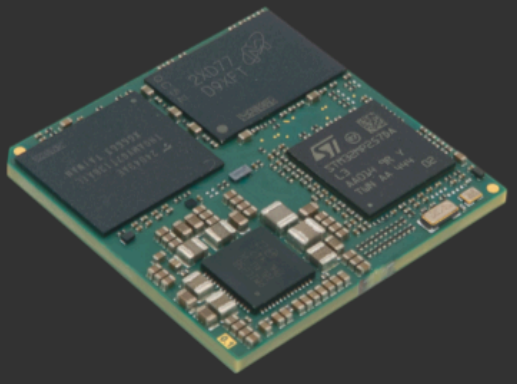
bytesatwork

Production Manual



Production Manual

OSM-S

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Symbols and Typographic Conventions

These symbols represent important details or aspects for working with bytesatwork-products.



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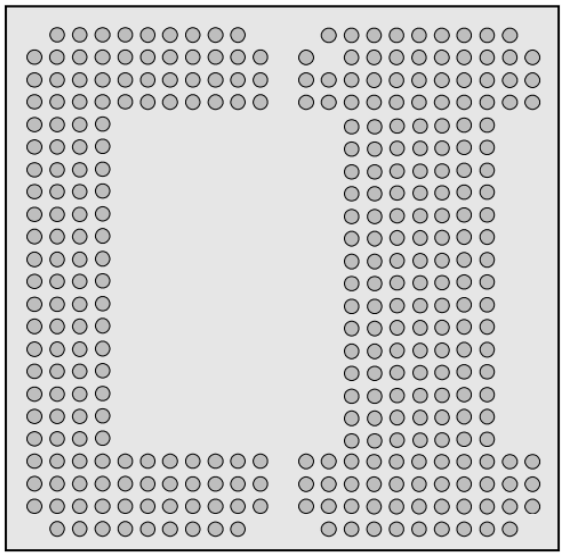
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1. Introduction

This guide defines the critical process parameters, footprint recommendations, stencil design, soldering profiles, and quality acceptance criteria for assembling bytesatwork byteENGINE-OSM-S System on Modules onto carrier boards. Adherence to these guidelines ensures optimal solder joint integrity, thermal dissipation, and long-term mechanical reliability.

2. Module Information

Currently, there are three OSM-S system on modules available. The byteENGINEs are designed according to the SGET Open Standard Module. The following picture shows the OSM-S Standard.



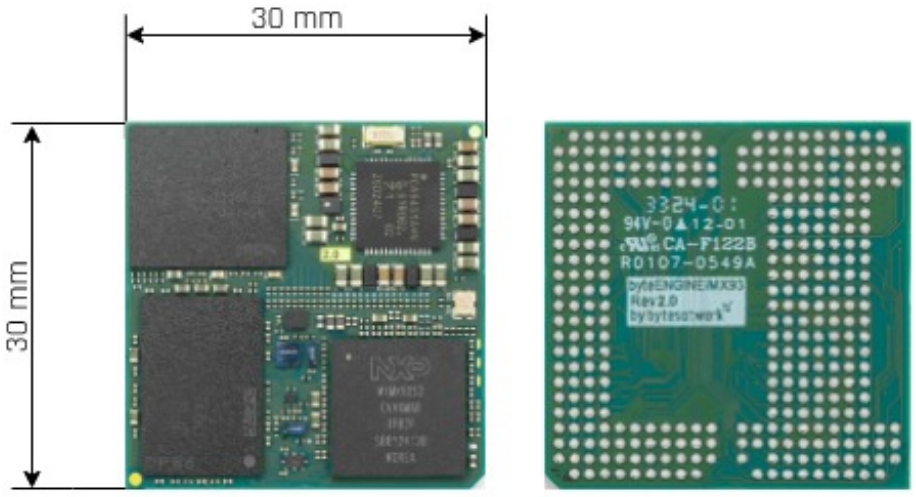
OSM-S SPECIFICATIONS

Size	30 mm x 30 mm
Pinouts	332

For more information to the Standard, refer to the standardization organization:

https://sget.org

2.1. byteENGINE IMX9x



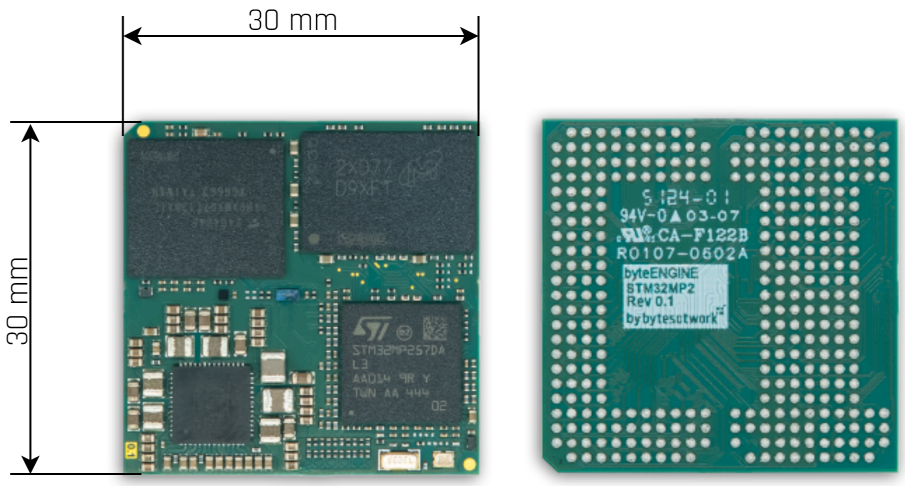
byteENGINE IMX9x Specification

CPU	Up to Dual ARM® Cortex® A55 processors
Frequency	Max. 1.7 GHz
Co-Processor	Cortex® M33 up to 250 MHz
Memory	512 MB to 2048 MB LPDDR4
Flash eMMC	up to 128 GB
Temperature	Industrial: -40° to +85° C, consumer: 0 to 85° C
Power Supply	5.0 V, 4 W

For detailed module information including technical documentation please refer to the IMX9x Datasheet.

Datasheet byteENGINE IMX9x

2.2. byteENGINE STM32MP2



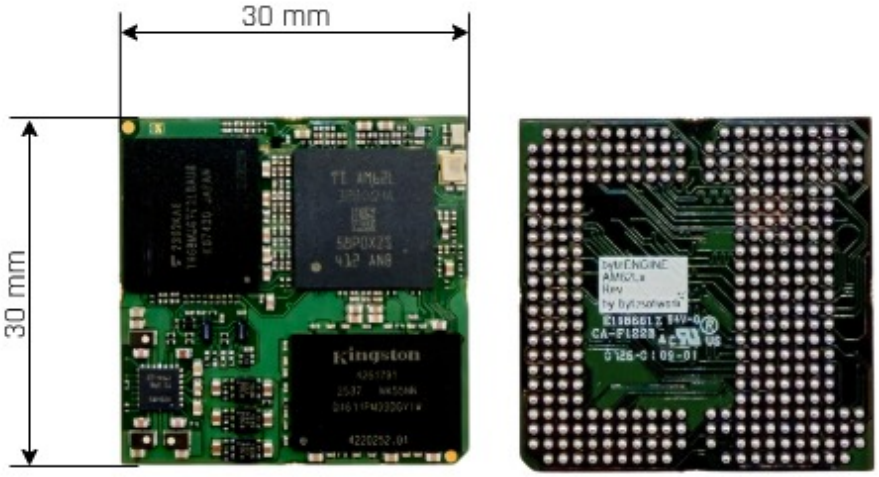
byteENGINE STM32MP2 Specification

CPU	Up to Dual ARM® Cortex® A35 processors
Frequency	Max. 1.5 GHz
Co-Processor	Cortex® M33 up to 400 MHz
Memory	512 MB to 2048 MB LPDDR4
Flash eMMC	up to 128 GB
Temperature	Industrial: -40° to +85° C, consumer: 0 to 85° C
Power Supply	5.0 V, 4 W

For detailed module information including technical documentation please refer to the STM32MP2 Datasheet.

Datasheet byteENGINE STM32MP2

2.3. byteENGINE AM62L



byteENGINE AM62L Specification

CPU	Up to dual ARM® Cortex® A53 processors
Frequency	1.25 GHz
Memory	512 MB to 2048 MB LPDDR4
Flash eMMC	up to 128 GB
Temperature	Industrial: -40° to +85° C, consumer: 0 to 85° C
Power Supply	5.0 V, 2 W

For detailed module information including technical documentation please refer to the AM62L Datasheet.

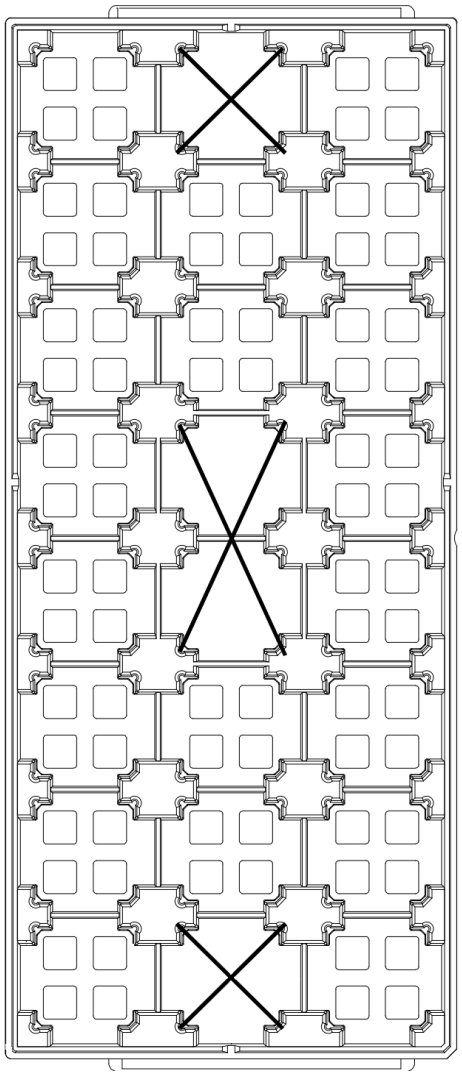
Datasheet byteENGINE AM62L

3. Handling

OSM-S modules are moisture-sensitive and ESD-sensitive devices that require proper handling during storage, transport, and assembly to maintain product integrity and prevent damage.

Special requirements regarding packaging and Unique Identification need to be communicated when ordering.

3.1. Tray Packaging

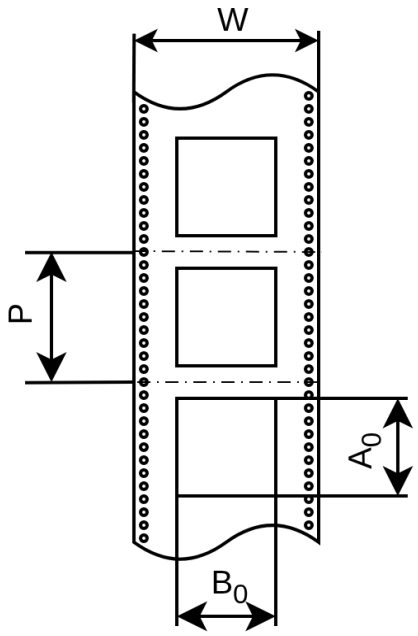


TRAY SPECIFICATIONS

Tray dimensions	322.6 mm x 136 mm
Modules per Tray	20 pieces

The packaging, covered by one empty tray, will be vacuum sealed. This packaging is used for smaller badge sizes.

3.2. Tape and Reel Packaging



TAPE SPECIFICATIONS

Tape width W	56 mm
Pitch P	40 mm
Pocked dimensions A0, B0	30.4 mm
Sprocket holes	4 mm

REEL SPECIFICATIONS

Standard Reel Quantity	750 modules
Reel Size	13 inch (330 mm)

Tape and Reel packaging is the standard packaging for larger quantities. Smaller quantities can also be supplied as cut tape.

3.3. Storage Conditions

To ensure optimal performance and reliability, all OSM-S Modules shall be handled and stored in accordance with moisture sensitivity requirements.

The OSM-S Modules are classified as **MSL Level 3** in accordance with J-STD-020.

Floor Life: After opening the moisture barrier bag, components may be exposed to ambient conditions for a maximum of 168 hours at ≤30°C and ≤60% relative humidity (RH).

Handling after floor life expiry: Modules that exceed the specified floor life shall be baked in accordance with J-STD-033 prior to reflow soldering to restore suitability for assembly.

3.4. Unique Identification

All system on modules are shipped with a 7 x 7 mm serial number (UID) sticker on them. The package includes a certificate of conformity generated out of our production test. With this UID, your modules are fully traceable to delivery date, order, our production lot and production date. To retrieve this information, please contact us.



3.5. PCB Marking

Our OSM-S system on modules have a marking on the PCB bottom side containing the name and revision of the module.

4. Production

This chapter covers the key manufacturing steps, stencil parameters, placement recommendations, and soldering guidelines for assembling byteENGINE OSM-S modules onto carrier boards.

4.1. Solder Paste Application

For solder paste application, either stencil printing (using a physical stencil) or jet printing (stencil-less direct dispensing) can be used. The following parameters are to be considered:

Jet Printing

PARAMETER	RECOMMENDATION
Stencil Thickness	120 µm
Fill Ratio	80 %

Stencil Printing

PARAMETER	RECOMMENDATION
Stencil Thickness	100 µm
Material	Electropolished stainless steel (optional nano-coating)
Aperture size	0.80mm (same as pad)

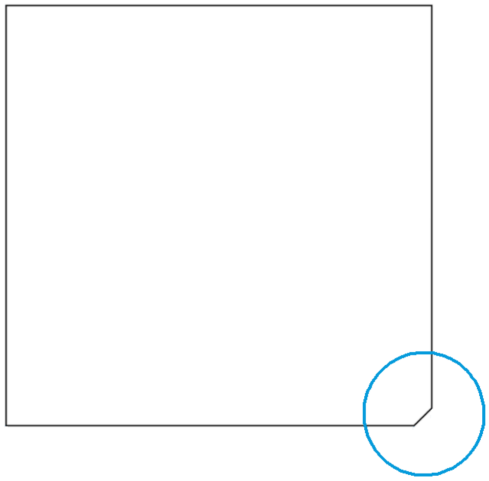
4.2. Solder Paste Inspection

The following parameters should be taken into account during inspection:

PARAMETER	RECOMMENDATION
Area min/max	±60%
XY offset	0.2 mm

4.3. Orientation Mark for Placement

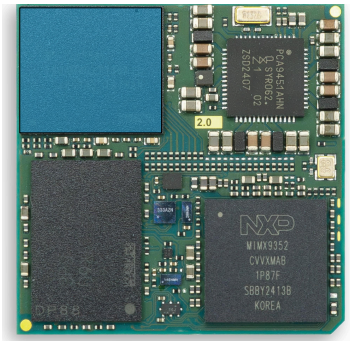
As a reference point for positioning the OSM-S Module, one corner of the module is chamfered.



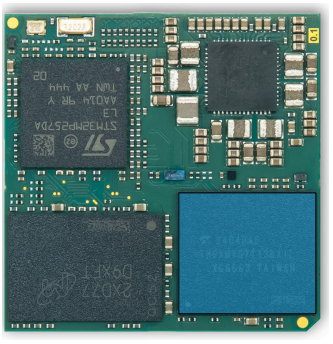
4.4. Pick and Place Recommendation

Always use the biggest nozzle to pick up the modules.
Following pick position (area marked in blue) are recommended for reliable SMT placement, depending on module type:

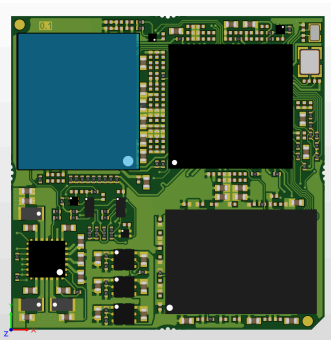
byteENGINE IMX9x:



byteENGINE STM32MP2:



byteENGINE AM62L:



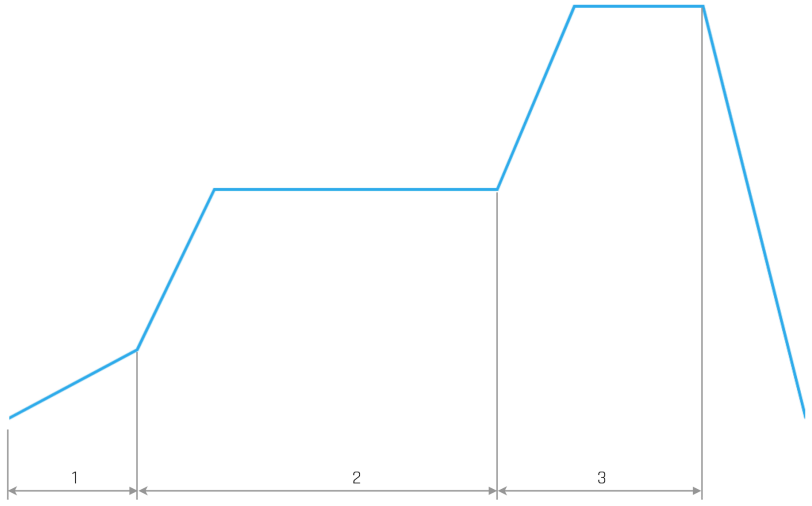
PARAMETER	RECOMMENDATION
Recommended Z-Overdrive*	0.2 mm

*At the pick-up or placement position, the placement head is driven slightly beyond the calibrated Z-height (overdrive). This additional downward motion is absorbed by the spring-loaded placement head/nozzle to ensure reliable contact without exerting excessive mechanical stress on the module.

4.5. Soldering profile

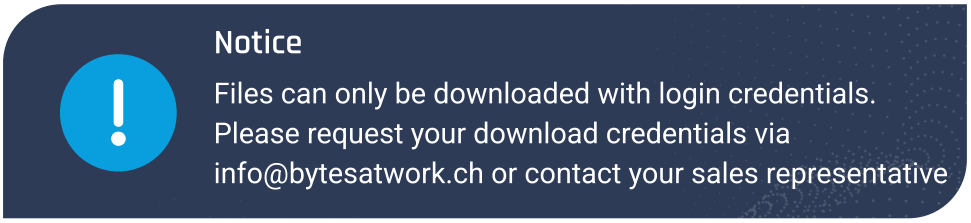
Following conditions have to be met :

- Dry OSM-S Module (MSL 3)
- 2 (two) soldering cycles are permitted in total
- Total time above 60°C must not exceed 600s
- The profile is only valid for Vapor Phase Soldering. Reflow may require higher temperatures, however, 260°C must not be exceeded.



PHASE	DESCRIPTION	TEMPERATURE	TIME
1	Synchronisation for temperature equalization, if required	Max. 80 °C	N/A
2	Preheat	Typical: 160 °C Max: 190 °C	Typical: ≤60 s Max.: 90 s
3	Soldering	Typical: 225 °C Max.: 240 °C	Typical: 15 s Max.: 30 s

5. References





Links

Datasheets of our OSM-S Modules

Datasheet byteENGINE IMX9x

Datasheet byteENGINE STM32MP2

Datasheet byteENGINE AM62L

Hardware Specification for OSM and OSM Design Guide

https://sget.org

Software

byteWIKI

meta-bytesatwork on github

bytesatwork

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Help

bytewiki.readthedocs.io

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