



# Industrial PCIe M.2 2242 Specification

## (RAPIX Series, 3D TLC)

**Version 1.2**

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# 1. GENERAL DESCRIPTION



## 1.1. Introduction

FLEXXON’s RAPIX PCIe M.2 2242 has PCIe Gen3x4 interface, and is fully compliant with NVMe 1.3 industrial standard. It is DRAM-less design with high performance and low power consumption, suitable for embedded systems.

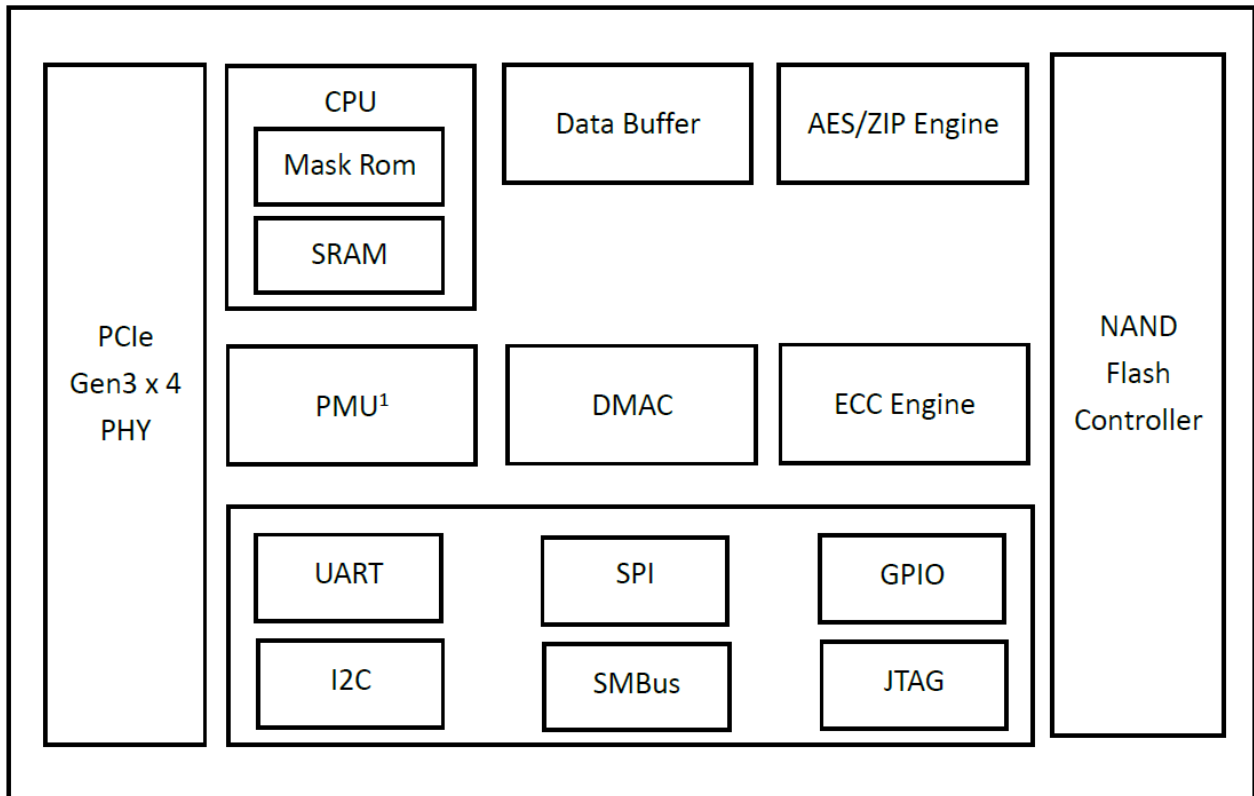


Figure 1-1 RAPIX PCIe M.2 2242 Controller Block Diagram

## 1.2. Product Overview

- ❖ **Flash**
  - 3D TLC
- ❖ **Capacity**
  - 64GB ~ 1TB
- ❖ **PCIe Interface**
  - Compliant with NVMe 1.3
  - PCIe Express Base Ver 3.1
  - PCIe Gen3x4 lane & backward compatible to PCIe Gen 2 and Gen 1
  - Support up to QD 128 with queue depth of up to 64K
  - Support power management
- ❖ **ECC Technology**
  - StrongECC algorithm with frame size 4KB
- ❖ **GPIO**
- ❖ **UART**
- ❖ **Support SMART and TRIM commands**
- ❖ **Support AES 256, TCG OPAL/Pyrite (Optional)**
- ❖ **Thermal Throttling**
- ❖ **Temperature Range**
  - Operation (Silver): 0°C ~ 70°C
  - Operation (Diamond): -40°C ~ 85°C
  - Storage: -40°C ~ 85°C
- ❖ **RoHS Compliant**

## 2. PRODUCT SPECIFICATIONS



### 2.1. Performance

Table 2-1 Performance of RAPIX PCIe M.2 2242

Capacity	Sequential		IOMeter	
	Read (MB/s)	Write (MB/s)	Read (IOPS)	Write (IOPS)
60/64GB	560	230	38K	15K
120/128GB	2250	600	120K	130K
240/256GB	2500	1100	240K	230K
480/512GB	2500	900	210K	150K
960/1024GB	2500	1200	220K	210K

**NOTES:**

1. Performance may differ according to flash configuration and platform.

### 2.2. Power

Table 2-2 Supply Voltage of RAPIX PCIe M.2 2242

Parameter	Rating
Operating Voltage	3.14V ~ 3.47V

**NOTE:**

1. Power Consumption may differ according to flash configuration and platform.
2. The measured power voltage is 3.3V.

## 2.3. TBW (Terabytes Written)

Capacity	TBW
60/64GB	120
120/128GB	240
240/256GB	480
480/512GB	960
960/1024GB	1920

### NOTES:

1. TBW may differ according to flash configuration and platform.
2. Samples were tested under JESD218A endurance test method and JESD219A endurance workloads specification.

## 2.4. MTBF

MTBF, an acronym for Mean Time Between Failures, is a measure of a device's reliability. Its value represents the average time between a repair and the next failure. The predicted result of FLEXXON's RAPIX PCIe M.2 2242 is more than 2 million hours.

## 2.5. Data Retention

- 10 years if > 90% life remaining (@25C)
- 1 year if < 10% life remaining (@25C)

### 3. ENVIRONMENTAL SPECIFICATIONS



Test Items	Test Conditions
Storage Temperature	-40°C ~ 85°C
Operating Temperature	Silver Grade: 0°C ~ 70°C Diamond Grade: -40°C ~ 85°C
Storage Humidity	40°C, 93% RH
Operating Humidity	40°C, 90% RH
Shock	1500G, Half Sin Pulse Duration 0.5ms
Vibration	80Hz ~ 2000Hz/20G, 20Hz ~ 80Hz/1.52mm, 3 axis/60min
Drop	80cm free fall, 6 face of each unit
Bending	≥ 20N, Hold 1 min/5 times
Torque	0.5N-m, Hold 1 min/5 times
ESD	24°C, 49% RH, +/-4KV

## 4. PIN ASSIGNMENT



**Table 4-1 Pin Assignment and Description of RAPIX PCIe M.2 2242**

Pin No.	PCIe Pin	Description
1	GND	Ground
2	3.3V	3.3V source
3	GND	Ground
4	3.3V	3.3V source
5	N/C	No connect
6	N/C	No connect
7	N/C	No connect
8	N/C	No connect
9	N/C	No connect
10	DAS/DSS	Device Activity Signal / Disable Staggered Spin-up
11	N/C	No connect
12	Module Key B	Module Key
13	Module Key B	
14	Module Key B	
15	Module Key B	
16	Module Key B	
17	Module Key B	
18	Module Key B	
19	Module Key B	
20	N/C	No connect
21	GND	Ground
22	N/C	No connect
23	N/C	No connect
24	N/C	No connect
25	N/C	No connect
26	N/C	No connect
27	GND	Ground
28	N/C	No connect
29	TXN1	PCIe TX Differential signal

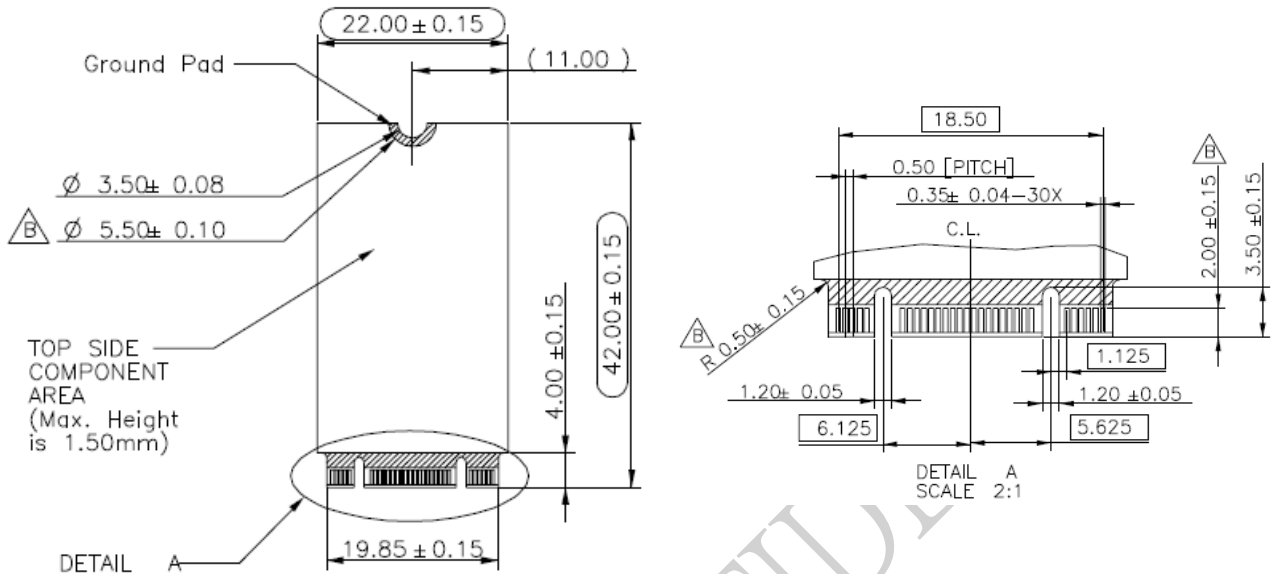


Pin No.	PCIe Pin	Description
30	N/C	No connect
31	TXP1	PCIe TX Differential signal
32	N/C	No connect
33	GND	Ground
34	N/C	No connect
35	RXN1	PCIe RX Differential signal
36	N/C	No connect
37	RXP1	PCIe RX Differential signal
38	N/C	No connect
39	GND	Ground
40	N/C	No connect
41	TXN0	PCIe TX Differential signal
42	N/C	No connect
43	TXP0	PCIe TX Differential signal
44	N/C	No connect
45	GND	Ground
46	N/C	No connect
47	RXN0	PCIe RX Differential signal
48	N/C	No connect
49	RXP0	PCIe RX Differential signal
50	PERST#	PERST
51	GND	Ground
52	CLKREQ#	CLKREQ
53	REFCLKn	PCIe Reference Clock signals
54	N/C	No connect
55	REFCLKp	PCIe Reference Clock signals
56	N/C	No connect
57	GND	Ground

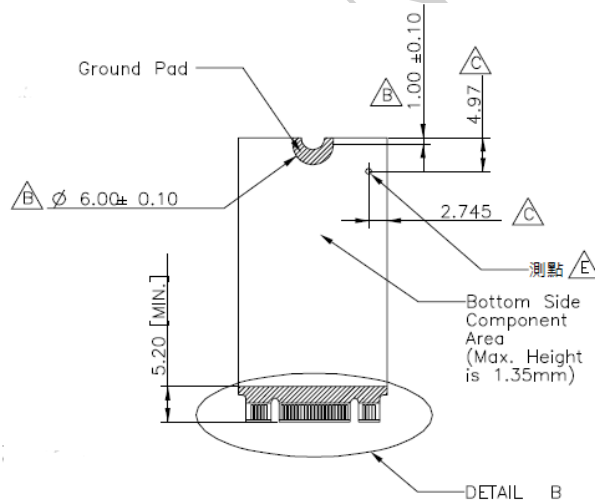
Pin No.	PCIe Pin	Description
58	N/C	No connect
59	Module Key M	Module Key
60	Module Key M	
61	Module Key M	
62	Module Key M	
63	Module Key M	
64	Module Key M	
65	Module Key M	
66	Module Key M	
67	N/C	No connect
68	N/C	No connect
69	N/C	CONFIG_1 = No connect
70	3.3V	3.3V source
71	GND	Ground
72	3.3V	3.3V source
73	GND	Ground
74	3.3V	3.3V source
75	GND	CONFIG_2 = Ground

# 5. PHYSICAL DIMENSION

Dimension: 42mm(L) x 22mm(W) x 3.8mm (H)



Top View



Bottom View



## 6. ORDERING INFORMATION



Capacity	MPN (Silver)	MPN (Diamond)
64GB	FCSL064GBS-ED00	FCSL064GBE-ED00
60GB	FCSL060GBS-ED00	FCSL060GBE-ED00
128GB	FCSL128GBS-ED00	FCSL128GBE-ED00
120GB	FCSL120GBS-ED00	FCSL120GBE-ED00
256GB	FCSL256GBS-ED00	FCSL256GBE-ED00
240GB	FCSL240GBS-ED00	FCSL240GBE-ED00
512GB	FCSL512GBS-ED00	FCSL512GBE-ED00
480GB	FCSL480GBS-ED00	FCSL480GBE-ED00
1TB	FCSL001TBS-ED00	FCSL001TBE-ED00
960GB	FCSL960GBS-ED00	FCSL960GBE-ED00

AES256, TCG OPAL

Capacity	MPN (Silver)	MPN (Diamond)
64GB	FCSL064GBS-ED0S	FCSL064GBE-ED0S
60GB	FCSL060GBS-ED0S	FCSL060GBE-ED0S
128GB	FCSL128GBS-ED0S	FCSL128GBE-ED0S
120GB	FCSL120GBS-ED0S	FCSL120GBE-ED0S
256GB	FCSL256GBS-ED0S	FCSL256GBE-ED0S
240GB	FCSL240GBS-ED0S	FCSL240GBE-ED0S
512GB	FCSL512GBS-ED0S	FCSL512GBE-ED0S
480GB	FCSL480GBS-ED0S	FCSL480GBE-ED0S
1TB	FCSL001TBS-ED0S	FCSL001TBE-ED0S
960GB	FCSL960GBS-ED0S	FCSL960GBE-ED0S

## Revision History

Revision	Date	Description
1.0	2021/12	First release
1.1	2022/10	Update capacity
1.2	2022/10	Update ordering information

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