

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	$I_D$ max $T_A = 25^\circ\text{C}$
20V	18.5m $\Omega$ @ $V_{GS} = 10\text{V}$	5.4 A
	21m $\Omega$ @ $V_{GS} = 4.5\text{V}$	5.0 A
	24m $\Omega$ @ $V_{GS} = 2.5\text{V}$	4.6 A
	31m $\Omega$ @ $V_{GS} = 1.8\text{V}$	3.5 A

## 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

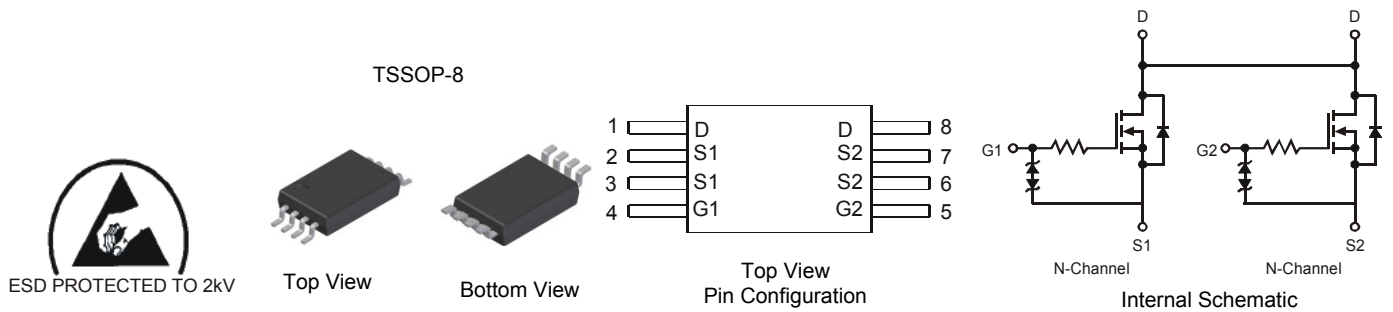
- Power management functions
- Load Switch

## Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **ESD Protected up 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: TSSOP-8
- 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 Below
- Weight: 0.039 grams (approximate)

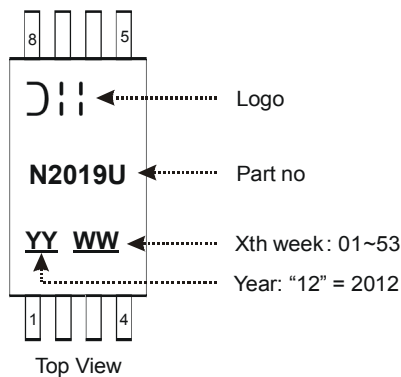


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2019UTS-13	TSSOP-8	2500/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> 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>.

## Marking Information



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

Characteristic				Symbol	Value	Units
Drain-Source Voltage				$V_{DSS}$	20	V
Gate-Source Voltage				$V_{GSS}$	$\pm 12$	V
Continuous Drain Current (Note 5)	$V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	$I_D$	5.4	A
			$T_A = +70^\circ\text{C}$		4.3	
Continuous Drain Current (Note 5)	$V_{GS} = 2.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$	$I_D$	4.6	A
			$T_A = +70^\circ\text{C}$		3.7	
Continuous Body Diode Forward Current (Note 5)			Steady State	$I_S$	0.9	A
Pulsed Drain Current (Note 5) 10 $\mu\text{s}$ pulse, duty cycle = 1%				$I_{DM}$	30	A

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	$P_D$	0.78	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	161	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case (Note 5)	$R_{\theta JC}$	26	$^\circ\text{C/W}$
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	$BV_{DSS}$	20	-	-	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	-	-	1.0	$\mu\text{A}$	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	-	-	10	$\mu\text{A}$	$V_{GS} = \pm 10\text{V}, V_{DS} = 0\text{V}$
Gate-Source Breakdown Voltage	$BV_{SGS}$	$\pm 12$	-	-	V	$V_{DS} = 0\text{V}, I_G = \pm 250\mu\text{A}$
<b>ON CHARACTERISTICS (Note 6)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	0.35	-	0.95	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	-	15.5	18.5	m $\Omega$	$V_{GS} = 10\text{V}, I_D = 7\text{A}$
		-	16.5	21		$V_{GS} = 4.5\text{V}, I_D = 7\text{A}$
		-	17	21.5		$V_{GS} = 4.0\text{V}, I_D = 7\text{A}$
		-	17.5	22.5		$V_{GS} = 3.6\text{V}, I_D = 6.5\text{A}$
		-	18	23		$V_{GS} = 3.1\text{V}, I_D = 6.5\text{A}$
		-	19	24		$V_{GS} = 2.5\text{V}, I_D = 5.5\text{A}$
		-	24	31		$V_{GS} = 1.8\text{V}, I_D = 3.5\text{A}$
		Forward Transfer Admittance	$ Y_{fs} $	-		13
Diode Forward Voltage	$V_{SD}$	-	0.7	1.0	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 7)</b>						
Input Capacitance	$C_{iss}$	-	143	-	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	-	74	-	pF	
Reverse Transfer Capacitance	$C_{rss}$	-	29	-	pF	
Gate Resistance	$R_g$	-	202	-	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge	$Q_g$	-	8.8	-	nC	$V_{GS} = 4.5\text{V}, V_{DS} = 10\text{V}, I_D = 6.5\text{A}$
Gate-Source Charge	$Q_{gs}$	-	1.4	-	nC	
Gate-Drain Charge	$Q_{gd}$	-	3.0	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	53	-	ns	$V_{DD} = 10\text{V}, V_{GS} = 4.5\text{V}, R_L = 10\Omega, R_G = 6\Omega$
Turn-On Rise Time	$t_r$	-	78	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	562	-	ns	
Turn-Off Fall Time	$t_f$	-	234	-	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.

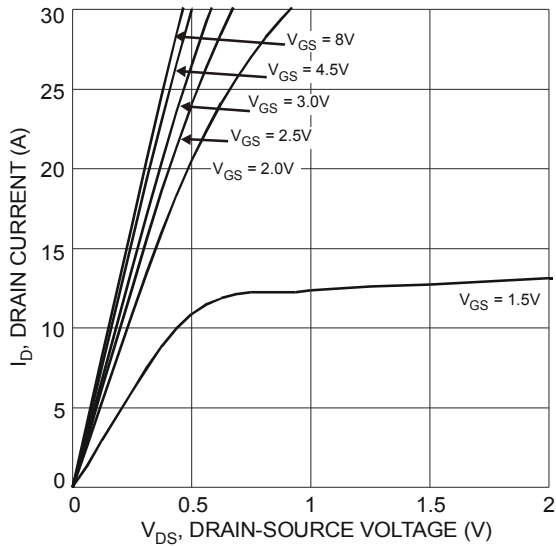


Fig. 1 Typical Output Characteristic

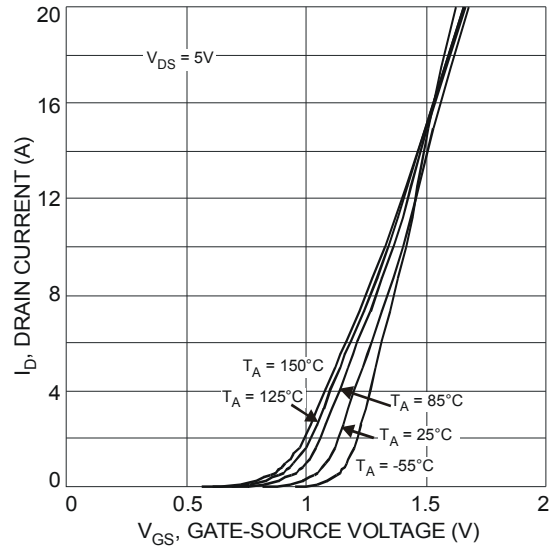


Fig. 2 Typical Transfer Characteristic

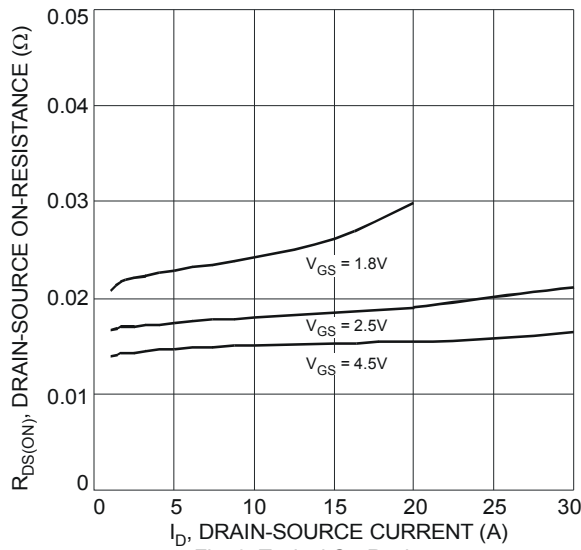


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

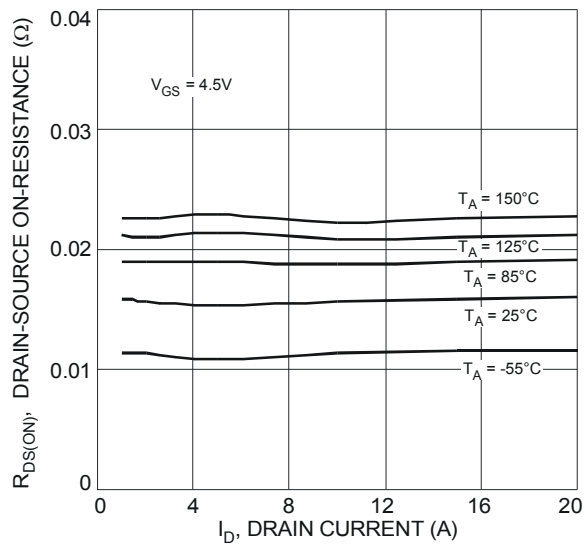


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

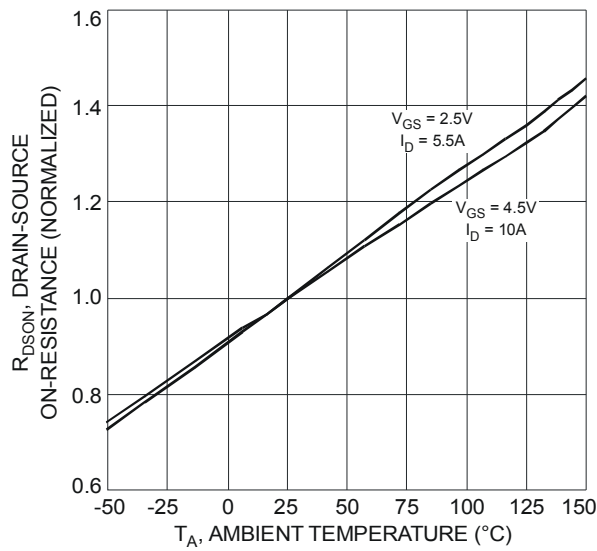


Fig. 5 On-Resistance Variation with Temperature

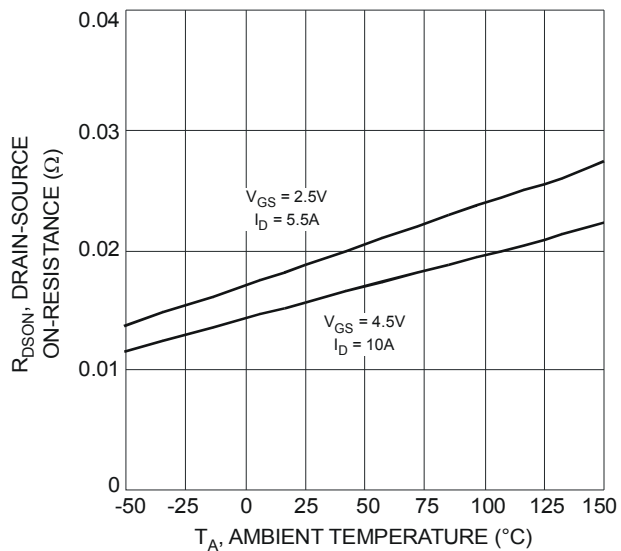


Fig. 6 On-Resistance Variation with Temperature

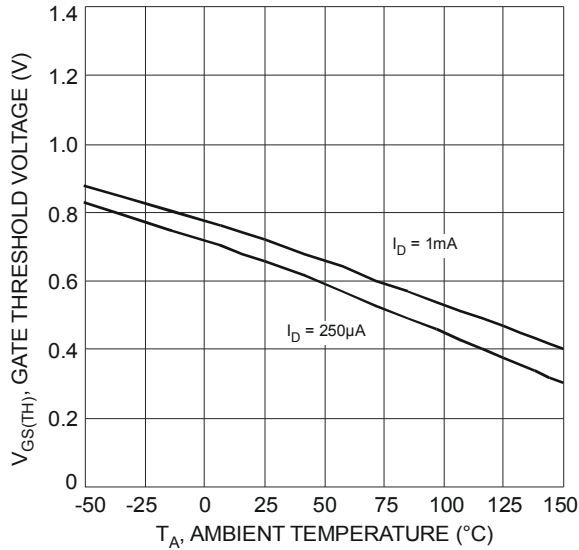


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

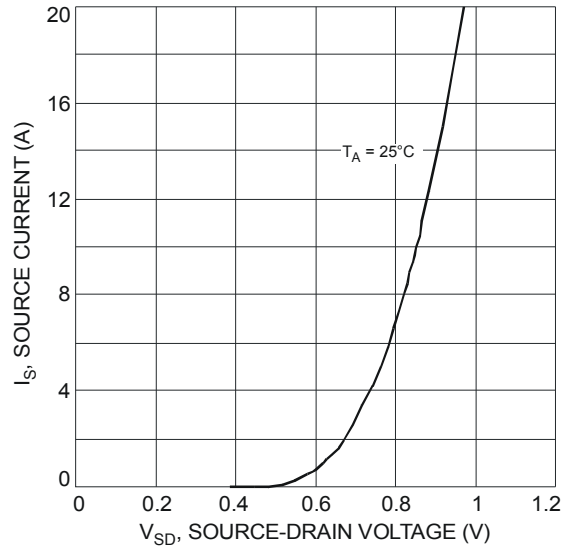


Fig. 8 Diode Forward Voltage vs. Current

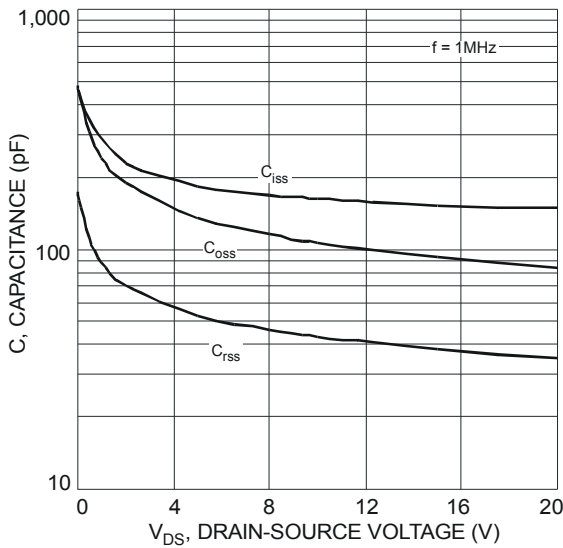


Fig. 9 Typical Total Capacitance

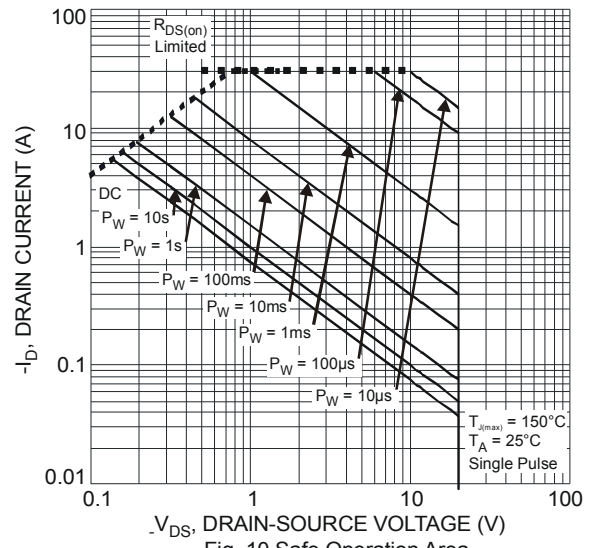


Fig. 10 Safe Operation Area

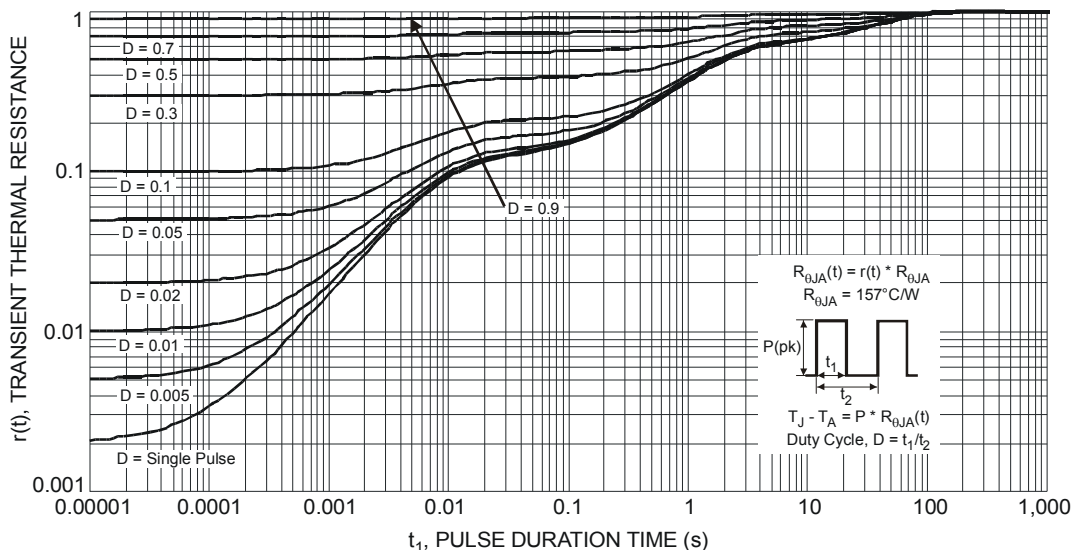
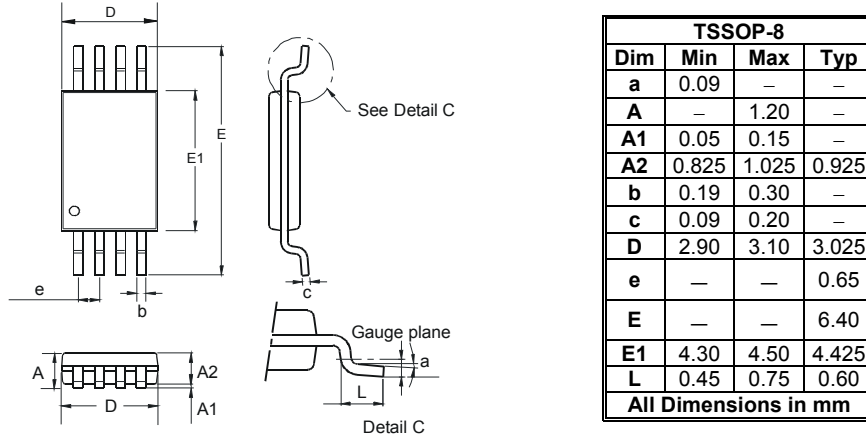


Fig. 11 Transient Thermal Response

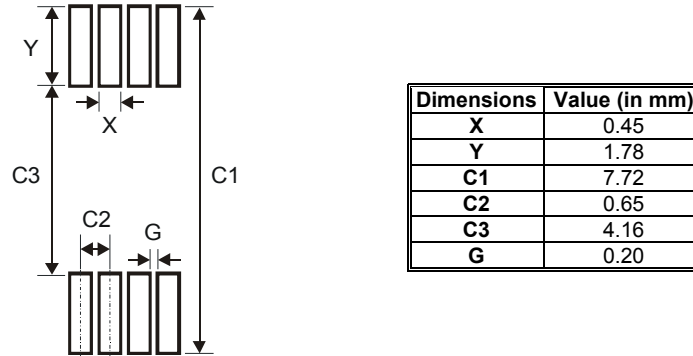
**Package Outline Dimensions**

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



**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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