

Intel[®] Z-U130 Value Solid State Drive

Datasheet

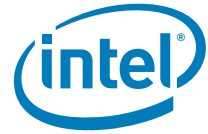
Product Features

- Capacities
 - 1GB, 2GB, and 4GB
- Performance
 - Sequential Read: 28 MB/sec
 - Sequential Write: 20MB/sec
 - IOPS¹: 100 (4KB, 2:1 Read vs. Write)
- RoHS Compliant
- CE and FCC certified (pending)
- Supports USB 2.0/1.1 specification
- NAND management
 - Error correction code: 4 symbol
 - Wear leveling algorithm
- Operating temperature
 - 0°C - 70°C (commercial)
 - -25°C - 85°C (extended - pending)
- Typical Active Current: 80 mA
- Typical Idle Current: 65 mA
- Standard and low profile connectors
- Package dimensions
 - 36.9 x 26.6 x 5.88 mm (low profile)
 - 36.9 x 26.6 x 9.6 mm (standard)
- Endurance
 - Mean Time Between Failure (MTBF) 5,000,000 hours (targeted)
 - 5 Years Useful Life at 12GB/day write rate on a 1GB module under typical operating conditions

Intel's Z-U130 Value Solid State Drive (SSD) is a USB 2.0 storage solution built around high performance Intel[®] NAND flash memory. This module uses single-level cell Intel[®] NAND flash memory with cache programming and dual plane feature set designed to improve overall module performance. Additionally each module has two TSOP packages attached to the printed circuit board with densities varied by the number of die within each package (i.e. 2GB = 2 X 512MB die per package and 4GB = 4 X 512MB die per package). The Intel Z-U130 Value SSD supports the Universal Serial Bus (USB) Specification v2.0 and is backward compatible with v1.1. The module uses industry standard connectors which are available in two sizes. This device can be used with operating systems compatible with the USB Mass Storage Class specification v1.0.

Note:

1. I/O Operations Per Second (IOPS) measured with IOMETER 2003.12.6



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Revision History

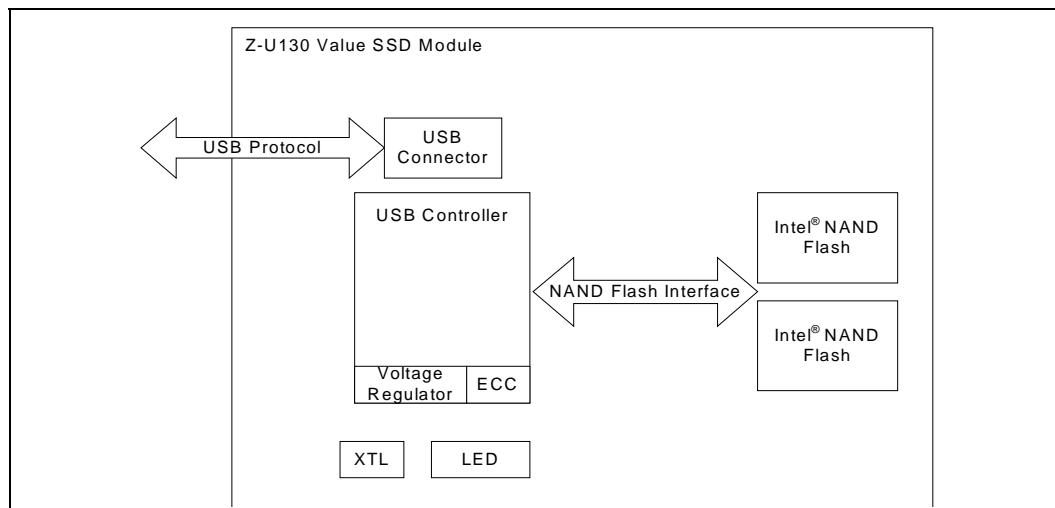
Revision Date	Revision	Description
Dec - 06	001-P	Initial Preliminary Release
Jan - 07	002-P	2nd Preliminary Release, Updated specifications, added correct naming convention
Mar - 07	001	Updated current and power specs, final naming convention

1.0 Functional Overview

1.1 Architecture

This solid state drive combines Intel® NAND Flash memory and a USB controller to deliver a reliable and durable solution for embedded and thin client markets. The system is based on a Single Level Cell (SLC) flash technology which is ideal for the needs of high performance platforms. All capacity options of this module contain two NAND flash devices. The high speed USB 2.0 controller includes 4 symbol error correction capability as well as wear-leveling algorithms for enhanced NAND management. The controller is backward compatible to the USB 1.1 specification and complies with USB Mass Storage Class Specification v1.0. There are 2 connector options to ease migration into platforms. The high profile and low profile connectors both support the standard USB interface.

Figure 1. Z-U130 Value SSD Functional Block Diagram



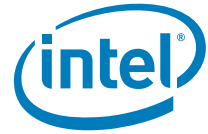
1.2 Useful Product Life

Product life is at least 5 years or 43,800 power-on hours whichever comes earlier under the following conditions:

- Power-on hours = 8,760 per year
- Operating Time = 100% of power-on hours
- Active/Idle duty cycle = 90% of the time
- 1GB Module Write Rate^{1,2} = 12 GB per day (at 6 days a week, 52 weeks a year for 5 years)
- Environmental = typical operating conditions

Note:

1. Write rate of 12GB/day is multiplied by module density. Therefore a 2GB module Write Rate is 24GB/day and a 4GB module Write Rate is 48GB/day. Please contact Intel Applications Engineering for applicability of other use models.
2. Assumes no static data files and all available blocks are used to write and erase data.



1.3 Mean Time Between Failure

The Mean Time Between Failure is calculated based on a Part Stress Analysis. MTBF for Intel's Z-U130 Solid State Drives is 5 Million Hours (targeted)

Conditions for the calculation are as follows:

- Power-On hours = 8,760 per year
- Operating time = 100% of power-on hours
- Active/Idle duty cycle = 90% of the time
- Environmental Conditions = typical operating ranges

1.4 Shock and Vibration

Non-operating shock: 600 G/2mS

Non-operating vibration: 5-500Hz; 3.13 G

Operating vibration: 5-50 Hz; 1.1 G

1.5 Electrostatic Discharge (ESD)

Intel Z-U130 SSD can withstand an electrostatic discharge of +/- 4 KV

1.6 Regulatory Certifications

The Intel Z-U130 Value SSD is compliant with the Restriction of Hazardous Substances (RoHS) directive

The following certifications are being pursued:

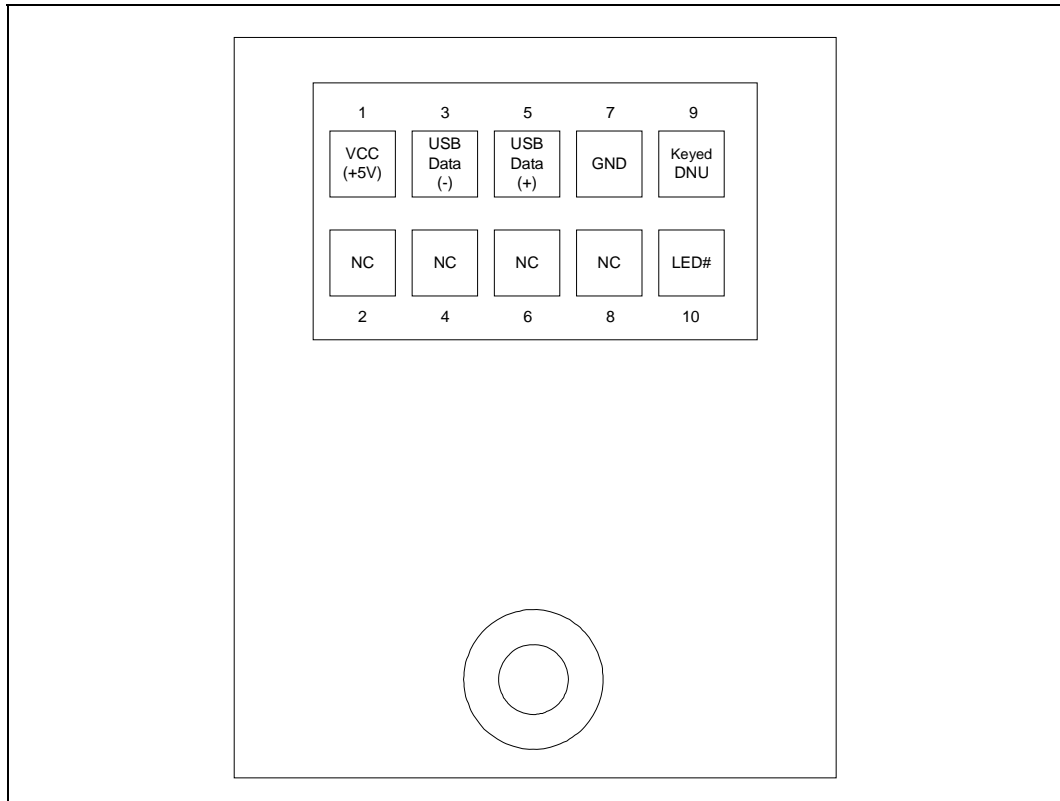
- FCC 47CFR part 15 subpart B class B
- CE Mark for European consumer electronics compliance

1.7 Reference Documents

USB 2.0 Reference Document is located at <http://www.usb.org/developers/docs/> and contains the USB 2.0 specification, USB Technical documents, USB-IF Compliance Test procedures, and other USB related documents.

2.0 Signal Pin Assignments and Descriptions

Figure 2. Pin Assignment (Bottom View) 2x5 Connector



Note:
1. Not drawn to scale.

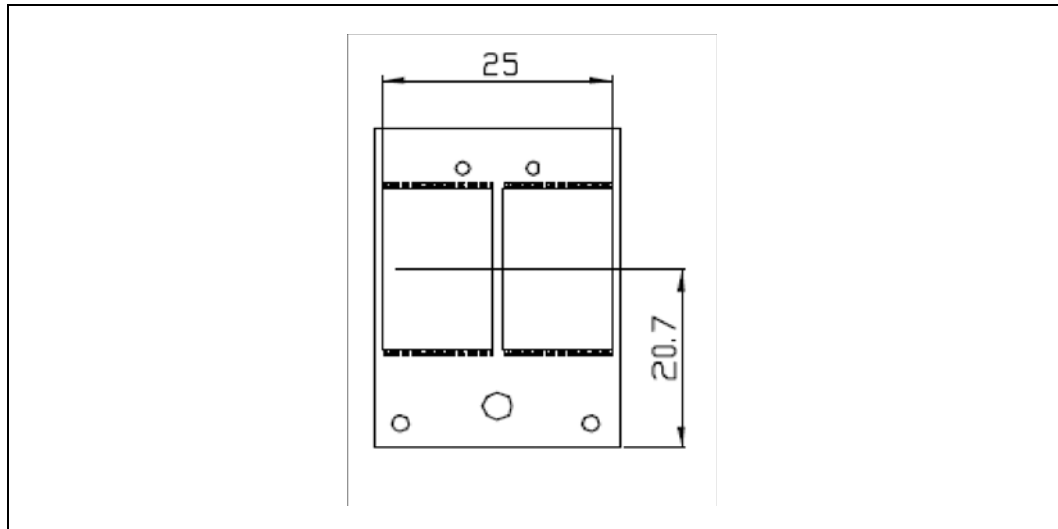
Table 1. Signal Descriptions

Symbol	Type	Description
USB_Data	I/O	Data inputs/outputs: The bidirectional I/Os transfer address, data, and instruction information. Data is output only during READ operations; at other times the I/Os are inputs.
LED#	Output	LED#: Connected to an LED on the PCB which indicates if the drive is active or idle.
Vcc	Supply	Vcc: Power supply.
Vss	Supply	Vss: Ground connection.
NC	-	No connect: NCs are not internally connected. They can be driven or left unconnected.
DNU	-	Do not use: DNUs must be left unconnected.

3.0 Mechanical Information

There are two options for connectors. There is a standard profile (7.4mm high) 2x5 electrical connector and a low profile (3.6mm) 2x5 connector version. Both versions have a mounting hole opposite the electrical connector in order to secure the board to a platform.

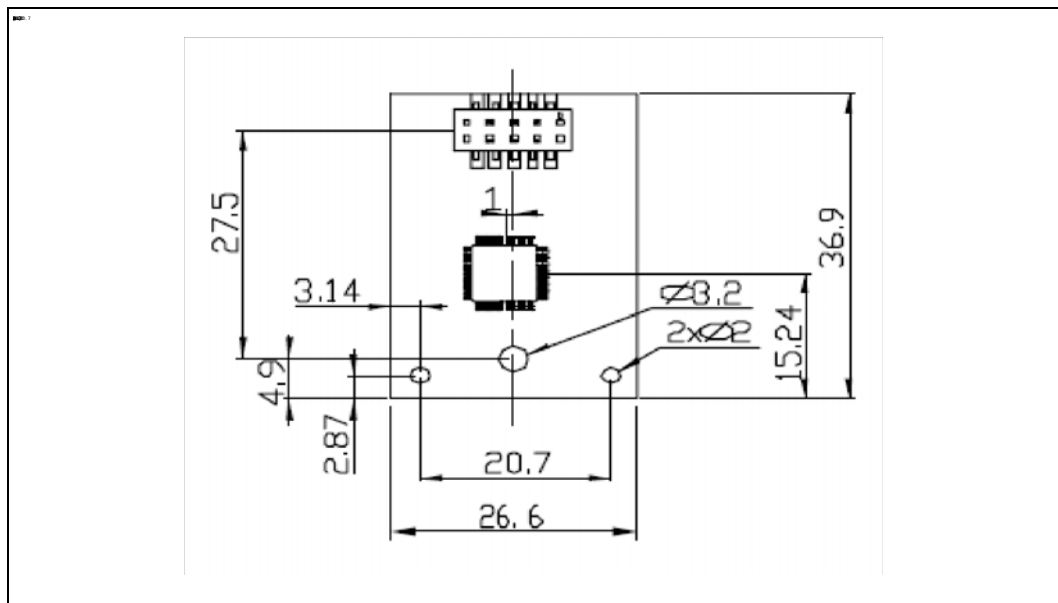
Figure 3. Standard Profile Mechanicals - Top View



Note:

1. All dimensions are in millimeters.
2. Tolerance on all dimensions is +/- 0.25 mm.

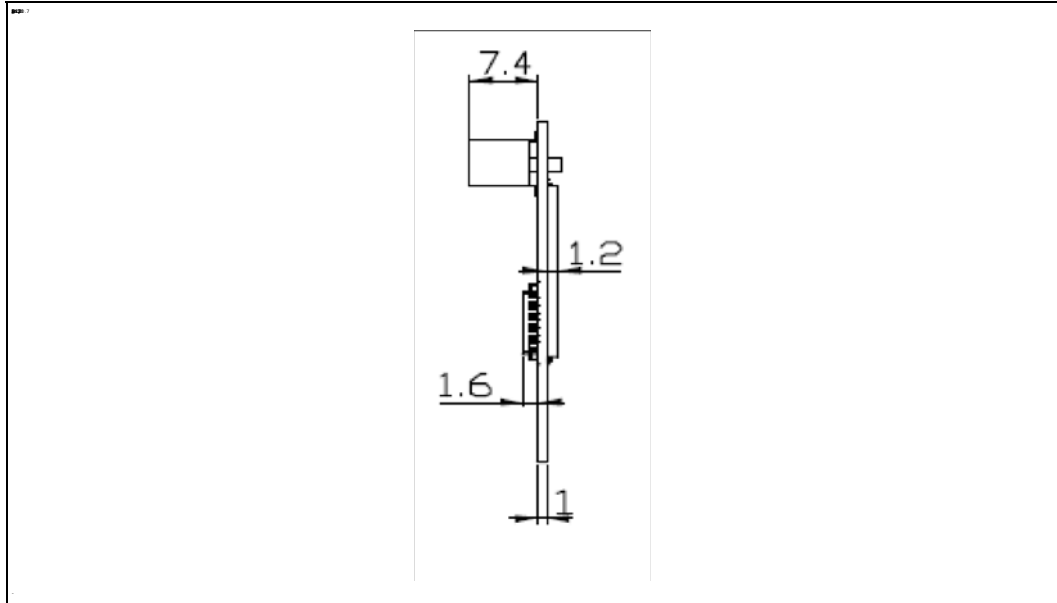
Figure 4. Standard Profile Mechanicals - Bottom View



Note:

1. All dimensions are in millimeters.
2. Tolerance on all dimensions is +/- 0.25 mm.

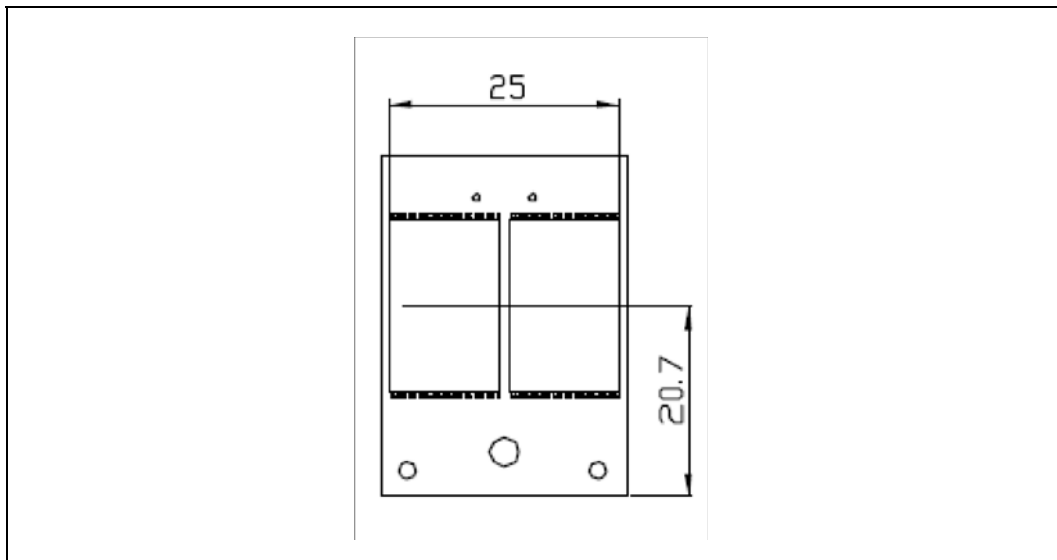
Figure 5. Standard Profile Mechanicals - Side View



Note:

1. All dimensions are in millimeters.
2. Tolerance on all dimensions is +/- 0.25 mm.
3. Standard Profile connector order # from Pinrex Technology is 615-92-05GBB8

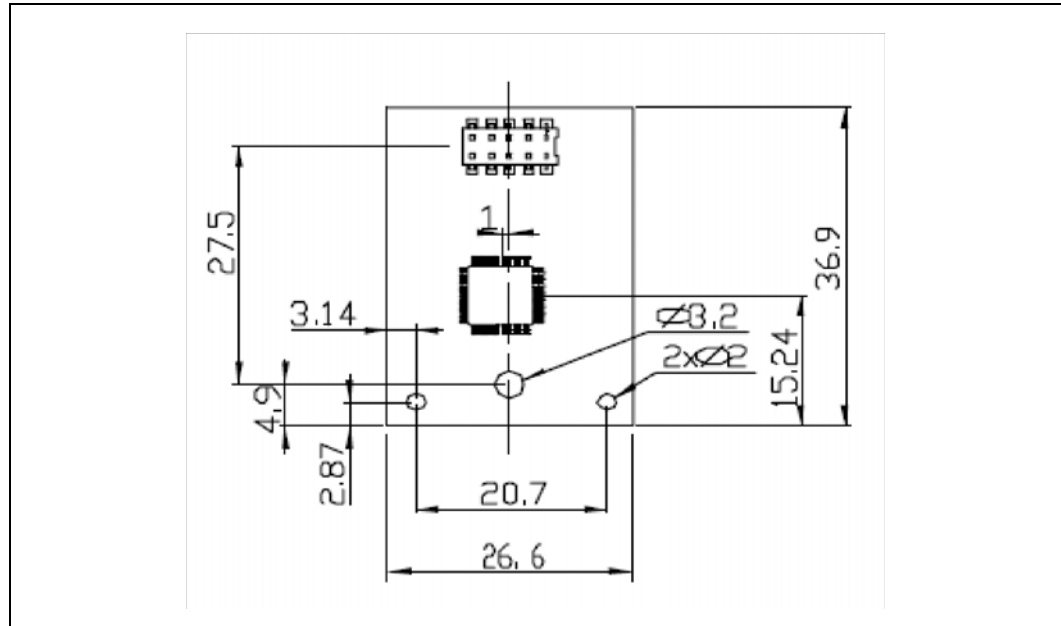
Figure 6. Low Profile Mechanicals - Top View



Note:

1. All dimensions are in millimeters.
2. Tolerance on all dimensions is +/- 0.25 mm.

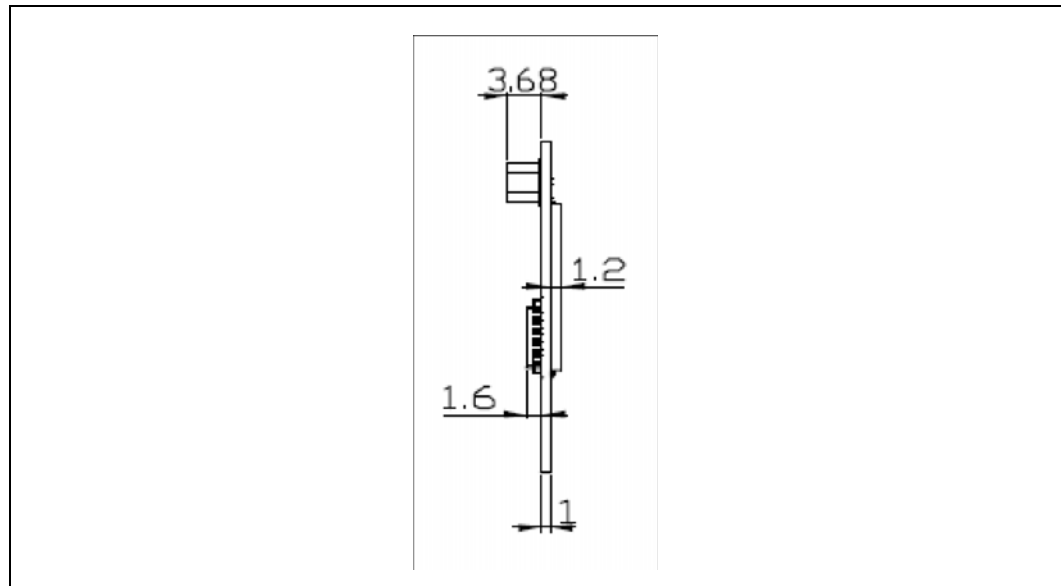
Figure 7. Low Profile Mechanicals - Bottom View



Note:

1. All dimensions are in millimeters.
2. Tolerance on all dimensions is +/- 0.25 mm.

Figure 8. Low Profile Mechanicals - Side View



Note:

1. All dimensions are in millimeters.
2. Tolerance on all dimensions is +/- 0.25 mm
3. Low Profile connector order # from SamTek is SMM-105-02-SM-D-09-P-TR



4.0 Electrical Characteristics

Table 2. Absolute Maximum Ratings by Device

Parameter/Condition	Symbol	Min	Max	Unit
Vcc supply voltage	Vcc	4.4	5.25	V
Storage temperature	TSTG	-65	+150	°C
Note: Voltage on any pin relative to Vss.				

Caution: Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating *only*, and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not guaranteed. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Table 3. Recommended Operating Conditions

Parameter/Condition	Symbol	Min	Typ	Max	Unit
Operating temperature	Commercial	-0	–	+70	°C
	Extended (pending)	-25	–	+85	°C
Vcc supply voltage	Vcc	4.75	5.00	5.25	V
Ground supply voltage	Vss	0	0	0	V

Table 4. Z-U130 Value SSD Device DC and Operating Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Standby current ¹	I _{sb}	–	65	TBD	mA	VCC = 5.0V
Active current ¹	I _{cc1}	-	80	TBD	mA	
Standby Power ¹	P _{sb}	-	325	TBD	mW	
Active Power ¹	P _{act}	-	400	TBD	mW	

Note:

1. Sampled, not tested.



5.0 Ordering Information

Figure 9, “Decoder” on page 12 provides the device part number decoder and Table 5, “Intel® Z-U130 Value SSD Ordering Information” on page 12 provides the available combinations. For combinations not listed, please contact your local Intel sales office.

Figure 9. Decoder

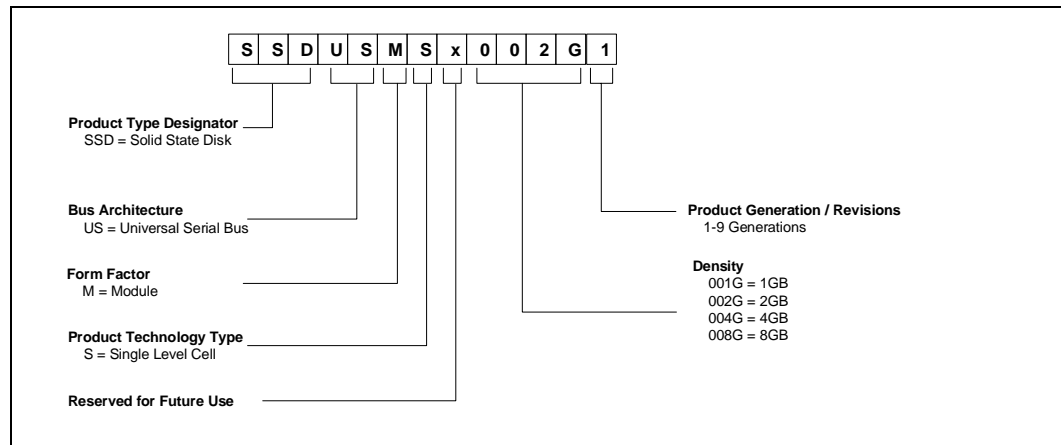


Table 5. Intel® Z-U130 Value SSD Ordering Information

L1 Part Number	MM #	Device Nomenclature
SSDUSMS0001G1	888492	1GB Module - Standard Connector
	888523	1GB Module - Low Profile Connector
SSDUSMS0002G1	888493	2GB Module - Standard Connector
	888524	2GB Module - Low Profile Connector
SSDUSMS0004G1	888522	4GB Module - Standard Connector
	888525	4GB Module - Low Profile Connector