NTMJS1D0N04C

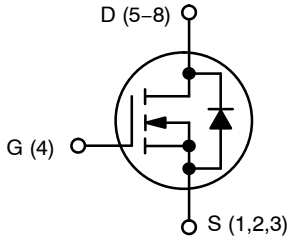
MOSFET – Power, Single, N-Channel
40 V, 0.92 mΩ, 300 A

ON Semiconductor®

www.onsemi.com

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
- LFPAK−E Package, Industry Standard
- These Devices are Pb−Free and are RoHS Compliant

$V_{(BR)DSS}$	$R_{DS(ON)}$ MAX	I_D MAX
40 V	0.92 mΩ @ 10 V	300 A



N−CHANNEL MOSFET

MAXIMUM RATINGS (T_J = 25°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°C	I_D	300	A
		T_C = 100°C		212	
Power Dissipation $R_{\theta JC}$ (Note 1)		T_C = 25°C	P_D	166	W
		T_C = 100°C		83	
Continuous Drain Current $R_{\theta JA}$ (Notes 1, 2, 3)	Steady State	T_A = 25°C	I_D	46	A
		T_A = 100°C		32	
Power Dissipation $R_{\theta JA}$ (Notes 1, 2)		T_A = 25°C	P_D	3.9	W
		T_A = 100°C		1.9	
Pulsed Drain Current	T_A = 25°C, t_p = 10 μs		I_{DM}	900	A
Operating Junction and Storage Temperature Range			T_J, T_{stg}	−55 to + 175	°C
Source Current (Body Diode)			I_S	158	A
Single Pulse Drain−to−Source Avalanche Energy ($I_{L(pk)}$ = 34 A)			E_{AS}	578	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.

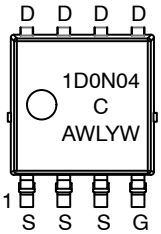
THERMAL RESISTANCE MAXIMUM RATINGS

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 mm^2, 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.

LFPAK8
CASE 760AA

MARKING DIAGRAM



1D0N04C = Specific Device Code
A = Assembly Location
WL = Wafer Lot
Y = Year
W = Work Week

ORDERING INFORMATION
See detailed ordering, marking and shipping information on page 5 of this data sheet.

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

Parameter	Symbol	Test Condition		Min	Typ	Max	Unit
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	$V_{(BR)DSS}/T_J$				16		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			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 = 190 μA		2.5		3.5	V
Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$				−7		mV/°C
Drain−to−Source On Resistance	$R_{DS(on)}$	V_{GS} = 10 V	I_D = 50 A		0.76	0.92	mΩ
Forward Transconductance	g_{FS}	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			6100		pF
Output Capacitance	C_{OSS}				3400		
Reverse Transfer Capacitance	C_{RSS}				70		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 10 V, V_{DS} = 32 V; I_D = 50 A			86		nC
Threshold Gate Charge	$Q_{G(TH)}$	V_{GS} = 10 V, V_{DS} = 32 V; I_D = 50 A			18		
Gate−to−Source Charge	Q_{GS}				28		
Gate−to−Drain Charge	Q_{GD}				14		
Plateau Voltage	V_{GP}				4.9		V
SWITCHING CHARACTERISTICS (Note 5)							
Turn−On Delay Time	$t_{d(ON)}$	V_{GS} = 10 V, V_{DS} = 32 V, I_D = 50 A, R_G = 2.5 Ω			54		ns
Rise Time	t_r				162		
Turn−Off Delay Time	$t_{d(OFF)}$				227		
Fall Time	t_f				173		
DRAIN−SOURCE DIODE CHARACTERISTICS							
Forward Diode Voltage	V_{SD}	V_{GS} = 0 V, I_S = 50 A	T_J = 25°C		0.8	1.2	V
			T_J = 125°C		0.65		
Reverse Recovery Time	t_{RR}	V_{GS} = 0 V, dIS/dt = 100 A/μs, I_S = 50 A			91		ns
Charge Time	t_a				42		
Discharge Time	t_b				49		
Reverse Recovery Charge	Q_{RR}				159		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

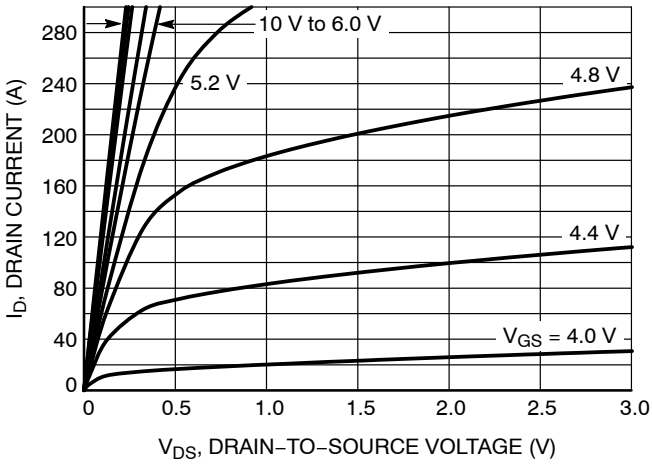


Figure 1. On−Region Characteristics

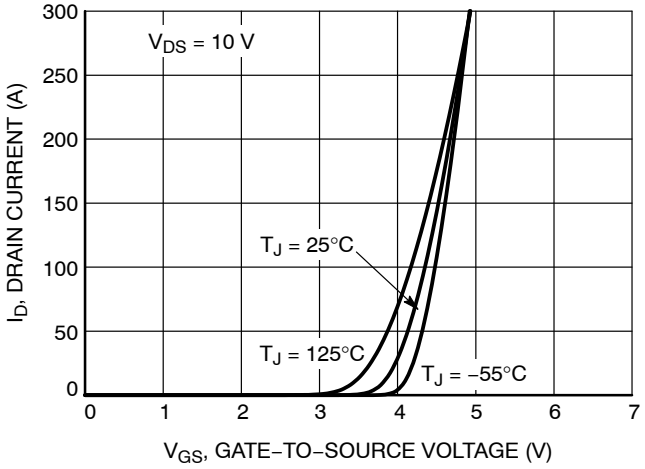


Figure 2. Transfer Characteristics

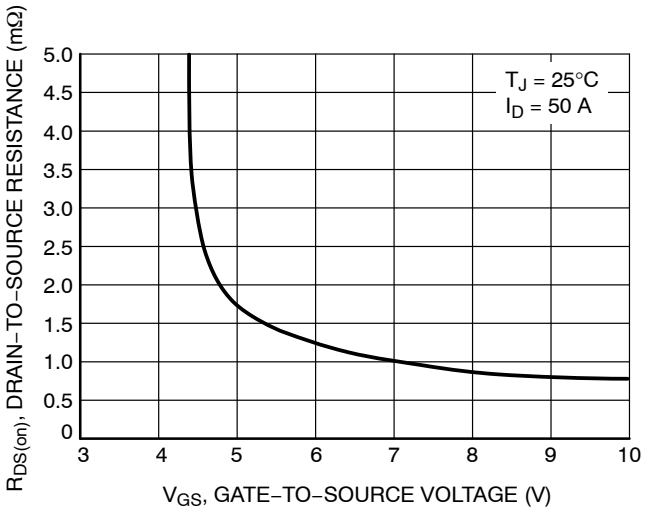


Figure 3. On−Resistance vs. Gate−to−Source Voltage

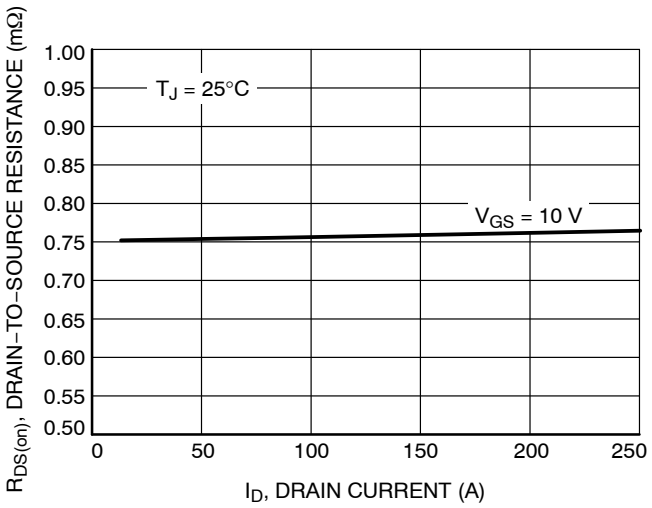


Figure 4. On−Resistance vs. Drain Current and Gate Voltage

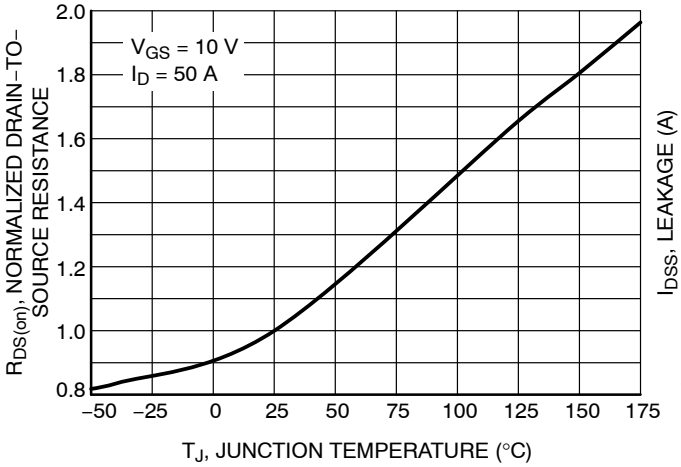


Figure 5. On−Resistance Variation with Temperature

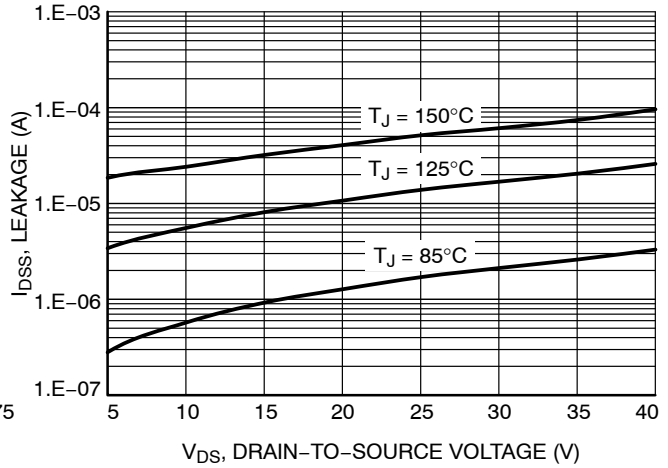


Figure 6. Drain−to−Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

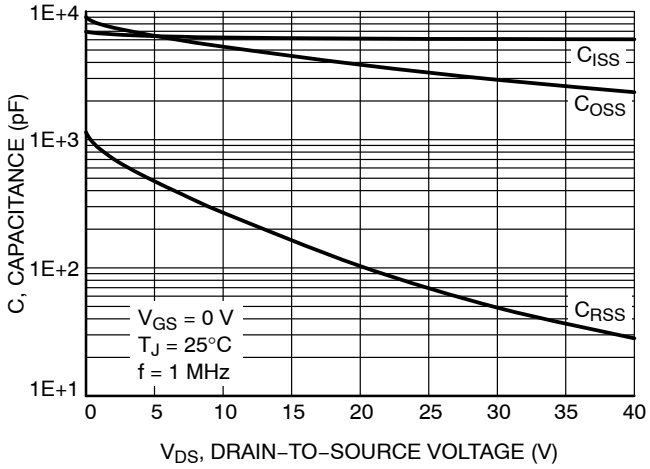


Figure 7. Capacitance Variation

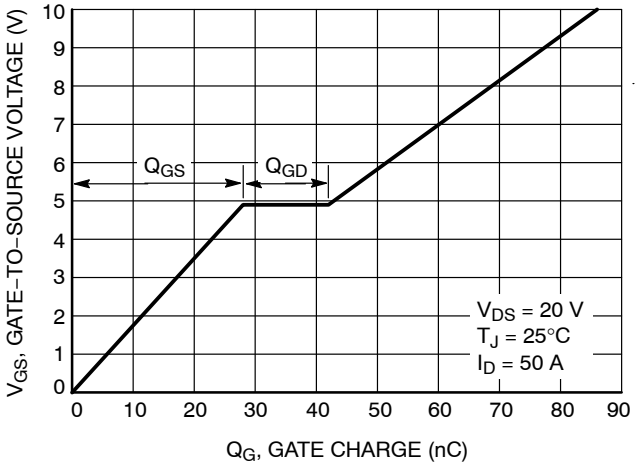


Figure 8. Gate−to−Source Voltage vs. Charge

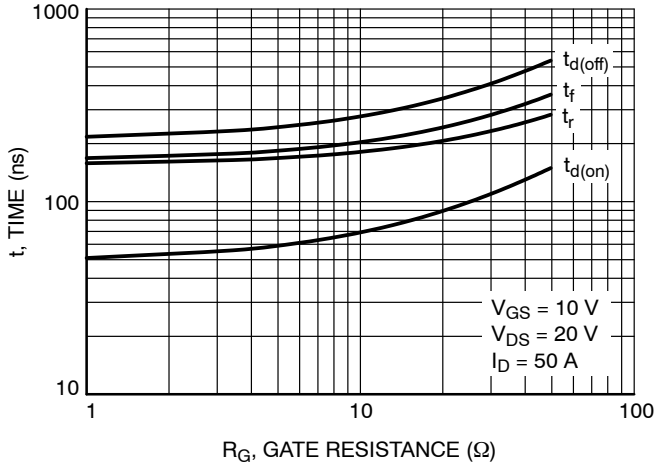


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

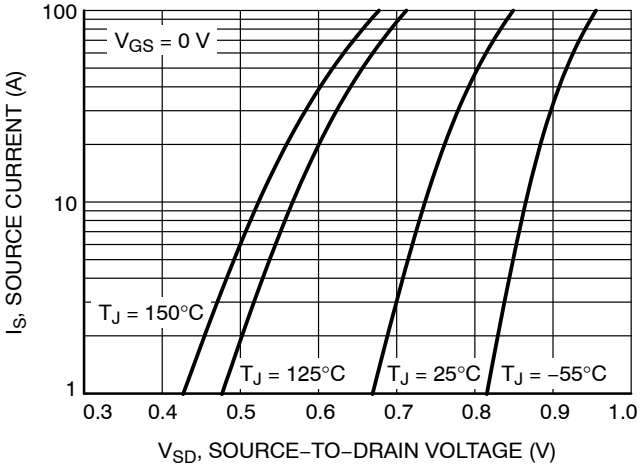


Figure 10. Diode Forward Voltage vs. Current

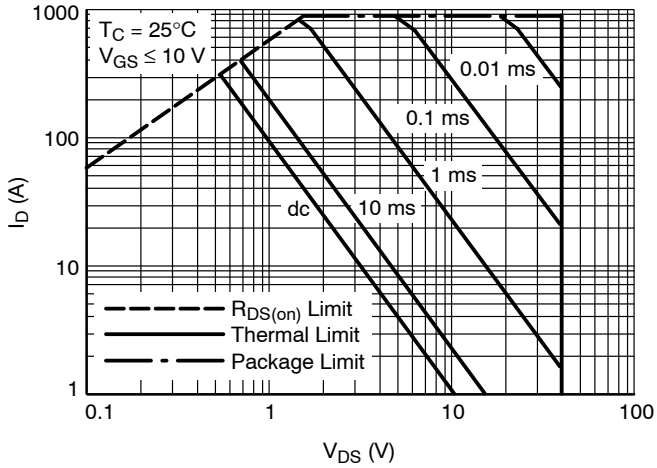


Figure 11. Safe Operating Area

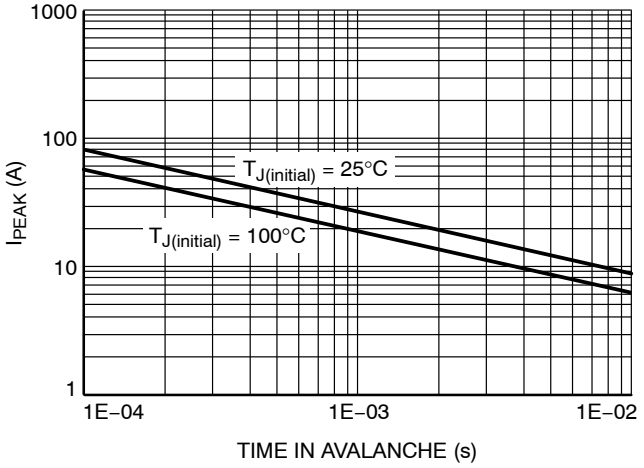


Figure 12. I_{PEAK} vs. Time in Avalanche

TYPICAL CHARACTERISTICS

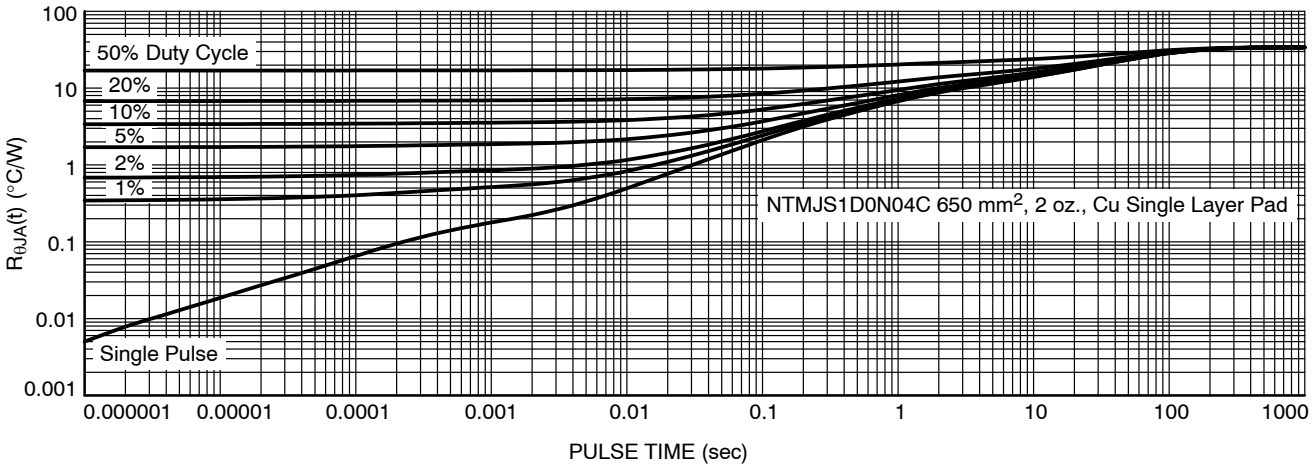


Figure 13. Thermal Characteristics

DEVICE ORDERING INFORMATION

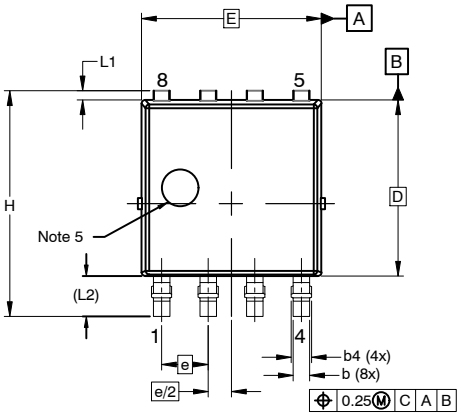
Device	Marking	Package	Shipping†
NTMJS1D0N04CTWG	1D0N04 C	LFPAK8 (Pb−Free)	3000 / Tape & Reel

†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.

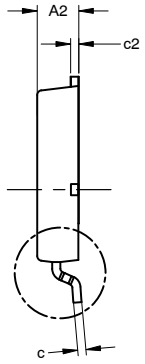
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

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

DATE 22 APR 2024

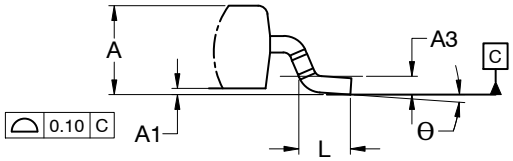


TOP VIEW



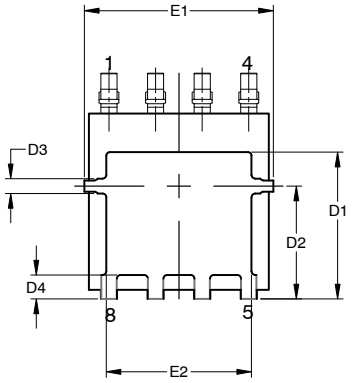
SIDE VIEW

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.

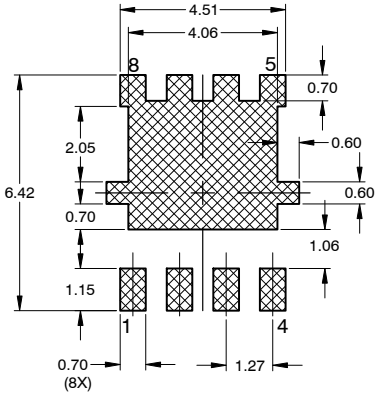


DETAIL 'A'

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°



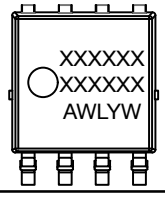
BOTTOM VIEW



RECOMMENDED LAND PAD

*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.

DOCUMENT NUMBER:	**98AON82475G**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	**LFPAK8 4.90x4.80x1.12MM, 1.27P**	**PAGE 1 OF 1**

ADDITIONAL INFORMATION

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