



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.

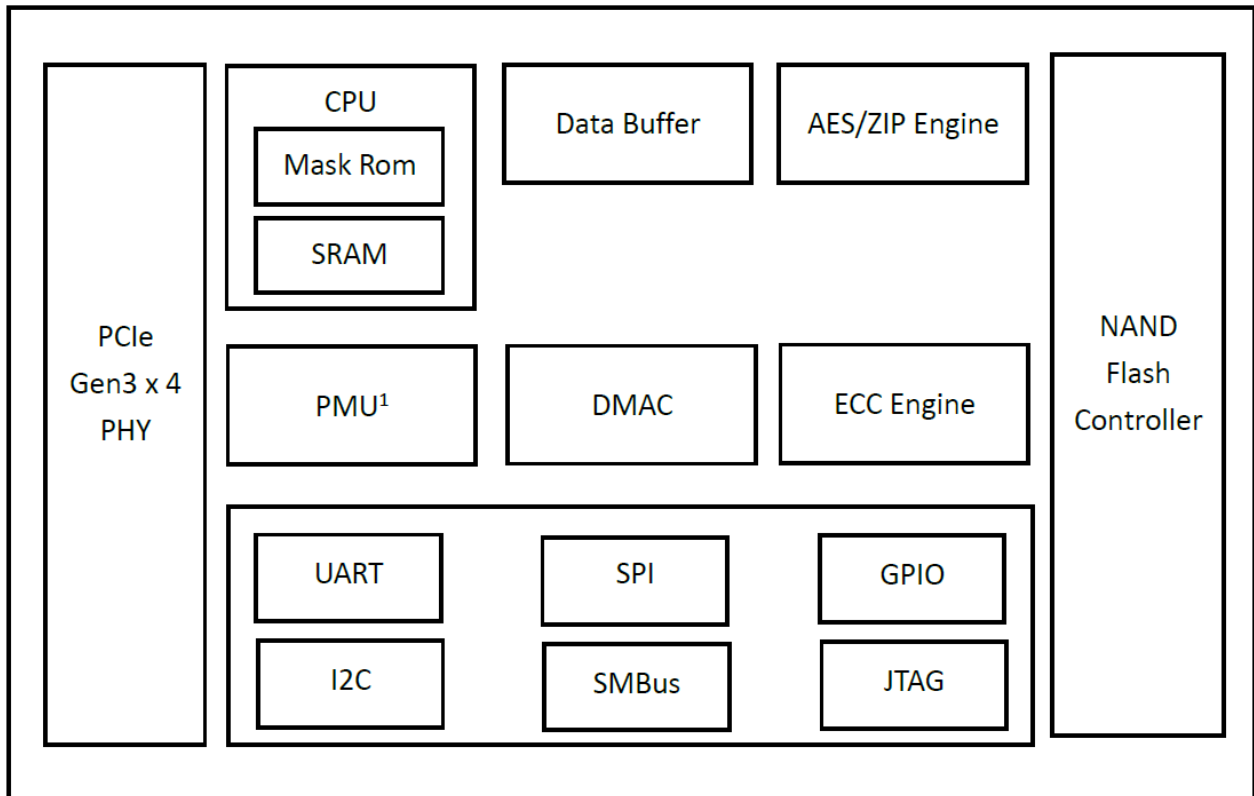


Figure 1-1 RAPIX PCIe M.2 2242 Controller Block Diagram

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

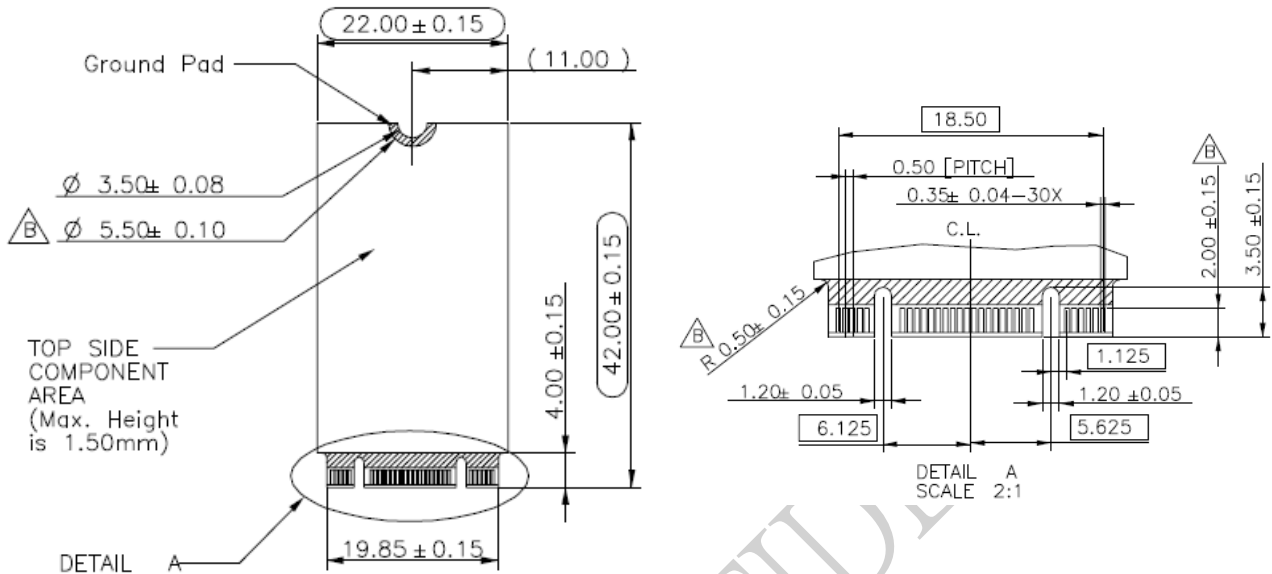
Pin No.	PCIe Pin	Description
1	GND	Ground
2	3.3V	3.3V source
3	GND	Ground
4	3.3V	3.3V source
5	N/C	No connect
6	N/C	No connect
7	N/C	No connect
8	N/C	No connect
9	N/C	No connect
10	DAS/DSS	Device Activity Signal / Disable Staggered Spin-up
11	N/C	No connect
12	Module Key B	Module Key
13	Module Key B	
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

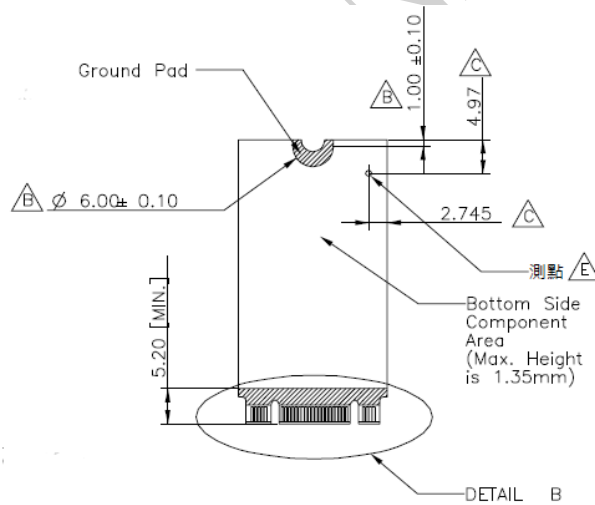
Pin No.	PCIe Pin	Description
58	N/C	No connect
59	Module Key M	Module Key
60	Module Key M	
61	Module Key M	
62	Module Key M	
63	Module Key M	
64	Module Key M	
65	Module Key M	
66	Module Key M	
67	N/C	No connect
68	N/C	No connect
69	N/C	CONFIG_1 = No connect
70	3.3V	3.3V source
71	GND	Ground
72	3.3V	3.3V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