

MOSFET - Power, Single N-Channel 80 V, 8.8 mΩ, 59 A

NVMFS6H848NL

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
- NVMFS6H848NLWF – Wettable Flank Option for Enhanced Optical Inspection
- AEC-Q101 Qualified and PPAP Capable
- 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}	80	V	
Gate-to-Source Voltage		V _{GS}	±20	V	
Continuous Drain Current R _{θJC} (Notes 1, 3)	Steady State	T _C = 25°C	I _D	59	A
		T _C = 100°C		42	
	T _C = 25°C	P _D	73		W
			37		
Continuous Drain Current R _{θJA} (Notes 1, 2, 3)	Steady State	T _A = 25°C	I _D	13	A
		T _A = 100°C		9.0	
	T _A = 25°C	P _D	3.7		W
			1.8		
Pulsed Drain Current	T _A = 25°C, t _p = 10 µs	I _{DM}	319	A	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to + 175	°C	
Source Current (Body Diode)		I _S	61	A	
Single Pulse Drain-to-Source Avalanche Energy (I _{L(pk)} = 3.4 A)		E _{AS}	267	mJ	
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T _L	260	°C	

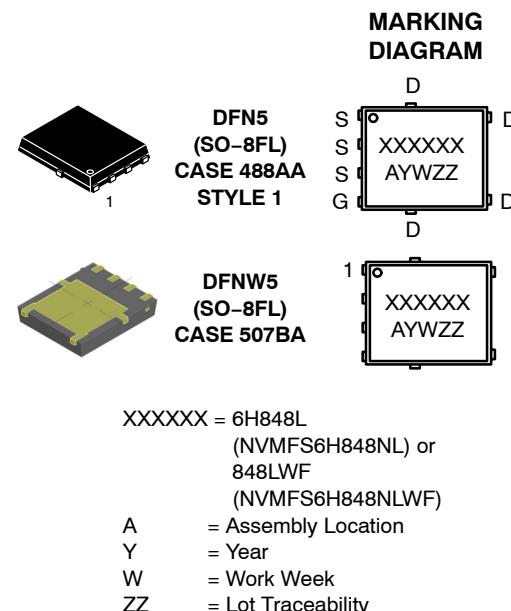
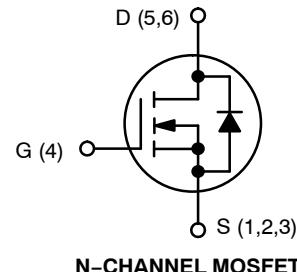
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Case – Steady State	R _{θJC}	2.0	°C/W
Junction-to-Ambient – Steady State (Note 2)	R _{θJA}	41	

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.

V _{(BR)DSS}	R _{DS(ON) MAX}	I _{D MAX}
80 V	8.8 mΩ @ 10 V	59 A
	11 mΩ @ 4.5 V	



ORDERING INFORMATION

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

NVMFS6H848NL

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

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250 μA		80			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J				45.7		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 80 V	T _J = 25°C		10		μA
			T _J = 125°C		100		
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 = 70 μA		1.2		2.0	V
Threshold Temperature Coefficient	V _{GS(TH)} /T _J				-5.2		mV/°C
Drain-to-Source On Resistance	R _{DSS(on)}	V _{GS} = 10 V	I _D = 10 A		7.2	8.8	mΩ
		V _{GS} = 4.5 V	I _D = 10 A		8.8	11	
Forward Transconductance	g _{FS}	V _{DS} = 8 V, I _D = 10 A			84		S

CHARGES, CAPACITANCES & GATE RESISTANCE

Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1 MHz, V _{DS} = 40 V		1420		pF
Output Capacitance	C _{OSS}			192		
Reverse Transfer Capacitance	C _{rss}			11		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 10 V, V _{DS} = 40 V; I _D = 30 A		25		nC
Threshold Gate Charge	Q _{G(TH)}			2.4		
Gate-to-Source Charge	Q _{GS}			4.6		
Gate-to-Drain Charge	Q _{GD}			4.3		
Plateau Voltage	V _{GP}			3.1		V
Total Gate Charge	Q _{G(TOT)}			12		nC

SWITCHING CHARACTERISTICS (Note 5)

Turn-On Delay Time	t _{d(ON)}	V _{GS} = 4.5 V, V _{DS} = 64 V, I _D = 30 A, R _G = 2.5 Ω		37		ns
Rise Time	t _r			87		
Turn-Off Delay Time	t _{d(OFF)}			22		
Fall Time	t _f			8		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 10 A	T _J = 25°C		0.81	1.2	V
			T _J = 125°C		0.65		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _S /dt = 100 A/μs, I _S = 30 A			39		ns
Charge Time	t _a				23		
Discharge Time	t _b				16		
Reverse Recovery Charge	Q _{RR}				36		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

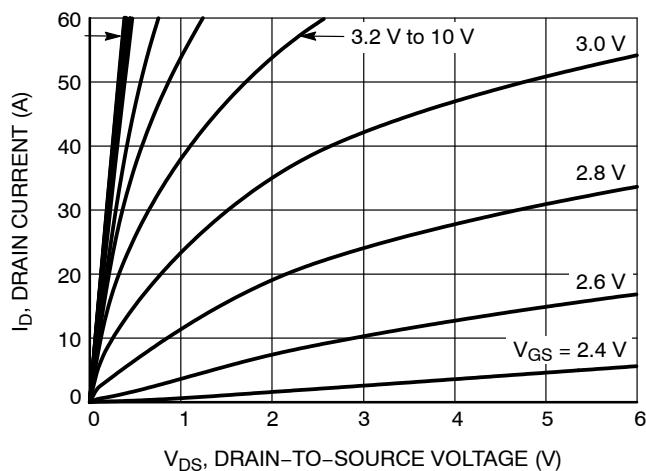


Figure 1. On-Region Characteristics

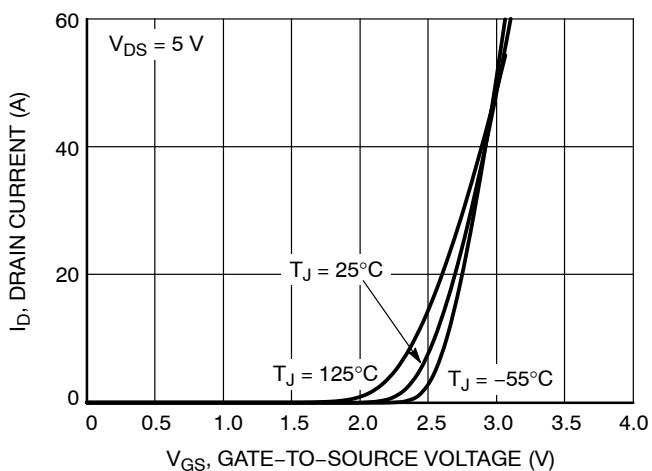


Figure 2. Transfer Characteristics

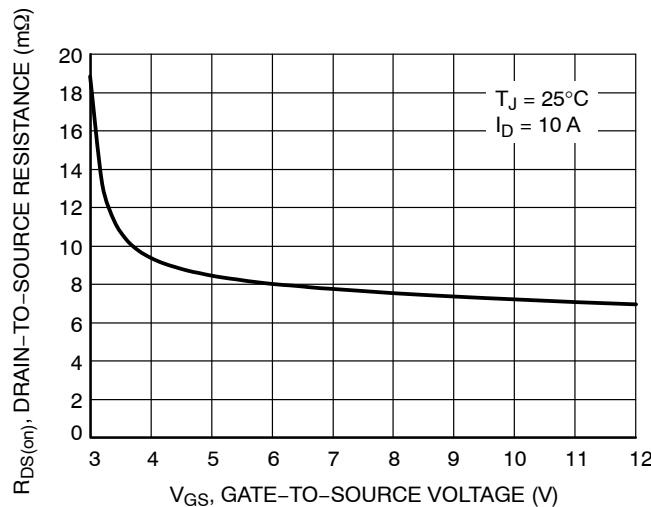


Figure 3. On-Resistance vs. Gate-to-Source Voltage

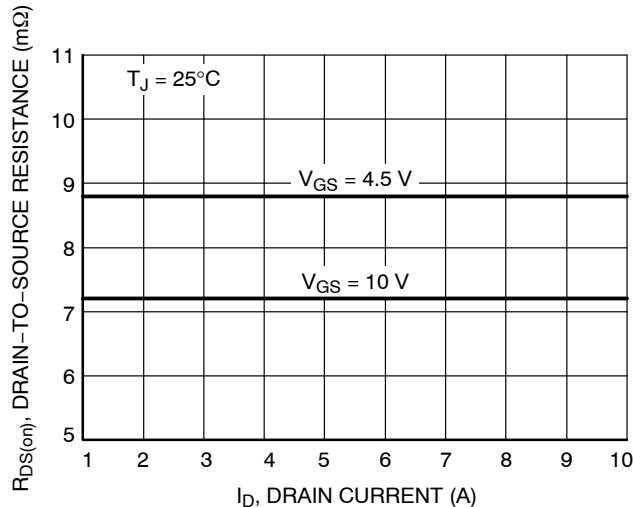


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

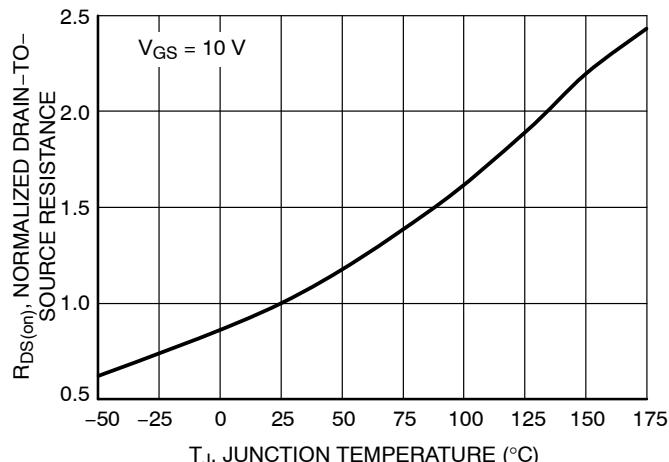


Figure 5. On-Resistance Variation with Temperature

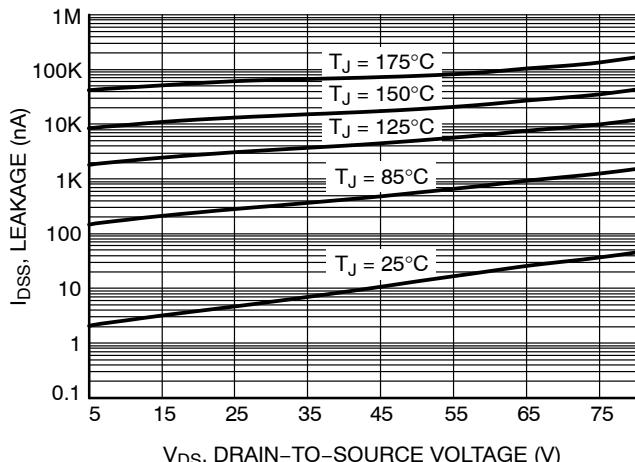


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

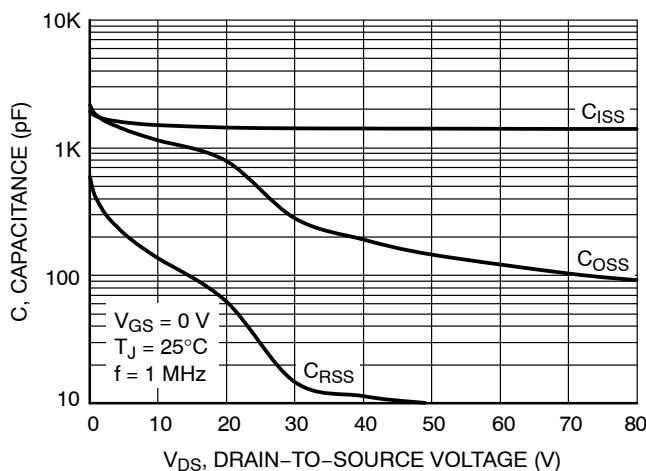


Figure 7. Capacitance Variation

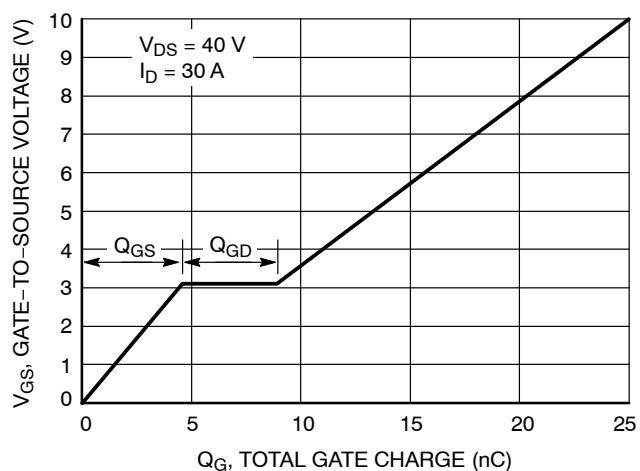


Figure 8. Gate-to-Source vs. Total Charge

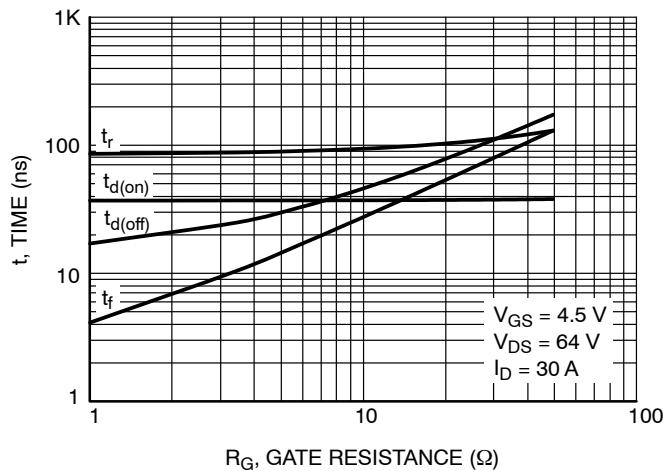


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

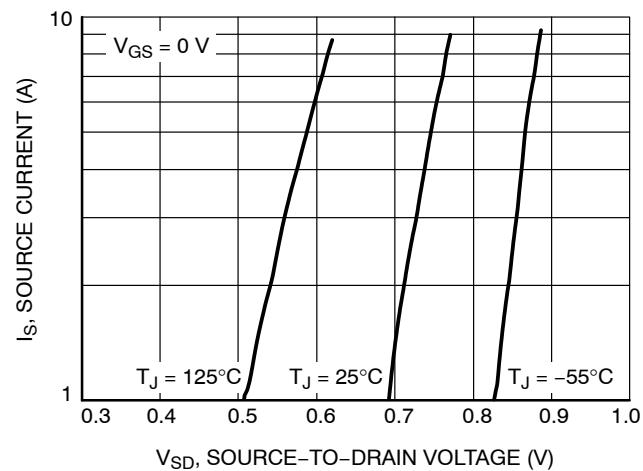


Figure 10. Diode Forward Voltage vs. Current

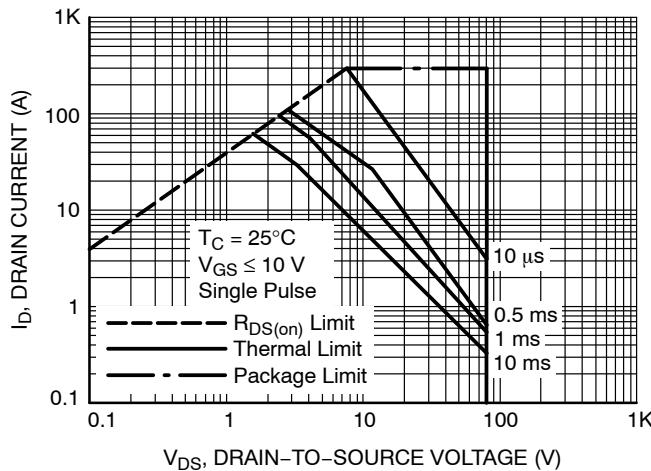


Figure 11. Maximum Rated Forward Biased Safe Operating Area

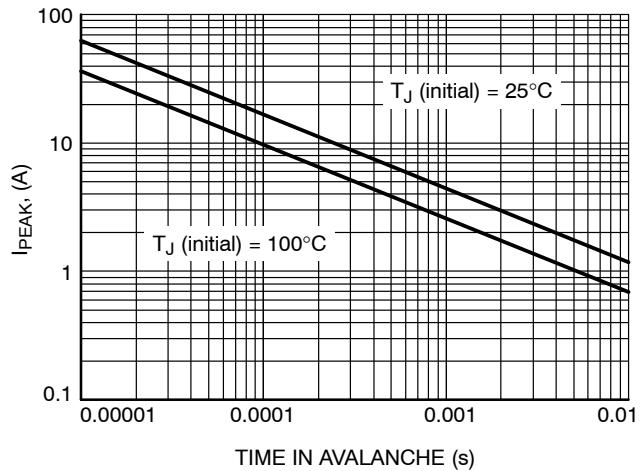


Figure 12. Maximum Drain Current vs. Time in Avalanche

NVMFS6H848NL

TYPICAL CHARACTERISTICS

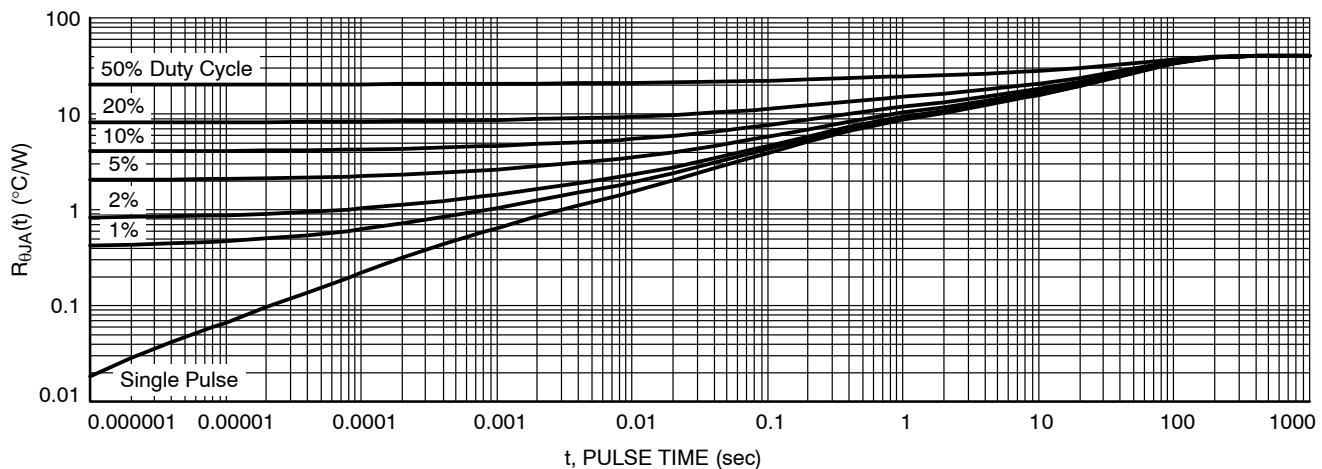
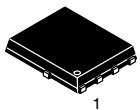


Figure 13. Thermal Response

DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping [†]
NVMFS6H848NLT1G	6H848L	DFN5 (Pb-Free)	1500 / Tape & Reel
NVMFS6H848NLWFT1G	848LWF	DFNW5 (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.



SCALE 2:1

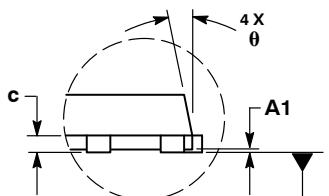
DFN5 5x6, 1.27P
(SO-8FL)
CASE 488AA
ISSUE N

DATE 25 JUN 2018

NOTES:

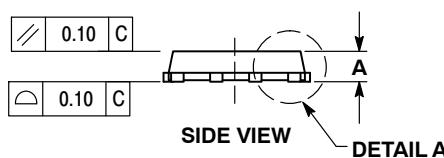
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

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 °

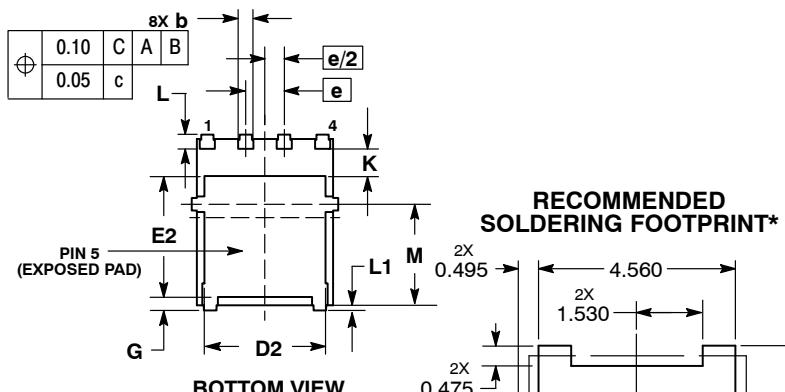


DETAIL A

SEATING PLANE

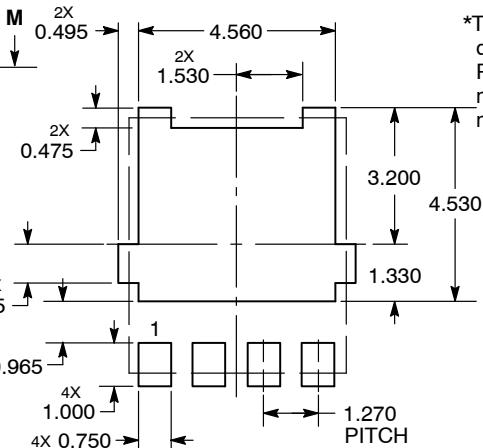


DETAIL A



BOTTOM VIEW

RECOMMENDED SOLDERING FOOTPRINT*



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

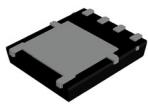
XXXXXX = Specific Device Code
A = Assembly Location
Y = Year
W = Work Week
ZZ = Lot Traceability

*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.

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

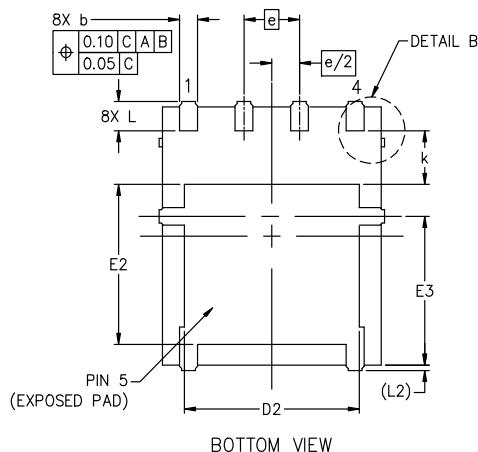
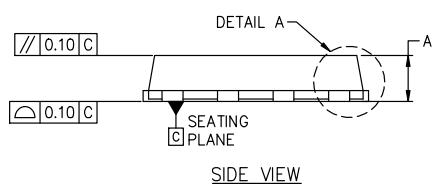
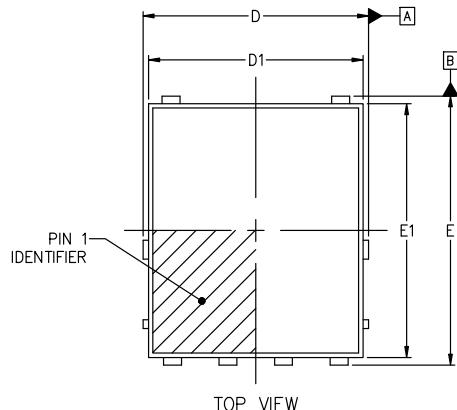
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DESCRIPTION:	DFN5 5x6, 1.27P (SO-8FL)	PAGE 1 OF 1

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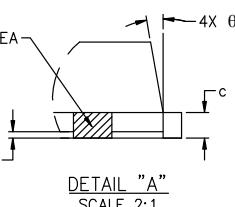
DFNW5 4.90x5.90x1.00, 1.27P
CASE 507BA
ISSUE C

DATE 19 SEP 2024

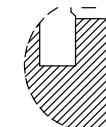


NOTES:

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.

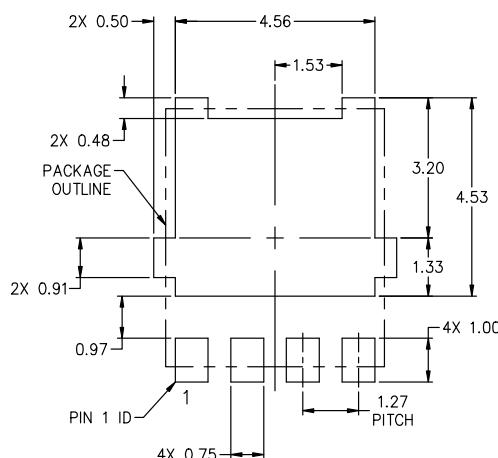


DETAIL "A"
SCALE 2:1



DETAIL "B"
SCALE 2:1

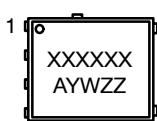
DIM	MILLIMETERS		
	MIN	NOM	MAX
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D	5.00	5.15	5.30
D1	4.70	4.90	5.10
D2	3.80	4.00	4.20
E	6.00	6.15	6.30
E1	5.70	5.90	6.10
E2	3.45	3.65	3.85
E3	3.00	3.40	3.80
e		1.27 BSC	
k	1.20	1.35	1.50
L	0.51	0.57	0.71
L2		0.15 REF.	
θ	0°	6°	12°



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 = 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.

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