

# Common Mode Choke Arrays

**Steward's** multi-line common mode power/data array filters provide the most economical EMI filtering available for common mode noise. These ferrite surface mount filters provide EMI suppression for groups of conductors like power traces and high speed input/output circuitry (including network and storage subsystems). Steward's common mode choke arrays exhibit high frequency impedance essentially independent of low frequency AC or DC bias current.

Protected by the following US Patent : 5,455,552

## Features:

- Surface mount design
- The most economical common mode filter available for filtering groups of signals
- Can be used as multi-turn device to multiply impedance
- With two turns, over 1000 ohms impedance at 100 MHz
- Will fit behind an RJ45 jack
- High continuous operating current carrying capability
- 4, 6 or 8 line parts
- Parts available in broad band and high frequency materials

## Applications:

- Cost sensitive designs (no need for an expensive filtered connector)
- Filtering DC power on PC boards, especially in applications of greater than 3.0 amperes
- Filtering common mode EMI on high speed differential lines such as network and SCSI subsystems
- Low normal mode distortion provides excellent response in telecom applications

## Test Specifications:

•HP4396A (100KHz - 1.8 GHz) or HP8753 (to 6 GHz) Network/Spectrum Analyzer •HP43961A Impedance Test Kit •HP16192A Test Fixture or Inter-Continental Microwave custom fixtures •HP16200A DC Bias Adapter •Philips PM2811 DC Power Supply •Ambient Temperature 23.5°C ± 2° •Bandwidth 3 kHz •Sweep Time 423 ms •Impedance is rated at ± 25% @100MHz •Board level components are rated up to a maximum of 75 volts •Maximum current ratings are determined by testing to a maximum temperature rise of 40°C with continuous operating current. Part performance is shown with curves for Common, Open and Normal Mode Impedances measured along two conductors. **Common Mode** Impedance is the impedance of EMI noise conducted in the same direction along two conductors. **Open Circuit** Impedance is the impedance measured across a single leg of the common mode choke.

**Normal Mode** Impedance is the total impedance to the differential circuit (both out and back).

PART NUMBERING SYSTEM					
<u>CM</u>	<u>3032</u>	<u>V</u>	<u>201</u>	<u>R</u>	<u>00</u>
PRODUCT SERIES CODE	PART SIZE CODE	RATED CURRENT CODE	IMPEDANCE VALUE CODE	PACKAGING CODE	ADDITIONAL DESCRIPTION

Ambient Operating Temperature Range: -55° C to +125° C

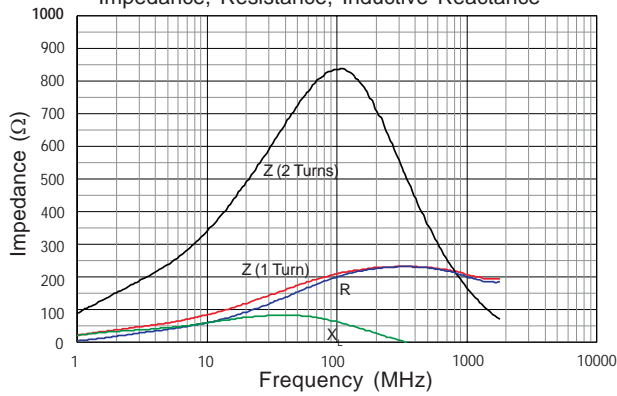
PART NUMBER	Fig #	# of Single Lines	A mm (inches)	B mm (inches)	C mm (inches)	E1 mm (inches)	E mm (inches)	IMPEDANCE (Z) TYPICAL OHMS @			DCR MAX OHMS	RATED I MAX (continuous) mA
								100MHz	500MHz	1GHz		
CM3032V201R-00	3	4	7.62 ± 0.30 (0.300 ± 0.012)	8.13 ± 0.15 (0.320 ± 0.006)	9.45 ± 0.25 (0.372 ± 0.010)	1.27 ± 0.08 (0.050 ± 0.003)	2.03 ± 0.08 (0.080 ± 0.003)	200	230	205	0.010	8,000
CM4732V201R-00	2	6	11.94 ± 0.30 (0.470 ± 0.012)	8.13 ± 0.15 (0.320 ± 0.006)	9.45 ± 0.25 (0.372 ± 0.010)	1.27 ± 0.08 (0.050 ± 0.003)	2.03 ± 0.08 (0.080 ± 0.003)	200	230	205	0.010	8,000
CM6032V201R-00	1	8	15.24 ± 0.30 (0.600 ± 0.012)	8.13 ± 0.15 (0.320 ± 0.006)	9.45 ± 0.25 (0.372 ± 0.010)	1.27 ± 0.08 (0.050 ± 0.003)	2.03 ± 0.08 (0.080 ± 0.003)	200	230	205	0.010	8,000
CM3032V301R-00	3	4	7.62 ± 0.30 (0.300 ± 0.012)	8.13 ± 0.15 (0.320 ± 0.006)	14.48 ± 0.25 (0.570 ± 0.010)	1.27 ± 0.08 (0.050 ± 0.003)	2.03 ± 0.08 (0.080 ± 0.003)	300	300	240	0.010	8,000
* CM4732V301R-00	2	6	11.94 ± 0.30 (0.470 ± 0.012)	8.13 ± 0.15 (0.320 ± 0.006)	14.48 ± 0.25 (0.570 ± 0.010)	1.27 ± 0.08 (0.050 ± 0.003)	2.03 ± 0.08 (0.080 ± 0.003)	300	300	240	0.010	8,000
* CM6032V301R-00	1	8	15.24 ± 0.30 (0.600 ± 0.012)	8.13 ± 0.15 (0.320 ± 0.006)	14.48 ± 0.25 (0.570 ± 0.010)	1.27 ± 0.08 (0.050 ± 0.003)	2.03 ± 0.08 (0.080 ± 0.003)	300	300	240	0.010	8,000
* CM3032V131R-00	3	4	7.62 ± 0.30 (0.300 ± 0.012)	8.13 ± 0.15 (0.320 ± 0.006)	9.45 ± 0.25 (0.372 ± 0.010)	1.27 ± 0.08 (0.050 ± 0.003)	2.03 ± 0.08 (0.080 ± 0.003)	130	260	250	0.010	8,000
* CM4732V131R-00	2	6	11.94 ± 0.30 (0.470 ± 0.012)	8.13 ± 0.15 (0.320 ± 0.006)	9.45 ± 0.25 (0.372 ± 0.010)	1.27 ± 0.08 (0.050 ± 0.003)	2.03 ± 0.08 (0.080 ± 0.003)	130	260	250	0.010	8,000
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PART NUMBER	Fig #	# of Single Lines	A mm (inches)	B mm (inches)	C mm (inches)	E1 mm (inches)	E mm (inches)	IMPEDANCE (Z) TYPICAL OHMS @			DCR MAX OHMS	RATED I MAX (continuous) mA
								100MHz	500MHz	1GHz		
* CM3032V221R-00	3	4	7.62 ± 0.30 (0.300 ± 0.012)	8.13 ± 0.15 (0.320 ± 0.006)	14.48 ± 0.25 (0.570 ± 0.010)	1.27 ± 0.08 (0.050 ± 0.003)	2.03 ± 0.08 (0.080 ± 0.003)	220	300	190	0.010	8,000
* CM4732V221R-00	2	6	11.94 ± 0.30 (0.470 ± 0.012)	8.13 ± 0.15 (0.320 ± 0.006)	14.48 ± 0.25 (0.570 ± 0.010)	1.27 ± 0.08 (0.050 ± 0.003)	2.03 ± 0.08 (0.080 ± 0.003)	220	300	190	0.010	8,000
* CM6032V221R-00	1	8	15.24 ± 0.30 (0.600 ± 0.012)	8.13 ± 0.15 (0.320 ± 0.006)	14.48 ± 0.25 (0.570 ± 0.010)	1.27 ± 0.08 (0.050 ± 0.003)	2.03 ± 0.08 (0.080 ± 0.003)	220	300	190	0.010	8,000

\*High Frequency Material

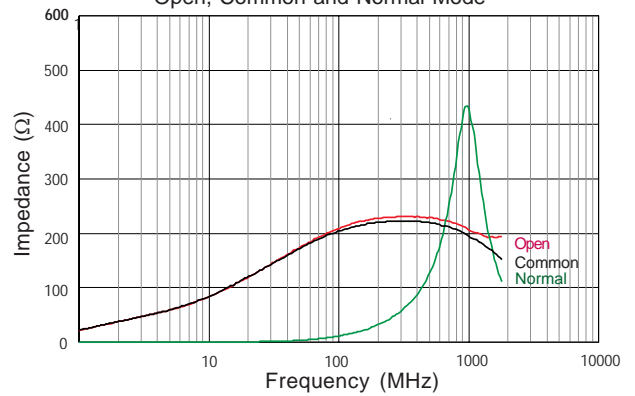
CM3032V201R-00, CM4732V201R-00 & CM6032V201R-00

Z (1 & 2 Turn), R, X<sub>L</sub> vs. Frequency  
Impedance, Resistance, Inductive Reactance



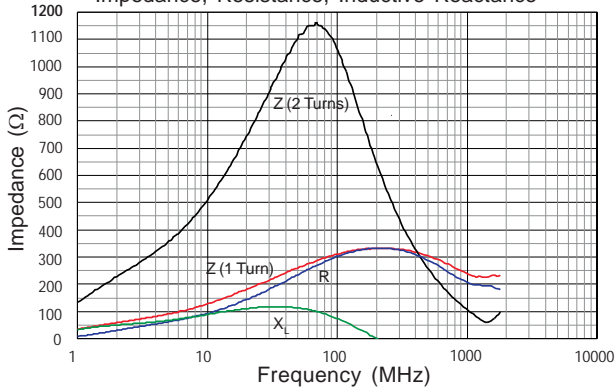
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Z vs. Frequency  
Open, Common and Normal Mode



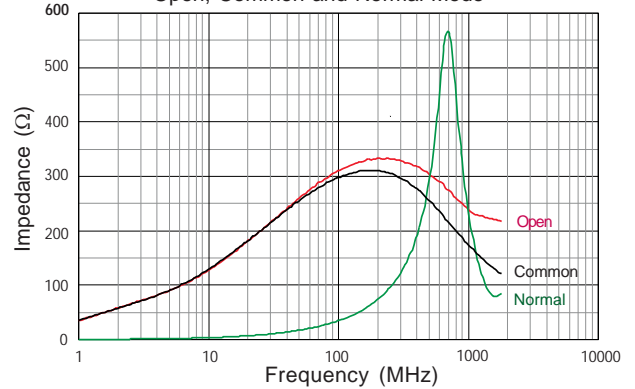
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Z (1 & 2 Turn), R, X<sub>L</sub> vs. Frequency  
Impedance, Resistance, Inductive Reactance

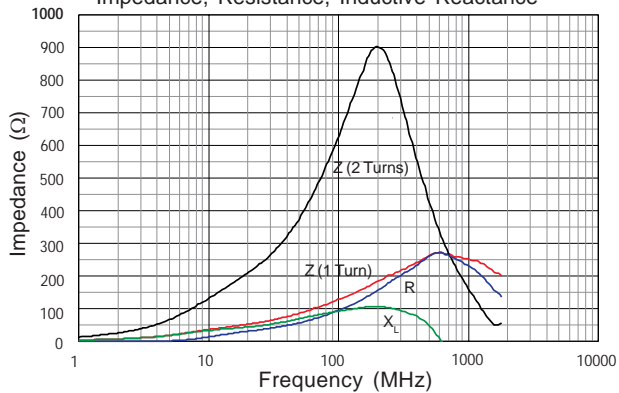


CM3032V301R-00, CM4732V301R-00 & CM6032V301R-00

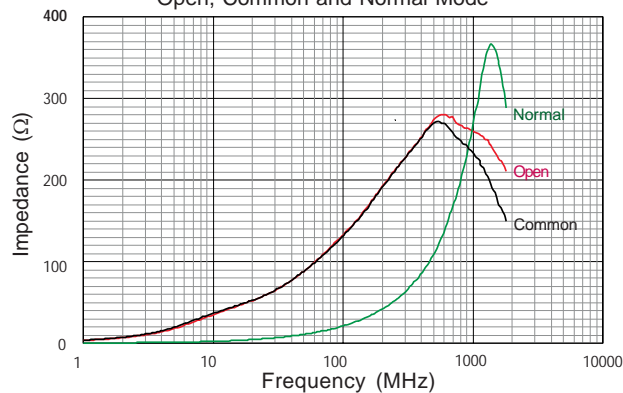
Z vs. Frequency  
Open, Common and Normal Mode



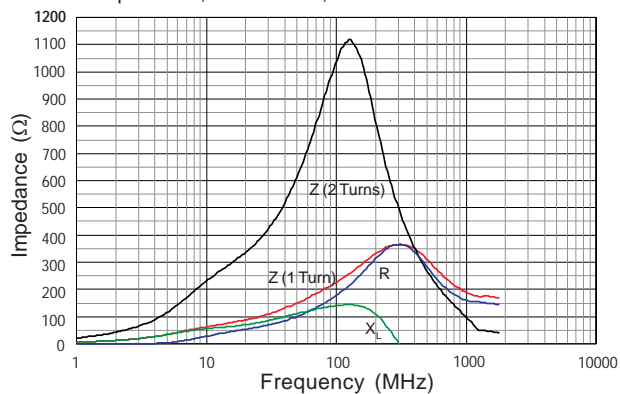
**CM3032V131R-00, CM4732V131R-00 & CM6032V131R-00**  
 Z (1 & 2 Turn), R,  $X_L$  vs. Frequency  
 Impedance, Resistance, Inductive Reactance



**CM3032V131R-00, CM4732V131R-00 & CM6032V131R-00**  
 Z vs. Frequency  
 Open, Common and Normal Mode



**CM3032V221R-00, CM4732V221R-00 & CM6032V221R-00**  
 Z (1 & 2 Turn), R,  $X_L$  vs. Frequency  
 Impedance, Resistance, Inductive Reactance



**CM3032V221R-00, CM4732V221R-00 & CM6032V221R-00**  
 Z vs. Frequency  
 Open, Common and Normal Mode

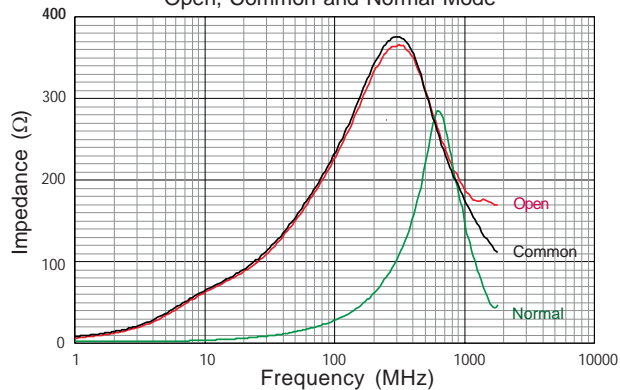


Figure 1

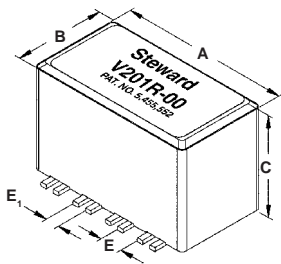


Figure 2

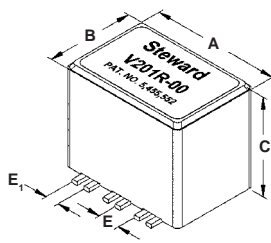
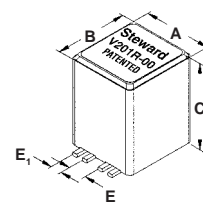


Figure 3



Land Patterns for Reflow Soldering

Figure 1

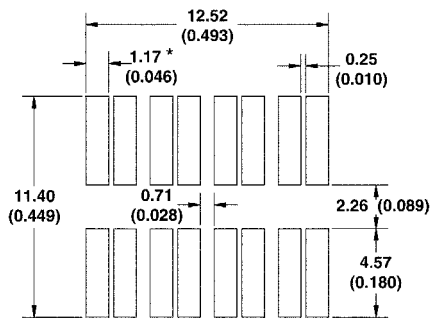


Figure 2

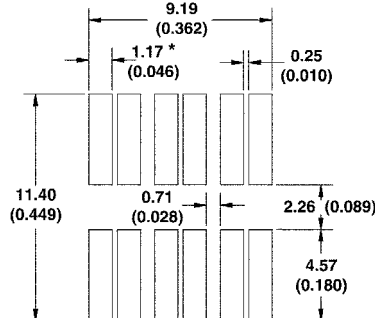
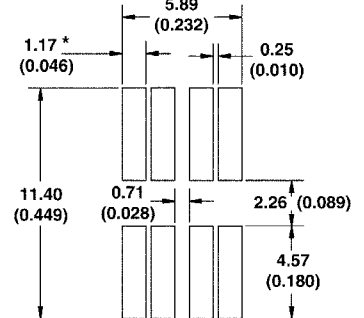
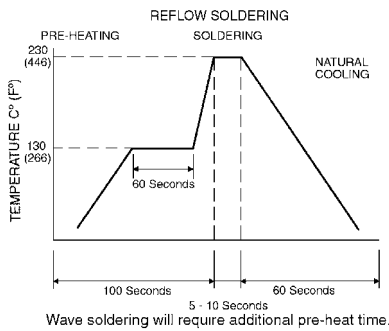


Figure 3



\* (For wave soldering, add 0.076mm (0.030") to this dimension.)

Recommended Soldering Conditions



One Turn / Two Turn Equivalent Circuits

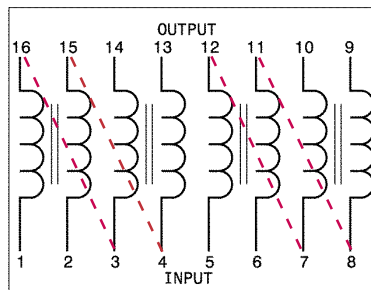


Figure 1

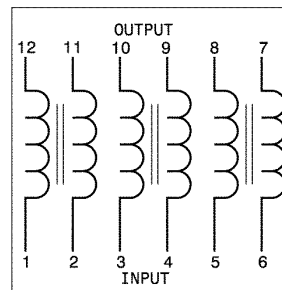


Figure 2

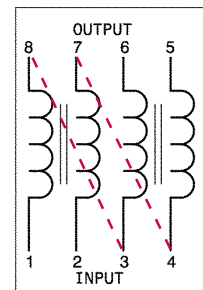


Figure 3