

Coaxial High Pass Filter

SHP-20+

50Ω 20 to 1000 MHz

The Big Deal

- Low insertion loss
- High rejection
- Connectorized package



CASE STYLE: FF99

Product Overview

SHP-20+ is a High pass filter in a connectorized package covering 20 to 1000 MHz. This filter can be used in IF stage filtering of various multiband, CATV, Broadband Fiber Networks and Multiband radio systems. It has repeatable performance across production lots and consistent performance across temperature.

Key Features

Feature	Advantages
Low insertion loss	Can be used in high performance applications.
Good rejection	This enables the filter to attenuate spurious signals and reject harmonics for broad band frequency.
Connectorized package	The connectorized package is easy to interface with other devices and well suited for test setups.

Notes

- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp



Coaxial High Pass Filter

50Ω 20 to 1000 MHz

SHP-20+



Features

- Wide band, 20 MHz to 1000 MHz
- High rejection
- Connectorized package

CASE STYLE: FF99

Connectors	Model
SMA-MF	SHP-20+

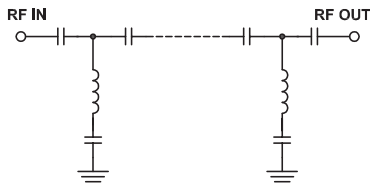
Electrical Specifications at 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Stop Band	Rejection Loss	DC-F1	DC-11	20	35	-	dB
	VSWR	DC-F1	DC-11	-	40	-	:1
Pass Band	Insertion Loss	F2-F3	20-1000	-	0.4	1	dB
	VSWR	F2-F3	20-1000	-	1.3	-	:1

Applications

- IF stage filtering of various multiband
- Broadband Fiber Networks
- CATV
- Radio communications
- Receiver \ transmitters

Functional Schematic



Maximum Ratings

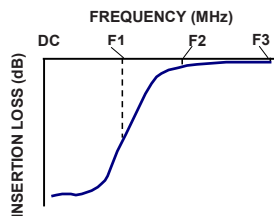
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	0.5 W.

Permanent damage may occur if any of these limits are exceeded.

Typical Performance Data at 25°C

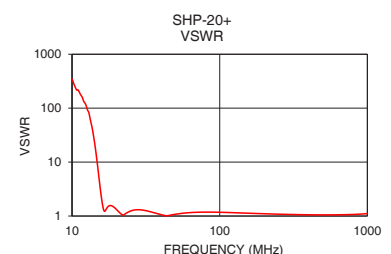
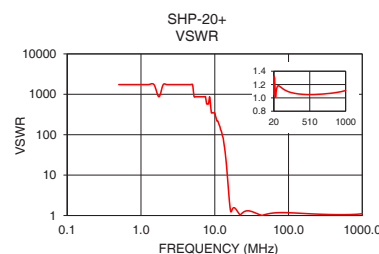
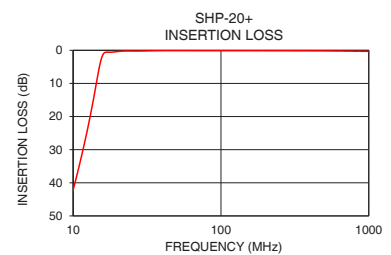
Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
0.50	99.43	1737.18
5.25	83.83	868.59
6.75	68.78	868.59
8.25	55.90	579.06
10.25	40.28	289.53
11.00	34.78	217.15
12.50	23.87	108.58
13.25	18.30	64.35
14.25	10.70	22.00
15.00	5.31	7.28
15.50	2.61	3.38
16.00	1.11	1.78
16.75	0.57	1.24
20.00	0.37	1.32
22.00	0.23	1.05
44.00	0.10	1.01
165.00	0.13	1.12
445.00	0.18	1.05
740.00	0.24	1.06
1000.00	0.35	1.11

Typical Frequency Response



+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications



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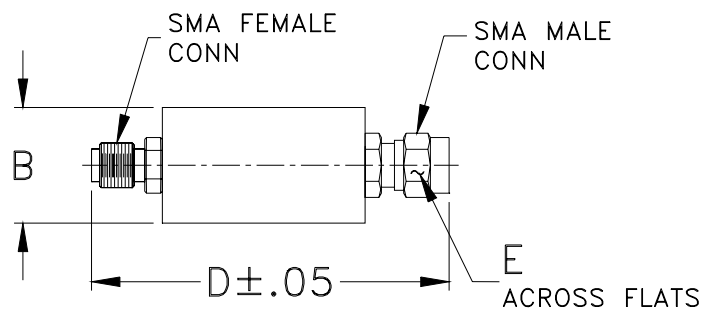
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SHP-20+
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Coaxial Connections

INPUT	SMA-Male
OUTPUT	SMA-Female

Outline Drawing



Outline Dimensions (^{inch}/_{mm})

B	D	E	wt
.67	1.98	.312	grams
17.02	50.29	7.92	42.0

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Typical Performance Data

FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1	94.69	99.76	101.96	0.01	0.01	0.01	0.01	0.00	0.00
2	96.47	95.55	112.15	0.01	0.00	0.01	0.00	0.00	0.00
3	93.51	93.86	95.93	0.01	0.01	0.01	0.01	0.01	0.01
4	98.25	101.32	90.79	0.01	0.01	0.01	0.00	0.01	0.00
5	87.84	86.63	83.80	0.01	0.02	0.02	0.01	0.01	0.01
6	76.86	76.91	75.79	0.01	0.02	0.02	0.02	0.02	0.02
7	66.73	66.62	66.42	0.02	0.03	0.03	0.02	0.02	0.02
8	58.04	57.89	57.78	0.03	0.03	0.04	0.02	0.03	0.03
9	49.89	49.77	49.66	0.04	0.04	0.05	0.04	0.05	0.05
10	42.24	42.12	41.96	0.05	0.06	0.07	0.04	0.05	0.06
11	34.87	34.74	34.57	0.08	0.09	0.11	0.07	0.08	0.09
12	27.61	27.48	27.29	0.13	0.14	0.15	0.11	0.13	0.14
13	20.27	20.14	19.93	0.24	0.26	0.29	0.19	0.21	0.24
14	12.72	12.57	12.36	0.59	0.65	0.72	0.53	0.58	0.64
15	5.37	5.29	5.11	2.41	2.58	2.81	2.25	2.40	2.59
16	1.07	1.10	1.11	11.53	12.09	12.93	10.62	11.01	11.60
17	0.51	0.56	0.61	18.33	18.13	17.73	17.28	17.07	16.73
18	0.55	0.58	0.62	13.19	13.26	13.31	13.15	13.21	13.27
19	0.46	0.49	0.52	13.92	14.06	14.25	13.92	14.07	14.24
20	0.34	0.37	0.39	16.99	17.20	17.52	16.97	17.17	17.48
22	0.22	0.24	0.26	41.50	43.38	50.53	32.85	32.67	32.64
24	0.21	0.22	0.25	21.73	21.79	21.63	21.52	21.57	21.41
26	0.22	0.23	0.25	18.05	18.19	18.22	18.03	18.17	18.19
28	0.22	0.23	0.25	17.24	17.43	17.55	17.27	17.47	17.59
30	0.20	0.21	0.22	17.63	17.87	18.04	17.70	17.95	18.12
32	0.17	0.18	0.20	18.71	18.99	19.21	18.84	19.12	19.39
34	0.14	0.16	0.17	20.33	20.66	20.94	20.52	20.89	21.20
36	0.13	0.14	0.16	22.45	22.84	23.17	22.75	23.16	23.60
38	0.11	0.12	0.14	25.11	25.55	25.98	25.70	26.23	26.81
40	0.10	0.12	0.14	28.47	28.99	29.46	29.70	30.41	31.29
42	0.10	0.12	0.13	32.60	33.06	33.32	36.10	37.27	39.06
44	0.09	0.11	0.13	35.28	35.25	34.78	44.23	44.85	43.82
46	0.09	0.11	0.13	33.15	33.05	32.50	35.82	35.72	35.02
48	0.09	0.11	0.12	30.22	30.29	29.96	31.16	31.29	30.96
50	0.09	0.11	0.12	27.98	28.19	28.02	28.42	28.66	28.52
55	0.10	0.11	0.12	24.64	25.01	25.08	24.74	25.15	25.23
56	0.10	0.11	0.13	24.22	24.62	24.73	24.28	24.69	24.81
58	0.10	0.12	0.13	23.48	23.92	24.11	23.53	23.99	24.16
60	0.10	0.12	0.13	22.91	23.38	23.60	22.92	23.42	23.63
62	0.11	0.12	0.13	22.43	22.98	23.23	22.42	22.97	23.23
80	0.12	0.12	0.14	20.88	21.66	22.23	20.81	21.59	22.14
100	0.12	0.13	0.14	21.10	22.04	22.85	21.02	21.96	22.76
150	0.11	0.13	0.14	23.97	24.36	25.09	23.80	24.19	24.90
200	0.10	0.13	0.15	28.54	26.58	26.03	28.23	26.31	25.76
250	0.10	0.14	0.17	34.75	28.53	26.06	34.18	28.14	25.73
300	0.11	0.14	0.18	41.23	30.04	25.92	40.44	29.52	25.52
350	0.11	0.16	0.20	45.14	31.45	26.06	43.21	30.71	25.58
400	0.12	0.17	0.21	42.93	32.52	26.42	40.88	31.53	25.86
450	0.12	0.18	0.22	40.19	33.45	26.98	38.22	32.10	26.27
500	0.14	0.19	0.25	38.69	33.96	27.61	36.71	32.29	26.78
550	0.14	0.20	0.26	38.25	34.19	28.17	35.96	32.22	27.22
600	0.14	0.22	0.27	38.66	34.23	28.64	35.56	31.94	27.52
650	0.14	0.22	0.28	38.83	33.71	28.69	35.06	31.42	27.61
700	0.16	0.24	0.31	39.03	33.13	28.59	34.62	30.90	27.60
750	0.15	0.23	0.31	39.25	32.31	28.34	34.02	30.17	27.44
800	0.18	0.28	0.35	38.89	31.37	27.91	33.62	29.49	27.21
850	0.15	0.25	0.33	37.77	30.30	27.41	32.96	28.65	26.87
900	0.20	0.31	0.39	35.57	29.13	26.65	32.07	27.68	26.29
950	0.17	0.28	0.37	33.43	27.94	25.86	31.00	26.76	25.62
1000	0.22	0.34	0.43	31.25	26.63	24.85	29.51	25.61	24.73

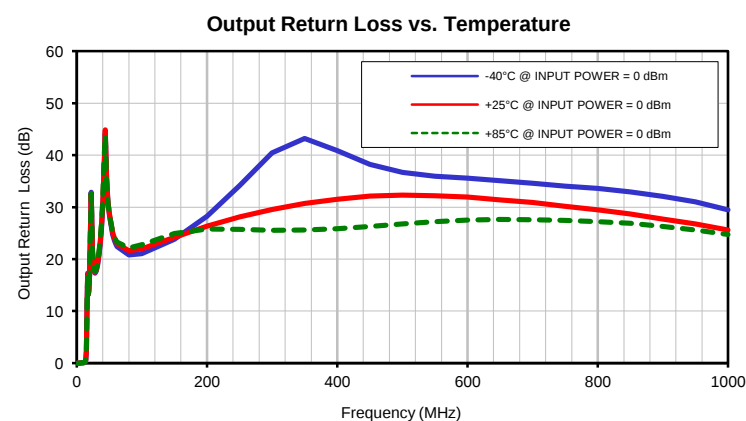
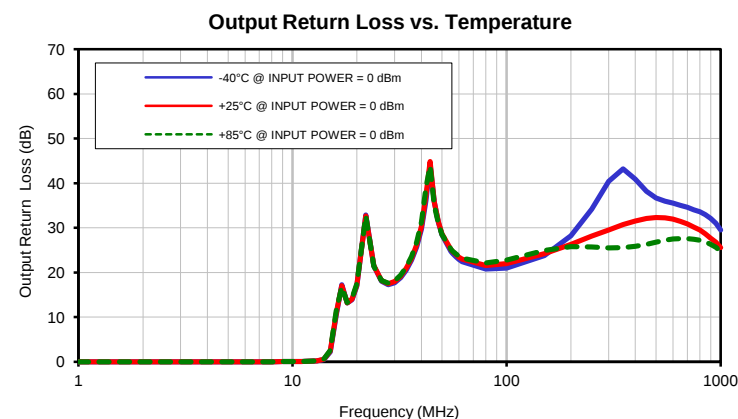
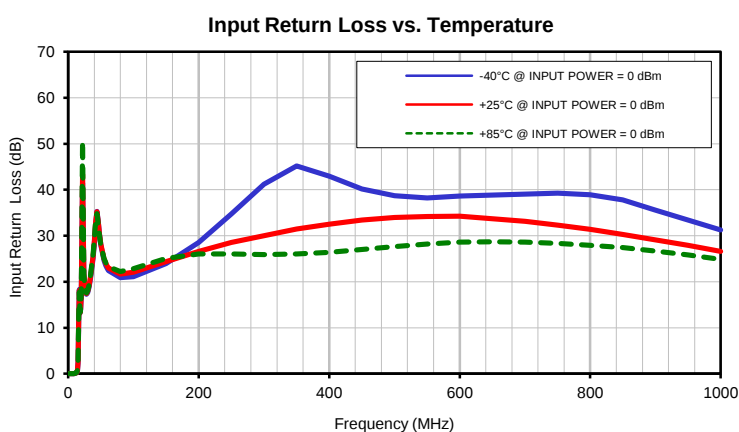
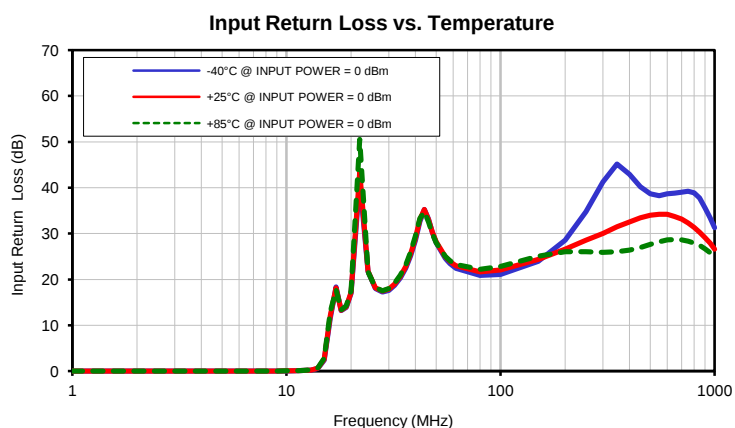
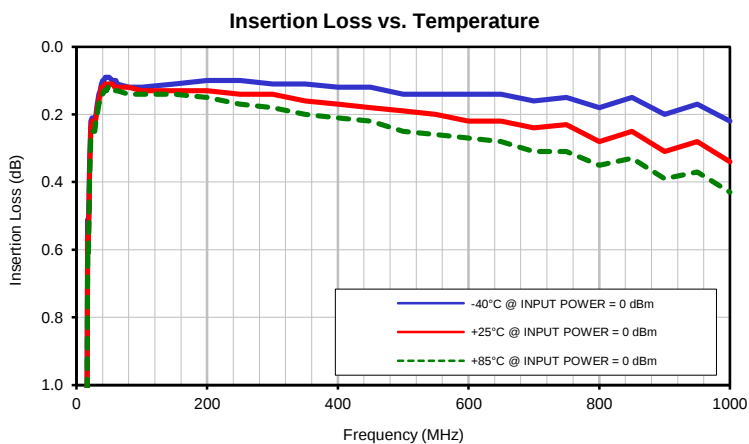
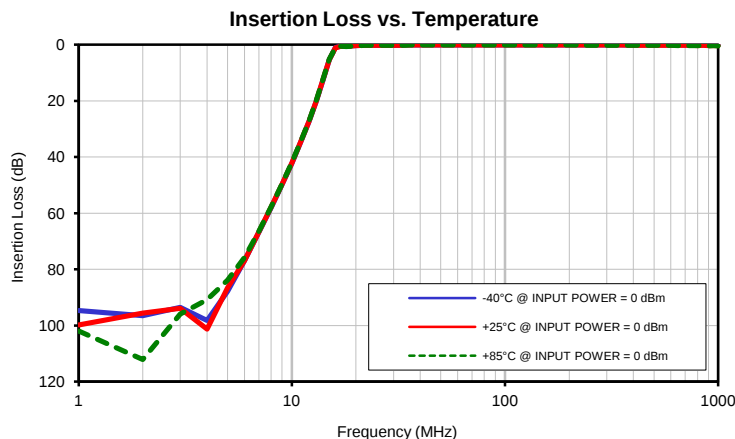
Typical Performance Data

FREQ. (MHz)	GROUP DELAY		
	(nsec)		
	@-40°C	@+25°C	@+85°C
20	51.38	51.31	51.06
21	45.14	45.01	44.72
22	39.70	39.56	39.41
23	35.12	34.88	34.72
25	27.90	27.87	27.72
27	22.88	22.85	22.78
29	19.34	19.35	19.26
31	17.00	17.01	16.97
32	16.33	16.25	16.21
32	15.78	15.79	15.70
33	15.22	15.26	15.20
33	14.81	14.76	14.75
34	14.32	14.30	14.28
34	13.79	13.84	13.82
35	13.42	13.39	13.36
35	13.10	13.02	13.00
36	12.67	12.67	12.66
36	12.36	12.36	12.28
37	12.02	11.99	11.94
37	11.62	11.60	11.60
38	11.32	11.30	11.29
38	11.04	10.94	10.93
39	10.67	10.61	10.64
39	10.45	10.40	10.39
40	9.89	9.90	9.83
41	9.41	9.41	9.36
43	8.49	8.50	8.45
45	7.80	7.77	7.76
50	5.93	5.95	5.92
55	5.62	5.61	5.61
60	4.39	4.39	4.37
65	3.79	3.80	3.77
70	3.24	3.23	3.22
75	2.89	2.87	2.89
80	2.57	2.56	2.55
85	2.30	2.29	2.29
90	2.06	2.09	2.06
95	1.89	1.87	1.90
100	1.75	1.76	1.73
105	1.62	1.59	1.60
110	1.49	1.50	1.48
125	1.23	1.22	1.22
150	0.96	0.96	0.96
200	0.68	0.67	0.67
250	0.55	0.53	0.54
300	0.48	0.47	0.47
350	0.44	0.43	0.42
400	0.41	0.40	0.40
450	0.39	0.38	0.38
500	0.37	0.37	0.37
550	0.37	0.36	0.36
600	0.36	0.34	0.34
650	0.36	0.35	0.35
700	0.34	0.33	0.33
750	0.36	0.35	0.35
800	0.33	0.33	0.33
850	0.35	0.35	0.35
900	0.33	0.32	0.31
950	0.35	0.34	0.34
1000	0.34	0.33	0.33

High Pass Filter

SHP-20+

Typical Performance Curves



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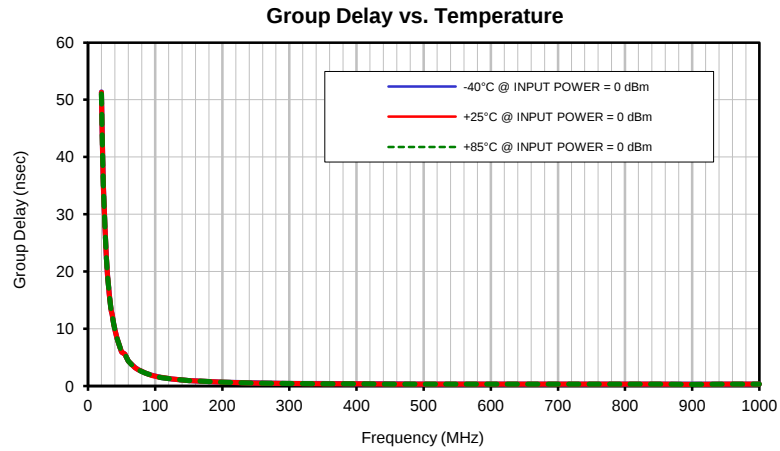
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High Pass Filter

SHP-20+

Typical Performance Curves



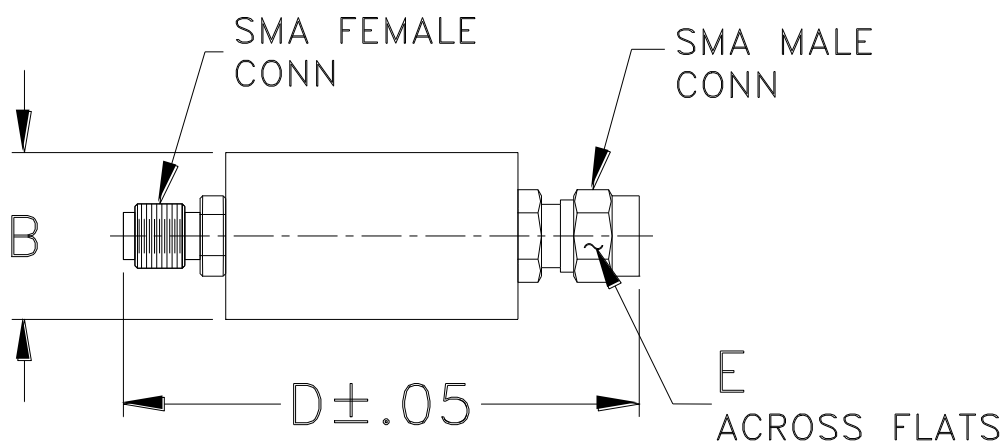
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IF/RF MICROWAVE COMPONENTS

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FF56
FF99

Outline Dimensions



CASE #.	A	B	C	D	E	WT GRAMS
FF56	--	.46 (11.68)	--	1.70 (43.18)	.312 (7.92)	18.0
FF99	--	.70 (17.78)	--	1.98 (50.29)		42.0

Dimensions are in inches (mm). Tolerances: 2Pl. ± .03; 3Pl. ± .015

Notes:

1. Case material: Brass.
2. Case finish: Nickel plate.



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-55° to 100°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Barometric Pressure	100,000 Feet	MIL-STD-202, Method 105, Condition D
Humidity	90% RH, 65°C Units may require bake-out after humidity to restore full performance.	MIL-STD-202, Method 103
Thermal Shock	-65° to 125°C, 5 cycles	MIL-STD-202, Method 107, Condition B
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18)	MIL-STD-202, Method 213, Condition I