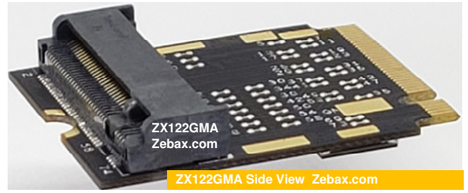
Product Name: **ZX122GxA – PCISIG M.2 NGFF passive breakout adapter module offering all KEY type combinations**

Product Description: ZX122GxA is PCISIG M.2 (NGFF) breakout adapter providing access to all PCISIG M.2 signals. It is designed to be placed in between Host and Target for real-time test and measurements. ZX122GxA is breakout adapter designed for Test and measurement , signal integrity , characterization , test and debug of any PCISIG M.2 design via onboard 0405 SMD shunt landing pads.

a) All PCISIG M.2 signals are routed to 0402 SMD shunt package for easy probe access.
b) All PCISIG M.2 reserved Ground (GND) signals are inner connected on the ZX122GxA module, accessible via Exposed Copper
c) Each 0402 SMD shunt package may be wired for signal measurement via scope / test equipment.
d) Each 0402 SMD shunt package may be cut and redirected to another signal (onboard or offboard) for test and debug.
e) Ideal breakout module for manufacturing / development loopback test.

ZX122GxA is commonly used throughout this document. It is referred to the ZX122GxA module where the "x" will be different M.2 Key type , as listed in the Ordering Information on page 4



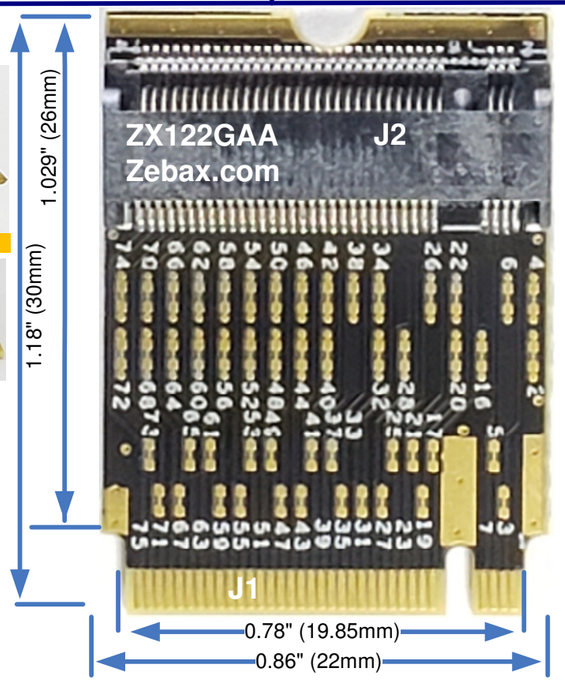


Figure 2 – ZX122GAA shown – All other modules have identical dimensions

ZX122GxA features:

1- Provides access to ALL PCISIG reserved signals (excluding the GND reserved signals) via onboard 0402 SMD shunt packages, (67 signals on single M.2 Key design).
2- All PCISIG M.2 reserved Ground (GND) signals are inner connected on the ZX122GxA module. They're accessible via Exposed Copper – See "**Signal assignment**" & "**ZX122GxA Ground Access**" on pages 3 & 4 for specific ZX122GxA signal assignment table listings.
3- ZX122GxA is designed to be inserted into host and interfaced (wired or connected) to target , or any evaluation board (development board) for purpose of debugging, development, testing and characterization.
4- Listed number adjacent to each 0402 SMD shunt package represents the associated PCISIG M.2 connector's pin number.
5- All traces are 50 Ohms impedance controlled with exceptional signal integrity & crosstalk.
6- Mates with any key matching M.2 Host and Device / DUT
7- ZX122GxA is offered in **7 different M.2 Key types**, serving variety of PCISIG M.2 applications. See *Ordering Information* section. ZX122GAES and ZX122GBMA are offered in two different onboard J2 connector Key configuration. They are ideal solution for converting one M.2 Key type to another M.2 Key type. see section "**Key Conversion**" on page 2
8- Compatible with other design derivatives utilizing PCISIG M.2 connectors, such as NGSFF EDSFF
9 - Probing wire , ZX00BC2PH30, is offered to application requiring scope probe interface. See ordering information

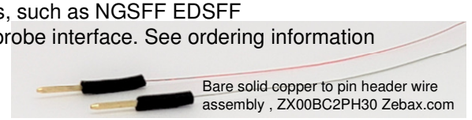
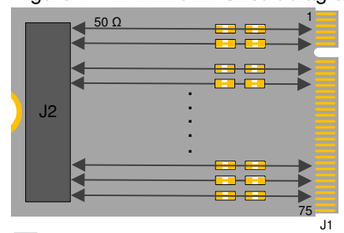


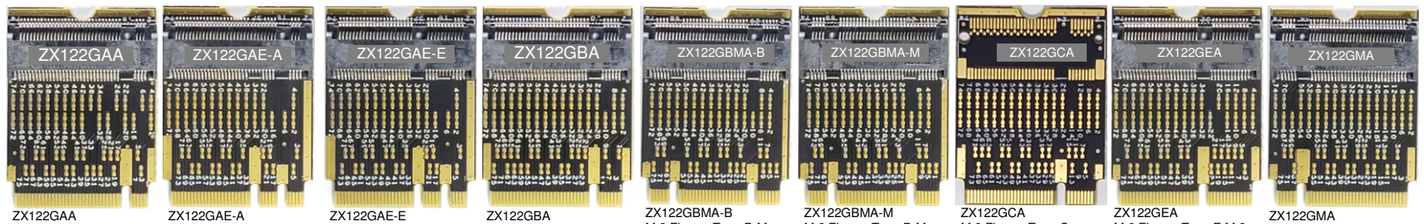
Figure 1 – ZX122GxA Circuit diagram



Shunt 0402 SMD package 0 Ω
50 Ω : All traces are designed 50 Ω trace impedance control
J2 : PCISIG M.2 receptacle connector – See Ordering Information for details

Electrical:

Insertion loss > -2dB @6GHz
Trace impedance: 50 Ω
Operating Temperature: -65°C to +170°C
M.2 Edge Connector type (J1) : see Ordering INFO
Mates with: see Ordering INFO
Plating: Gold 100U
M.2 Receptacle (J2) :
Key Type: see Ordering INFO
Height: 0.16" (4.2mm) – See Figure 4
Spacer : 0.1" (2.54mm) – See Figure 4
Plating: Gold 100U
Current per pin: 0.5A (maximum)
Shunt:
Package: 0402 SMD



ZX122GAA
M.2 Finger: Type A
M.2 Conn: Type A

ZX122GAE-A
M.2 Finger: Type A-E
M.2 Conn: Type A

ZX122GAE-E
M.2 Finger: Type A-E
M.2 Conn: Type E

ZX122GBA
M.2 Finger: Type B
M.2 Conn: Type B

ZX122GBMA-B
M.2 Finger: Type B-M
M.2 Conn: Type B

ZX122GBMA-M
M.2 Finger: Type B-M
M.2 Conn: Type M

ZX122GCA
M.2 Finger: Type C
M.2 Conn: Type C

ZX122GEA
M.2 Finger: Type E M.2 Conn: Type E

ZX122GMA
M.2 Finger: Type M
M.2 Conn: Type M

Application: Bringup, testing, emulation, development, modular design evaluations of PCISIG M.2 (NGFF – Next Generation Form Factor). Manufacturing - Development loopback test. M.2 PCISIG module design test characterization. DP WIFI GPS GYRO Compass BT FM sensor module Add-in Card DisplayPort SDIO WWAN PCIe-based SSD SATA-based PCIe / USB 3.1 SSIC Gen1-Based Socket 1 2 3. All ZX122GMA, ZX122GBMA-M are compatible with NGSFF / NF1 (Next Generation Small Form Factor) as well as EDSFF (Enterprise & Datacenter SSD Form Factor) interface solution or any other design interface utilizing M.2 connector series.

Compliance:

ISO2001 certified
RoHs - Lead Free
EU RoHS2
UL E111594 document
ELV- Vehicle Directive (Directive 2000/EC)
European Union Directive (203/11/EC)
Halogen Free per IEC-61249-2.21 : 2003
RoHs Directive 2011/65/EU
WEEE Directive (2012/12/EU)

Certificate of Compliance for Radioactive substances
Certificate of Compliance for Asbestos
Certificate of Compliance for Ozone Depleting Substances, ODS
Certificate REACH SVHC
Certificate of Compliance RoHS_EN_CoC

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SPECIFIED DIMENSIONS ARE INCHES (MM). ROHS COMPLIANT	ASSEMBLY DRAWING
	ITEM: ZX122GxA M.2 NGFF PCISIG
DESCRIPTION:	PCISIG M.2 NGFF passive breakout adapter module keys A A-E B B-M C E and M
CHECKED: M. MARINA	DRAWN: SONYA
	REVISSION: 1.0
	SHEET: 1 OF 4

Product Name: ZX122GxA – PCISIG M.2 NGFF passive breakout adapter module offering all KEY type combinations, Page 2

Mates with : Any standard M.2 NGFF PCISIG connectors on host and device Key A B C E M A-E B-M
TE JAE Bellwether Amphenol 2199125 2199119 2199230 2199133 SM3ZS067 SD-80148 SD-80149 SD-80152 SD-80159
NGSFF NF1 EDSFF

Breakout Access : All ZX122GxA breakout adapters provide breakout access via onboard 0402 SMD shunts landing pads, see Figure 3. All signals are accessible on top layer of the module. Each 0402 SMD shunt package may be wired for signal measurement via scope / test equipment. Additionally; each 0402 SMD shunt package may be cut and redirected to another signal (onboard or offboard) for test and debug.

Figure 3- 0402 SMD shunt – not scaled

Ground Access : ZX122GxA provides exposed copper for accessing the module's ground reference. The ZX122GxA is 4 layers PCB design, where the 2 inner layers are used as the module's ground reference. The Ground stitching vias , the top / bottom ground fills and the inner ground planes are all interconnected, hence referred as "GND". The exposed copper provide access to the ZX122GxA GND reference. The exposed coppers provides ease of access to ZX122GxA GND reference. In order to improve signal integrity , please connect one of the exposed copper or the GND test point to your nearest system GND reference.

Key Conversion : ZX122GAEA and ZX122GBMA are offered in 2 different J2 M.2 Key types. This Key conversion is ideal solution for applications requiring to interface with the listed M.2 Key application.

Part number	PCB Edge	J2	Description
ZX122GAEA-A	Key A-E	Key A	Convert M.2 PCISIG Key E to Key A
ZX122GAEA-E	Key A-E	Key E	Convert M.2 PCISIG Key A to Key E
ZX122GBMA-B	Key B-M	Key B	Convert M.2 PCISIG Key M to Key B
ZX122GBMA-M	Key B-M	Key M	Convert M.2 PCISIG Key B to Key M

Please note, the dual M.2 Key modules (such as ZX122GAEA-E) have two key notches on PCB edge finger connectors (ZX122GAEA-E has PCB edge finger connector Key A and Key E). Therefore signals associated with the opposite Key type on the J2 connector will not be accessible due to dual key notch design.
Example: ZX122GAEA-E Utilizes J2 M.2 connector of Key type E, therefore the "Key A" signals at J2 connector will be available at J2 connector, but they will be floating (Not connected to any signal) since the PCB Edge finger does have both A and E Key notches.

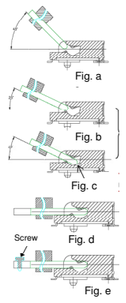
Vertical M.2 connector Form Factor: ZX122GxA offers few modules in Vertical formfactor. This applies only to the onboard J2 M.2 connector formfactor, see Figure 4 and 5. The Vertical M.2 receptacle formfactor enables DUT to be inserted in Vertical direction as exhibited in Figure 5. The Vertical formfactor M.2 option provides access to both sides of DUT for test & measurement as well as unleashing design space constraints.

Only the **-V** option modules are available in the Vertical formfactor solutions.
Please see Ordering Information.

NGSFF NDSFF compatibility : ZX122GxA is PCISIG M.2 (NGFF) breakout adapter provides access to all PCISIG M.2 signals. There have been emerging design application solutions utilizing M.2 connector series, such as NGSFF / NF1 , EDSFF and more. ZX122GxA is fully compatible with these design derivatives since it provides hardware test & measurement capability without ang signal assignments.

Module Insertion, Removal process: In order to avoid any mechanical stress or damage to ZX122GxA, please follow the below listed guidelines for insertion and removal process:

1- Move the Module against the housing chamber, see figure a
2- Rotate module to 25°, insert it until the module surface reaches the ramp, figure b, c
3- Rotate the module to horizontal position, see figure d
4- Fix the module by screw, see figure e



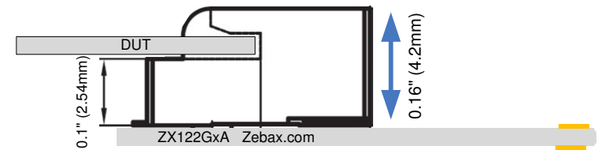


Figure 4- ZX122GxA in standard, Std , M.2 style M.2 receptacle connector formfactor

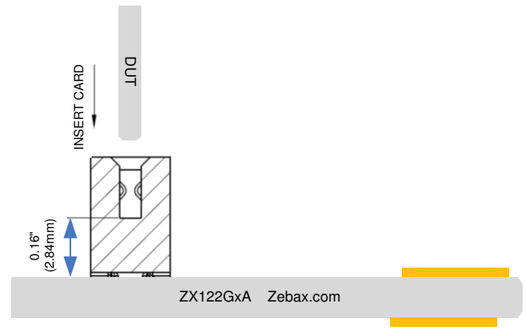
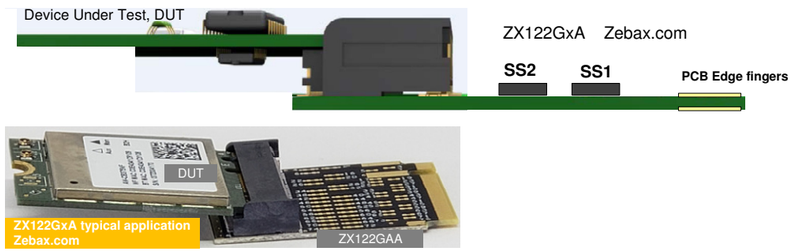


Figure 5 – ZX122GxA in Vertical mount M.2 connector formfactor

Figure 6 – Typical application using ZX122GxA Standard formfactor



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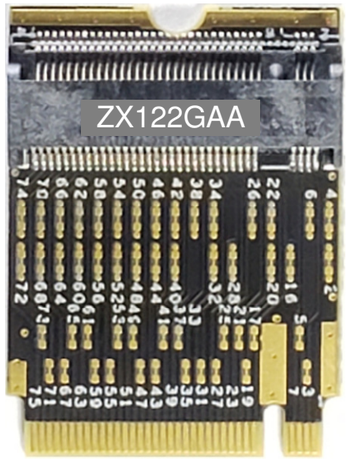
SPECIFIED DIMENSIONS ARE INCHES (MM). ROHS COMPLIANT	ASSEMBLY DRAWING
	ITEM: ZX122GxA M.2 NGFF PCISIG
DESCRIPTION:	PCISIG M.2 NGFF passive breakout adapter module keys A A-E B B-M C E and M
CHECKED: M. MARINA	DRAWN: SONYA
	REVISSION: 1.0
	SHEET: 2 OF 4

Product Name: ZX122GxA – PCISIG M.2 NGFF passive breakout adapter module offering all KEY type combinations, page 3/4

ZX122GxA part numbers : ZX122GxA is offered in 7 different M.2 Key types, serving variety of PCISIG M.2 breakout applications. Below are each part number with associated signal assignment table.

Signal assignments: The listed signal assignment tables exhibits only the reserved M.2 PCISIG GND reference signals. All reserved M.2 PCISIG GND reference signals are inner connected on ZX122GxA modules. All other PCISIG M.2 signals are accessible on ZX122GxA module.

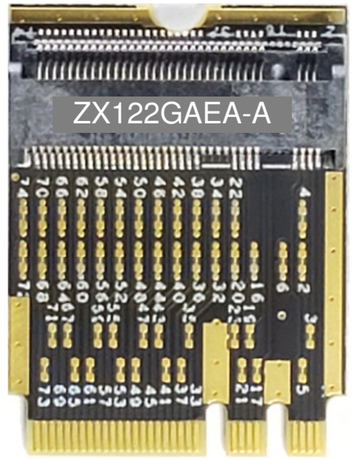
PCISIG M.2 signals : ZX122GxA passes through all PCISIG M.2 signals (excluding the reserved GND signals) via onboard 0402 shunt SMD package. This includes NC or reserved PCISIG M.2 signals.



Socket 1 Key A

Signal	Pin	ZX122GAA	Pin	Signal
			75	GND
			69	GND
			63	GND
			57	GND
			51	GND
			45	GND
			39	GND
			33	GND
			29	GND
			23	GND
			15	ADD-IN CARD KEY A
			13	
			11	
			9	
			7	GND
			1	GND
GND	36	EP[1]		
GND	30			
GND	24			
GND	18			
ADD-IN CARD KEY A	14			
	12			
	10			
	8			

Note **1:** Exposed Copper is connected to inner GND planes

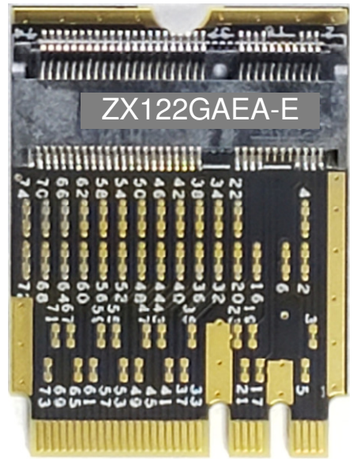


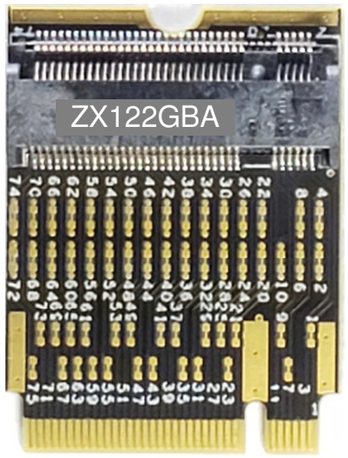
Socket 1 Key A-E

Signal	Pin	ZX122GAEA[2]	Pin	Signal
			75	GND
			69	GND
			63	GND
			57	GND
			51	GND
			45	GND
			39	GND
			33	GND
			31	ADD-IN CARD KEY E
			29	
			27	
			25	
			15	ADD-IN CARD KEY A
			13	
			11	
			9	
			7	GND
			1	GND
ADD-IN CARD KEY E	30	EP[1]		
	28			
	26			
	24			
GND	18			
ADD-IN CARD KEY A	14			
	12			
	10			
	8			

Note **1:** Exposed Copper is connected to inner GND planes

2: ZX122GAEA is offered in -A or -E options, please see ordering information.

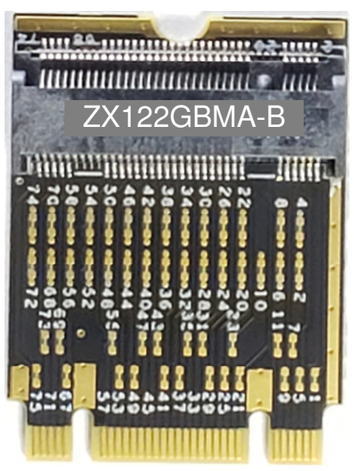




Socket 2 Key B

Signal	Pin	ZX122GBA	Pin	Signal
			75	GND
			69	GND
			63	GND
			57	GND
			51	GND
			45	GND
			39	GND
			33	GND
			31	ADD-IN CARD KEY B
			29	
			27	
			25	
			7	GND
			1	GND
ADD-IN CARD KEY B	18	EP[1]		
	16			
	14			
	12			

Note **1:** Exposed Copper is connected to inner GND planes.

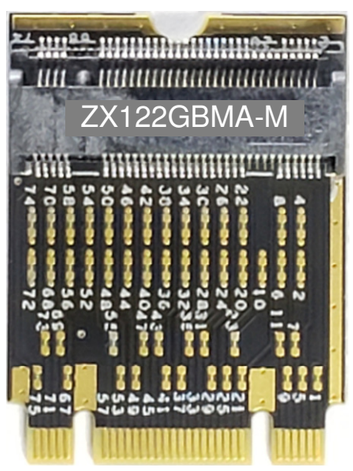


Socket 2 Key B-M

Signal	Pin	ZX122GBMA[2]	Pin	Signal
			71	GND
			65	ADD-IN CARD KEY M
			63	
			61	
			59	
			57	GND
			51	GND
			45	GND
			39	GND
			33	GND
			27	GND
			19	ADD-IN CARD KEY B
			17	
			15	
			13	
			3	GND
ADD-IN CARD KEY M	66	EP[1]		
	64			
	62			
	60			
ADD-IN CARD KEY B	18			
	16			
	14			
	12			

Note **1:** Exposed Copper is connected to inner GND planes.

2: ZX122GBMA is offered in -B or -M options, please see ordering information.



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SPECIFIED DIMENSIONS ARE INCHES (MM).
ROHS COMPLIANT

ASSEMBLY DRAWING

ITEM: ZX122GxA M.2 NGFF PCISIG

DESCRIPTION: PCISIG M.2 NGFF passive breakout adapter module keys A A-E B B-M C E and M

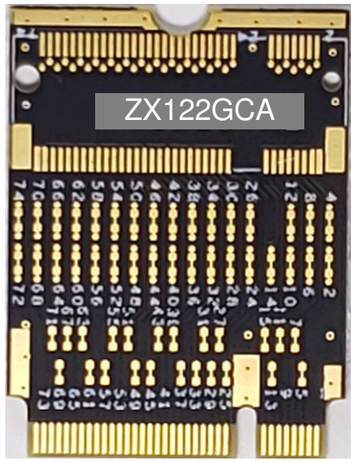
CHECKED: M. MARINA

DRAWN: SONYA

REVISSION: 1.0

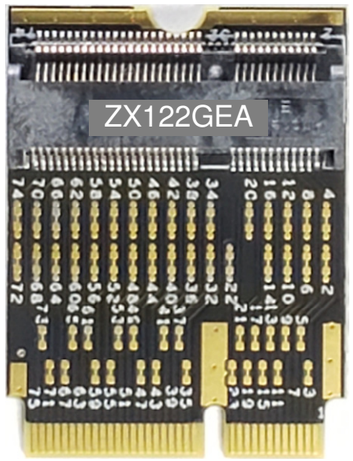
SHEET: 3 OF 4

Product Name: ZX122GxA – PCISIG M.2 NGFF passive breakout adapter module offering all KEY type combinations, page 4/4



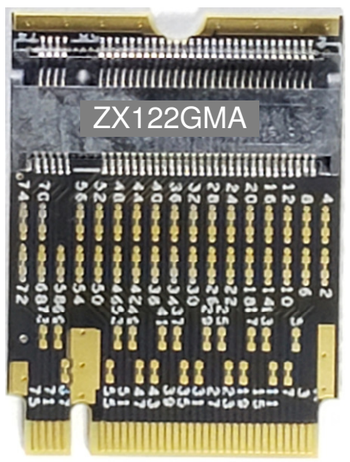
Socket 2 Key C						
Signal	PCISIG M.2 connector pin Pin	ZX122GCA			Pin	Signal
				EP[1]	75	GND
					73	GND
ADD-IN CARD KEY C	22				65	GND
	20				59	GND
	18				53	GND
	16				47	GND
					41	GND
					35	GND
					23	ADD-IN CARD KEY C
					21	
					19	
					17	
				EP[1]	9	GND
					3	GND
					1	GND

Note **1:** Exposed Copper is connected to inner GND planes.



Socket 1 Key E						
Signal	PCISIG M.2 connector pin Pin	ZX122GEA			Pin	Signal
				EP[1]	75	GND
					69	GND
ADD-IN CARD KEY E	30				63	GND
	28				57	GND
	26				51	GND
	24				45	GND
GND	18	EP[1]			39	GND
					33	GND
					31	ADD-IN CARD KEY E
					29	
					27	
					25	
				EP[1]	7	GND
					1	GND

Note **1:** Exposed Copper is connected to inner GND planes.



Socket 3 Key M						
Signal	PCISIG M.2 connector pin Pin	ZX122GMA			Pin	Signal
				EP[1]	75	GND
					71	GND
					65	ADD_IN CARD KEY M
ADD_IN CARD KEY M	66				63	
	64				61	
	62				59	
	60				57	GND
					51	GND
					45	GND
					39	GND
					33	GND
					27	GND
					21	GND
					15	GND
					9	GND
					3	GND
					1	GND

Note **1:** Exposed Copper is connected to inner GND planes.

Ordering Information:

Part number	PCB Edge	J2	Formfactor[1]	Description
ZX122GAA	Key A	Key A	Std	PCISIG M.2 passive breakout adapter
ZX122GAEA-A	Key A-E	Key A	Std	Convert M.2 PCISIG Key E to Key A
ZX122GAEA-E	Key A-E	Key E	Std	Converts M.2 PCISIG Key A to Key E
ZX122GBA	Key B	Key B	Std	PCISIG M.2 passive breakout adapter
ZX122GBMA-B	Key B-M	Key B	Std	Convert M.2 PCISIG Key M to Key B
ZX122GBMA-M	Key B-M	Key M	Std	Convert M.2 PCISIG Key B to Key M
ZX122GBMA-MV	Key B-M	Key M	Vertical	Convert M.2 PCISIG Key B to Key M
ZX122GCA	Key C	Key C		see Note 2
ZX122GEA	Key E	Key E	Std	PCISIG M.2 passive breakout adapter
ZX122GMA	Key M	Key M	Std	PCISIG M.2 passive breakout adapter
ZX122GMA-V	Key M	Key M	Vertical	PCISIG M.2 passive breakout adapter

Note:

1 – Few selected modules are offered in Vertical or Standard (Std) formfactor. This applies only to the onboard J2 M.2 connector formfactor – See Figure 3 and 4

2 - Due to un-availability of M.2 Key C receptacle in industry, ZX122CA is shipped without J2 connector.

ZX00BC2PH30 30AWG Bare Copper wire to pin header wire assembly

ZX00BC2PH30 site page for ordering ZX00BC2PH30 wire assembly

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ASSEMBLY DRAWING

ITEM: ZX122GxA M.2 NGFF PCISIG

DESCRIPTION: PCISIG M.2 NGFF passive breakout adapter module keys A A-E B B-M C E and M

CHECKED: M. MARINA

DRAWN: SONYA

REVISSION: 1.0

SHEET: 4 OF 4