Final Product/Process Change Notification

Document #:FPCN25572X30
Issue Date: 28 Mar 2024

Title of Change:	Update to **FPCN25572X** - To include the reliability data for QFN-16 package Qualification of Vanguard Fab and Assembly related changes for Logic parts.
Proposed First Ship date:	05 Jul 2024 or earlier if approved by customer
Contact Information:	Contact your local onsemi Sales Office or logic.fpcn@onsemi.com
PCN Samples Contact:	Contact your local onsemi Sales Office. Sample requests are to be submitted no later than 30 days from the date of first notification, Initial PCN or Final PCN, for this change. Samples delivery timing will be subject to request date, sample quantity and special customer packing/label requirements.
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. FPCNs are issued 90 days prior to implementation of the change. onsemi will consider this change accepted, unless an inquiry is made in writing within 30 days of delivery of this notice. To do so, contact PCN.Support@onsemi.com
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.
Change Category:	Test Change, Assembly Change, Wafer Fab Change
Change Sub-Category(s):	Datasheet/Product Doc change, Manufacturing Site Transfer

Sites Affected:	
onsemi Sites	**External Foundry/Subcon Sites**
onsemi Tarlac, Philippines	Vanguard International Semiconductor, Taiwan

Description and Purpose:

With reference to **FPCN25572X**, this FPCN presents the information solely for QFN-16 and the pertinent reliability data.

	From		To
Fab Site	Tower Semiconductor	Diodes Incorporated (Diodes)	Vanguard International Semiconductor (VIS)
Wafer Size	150 mm	200 mm	200 mm

Assembly and test changes as shown in the table below:

QFN16 2.5 x 3.5 Package

	From	To
Assembly Site	Stars Micro	onsemi Tarlac
Test Site	Stars Micro	onsemi Tarlac
Leadframe	PPF	Selective AG Plated
Die Attach	HR5104	CRM-1076WB
Bond Wire	0.8 mil AU	0.8 mil PCC
Mold Compound	G700LTD	G770HMD

wQFN16 3.5 x 2.5 Package

	From	To
Assembly Site	Hana Semiconductor	onsemi Tarlac
Test Site	Hana Semiconductor	onsemi Tarlac
Leadframe	PPF (HDS)	PPF (AAMI)
Die Attach	Abletherm 8600	CRM-1076WB
Bond Wire	1 mil AU	1 mil PCC
Mold Compound	CEL9220HF13H HF	G770HMD

For 74LCX138BQX wQFN16 only

	From	To
Marking	 Z= ASSY Plant Code XY = Two Digit Date Code Format (Year & Week) KK = Two Digit Lot Run Traceability Code	 A = Assembly Site L = Wafer Lot Traceability Y = Year of Production, Last Number WW = Work Week Number

Reliability Data Summary:

QV DEVICE NAME : NLV74HC595AMN1TWG
RMS : S89269 / S92696
PACKAGE : QFN-16

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

QV DEVICE NAME : MC74LVX4051MNTWG
RMS : S89440
PACKAGE : QFN-16

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

Electrical Characteristics Summary:

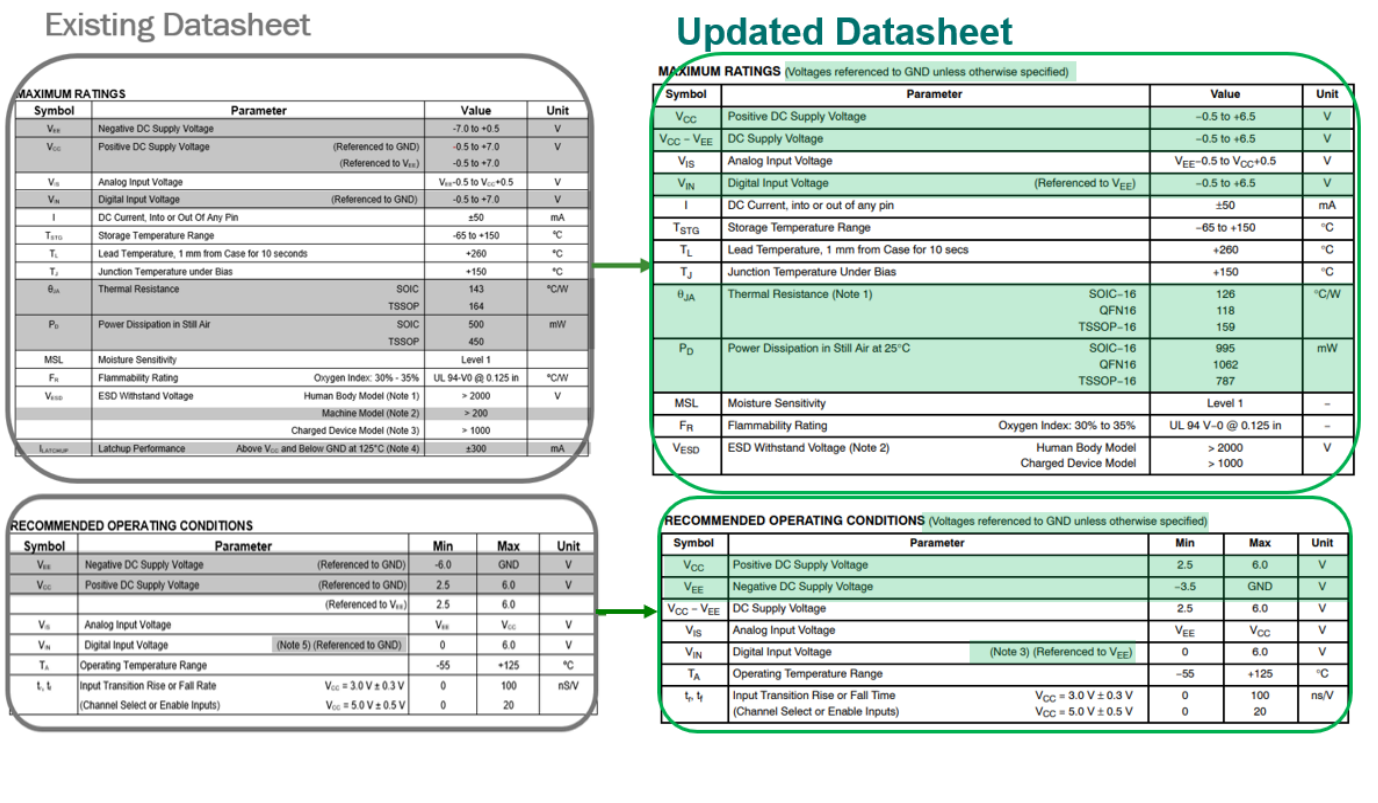
	From	To
Datasheet	Current Revision	New Revision
Absolute Max Voltage Rating	7 V	6.5 V

- **Additional change for only 74LCX138BQX:**

	From	To
Recommended Operating Voltage Range	2.0 – 3.6 V	1.65 – 5.5 V
Recommended Operating Temperature Range	-40 – 85 °C	-40 – 125 °C

- **Additional change for MC74LVX4051MNTWG only:**

Datasheet Existing vs Updated Comparison:



MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{EE}	Negative DC Supply Voltage		-7.0 to +0.5	V
V_{CC}	Positive DC Supply Voltage	(Referenced to GND)	-0.5 to +7.0	V
		(Referenced to V_{EE})	-0.5 to +7.0	
V_{IS}	Analog Input Voltage		V_{EE}-0.5 to V_{CC}+0.5	V
V_{IN}	Digital Input Voltage	(Referenced to GND)	-0.5 to +7.0	V
I	DC Current, Into or Out Of Any Pin		±50	mA
T_{STG}	Storage Temperature Range		-65 to +150	°C
T_L	Lead Temperature, 1 mm from Case for 10 seconds		+260	°C
T_J	Junction Temperature under Bias		+150	°C
θ_{JA}	Thermal Resistance	SOIC	143	°C/W
		TSSOP	164	
P_D	Power Dissipation in Still Air	SOIC	500	mW
		TSSOP	450	
MSL	Moisture Sensitivity		Level 1	
F_R	Flammability Rating	Oxygen Index: 30% - 35%	UL 94-V0 @ 0.125 in	°C/W
V_{ESD}	ESD Withstand Voltage	Human Body Model (Note 1)	> 2000	V
		Machine Model (Note 2)	> 200	
		Charged Device Model (Note 3)	> 1000	
$I_{LATCHUP}$	Latchup Performance	Above V_{CC} and Below GND at 125°C (Note 4)	±300	mA

MAXIMUM RATINGS (Voltages referenced to GND unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{CC}	Positive DC Supply Voltage		-0.5 to +6.5	V
$V_{CC} - V_{EE}$	DC Supply Voltage		-0.5 to +6.5	V
V_{IS}	Analog Input Voltage		V_{EE}-0.5 to V_{CC}+0.5	V
V_{IN}	Digital Input Voltage	(Referenced to V_{EE})	-0.5 to +6.5	V
I	DC Current, into or out of any pin		±50	mA
T_{STG}	Storage Temperature Range		-65 to +150	°C
T_L	Lead Temperature, 1 mm from Case for 10 secs		+260	°C
T_J	Junction Temperature Under Bias		+150	°C
θ_{JA}	Thermal Resistance (Note 1)	SOIC-16	126	°C/W
		QFN16	118	
		TSSOP-16	159	
P_D	Power Dissipation in Still Air at 25°C	SOIC-16	995	mW
		QFN16	1062	
		TSSOP-16	787	
MSL	Moisture Sensitivity		Level 1	-
F_R	Flammability Rating	Oxygen Index: 30% to 35%	UL 94 V-0 @ 0.125 in	-
V_{ESD}	ESD Withstand Voltage (Note 2)	Human Body Model	> 2000	V
		Charged Device Model	> 1000	

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter		Min	Max	Unit
V_{EE}	Negative DC Supply Voltage	(Referenced to GND)	-6.0	GND	V
V_{CC}	Positive DC Supply Voltage	(Referenced to GND)	2.5	6.0	V
		(Referenced to V_{EE})	2.5	6.0	
V_{IS}	Analog Input Voltage		V_{EE}	V_{CC}	V
V_{IN}	Digital Input Voltage	(Note 5) (Referenced to GND)	0	6.0	V
T_A	Operating Temperature Range		-55	+125	°C
t_r, t_f	Input Transition Rise or Fall Rate	V_{CC} = 3.0 V ± 0.3 V	0	100	nS/V
	(Channel Select or Enable Inputs)	V_{CC} = 5.0 V ± 0.5 V	0	20	

RECOMMENDED OPERATING CONDITIONS (Voltages referenced to GND unless otherwise specified)

Symbol	Parameter		Min	Max	Unit
V_{CC}	Positive DC Supply Voltage		2.5	6.0	V
V_{EE}	Negative DC Supply Voltage		-3.5	GND	V
$V_{CC} - V_{EE}$	DC Supply Voltage		2.5	6.0	V
V_{IS}	Analog Input Voltage		V_{EE}	V_{CC}	V
V_{IN}	Digital Input Voltage	(Note 3) (Referenced to V_{EE})	0	6.0	V
T_A	Operating Temperature Range		-55	+125	°C
t_r, t_f	Input Transition Rise or Fall Time	V_{CC} = 3.0 V ± 0.3 V	0	100	ns/V
	(Channel Select or Enable Inputs)	V_{CC} = 5.0 V ± 0.5 V	0	20	

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****.*

Part Number	Qualification Vehicle
74LCX138BQX	NLV74HC595AMN1TWG
MC74LVX4051MNTWG	MC74LVX4051MNTWG
MC74HC165AMN2TWG	NLV74HC595AMN1TWG
MC74HC165AMNTWG	NLV74HC595AMN1TWG