

Integrated common mode filter & protection solving EMI & electrostatic challenges

High-speed wired lines and popular wireless standards frequently interfere in the Gigahertz range, resulting in EMI disturbance for mobile users. Nexperia has designed common mode filters with electrostatic discharge protection for 1, 2 and 3 differential line pairs that attenuate common mode signals and deliver superior communications experiences. Our solutions provide common mode noise suppression over all bands, with high suppression at 2.5 GHz and 5 GHz, the fundamentals of USB 3.x



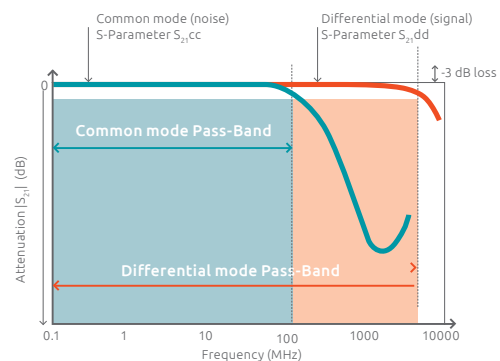
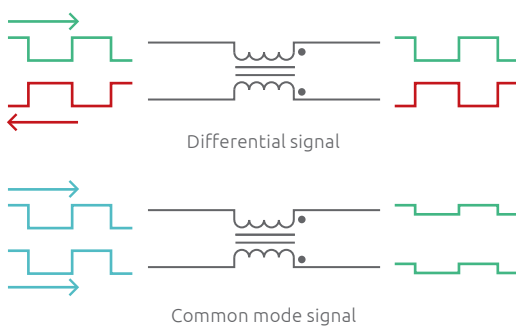
Benefits

- › Effective 1, 2 & 3 line pairs protection and filtering
- › USB 3.x & HDMI2 optimized common mode suppression
- › Proven 10+ Gbps communications lines protection
- › Providing high system-level robustness for sensitive SoCs
- › Minimized reflections compared to discrete CMF + additional ESD
- › Low clamping and dynamic resistance using TrEOS technology

Features

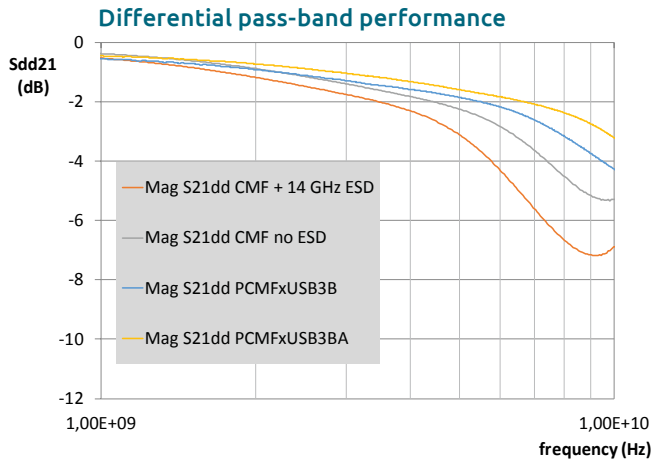
- › Protection up to 6 lines (Tx +/-, Rx +/-, D +/-)
- › Wide differential passband (up to 10 GHz 3dB frequency)
- › Up to -32 dB CM rejection at 2.5 GHz & up to -21 dB at 5 GHz (USB3 fundamentals)
- › Up to -31 dB CM rejection at 3 GHz and -16 dB at 6 GHz HDMI fundamental
- › Low-inductance & space-saving WLCSP packages
- › Footprint-compatible with ESD-only solutions
- › Exceeding IEC 61000-4-2 ESD ruggedness standard

Common Mode Filter lets differential signals pass and attenuates common-mode noise



PCMF - Performance advantage thanks to integration

Nexperia's PCMF series integrate ESD protection and CMF in a single device which offers an unmatched overall performance. When comparing a standalone CMF solution to a combination of discrete CMF and discrete 14 GHz differential pass band ESD protection, performance losses are notable. In contrast to this, our PCMFxUSB3B and ...BA deliver a performance advantage of more than 1 GHz and even 3 GHz compared to the standalone CMF without ESD protection. The maximum of the Common Mode Rejection is shifting as well to attenuate CM noise at higher signal frequencies.



Parametrics

Types in **bold** represent new products

	Function	Line pairs	Layout	RF key data	Outline	Robustness		System protection (lower is better)
				Differential pass-band * (GHz)	Package	Robustness ESD contact at IEC61000-4-2 (kV)	Robustness surge at I _{PPM} 8/20µs (A)	R _{dyn} +/- (Ω)
PCMF1USB3S	CMF + ESD	1	Unidirectional	> 6	WLCSP5	15	7	0.14
PCMF1HDMI2S	CMF + ESD		Unidirectional	> 6		15	7	0.16
PCMF1USB3B/C	CMF + ESD		Bidirectional	8.1		20	9.5	0.2
PCMF1USB3BA/C	CMF + ESD		Bidirectional	10		15	7.5	0.29
PESD1USB3S	ESD protection		Unidirectional	17		15	8	0.16
PESD1USB3B/C	ESD protection		Bidirectional	16.1		20	9.5	0.2
PCMF2USB3S	CMF + ESD	2	Unidirectional	> 6	WLCSP10	15	7	0.14
PCMF2HDMI2S	CMF + ESD		Unidirectional	> 6		15	7	0.16
PCMF2USB3B/C	CMF + ESD		Bidirectional	8.1		20	9.5	0.2
PCMF2USB3BA/C	CMF + ESD		Bidirectional	10		15	7.5	0.29
PESD2USB3S	ESD protection		Unidirectional	17		15	8	0.16
PESD2USB3B/C	ESD protection		Bidirectional	16.1		20	9.5	0.2
PCMF3USB3S	CMF + ESD	3	Unidirectional	>6	WLCSP15	15	7	0.14
PCMF3HDMI2S	CMF + ESD		Unidirectional	> 6		15	7	0.16
PCMF3USB3B/C	CMF + ESD		Bidirectional	8.1		20	9.5	0.2
PCMF3USB3BA/C	CMF + ESD		Bidirectional	10		15	7.5	0.29
PESD3USB3S	ESD protection		Unidirectional	17		15	8	0.16
PESD3USB3B/C	ESD protection		Bidirectional	16.1		20	9.5	0.2

* Normalized to attenuation at 1 MHz

Package details

Our PCMF family is available in wafer level chip-size package known as WLCSP. Five, ten and fifteen bump variants of this package are proposed, respectively catering to single-, dual- and triple-channel needs.

Package name	Dimensions (L x W x H, in mm)	
WLCSP5	0.8 x 1.2 x 0.6, 0.4	
WLCSP10	1.6 x 1.2 x 0.6, 0.4	
WLCSP15	2.4 x 1.2 x 0.6, 0.4	

Browse our full portfolio of common mode filtering with ESD protection:

<https://www.nexperia.com/products/esd-protection-tvs-filtering-and-signal-conditioning/emi-solutions-with-integrated-protection/common-mode-filter-for-usb-ports>

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