2.5G Ethernet Switches with 5 Integrated PHYs and Uplinks

**PRODUCTS**

<table>
<thead>
<tr>
<th>Products</th>
<th>Ports</th>
<th>Uplinks</th>
<th>Web-Smart</th>
<th>Temp Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>MxL86250C</td>
<td>5</td>
<td>0</td>
<td>No</td>
<td>Commercial</td>
</tr>
<tr>
<td>MxL86252C</td>
<td>7</td>
<td>2</td>
<td>No</td>
<td>Commercial</td>
</tr>
<tr>
<td>MxL86252S</td>
<td>7</td>
<td>2</td>
<td>Yes</td>
<td>Commercial</td>
</tr>
<tr>
<td>MxL86252I</td>
<td>7</td>
<td>2</td>
<td>Yes</td>
<td>Industrial</td>
</tr>
</tbody>
</table>

**FEATURES**
- Wire-speed switching between all ports
- Two 10G XFI / USXGMII / SGMII uplink ports (MxL86252)
- VLAN, QoS, loop detection, ACL
- Five integrated 2.5GBASE-T PHYs
  - 2.5GBASE-T, 1000BASE-T, 100BASE-TX and 10BASE-Te link rates
- Package PG-FCLBGA-277 12mm x 12mm, 0.628 / 0.700 mixed ball pitch
- Commercial and industrial temperature variants
- Variants for web-smart applications

**BENEFITS**
- Low power consumption through high integration
- Power saving modes for short cables, through Energy Efficient Ethernet (EEE) and no-link detection
- Same package for 5 and 7 port switches
- Integrated processor enables web-smart switch applications (MxL86252S, MxL86252I)

**APPLICATIONS**
- Standalone five port 2.5G switches with and without uplinks
- Unmanaged and web-smart switches
- External switches for gateway SoCs
- Industrial switches

**STANDARDS**
- IEEE Standard for Ethernet, IEEE802.3™-2022

**Product Description**

MxL86250 and MxL86252 are highly integrated 2.5G Ethernet switches with five integrated 2.5GBASE-T PHYs. MxL86252 supports two uplink SERDES ports. The ports can be configured to support 10G XFI, USXGMII, 2.5G SGMII, or 1G SGMII. The uplink ports are used for connection of two SFPs, two external BASE-T PHYs or a gateway SoC. These switches have low power consumption due to their high integration and advanced technology.

2.5GBASE-T works over the same Cat5e link segments as 1000BASE-T. Networks can benefit from the higher rate without the need to change cable installations.

The integrated microcontroller in MxL86252S and MxL86252I can run a real-time operating system with a web server. This allows customers to design a web-smart switch, which can be configured over a web-browser on a PC or a mobile device.

To enable industrial and outdoor applications, MxL86252I supports the industrial temperature range.

The parts are packaged in a small 12 mm x 12 mm 277 ball BGA package, which allows a single layout to be used for switches with and without uplinks.
The switches execute their program from an external cost effective QSPI Flash. The QSPI Flash code can be upgraded in the field.

**System Features**
- Clock input from a 25MHz or 50MHz oscillator or crystal
- Quad SPI interface for execution from external Flash
- Two master I²C interfaces to control two SFPs (MxL86252)
- MDIO slave interface to control the device when connected to an external SoC
- Integrated temperature sensor for warning interrupt and auto down speed
- 4 power supply rails: 3.3V, 1.8V, 1.2V, and 0.8V
- Typical power consumption below 4W

**PHY Features**
- 2.5GBASE-T and 1000BASE-T full duplex, 100BASE-TX and 10BASE-Te full and half-duplex
- More than 100m reach over CAT5e or higher quality link segments
- Low EMI voltage mode line driver with integrated termination resistors
- Auto-Negotiation (ANEG) with extended next page support
- Auto MDI/MDI-X and auto polarity detection and correction
- Auto down-speed (ADS) for poor quality cables
- Energy Efficient Ethernet for 100BASE-TX, 1000BASE-T and 2.5GBASE-T
- Additional power savings with no-link and short cable detection
- Wake-on-LAN (WoL)
- Fast retrain
- Three configurable network status LEDs per port
- Cable diagnostic: cable open/short detection and cable length estimation
- Support of jumbo frames up to 10kB
- Support of MACsec, PTP (Precision time Protocol IEEE1588v2), and SyncE (MxL86252I)

**Switch Features**
- Wire speed switching between all ports
- 16k entry VLAN-aware MAC address table
- 4 to 8Mbit packet buffer depending on mode
- Layer 2 security: IEEE 802.1X port authentication, MAC address filtering, port locking and spoofing detection, MAC address limiting, and broadcast storm control
- Supports multiple spanning tree protocols
- MAC in MAC tunneling (802.1ah), 256 tunnels
- L3 multicast forwarding, IGMP (v2 and v3) / MLD (1 and 2) snooping
- VLAN support with 512 VLANs and 4k VID
- Supports QinQ double tagging
- Supports RMON groups 1, 2, 3 and 9
- Multiple to 1 port mirroring
- QoS with 128 priority queues: Weighted round robin, strict and mix up mode
- Link aggregation
- Loop detection
- 512 ACL (access control list) entries
- Per port or flow-based traffic shaping
- Up to 4Gbit external Flash for dual image storage
- Build-in CPU for web-smart switch applications (MxL86252S, MxL86252I)
- Secure boot support
MxL86250 and MxL86252

Application Block Diagrams

Product Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Ordering Code</th>
<th>Ports</th>
<th>Uplinks</th>
<th>Web-smart Support</th>
<th>Temperature Range</th>
<th>Additional Features</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>MxL86250C</td>
<td>MXL86250C-ABE-R</td>
<td>5</td>
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<td>No</td>
<td>0°C to 70°C</td>
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<td>PG-FCLBGA-277</td>
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Evaluation Kit

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<th>Part Number</th>
<th>Description</th>
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<tr>
<td>MXL86252S-EVK-1</td>
<td>Evaluation Kit for MxL86250C, MxL86252C, MxL86252S, and MxL86252I (equipped with MxL86252S)</td>
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