Power MOSFET

30 V, 7.4 m Ω , 47 A, Single N–Channel, μ 8FL

Features

- Low R_{DS(on)} to Minimize Conduction Losses
- Low Capacitance to Minimize Driver Losses
- Optimized Gate Charge to Minimize Switching Losses
- NVTFS4C10NWF Wettable Flanks Product
- NVT Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC–Q101 Qualified and PPAP Capable
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant

(.] =00				
Parameter			Value	Unit
Drain-to-Source Voltage			30	V
		V _{GS}	±20	V
	$T_A = 25^{\circ}C$	I _D	15.3	A
	$T_A = 100^{\circ}C$		10.8	
	T _A = 25°C	PD	3.0	W
Steady	$T_A = 100^{\circ}C$		1.5	
State	$T_{C} = 25^{\circ}C$	Ι _D	47	A
	$T_C = 100^{\circ}C$		33	
	$T_C = 25^{\circ}C$	PD	28	W
	$T_C = 100^{\circ}C$		14	W
$T_{A} = 25^{\circ}$	C, t _p = 10 μs	I _{DM}	196	А
Operating Junction and Storage Temperature			–55 to +175	°C
Source Current (Body Diode)			53	А
Single Pulse Drain–to–Source Avalanche Energy (T _J = 25°C, V _{GS} = 10 V, I _L = 10.2 A, L = 0.5 mH)			26	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			260	°C
	Steady State $T_A = 25^{\circ}$ State Storage Ten Dode) urce Avalar _ = 10.2 A,	TA = 25°CTA = 100°CTA = 100°CTA = 100°CTA = 100°CTC = 25°CTC = 100°CTC = 100°CTC = 100°CTC = 100°CTA = 25°C, tp = 10 μ sStorage TemperatureDde)urce Avalanche Energy= 10.2 A, L = 0.5 mH)	$\begin{array}{c c c c c c } & & & & & & & & & & & & & & & & & & &$	$\begin{tabular}{ c c c c c } \hline Symbol & Value \\ \hline V_{DSS} & 30 \\ \hline V_{DSS} & 30 \\ \hline V_{DSS} & \pm 20 \\ \hline V_{DSS} & \pm 20 \\ \hline I_{D} & 15.3 \\ \hline T_{A} = 25^{\circ}C & I_{D} & 10.8 \\ \hline T_{A} = 25^{\circ}C & P_{D} & 3.0 \\ \hline T_{A} = 100^{\circ}C & 1.5 \\ \hline T_{C} = 25^{\circ}C & I_{D} & 47 \\ \hline T_{C} = 100^{\circ}C & 33 \\ \hline T_{C} = 25^{\circ}C & I_{D} & 47 \\ \hline T_{C} = 100^{\circ}C & 14 \\ \hline T_{A} = 25^{\circ}C, t_{p} = 10 \ \mu s & I_{DM} & 196 \\ \hline Storage Temperature & T_{J}, & -55 \ to \\ T_{Stg} & -55 \ to \\ +175 \\ \hline Dde) & I_{S} & 53 \\ \hline urce Avalanche Energy \\ L = 10.2 \ A, \ L = 0.5 \ mH) & I \\ \hline \end{tabular}$

MAXIMUM RATINGS (T_{.1} = 25°C unless otherwise stated)

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

Parameter	Symbol	Value	Unit
Junction-to-Case (Drain) (Notes 1, 3)	R_{\psiJC}	5.4	
Junction-to-Ambient - Steady State (Notes 1, 2)	R_{\thetaJA}	50	°C/W

1. The entire application environment impacts the thermal resistance values shown; they are not constants and are valid for the specific conditions noted.

2. Surface-mounted on FR4 board using 650 $\rm mm^2,$ 2 oz. Cu Pad.

- 3. Assumes heat-sink sufficiently large to maintain constant case temperature independent of device power.
- 4. Continuous DC current rating. Maximum current for pulses as long as one second is higher but dependent on pulse duration and duty cycle.

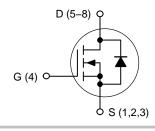


ON Semiconductor®

http://onsemi.com

V _{(BR)DSS}	R _{DS(on)} MAX	I _D MAX	
30 V	7.4 mΩ @ 10 V	47 A	
30 V	11 mΩ @ 4.5 V	77 8	

N-Channel MOSFET



MARKING DIAGRAM 1 sd D b ΙÞΡ XXXX SC sd AYWWþρ (µ8FL) CASE 511AB G h D

4C10	= Specific Device Code for
	NVMTS4C10N
10WF	= Specific Device Code of
	NVTFS4C10NWF
А	= Assembly Location
Y	= Year
WW	= Work Week
•	= Pb-Free Package
(h) (h)	

(Note: Microdot may be in either location)

ORDERING INFORMATION

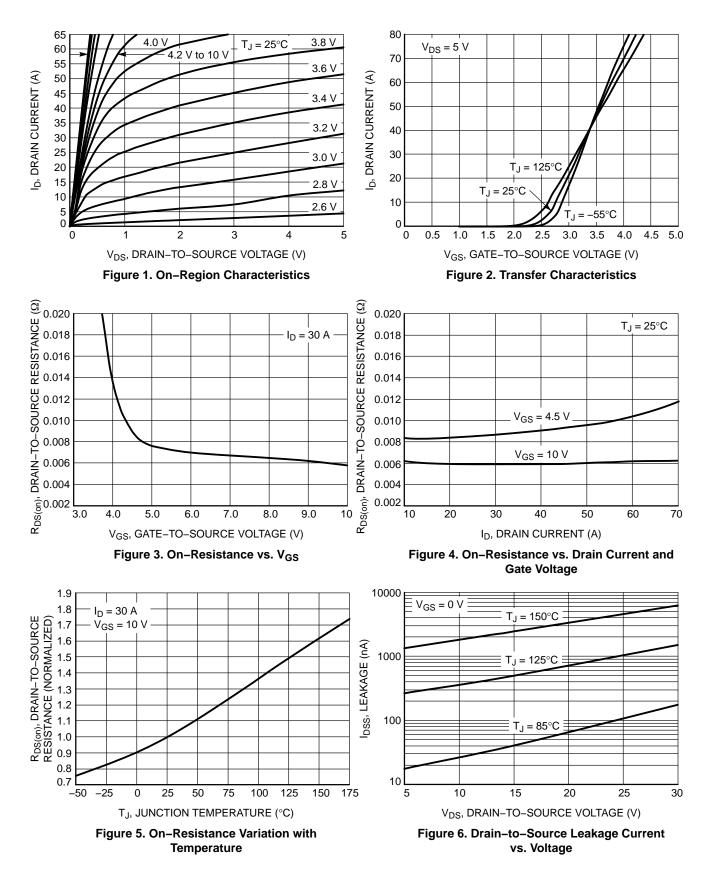
See detailed ordering and shipping information on page 5 of this data sheet.

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise specified) Parameter Symbol Test Con

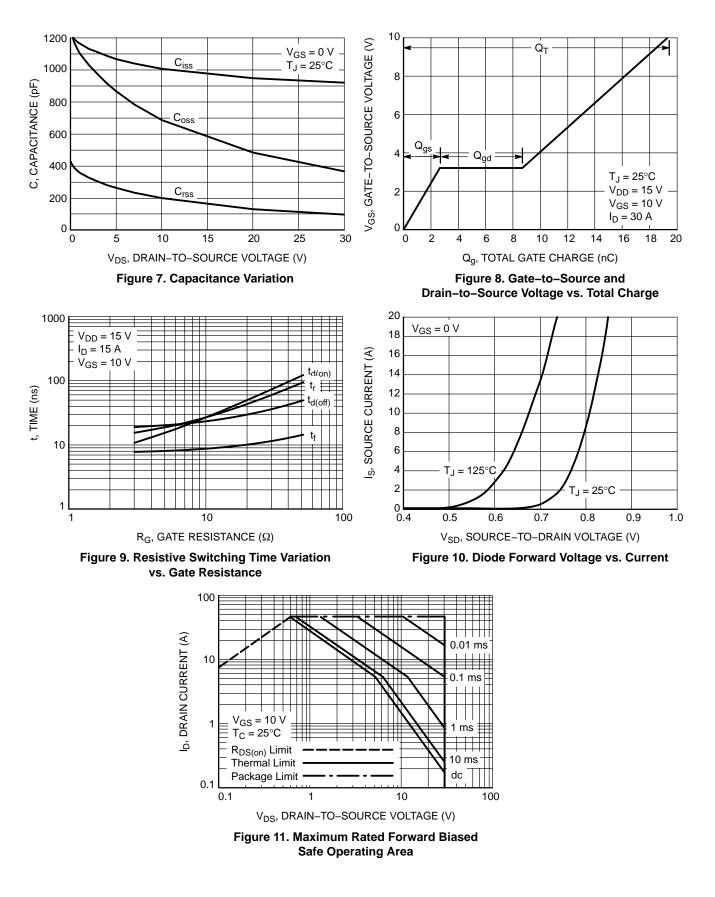
Parameter	Symbol	Test Condition		Min	Тур	Мах	Unit
OFF CHARACTERISTICS							
Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	$V_{GS} = 0 \text{ V}, \text{ I}_{D} = 250 \ \mu\text{A}$		30			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} / T _J				14.5		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 24 V	$T_J = 25^{\circ}C$			1.0	μΑ
		V _{DS} = 24 V	T _J = 125°C			10	
Gate-to-Source Leakage Current	I _{GSS}	$V_{DS} = 0 V, V_{G}$	_S = ±20 V			±100	nA
ON CHARACTERISTICS (Note 5)							
Gate Threshold Voltage	V _{GS(TH)}	$V_{GS} = V_{DS}, I_{D}$	= 250 μA	1.3		2.2	V
Threshold Temperature Coefficient	V _{GS(TH)} /T _J				-4.5		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 10 V	I _D = 30 A		5.9	7.4	
		V _{GS} = 4.5 V	I _D = 15 A		8.8	11	mΩ
Forward Transconductance	9 _{FS}	V _{DS} = 1.5 V,	I _D = 15 A		43		S
Gate Resistance	R _G	T _A = 25	°C		1.0		Ω
CHARGES AND CAPACITANCES							
Input Capacitance	C _{ISS}				993		
Output Capacitance	C _{OSS}	V _{GS} = 0 V, f = 1 MI	Hz, V _{DS} = 15 V		574		pF
Reverse Transfer Capacitance	C _{RSS}				163		
Capacitance Ratio	C _{RSS} /C _{ISS}	V _{GS} = 0 V, V _{DS} = 15 V, f = 1 MHz			0.164		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 4.5 V, V _{DS} = 15 V; I _D = 30 A			10.1		nC
Threshold Gate Charge	Q _{G(TH)}				1.8		
Gate-to-Source Charge	Q _{GS}				2.6		
Gate-to-Drain Charge	Q _{GD}				6.1		
Gate Plateau Voltage	V _{GP}				3.2		V
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 10 V, V _{DS} = 15 V; I _D = 30 A			19.3		nC
SWITCHING CHARACTERISTICS (Note 6	;)						
Turn–On Delay Time	t _{d(ON)}				9.0		
Rise Time	tr	V _{GS} = 4.5 V, V _I	₂₅ = 15 V,		30		1
Turn–Off Delay Time	t _{d(OFF)}	$V_{GS} = 4.5 \text{ V}, V_{DS} = 15 \text{ V},$ $I_D = 15 \text{ A}, \text{ R}_G = 3.0 \Omega$			14		ns -
Fall Time	t _f				7.0		
Turn–On Delay Time	t _{d(ON)}	V_{GS} = 10 V, V_{DS} = 15 V, I _D = 15 A, R _G = 3.0 Ω			6.0		
Rise Time	tr				25		ns
Turn–Off Delay Time	t _{d(OFF)}				18		
Fall Time	t _f				4.0		
DRAIN-SOURCE DIODE CHARACTERIS	TICS						
Forward Diode Voltage	V _{SD}	V _{GS} = 0 V,	$T_J = 25^{\circ}C$		0.80	1.1	
		$I_{\rm S} = 10 {\rm A}$	T _J = 125°C		0.67		V
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dIS/dt = 100 A/μs, I _S = 30 A			23.3		
Charge Time	t _a				12.7		ns
Discharge Time	t _b				10.6		1
Reverse Recovery Charge	Q _{RR}				8.3		nC

Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
 Switching characteristics are independent of operating junction temperatures.

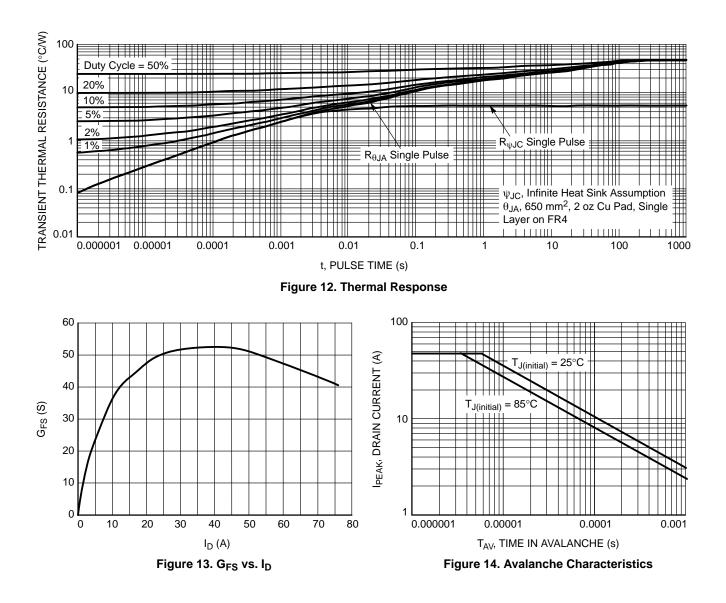
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



ORDERING INFORMATION

Device	Package	Shipping [†]
NVTFS4C10NTAG	WDFN8 (Pb–Free)	1500 / Tape & Reel
NVTFS4C10NWFTAG	WDFN8 (Pb–Free)	1500 / Tape & Reel

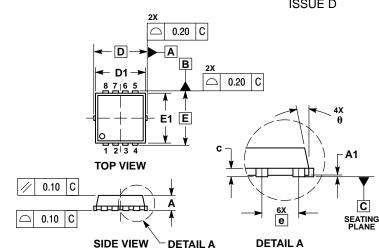
+For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

PACKAGE DIMENSIONS

WDFN8 3.3x3.3, 0.65P CASE 511AB

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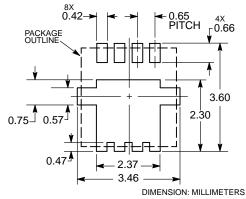
BOTTOM VIEW

PROTRUSIONS OR GATE BURRS. MILLIMETERS INCHES NOM DIM NOM MAX MIN MIN MAX 0.70 0.75 0.80 0.028 0.030 0.031 Α A1 0.00 0.05 0.000 0.002 0.012 0.30 b 0.23 0.40 0.009 0.016 0.008 0.15 0.20 0.25 0.006 0.010 с .130 BS D 30 BS(0.124 D1 2.95 3.05 3.15 0.116 0.120 D2 1.98 2.11 2.24 0.078 0.083 0.088 Е .30 BSC 0.130 BS 3.05 E1 2.95 3.15 0.116 0.120 0.124 E2 1.47 1.60 1.73 0.058 0.063 0.068 E3 0.23 0.30 0.40 0.009 0.012 0.016 0.026 BS е 0.65 BS0 0.41 0.30 0.012 0.016 0.020 G 0.51 κ 0.65 0.80 0.95 0.026 0.032 0.037 0.56 0.017 L 0.30 0.43 0.012 0.022 0.005 0.008 0.06 0.13 0.20 0.002 Μ 1.40 1.50 1.60 0.055 0.059 0.063 A 0 12

NOTES: 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.

CONTROLLING DIMENSION: MILLIMETERS. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD FLASH

SOLDERING FOOTPRINT*



*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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