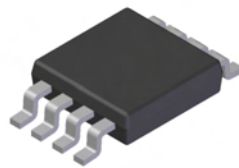


## Features

- Low On-Resistance
  - 18.5mΩ @  $V_{GS} = 10V$
  - 31mΩ @  $V_{GS} = 4.5V$
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Lead Free By Design/RoHS Compliant (Note 2)**
- **"Green" Device (Note 4)**
- **Qualified to AEC-Q101 Standards for High Reliability**

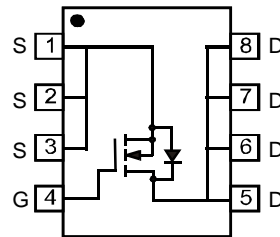
## Mechanical Data

- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.072g (approximate)



TOP VIEW

SOP-8L


 TOP VIEW  
Internal Schematic

## Maximum Ratings @ $T_A = 25^\circ C$ unless otherwise specified

Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	30	V
Gate-Source Voltage			$V_{GSS}$	$\pm 20$	V
Drain Current (Note 1)	Steady State	$T_A = 25^\circ C$	$I_D$	9	A
		$T_A = 70^\circ C$		6.75	
Pulsed Drain Current (Note 3)			$I_{DM}$	40	A

## Thermal Characteristics

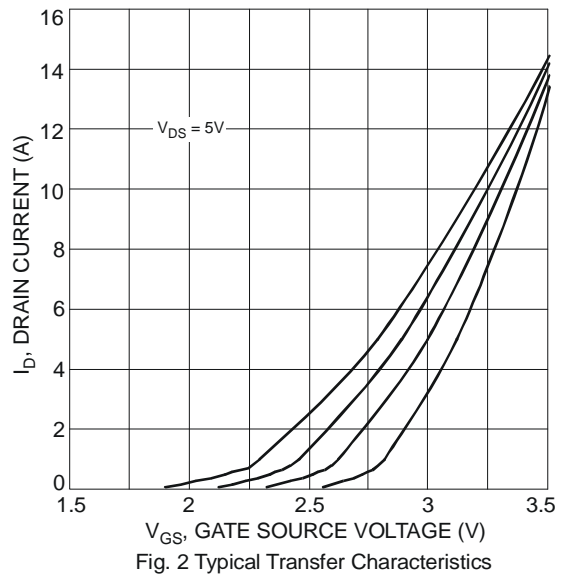
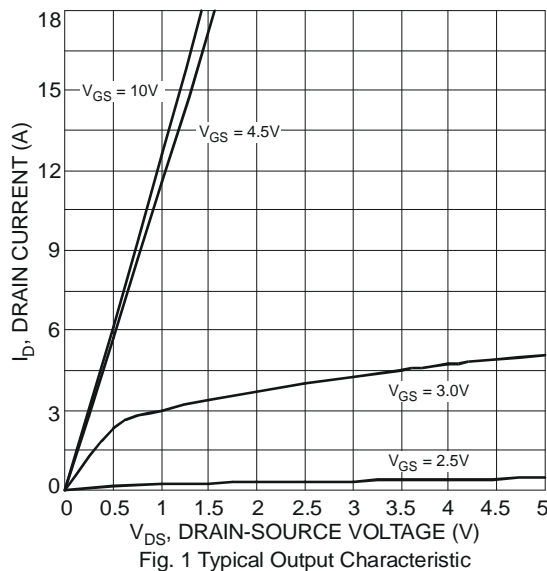
Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 1)	$P_D$	2.5	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	50	$^\circ C/W$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ C$

- Notes:
1. Device mounted on 2 oz copper pad layout with  $R_{\theta JA} = 50^\circ C/W$ .
  2. No purposefully added lead.
  3. Pulse width  $\leq 10\mu S$ , Duty Cycle  $\leq 1\%$ .
  4. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).

**Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 5)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu A$	$V_{DS} = 30V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 5)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	1	—	2.1	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	15 26	18.5 31	m $\Omega$	$V_{GS} = 10V, I_D = 9A$ $V_{GS} = 4.5V, I_D = 7A$
Forward Transconductance	$g_{fs}$	—	5.8	—	S	$V_{DS} = 10V, I_D = 9A$
Diode Forward Voltage (Note 5)	$V_{SD}$	0.5	0.7	1.2	V	$V_{GS} = 0V, I_S = 2.1A$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{iss}$	—	741	—	pF	$V_{DS} = 15V, V_{GS} = 0V$ $f = 1.0MHz$
Output Capacitance	$C_{oss}$	—	124	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	95	—	pF	
Gate Resistance	$R_G$	0.30	0.88	1.5	$\Omega$	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$
<b>SWITCHING CHARACTERISTICS</b>						
Total Gate Charge	$Q_g$	—	7.6 16.7	12 25	nC	$V_{DS} = 15V, V_{GS} = 4.5V, I_D = 9A$
Gate-Source Charge	$Q_{gs}$	—	1.9	—		$V_{DS} = 15V, V_{GS} = 10V, I_D = 9A$
Gate-Drain Charge	$Q_{gd}$	—	5.2	—		
Turn-On Delay Time	$t_{d(on)}$	—	4.0	—	ns	$V_{GS} = 10V, V_{DS} = 15V,$ $R_L = 15\Omega, R_G = 6\Omega$
Rise Time	$t_r$	—	4.4	—		
Turn-Off Delay Time	$t_{d(off)}$	—	23.0	—		
Fall Time	$t_f$	—	9.4	—		

Notes: 5. Short duration pulse test used to minimize self-heating effect.



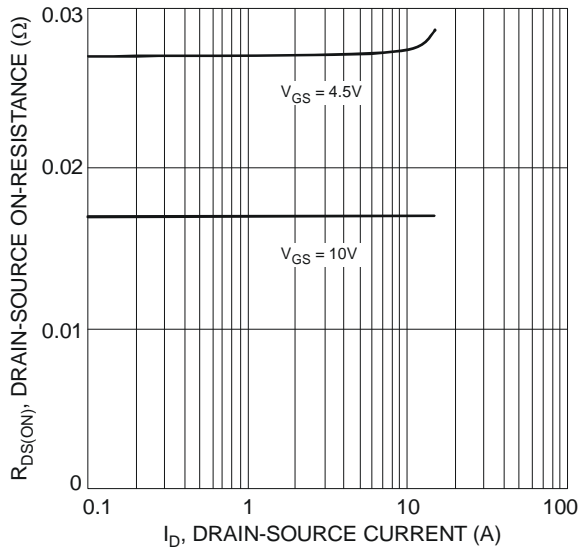


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

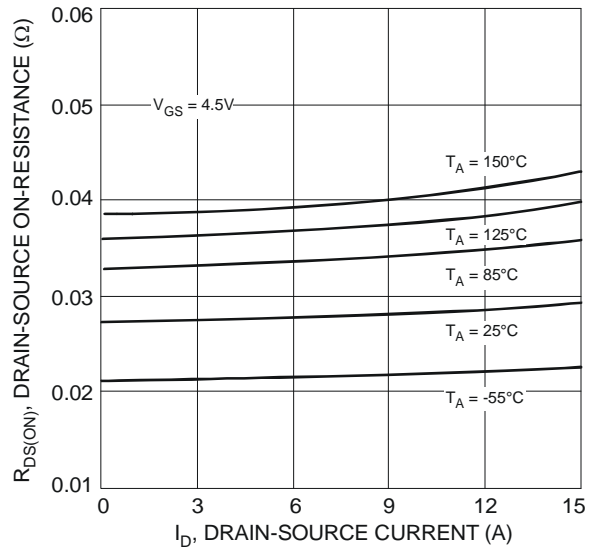


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

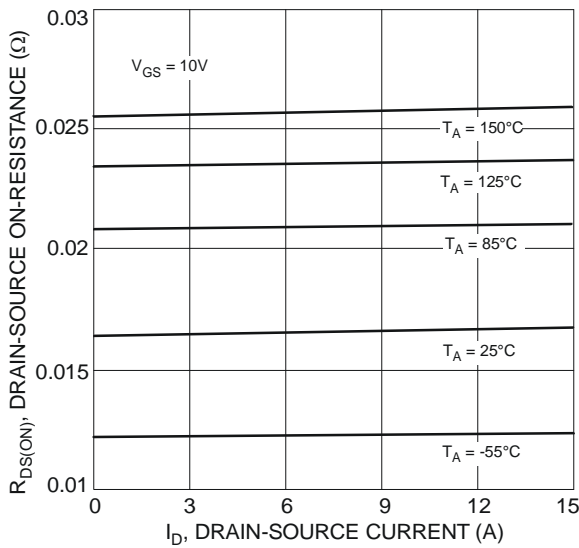


Fig. 5 Typical On-Resistance vs. Drain Current and Temperature

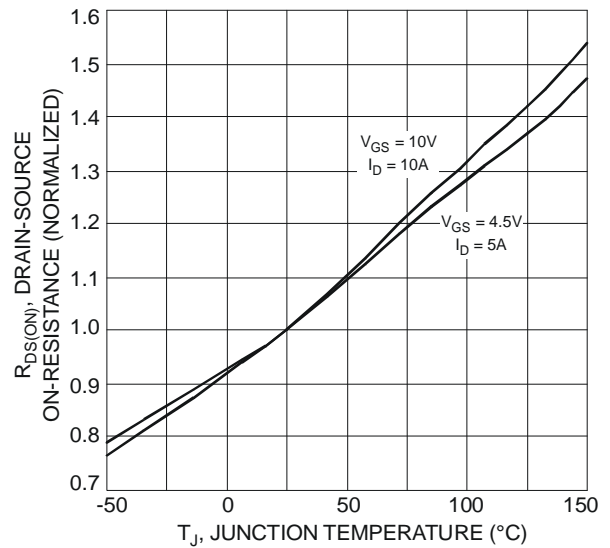


Fig. 6 On-Resistance Variation with Temperature

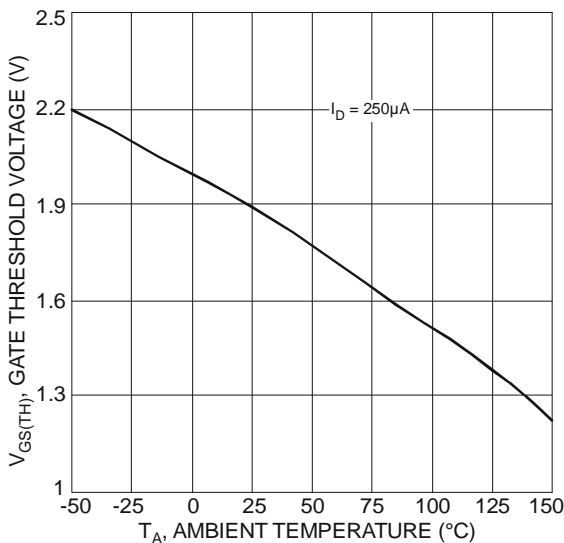


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

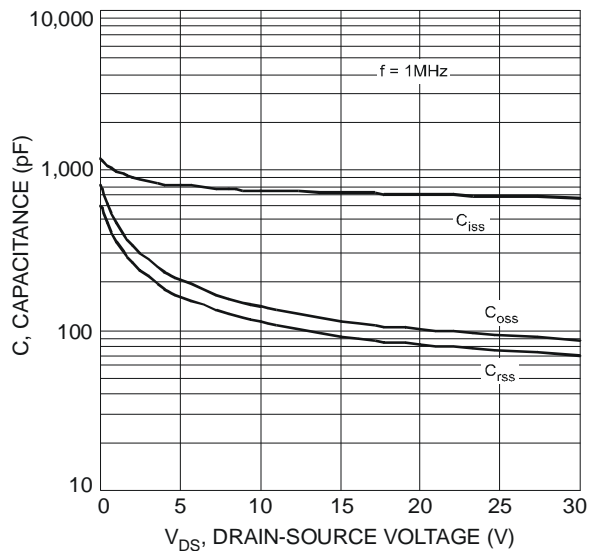


Fig. 8 Total Capacitance

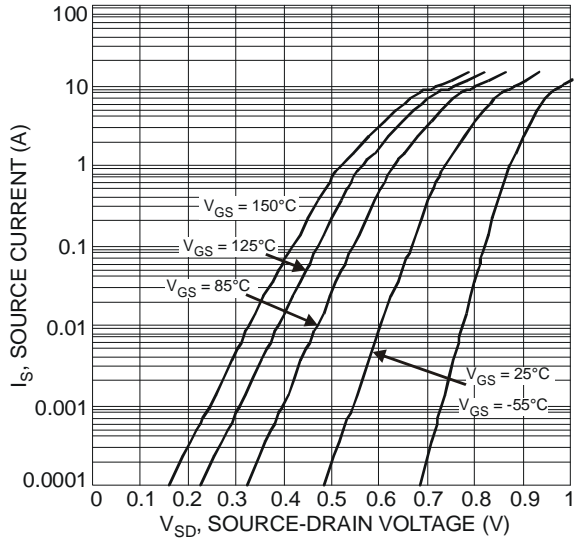


Fig. 9 Diode Forward Voltage vs. Current

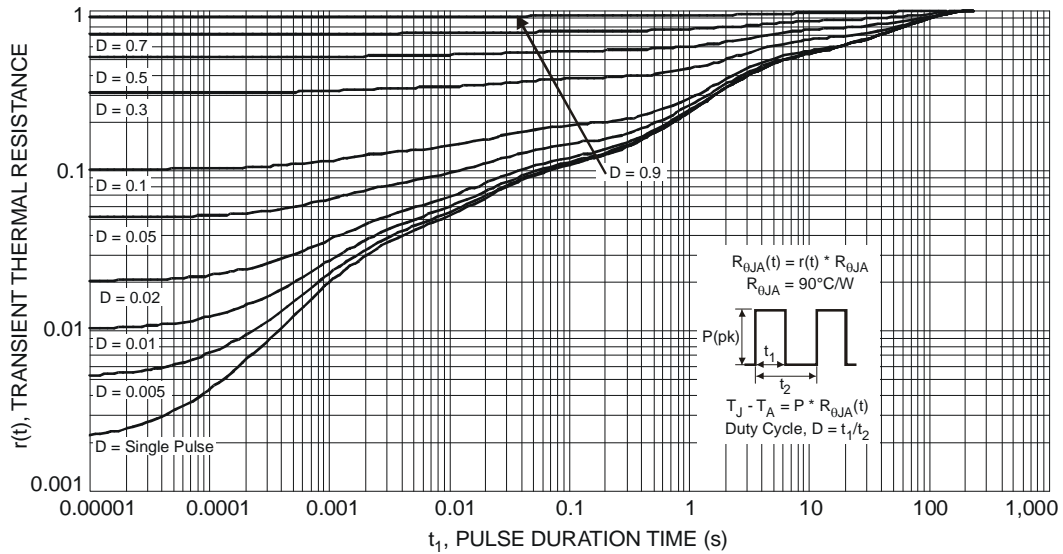


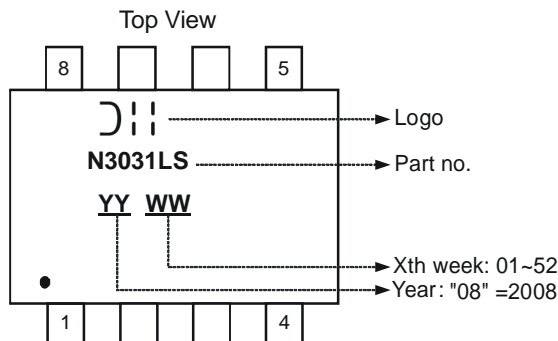
Fig. 10 Transient Thermal Response

**Ordering Information** (Note 6)

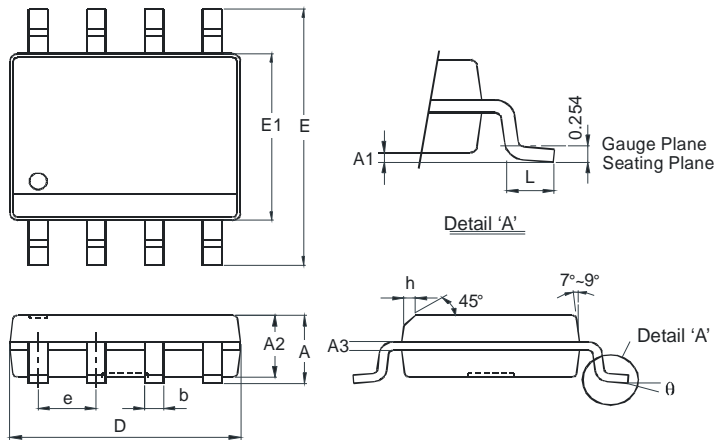
Part Number	Case	Packaging
DMN3031LSS-13	SO-8	2500/Tape & Reel

Notes: 6. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Marking Information**

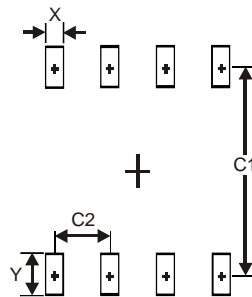


**Package Outline Dimensions**



SO-8		
Dim	Min	Max
A	-	1.75
A1	0.10	0.20
A2	1.30	1.50
A3	0.15	0.25
b	0.3	0.5
D	4.85	4.95
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	-	0.35
L	0.62	0.82
θ	0°	8°
All Dimensions in mm		

**Suggested Pad Layout**



Dimensions	Value (in mm)
X	0.60
Y	1.55
C1	5.4
C2	1.27

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