MOSFET – Power, Single, N-Channel 40 V, 2.4 m Ω , 136 A

Features

- Small Footprint (3.3 x 3.3 mm) for Compact Design
- Low R_{DS(on)} to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- These Devices are Pb-Free and are RoHS Compliant

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V_{DSS}	40	V
Gate-to-Source Voltage	Э		V_{GS}	±20	V
Continuous Drain		T _C = 25°C	I _D	136	Α
Current R _{0JC} (Notes 1, 2, 3, 4)	Steady	T _C = 100°C		77	
Power Dissipation	State	T _C = 25°C	P_{D}	85	W
R _{θJC} (Notes 1, 2, 3)		T _C = 100°C		27	
Continuous Drain		T _A = 25°C	I _D	27	Α
Current R _{θJA} (Notes 1, 3, 4)	Steady	T _A = 100°C		19	
Power Dissipation	State	T _A = 25°C	P_{D}	3.2	W
R _{θJA} (Notes 1, 3)		T _A = 100°C		1.6	
Pulsed Drain Current	$T_A = 25$	°C, t _p = 10 μs	I _{DM}	676	Α
Operating Junction and Storage Temperature Range			T _J , T _{stg}	-55 to +175	°C
Source Current (Body Diode)			IS	70.4	Α
Single Pulse Drain-to-Source Avalanche Energy (I _{L(pk)} = 10.2 A)			E _{AS}	268	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			TL	260	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL RESISTANCE MAXIMUM RATINGS (Note 1)

Parameter	Symbol	Value	Unit
Junction-to-Case - Steady State (Note 3)	$R_{\theta JC}$	1.8	°C/W
Junction-to-Ambient - Steady State (Note 3)	$R_{\theta JA}$	46.5	

- The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- 2. Psi (Ψ) is used as required per JESD51-12 for packages in which substantially less than 100% of the heat flows to single case surface.
- 3. Surface-mounted on FR4 board using a 650 mm², 2 oz. Cu pad.
- Continuous DC current rating. Maximum current for pulses as long as 1 second is higher but is dependent on pulse duration and duty cycle.

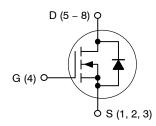


ON Semiconductor®

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V _{(BR)DSS}	R _{DS(on)} MAX	I _D MAX	
40 V	2.4 mΩ @ 10 V	136 A	

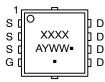
N-Channel





WDFN8 (μ8FL) CASE 511DY

MARKING DIAGRAM



XXXX = Specific Device Code A = Assembly Location

Y = Year
WW = Work Week
Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering, marking and shipping information in the package dimensions section on page 5 of this data sheet.

ELECTRICAL CHARACTERISTICS ($T_J = 25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Test Condition		Min	Тур	Max	Unit
OFF CHARACTERISTICS	•				•	•	•
Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu A$		40			V
Zero Gate Voltage Drain Current	I _{DSS}	$V_{GS} = 0 \text{ V},$ $T_J = 25^{\circ}\text{C}$	T _J = 25°C			10	μΑ
		$V_{DS} = 40 \text{ V}$	T _J = 125°C			250	1
Gate-to-Source Leakage Current	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{G}$	S = 20 V			100	nA
ON CHARACTERISTICS (Note 5)							
Gate Threshold Voltage	V _{GS(TH)}	$V_{GS} = V_{DS}, I_{D}$	= 90 μΑ	2.5		3.5	V
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 10 V, I _E	₀ = 50 A		2.0	2.4	mΩ
Forward Transconductance	9 _{FS}	V _{DS} = 15 V, I _D = 50 A			92		S
CHARGES AND CAPACITANCES							
Input Capacitance	C _{iss}				2250		pF
Output Capacitance	C _{oss}	V _{GS} = 0 V, f = V _{DS} = 25	1.0 MHz, 5 V		1230		1
Reverse Transfer Capacitance	C _{rss}	V DS - 20 V			41		1
Threshold Gate Charge	Q _{G(TH)}	V _{GS} = 10 V, V _{DS} = 20 V, I _D = 50 A			6.7		nC
Gate-to-Source Charge	Q_{GS}				11.4		
Gate-to-Drain Charge	Q_{GD}				5.7		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10 \text{ V}, V_{DS} = 20 \text{ V}, I_D = 50 \text{ A}$			34		nC
SWITCHING CHARACTERISTICS (No	te 6)						
Turn-On Delay Time	t _{d(on)}				11		ns
Rise Time	t _r	V _{GS} = 10 V, V _D	s = 20 V,		77		
Turn-Off Delay Time	t _{d(off)}	$I_{D} = 50 \text{ A}$			23		1
Fall Time	t _f				7		1
DRAIN-SOURCE DIODE CHARACTER	RISTICS						
Forward Diode Voltage	V _{SD}	V _{GS} = 0 V,	T _J = 25°C		0.84	1.2	V
		I _S = 50 A	T _J = 125°C		0.72		1
Reverse Recovery Time	t _{RR}		•		50		ns
Charge Time	t _a	$V_{GS} = 0 \text{ V, } dI_{S}/dt = 100 \text{ A}/\mu\text{s,}$ $I_{S} = 50 \text{ A}$			25		1
Discharge Time	t _b				25		1
Reverse Recovery Charge	Q _{RR}				50		nC

^{5.} Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
6. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

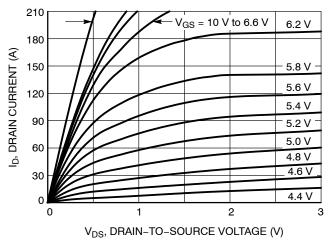


Figure 1. On-Region Characteristics

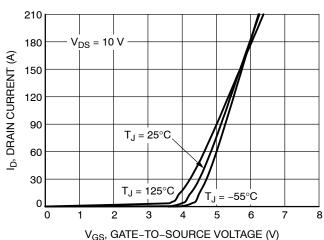


Figure 2. Transfer Characteristics

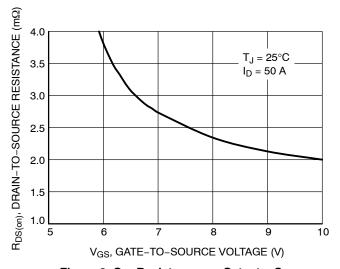


Figure 3. On-Resistance vs. Gate-to-Source Voltage

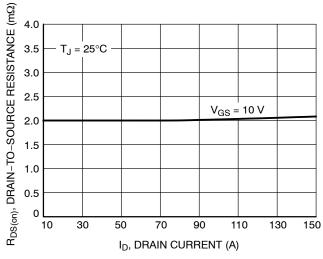


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

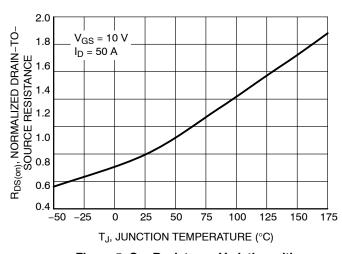


Figure 5. On–Resistance Variation with Temperature

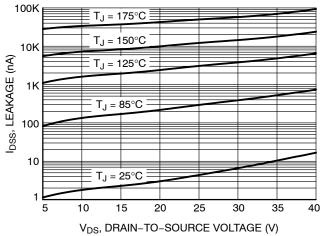


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

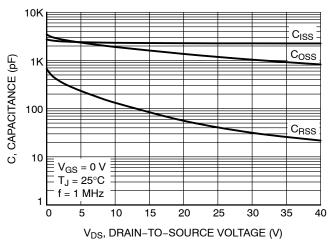


Figure 7. Capacitance Variation

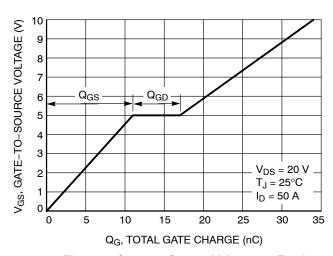


Figure 8. Gate-to-Source Voltage vs. Total Charge

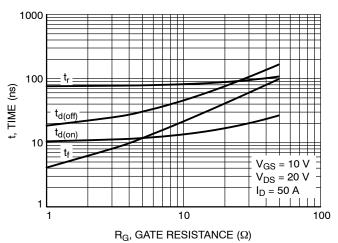


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

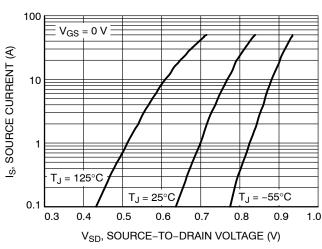


Figure 10. Diode Forward Voltage vs. Current

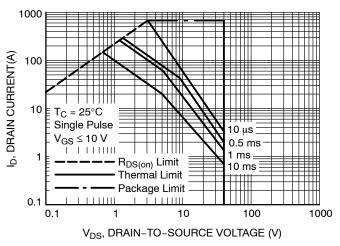


Figure 11. Maximum Rated Forward Biased Safe Operating Area

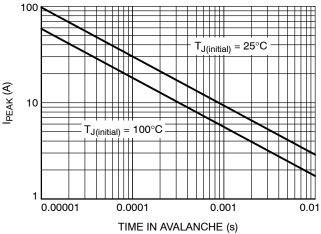


Figure 12. I_{PEAK} vs. Time in Avalanche

TYPICAL CHARACTERISTICS

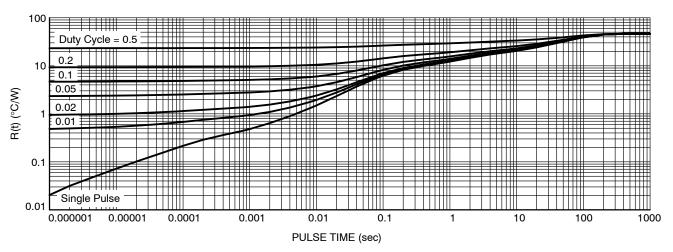


Figure 13. Thermal Characteristics

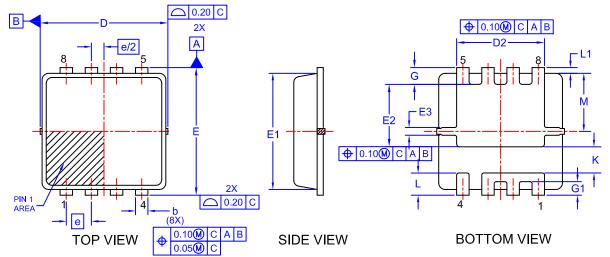
DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping [†]
NTTFS002N04CTAG	02NC	WDFN8 (Pb-Free)	1500 / Tape & Reel

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

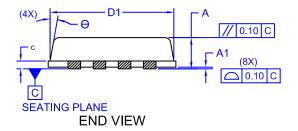
WDFN8 3.3x3.3, 0.65P CASE 511DY ISSUE A

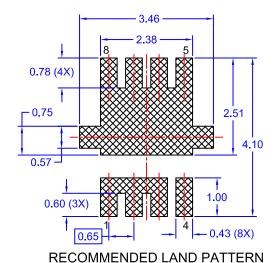
DATE 21 AUG 2018



NOTES:

- 1. CONTROLLING DIMENSION: MILLIMETERS
- 2. DIMENSIONS D1 & E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS NOR GATE BURRS.





GENERIC MARKING DIAGRAM*

O XXXX AYWW

XXXX = Specific Device Code A = Assembly Location

Y = Year Code WW = Work Week Code

l _{DIM}	MILLIMETERS			
DIM	MIN	NOM	MAX	
Α	0.70	0.75	0.80	
A1	0.00	-	0.05	
b	0.23	0.33	0.43	
С	0.15	0.20	0.25	
D	3.20	3.30	3.40	
D1	2.95	3.13	3.30	
D2	1.98	2.20	2.40	
Е	3.20	3.30	3.40	
E1	2.80	3.00	3.15	
E2	1.40	1.60	1.80	
E3	0.15	0.25	0.40	
е	0	0.65 BSC		
G	0.30	0.43	0.55	
G1	0.25	0.35	0.45	
K	0.55	0.75	0.95	
L	0.35	0.52	0.65	
L1	0.06	0.15	0.30	
М	1.35	1.50	1.60	
θ	0	-	12	

*This information is generic. Please refer to device data sheet for actual part marking. Pb–Free indicator, "G" or microdot " •", may or may not be present. Some products may not follow the Generic Marking.

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DESCRIPTION:	WDFN8 3.3x3.3, 0.65P		PAGE 1 OF 1	

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