MOSFET - Power, Dual N-Channel, DUAL SO8FL

60 V, 16.3 mΩ, 32 A

NVMFD016N06C

Features

- Small Footprint (5x6 mm) for Compact Design
- Low R_{DS(on)} to Minimize Conduction Losses
- Low Q_G and Capacitance to Minimize Driver Losses
- NVMFWD016N06C Wettable Flank Option for Enhanced Optical Inspection
- AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Typical Applications

- Power Tools, Battery Operated Vacuums
- UAV/Drones, Material Handling
- BMS/Storage, Home Automation

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

Parameter			Symbol	Value	Units
Drain-to-Source Voltage			V_{DSS}	60	V
Gate-to-Source Volta	Gate-to-Source Voltage			±20	V
Continuous Drain Current R _{B.IC}			I _D	32	Α
(Notes 1, 3)	State	T _C = 100°C		23	
Power Dissipation			P_{D}	36	W
R _{θJC} (Note 1)	State	T _C = 100°C		18	
Continuous Drain Current R _{0JA}	Steady T _A = 25°C		I _D	9	Α
(Notes 1, 2, 3)	State	T _A = 100°C		6	
Power Dissipation	, , , ,		P_{D}	3.1	W
R _{θJA} (Notes 1, 2)	State	T _A = 100°C		1.5	
Pulsed Drain Current	T _A = 25°0	C, t _p = 10 μs	I _{DM}	128	Α
Operating Junction and Storage Temperature Range			T _J , T _{stg}	-55 to +175	°C
Source Current (Body Diode)			I _S	30	Α
Single Pulse Drain-to-Source Avalanche Energy ($I_L = 6.4 \; A_{pk}$)			E _{AS}	21	mJ
Lead Temperature Soldering Reflow 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.

- The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- 2. Surface-mounted on FR4 board using a 650 mm², 2 oz Cu pad.
- 3. Maximum current for pulses as long as 1 second is higher but is dependent on pulse duration and duty cycle.

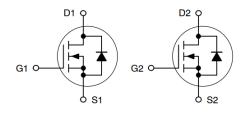


ON Semiconductor®

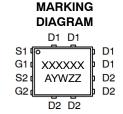
www.onsemi.com

V _{(BR)DSS}	R _{DS(ON)} MAX	I _D MAX	
60 V	16.3 mΩ @ 10 V	32 A	

Dual N-Channel







XXXXXX = Specific Device Code

A = Assembly Location

Y = Year
W = Work Week
ZZ = Lot Traceability

ORDERING INFORMATION

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

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Max	Unit
Junction-to-Case - Steady State (Note 2)	$R_{ heta JC}$	4.1	°C/W
Junction-to-Ambient - Steady State (Note 2)	$R_{ heta JA}$	47.3	C/VV

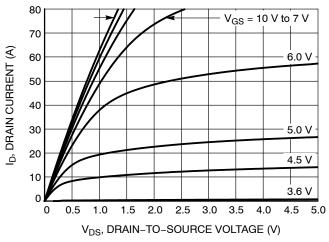
ELECTRICAL CHARACTERISTICS (T₁ = 25°C unless otherwise specified)

Parameter	Symbol	Test Co	ondition	Min	Тур	Max	Unit
OFF CHARACTERISTICS							•
Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$		60			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /	I _D = 250 μA	, ref to 25°C		29		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	$V_{GS} = 0 \text{ V},$ $T_J = 25^{\circ}\text{C}$				10	μΑ
		$V_{DS} = 60 \text{ V}$	T _J = 125°C			250	1
Gate-to-Source Leakage Current	I _{GSS}	$V_{DS} = 0 V$,	V _{GS} = 20 V			100	nA
ON CHARACTERISTICS (Note 4)							
Gate Threshold Voltage	V _{GS(TH)}	$V_{GS} = V_{DS}$, I _D = 25 μA	2.0		4.0	V
Negative Threshold Temperature Coefficient	V _{GS(TH)} / T _J	I _D = 25 μA,	ref to 25°C		-8.2		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 10	V, I _D = 5 A		13.6	16.3	mΩ
Forward Transconductance	9FS	V _{DS} = 5 \	/, I _D = 5 A		15		S
Gate Resistance	R _G	T _A = 25°C			1.4		Ω
CHARGES & CAPACITANCES							•
Input Capacitance	C _{ISS}				489		pF
Output Capacitance	C _{OSS}	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 30 V			319		
Reverse Transfer Capacitance	C _{RSS}				5.7		
Total Gate Charge	Q _{G(TOT)}	V_{GS} = 10 V, V_{DS} = 48 V, I_{D} = 5 A			6.9		nC
Threshold Gate Charge	Q _{G(TH)}				1.6		
Gate-to-Source Charge	Q _{GS}				2.6		
Gate-to-Drain Charge	Q _{GD}				0.62		1
SWITCHING CHARACTERISTICS, Vo	is = 10 V (Note	5)		•		•	
Turn-On Delay Time	t _{d(ON)}				7.2		ns
Rise Time	t _r	V _G = 10 V.	Vne = 48 V.		1.7		7
Turn-Off Delay Time	t _{d(OFF)}	V_{GS} = 10 V, V_{DS} = 48 V, I_D = 5 A, R_G = 6 Ω			11.1		
Fall Time	t _f				2.7		
DRAIN-SOURCE DIODE CHARACTE	RISTICS					I	
Forward Diode Voltage	V _{SD}	V _{GS} = 0 V,	T _J = 25°C		0.81	1.2	V
		$I_S = 5 A$	T _J = 125°C		0.67		1
Reverse Recovery Time	t _{RR}	$V_{GS} = 0 \text{ V, } d_{IS}/d_t = 100 \text{ A/}\mu\text{s,}$ $V_{DS} = 30 \text{ V, } I_S = 5 \text{ A}$		1	27		ns
Charge Time	ta				13		1
Discharge Time	tb				14		1
Reverse Recovery Charge	Q _{RR}				15		nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

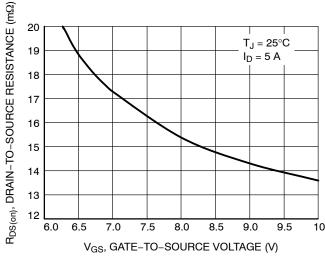
TYPICAL CHARACTERISTICS



40 35 ID, DRAIN CURRENT (A) 30 25 20 15 $T_{.J} = -55^{\circ}C$ 10 $T_{.1} = 25^{\circ}C$ 5 $T_J = 125^{\circ}C$ 0 0.5 1.0 2.0 2.5 3.0 3.5 1.5 V_{GS}, GATE-TO-SOURCE VOLTAGE (V)

Figure 1. On-Region Characteristics

Figure 2. Transfer Characteristics



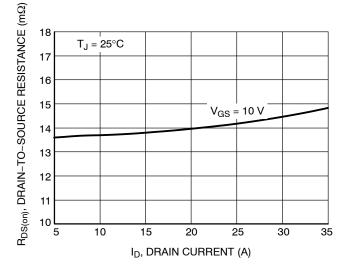
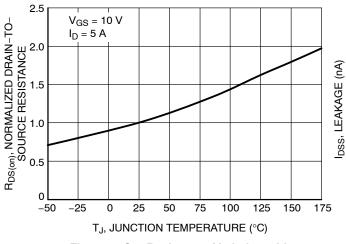


Figure 3. On-Resistance vs. Gate-to-Source Voltage

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



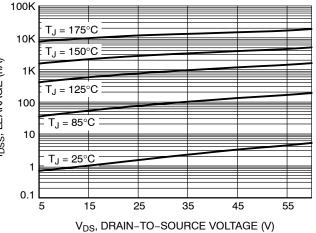


Figure 5. On–Resistance Variation with Temperature

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

TYPICAL CHARACTERISTICS

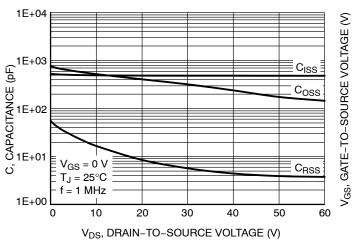


Figure 7. Capacitance Variation

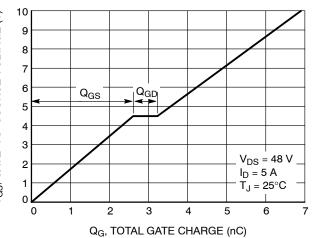


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

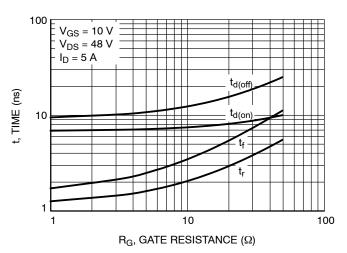


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

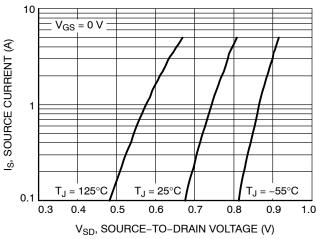


Figure 10. Diode Forward Voltage vs. Current

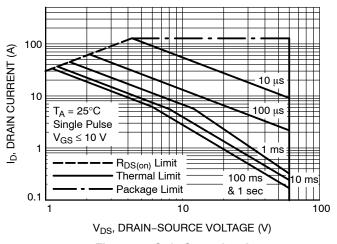


Figure 11. Safe Operating Area

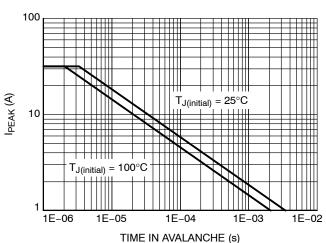


Figure 12. Maximum Drain Current vs. Time in Avalanche

TYPICAL CHARACTERISTICS

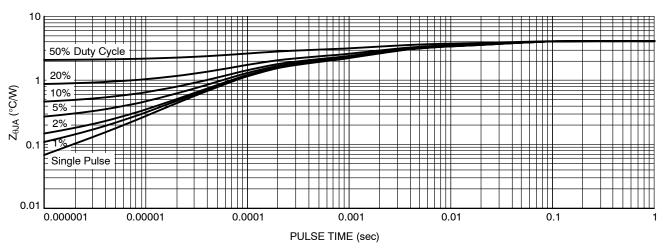


Figure 13. Thermal Characteristics

DEVICE ORDERING INFORMATION

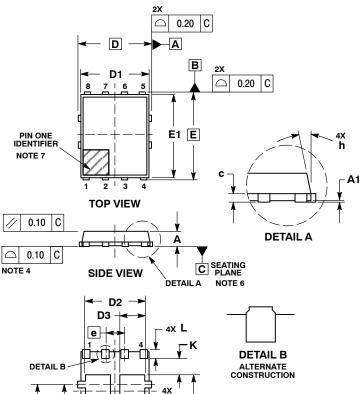
Device	Marking	Package	Shipping [†]
NVMFD016N06CT1G	16DN6C	SO8FL Dual (Pb-Free)	1500 / Tape & Reel
NVMFWD016N06CT1G	16DN6W	SO8FL Dual (Pb-Free, Wettable Flanks)	1500 / Tape & Reel

[†]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

DFN8 5x6, 1.27P Dual Flag (SO8FL-Dual)

CASE 506BT ISSUE E



E2

8x b 0.10 С AB

 \oplus 0.05 С NOTE 3

BOTTOM VIEW

4X G

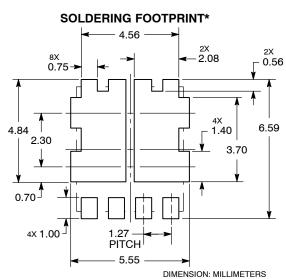
- NOTES:

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

 2. CONTROLLING DIMENSION: MILLIMETERS.

 3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED
 BETWEEN 0.15 AND 0.30 MM FROM THE TERMINAL TIP.
- PROFILE TOLERANCE APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.
- DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.
- SEATING PLANE IS DEFINED BY THE TERMINALS. A1 IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.
 A VISUAL INDICATOR FOR PIN 1 MUST BE LOCATED IN THIS AREA.

	MILLIMETERS			
DIM	MIN	MAX	MAX	
Α	0.90	-	1.10	
A1			0.05	
b	0.33	0.42	0.51	
b1	0.33	0.42	0.51	
С	0.20		0.33	
D	5.15 BSC			
D1	4.70	4.90	5.10	
D2	3.90	4.10	4.30	
D3	1.50	1.70	1.90	
E	6.15 BSC			
E1	5.70	5.90	6.10	
E2	3.90	4.15	4.40	
е	1.27 BSC			
G	0.45	0.55	0.65	
h			12 °	
K	0.51			
K1	0.56			
L	0.48	0.61	0.71	
М	3.25	3.50	3.75	
N	1.80	2.00	2.20	



^{*}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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