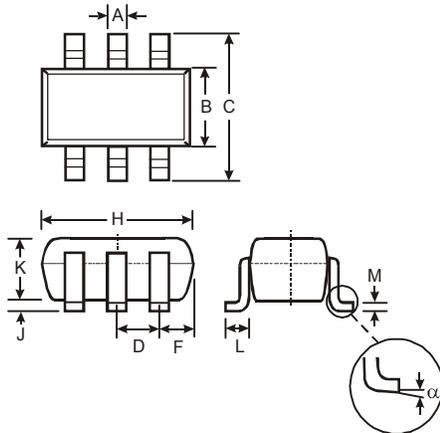


Figure 10 Gate Charge

## Package Outline Dimensions

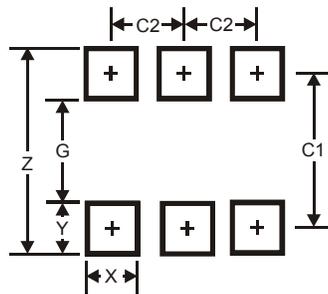
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT363			
Dim	Min	Max	Typ
A	0.10	0.30	0.25
B	1.15	1.35	1.30
C	2.00	2.20	2.10
D	0.65 Typ		
F	0.40	0.45	0.425
H	1.80	2.20	2.15
J	0	0.10	0.05
K	0.90	1.00	1.00
L	0.25	0.40	0.30
M	0.10	0.22	0.11
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	2.5
G	1.3
X	0.42
Y	0.6
C1	1.9
C2	0.65

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