20V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

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

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**

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

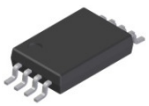
- Power management functions
- Load Switch

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)

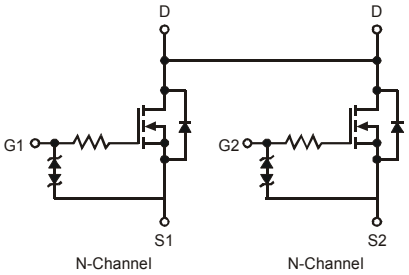

ESD PROTECTED TO 2kV

TSSOP-8


Top View


Bottom View

Top View
Pin Configuration



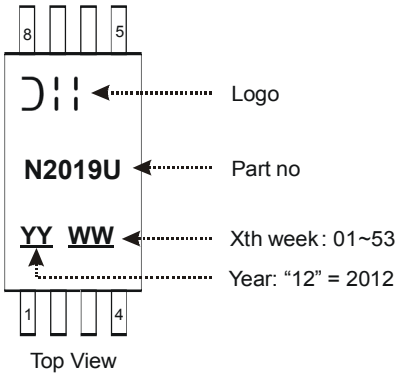
Internal Schematic

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



Top View

Maximum Ratings (@T_A = +25°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} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	5.4 4.3	A
Continuous Drain Current (Note 5)	V_{GS} = 2.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	4.6 3.7	A
Continuous Body Diode Forward Current (Note 5)		Steady Stat	T_A = +25°C	I_S	0.9	A
Pulsed Drain Current (Note 5) 10µs pulse, duty cycle = 1%				I_{DM}	30	A

Thermal Characteristics (@T_A = +25°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°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} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1.0	µA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	10	µA	V_{GS} = ±10V, V_{DS} = 0V
Gate-Source Breakdown Voltage	BV_{SGS}	±12	-	-	V	V_{DS} = 0V, I_G = ±250µA
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(th)}$	0.35	-	0.95	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	15.5	18.5	mΩ	V_{GS} = 10V, I_D = 7A
		-	16.5	21		V_{GS} = 4.5V, I_D = 7A
		-	17	21.5		V_{GS} = 4.0V, I_D = 7A
		-	17.5	22.5		V_{GS} = 3.6V, I_D = 6.5A
		-	18	23		V_{GS} = 3.1V, I_D = 6.5A
		-	19	24		V_{GS} = 2.5V, I_D = 5.5A
		-	24	31		V_{GS} = 1.8V, I_D = 3.5A
Forward Transfer Admittance	$\|Y_{fs}\|$	-	13	-	S	V_{DS} = 5V, I_D = 5A
Diode Forward Voltage	V_{SD}	-	0.7	1.0	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	-	143	-	pF	V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	74	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	29	-	pF	
Gate Resistance	R_g	-	202	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	-	8.8	-	nC	V_{GS} = 4.5V, V_{DS} = 10V, I_D = 6.5A
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} = 10V, V_{GS} = 4.5V, R_L = 10Ω, R_G = 6Ω
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.

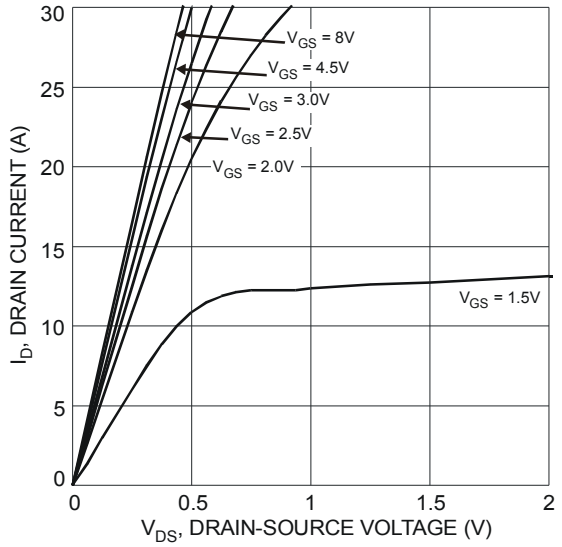


Fig. 1 Typical Output Characteristic

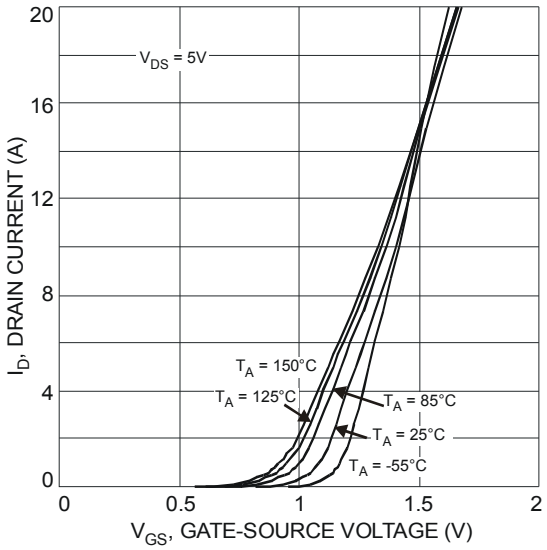


Fig. 2 Typical Transfer Characteristic

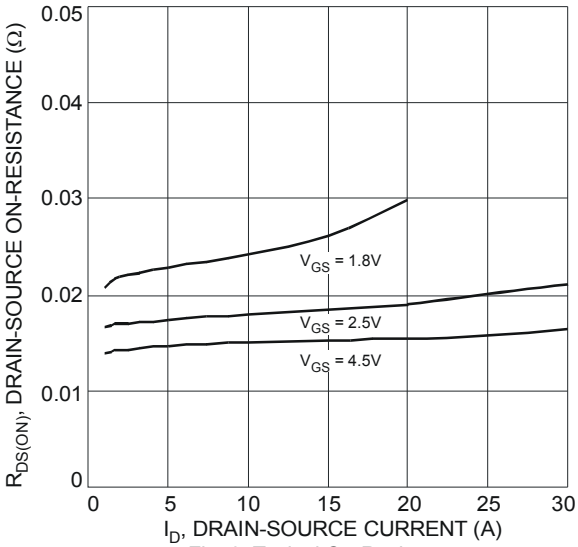


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

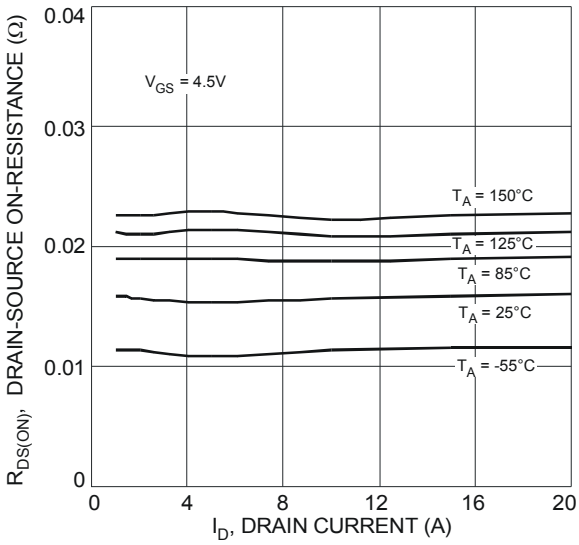


Fig. 4 Typical On-Resistance
vs. Drain Current and Temperature

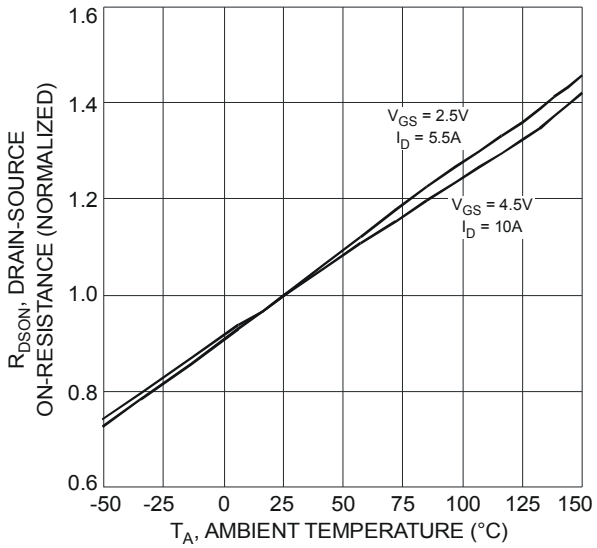


Fig. 5 On-Resistance Variation with Temperature

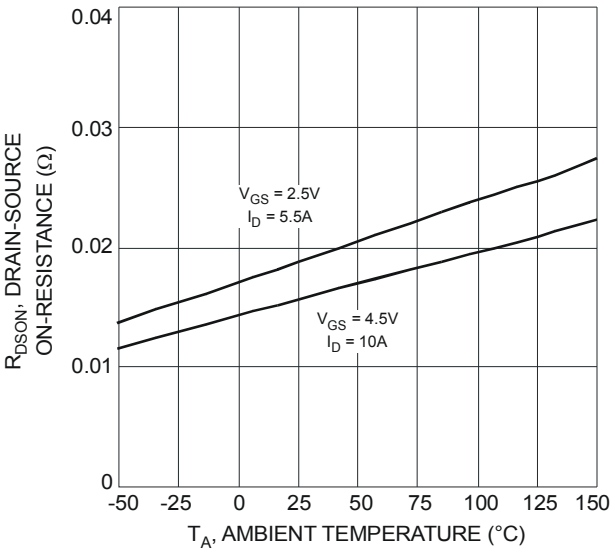


Fig. 6 On-Resistance Variation with Temperature

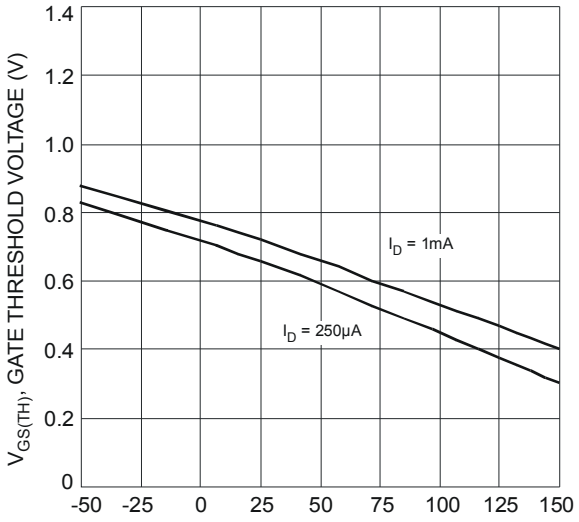


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

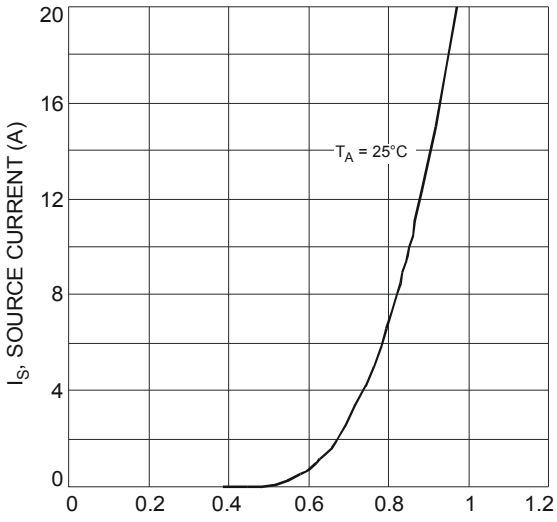


Fig. 8 Diode Forward Voltage vs. Current

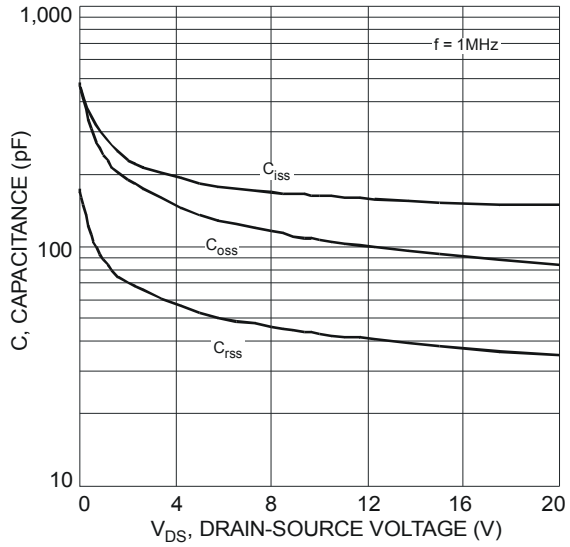


Fig. 9 Typical Total Capacitance

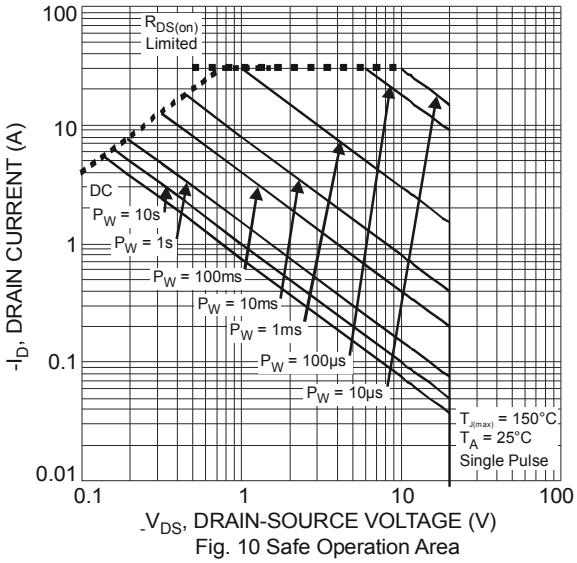


Fig. 10 Safe Operation Area

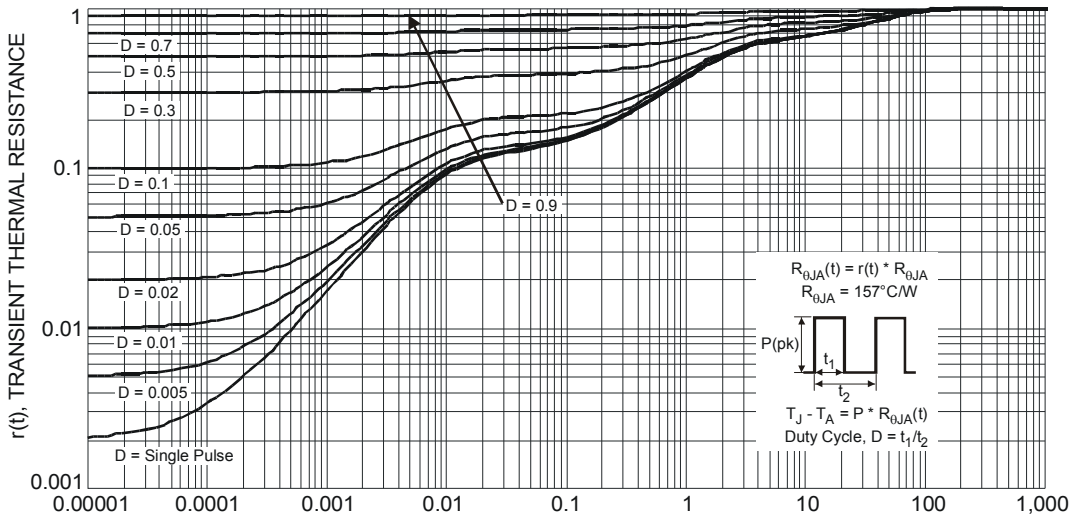
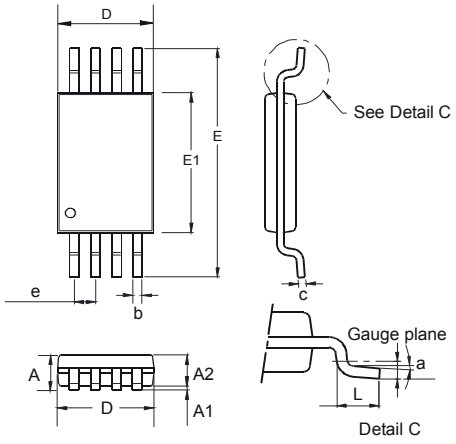


Fig. 11 Transient Thermal Response

Package Outline Dimensions

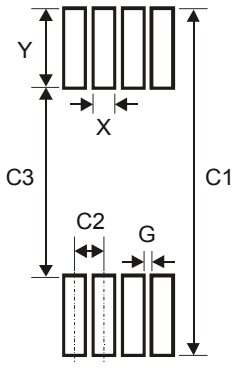
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



TSSOP-8			
Dim	**Min**	**Max**	**Typ**
a	0.09	–	–
A	–	1.20	–
A1	0.05	0.15	–
A2	0.825	1.025	0.925
b	0.19	0.30	–
c	0.09	0.20	–
D	2.90	3.10	3.025
e	—	—	0.65
E	—	—	6.40
E1	4.30	4.50	4.425
L	0.45	0.75	0.60
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)
X	0.45
Y	1.78
C1	7.72
C2	0.65
C3	4.16
G	0.20

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