NVMFS6H801NT3G Datasheet

https://www.DiGi-Electronics.com
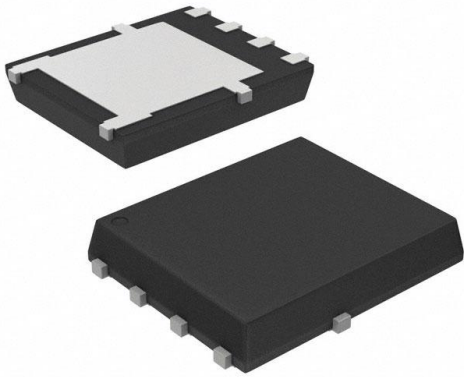
DiGi Electronics Part Number	NVMFS6H801NT3G-DG
Manufacturer	onsemi
Manufacturer Product Number	NVMFS6H801NT3G
Description	TRENCH 8 80V NFET
Detailed Description	N-Channel 80 V 23A (Ta), 157A (Tc) 3.8W (Ta), 166W (Tc) Surface Mount 5-DFN (5x6) (8-SOFL)

Purchase and inquiry

Manufacturer Product Number:	**Manufacturer:**
NVMFS6H801NT3G	onsemi
Series:	**Product Status:**
-	Active
FET Type:	**Technology:**
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	**Current - Continuous Drain (Id) @ 25°C:**
80 V	23A (Ta), 157A (Tc)
Drive Voltage (Max Rds On, Min Rds On):	**Rds On (Max) @ Id, Vgs:**
10V	2.8mOhm @ 50A, 10V
Vgs(th) (Max) @ Id:	**Gate Charge (Qg) (Max) @ Vgs:**
4V @ 250µA	64 nC @ 10 V
Vgs (Max):	**Input Capacitance (Ciss) (Max) @ Vds:**
±20V	4120 pF @ 40 V
FET Feature:	**Power Dissipation (Max):**
-	3.8W (Ta), 166W (Tc)
Operating Temperature:	**Grade:**
-55°C ~ 175°C (TJ)	Automotive
Qualification:	**Mounting Type:**
AEC-Q101	Surface Mount
Supplier Device Package:	**Package / Case:**
5-DFN (5x6) (8-SOFL)	8-PowerTDFN, 5 Leads

Environmental & Export classification

RoHS Status:	**Moisture Sensitivity Level (MSL):**
ROHS3 Compliant	1 (Unlimited)
REACH Status:	**ECCN:**
REACH Unaffected	EAR99
HTSUS:	
8541.29.0095	

onsemi

[MOSFET]{.blue} – Power, Single N-Channel

80 V, 157 A, 2.8 mΩ

NVMFS6H801N

$V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	I_D MAX
80 V	2.8 mΩ @ 10 V	157 A

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
- NVMFS6H801NWF – Wettable Flank Option for Enhanced Optical Inspection
- AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free and are RoHS Compliant

DFN5
(SO−8FL)
CASE 488AA
STYLE 1

DFNW5
(FULL−CUT SO8FL WF)
CASE 507BA

D (5)

G (4)

S (1,2,3)

N−CHANNEL MOSFET

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

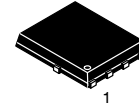| Symbol	Parameter			Value	Unit
V_{DSS}	Drain−to−Source Voltage			80	V
V_{GS}	Gate−to−Source Voltage			±20	V
I_D	Continuous Drain Current $R_{θJC}$ (Notes 1, 3)	Steady State	T_C = 25°C	157	A
			T_C = 100°C	111	
P_D	Power Dissipation $R_{θJC}$ (Note 1)		T_C = 25°C	166	W
			T_C = 100°C	83	
I_D	Continuous Drain Current $R_{θJA}$ (Notes 1, 2, 3)	Steady State	T_A = 25°C	23	A
			T_A = 100°C	16	
P_D	Power Dissipation $R_{θJA}$ (Notes 1, 2)		T_A = 25°C	3.8	W
			T_A = 100°C	1.9	
I_{DM}	Pulsed Drain Current	T_A = 25°C, t_p = 10 μs		900	A
T_J, T_{stg}	Operating Junction and Storage Temperature Range			−55 to +175	°C
I_S	Source Current (Body Diode)			138	A
E_{AS}	Single Pulse Drain−to−Source Avalanche Energy ($I_{L(pk)}$ = 12.2 A)			960	mJ
T_L	Lead Temperature for Soldering Purposes (1/8″ from case for 10 s)			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.
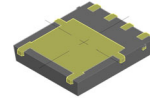
THERMAL RESISTANCE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$R_{θJC}$	Junction−to−Case – Steady State	0.9	°C/W
$R_{θJA}$	Junction−to−Ambient – Steady State (Note 2)	39	

1. 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.
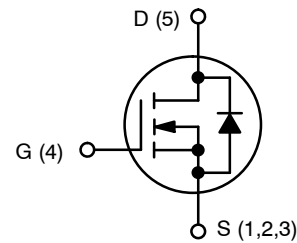3. Maximum current for pulses as long as 1 second is higher but is dependent on pulse duration and duty cycle.

MARKING DIAGRAM

```
        D
   S ┌──────┐ D
   S │XXXXXX│ D
   S │AYWZZ │
   G └──────┘ D
        D
```

XXXXXX = 6H801N
　　　　　　(NVMFS6H801N) or
　　　　　　801NWF
　　　　　　(NVMFS6H801NWF)
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.

NOTE: Some of the devices on this data sheet have been **DISCONTINUED**. Please refer to the table on page 5.

August, 2024 – Rev. 5

Publication Order Number:
NVMFS6H801N/D

NVMFS6H801N

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

Symbol	Parameter	Test Condition		Min	Typ	Max	Unit
OFF CHARACTERISTICS							
$V_{(BR)DSS}$	Drain–to–Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA		80			V
$V_{(BR)DSS}/T_J$	Drain–to–Source Breakdown Voltage Temperature Coefficient				38		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS} = 0 V, V_{DS} = 80 V	T_J = 25 °C			10	μA
			T_J = 125°C			100	
I_{GSS}	Gate–to–Source Leakage Current	V_{DS} = 0 V, V_{GS} = 20 V				100	nA
ON CHARACTERISTICS (Note 4)							
$V_{GS(TH)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 250 μA		2.0		4.0	V
$V_{GS(TH)}/T_J$	Threshold Temperature Coefficient				7.2		mV/°C
$R_{DS(on)}$	Drain–to–Source On Resistance	V_{GS} = 10 V	I_D = 50 A		2.3	2.8	mΩ
g_{FS}	Forward Transconductance	V_{DS} =15 V, I_D = 50 A			128		S
CHARGES, CAPACITANCES & GATE RESISTANCE							
C_{ISS}	Input Capacitance	V_{GS} = 0 V, f = 1 MHz, V_{DS} = 40 V			4120		pF
C_{OSS}	Output Capacitance				586		
C_{RSS}	Reverse Transfer Capacitance				22		
$Q_{G(TOT)}$	Total Gate Charge	V_{GS} = 10 V, V_{DS} = 40 V; I_D = 50 A			64		nC
$Q_{G(TH)}$	Threshold Gate Charge	V_{GS} = 10 V, V_{DS} = 40 V; I_D = 50 A			11		
Q_{GS}	Gate–to–Source Charge				19		
Q_{GD}	Gate–to–Drain Charge				13		
V_{GP}	Plateau Voltage				5.0		V
SWITCHING CHARACTERISTICS (Note 5)							
$t_{d(ON)}$	Turn–On Delay Time	V_{GS} = 10 V, V_{DS} = 64 V, I_D = 50 A, R_G = 2.5 Ω			25		ns
t_r	Rise Time				74		
$t_{d(OFF)}$	Turn–Off Delay Time				70		
t_f	Fall Time				19		
DRAIN–SOURCE DIODE CHARACTERISTICS							
V_{SD}	Forward Diode Voltage	V_{GS} = 0 V, I_S = 50 A	T_J = 25°C		0.8	1.2	V
			T_J = 125°C		0.7		
t_{RR}	Reverse Recovery Time	V_{GS} = 0 V, dIS/dt = 100 A/μs, I_S = 50 A			64		ns
t_a	Charge Time				36		
t_b	Discharge Time				28		
Q_{RR}	Reverse Recovery Charge				98		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.
4. Pulse Test: pulse width ≤ 300 μs, duty cycle ≤ 2%.
5. Switching characteristics are independent of operating junction temperatures.

TYPICAL CHARACTERISTICS

Figure 1. On–Region Characteristics
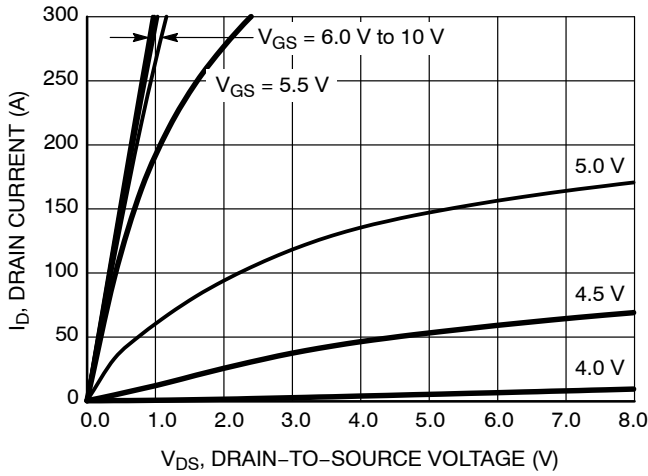

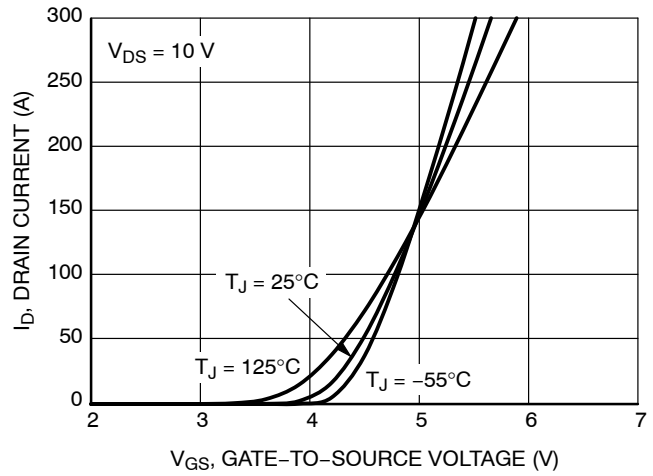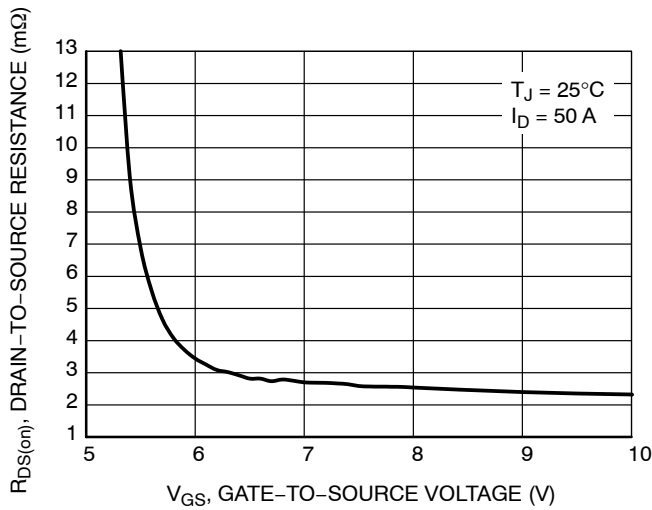**Figure 2. Transfer Characteristics**

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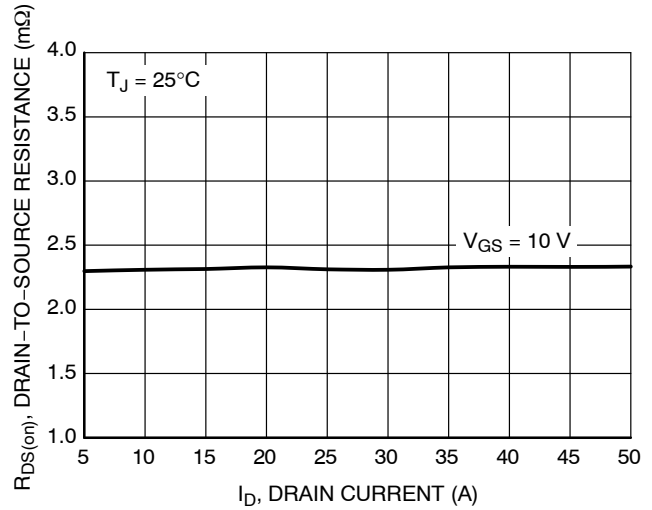

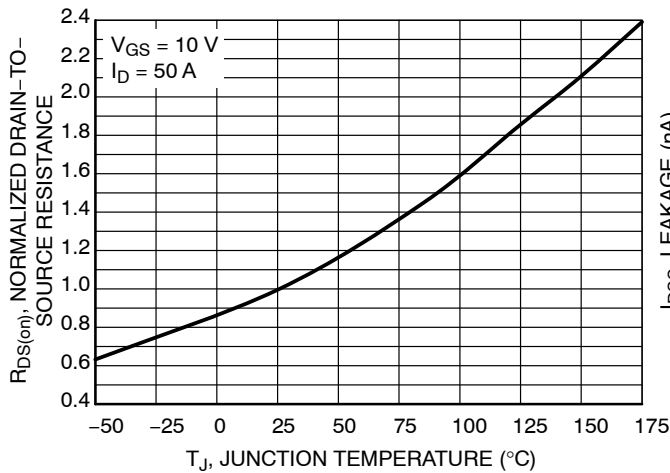**Figure 4. On–Resistance vs. Drain Current and Gate Voltage**
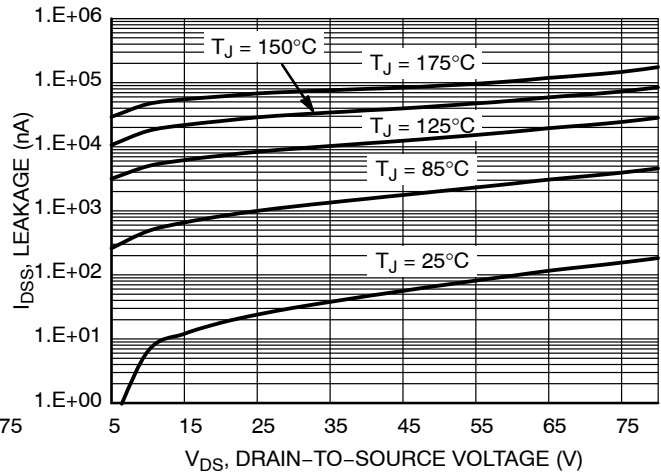

Figure 5. On–Resistance Variation with Temperature

Figure 6. Drain–to–Source Leakage Current vs. Voltage
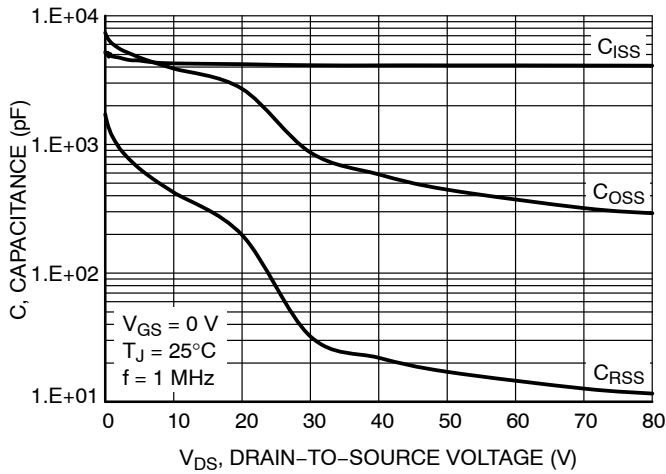
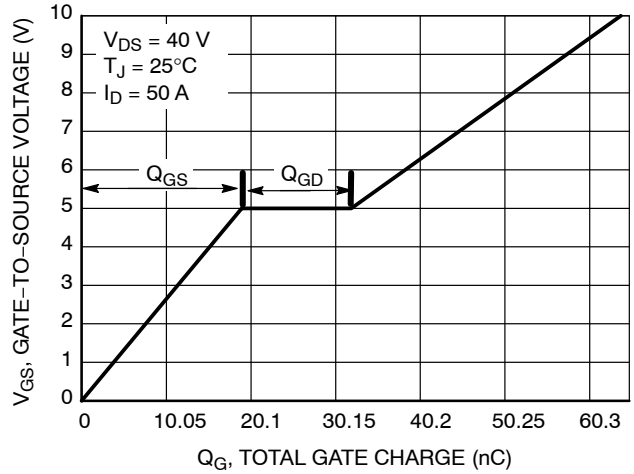## TYPICAL CHARACTERISTICS (continued)

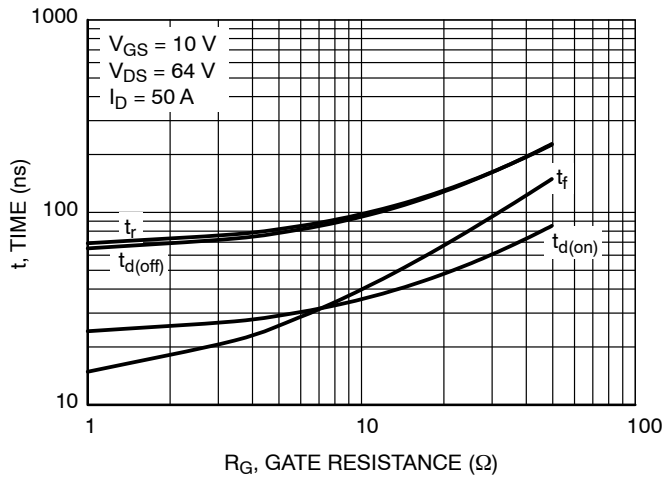**Figure 7. Capacitance Variation**

Figure 8. Gate−to−Source vs. Total Charge

Figure 9. Resistive Switching Time Variation vs. Gate Resistance
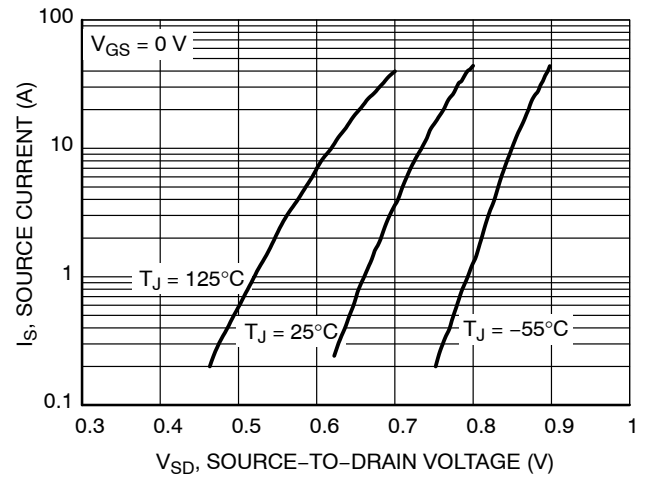
Figure 10. Diode Forward Voltage vs. Current
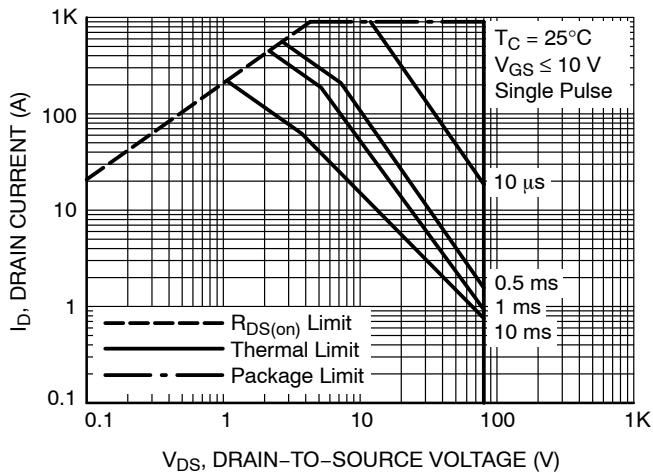
Figure 11. Maximum Rated Forward Biased Safe Operating Area
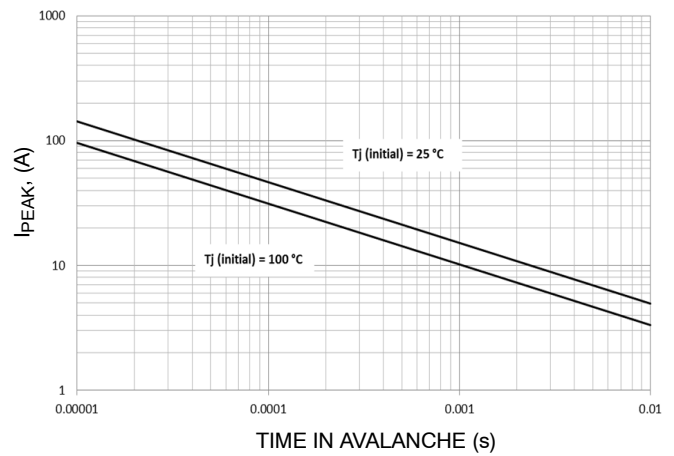
Figure 12. I$_{PEAK}$ vs. Time in Avalanche

NVMFS6H801N

TYPICAL CHARACTERISTICS (continued)
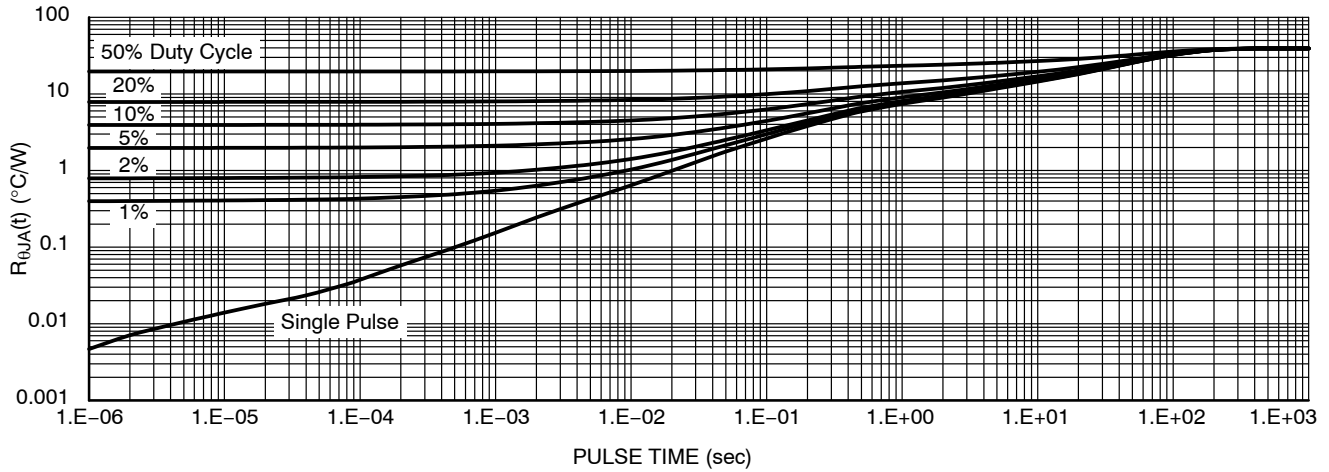
Figure 13. Thermal Characteristics

DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping†
NVMFS6H801NT1G	6H801N	DFN5 (Pb–Free)	1500 / Tape & Reel
NVMFS6H801NT3G	6H801N	DFN5 (Pb–Free)	5000 / Tape & Reel
NVMFS6H801NWFT1G	801NWF	DFNW5 (Pb–Free, Wettable Flanks)	1500 / Tape & Reel

DISCONTINUED (Note 6)

NVMFS6H801NWFT3G	801NWF	DFNW5 (Pb–Free, Wettable Flanks)	5000 / 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.

6. **DISCONTINUED:** This device is not recommended for new design. Please contact your **onsemi** representative for information. The most current information on this device may be available on www.onsemi.com.

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MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS
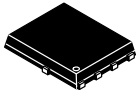
SCALE 2:1

DFN5 5x6, 1.27P
(SO–8FL)
CASE 488AA
ISSUE N

DATE 25 JUN 2018
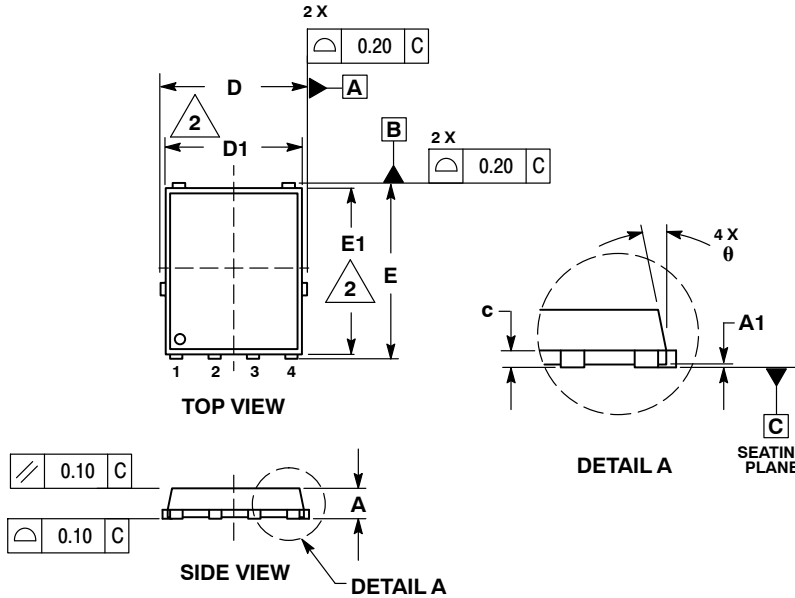
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

TOP VIEW

2 X $\boxed{\frown\ 0.20\ C}$

$\boxed{A}$

$\boxed{B}$ 2 X $\boxed{\frown\ 0.20\ C}$

DETAIL A

4 X θ

SEATING PLANE

$\boxed{C}$

SIDE VIEW

$\boxed{/\!/\ 0.10\ C}$

$\boxed{\frown\ 0.10\ C}$

DETAIL A

BOTTOM VIEW

8X b $\boxed{\oplus\ 0.10\ C\ A\ B}$ $\boxed{0.05\ c}$

PIN 5 (EXPOSED PAD)

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.00	---	0.05
b	0.33	0.41	0.51
c	0.23	0.28	0.33
D	5.00	5.15	5.30
D1	4.70	4.90	5.10
D2	3.80	4.00	4.20
E	6.00	6.15	6.30
E1	5.70	5.90	6.10
E2	3.45	3.65	3.85
e	1.27 BSC		
G	0.51	0.575	0.71
K	1.20	1.35	1.50
L	0.51	0.575	0.71
L1	0.125 REF		
M	3.00	3.40	3.80
θ	0 °	---	12 °

GENERIC MARKING DIAGRAM*
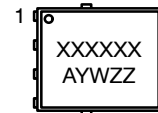
XXXXXX
AYWZZ

XXXXXX = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceability

*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.

RECOMMENDED SOLDERING FOOTPRINT*

2X 0.495
2X 4.560
2X 1.530
2X 0.475
3.200
4.530
1.330
2X 0.905
0.965
1
4X 1.000
4X 0.750
1.270 PITCH

DIMENSIONS: MILLIMETERS
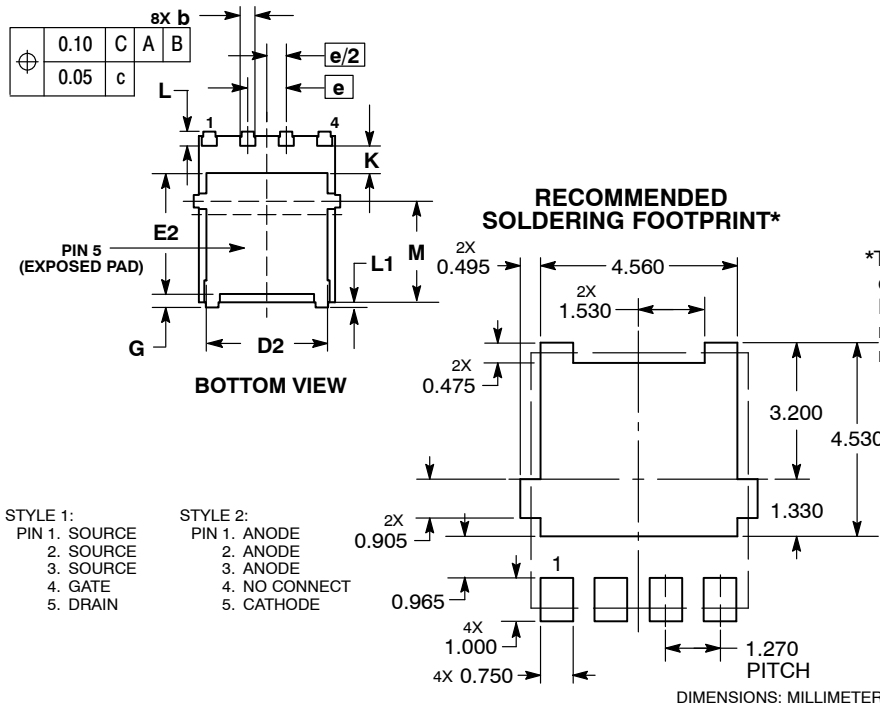
STYLE 1:
PIN 1. SOURCE
2. SOURCE
3. SOURCE
4. GATE
5. DRAIN

STYLE 2:
PIN 1. ANODE
2. ANODE
3. ANODE
4. NO CONNECT
5. CATHODE

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

DOCUMENT NUMBER:	98AON14036D	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.	
DESCRIPTION:	**DFN5 5x6, 1.27P (SO–8FL)**		PAGE 1 OF 1

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

DFNW5 4.90x5.90x1.00, 1.27P
CASE 507BA
ISSUE C
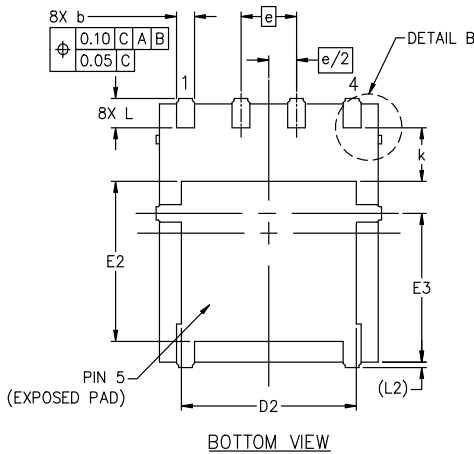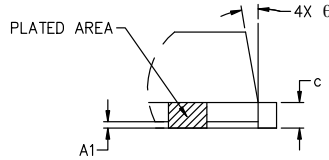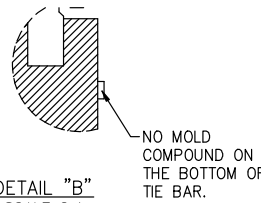
DATE 19 SEP 2024
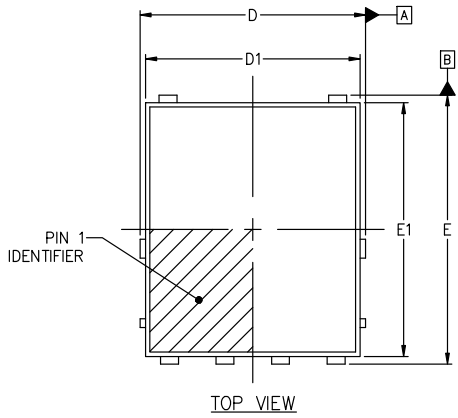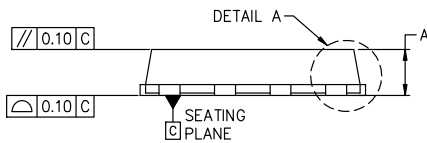
NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5M−2018.
2. ALL DIMENSIONS ARE IN MILLIMETERS.
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.
4. THIS PACKAGE CONTAINS WETTABLE FLANK DESIGN FEATURES TO AID IN FILLET FORMATION ON THE LEADS DURING MOUNTING.
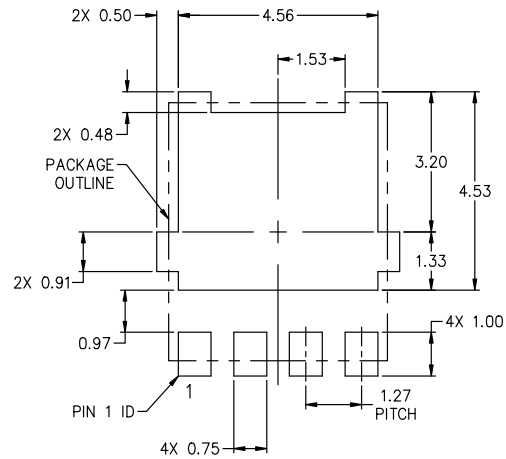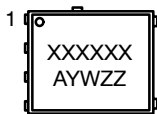
PIN 1 IDENTIFIER

TOP VIEW

PLATED AREA

4X θ

DETAIL "A"
SCALE 2:1

DETAIL A

// 0.10 C

0.10 C

SEATING PLANE

SIDE VIEW

NO MOLD COMPOUND ON THE BOTTOM OF TIE BAR.

DETAIL "B"
SCALE 2:1

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.00	---	0.05
b	0.33	0.41	0.51
c	0.23	0.28	0.33
D	5.00	5.15	5.30
D1	4.70	4.90	5.10
D2	3.80	4.00	4.20
E	6.00	6.15	6.30
E1	5.70	5.90	6.10
E2	3.45	3.65	3.85
E3	3.00	3.40	3.80
e	1.27 BSC		
k	1.20	1.35	1.50
L	0.51	0.57	0.71
L2	0.15 REF.		
θ	0°	6°	12°

8X b

0.10 C A B
0.05 C

8X L

DETAIL B

PIN 5
(EXPOSED PAD)

BOTTOM VIEW

2X 0.50
1.53
2X 0.48
PACKAGE OUTLINE
2X 0.91
3.20
4.53
1.33
4.56
0.97
PIN 1 ID
4X 1.00
1.27 PITCH
4X 0.75

RECOMMENDED MOUNTING FOOTPRINT*
*FOR ADDITIONAL INFORMATION ON OUR Pb−FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ONSEMI SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

GENERIC MARKING DIAGRAM*

XXXXXX
AYWZZ

XXXXXX = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceability

*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.

DOCUMENT NUMBER:	98AON26450H	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.	
DESCRIPTION:	DFNW5 4.90x5.90x1.00, 1.27P		PAGE 1 OF 1

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales

◊

OUR CERTIFICATE

DiGi provide top-quality products and perfect service for customer worldwide through standardization, technological innovation and continuous improvement. DiGi through third-party certification, we striciy control the quality of products and services. Welcome your RFQ to Email: Info@DiGi-Electronics.com