swissbit®

Product fact sheet

Industrial mSATA SSD (M0-300 full size)

X-200m Series

SATA II - 3.0Gb/s
up to UDMA6 / MDMA2 / PIO4

Standard and industrial temperature grade

BU: Swissbit Group
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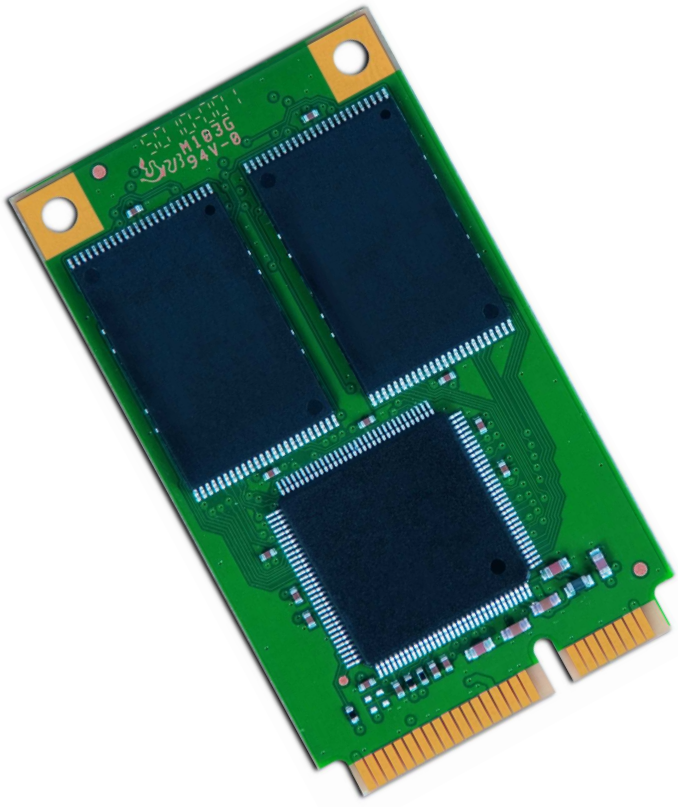
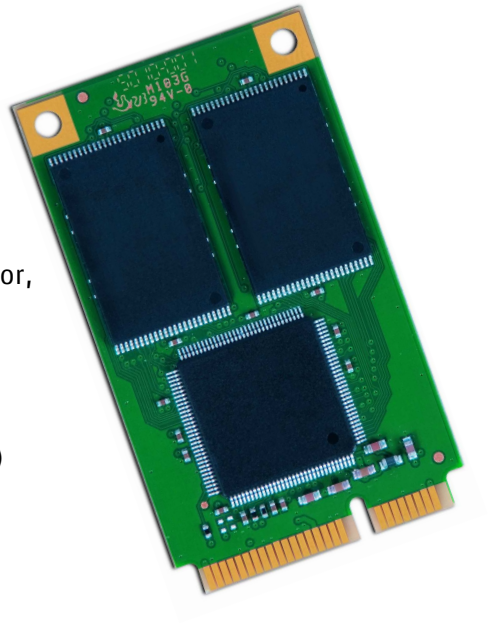


X-200m Series – Industrial MSATA Solid State Drive 2GByte up to 64GByte (MO-300 full size)

Feature summary



- Form factor:
  - Full-sized mSATA form factor
  - JEDEC MO-300 full size Solid State Drive (SSD)
  - 50.8mm x 29.85mm x 3.3mm
  - 52 pin PCI Express (PCIe) mini-connector (SATA II)
- Interface:
  - SATA Rev 2.6 – 3Gbit/s (1.5Gbit/s compatible)
  - mechanical identical to mini-PCIe and eeePC card connector, but different pin out
- Highly-integrated memory controller
  - max. UDMA6 supported
  - max. PIO mode 4, MDMA2 supported
  - SLC NAND Flash
  - Hardware BCH-code ECC (8 Bit correction per sector for SLC)
  - fix drive configuration
- Low-power CMOS technology
- 3.3V ± 5% power supply
- optional activity LED and write protect switch on request
- No mechanical noise
- Wear Leveling: active wear leveling of static and dynamic data
  The wear leveling assures that dynamic data as well as static data is balanced evenly across the memory. With that the maximum write endurance of the device is guaranteed.
- High reliability
  - MTBF > 2,500,000 hours
  - Data reliability: < 1 non-recoverable error per 10^{14} bits read
- High performance
  - Up to 300MB/s burst transfer rate in SATA II – 3.0Gb/sec
  - Sustained Write performance: up to 95MB/s
  - Sustained Read Performance: up to 120MB/s
- Available densities
  - 2GByte up to 64GByte (SLC NAND Flash)
- S.M.A.R.T. support
- 2 Temperature ranges
  - Commercial Temperature range 0 ... +70°C
  - Industrial Temperature range -40 ... +85°C
- Life Cycle Management
- Controlled BOM
- RoHS compatible

Pin out

The Mini-SATA connector is the same as the miniPCIE and eeePC card connector, **but the pinout is different.**

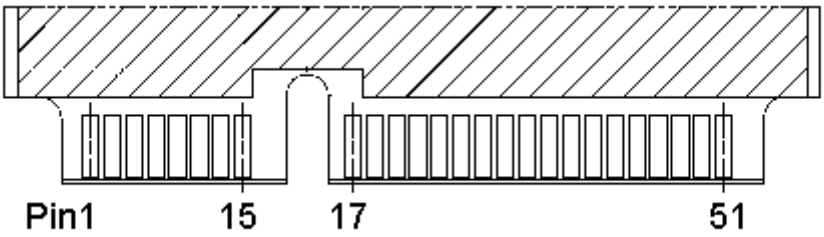


Table 1: Pin Assignment, name, and description

Description	Assignment	Pin	Pin	Assignment	Description
No Connect	N/A	1	2	+3.3V	3.3V Source
No Connect	N/A	3	4	GND	Return Current Path
No Connect	N/A	5	6	+1.5V	No Connect
No Connect	N/A	7	8	N/A	No Connect
Return Current Path	GND	9	10	N/A	No Connect
No Connect	N/A	11	12	N/A	No Connect
No Connect	N/A	13	14	N/A	No Connect
Return Current Path	GND	15	16	N/A	No Connect
No Connect	N/A	17	18	GND	Return Current Path
No Connect	N/A	19	20	N/A	No Connect
Return Current Path	GND	21	22	N/A	No Connect
+ SATA differential transmit signal	B+	23	24	3.3V	3.3V Source
- SATA differential transmit signal	B-	25	26	GND	Return Current Path
Return Current Path	GND	27	28	1.5V	No Connect
Return Current Path	GND	29	30	N/A	No Connect
- SATA differential receive signal	A-	31	32	N/A	No Connect
+ SATA differential receive signal	A+	33	34	GND	Return Current Path
Return Current Path	GND	35	36	N/A	No Connect
Return Current Path	GND	37	38	N/A	No Connect
3.3V Source	3.3V	39	40	GND	Return Current Path
3.3V Source	3.3V	41	42	N/A	No Connect
Return Current Path	GND	43	44	N/A	No Connect
No Connect	Reserved	45	46	N/A	No Connect
No Connect	Reserved	47	48	+1.5V	No Connect
Device activity / LED (optional) *)	DA	49	50	N/A	optional Return Current Path**)
Pulled to GND by Device	Presence detection	51	52	3.3V	3.3V Source

*) Device Activity Pin is low in idle mode and high (flickering) during data transfer.
It can be optional disconnected on the module on request.

**) In standard products pin50 is not connected on the SSD to prevent power short circuit if connected to an eeePC card connector, but could be optional connected to GND

Table 2: System Performance

System Performance	2GB	4GB	8...32GB	64GB	Unit
Data transfer Rate (SATA burst)	3.0 (1.5)				Gbit/s
Sustained Read (max. measured)	~60	~110	~120	~110	MB/s
Sustained Write (max. measured)	~26	~47	~95	~91	

1. All values refer to modules with Toshiba or Micron Flash chips in UDMA mode 5, SATA 3.0Gbit/s, write/read data sequential 256 Sectors/Transfer command.
2. Sustained speed depends on flash type and number, file size, and burst speed

Table 3: Current consumption(1) at 3.3V ± 5%

Current Consumption	Typical 2GB	Typical 4...32GB	Typical 64GB	max	Unit
Write (UDMA6)	400	450	400	490	mA
Read (UDMA6)	280	320	380	400	
Standby	180	180	180	200	

1. All values are typical at 25° C and nominal supply voltage.

Table 4: Environmental Specifications

Environmental Specifications	Operating	Non Operating
Temperature (commercial)	0 to 70°C	-50 to 100°C
Temperature (industrial)	-40 to 85°C	-50 to 100°C
Humidity (non-condensing)	85% RH, at 85°C	max. 95% RH, at 85°C
Vibration (peak -to-peak)	20G Peak, 10...2000Hz, depends on connector	
Shock	1500G, 0.5ms duration, half sine wave	

Table 5: Physical Dimensions

Physical Dimensions		Unit
Width	29.85	mm
Height	50.8	
Thickness max.	3.6	
Weight (typ.)	10	g

Table 6: SSD capacity specification

Capacity	Default_cylinders	Default_heads	Default_sectors _track	Sectors_drive	Total addressable capacity (Byte)
2GB	3,886	16	63	3,896,928	1,995,227,136
4GB	7,732	16	63	7,793,856	3,990,454,272
8GB	15,498	16	63	15,621,984	7,998,455,808
16GB	16,383*)	16	63	31,277,056	16,013,852,672
32GB	16,383*)	16	63	62,586,880	32,044,482,560
64GB	16383*)	16	63	125'313'024	64'160'268'288

*) The CHS addressing is limited to about 8GB. Larger drives should be used in LBA mode.

Table 7: System Reliability and Maintenance

MTBF (at 25°C)	> 2,500,000 hours
Data Reliability	< 1 Non-Recoverable Error per 10^{14} bits Read

(1) Dependent on final system qualification data.

For more information on M0-300 full size mechanical standard, please visit JEDEC at www.jedec.org.

For more information on Serial ATA Revision 2.6, please visit Serial ATA International Organization at www.serialata.org

Why Swissbit?

Swissbit strives to create innovative technologies for future market opportunities utilizing a highly skilled in-house product research and development team. Swissbit maintains a marketing edge by continuing to manufacture world-class high quality memory products and providing customers with both high value and low cost of ownership achieved through efficient processes and procedures.

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