



Final Product/Process Change Notification

Document #:FPCN25572Z23

Issue Date:28 Apr 2024

Title of Change:	Update to FPCN25572Z - To include the reliability data of uDFN6 package for the Qualification of Vanguard Fab and Assembly related changes for Logic part.
Proposed Changed Material First Ship Date:	04 Nov 2024 or earlier if approved by customer
Current Material Last Order Date:	20 Nov 2023 <i>Orders received after the Current Material Last Order Date expiration are to be considered as orders for new changed material as described in this PCN. Orders for current (unchanged) material after this date will be per mutual agreement and current material inventory availability.</i>
Current Material Last Delivery Date:	N/A <i>The Current Material Last Delivery Date may be subject to change based on build and depletion of the current (unchanged) material inventory</i>
Product Category:	Active components – Integrated circuits
Contact information:	Contact your local onsemi Sales Office or logic.fpcn@onsemi.com
PCN Samples Contact:	Contact your local onsemi Sales Office to place sample order. Sample requests are to be submitted no later than 45 days after publication of this change notification. Samples delivery timing will be subject to request date, sample quantity and special customer packing/label requirements.
Sample Availability Date:	05 Apr 2024
PPAP Availability Date:	05 May 2024
Additional Reliability Data:	Contact your local onsemi Sales Office or ChangKit.Mok@onsemi.com
Type of Notification:	This is a Final Product/Process Change Notification (FPCN) sent to customers. The change will be implemented at 'Proposed Change Material First Ship Date' in compliance to J-STD-46 or ZVEI, or earlier upon customer approval, or per our signed agreements. onsemi will consider this proposed change and it's conditions acceptable, unless an inquiry is made in writing within 45 days of delivery of this notice. To do so, contact PCN.Support@onsemi.com .
Change Category	
Category	Type of Change
Test Flow	Move of all or part of electrical wafer test and/or final test to a different location/site/subcontractor
Process - Wafer Production	Move of all or part of wafer fab to a different location/site/subcontractor, New wafer diameter
Equipment	Production from a new equipment/tool which uses a different basic technology or which due to its unique form or function can be expected to influence the integrity of the final product
Data Sheet	Change of datasheet parameters/electrical specification (min./max./typ. values) and/or AC/DC specification
Process - Assembly	Move of all or part of assembly to a different location/site/subcontractor., Change of leadframe base material, Change of wire bonding

Description and Purpose:

With reference to **FPCN25572Z**, this FPCN presents the updated reliability results for uDFN6.

QV DEVICE NAME : NL17SZ08MU1TCG and NL27WZ17MU1TCG
PACKAGE: UDFN6

➤ UDFN6 1.45x1.0

	From	To
Fab Site	Tower	Vanguard
Wafer Size	6 inch	8 inch
Assembly Site	onsemi Seremban	onsemi Tarlac
Test Site	onsemi Seremban	onsemi Tarlac
Wire Type	Au	PCC
Lead Frame	PPF , CU Alloy	LF PPF PLATED (C7025)

➤ Reliability Summary: Refer to embedded excel RMS S87719, S87094, and S87316.

NLVU1GT125AMUTCG to MC74VHC1GT125MU1TCG-Q

Absolute Maximum Ratings and Recommended Operating Conditions

Existing

MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{CC}	DC Supply Voltage	-0.5 to +7.0	V
V _{IN}	DC Input Voltage	-0.5 to +7.0	V
V _{OUT}	DC Output Voltage	-0.5 to +7.0	V

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V _{CC}	Positive DC Supply Voltage	1.65	5.5	V
V _{IN}	Digital Input Voltage	0	5.5	V
V _{OUT}	Output Voltage	0	5.5	V
T _A	Operating Free-Air Temperature	-55	+125	°C
Δt/ΔV	Input Transition Rise or Fall Rate	0	100	ns/V
	V _{CC} = 3.3 V ± 0.3 V V _{CC} = 5.0 V ± 0.5 V	0	20	

New

MAXIMUM RATINGS

Symbol	Characteristics	Value	Unit
V _{CC}	DC Supply Voltage	-0.5 to +6.5	V
V _{IN}	DC Input Voltage	-0.5 to +6.5	V
V _{OUT}	DC Output Voltage	-0.5 to V _{CC} + 0.5 Tri-State Mode (Note 1) Power-Down Mode (V _{CC} = 0 V)	V

RECOMMENDED OPERATING CONDITIONS

Symbol	Characteristics	Min	Max	Unit
V _{CC}	Positive DC Supply Voltage	2.0	5.5	V
V _{IN}	DC Input Voltage	0	5.5	V
V _{OUT}	DC Output Voltage	0	V _{CC} 5.5	V
	Active-Mode (High or Low State) Tri-State Mode (Note 1) Power-Down Mode (V _{CC} = 0 V)	0	5.5	
T _A	Operating Temperature Range	-55	+125	°C
t _r , t _f	Input Rise and Fall Time	0	20	ns/V
	V _{CC} = 2.0 V V _{CC} = 2.3 V to 2.7 V V _{CC} = 3.0 V to 3.6 V V _{CC} = 4.5 V to 5.5 V	0	10 5	

DC Characteristics

Existing

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} (V)	T _A = 25 °C			T _A = +85 °C		T _A = -55 °C to +125 °C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
V _{IH}	Low-Level Input Voltage		3.0 4.5 to 5.5	1.4 2.0			1.4 2.0		1.4 2.0		V
V _{IL}	Low-Level Input Voltage		3.0 4.5 to 5.5		0.53 0.8		0.53 0.8		0.53 0.8		V

New

DC ELECTRICAL CHARACTERISTICS (MC74VHC1GT125)

DC ELECTRICAL CHARACTERISTICS (NOTING TABLE 2)											
Symbol	Parameter	Test Conditions	V _{CC} (V)	T _A = 25 °C			-40 °C ≤ T _A ≤ 85 °C		-55 °C ≤ T _A ≤ 125 °C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
V _{IH}	High-Level Input Voltage		2.0	1.0	-	-	1.0	-	1.0	-	V
			3.0	1.4	-	-	1.4	-	1.4	-	
			4.5	2.0	-	-	2.0	-	2.0	-	
			5.5	2.0	-	-	2.0	-	2.0	-	
V _{IL}	Low-Level Input Voltage		2.0	-	-	0.28	-	0.28	-	0.28	V
			3.0	-	-	0.45	-	0.45	-	0.45	
			4.5	-	-	0.8	-	0.8	-	0.8	
			5.5	-	-	0.8	-	0.8	-	0.8	

AC Characteristics

Existing

AC ELECTRICAL CHARACTERISTICS (Input $t_r = 3.0$ ns)

Symbol	Parameter	V_{CC} (V)	Test Condition	$T_A = 25^\circ\text{C}$			$T_A = +85^\circ\text{C}$			$T_A = -55^\circ\text{C}$ to $+125^\circ\text{C}$			Unit
				Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
t_{PLH} , t_{PHL}	Propagation Delay, A to Y (Figures 3 and 5)	3.0 to 3.6	$C_L = 15$ pF $C_L = 50$ pF	5.6 8.1	8.0 11.5	1.0 1.0	9.5 13.0			12.0 16.0			ns
		4.5 to 5.5	$C_L = 15$ pF $C_L = 50$ pF	3.8 5.3	5.5 7.5	1.0 1.0	6.5 8.5			8.5 10.5			
t_{PZL} , t_{PZH}	Output Enable Time, OE to Y (Figures 4 and 6)	3.0 to 3.6	$C_L = 15$ pF $C_L = 50$ pF	5.4 7.9	8.0 11.5	1.0 1.0	9.5 13.0			11.5 15.0			ns
		4.5 to 5.5	$C_L = 15$ pF $C_L = 50$ pF	3.6 5.1	5.1 7.1	1.0 1.0	6.0 8.0			7.5 9.5			

New

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V_{CC} (V)	$T_A = 25^\circ\text{C}$			$-40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$			$-55^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$			Unit
				Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
t_{PLH} , t_{PHL}	Propagation Delay, A to Y (Figures 3 and 4)	$C_L = 15$ pF	3.0 to 3.6	—	4.5	8.0	—	—	9.5	—	—	12.0	ns
		$C_L = 50$ pF	—	—	6.4	11.5	—	—	13.0	—	—	16.0	
		$C_L = 15$ pF	4.5 to 5.5	—	3.5	5.5	—	—	6.5	—	—	8.5	
t_{PZL} , t_{PZH}	Output Enable Time, OE to Y (Figures 3 and 4)	$C_L = 15$ pF	3.0 to 3.6	—	4.5	7.5	—	—	8.5	—	—	10.5	ns
		$C_L = 50$ pF	—	—	4.5	8.0	—	—	9.5	—	—	11.5	
		$C_L = 15$ pF	4.5 to 5.5	—	3.5	5.5	—	—	6.5	—	—	8.5	
		$C_L = 50$ pF	—	—	4.5	7.1	—	—	8.0	—	—	10.5	

NLVX2G16AMUTCG to NL27WZ16MU1TCG-Q

Absolute Maximum Ratings and Recommended Operating Conditions

Existing

MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	DC Supply Voltage	-0.5 to +7.0	V
V_{IN}	DC Input Voltage	-0.5 to +7.0	V
V_{OUT}	DC Output Voltage	-0.5 to +7.0	V
$I_{LATCHUP}$	Latchup Performance Above V_{CC} and Below GND at 125°C (Note 5)	± 500	mA

New

MAXIMUM RATINGS

Symbol	Characteristics	Value	Units
V_{CC}	DC Supply Voltage	-0.5 to +6.5	V
V_{IN}	DC Input Voltage	-0.5 to +6.5	V
V_{OUT}	DC Output Voltage SC-88, SC-74, UDFN6	Active-Mode (High or Low State) Tri-State Mode (Note 1) Power-Down Mode ($V_{CC} = 0$ V)	-0.5 to $V_{CC} + 0.5$ -0.5 to +6.5 -0.5 to +6.5
$I_{LATCHUP}$	Latchup Performance (Note 4)	± 100	mA

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V_{CC}	Positive DC Supply Voltage	1.65	5.5	V
V_{IN}	Digital Input Voltage	0	5.5	V
V_{OUT}	Output Voltage	0	5.5	V

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V_{CC}	Positive DC Supply Voltage	1.65	5.5	V
V_{IN}	DC Input Voltage	0	5.5	V
V_{OUT}	DC Output Voltage	Active-Mode (High or Low State) Tri-State Mode (Note 1) Power-Down Mode ($V_{CC} = 0$ V)	0 V_{CC} 0	V

DC Characteristics

Existing

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V_{CC} (V)	$T_A = 25^\circ\text{C}$			$T_A = +85^\circ\text{C}$			$T_A = -55^\circ\text{C}$ to $+125^\circ\text{C}$			Unit
				Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V_{IH}	High-Level Input Voltage	1.65-1.95	$0.75 \times V_{CC}$				$0.75 \times V_{CC}$			$0.75 \times V_{CC}$			V
		2.3 to 5.5	$0.70 \times V_{CC}$				$0.70 \times V_{CC}$			$0.70 \times V_{CC}$			
V_{IL}	Low-Level Input Voltage	1.65-1.95	$0.25 \times V_{CC}$				$0.25 \times V_{CC}$			$0.25 \times V_{CC}$			V
		2.3 to 5.5	$0.30 \times V_{CC}$				$0.30 \times V_{CC}$			$0.30 \times V_{CC}$			

New

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Condition	V_{CC} (V)	$T_A = 25^\circ\text{C}$			$-55^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$			Units
				Min	Typ	Max	Min	Typ	Max	
V_{IH}	High-Level Input Voltage		1.65 to 1.95	$0.65 \times V_{CC}$			$0.65 \times V_{CC}$			V
V_{IL}	Low-Level Input Voltage		2.3 to 5.5	$0.70 \times V_{CC}$			$0.70 \times V_{CC}$			V
			1.65 to 1.95	$0.35 \times V_{CC}$			$0.35 \times V_{CC}$			V
			2.3 to 5.5	$0.30 \times V_{CC}$			$0.30 \times V_{CC}$			V

AC Characteristics

Existing

AC ELECTRICAL CHARACTERISTICS (Input $t_r = 3.0$ ns)

Symbol	Parameter	V_{CC} (V)	Test Condition	$T_A = 25^\circ\text{C}$			$T_A = -55^\circ\text{C}$ to $+125^\circ\text{C}$			Unit
				Min	Typ	Max	Min	Typ	Max	
t_{PLH} , t_{PHL}	Propagation Delay Input A to Output	1.65-1.95	$R_L = 1$ M Ω , $C_L = 15$ pF	1.8	8.0	9.6	1.8	10.2		ns
		2.3-2.7	$R_L = 1$ M Ω , $C_L = 15$ pF	1.0	3.0	5.2	1.0	5.8		
		3.0-3.6	$R_L = 1$ M Ω , $C_L = 15$ pF	0.8	2.3	3.6	0.8	4.0		
			$R_L = 500$ Ω , $C_L = 50$ pF	1.2	3.0	4.6	1.2	5.1		
		4.5-5.5	$R_L = 1$ M Ω , $C_L = 15$ pF	0.5	1.8	2.9	0.5	3.2		
			$R_L = 500$ Ω , $C_L = 50$ pF	0.8	2.4	3.8	0.8	4.2		
C_{IN}	Input Capacitance	5.5	$V_{IN} = 0$ V or V_{CC}	7.0						pF
C_{PD}	Power Dissipation Capacitance (Note 6)	3.3	10 MHz, $V_{IN} = 0$ V or V_{CC}	9	11					pF

New

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Condition	V_{CC} (V)	$T_A = 25^\circ\text{C}$			$-40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$			$-55^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$			Unit
				Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
t_{PLH} , t_{PHL}	Propagation Delay, A to Y (Figures 3 and 4)	$R_L = 1$ M Ω , $C_L = 15$ pF	1.65 to 1.95	—	8.0	9.6	—	—	10.2	—	—	10.2	ns
		$R_L = 1$ M Ω , $C_L = 15$ pF	2.3 to 2.7	—	3.0	5.2	—	—	5.8	—	—	5.8	
		$R_L = 1$ M Ω , $C_L = 15$ pF	3.0 to 3.6	—	2.3	3.6	—	—	4.0	—	—	4.0	
		$R_L = 1$ M Ω , $C_L = 15$ pF	4.5 to 5.5	—	1.8	2.9	—	—	3.2	—	—	3.2	
		$R_L = 500$ Ω , $C_L = 50$ pF	3.0 to 3.6	—	3.0	4.6	—	—	5.1	—	—	5.1	
		$R_L = 500$ Ω , $C_L = 50$ pF	4.5 to 5.5	—	2.4	3.8	—	—	4.2	—	—	4.2	

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Condition	Typical	Unit
C_{IN}	Input Capacitance	$V_{CC} = 5.5$ V, $V_I = 0$ V or V_{CC}	2.5	pF
C_{OUT}	Output Capacitance	$V_{CC} = 5.5$ V, $V_I = 0$ V or V_{CC}	4.0	pF
C_{PD}	Power Dissipation Capacitance (Note 5)	10 MHz, $V_{CC} = 3.3$ V, $V_{IN} = 0$ V or V_{CC}	11	pF
		10 MHz, $V_{CC} = 5.0$ V, $V_{IN} = 0$ V or V_{CC}	12.5	pF



Final Product/Process Change Notification

Document #:FPCN25572Z23

Issue Date:28 Apr 2024

Reason / Motivation for Change:	Supply disruption
Anticipated impact on fit, form, function, reliability, product safety or manufacturability:	The device has been qualified and validated based on the same Product Specification. The device has successfully passed the qualification tests. Potential impacts can be identified, but due to testing performed by onsemi in relation to the PCN, associated risks are verified and excluded. No anticipated impacts.
Sites Affected:	
onsemi Sites	External Foundry/Subcon Sites
onsemi Tarlac, Philippines	Vanguard International Semiconductor, Taiwan
Marking of Parts/ Traceability of Change:	Custom source on label will show TW instead of US/JP to indicate new die source from Vanguard. Changed material may be identified by plant code or lot code too.

Reliability Data Summary:

QV DEVICE NAME : NL17SZ08MU1TCG

RMS : S87094 / S87719

PACKAGE : UDFN 6 (Tarlac)

Test	Specification	Condition	Interval	Results
High Temperature Operating Life	JESD22-A108	Ta=125°C, 100 % max rated Vcc	1008 hrs	0/231
High Temperature Storage Life	JESD22-A103	Ta= 150°C	1008 hrs	0/231
Early Life Failure Rate	JESD22-A108	Ta=125°C, 100 % max rated Vcc	48 hrs	0/2400
Preconditioning	J-STD-020 JESD-A113	MSL 1 @ 260°C, Pre TC, uHAST, HAST for surface mount pkgs only		0/693
Temperature Cycling	JESD22-A104	Ta= -65°C to +150°C	500 cyc	0/231
Highly Accelerated Stress Test	JESD22-A110	130°C, 85% RH, 18.8psig, bias	96 hrs	0/231
Unbiased Highly Accelerated Stress Test	JESD22-A118	130°C, 85% RH, 18.8psig, unbiased	96 hrs	0/231
Resistance to Solder Heat	JESD22- B106	Ta = 265°C, 10 sec	-	0/30

QV DEVICE NAME : NL27WZ17MU1TCG

RMS : S87316

PACKAGE : UDFN 6 (Tarlac)

Test	Specification	Condition	Interval	Results
High Temperature Operating Life	JESD22-A108	Ta=125°C, 100 % max rated Vcc	1008 hrs	0/77
High Temperature Storage Life	JESD22-A103	Ta= 150°C	1008 hrs	0/77
Preconditioning	J-STD-020 JESD-A113	MSL 1 @ 260°C, Pre TC, uHAST, HAST for surface mount pkgs only		0/231
Temperature Cycling	JESD22-A104	Ta= -65°C to +150°C	500 cyc	0/77
Highly Accelerated Stress Test	JESD22-A110	130°C, 85% RH, 18.8psig, bias	96 hrs	0/77
Unbiased Highly Accelerated Stress Test	JESD22-A118	130°C, 85% RH, 18.8psig, unbiased	96 hrs	0/77
Resistance to Solder Heat	JESD22- B106	Ta = 265°C, 10 sec	-	0/10



Final Product/Process Change Notification

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Note: AEC-1pager is attached.

To view attachments:

1. Download pdf copy of the PCN to your computer
2. Open the downloaded pdf copy of the PCN
3. Click on the paper clip icon available on the menu provided in the left/bottom portion of the screen to reveal the Attachment field
4. Then click on the attached file.

Electrical Characteristics Summary:

Electrical characteristics available upon request.

List of Affected Parts:

Note: Only the standard (off the shelf) part numbers are listed in the parts list. Any custom parts affected by this PCN are shown in the customer specific PCN addendum in the PCN email notification, or on the **PCN Customized Portal**.

Current Part Number	New Part Number	Qualification Vehicle
NLVU1GT125AMUTCG	MC74VHC1GT125MU1TCG-Q	NL17SZ08MU1TCG, NL27WZ17MU1TCG
NLVX2G16AMUTCG	NL27WZ16MU1TCG-Q	NL17SZ08MU1TCG, NL27WZ17MU1TCG