Pulse
a YAGEO company

MSL

ROHS COMPLIANT

SIGNAL COMMON MODE CHOKE OVERVIEW (Non-Automotive)

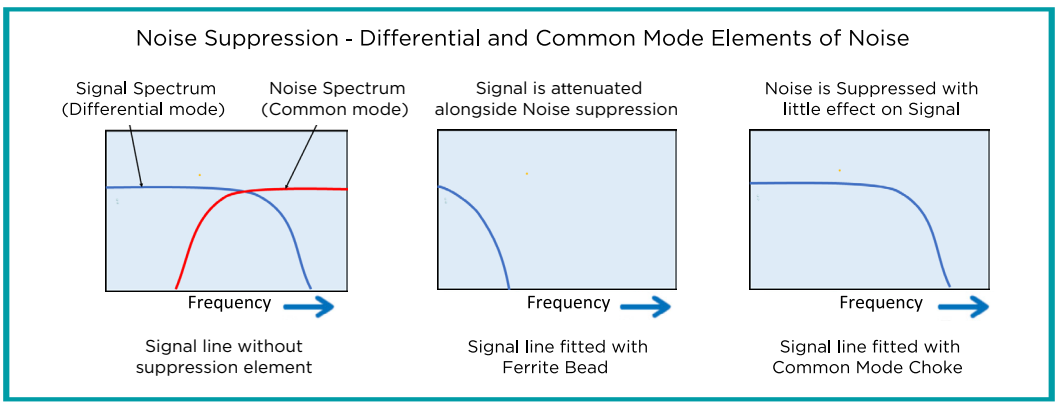
SURFACE MOUNT AND THROUGH-HOLE SOLUTIONS

Common Mode Signal Chokes, as the name implies, are designed to attenuate and filter common mode noise propagated on a differential signal communication line. The key parameters for a signal line common mode choke are the impedance or attenuation level with frequency, the number of data lines in use 2, 3, 4, 6 and 8 and the size.

Unlike power line chokes, where currents are high, differential data signals are generated from very low voltages and currents; typically 5V(peak to peak) and <200mA. Therefore, nearly all signal line chokes are actually better defined as differential/common mode chokes since the windings are wound bilfilar (side by side) and are in phase. This means that currents flowing through them add, rather than cancel out. That gives risk to potential core saturatation, if excessive currents are applied, so care should be taken in selecting chokes for applications where current may be high, such as power over Ethernet (PoE+), where up to 800mAmps could be seen.

Signal line chokes are often listed by inductance value as this is used as an indication of their effective frequency range; - A high Inductance value will best suppress low frequency noise while a low inductance value will be best for higher frequency ranges. They also provide limited isolation between signal lines. Typically only a few hundred volts - since chokes are not approved for safety Isolation. The isolation level is based on the coating of the wire with typical values ranging form 125Vdc ~ 500Vdc.

Signal line Chokes offer superior noise suppression without affecting to signal quality when compared to ferrite beads or snubbing inductor, The beneficial performance comparison of Signal line chokes is shown below.



Pulse catalog signal common mode chokes are listed on the following pages and are available in SMT and THT topologies. All are based on ferrite toroidal core constructions for currents < 1Amp. The Automotive and ChipChoke product range overview can be found in a separate guide on the web at PulseElectronics.com

SIGNAL COMMON MODE CHOKE OVERVIEW (Non-Automotive)

SURFACE MOUNT AND THROUGH-HOLE SOLUTIONS

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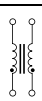
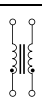
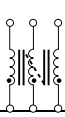
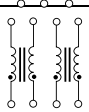
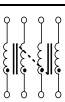
PRODUCT OVERVIEW: SIGNAL COMMON MODE CHOKES

THT Part Number		Platform Size (Max) L (mm)	W (mm)	H (mm)	Primary Inductance OCL (uH)	Winding Resistance (DCR MAX)	Winding Schematic	Common Mode Attenuation (represetative) 0.1 MHz	1.0MHz	10MHz	30MHz	50MHz	100MHz	300MHz	500MHz	1.0GHz
	B2005NL	12.70	10.16	12.70	9,000	1.0Ω			47dB				33dB			15dB
	PE-67531NL	10.16	5.08	8.89	140min	0.60Ω			34dB				47dB			25dB
	PE-65554NL	15.11	12.20	7.62	24min	0.30Ω			21dB				39dB			
	PE-65950NL	14.17	14.17	10.16	470Ω	1.0Ω			51dB				20dB			

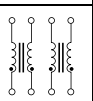
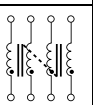
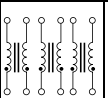
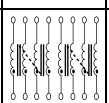
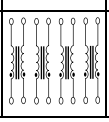
SMD Part Number		Platform Size (Max) L (mm)	W (mm)	H (mm)	Primary Inductance OCL (uH)	Winding Resistance (DCR MAX)	Winding Schematic	Common Mode Attenuation (represetative) 0.1MHz	1.0MHz	10MHz	30MHz	50MHz	100MHz	300MHz	500MHz	1.0GHz
	B2013NL	15.11	12.20	7.62	9,000	0.30Ω		46dB	47dB		32dB		29dB			16dB
	B4003NL	9.02	8.76	7.62	4,700	0.40Ω		42dB	47dB		38dB		21dB			17dB
	BX8333NL	15.11	12.20	7.62	16,000	0.30Ω		38dB	36dB		15dB		8dB			
	BX8333DNL	15.11	12.20	7.62	33,000	0.30Ω		46dB	22dB		12dB		6dB			
	PE-65855NL	15.11	12.20	7.62	4,700	0.40Ω		41dB	43dB		39dB		26dB			12dB
	PE-68264NL	8.64	6.60	2.49	47min	0.30Ω			27dB		44dB		36dB		17dB	
	R0003NL	8.64	6.60	2.49	20min	1.00Ω			14dB		27dB		30dB			25dB
	PE-65627NL	9.02	8.76	5.26	24min	0.40Ω			21dB		36dB		36dB		20dB	
	PE-65854NL	9.14	8.64	2.50	47min	0.25Ω			19dB		36dB		29dB		6dB	

SIGNAL COMMON MODE CHOKE OVERVIEW (Non-Automotive)

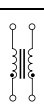
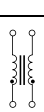
SURFACE MOUNT AND THROUGH-HOLE SOLUTIONS

Pulse a YAGEO company

PRODUCT OVERVIEW: HIGH FREQUENCY COMMON MODE CHOKES

Platform Name		Platform Size (Max) L (mm)	W (mm)	H (mm)	Primary Inductance OCL (uH)	Winding Resistance (DCR MAX)	Winding Schematic	Common Mode Attenuation (represetative) 0.1MHz	1MHz	10MHz	30MHz	50MHz	100MHz	300MHz	500MHz	1.0GHz
	23Z104SMNL	12.20	12.20	7.62	68	0.20Ω			22dB	28dB			25dB		15dB	
	PE-65857NL	12.07	15.24	8.64	22.5	0.22Ω			20dB	30dB			34dB		13dB	
	PE-67540NL	12.07	15.24	8.64	100	0.60Ω			33dB	44dB			44dB		29dB	
	T8003NL MSL 4	15.11	12.20	7.62	33	0.20Ω			13dB	32dB			27dB		17dB	
	23Z106SMNL	11.43	9.14	5.46	68	0.20Ω			22dB	29dB			29dB		19dB	
	23Z105SMNL	11 .43	9.14	5.46	68	0.20Ω			24dB	30dB			24dB		11dB	
	PE-69011NL MSL 4	12.70	9.40	5.08	36	0.35Ω			24dB	36dB			29dB		11dB	

PRODUCT OVERVIEW: 2-WIRE CAN/WAN COMMON MODE CHOKES

Platform Name		Platform Size (Max) L (mm)	W (mm)	H (mm)	Primary Inductance OCL (uH)	Winding Resistance (DCR MAX)	Winding Schematic	Common Mode Impedance (|Z| Typ.) (represetative) 0.1MHz	1MHz	5MHz	10MHz	30MHz	50MHz	80MHz	100MHz	200MHz
	T81119NLT	8.90	6,39	4,11	15	0.16Ω			180		800		1,700		1,800	
	TX8111NLT	15.11	12.20	7.62	51	0.20Ω			400		1,700		3,800		3,400	
	T8116NLT	15.11	12.20	7.62	470	0.30Ω			3,000		4500		1,200		500	
	T8112NLT	15.11	12.20	7.62	1,000	0.30Ω			3,200		5,200		2,500		1,300	
	T8113NLT	15.11	12.20	7.62	2,200	0.40Ω			6,000		8,000		1,800		700	
	T8114NLT	15.11	12.20	7.62	4,700	0.70Ω			14,000		2,800		500		240	

SIGNAL COMMON MODE CHOKE OVERVIEW (Non-Automotive)

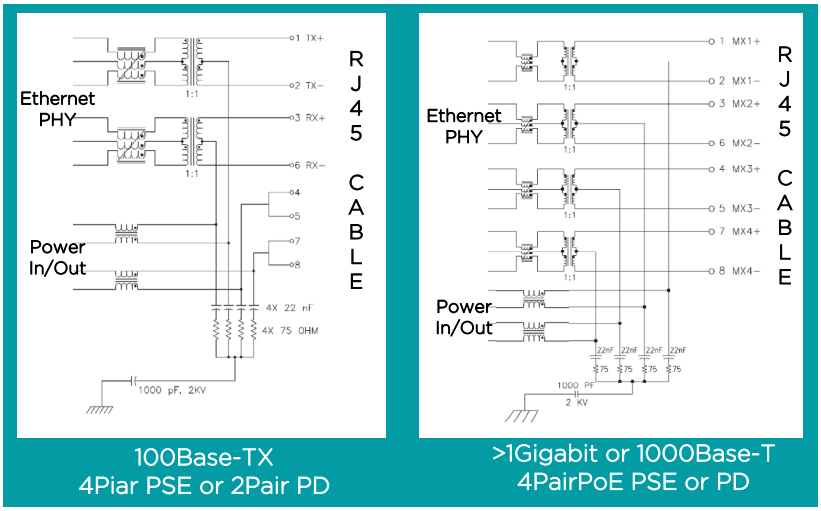
SURFACE MOUNT AND THROUGH-HOLE SOLUTIONS

Pulse a YAGEO company

Power over Ethernet (PoE) - DC supply line chokes

PoE Common Mode line chokes are designed to sit across the DC power supply pairings that connect directly to the central taps of the isolation transformers, or to the spare wires, in the case of 100Base-Tx (as shown in the diagram below). The chokes need to suppress CM noise on these DC power lines which may be generated by the switching frequencies of the DC converter used to “inject” or “take-off” the DC power on to the cable via an RJ45 connector.

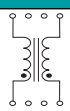
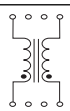
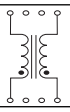
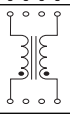
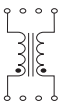
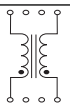
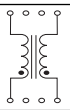
In the generic PoE set-up opposite, each DC power supply - labeled “Power in/out”- is shown connected to the signal transformers central tap. Therefore, the performance of the choke needs, not only to remove unwanted CM noise ,but also not appear to impede, delay or disrupt the transmission of the Ethernet data. Pulse PoE and PoE+ Choke series has been designed and tested to meet the requirements of IEEE802.3 standards at system level for Return and Insertion loss while supporting the load currents of 400mA for PoE (15W/pair) or 800mA for PoE+ (30W/pair).



100Base-TX
4Piar PSE or 2Pair PD

>1Gigabit or 1000Base-T
4PairPoE PSE or PD

The table below shows a small selection of the PoE power Line chokes that are available. The two series for PoE and PoE+ can be found on the website on data sheet H603.A (PoE) and H04.A (PoE+).

	Platform Name		Platform Size (Max) L (mm)	W (mm)	H (mm)	Primary Inductance OCL (uH)	Winding Resistance (DCR MAX)	Winding Schematic	Common Mode Impedance (|Z| Typ.) (represetative) 0.01MHz	0.1MHz	1.0MHz	6.0MHz	10MHz	30MHz	60MHz	100MHz	300MHz
POE		H6033NL	6.22	9.27	5.50	100	0.40Ω			100	500	2,000		4,900		1,800	
POE		H6034NL	6.22	9.27	5.50	250	0.30Ω			200	1,250	3,200		2,000		1,000	
POE		H6035NL	6.22	9.27	5.50	500	0.60Ω			350	2,700	7,000		2,400		800	
POE+		H6502NL	6.22	9.27	5.50	60	0.20Ω			100	300	1,100		3,200		1,900	
POE+		H6504NL	6.22	9.27	5.50	250	0.18Ω			200	1,200	3,300		2,000		1,000	
POE+		H6506NL	6.22	9.27	5.50	1,000	0.35Ω			600	6,000	11,000		2,400		600	
POE+		H6507NL	12.10	15.30	8.64	20,000	1.50Ω		3,000	16,500		3,000		1,000		100	

SIGNAL COMMON MODE CHOKE OVERVIEW (Non-Automotive)

SURFACE MOUNT AND THROUGH-HOLE SOLUTIONS

Pulse
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Wide frquency 2-wire CAN/WAN Solutions

T81xxxNLT, TX8111NLT

- Cost Effective SLIC (8.9x6.3x4.1mm)
- Current Rating: 400mA to 800mA
- Inductance: Low frequency 1.0mH to 2.7mH
  High frequency 15uH to 470uH
- Impedance: Low frequency 3.0~14KΩ @ 1.0MHz
  High frequency 0.80~3KΩ @ 100MHz

High frequency, 2/3/4-wire LAN Solutions

PE-65xxxNL, R0003NL, PE-65627NL, PE-65854NL

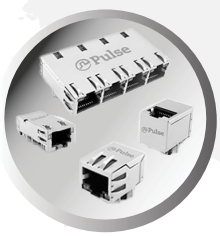
- Cost Effective SLIC - 2 package sizes
  (6.6x8.6x2.5mm and 9.1x8.7x2.5/5.1/7.6mm)
- Current Rating: 300mA
- Inductance: 20uH or 47uH
- Typical Attenuation: > 30dB @100MHz

Low frequency, High Impedance Solutions

PE-65855NL, BX8333NL/DNL

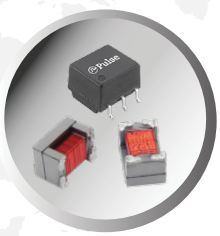
- Cost Effective SMD - (7.6x8.8x6.4/8.6mm)
- Current Rating: 100mA~400mA
- Inductance : 4.7mH or 33mH
- Typical Attenuation : 30dB @10KHz
  40dB @ 100KHz
  30dB @ 1MHz

Other Great Products from Pulse Electronics



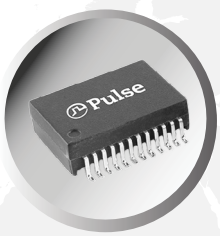
Integrated Connector Modules (ICMs)

- 100Base-T to 25GBase-T
- PoE, PoE+, 4 Pair PoE
- 1x1, 1xN, 2xN Packaging
- THT, SMT, Pin-in-Paste and Press Fit



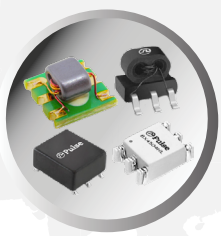
Automotive Network Magnetics

- BMS Modules & Xfrms Transformers (functional, basic, reinforced insulation)
- Automotive Ethernet (100Base-T to 10GBase-T)
- CMC (100Base-T, CAN)



Ethernet Transformer & Modules (LAN)

- 100Base-T to 25GBase-T
- PoE, PoE+, 4 Pair PoE
- Single, Dual, Quad, Octal
- THT, SMT, BGA & Pin-in-Paste



Telecom & Audio Magnetics (WAN)

- PLC Transformers
- ISDN, T1/E1, T3/E3, xDSL & G.Fast
- Multiple Port Options

Connectors & Cages

- Unfiltered Connectors (RJ45, RJxx, USBx)
- Optical Connectors & Cages (SFP, SFP+, QSFP)
- 1x1, 1xN, 2xN