

Common-mode filter with integrated ESD protection



STMicroelectronics

The first common-mode filters with high-efficiency ESD protection using ST's advanced technology and housed in μ QFN packages

High-speed data communication has found increasing applications in portable devices. Differential signaling standards such as USB 2.0, USB 3.0, MIPI D-PHY and HDMI are gaining ground very quickly.

Despite improved signal integrity with differential signaling, any imbalance between the differential lines is a source of common-mode noise which creates mobile antenna desensing. Common-mode filters are thus usually implemented on fast differential lanes, together with high-bandwidth ESD protection on the connector side.

Two filters for all needs

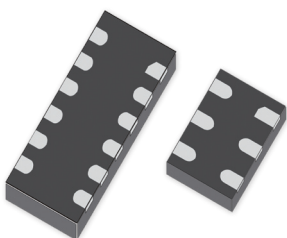
STMicroelectronics has introduced two common-mode filters combining high-efficiency ESD protection, the ECMF02-2AMX6, a single-lane device, and the ECMF04-4AMX12, a dual-lane device.

Targeted applications

- MIPI D-PHY
- USB 2.0
- HDMI

Key features and benefits

- Ultra-large differential bandwidth up to 7 GHz
- High common-mode attenuation from 800 MHz to 2.5 GHz
- Compliance with IEC 61000-4-2 level 4 ESD standard
- Robust ESD protection providing low residual peak voltage ($V_{PEAK} < 50$ V)
- Ultra-compact and straightforward flow-through layout
- Proven in compliancy with MIPI D-PHY, USB 2.0 and HDMI applications



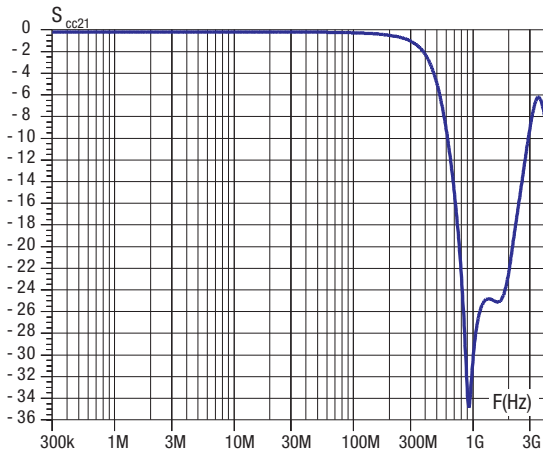
Features and measurements

The ECMF02-2AMX6 and ECMF04-4AMX12 feature a very large differential bandwidth up to 7 GHz, providing compatibility with high-speed buses.

The ECMF02-2AMX6 and ECMF04-4AMX12 have been designed to comply with MIPI D-PHY, USB 2.0 and HDMI specifications.

The common-mode attenuation has been optimized for the wireless bands from 800 MHz to 2.5 GHz:

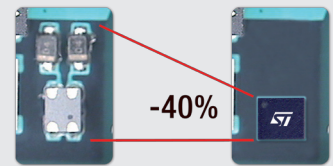
- $S_{cc21} = -34 \text{ dB}$ at 900 MHz
- $S_{cc21} = -22 \text{ dB}$ at 2.0 GHz



Compactness

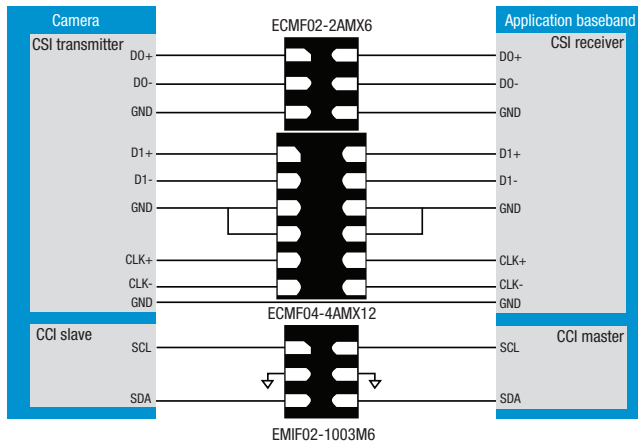
The ECMF02-2AMX6 and ECMF04-4AMX12 are the industry's first silicon common-mode filters combining high-efficiency ESD protection. Housed in μ QFN packages, they offer ultra-compact and straightforward flow-through layout solutions.

They provide up to 40% board space reduction compared to conventional solutions using discrete TVS and ceramic common-mode chokes.



Application schematics

MIPI D-PHY interface



USB 2.0 interface

