Final Product/Process Change Notification

Document #:FPCN25572X28
Issue Date:13 Feb 2024

Title of Change:	Update to **FPCN25572X** - Wafer Fab Site Addition of Vanguard International Semiconductor, Taiwan an Alternate Fab Site for FXMA2102L8X and FXMA108BQX.
Proposed First Ship date:	20 May 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 to indicate new die source from Vanguard. Changed material may be identified by plant code or lot code too.
Change Category:	Wafer Fab Change
Change Sub-Category(s):	Manufacturing Site Transfer, Datasheet/Product Doc change

Sites Affected:

onsemi Sites	**External Foundry/Subcon Sites**
None	Vanguard International Semiconductor, Taiwan

Description and Purpose:

With reference to **FPCN25572X**, this FPCN presents the information solely for FXMA2102L8X and FXMA108BQX part numbers.

This notification includes the pertinent reliability data.

	From	**To**	
Fab Site	Diodes Incorporated (Diodes)	Vanguard International Semiconductor (VIS)	Diodes Incorporated (Diodes)

There is no product marking change as a result of this change.

Reliability Data Summary:

QV DEVICE NAME: FXMA2102L8X
RMS: S88603 / S91286
PACKAGE: UQFN8 1.6x1.6, 0.5P

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	0/3120
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: FXMA108BQX
RMS: S88604
PACKAGE: WQFN20 4.5x2.5, 0.5P

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

Datasheet Existing vs Updated for FXMA2102L8X:

Existing Datasheet

Features

- Bi−Directional Interface between Any Two Levels: 1.65 V to 5.5 V
- Direction Control not Needed
- System GPIO Resources Not Required when OE Tied to V_{CCA}
- I^2C 400 pF Buffer / Repeater
- I^2C Bus Isolation
- A/B Port V_{OL} = 175 mV (Typical), V_{IL} = 150 mV, I_{OL} = 6 mA
- Open−Drain Inputs / Outputs
- Accommodates Standard−Mode and Fast−Mode I^2C−Bus Devices
- Supports I^2C Clock Stretching & Multi−Master
- Fully Configurable: Inputs and Outputs Track V_{CC}
- Control Input (OE) Referenced to V_{CCA}.
- Non−Preferential Power−Up; Either V_{CC} May Be Powered−Up First
- Outputs Switch to 3−State if Either V_{CC} is at GND
- Tolerant Output Enable: 5 V
- Packaged in 8−Terminal Leadless MicroPak™ (1.6 mm x 1.6 mm) and Ultrathin MLP (1.2 mm x 1.4 mm)
- ESD Protection Exceeds:
  - 8 kV HBM ESD (per JESD22−A114)
  - 2 kV CDM (per JESD22− C101)

Updated Datasheet

Features

- Bi−Directional Interface between Any Two Levels: 1.65 V to 5.5 V
- Direction Control not Needed
- System GPIO Resources Not Required when OE Tied to V_{CCA}
- I^2C 400 pF Buffer / Repeater
- I^2C Bus Isolation
- A/B Port V_{OL} = 175 mV (Typical), V_{IL} = 150 mV, I_{OL} = 6 mA
- Open−Drain Inputs / Outputs
- Accommodates Standard−Mode and Fast−Mode I^2C−Bus Devices
- Supports I^2C Clock Stretching & Multi−Master
- Fully Configurable: Inputs and Outputs Track V_{CC}
- Control Input (OE) Referenced to V_{CCA}.
- Non−Preferential Power−Up; Either V_{CC} May Be Powered−Up First
- Outputs Switch to 3−State if Either V_{CC} is at GND
- Tolerant Output Enable: 5 V
- Packaged in 8−Terminal Leadless MicroPak™ (1.6 mm x 1.6 mm) and Ultrathin MLP (1.2 mm x 1.4 mm)
- ESD Protection Exceeds:
  - 5 kV HBM ESD (per JESD22−A114)
  - 2 kV CDM (per JESD22− C101)

Existing Datasheet

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Min	Max	Unit
V_{CCA}, V_{CCB}	Supply Voltage		−0.5	7.0	V
V_{IN}	DC Input Voltage	A Port	−0.5	7.0	
		B Port	−0.5	7.0	
		Control Input (OE)	−0.5	7.0	
V_O	Output Voltage (Note 2)	A_n Outputs 3−State	−0.5	7.0	V
		B_n Outputs 3−State	−0.5	7.0	
		A_n Outputs Active	−0.5	V_{CCA} + 0.5 V	
		B_n Outputs Active	−0.5	V_{CCB} + 0.5 V	
I_{IK}	DC Input Diode Current	At V_{IN} < 0 V	−	−50	mA
I_{OK}	DC Output Diode Current	At V_O < 0 V	−	−50	mA
		At V_O > V_{CC}	−	+50	
I_{OH} / I_{OL}	DC Output Source/Sink Current		−50	+50	mA
I_{CC}	DC V_{CC} or Ground Current per Supply Pin		−	±100	mA
P_D	Power Dissipation	At 400 KHz	−	0.129	mW
T_{STG}	Storage Temperature Range		−65	+150	°C
ESD	Electrostatic Discharge Capability	Human Body Model, JESD22−A114	−	8	kV
		Charged Device Mode, JESD22−C101	−	2	

Updated Datasheet

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Min	Max	Unit
V_{CCA}, V_{CCB}	Supply Voltage		−0.5	7.0	V
V_{IN}	DC Input Voltage	A Port	−0.5	7.0	
		B Port	−0.5	7.0	
		Control Input (OE)	−0.5	7.0	
V_O	Output Voltage (Note 2)	A_n Outputs 3−State	−0.5	7.0	V
		B_n Outputs 3−State	−0.5	7.0	
		A_n Outputs Active	−0.5	V_{CCA} + 0.5 V	
		B_n Outputs Active	−0.5	V_{CCB} + 0.5 V	
I_{IK}	DC Input Diode Current	At V_{IN} < 0 V	−	−50	mA
I_{OK}	DC Output Diode Current	At V_O < 0 V	−	−50	mA
		At V_O > V_{CC}	−	+50	
I_{OH} / I_{OL}	DC Output Source/Sink Current		−50	+50	mA
I_{CC}	DC V_{CC} or Ground Current per Supply Pin		−	±100	mA
P_D	Power Dissipation	At 400 KHz	−	0.129	mW
T_{STG}	Storage Temperature Range		−65	+150	°C
ESD	Electrostatic Discharge Capability	Human Body Model, JESD22−A114	−	5	kV
		Charged Device Mode, JESD22−C101	−	2	

Existing Datasheet

AC CHARACTERISTICS (Output load: C_L = 50 pF, R_{PU} = 2.2 kΩ, and T_A = −40°C to +85°C.)

Symbol	Parameter	V_{CCB} 4.5 to 5.5 V Typ	Max	3.0 to 3.6 V Typ	Max	2.3 to 2.7 V Typ	Max	1.65 to 1.95 V Typ	Max	Unit
V_{CCA} = 4.5 to 5.5 V										
t_{PLH}	A to B	1	3	1	3	1	3	1	3	ns
	B to A	1	3	2	4	3	5	4	7	
t_{PHL}	A to B	2	4	3	5	4	6	5	7	ns
	B to A	2	4	2	5	2	6	5	7	
t_{PZL}	OE to A	4	5	6	10	5	9	7	15	ns
	OE to B	3	5	4	7	5	8	10	15	
t_{PLZ}	OE to A	65	100	65	105	65	105	65	105	ns
	OE to B	5	9	6	10	7	12	9	16	
t_{skew}	A Port, B Port (Note 14)	0.50	1.50	0.50	1.00	0.50	1.00	0.50	1.00	ns
V_{CCA} = 3.0 to 3.6 V										
t_{PLH}	A to B	2.0	5.0	1.5	3.0	1.5	3.0	1.5	3.0	ns
	B to A	1.5	3.0	1.5	4.0	2.0	6.0	3.0	9.0	
t_{PHL}	A to B	2.0	4.0	2.0	4.0	2.0	5.0	3.0	5.0	ns
	B to A	2.0	4.0	2.0	4.0	2.0	5.0	3.0	5.0	
t_{PZL}	OE to A	4.0	8.0	5.0	9.0	6.0	11.0	7.0	15.0	ns
	OE to B	4.0	8.0	6.0	9.0	8.0	11.0	10.0	14.0	
t_{PLZ}	OE to A	100	115	100	115	100	115	100	115	ns
	OE to B	5	10	4	8	5	10	9	15	
t_{skew}	A Port, B Port (Note 14)	0.5	1.5	0.5	1.0	0.5	1.0	0.5	1.0	ns
V_{CCA} = 2.3 to 2.7 V										
t_{PLH}	A to B	2.5	5.0	2.5	5.0	2.0	4.0	1.0	3.0	ns
	B to A	1.5	3.0	2.0	4.0	3.0	6.0	5.0	10.0	
t_{PHL}	A to B	2.0	5.0	2.0	5.0	2.0	5.0	3.0	6.0	ns
	B to A	2.0	5.0	2.0	5.0	2.0	5.0	3.0	6.0	
t_{PZL}	OE to A	5.0	10.0	5.0	10.0	6.0	12.0	9.0	18.0	ns
	OE to B	4.0	8.0	4.5	9.0	5.0	10.0	9.0	18.0	
t_{PLZ}	OE to A	100	115	100	115	100	115	100	115	ns
	OE to B	65	110	65	110	65	115	12	25	
t_{skew}	A Port, B Port (Note 14)	0.5	1.5	0.5	1.0	0.5	1.0	0.5	1.0	ns
V_{CCA} = 1.65 to 1.95 V										
t_{PLH}	A to B	4	7	4	7	5	8	5	10	ns
	B to A	1.0	2.0	1.0	2.0	1.5	3.0	5.0	10.0	
t_{PHL}	A to B	5	8	3	7	3	7	3	7	ns
	B to A	4	8	3	7	3	7	3	7	
t_{PZL}	OE to A	11	15	11	14	14	28	14	23	ns
	OE to B	6	14	6	12	6	12	9	16	
t_{PLZ}	OE to A	75	115	75	115	75	115	75	115	ns
	OE to B	75	115	75	115	75	115	75	115	
t_{skew}	A Port, B Port (Note 14)	0.5	1.5	0.5	1.0	0.5	1.0	0.5	1.0	ns

14. Skew is the variation of propagation delay between output signals and applies only to output signals on the same port (A_n or B_n) and switching with the same polarity (LOW−to−HIGH or HIGH−to−LOW) *(see Figure 15)*. Skew is guaranteed, but not tested.

Updated Datasheet

AC CHARACTERISTICS (Output load: C_L = 50 pF, R_{PU} = 2.2 kΩ, and T_A = −40°C to +85°C.)

Symbol	Parameter	V_{OOB} 4.5 to 5.5 V Typ	Max	3.0 to 3.6 V Typ	Max	2.3 to 2.7 V Typ	Max	1.65 to 1.95 V Typ	Max	Unit
V_{OOA} = 4.5 to 5.5 V										
t_{PLH}	A to B	1	6	3	6	3	6	5	7	ns
	B to A	1	4	2	4	3	5	4	7	
t_{PHL}	A to B	2	4	3	5	4	6	9	10.5	ns
	B to A	2	4	2	5	2	6	5	7	
t_{PZL}	OE to A	4	5	6	10	5	9	7	15	ns
	OE to B	3	5	4	7	5	8	10	15	
t_{PLZ}	OE to A	65	100	65	105	65	105	65	105	ns
	OE to B	20	30	21	35	55	105	55	105	
t_{skew}	A Port, B Port (Note 14)	0.50		0.50		0.50		0.50		ns
V_{OOA} = 3.0 to 3.6 V										
t_{PLH}	A to B	2.0	5.0	1.5	3.0	3.5	5	3.6	5	ns
	B to A	1.5	4.5	1.5	4.0	2.0	6.0	3.0	9.0	
t_{PHL}	A to B	2.0	4.0	2.0	4.0	2.0	5.0	4.3	7.5	ns
	B to A	2.0	5.3	2.0	4.0	2.0	5.0	3.0	5.0	
t_{PZL}	OE to A	4.0	8.0	5.0	9.0	6.0	11.0	7.0	15.0	ns
	OE to B	4.0	8.0	6.0	9.0	8.0	11.0	10.0	14.0	
t_{PLZ}	OE to A	100	115	100	115	100	115	100	115	ns
	OE to B	21	35	22	35	65	115	65	115	
t_{skew}	A Port, B Port (Note 14)	0.5		0.5		0.5		0.5		ns
V_{OOA} = 2.3 to 2.7 V										
t_{PLH}	A to B	2.5	5.0	2.5	5.0	2.0	4.0	4.2	5.5	ns
	B to A	3.6	7	2.0	4.0	3.0	6.0	5.0	10.0	
t_{PHL}	A to B	2.0	5.0	2.0	5.0	2.0	5.0	3.0	6.0	ns
	B to A	6	7.5	4	5.5	2.0	5.0	3.0	6.0	
t_{PZL}	OE to A	5.0	10.0	5.0	10.0	6.0	12.0	9.0	18.0	ns
	OE to B	4.0	8.0	4.5	9.0	5.0	10.0	9.0	18.0	
t_{PLZ}	OE to A	100	115	100	115	100	115	100	115	ns
	OE to B	65	110	65	110	65	115	65	115	
t_{skew}	A Port, B Port (Note 14)	0.5		0.5		0.5		0.5		ns
V_{OOA} = 1.65 to 1.95 V										
t_{PLH}	A to B	4	7	4	7	5	8	5	10	ns
	B to A	4	8.5	4	5	4	5	5.0	10.0	
t_{PHL}	A to B	5	8	3	7	3	7	3	7	ns
	B to A	9.5	10.5	5	7.5	3	7	3	7	
t_{PZL}	OE to A	11	15	11	14	8	28	14	23	ns
	OE to B	6	14	6	12	6	12	9	16	
t_{PLZ}	OE to A	75	115	75	115	75	115	75	115	ns
	OE to B	75	115	75	115	75	115	75	115	
t_{skew}	A Port, B Port (Note 14)	0.5		0.5		0.5		0.5		ns

14. Skew is the variation of propagation delay between output signals and applies only to output signals on the same port (A_n or B_n) and switching with the same polarity (LOW−to−HIGH or HIGH−to−LOW) *(see Figure 15)*. Skew is guaranteed, but not tested.

Datasheet Existing vs Updated for FXMA108BQX:

Existing Datasheet

Features

- Bi−Directional Interface between Two Levels from 1.65 V to 5.5 V
- Fully Configurable: Inputs and Outputs Track V_{CC}
- Non−Preferential Power−Up; Either V_{CC} May Be Powered−Up First
- Outputs Remain in 3−State Until Active V_{CC} Level is Reached
- Outputs Switch to 3−State if Either V_{CC} is at GND
- Power−Off Protection
- Bus Hold On Data Inputs Eliminates the Need for Pull−Up Resistors
- Control Input (/OE) is Referenced to V_{CCA} Voltage
- Packaged in 20−Terminal WQFN
- Direction Control Not Needed
- 80 Mbps Throughput when Translating between 2.5 V and 5.0 V
- ESD Protection Exceeds:
  - 8 kV Human Body Model (B Port I/O to GND) (JESD22−A114 & Mil Std 883e 3015.7)
  - 5 kV Human Body Model (A Port I/O to GND) (JESD22−A114 & Mil Std 883e 3015.7)
  - 2 kV Charged Device Model (ESD STM 5.3) (JESD22−C101)

Updated Datasheet

Features

- Bi−Directional Interface between Two Levels from 1.65 V to 5.5 V
- Fully Configurable: Inputs and Outputs Track V_{CC}
- Non−Preferential Power−Up; Either V_{CC} May Be Powered−Up First
- Outputs Remain in 3−State Until Active V_{CC} Level is Reached
- Outputs Switch to 3−State if Either V_{CC} is at GND
- Power−Off Protection
- Bus Hold On Data Inputs Eliminates the Need for Pull−Up Resistors
- Control Input (/OE) is Referenced to V_{CCA} Voltage
- Packaged in 20−Terminal WQFN
- Direction Control Not Needed
- 80 Mbps Throughput when Translating between 2.5 V and 5.0 V
- ESD Protection Exceeds:
  - 8 kV Human Body Model (B Port I/O to GND) (JESD22−A114 & Mil Std 883e 3015.7)
  - 4 kV Human Body Model (A Port I/O to GND) (JESD22−A114 & Mil Std 883e 3015.7)
  - 2 kV Charged Device Model (ESD STM 5.3) (JESD22−C101)

Existing Datasheet

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Condition	Min	Max	Unit
V_{CC}	Supply Voltage		V_{CCA}	−0.5	7.0	V
			V_{CCB}	−0.5	7.0	
V_{IN}	DC Input Voltage		I/O Side A and B	−0.5	7.0	V
			Control Input (/OE)	−0.5	7.0	
V_O	Output Voltage		Output 3−State	−0.5	7.0	V
			Output Active (A_n) (Note 1)	−0.5	V_{CCA} + 0.5	
			Output Active (B_n) (Note 1)	−0.5	V_{CCB} + 0.5	
I_{IK}	DC Input Diode Current		V_{IN} < 0 V		−50	mA
I_{OK}	DC Output Diode Current		V_O < 0 V		−50	mA
			V_O > V_{CC}		+50	
I_{OH}/I_{OL}	DC Output Source/Sink Current			−50	+50	mA
I_{CC}	DC V_{CC} or Ground Current (Per Supply Pin)				±100	mA
T_{STG}	Storage Temperature Range			−65	+150	°C
ESD	Electrostatic Discharge Capability	Human Body Model, JESD22−A114, and Mil Std 883e 3015.7	B Port I/O to GND		8000	V
		Human Body Model, JESD22−A114 and Mil Std 883e 3015.7	A Port I/O to GND		5000	
		Charged Device Model, JESD22−C101 per ESD STM 5.3			2000	

Updated Datasheet

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Condition	Min	Max	Unit
V_{CC}	Supply Voltage		V_{CCA}	−0.5	7.0	V
			V_{CCB}	−0.5	7.0	
V_{IN}	DC Input Voltage		I/O Side A and B	−0.5	7.0	V
			Control Input (/OE)	−0.5	7.0	
V_O	Output Voltage		Output 3−State	−0.5	7.0	V
			Output Active (A_n) (Note 1)	−0.5	V_{CCA} + 0.5	
			Output Active (B_n) (Note 1)	−0.5	V_{CCB} + 0.5	
I_{IK}	DC Input Diode Current		V_{IN} < 0 V		−50	mA
I_{OK}	DC Output Diode Current		V_O < 0 V		−50	mA
			V_O > V_{CC}		+50	
I_{OH}/I_{OL}	DC Output Source/Sink Current			−50	+50	mA
I_{CC}	DC V_{CC} or Ground Current (Per Supply Pin)				±100	mA
T_{STG}	Storage Temperature Range			−65	+150	°C
ESD	Electrostatic Discharge Capability	Human Body Model, JESD22−A114, and Mil Std 883e 3015.7	B Port I/O to GND		8000	V
		Human Body Model, JESD22−A114 and Mil Std 883e 3015.7	A Port I/O to GND		4000	
		Charged Device Model, JESD22−C101 per ESD STM 5.3			2000	

Existing Datasheet

AC CHARACTERISTICS (V_{CCA} = 4.5 V to 5.5 V, Output Load) *(See Table 2)*

Symbol	Parameter	T_A = −40°C to +85°C								Unit
		V_{CCB} = 4.5 V to 5.5 V		V_{CCB} = 3.0 V to 3.6 V		V_{CCB} = 2.3 V to 2.7 V		V_{CCB} = 1.65 V to 1.95 V		
		Min	Max	Min	Max	Min	Max	Min	Max	
t_{PLH}, t_{PHL}	A−to−B Side	1.5	5.0	1.75	6.0	2.0	6.5	2.6	10.5	ns
	B−to−A Side	1.5	5.0	1.75	6.0	2.0	6.5	2.6	10.5	
t_{PZL}, t_{PZH}	/OE−to−A, /OE−to−B		1.7		1.7		1.7		1.7	μs
t_{skew}	A Port, B Side (Note 11)		0.5		0.5		0.5		0.5	ns

11. Skew is the variation of propagation delay between output signals and applies only to output signals on the same Side (An or Bn) and switching with the same polarity (LOW−to−HIGH or HIGH−to−LOW). Skew is guaranteed, but not tested in production *(see Figure 11)*.

Updated Datasheet

AC CHARACTERISTICS (V_{CCA} = 4.5 V to 5.5 V, Output Load) *(See Table 2)*

Symbol	Parameter	T_A = −40°C to +85°C								Unit
		V_{CCB} = 4.5 V to 5.5 V		V_{CCB} = 3.0 V to 3.6 V		V_{CCB} = 2.3 V to 2.7 V		V_{CCB} = 1.65 V to 1.95 V		
		Min	Max	Min	Max	Min	Max	Min	Max	
t_{PLH}, t_{PHL}	A−to−B Side		5.0		6.0		6.5		10.5	ns
	B−to−A Side		5.0		6.0		6.5		10.5	
t_{PZL}, t_{PZH}	/OE−to−A, /OE−to−B		1.7		1.7		1.7		1.7	μs
t_{skew}	A Port, B Side (Note 11)		0.7		0.7		0.7		0.7	ns

11. Skew is the variation of propagation delay between output signals and applies only to output signals on the same Side (An or Bn) and switching with the same polarity (LOW−to−HIGH or HIGH−to−LOW). Skew is guaranteed, but not tested in production *(see Figure 11)*.

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
FXMA108BQX	FXMA108BQX
FXMA2102L8X	FXMA2102L8X