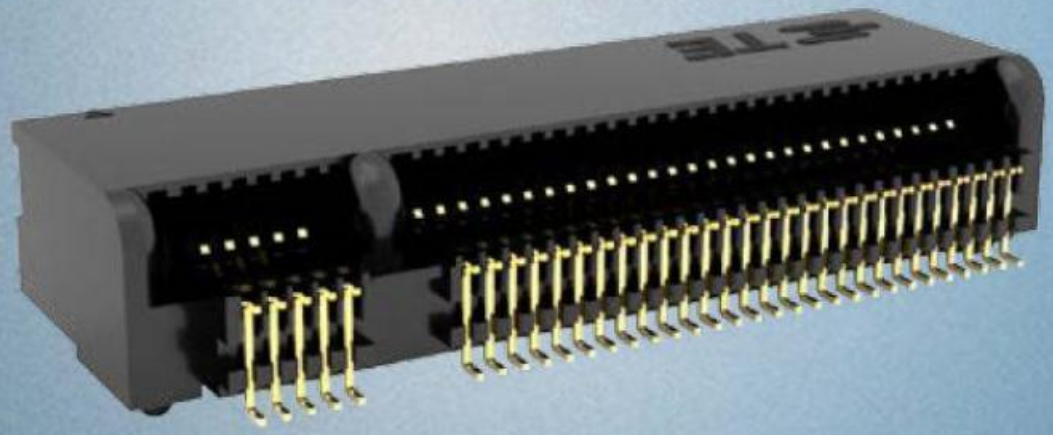
M.2 | Next Generation Form Factor



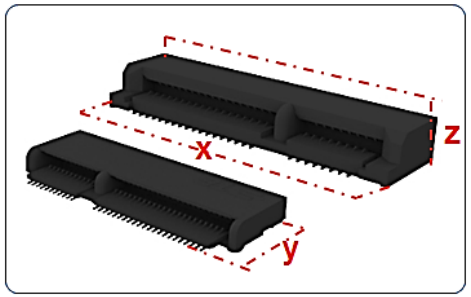
Miniature in size.
Big in possibilities.

- 0.5MM PITCH WITH 67 POSITIONS & AVAILABLE IN VARIOUS HEIGHTS
- SUPPORTS HIGHER DATA RATES IN A DENSE FORM FACTOR
- SAVES MORE THAN 20% PCB REAL ESTATE COMPARED TO PCIe MINI CARD
- ENSURES PROPER MATING WITH VARIOUS MODULE CARDS

Product Introduction

A natural transition from the Mini Card and Half Mini Card to a smaller form factor.

M.2 (NGFF) supports wireless and SSD module cards.



	Stack Height (z)	Card Centerline to PCB	Length (x)	Width (y)	Volume
MiniCard	4.0	2.1	9.09	29.9	1087
NGFF	2.25	1.08	8.7	21.9	426
Savings	1.75	1.02	0.39	8.0	659

Dimensions in mm

Features

- Available in various heights
- 0.5mm pitch with 67 positions
- Designed for both single and double-sided modules
- Available in various keying options for module cards
- Support PCI Express 3.0, USB 3.0, & SATA 3.0

Benefits

- Wide product offering to meet customers design needs
- Save more than 20% PCB real estate compared to PCIe Minicard
- Reduces connector height by 15%
- Ensures proper mating with various module cards
- Supports higher data rates

Wireless Applications

- Wi-Fi
- WWAN (2G, 3G, 4G)
- Bluetooth
- WiGig
- GPS
- Global Navigation Satellite System (GNSS)
- Near Field Communication (NFC)
- Hybrid Digital Radio (HDR)

Host Interfaces

- PCIe, PCIe LP
- SSIC
- USB (2.0, HS, 3.0)
- SDIO
- UART
- PCM/ I2S
- I2C
- SATA
- Display Port
- Future variants of the above

The List Goes On And On…

Module Card Overview

Module Nomenclature

Type XX XX - XX - X - X

Width (mm)
12
16
22
30

Length (mm)
16
26
30
42
60
80
110

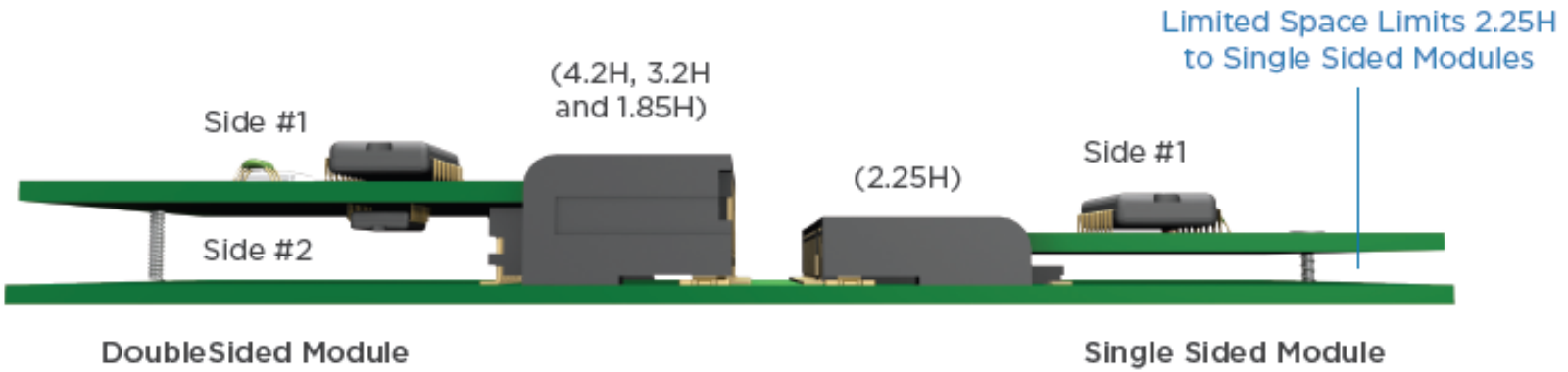
	Component Max Ht. (mm)	
	Top Max	Bottom Max
S1	1.20	0.00
S2	1.35	0.00
S3	1.50	0.00
D1	1.20	1.35
D2	1.35	1.35
D3	1.50	1.35
D4	1.50	0.70
D5	1.50	1.50

Key ID	Pin	Interface
A	8-15	2x PCIe x1/USB 2.0/12C/DP x4
B	12-19	PCIe x2/SATA/USB 2.0/USB 3.0/HSIC/SSIC/Audio/UIM/I2C
C	16-23	Reserved for Future Use
D	20-27	Reserved for Future Use
E	24-31	2x PCIe x1/USB 2.0/IC2/SDIO/UART/PCM
F	28-35	Future Memory Interface (FMI)
G	39-46	Generic (Not used for M.2)
H	43-50	Reserved for Future Use
J	47-54	Reserved for Future Use
K	51-58	Reserved for Future Use
L	55-62	Reserved for Future Use
M	59-66	PCIe x4/SATA

Key	Intended Use	Host Interfaces	Applications	Module Card Type
A	Connectivity Version 1-DP	2x PCIe x1/USB 2.0/12C/ DP x4	Wireless Connectivity devices including combinations of Wi-Fi, BT, HFC, and/or WiGig.	1630, 2230, 3030
B	WWAN/SSD/ Others Primary Key	PCIe x2/SATA/USB 2.0/ USB 3.0/ HSIC/SSIC / Audio/UIM/ I2C	WWAN+GNSS, or SSD	3042, 2230, 2242, 2260, 2280, 22110
E	Connectivity Version 1-SD	2x PCIe x1/USB 2.0/ IC2/SDIO/UART/PCM	Wireless Connectivity devices including combinations of Wi-Fi, BT, NFC, and/ or GNSS.	1630, 2230, 3030
M	SSD 4 Lane PCIe	PCIe x4/ SATA	SSD devices and Host I/Fs supported are PCIe with up to four lanes or SATA.	2242, 2260, 2280, 22110

Single vs. Double Sided Modules

M.2 (NGFF) Single vs Double Sided Modules



The difference between single and dual sided modules in functionality. All soldered down type module cards are single sided and do not have a pin layout. Single sided modules are intended to be used in low profile applications

There are two type of module cards, soldered down and connectorized. TE's M.2 (NGFF) product line supports the connectorized modules/ add-in cards.

Triple Insertion Module Method

- Step 1: Move the module against the housing's chamber
- Step 2: Rotate the module to 25 degrees and insert it until the bottom of the module surface reaches the ramp
- Step 3: Rotate the module to horizontal position by hand
- Step 4: Fix the module with a PCB screw to secure the module

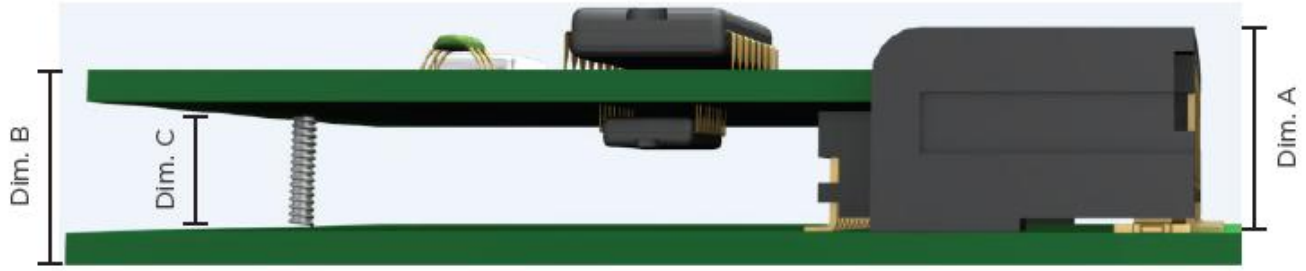
Please refer to the application specification for a complete description of both the insertion and removal method for modules.

Application Specification: 114-115006

M.2 (NGFF) Standard Product List

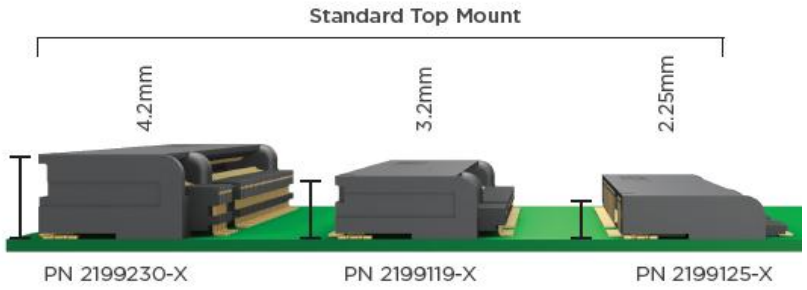
Base PN	Max. Height	Nominal Height Dim. A	Dim. B	Dim. C	Double Sided Modules	Key	Gold Plating		
							Gold Flash	15u"	30u"
2199125-x	2.25	2.15	1.08	0.63	No	A	-7	-8	-9
						B	-1	-3	-5
						E	-2	-4	-6
						M	-13	-14	-15
2199119-x	3.2	3.1	1.94	1.48	Yes	A	-7	-8	-9
						B	-1	-3	-5
						E	-2	-4	-6
						M	-13	-15	-16
2199230-x	4.2	4.1	2.94	2.48	Yes	A	-7	-8	-9
						B	-1	-3	-5
						E	-2	-4	-6
						M	-13	-15	-16

Dim. A: Max. connector height **Dim. B**: Card Centerline to PCB **Dim. C**: Bottom of Card to PCB



TE Connectivity's Strengths

Product Breadth



Industry Partnerships

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VERY HI-SPEED CERTIFIED USB3.0 Unofficial Logo

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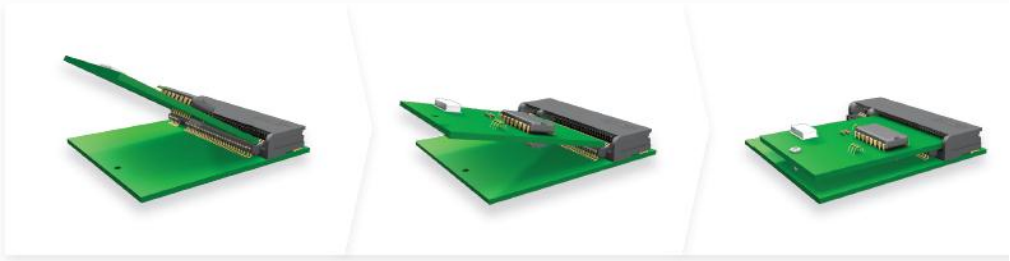
Triple Insertion Module Method



TE connectivity

tyco Electronics

Resources

- **Product Landing Page:** www.te.com/products/ngff
- **Quick Reference Guide:** 1-1773702-1
- **Product Specification:** 108-115042/ 108-115049 (Au Flash)
- **Application Specification:** 114-115006

- **Who to contact for help?**
  - **Product Management**
    - Global: Jaren May jaren.may@te.com
  - **Industry Marketing**
    - Global: Jim McGrath jim.mcgrath@te.com