

MOSFET – Power, Single, N-Channel

40 V, 0.82 mΩ, 330 A

NVMJS0D9N04CL

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
- LFPAK8 Package, Industry Standard
- AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-to-Source Voltage		V_{DSS}	40	V
Gate-to-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current $R_{\theta JC}$ (Notes 1, 3)	Steady State	$T_C = 25^\circ\text{C}$	I_D	A
		$T_C = 100^\circ\text{C}$		
Power Dissipation $R_{\theta JC}$ (Note 1)		$T_C = 25^\circ\text{C}$	P_D	W
		$T_C = 100^\circ\text{C}$		
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2, 3)	Steady State	$T_A = 25^\circ\text{C}$	I_D	A
		$T_A = 100^\circ\text{C}$		
Power Dissipation $R_{\theta JA}$ (Notes 1, 2)		$T_A = 25^\circ\text{C}$	P_D	W
		$T_A = 100^\circ\text{C}$		
Pulsed Drain Current	$T_A = 25^\circ\text{C}$, $t_p = 10\ \mu\text{s}$	I_{DM}	900	A
Operating Junction and Storage Temperature Range		T_J, T_{Stg}	-55 to +175	°C
Source Current (Body Diode)		I_S	169	A
Single Pulse Drain-to-Source Avalanche Energy ($I_{L(pk)} = 29\text{ A}$)		E_{AS}	706	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)		T_L	260	°C

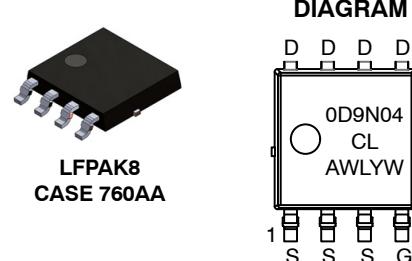
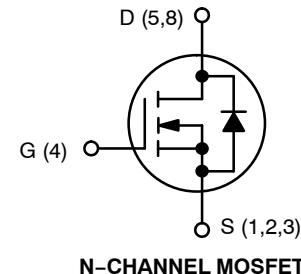
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Case – Steady State	$R_{\theta JC}$	0.9	°C/W
Junction-to-Ambient – Steady State (Note 2)	$R_{\theta JA}$	36	

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.

$V_{(BR)DSS}$	$R_{DS(on)}\text{ MAX}$	$I_D\text{ MAX}$
40 V	0.82 mΩ @ 10 V	330 A
	1.2 mΩ @ 4.5 V	



0D9N04CL = Specific Device Code
 A = Assembly Location
 WL = Wafer Lot
 Y = Year
 W = Work Week

ORDERING INFORMATION

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

NVMJS0D9N04CL

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		40			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J				18		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	V _{GS} = 0 V, V _{DS} = 40 V	T _J = 25 °C			10	μA
			T _J = 125 °C			250	
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 = 190 μA		1.2		2.0	V
Threshold Temperature Coefficient	V _{GS(TH)} /T _J				-5.5		mV/°C
Drain-to-Source On Resistance	R _{DSS(on)}	V _{GS} = 10 V	I _D = 50 A		0.65	0.82	mΩ
		V _{GS} = 4.5 V	I _D = 50 A		0.95	1.2	
Forward Transconductance	g _F	V _{DS} = 15 V, I _D = 50 A			190		S

CHARGES, CAPACITANCES & GATE RESISTANCE

Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1 MHz, V _{DS} = 25 V		8862		pF
Output Capacitance	C _{OSS}			3328		
Reverse Transfer Capacitance	C _{rss}			77		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 4.5 V, V _{DS} = 20 V; I _D = 50 A		66		nC
Total Gate Charge	Q _{G(TOT)}			143		
Threshold Gate Charge	Q _{G(TH)}			6.75		
Gate-to-Source Charge	Q _{GS}			21.4		
Gate-to-Drain Charge	Q _{GD}			22		
Plateau Voltage	V _{GP}			2.7		V

SWITCHING CHARACTERISTICS (Note 5)

Turn-On Delay Time	t _{d(ON)}	V _{GS} = 4.5 V, V _{DS} = 20 V, I _D = 50 A, R _G = 1.0 Ω		20		ns
Rise Time	t _r			130		
Turn-Off Delay Time	t _{d(OFF)}			66		
Fall Time	t _f			177		

DRAIN-SOURCE DIODE CHARACTERISTICS

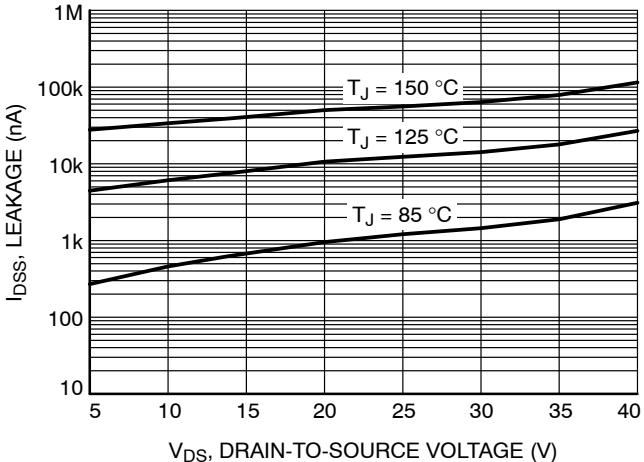
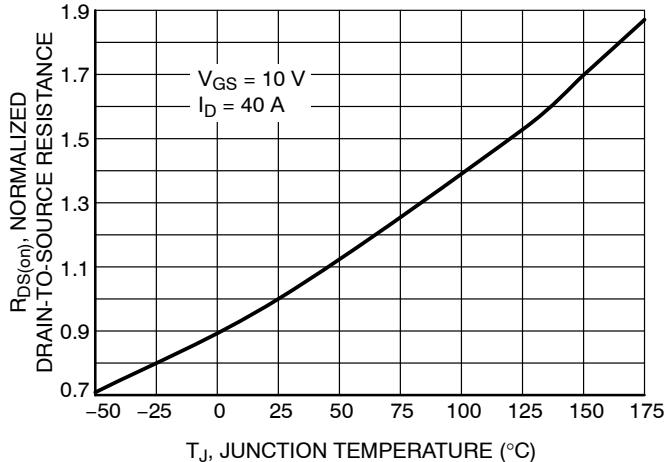
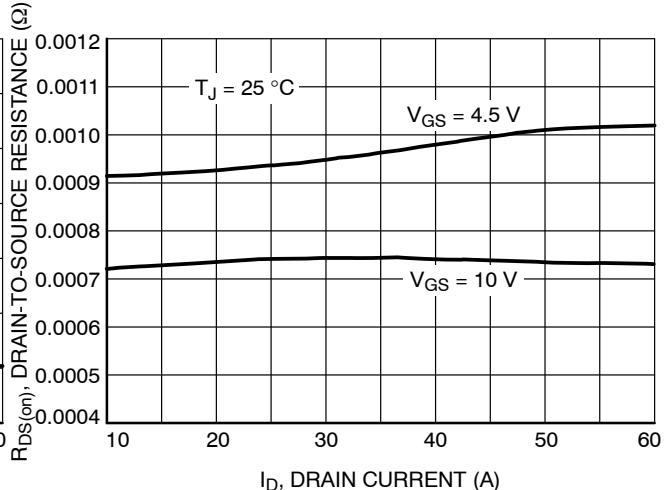
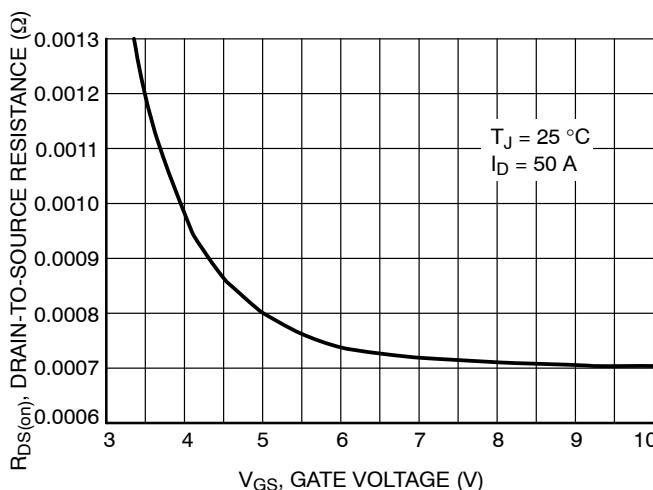
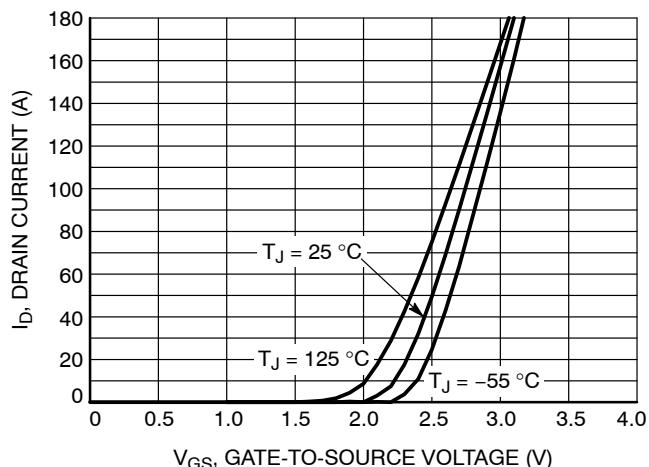
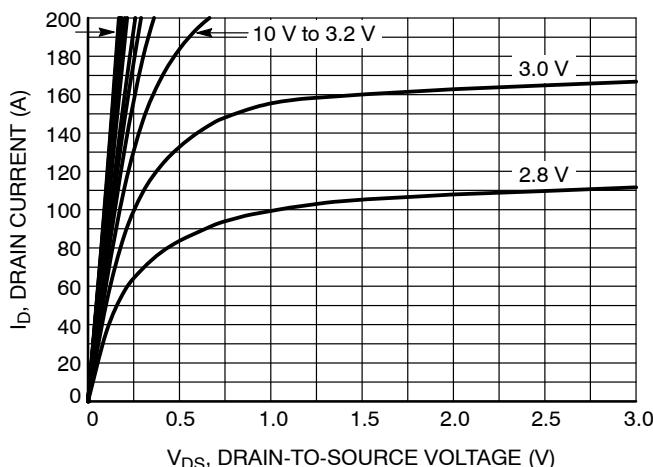
Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 50 A	T _J = 25 °C		0.73	1.2	V
			T _J = 125 °C		0.6		
Reverse Recovery Time	t _{RR}	V _{GS} = 0 V, dI _S /dt = 100 A/μs, I _S = 50 A			79.5		ns
Charge Time	t _a				39		
Discharge Time	t _b				40.5		
Reverse Recovery Charge	Q _{RR}				126		

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



TYPICAL CHARACTERISTICS

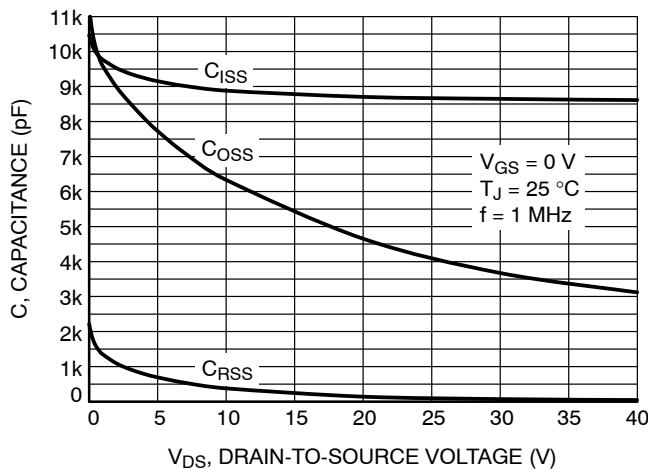


Figure 7. Capacitance Variation

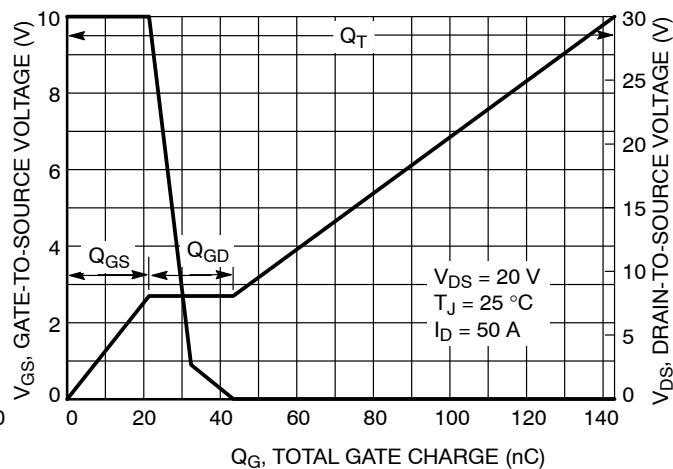


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

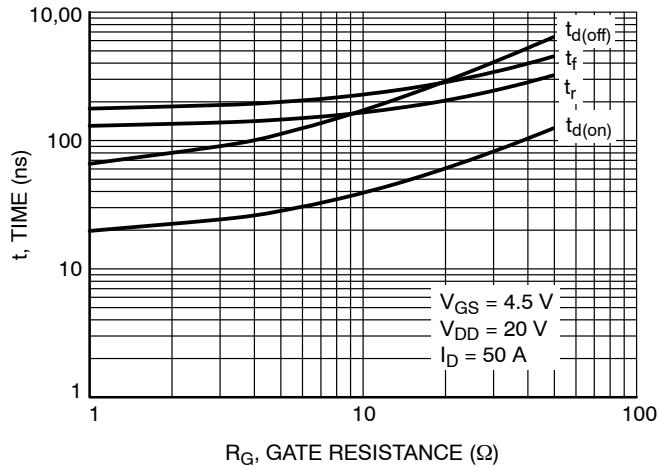


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

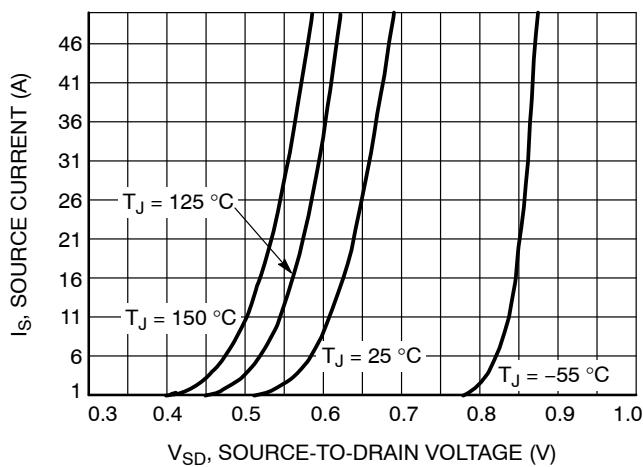


Figure 10. Diode Forward Voltage vs. Current

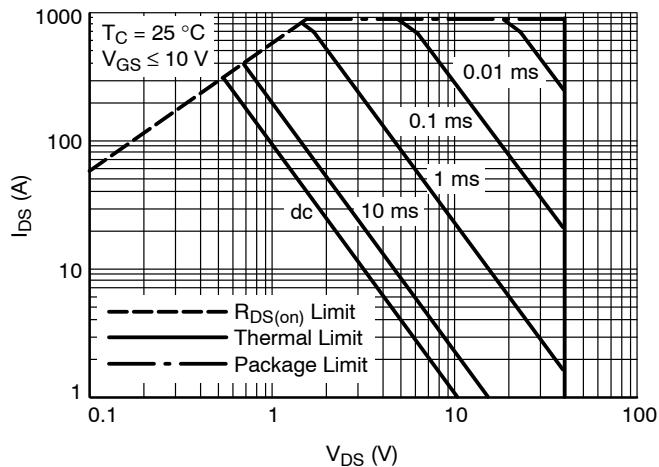


Figure 11. Safe Operating Area

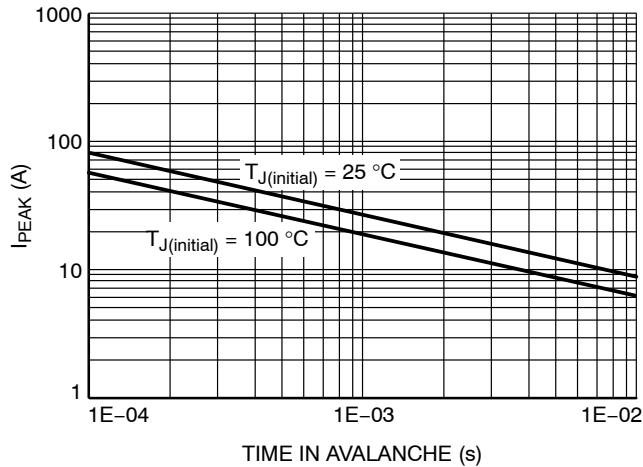


Figure 12. I_{PEAK} vs. Time in Avalanche

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TYPICAL CHARACTERISTICS

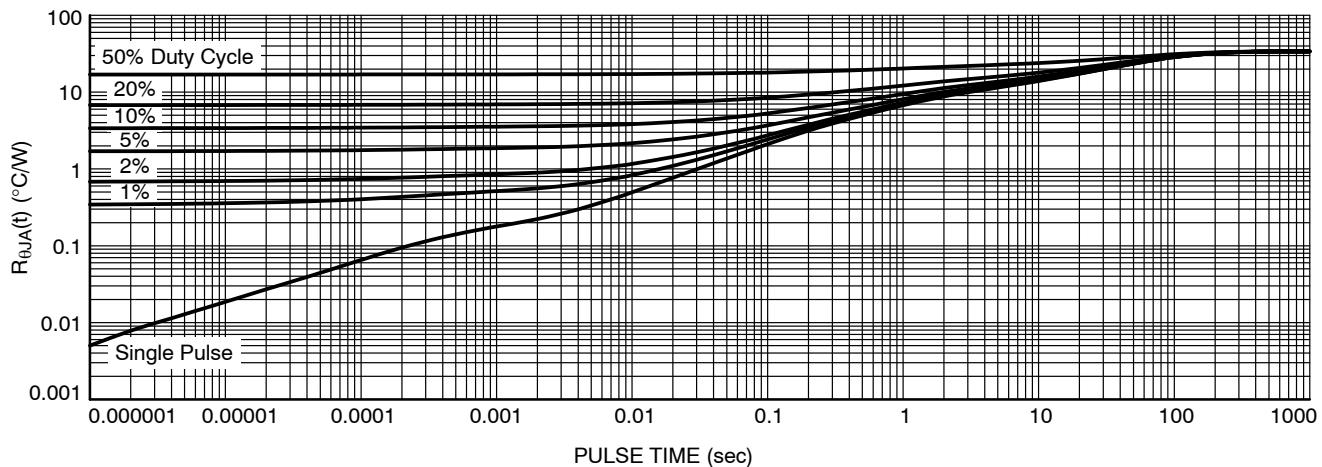


Figure 13. Thermal Characteristics

DEVICE ORDERING INFORMATION

Device	Marking	Package	Shipping [†]
NVMJS0D9N04CLTWG	0D9N04CL	LFPAK8 (Pb-Free)	3000 / Tape & Reel

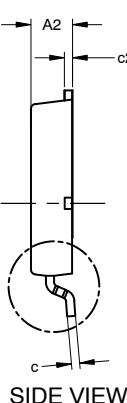
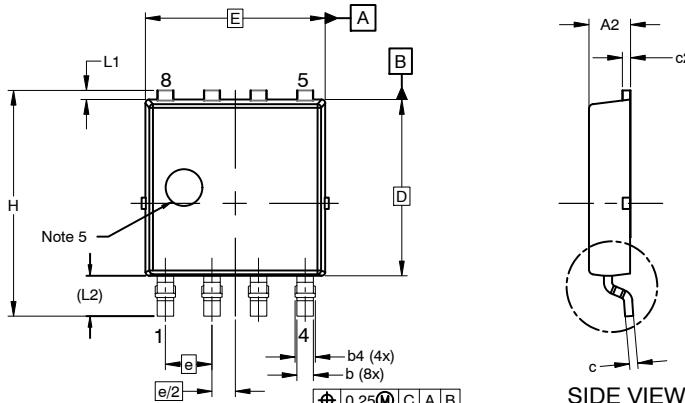
[†] For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).

REVISION HISTORY

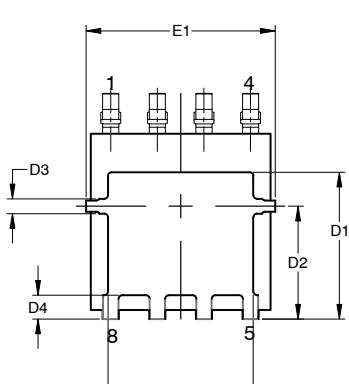
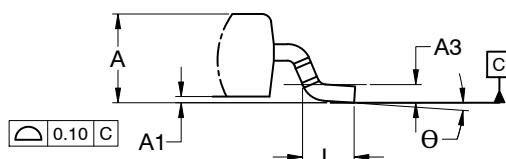
Revision	Description of Changes	Date
0	Initial production document version release.	12/4/2018
1	Document rebranded to onsemi format.	11/14/2025


LFPAK8 4.90x4.80x1.12MM, 1.27P
CASE 760AA
ISSUE D

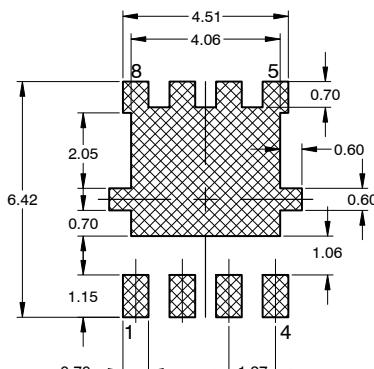
DATE 22 APR 2024



TOP VIEW



DETAIL 'A'



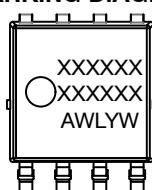
RECOMMENDED LAND PAD

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.150mm PER SIDE.
4. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
5. OPTIONAL MOLD FEATURE.

MILLIMETERS			
DIM	MIN	NOM	MAX
A	1.10	1.20	1.30
A1	0.00	0.08	0.15
A2	1.10	1.15	1.20
A3	0.25	BSC	
b	0.40	0.45	0.50
b4	0.45	0.55	0.65
c	0.19	0.22	0.25
c2	0.19	0.22	0.25
D	4.70	4.80	4.90
D1	3.80	4.00	4.20
D2	2.98	3.08	3.18
D3	0.30	0.40	0.50
D4	0.55	0.65	0.75
E	4.80	4.90	5.00
E1	5.05	5.15	5.25
E2	3.91	3.96	4.01
e	1.27	BSC	
e/2	0.635	BSC	
H	6.00	6.15	6.30
L	0.50	0.70	0.90
L1	0.15	0.25	0.35
L2	1.10	REF	
θ	0°	4°	8°

*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
WL = Wafer Lot
Y = Year
W = Work Week

*This information is generic. Please refer to device data sheet for actual part marking. Some products may not follow the Generic Marking.

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DESCRIPTION:	LFPAK8 4.90x4.80x1.12MM, 1.27P	PAGE 1 OF 1

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