

Product Summary

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

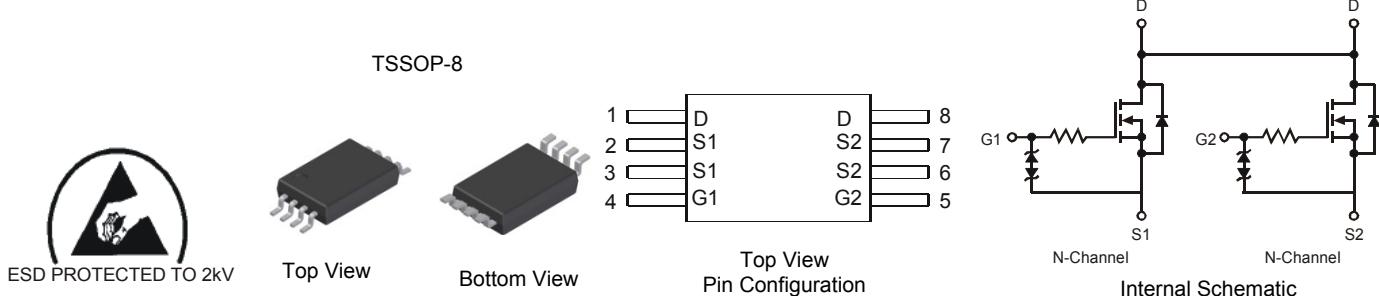
- Power management functions
- Load Switch

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)



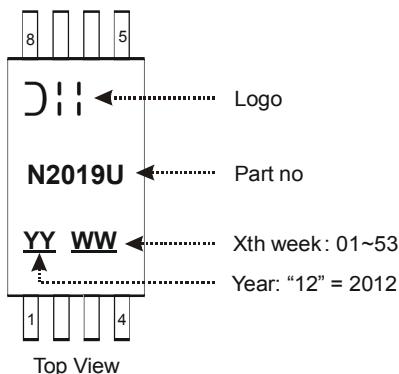
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2019UTS-13	TSSOP-8	2500/Tape & Reel

Notes:

- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- See <http://www.diodes.com> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- 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}	± 12	V	
Continuous Drain Current (Note 5)	$V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	5.4 4.3	A
Continuous Drain Current (Note 5)	$V_{GS} = 2.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	4.6 3.7	A
Continuous Body Diode Forward Current (Note 5)		Steady State	$T_A = +25^\circ\text{C}$	I_S	0.9	A
Pulsed Drain Current (Note 5)	10 μs 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	°C/W
Thermal Resistance, Junction to Case (Note 5)	$R_{\theta JC}$	26	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
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	μA	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	-	-	10	μA	$V_{GS} = \pm 10\text{V}, V_{DS} = 0\text{V}$
Gate-Source Breakdown Voltage	BV_{SGS}	± 12	-	-	V	$V_{DS} = 0\text{V}, I_G = \pm 250\mu\text{A}$
ON CHARACTERISTICS (Note 6)						
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	$R_{DS(\text{ON})}$	-	15.5	18.5	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 7\text{A}$
		-	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	-	S	$V_{DS} = 5\text{V}, I_D = 5\text{A}$
Diode Forward Voltage	V_{SD}	-	0.7	1.0	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
DYNAMIC CHARACTERISTICS (Note 7)						
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	-	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
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.

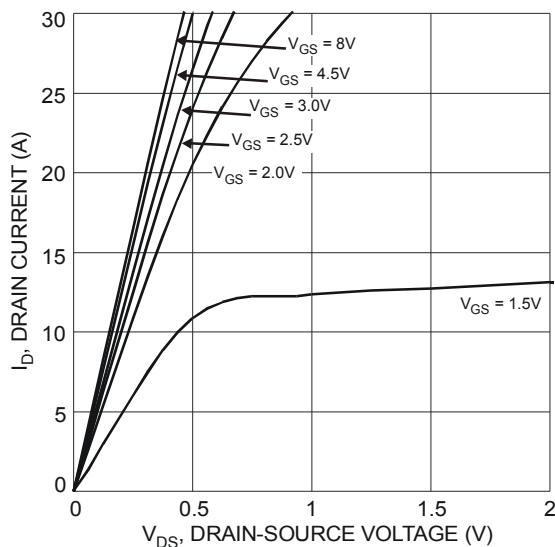


Fig. 1 Typical Output Characteristic

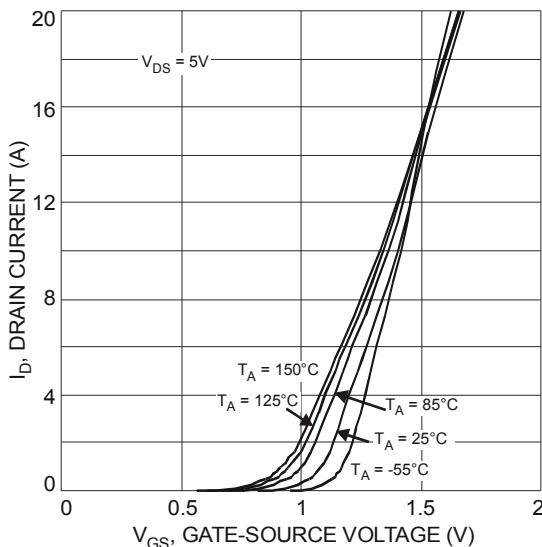


Fig. 2 Typical Transfer Characteristic

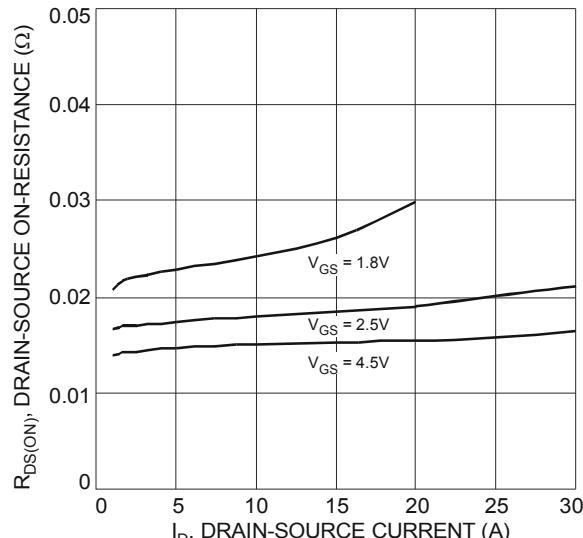


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

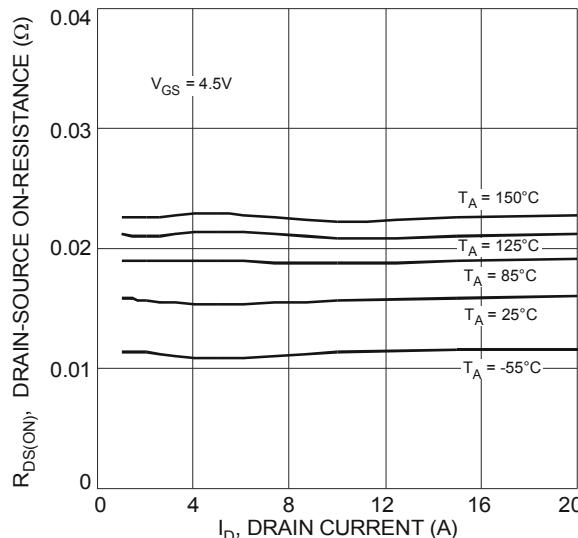


Fig. 4 Typical On-Resistance
vs. Drain Current and Temperature

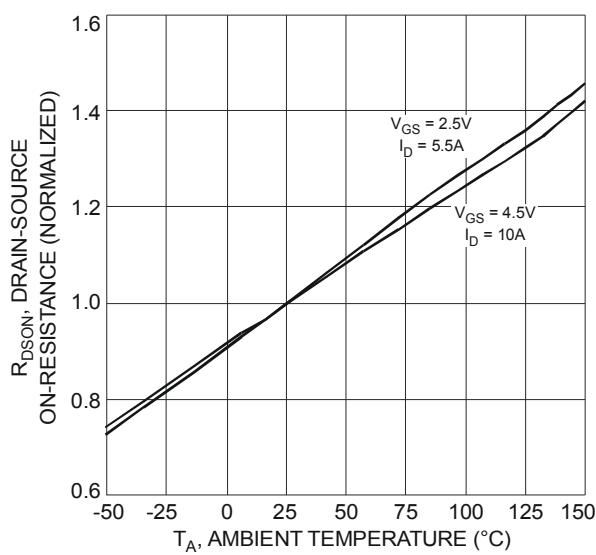


Fig. 5 On-Resistance Variation with Temperature

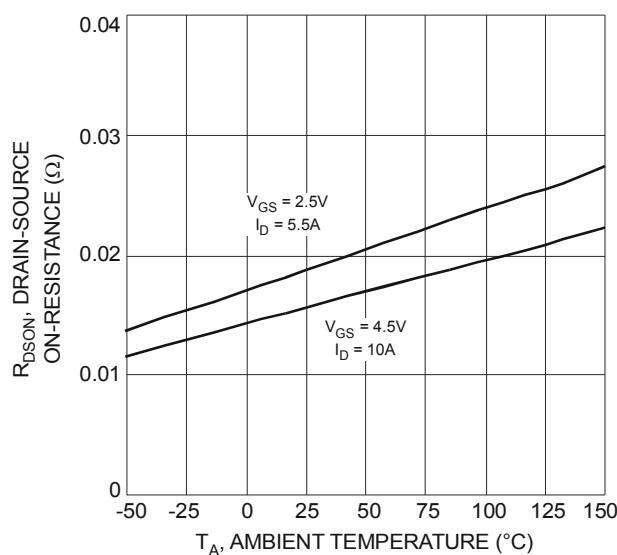


Fig. 6 On-Resistance Variation with Temperature

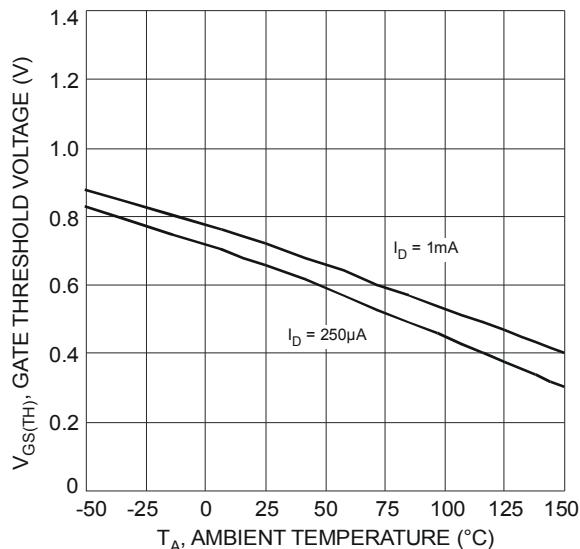


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

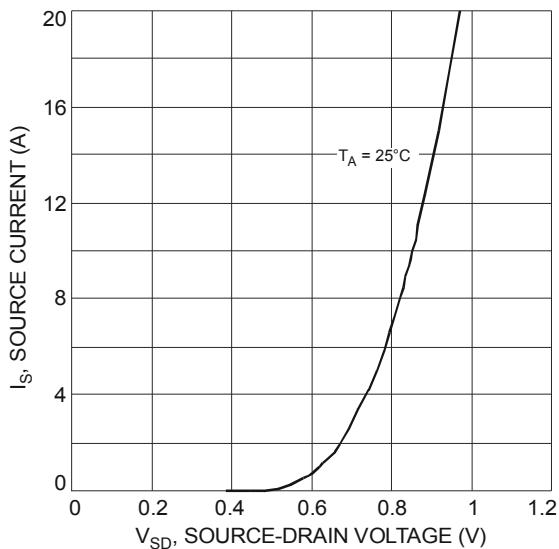


Fig. 8 Diode Forward Voltage vs. Current

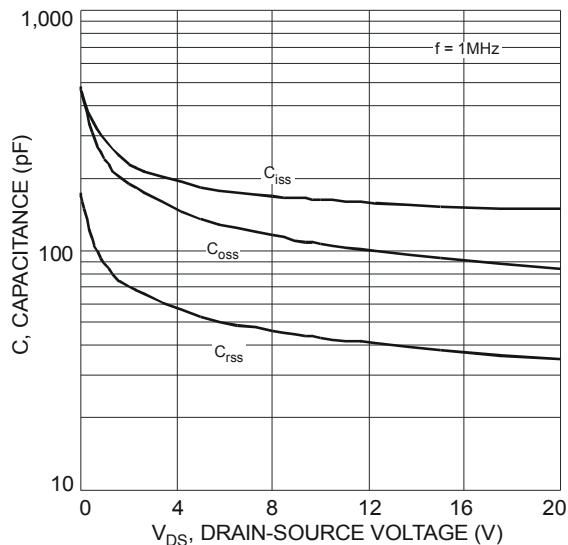


Fig. 9 Typical Total Capacitance

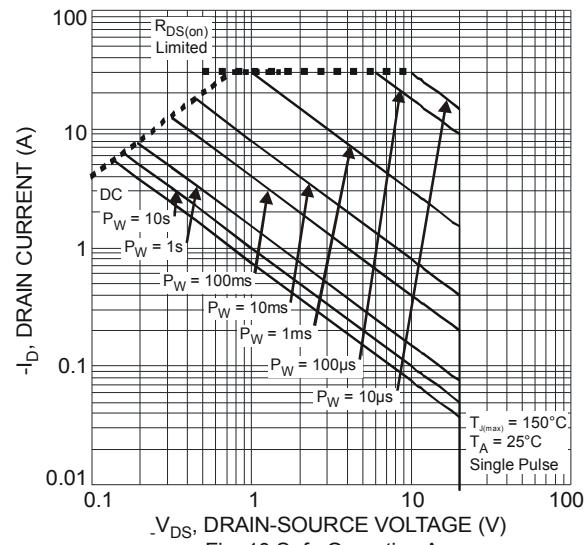


Fig. 10 Safe Operation Area

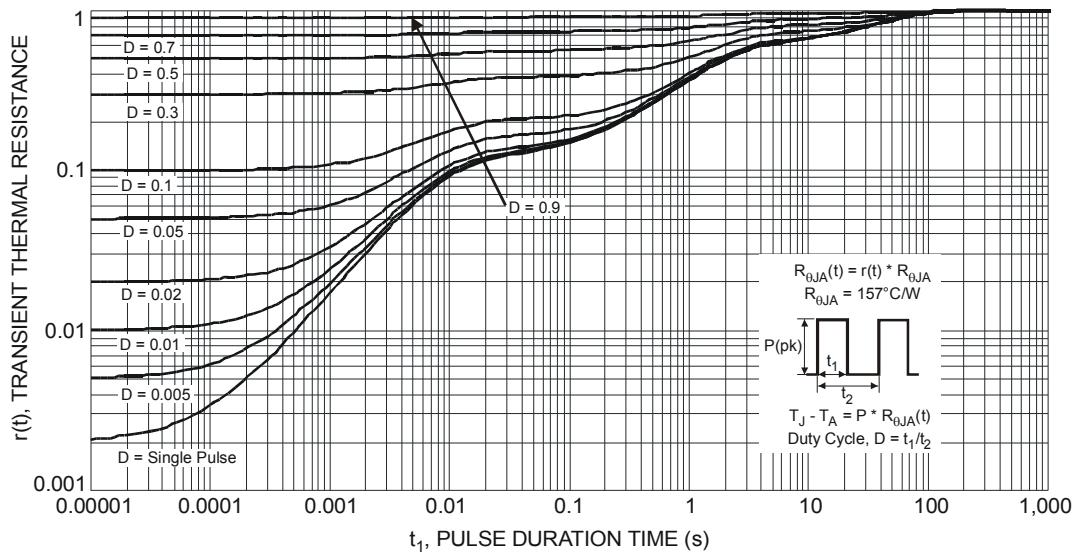
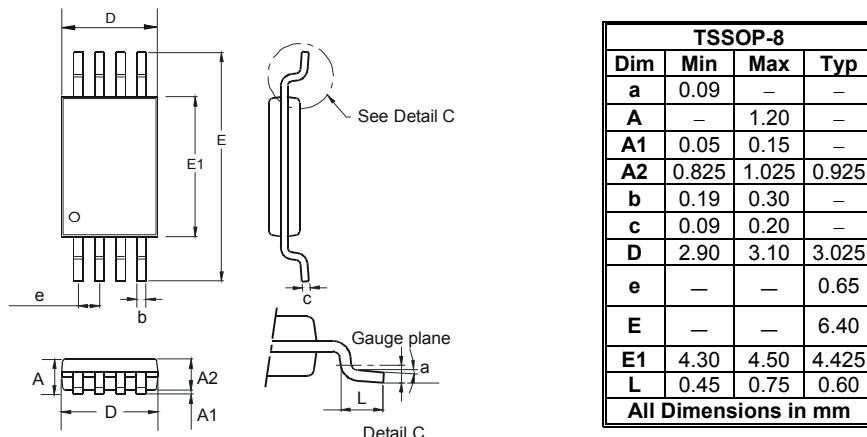


Fig. 11 Transient Thermal Response

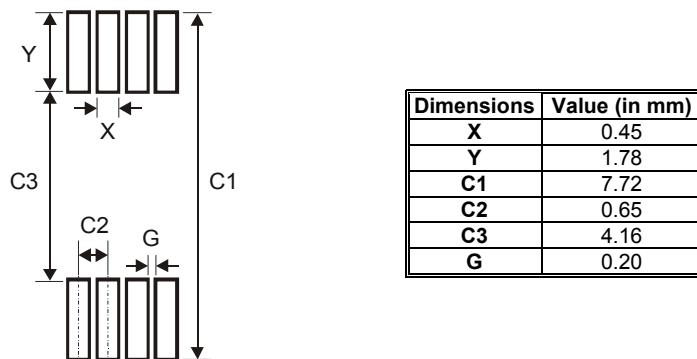
Package Outline Dimensions

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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