

PRODUCT SPECIFICATION

Introduction

Electrical Characteristics

The unique technology of RF Immunity enables the integration of a variety of filter types and a diversity of transient protections, into a single filtered connector.

This section of the catalog presents the electrical characteristic of the available filters and transient protections and their filter codes. If you select identical filters, transient protections or a combination of these two for all contacts, fill in the filter code into the P/N

The filter codes are applicable only when the same filter type is used for all the connector contacts.

If selected, a customized combination of filters and/or transient protections cannot be coded for the P/N by the customer. For such P/N, replace the P/N filter code with "XXXX" and contact the sales department.

Five filter types (C, C 2 , L, J, and π) and two transient protection types (0.1J, and 0.3J), and the combinations of all filter types with all transient protection types are characterized in this section. For explanations regarding the selection of the most appropriate filter, please refer to the Design Notes (page 71).

General electrical characteristics

Working Voltage(WV) [Vbc]	A variety of operating voltages can be selected, from 6.3Vpc. up to 2000Vpc. Note that the operating voltage limits the capacitance of the filter. Both the filter capacitance and operating voltage correlate to the selected insert arrangement of the connector. Refer to the Electrical Characteristics V/S Insert Arrangement section (page 28)								
Dielectric Withstanding	W	/V<200VDc		DWV - 250%					
Voltage (DWV)	201 VD	c <wv<500vpc< th=""><th></th><th colspan="4">DWV - 150%</th></wv<500vpc<>		DWV - 150%					
voitage (Divv)	w	V>500Vpc		DWV - 120%					
Insulation Resistance		25°c			500 Ω F				
ilisulation resistance		125°C		50Ω F					
1[A]	#22 Contact	#20 Contact	#16 Contact		#12 Contact	# 8 Contact			
ΠΑJ	5	7.5	1:	3	23	35			

The structure of this section and the use of the following Frequency Range vs. Filter Type and Page Number table and of the Contents of Section, enables the designer to quickly and easily select the correct filter, transient protection or the combination of both

Frequency Range vs. Filter Type and Page Number

	Filter Cutoff		Pa	ge	
Frequency Range	Frequency	C Filter (1) (2)	C ² Filter (1) (2)	L&JFilter (1) (2)	Π Filter (1)
VFH and UHF 300MHz $\leq f \leq$ 3Ghz	<i>f</i> ∞ ≥ 30MHz	33	38	43	48
HF 3MHz ≤ f ≤ 30MHz	f∞ ≥ 3MHz	34	39	44	49
	್ಯ ≥ 300KHz	35	40	45	50
LF 30KHz≤ f ≤ 300KHz	<i>f</i> co ≥ 30KHz	36	41	46	51
AUDIO f ≤ 30KHz	<i>f</i> ∞ < 30KHz	37	42	47	52

Note: For other filter topologies, e.g. Double L&J, H i (Double TI, T and Double T, contact the sales department.

- (1) Refer to the Design Notes (page 71) for explanation regarding the differences between these filter topologies and for equivalent circuits.
- (2) Both C and C² type filter have a C type topology. The C ²type filter provides higher attenuation.
- (3) J type filters have the same topology as L type filter. Refer to the illustrated description on page 75 for details related to the differences between the two.

Content of Section

C Filter	Pages 33-37
C ² Filter	Pages 38-42
L&J Filter	Pages 43-47
Π _{Filter}	Pages 48-52
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0.3J Bidirectional Transient Protection	Page 53
C Filter Combined with 0.1J Bidirectional Transient Protection	Page 54
C ² Filter Combined with 0.1J Bidirectional Transient Protection	Page 55
L&J Filter Combined with 0.1J Bidirectional Transient Protection	Page 56
Π Filter Combined with 0.1J Bidirectional Transient Protection	Page 57
C Filter Combined with 0.3J Bidirectional Transient Protection	Page 58
C ² filter Combined with 0.3J Bidirectional Transient Protection	Page 59
L&J Filter Combined with 0.3J Bidirectional Transient Protection	Page 60
πFilter Combined with 0.3J Bidirectional Transient Protection	Page 61

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C Filter

Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
<i>f</i> ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz ≤ <i>f</i> ≤ 30MHz	30MHz ≤ <i>f</i> ≤ 300MHz	300MHz ≤ <i>f</i> ≤ 3GHz

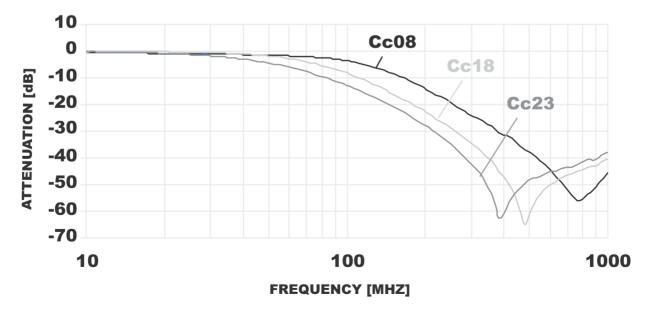
Typical cut-off frequency (-3dB) €o ≥ 30MHz.

Minimum Attenuation

F:14	Typical	fco	Min. Attenuation [dB] vs. Frequency [MHz] (1)										
Filter Code	Cap. [pF] (2)	[MHZ] Typical (3)	1	5	10	30	50	100	300	500	1000		
Cc08	47	92	0	0	0	0	0	0	19	32	37		
Cc18	120	62	0	0	0	0	0	2	27	54	30		
Cc23	180	40	0	0	0	0	1	7	37	43	29		

- (1) Measured in 50 $\,\Omega$ system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ±20%. For other capacitor values, contact the sales department
- (3) For estimation of the filter cut-off frequency in non-50 Ω system, please refer to the design notes.

Typical measured filter attenuation



Note: All filter characteristics subject to change without prior notice.



C Filter

Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
f ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz ≤ <i>f</i> ≤ 30MHz	30MHz <u><</u> <i>f</i> ≤ 300MHz	300MHz ≤ <i>f</i> ≤ 3GHz

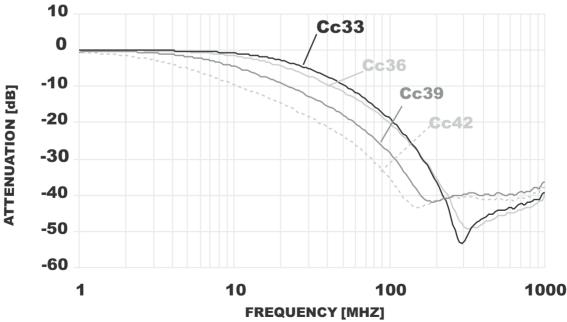
Typical cut-off frequency (-3dB) fco > 3MHz.

Minimum Attenuation

Filter Typical fcc	$f_{\mathbf{co}}$	Min. Attenuation [dB] vs. Frequency [MHz] (1)									
Code	Cap. [pF] (2)	[MHZ] Typical (3)	1	5	10	30	50	100	300	500	1000
Cc33	330	20.00	0	0	0	2	6	13	44	37	28
Cc36	470	15.20	0	0	0	4	8	14	43	40	31
Cc39	1000	7.30	0	0	1	9	14	22	34	33	26
Cc42	2200	3.19	0	2	6	15	20	30	34	34	28

- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department
- (3) For estimation of the filter cut-off frequency in non-50Ωsystem, please refer to the design notes.

Typical measured filter attenuation



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C Filter

Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
<i>f</i> ≤ 30KHz	30KHz ≤ f ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz ≤ <i>f</i> ≤30MHz	30MHz <i>≤f</i> ≤ 300MHz	300MHz ≤ f ≤ 3GHz

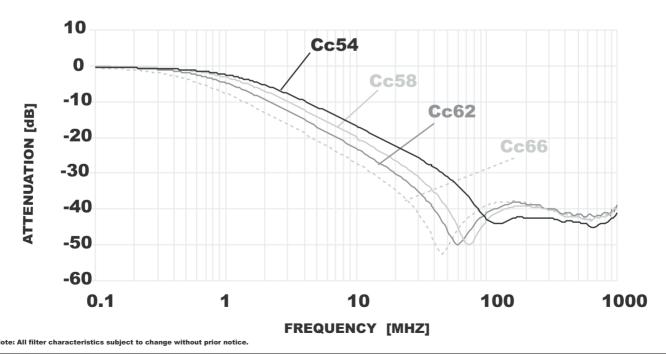
Typical cut-off frequency (-3dB) &o > 300KHz.

Minimum Attenuation

Filter	Typical	$f_{\mathbf{co}}$	Min. Attenuation [dB] vs. Frequency [MHz] (1)										
Code	Cap. [nF] (2)	[MHZ] Typical (3)	1	5	10	30	50	100	300	500	1000		
Cc54	4.7	1.180	0	9	13	22	28	37	37	37	33		
Cc58	6.8	0.925	0	11	16	27	35	37	34	36	30		
Cc62	10	0.695	2	15	20	32	43	36	35	36	30		
Cc66	15	0.420	5	18	23	37	46	32	33	34	28		

- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department
- (3) For estimation of the filter cut-off frequency in non-50Ωsystem, please refer to the design notes.

Typical measured filter attenuation



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C Filter

Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
f ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz ≤ f≤ 30MHz	30MHz <i>≤f</i> ≤ 300MHz	300MHz ≤ f ≤ 3GHz

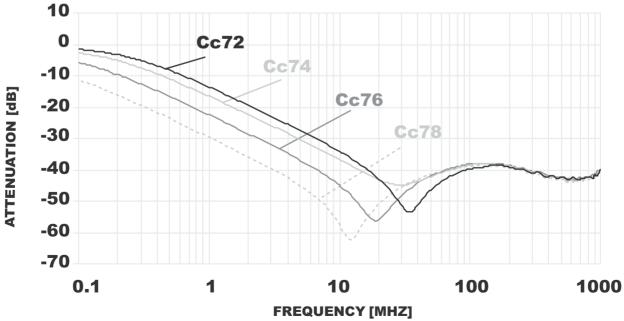
Typical cut-off frequency (-3dB) √co ≥ 30KHz.

Minimum Attenuation

Filter	Typical	$f_{\mathbf{co}}$	Min. Attenuation [dB] vs. Frequency [MHz] (1)										
Code	Cap. [nF] (2)	[Khz] Typical (3)	1	5	10	30	50	100	300	500	1000		
Cc72	33	182	11	25	31	48	43	34	36	37	32		
Cc74	47	109	14	28	33	40	38	32	34	36	31		
Cc76	100	63	20	34	40	43	38	33	35	37	32		
Cc78	220	30	27	42	53	41	38	33	35	36	31		

- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department
- (3) For estimation of the filter cut-off frequency in non-50 Ω system, please refer to the design notes.

Typical measured filter attenuation



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C Filter

Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
f ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz ≤ <i>f</i> ≤ 30MHz	30MHz ≤ <i>f</i> ≤ 300MHz	300MHz ≤ <i>f</i> ≤ 3GHz

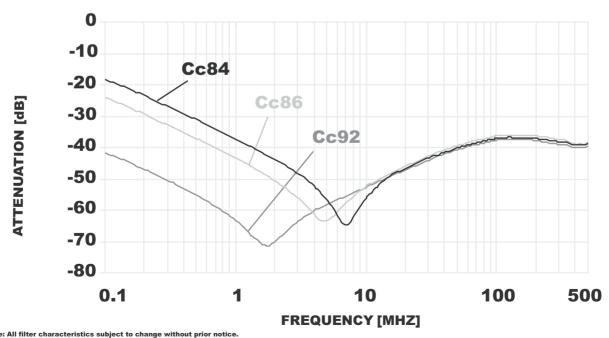
Typical cut-off frequency (-3dB) √co ≥ 30KHz.

Minimum Attenuation

File	Typical	$f_{\mathbf{co}}$			Min. Att	tenuation [d	B] vs. Frequ	ıency [MHz]	ncy [MHz] (1)		
Filter Code	Cap.	[Khz] Typical (3)	1	5	10	30	50	100	300	500	
Cc84	0.47	12.4	35	54	53	40	37	32	33	33	
Cc86	1	6.2	41	59	47	38	34	29	30	30	
Cc92	10	0.67	61	54	48	40	36	32	33	33	

- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department
- (3) For estimation of the filter cut-off frequency in non-50 ∩ system, please refer to the design notes.

Typical measured filter attenuation



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C² Filter

Electrical Characteristics

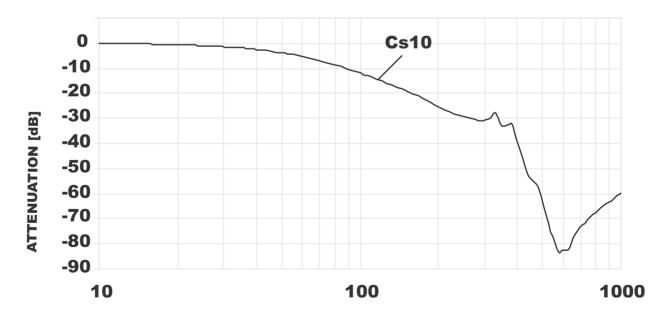
Audio	LF	MF	HF	VHF	UHF
f ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz ≤ <i>f</i> ≤ 30MHz	30MHz ≤ <i>f</i> ≤ 300MHz	300MHz ≤ <i>f</i> ≤ 3GHz

Typical cut-off frequency (-3dB) √co ≥ 30MHz.

		ſ			Min	. Attenuatio	n [dB] vs. F	requency [N	MHz] (1)		
Filter Code	Typical Cap. [pF] (2)	/co [MHZ] Typical (3)	1	5	10	30	50	100	300	500	1000
Cs10	164p	41.6	0	0	0	0	0	6	24	57	52

- (1) Measured in 50 ∩ system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department
- (3) For estimation of the filter cut-off frequency in non-50 ∩ system, please refer to the design notes.

Typical measured filter attenuation



FREQUENCY [MHZ]

C² Filter

Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
<i>f</i> ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz <u><</u> <i>f</i> ≤ 3MHz	3MHz <u><</u> <i>f</i> ≤ 30MHz	30MHz ≤ <i>f</i> ≤ 300MHz	300MHz ≤ <i>f</i> ≤ 3GHz

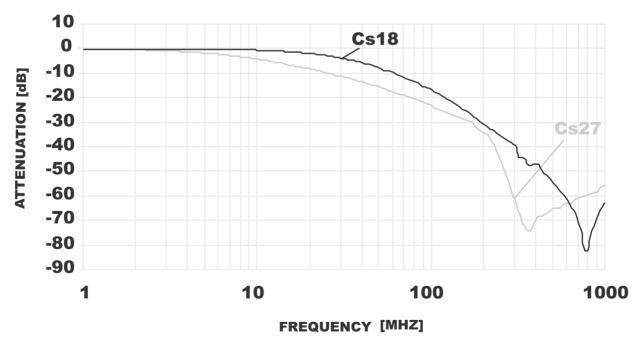
Typical cut-off frequency (-3dB) &o ≥3MHz.

Minimum Attenuation

Filter	Typical	$f_{\mathbf{co}}$	Min. Attenuation [dB] vs. Frequency [MHz] (1)								
Code	Cap. [pF] (2)	[Mhz] Typical (3)	1	5	10	30	50	100	300	500	1000
Cc18	267	24.8	0	0	0	0	4	11	34	45	57
Cc23	660	9.35	0	0	0	7	12	18	62	57	50
Cc27	940	7.35	0	0	1	7	12	17	56	57	50

- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department
- (3) For estimation of the filter cut-off frequency in non-50 ∩ system, please refer to the design notes.

Typical measured filter attenuation



PRODUCT SPECIFICATION

C² Filter

Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
<i>f</i> ≤ 30KHz	30KHz ≤ f ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz <u><</u> <i>f</i> ≤ 30MHz	$30 \mathrm{MHz} \leq f \leq 300 \mathrm{MHz}$	300MHz ≤ <i>f</i> ≤ 3GHz

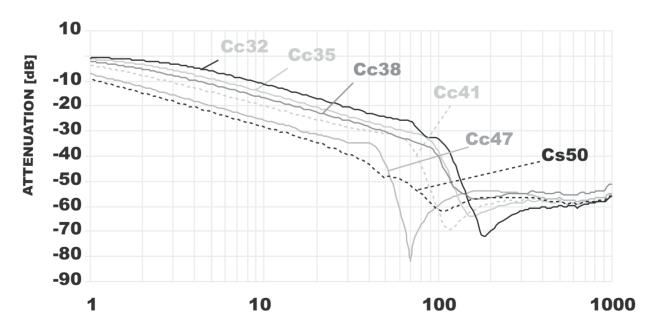
Typical cut-off frequency (-3dB) £o ≥300KHz.

Minimum Attenuation

F114	Typical	$f_{\mathbf{co}}$			Min. Att	tenuation [d	B] vs. Frequ	iency [MHz]	ncy [MHz] (1)					
Filter Code	Cap. [nF] (2)	[Mhz] Typical (3)	1	5	10	30	50	100	300	500	1000			
Cs32	2.4	2.77	0	3	7	16	21	25	56	53	49			
Cs35	3.6	1.8	0	7	11	20	24	32	51	50	50			
Cs38	5.7	1.23	0	9	13	22	27	33	48	47	43			
Cs41	7.8	0.79	1	12	16	24	27	55	51	52	50			
Cs47	13.6	0.450	5	17	22	30	39	53	49	51	49			
Cs50	19.7	0.330	7	20	25	34	44	55	50	51	49			

- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department
- (3) For estimation of the filter cut-off frequency in non-50 ∩ system, please refer to the design notes.

Typical measured filter attenuation



Note: All filter characteristics subject to change without prior notice.

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C² Filter

Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
<i>f</i> ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz ≤ f≤ 30MHz	30MHz <i>≤ f</i> ≤ 300MHz	300MHz ≤ <i>f</i> ≤ 3GHz

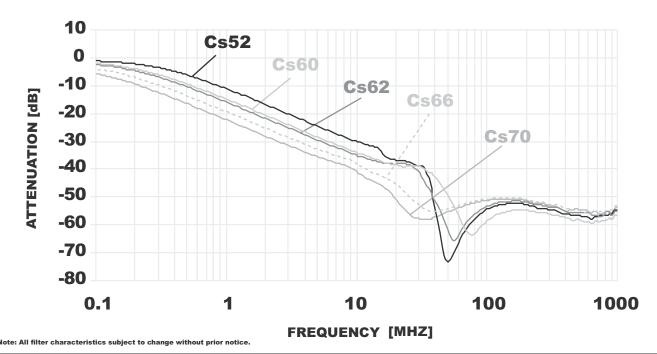
Typical cut-off frequency (-3dB) $f_{\text{co}} \ge 30\text{KHz}$.

Minimum Attenuation

Filter	Typical	$f_{\mathbf{co}}$	Min. Attenuation [dB] vs. Frequency [MHz] (1)									
Code	Cap. [nF] (2)	[Khz] Typical (3)	1	5	10	30	50	100	300	500	1000	
Cs52	25	256	9	22	27	35	60	49	49	51	49	
Cs60	39.8	142	12	26	31	36	45	53	50	52	50	
Cs62	43	125	13	27	31	37	56	48	48	49	48	
Cs66	66	98	17	30	34	49	51	45	47	49	48	
Cs70	94	94	20	33	37	50	50	45	47	48	46	

- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department.
- (3) For estimation of the filter cut-off frequency in non-50 ∩ system, please refer to the design notes.

Typical measured filter attenuation



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C² Filter

Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
<i>f</i> ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz ≤ <i>f</i> ≤ 30MHz	30MHz <i>≤ f</i> ≤ 300MHz	300MHz ≤ <i>f</i> ≤ 3GHz

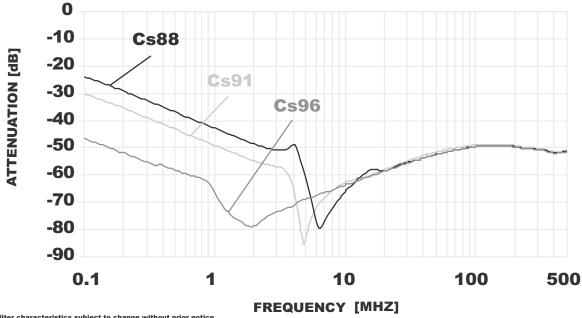
Typical cut-off frequency (-3dB) f_{co} < 30KHz.

Minimum Attenuation

Ciltor	Typical	f_{co}		M	lin. Attenua	tion [dB] vs	. Frequency	y [MHz] (1)	IHz] (1)	
Filter Code	Cap. [μF] (2)	[Khz] Typical (3)	1	5	10	30	50	100	300	500 44 42
Cs88	0.94	6.5	40	54	61	50	47	42	44	44
Cs91	2	3.1	46	73	57	49	46	41	42	42
Cs96	20	0.35	62	65	59	51	48	43	44	45

- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department.
- (3) For estimation of the filter cut-off frequency in non-50 Ω system, please refer to the design notes.

Typical measured filter attenuation



Note: All filter characteristics subject to change without prior notice.



Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
<i>f</i> ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz ≤ <i>f</i> ≤ 30MHz	30MHz ≤ <i>f</i> ≤ 300MHz	300MHz ≤ <i>f</i> ≤ 3GHz

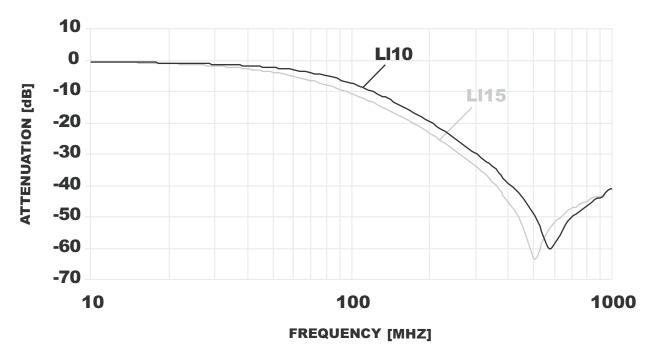
Typical cut-off frequency (-3dB) fco > 30MHz.

Minimum Attenuation

F:14	Typical	f_{co}	Min. Attenuation [dB] vs. Frequency [MHz] (1)								
Filter Code (*)	Cap. [pF] (2)	ap. [Mhz] oF] Typical	1	5	10	30	50	`100	300	500	1000
LI10	82	54.3	0	0	0	0	0	2	24	42	31
LI15	120	42.5	0	0	0	0	0	5	29	45	31

- (*) For J Filter, replace LL with JJ
- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department.
- (3) For estimation of the filter cut-off frequency in non-50 Ω system, please refer to the design notes.

Typical measured filter attenuation





Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
<i>f</i> ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz <u><</u> <i>f</i> ≤ 3MHz	3MHz <u><</u> <i>f</i> ≤ 30MHz	30MHz ≤ <i>f</i> ≤ 300MHz	300MHz ≤ <i>f</i> ≤ 3GHz

Typical cut-off frequency (-3dB) $f_{co} \ge 3$ MHz.

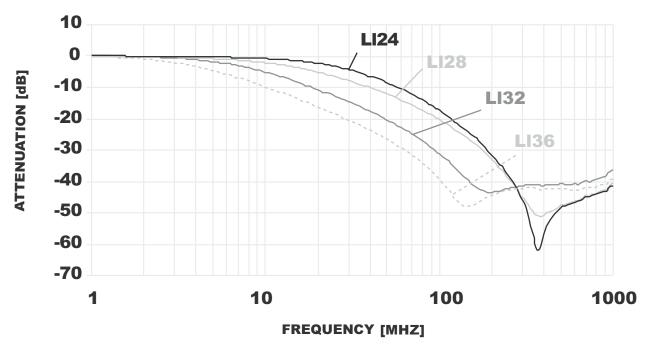
Minimum Attenuation

		f	Min. Attenuation [dB] vs. Frequency [MHz] (1)								
Filter Code (*)	Typical Cap. [pF] (2)	√co [Mhz] Typical (3)	1	5	10	30	50	100	300	500	1000
LI24	220	23.3	0	0	0	1	5	12	40	42	33
LI28	470	12.6	0	0	0	4	8	14	38	40	31
LI32	1000	6.85	0	0	1	11	17	25	36	35	28
LI36	1800	3.7	0	2	6	17	23	33	37	34	31

(*) For J Filter, replace LL with JJ

- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department.
- (3) For estimation of the filter cut-off frequency in non-50 Ω system, please refer to the design notes.

Typical measured filter attenuation





Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
f ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz ≤ <i>f</i> ≤30MHz	30MHz <i>≤f</i> ≤ 300MHz	300MHz ≤ <i>f</i> ≤ 3GHz

Typical cut-off frequency (-3dB) fco \geq 300KHz.

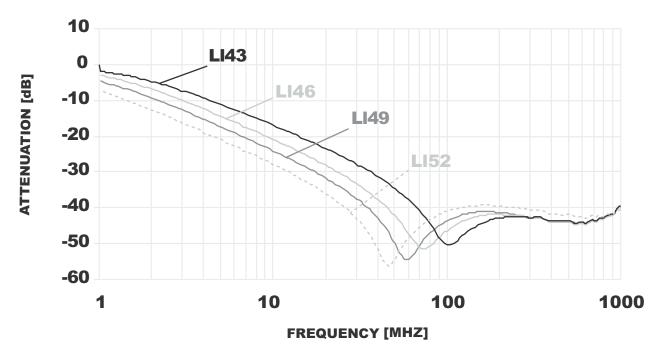
Minimum Attenuation

F'14	Typical	$f_{\mathbf{co}}$	Min. Attenuation [dB] vs. Frequency [MHz] (1)								
Filter Code (*)	Cap. [nF] (2)	[Mhz] Typical (3)	1	5	10	30	50	100	300	500	1000
LI43	4.7	1.4	0	8	13	24	31	44	37	38	31
LI46	6.8	0.975	0	12	17	30	39	41	37	38	31
LI49	10	0.690	2	15	21	34	44	38	36	38	30
LI52	15	0.46	5	18	24	39	50	36	35	36	31

(*) For J Filter, replace LL with JJ

- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department.
- (3) For estimation of the filter cut-off frequency in non-50 Ω system, please refer to the design notes.

Typical measured filter attenuation





Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
f ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz ≤ <i>f</i> ≤30MHz	30MHz <i>≤f</i> ≤ 300MHz	300MHz ≤ <i>f</i> ≤ 3GHz

Typical cut-off frequency (-3dB) fco \geq 30KHz.

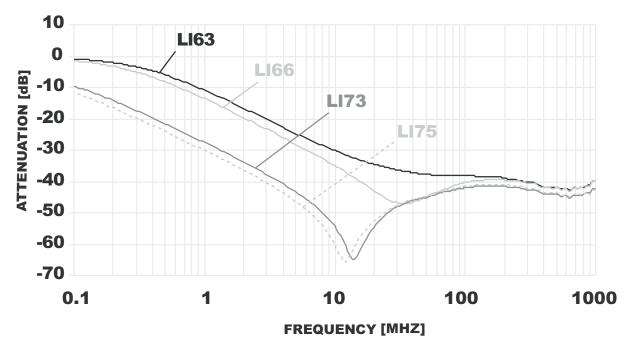
Minimum Attenuation

	Typical	$f_{\mathbf{co}}$	Min. Attenuation [dB] vs. Frequency [MHz] (1)								
Filter Code (*)	Cap. [nF] (2)	[Khz] Typical (3)	1	5	10	30	50	100	300	500	1000
LI63	22	265	8	22	25	30	31	31	34	36	30
LI66	33	179	11	26	31	42	41	35	35	37	31
LI73	180	38	25	40	50	44	40	35	36	37	34
LI75	220	31	28	44	56	43	40	35	36	38	32

(*) For J Filter, replace LL with JJ

- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department.
- (3) For estimation of the filter cut-off frequency in non-50 Ω system, please refer to the design notes.

Typical measured filter attenuation





Electrical Characteristics

	Audio	LF	MF	HF	VHF	UHF	
ĺ	<i>f</i> ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz ≤ <i>f</i> ≤ 30MHz	30MHz ≤ <i>f</i> ≤ 300MHz	300MHz ≤ f ≤ 3GHz	

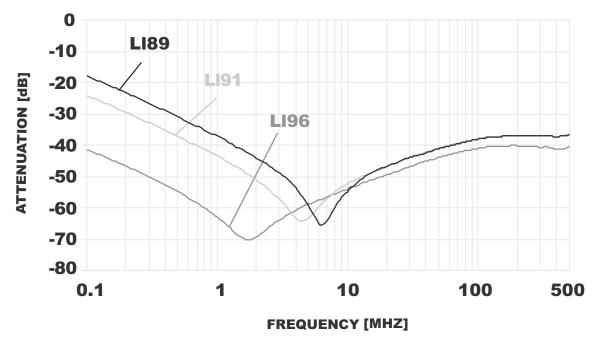
Typical cut-off frequency (-3dB) $f_{co} \le 30$ KHz.

Minimum Attenuation

		$f_{\mathbf{co}}$		Min. Attenuation [dB] vs. Frequency [MHz] (1)								
Filter Code (*)	Typical Cap. [μF] (2)	[Khz] Typical (3)	1	5	10	30	50	100	300	2 31 1 31		
LI89	0.47	11.5	35	55	51	40	38	33	32	31		
LI91	1	6.2	41	60	40	40	37	32	31	31		
LI96	10	0.68	60	55	49	42	39	34	34	33		

- (*) For J Filter, replace LL with JJ
- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department.
- (3) For estimation of the filter cut-off frequency in non-50 Ω system, please refer to the design notes.

Typical measured filter attenuation



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π Filter

Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
<i>f</i> ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz ≤ <i>f</i> ≤ 30MHz	30MHz ≤ <i>f</i> ≤ 300MHz	300MHz ≤ <i>f</i> ≤ 3GHz

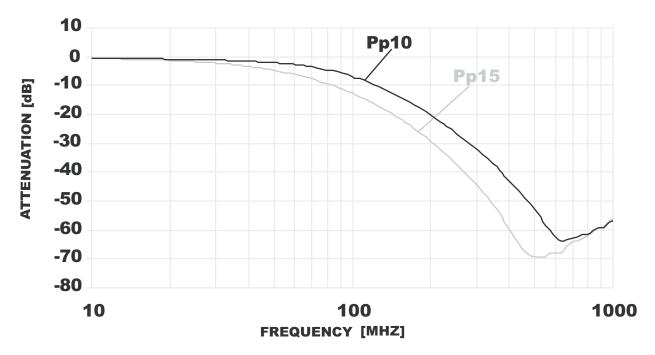
Typical cut-off frequency (-3dB) $f_{co} \ge 30$ MHz.

Minimum Attenuation

- 114	Tomical	f			Min	. Attenuatio	on [dB] vs. F	requency [l	MHz] (1)		
Filter Code	Typical Cap. [pF] (2)	∫co [Khz] Typical (3)	1	5	10	30	50	100	300	500	1000
Pp10	94	62.7	0	0	0	0	0	1	26	46	52
Ppl15	164	36.2	0	0	0	0	1	7	39	62	51

- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department.
- (3) For estimation of the filter cut-off frequency in non-50 Ω system, please refer to the design notes.

Typical measured filter attenuation





π Filter

Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
<i>f</i> ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz <u><</u> <i>f</i> ≤ 3MHz	3MHz <u><</u> <i>f</i> ≤ 30MHz	30MHz ≤ <i>f</i> ≤ 300MHz	300MHz ≤ <i>f</i> ≤ 3GHz

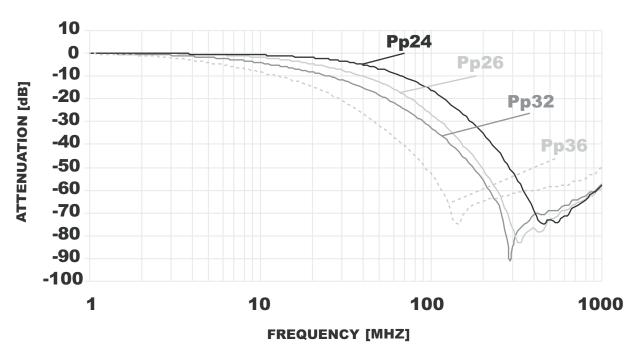
Typical cut-off frequency (-3dB) $f_{\text{co}} \ge 3\text{MHz}$.

Minimum Attenuation

F:14	Typical	$f_{\mathbf{co}}$	Min. Attenuation [dB] vs. Frequency [MHz] (1)									
Filter Code	Cap. [pF] (2)	[Mhz] Typical (3)	1	5	10	30	50	100	300	500	1000	
Pp24	240	28.1	0	0	0	0	3	10	45	63	50	
Pp28	440	14.5	0	0	0	4	9	20	67	65	54	
Pp32	940	7.7	0	0	1	8	15	27	66	60	46	
Pp36	2000	3.9	0	2	5	17	28	47	56	53	45	

- (1) Measured in 50 $\!\Omega$ system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department.
- (3) For estimation of the filter cut-off frequency in non-50 Ω system, please refer to the design notes.

Typical measured filter attenuation



Note: All filter characteristics subject to change without prior notice.



icronics | PRODUCT SPECIFICATION

π Filter

Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
f ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz≤ <i>f</i> ≤30MHz	30MHz ≤ <i>f</i> ≤ 300MHz	300MHz ≤ <i>f</i> ≤ 3GHz

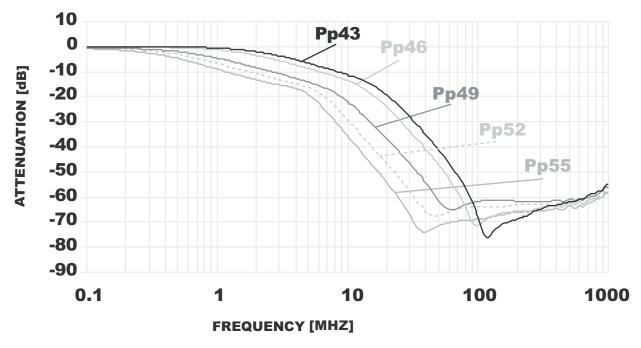
Typical cut-off frequency (-3dB) $f_{co} \ge 300 \text{KHz}$.

Minimum Attenuation

	Tomical	f		Min. Attenuation [dB] vs. Frequency [MHz] (1)										
Filter Code	Typical Cap. [nF] (2)	∫co [Mhz] Typical (3)	1	5	10	30	50	100	300	500	1000			
Pp43	3	2.5	0	4	7	23	35	58	57	54	47			
Pp46	4.4	1.74	0	6	10	30	44	55	58	55	52			
Pp49	9.4	0.677	2	11	18	43	57	55	56	55	49			
Pp52	13.6	0.470	4	14	25	54	62	57	57	56	48			
Pp55	20	0.325	6	16	32	62	66	60	58	57	49			

- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department.
- (3) For estimation of the filter cut-off frequency in non-50 Ω system, please refer to the design notes.

Typical measured filter attenuation



Note: All filter characteristics subject to change without prior notice.

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π Filter

Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
<i>f</i> ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz ≤ <i>f</i> ≤ 30MHz	30MHz <i>≤f</i> ≤ 300MHz	300MHz ≤ f ≤ 3GHz

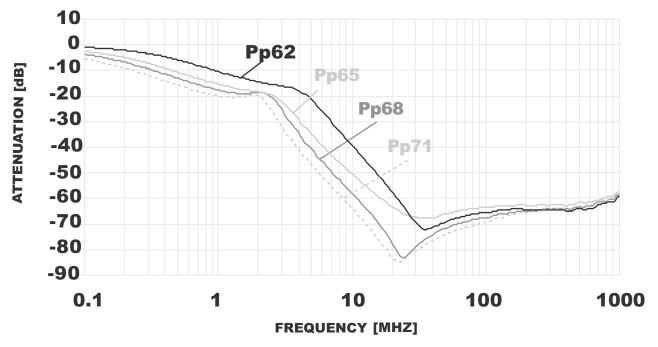
Typical cut-off frequency (-3dB) fco ≥ 30KHz.

Minimum Attenuation

= 11,	Typical	f_{co}		Min. Attenuation [dB] vs. Frequency [MHz] (1)									
Filter Code	Typical Cap. [nF] (2)	[Khz] Typical (3)	1	5	10	30	50	100	300	500	1000		
Pp62	24	265	8	19	36	63	64	59	59	58	54		
Pp65	44	118	13	31	45	59	60	57	57	56	52		
Pp68	66	99	15	38	54	73	68	62	58	57	53		
Pp71	94	75	17	45	60	72	68	63	58	57	53		

- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department.
- (3) For estimation of the filter cut-off frequency in non-50 Ω system, please refer to the design notes.

Typical measured filter attenuation



Note: All filter characteristics subject to change without prior notice.

icronics | PRODUCT SPECIFICATION

π Filter

Electrical Characteristics

Audio	LF	MF	HF	VHF	UHF
<i>f</i> ≤ 30KHz	30KHz ≤ <i>f</i> ≤ 300KHz	300KHz ≤ <i>f</i> ≤ 3MHz	3MHz≤ <i>f</i> ≤30MHz	30MHz ≤ <i>f</i> ≤300MHz	300MHz ≤ <i>f</i> ≤ 3GHz

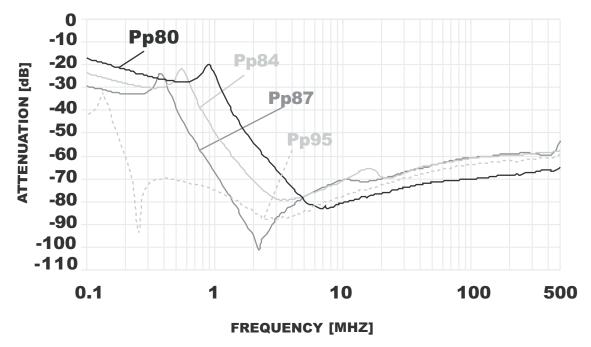
Typical cut-off frequency (-3dB) fco ≤ 30KHz.

Minimum Attenuation

	Tomical	$f_{\mathbf{co}}$		Min. Attenuation [dB] vs. Frequency [MHz] (1)								
Filter Code	Typical Cap. [μF] (2)	[Khz] Typical (3)	1	5	10	30	50	100	300	500		
Pp80	0.44	12	22	76	76	68	65	60	59	58		
Pp84	0.94	6.5	47	75	67	63	60	55	52	50		
Pp87	2	3.2	62	73	65	61	58	53	52	49		
Pp95	20	0.35	72	74	71	64	60	55	53	52		

- (1) Measured in 50 Ω system according to MIL-STD-220, no load.
- (2) Capacitance tolerance: ± 20%. For other capacitor values, contact the sales department.
- (3) For estimation of the filter cut-off frequency in non-50 Ω system, please refer to the design notes.

Typical measured filter attenuation



Note: All filter characteristics subject to change without prior notice.



PRODUCT SPECIFICATION

0.1J Bidirectional Transient Protection

Transient Protection

Transient Protection Code	Working Voltage [Voc]	Maximum Breakdown Voltage [V]	Clamping Voltage [V]	Maximum Leakage Current [A@Vɒc]	Transient Energy [J]	Maximum Capacitance [pF](1)
Za03	3.3	6.25	13.2	120	0.1	2175
Za05	5.6	10.63	19.8	42	0.1	1650
Za09	9.0	15.24	24.2	30	0.1	1125
Za14	14	21.64	35.2	22.5	0.1	900
Za18	18	28.75	46.2	12	0.1	525
Za26	26	39.67	66	12	0.1	233
Za30	30	47.15	73.7	12	0.1	188

⁽¹⁾ Measured at 0.5V RMS @ 1KHz

0.3J Bidirectional Transient Protection

Transient Protection Code	Working Voltage [Vpc]	Maximum Breakdown Voltage [V]	Clamping Voltage [V]	Maximum Leakage Current [A@Vɒc]	Transient Energy [J]	Maximum Capacitance [pF](1)
Za03	3.3	6.25	13.2	120	0.3	7500
Za05	5.6	10.63	19.8	42	0.3	4500
Za14	14	21.64	35.2	22.5	0.3	1350
Za18	18	28.75	46.2	12	0.3	825
Za26	26	39.67	66	12	0.3	375

⁽¹⁾ Measured at 0.5V RMS @ 1KHz

Note: For higher energy transient protection, contact the sales department.



Filter & Transient Protection Electrical Characteristics

C Filter Combined with 0.1J Bidirectional Transient Protection

	C Filt	C Filter and 0.1J Bidirectional Transient Protection Code. Typical Capacitance [nF]										
ilter Code			Transient Protectio	n Code Canacita	nce [nF] (2)							
Cap. [nF]				ii oode. oapacita	11100 [111] (2)							
(1)	Za03 2.175	Za05 1.65	Za09 1.125	Za14 0.9	Za18 0.525	Za26 0.233	Za30 0.188					
Cc08												
0.047												
Cc12												
0.1												
Cc18												
0.12												
Cc23 0.18												
Cc33												
0.33												
Cc36						Ya01	Ya02					
0.47						0.703	0.658					
Cc39						Ya03	Ya04					
1						1.233	1.188					
Cc42				Ya05	Ya06	Ya07	Ya08					
2.2				3.1	2.725	2.433	2.388					
Cc45		Ya9	Ya10	Ya11	Ya12	Ya13	Ya14					
3.9		5.55	5.025	4.8	4.425	4.133	4.088					
Cc54	Ya15	Ya16	Ya17	Ya18	Ya19	Ya20	Ya21					
4.7	6.875	6.35	5.825	5.6	5.225	4.933	4.888					
Cc58	Ya22	Ya23	Ya24	Ya25	Ya26	Ya27	Ya28					
6.8	8.975	8.45	7.925	7.7	7.325	7.033	6.988					
Cc62	Ya29	Ya30	Ya31	Ya32	Ya33	Ya34	Ya35					
10	12.175	11.65	11.125	10.9	10.525	10.233	10.188					
Cc66	Ya36	Ya37	Ya38	Ya39	Ya40	Ya41	Ya42					
15	17.175	16.65	16.125	15.9	15.525	15.233	15.188					
Cc72	Ya43	Ya44	Ya45	Ya46	Ya47	Ya48	Ya49					
33	35.175	34.65	34.125	33.9	33.525	33.233	33.188					
Cc74	Ya50	Ya51	Ya52	Ya53	Ya54	Ya55	Ya56					
47	49.175	48.65	48.125	47.9	47.525	47.233	47.188					
Cc76	Ya57	Ya58	Ya59	Ya60	Ya61	Ya62	Ya63					
100	102.175	101.65	101.125	100.9	100.525	100.233	100.18					
Cc78	Ya64	Ya65	Ya66	Ya67	Ya68	Ya69	Ya70					

- (1) Refer to the attenuation on pages 33-47.
- (2) Refer to the characteristics on page 53.

Example:

Assuming that a Cc45 filter and a Za14 transient protection are selected for all the connector contacts, the combined code can be extracted by finding the intersection of the Cc45 row with the Za14 column. The combined code is Ya11. The typical capacitance of the combined filter is 4.8nF.

Refer to the design notes (page 71) for estimation of the cut-off frequency($f^{(c)}$) of the combined filter. If the estimated $f \infty$ is too low, select a filter with lower capacitance.



Filter & Transient Protection Electrical Characteristics

C²Filter Combined with 0.1J Bidirectional Transient Protection

	C ² Filt	ter and 0.1 J B	idirectional Trai	nsient Protectio	on Code. Typical	Capacitance [nF]
Filter Code Cap. [nF]		1	Fransient Protectio	n Code. Capacitar	nce [nF] (2)		
(1)	Za03 2.175	Za05 1.65	Za09 1.125	Za14 0.9	Za18 0.525	Za26 0.233	Za30 0.188
Cs10 0.164							
Cs18							
0.267							
Cs23						Yb01	Yb02
0.66						0.893	0.848
Cs27						Yb03	Yb04
0.94						1.173	1.128
Cs32			Yb05	Yb06	Yb07	Yb08	Yb9
2.4		VII. 4.0	3.525	3.3	2.925	2.633	2.588
Cs35 3.6		Yb10 5,25	Yb11 4.725	Yb12 4.5	Yb13 4.125	Yb14 3.833	Yb15 3.788
Cs38	Yb16	5.25 Yb17	Yb18	4.5 Yb19	4.125 Yb20	3.833 Yb21	3.766 Yb22
5.7	7.875	7.35	6.825	6.6	6.225	5.933	5.888
Cs41	Yb23	Yb24	Yb25	Yb26	Yb27	Yb28	Yb29
7.8	9.975	9.45	8.925	8.7	8.325	8.033	7.988
Cs47	Yb30	Yb31	Yb32	Yb33	Yb34	Yb35	Yb36
13.6	15.775	15.25	14,725	14.5	14.125	13.833	13.788
Cs50	Yb37	Yb38	Yb39	Yb40	Yb41	Yb42	Yb43
19.7	21.875	21.35	20.825	20.6	20.225	19.933	19.888
Cs52	Yb44	Yb45	Yb47	Yb48	Yb49	Yb49	Yb50
25	27.175	26.65	26.125	25.9	25.525	25.233	25.188
Cs60	Yb51	Yb52	Yb53	Yb54	Yb55	Yb56	Yb57
39.8	41.975	41.45	40.925	40.7	40.325	40.033	39.988
Cs62	Yb58	Yb59	Yb60	Yb61	Yb62	Yb63	Yb64
43	45.175	44.65	44.125	43.9	43.525	43.233	43.188
Cs66	Yb65	Yb66	Yb67	Yb68	Yb69	Yb70	Yb71
66	68.175	67.65	67.125	66.9	66.525	66.233	66.188
Cs70	Yb72	Yb73	Yb74	Yb75	Yb76	Yb77	Yb78
94	96.175	95.65	95.125	94.9	94.525	94.233	94.188

⁽¹⁾ Refer to the attenuation on pages 38-42.

Example:

Assuming that a Cc38 filter and a Za14 transient protection are selected for all the connector contacts, the combined code can be extracted by finding the intersection of the Cc38 row with the Za14 column. The combined code is Yb19. The typical capacitance of the combined filter is 6.6nF.

Refer to the design notes (page 71) for estimation of the cut-off frequency($f^{(c)}$) of the combined filter. If the estimated $f \infty$ is too low, select a filter with lower capacitance.

⁽²⁾ Refer to the characteristics on page 53.



Filter & Transient Protection

Electrical Characteristics

L &J Filter Combined with 0.1J Bidirectional Transient Protection

	L &J	Filter and 0.1	J Bidirectional	Fransient Prote	ction Code. Typ	ical Capacitano	e [nF] (*)				
Filter Code Cap. [nF]	Transient Protection Code. Capacitance [nF] (2)										
					,						
(1)	Za03 2.175	Za05 1.65	Za09 1.125	Za14 0.9	Za18 0.525	Za26 0.233	Za30 0.188				
LI10 0.082											
LI15 0.12											
LI24 0.22											
LI28						Yc01	Yc02				
0.47						0.703	0.658				
LI32 1						Yc03 1.233	Yc04 1.188				
LI36 1.8				Yc05 2.7	Yc06 2.325	Yc07 2.033	Yc08 1.988				
LI43 4.7	Yc09 6.875	Yc10 6.35	Yc11 5.825	Yc12 5.6	Yc13 5.225	Yc14 4.933	Yc15 4.888				
LI46 6.8	Yc16 8.975	Yc17 8.45	Yc18 7.925	Yc19 7.7	Yc20 7.325	Yc21 7.033	Yc22 6.988				
LI49 10	Yc23 12.175	Yc24 11.65	Yc25 11.125	Yc26 10.9	Yc27 10.525	Yc28 10.233	Yc29 10.188				
LI52 15	Yc30 17.175	Yc31 16.65	Yc32 16.125	Yc33 15.9	Yc34 15.525	Yc35 15.233	Yc36 15.188				
LI63 22	Yc37	Yc38	Yc39	Yc40	Yc41	Yc42	Yc43				
LI66	24.175 Yc44	23.65 Yc45	23.125 Yc46	22.9 Yc47	22.525 Yc48	22.233 Yc49	22.188 Yc50				
33	35.175	34.65	34.125	33.9	33.525	33.233	33.188				
LI73 180	Yc51 182.175	Yc52 181.65	Yc53 181.125	Yc54 180.9	Yc55 180.525	Yc56 180,233	Yc57 180,188				
LI75 220	Yc58 222.175	Yc59 221.65	Yc60 221.125	Yc61 220.9	Yc62 220.525	Yc63 220,233	Yc64 220.188				

^{(*) -} For J filter replace YC with YD

- (1) Refer to the attenuation on pages 43-47.
- (2) Refer to the characteristics on page 53.

Example:

Assuming that a LI46 filter and a Za14 transient protection are selected for all the connector contacts, the combined code can be extracted by finding the intersection of the LL46 row with the Za14 column. The combined code is Yc19. The typical capacitance of the combined filter is 7.7nF.

Refer to the design notes (page 71) for estimation of the cut-off frequency ($f \infty$) of the combined filter. If the estimated $f\infty$ is too low, select a filter with lower capacitance.



Filter & Transient Protection Electrical Characteristics

π Filter Combined with 0.1J Bidirectional Transient Protection

	π Fil	ter and 0.1 J Bi	directional Trar	nsient Protection	on Code. Typical	Capacitance [r	nFl		
Filter Code Cap. [nF]		π Filter and 0.1 J Bidirectional Transient Protection Code. Typical Capacitance [nF] Transient Protection Code. Capacitance [nF] (2)							
					,				
(1)	Za03 2.175	Za05 1.65	Za09 1.125	Za14 0.9	Za18 0.525	Za26 0.233	Za30 0.188		
Pp10 0.094									
Pp15 0.164									
Pp24 0.24									
Pp28 0.44							Ye01 0.628		
Pp32 0.94						Ye02 1.173	Ye03 1.128		
Pp36 2				Ye04 2.9	Ye05 2.525	Ye06 2.233	Ye07 2.188		
Pp43 3			Ye08 4.125	Ye09 3.9	Ye10 3.525	Ye11 3.233	Ye12 3.188		
Pp46 4.4	Ye13 6.575	Ye14 6.05	Ye15 5.525	Ye16 5.3	Ye17 4.925	Ye18 4.633	Ye19 4.588		
Pp49 9.4	Ye20 11.575	Ye21 11.05	Ye22 10.525	Ye23 10.3	Ye24 9.925	Ye25 9.633	Ye26 9.588		
Pp52	Ye27	Ye28	Ye29	Ye30	Ye31	Ye32	Ye33		
13.6	15.775	15.25	14.725	14.5	14.125	13.833	13.788		
Pp55 20	Ye34 22.175	Ye35 21.65	Ye36 21.125	Ye37 20.9	Ye38 20.525	Ye39 20.233	Ye40 20.188		
Pp62	Ye41	Ye42	Ye43	Ye44	Ye45	Ye46	Ye47		
24	26.175	25.65	25.125	24.9	24.525	24,233	24.188		
Pp65	Ye48	Ye49	Ye50	Ye51	Ye52	Ye53	Ye54		
44	46.175	45.65	45.125	44.9	44.525	44.233	44.188		
Pp68	Ye55	Ye56	Ye57	Ye58	Ye59	Ye60	Ye61		
66	68.175	67.65	67.125	66.9	66.525	66.233	66.188		
Pp71	Ye62	Ye63	Ye64	Ye65	Ye66	Ye67	Ye68		
94	96.175	95.65	95.125	94.9	94.525	94.233	94.188		
Pp80	Ye69	Ye70	Ye71	Ye72	Ye73	Ye74	Ye75		
440	442.175	441.65	441.125	440.9	440.525	440.233	440.188		

⁽¹⁾ Refer to the attenuation on pages 48-52.

Example:

Assuming that a PP46 filter and a ZA14 transient protection are selected for all the connector contacts, the combined code can be extracted by finding the intersection of the PP46 row with the Za14 column. The combined code is Ye16. The typical capacitance of the combined filter is 5.3nF.

Refer to the design notes (page 71) for estimation of the cut-off frequency(f(x)) of the combined filter. If the estimated $f \infty$ is too low, select a filter with lower capacitance.

⁽²⁾ Refer to the characteristics on page 53.



Filter & Transient Protection

Electrical Characteristics

C Filter Combined with 0.3J Bidirectional Transient Protection

	C Filter ar	C Filter and 0.3 J Bidirectional Transient Protection Code. Typical Capacitance [nF]					
Filter Code	Transient Protestion Onde Constitues (nF1/0)						
Cap. [nF]	Transient Protection Code. Capacitance [nF] (2)						
(1)	Zc03 7.5	Zc05 4.5	Zc14 1.35	Zc18 0.825	Zc26 0.375		
Cc08 0.047							
Cc12 0.1							
Cc18 0.12							
Cc23 0.18							
Cc33 0.33							
Cc36 0.47							
Cc39					Yf01 1.375		
Cc42 2.2				Yf02 3.025	Yf03 2.575		
Cc45 3.9			Yf04 5.25	Yf05 4.725	Yf06 4.275		
Cc54 4.7			Yf07 6.06	Yf08 5.525	Yf09 5.075		
Cc58 6.8			Yf10 8.15	Yf11 7.625	Yf12 7.175		
Cc62 10		Yf13 14.5	Yf14 11.35	Yf15 10.825	Yf16 10.375		
Cc66 15	Yf17 22.5	Yf18 19.5	Yf19 16.35	Yf20 15.825	Yf21 15.375		
33	Yf22 40.5	Yf23 37.5	Yf24 34.35	Yf25 33.825	Yf26 33.375		
Cc74 47	Yf27 54.5	Yf28 51.5	Yf29 48.35	Yf30 47.825	Yf31 47.375		
Cc76 100	Yf32 107.5	Yf33 104.5	Yf34 101.35	Yf35 100.825	Yf36 100.375		
Cc78 220	Yf37 227.5	Yf38 224.5	Yf39 221.35	Yf40 220.825	Yf41 220.375		

- (1) Refer to the attenuation on pages 33-37.
- (2) Refer to the characteristics on page 53.

Example:

Assuming that a CC72 filter and a ZC18 transient protection are selected for all the connector contacts, the combined code can be extracted by finding the intersection of the CC72 row with the ZC18 column. The combined code is Yf25. The typical capacitance of the combined filter is 33.825nF.

Refer to the design notes (page 71) for estimation of the cut-off frequency($f \infty$) of the combined filter. If the estimated $f \circ o$ is too low, select a filter with lower capacitance.

Micronics | PRODUCT SPECIFICATION

Filter & Transient Protection

Electrical Characteristics

C²Filter Combined with 0.3J Bidirectional Transient Protection

	C ² Filter an	² Filter and 0.3J Bidirectional Transient Protection Code. Typical Capacitance [nF]				
Filter Code Cap. [nF]	Transient Protection Code. Capacitance [nF] (2)					
(1)	Zc03 7.5	Zc05 4.5	Zc14 1.35	Zc18 0.825	Zc26 0.375	
Cs10 0.164						
Cs18 0.267						
Cs23 0.66						
Cs27 0.94					Yg01 1.315	
Cs32 2.4				Yg02 3.225	Yg03 2.775	
Cs35 3.6			Yg04 4.95	Yg05 4.425	Yg06 3.975	
Cs38 5.7			Yg07 7.05	Yg08 6.525	Yg09 6.075	
7.8			Yg10 9.15	Yg11 8.625	Yg12 8.175	
Cs47 13.6		Yg13 18.1	Yg14 14.95	Yg15 14.425	Yg16 13.975	
Cs50 19.7	Yg17 27.2	Yg18 24.2	Yg19 21.05	Yg20 20.525	Yg21 20.075	
Cs52 25	Yg22 32.5	Yg23 29.5	Yg24 26.35	Yg25 25.825	Yg26 25.375	
Cs60 39.8	Yg27 47.3	Yg28 44.3	Yg29 41.15	Yg30 40.625	Yg31 40.175	
Cs62 43	Yg32 50.5	Yg33 47.5	Yg34 44.35	Yg35 43.825	Yg36 43.375	
Cs66 66	Yg37 73.5	Yg38 70.5	Yg39 67.35	Yg40 66.825	Yg41 66.375	
Cs70 94	Yg42 101.5	Yg43 98.5	Yg44 95.35	Yg45 94.825	Yg46 94.375	

⁽¹⁾ Refer to the attenuation on pages 38-42.

Example:

Assuming that a Cs62 filter and a ZC18 transient protection are selected for all the connector contacts, the combined code can be extracted by finding the intersection of the Cs62 row with the ZC18 column. The combined code is Yg35. The typical capacitance of the combined filter is 43.825nF.

Refer to the design notes (page 71) for estimation of the cut-off frequency $(f \circ)$ of the combined filter. If the estimated $f \infty$ is too low, select a filter with lower capacitance.

⁽²⁾ Refer to the characteristics on page 53.



Filter & Transient Protection Electrical Characteristics

L & J Filter Combined with 0.3J Bidirectional Transient Protection

	L & J Filter and 0.3J Bidirectional Transient Protection Code. Typical Capacitance [nF] (*)						
Filter Code Cap. [nF]	Transient Protection Code. Capacitance [nF] (2)						
(1)	Zc03 7.5	Zc05 4.5	Zc14 1.35	Zc18 0.825	Zc26 0.375		
LI10 0.082							
LI15 0.12							
LI24 0.22							
LI28 0.47							
LI32 1					Yh01 1.375		
LI36 1.8				Yh02 2.625	Yh03 2.175		
LI43 4.7			Yh04 6.05	Yh05 5.525	Yh06 5.075		
LI46 6.8			Yh07 8.15	Yh08 7.625	Yh09 7.175		
LI49 10		Yh10 14.5	Yh11 11.35	Yh12 10.825	Yh13 10.375		
LI52 15	Yh14 22.5	Yh15 19.5	Yh16 16.35	Yh17 15.825	Yh18 15.375		
LI63 22	Yh19 29.5	Yh20 26.5	Yh21 23.35	Yh22 22,825	Yh23 22.375		
LI66 33	Yh24 40.5	Yh25 37.5	Yh26 34.35	Yh27 33.825	Yh28 33.375		
LI73 180	Yh29 187.5	Yh30 184.5	Yh31 181.35	Yh32 180.825	Yh33 180,375		
LI75 220	Yh34 227.5	Yh35 224.5	Yh36 221.35	Yh37 220,825	Yh38 220.375		

^{(*) -} For J filter, replace YH with YJ

- (1) Refer to the attenuation on pages 43-47.
- (2) Refer to the characteristics on page 53.

Example:

Assuming that a LI63 filter and a Zc18 transient protection are selected for all the connector contacts, the combined code can be extracted by finding the intersection of the LL63 row with the ZC18 column. The combined code is Yh22. The typical capacitance of the combined filter is 22.825nF.

Refer to the design notes (page 71) for estimation of the cut-off frequency ($f \infty$) of the combined filter. If the estimated $f\infty$ is too low, select a filter with lower capacitance.



Filter & Transient Protection **Electrical Characteristics**

π Filter Combined with 0.3J Bidirectional Transient Protection

	π Filter an	π Filter and 0.3J Bidirectional Transient Protection Code. Typical Capacitance [nF]				
Filter Code Cap. [nF]	Transient Protection Code. Capacitance [nF] (2)					
(1)	Zc03	Zc05	Zc14	Zc18	Zc26	
	7.5	4.5	1.35	0.825	0.375	
Pp10 0.094						
Pp15 0.164						
Pp24 0.24						
Pp28 0.44						
Pp32 0.94					Yj01 1.315	
Pp36 2				Yj02 2.825	Yj03 2.375	
Pp43 3			Yj04 4.35	Yj05 3.825	Yj06 3.375	
Pp46 4.4			Yj07 5.75	Yj08 5.225	Yj09 4.775	
Pp49 9.4		Yj10 13.9	Yj11 10.75	Yj12 10.225	Yj13 9.775	
Pp52 13.6		Yj14 18.1	Yj15 14.95	Yj16 14.425	Yj17 13.975	
Pp55 20	Yj18 27.5	Yj19 24.5	Yj20 21.35	Yj21 20.825	Yj22 20.375	
Pp62 24	Yj23 31.5	Yj24 28.5	Yj25 25.35	Yj26 24.825	Yj27 24.375	
Pp65 44	Yj28 51.5	Yj29 48.5	Yj30 45.35	Yj31 44.825	Yj32 44.375	
P p68 66	Yj33 73.5	Yj34 70.5	Yj35 67.35	Yj36 66.825	Yj37 66.375	
Pp71 94	Yj38 101.5	Yj39 98.5	Yj40 95.35	Yj41 94.825	Yj42 94.375	
Pp80 440	Yj43 447.5	Yj44 444.5	Yj45 441.35	Yj46 440.825	Yj47 440.375	

- (1) Refer to the attenuation on pages 48-52.
- (2) Refer to the characteristics on page 53.

Example:

Assuming that a Pp62 filter and a ZC18 transient protection are selected for all the connector contacts, the combined code can be extracted by finding the intersection of the PP62 row with the ZC18 column. The combined code is Yj26. The typical capacitance of the combined filter is 24.825nF.

Refer to the design notes (page 71) for estimation of the cut-off frequency $(f \infty)$ of the combined filter. If the estimated $f \infty$ is too low, select a filter with lower capacitance.