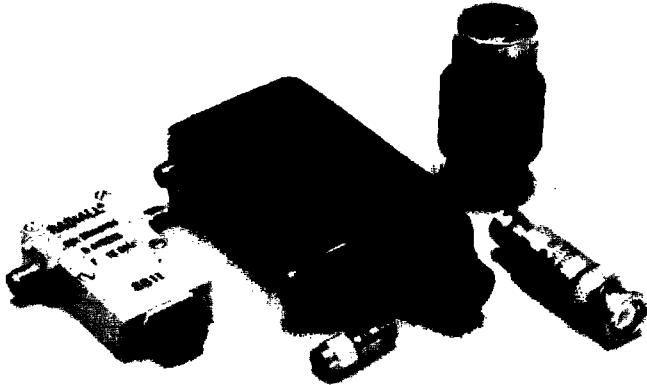


COAXIAL ATTENUATORS



- **Power :**
2 to 65 Watts
- **Frequency range :**
DC – 1 GHz to DC – 26.5 GHz
- **Flat response**
- **Miniature fixed :**
SMA, SMB
- **Standard fixed :**
BNC, N, TNC
- **Medium power :**
N, SMA
- **High power :**
N
- **Variable :**
Step by step or continuously
Programmable step

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SMA switchable attenuators	XVIII 17

Miniature Coaxial Attenuators

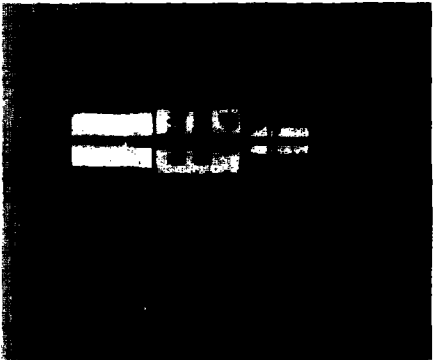
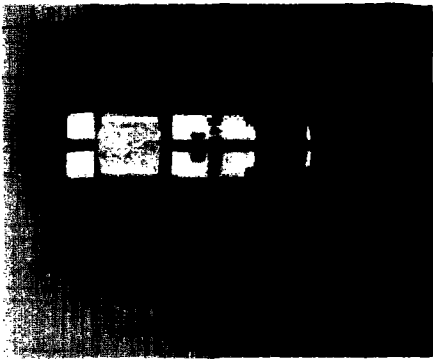
2 to 3.5 Watts

Connectors	ATTENUATION (dB)	PART NUMBER	Max. V.S.W.R.	Power (Watts)	Fig.
DC – 8 GHz					
SMB	3 ± 0.5	R 410 203 121	1.30	3.5	1
	6 ± 0.5	R 410 206 121	1.30	2.5	1
	10 ± 0.5	R 410 210 121	1.30	2	1
	20 ± 0.6	R 410 220 121	1.30	2	1
SMA	3 ± 0.4	R 411 803 119	1.25	3.5	2
	6 ± 0.5	R 411 806 119	1.25	2.5	2
	10 ± 0.5	R 411 810 119	1.25	2	2
	20 ± 0.6	R 411 820 119	1.25	2	2
DC – 15 GHz					
SMA *	3 ± 0.7	R 411 803	1.35	3.5	2
	6 ± 0.8	R 411 806	1.35	2.5	2
	10 ± 0.8	R 411 810	1.35	2	2
	20 ± 1	R 411 820	1.35	2	2
DC – 18 GHz					
SMA **	3 ± 0.8	R 411 803 121	1.35	3.5	2
	3 ± 0.3	R 413 803	1.35	2	3
	6 ± 0.8	R 411 806 121	1.35	2.5	2
	6 ± 0.3	R 413 806	1.35	2	3
	10 ± 0.9	R 411 810 121	1.35	2	2
	10 ± 0.5	R 413 810	1.35	2	3
	20 ± 1	R 411 820 121	1.35	2	2
	20 ± 0.6	R 413 820	1.35	2	3
DC – 26.5 GHz					
SMA **	3 ± 0.5	R 413 803 121	1.50	2	3
	6 ± 0.5	R 413 806 121	1.50	2	3
	10 ± 0.7	R 413 810 121	1.50	2	3
	20 ± 0.7	R 413 820 121	1.50	2	3

* Standard available in 1 dB step from 0 to 30 dB.

** Standard available in 1 dB step from 0 to 20 dB and 5 dB step to 60 dB.

Miniature Coaxial Attenuators


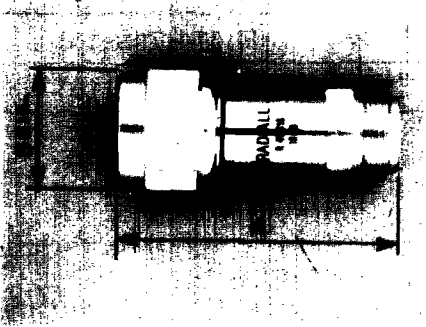

<table border="1" style="margin-bottom: 10px;"> <tr><td colspan="2" style="text-align: center;">Fig. 1</td></tr> <tr><td style="text-align: center;">A</td><td style="text-align: center;">.846 (21.5)</td></tr> <tr><td style="text-align: center;">B</td><td style="text-align: center;">.315 (8)</td></tr> </table>	Fig. 1		A	.846 (21.5)	B	.315 (8)								
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B	.315 (8)													
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Fig. 2		Fig. 3												
A	.748 (19)	.860 (21.8)												
B	.354 (9)	.300 (7.6)												

Standard Coaxial Attenuators

2 to 5 Watts

Connectors	ATTENUATION (dB)	PART NUMBER	Max. V.S.W.R.	Power (Watts)	Fig.
DC - 2 GHz					
BNC	3 ± 0.35	R 412 403	1.20	3.5	1
	6 ± 0.35	R 412 406	1.20	2.5	1
	10 ± 0.35	R 412 410	1.20	2	1
	20 ± 0.45	R 412 420	1.20	2	1
	30 ± 0.80	R 412 430	1.20	2	2
	40 ± 0.80	R 412 440	1.20	2	2
N	3 ± 0.35	R 412 703	1.15	3.5	3
	6 ± 0.35	R 412 706	1.15	2.5	3
	10 ± 0.35	R 412 710	1.15	2	3
	20 ± 0.45	R 412 720	1.15	2	3
	30 ± 0.80	R 412 730	1.15	2	4
DC - 8 GHz					
BNC	3 ± 0.50	R 414 403	1.25	3	1
	6 ± 0.50	R 414 406	1.25	3	1
	10 ± 0.50	R 414 410	1.25	3	1
	20 ± 0.50	R 414 420	1.25	3	1
	30 ± 0.80	R 414 430	1.25	3	2
	40 ± 0.80	R 414 440	1.25	3	2
DC - 12.4 GHz					
TNC	3 ± 0.70	R 414 503	1.30	5	5
	6 ± 0.70	R 414 506	1.30	3	5
	10 ± 0.70	R 414 510	1.30	3	5
	20 ± 0.70	R 414 520	1.30	3	5
N	3 ± 0.70	R 414 703	1.20	5	3
	6 ± 0.70	R 414 706	1.20	4	3
	10 ± 0.70	R 414 710	1.20	3	3
	20 ± 0.70	R 414 720	1.20	3	3
	30 ± 1.20	R 414 730	1.20	3	4
	40 ± 1.30	R 414 740	1.20	3	4

Standard Coaxial Attenuators

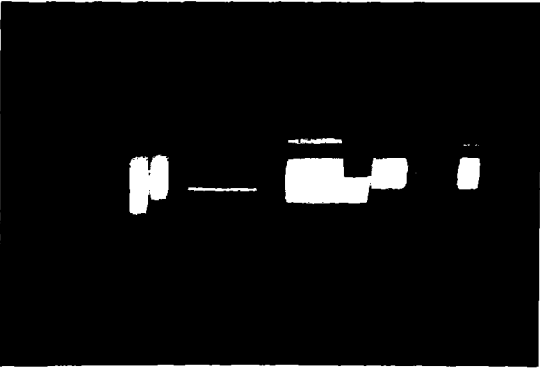
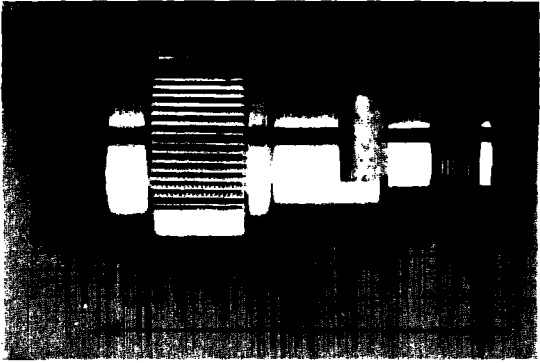
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td style="text-align: center;">Fig. 1</td> <td style="text-align: center;">Fig. 2</td> </tr> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">1.772 (45)</td> <td style="text-align: center;">2.205 (56)</td> </tr> <tr> <td style="text-align: center;">B</td> <td style="text-align: center;">.563 (14.3)</td> <td style="text-align: center;">.563 (14.3)</td> </tr> </table>		Fig. 1	Fig. 2	A	1.772 (45)	2.205 (56)	B	.563 (14.3)	.563 (14.3)		
	Fig. 1	Fig. 2									
A	1.772 (45)	2.205 (56)									
B	.563 (14.3)	.563 (14.3)									
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A	1.921 (48.8)	2.366 (60.1)									
B	.827 (21)	.827 (21)									
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	Fig. 5										
A	1.740 (44.2)										
B	.571 (14.5)										

Standard Coaxial Attenuators

2 Watts

Connectors	ATTENUATION (dB)	PART NUMBER	Max. V.S.W.R.	Power (Watts)	Fig.
DC – 18 GHz					
TNC	3 ± 0.40	R 414 503 161	1.35	2	1
	6 ± 0.40	R 414 506 161	1.35	2	1
	10 ± 0.50	R 414 510 161	1.35	2	1
	20 ± 0.60	R 414 520 161	1.35	2	1
N	3 ± 0.40	R 414 703 161	1.35	2	2
	6 ± 0.40	R 414 706 161	1.35	2	2
	10 ± 0.50	R 414 710 161	1.35	2	2
	20 ± 0.60	R 414 720 161	1.35	2	2

Standard Coaxial Attenuators

<table border="1" style="margin-bottom: 10px;"> <tr><td colspan="2" style="text-align: center;">Fig. 1</td></tr> <tr><td style="text-align: center;">A</td><td style="text-align: center;">1.378 (35)</td></tr> <tr><td style="text-align: center;">B</td><td style="text-align: center;">.630 (16)</td></tr> </table> <p style="margin-left: 20px;">Hex .551(14)/flats</p>	Fig. 1		A	1.378 (35)	B	.630 (16)	
Fig. 1							
A	1.378 (35)						
B	.630 (16)						
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Fig. 2							
A	1.614 (41)						
B	.827 (21)						

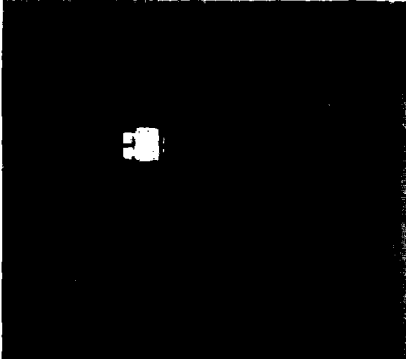
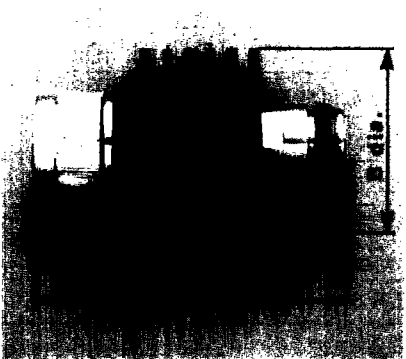
XVIII

Medium Power Coaxial Attenuators

10 to 20 Watts

Connectors	ATTENUATION (dB)	PART NUMBER	Max. V.S.W.R.	Power (Watts)	Fig.
DC - 8 GHz					
SMA	3 ± 0.3	R 415 303	1.25	15	1
	6 ± 0.3	R 415 306	1.25	12	1
	10 ± 0.3	R 415 310	1.25	10	1
	20 ± 0.5	R 415 320	1.25	10	1
N	3 ± 0.3	R 415 703	1.20	15	2
	6 ± 0.3	R 415 706	1.20	12	2
	10 ± 0.3	R 415 710	1.20	10	2
	20 ± 0.5	R 415 720	1.20	10	2
DC - 18 GHz					
N	3 ± 0.5	R 416 003	1.40	20	3
	6 ± 0.5	R 416 006	1.40	12	3
	10 ± 0.5	R 416 010	1.40	10	3
	20 ± 0.5	R 416 020	1.40	10	3

Medium Power Coaxial Attenuators

<table border="1"> <tr> <td colspan="2" style="text-align: center;">Fig. 1</td> </tr> <tr> <td>A</td> <td>1.150 (29.2)</td> </tr> <tr> <td>B</td> <td>1.024 (26)</td> </tr> </table>	Fig. 1		A	1.150 (29.2)	B	1.024 (26)					
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A	1.150 (29.2)										
B	1.024 (26)										
<table border="1"> <tr> <td colspan="2" style="text-align: center;">Fig. 2</td> <td style="text-align: center;">Fig. 3</td> </tr> <tr> <td>A</td> <td>1.921 (48.8)</td> <td>2.618 (66.5)</td> </tr> <tr> <td>B</td> <td>1.024 (26)</td> <td>1.614 (41)</td> </tr> </table>	Fig. 2		Fig. 3	A	1.921 (48.8)	2.618 (66.5)	B	1.024 (26)	1.614 (41)		
Fig. 2		Fig. 3									
A	1.921 (48.8)	2.618 (66.5)									
B	1.024 (26)	1.614 (41)									

XVIII

High Power Coaxial Attenuators

10 to 65 Watts

Connectors	ATTENUATION (dB)	PART NUMBER	Max. V.S.W.R.	Power (Watts)	Fig.
DC - 4 GHz (with cooling fins)					
N	3 ± 0.4	R 416 403	1.35	36	1
	6 ± 0.5	R 416 406	1.35	23	1
	10 ± 0.5	R 416 410	1.35	20	1
	20 ± 0.8	R 416 420	1.35	20	1
DC - 4 GHz (with infinite heat sink)					
N	3 ± 0.4	R 416 503	1.35	65	2
	6 ± 0.5	R 416 506	1.35	38	2
	10 ± 0.5	R 416 510	1.35	33	2
	20 ± 0.8	R 416 520	1.35	33	2
	30 ± 1	R 416 530 *	1.35	33	3
2 - 18 GHz					
N	3 ± 0.3	R 417 403	1.35	50	4
	6 ± 0.3	R 417 406	1.35	50	5
	10 ± 0.4	R 417 410	1.35	50	6

* Asymmetrical model.

Fig. 1	
A	3.465 (88)
B	.492 (12.5)
C	1.772 (45)
D	2.756 (70)

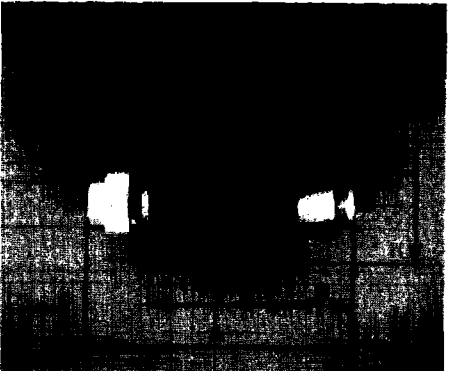


Fig. 2 Fig. 3		
A	3.465 (88)	4.134 (105)
B	.492 (12.5)	.492 (12.5)
C	1.772 (45)	1.772 (45)
D	1.260 (32)	1.260 (32)

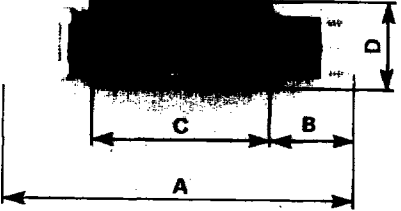
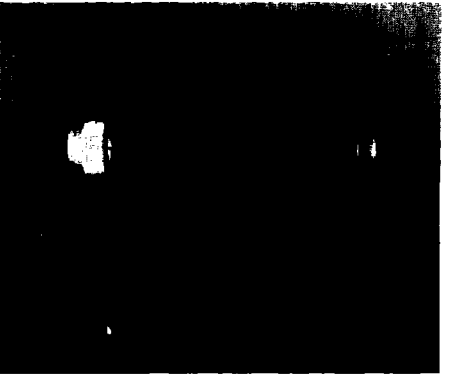



Fig. 4 Fig. 5 Fig. 6			
A	4.449 (113)	5.905 (150)	7.461 (189.5)
B	3.150 (80)	3.150 (80)	3.150 (80)

Variable Coaxial Attenuators

step by step

Connectors	ATTENUATION (dB)	PART NUMBER	Max. V.S.W.R.	Step (dB)	Fig.
DC – 4 GHz					
N male/female	0 to 5	R 418 035	1.25	1	1
	0 to 25	R 418 040	1.25	5	1
	0 to 50	R 418 045	1.25	10	2
DC – 12.4 GHz					
N male/female	0 to 5	R 418 505	1.30	1	3
	0 to 25	R 418 525	1.30	5	3
	0 to 50	R 418 550	1.30	10	4

continuously

Connectors	ATTENUATION (dB)	PART NUMBER	Max. V.S.W.R.	Step	Fig.
2 – 12.4 GHz					
SMA female	0 to 20	R 419 133	1.50	*	5
N female	0 to 40	R 419 157	1.50	*	6
7 – 18 GHz					
SMA female	0 to 20	R 419 213	1.50	**	7

* These attenuators are not calibrated. They are adjusted by the micrometer drive head, and has a positive locking feature.
 **This attenuator is not calibrated. It is adjusted by screw driver.

Variable Coaxial Attenuators

Fig. 1 Fig. 2

A	3.520 (89.4)	4.016 (102)
B	2.500 (63.5)	2.500 (63.5)
C	.866 (22)	.866 (22)
D	1.917 (48.7)	2.398 (60.9)

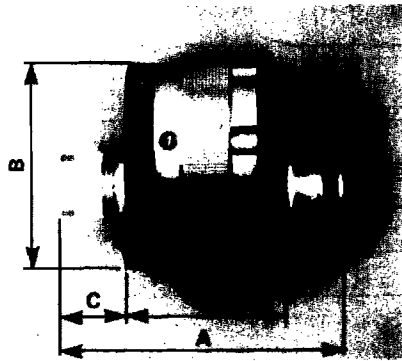


Fig. 3 Fig. 4

A	4.291 (109)	4.764 (121)
B	3.780 (96)	3.780 (96)
C	.630 (16)	.630 (16)
D	3.346 (85)	3.346 (85)

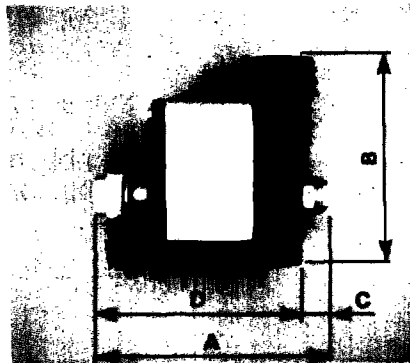


Fig. 5 Fig. 6 Fig. 7

A	5.905 (150)	5.905 (150)	1.744 (44.3)
B	5.039 (128)	5.039 (128)	2.055 (52.2)
C	4.724 (120)	4.724 (120)	.874 (22.2)



XVIII

SMA Programmable Step Attenuators

DC – 18 GHz

ATTENUATION range (dB)	Step (dB)	PART NUMBER	Actuator Voltage (V)	Switching time (ms)	Switching current (mA)	Loss (dB)	Weight (g)	Fig.
DC – 18 GHz								
0 – 11	1	R 522 221 xxx	24 – 30	≤ 20	< 80	0.5+0.04F	< 200	1
0 – 75	5	R 522 391 xxx	24 – 30	≤ 20	< 80	0.5+0.04F	< 200	1
0 – 70	10	R 522 461 xxx	24 – 30	≤ 20	< 80	0.4+0.03F	< 150	2
0 – 110	10	R 522 481 xxx	24 – 30	≤ 20	< 80	0.5+0.04F	< 200	1

PART NUMBER INFORMATION

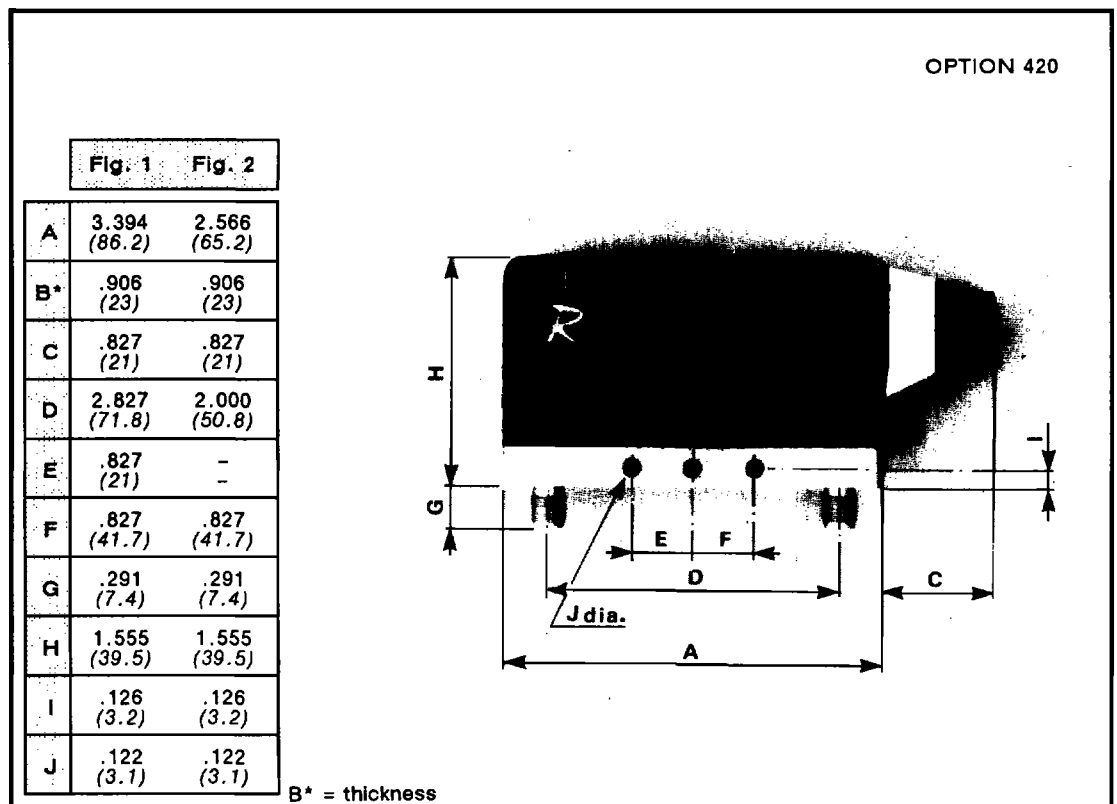
R 522 xxx xxx

Attenuation

Options

- 220 : Viking connector + 5 feet cable.
- 230 : TTL driver / 19 inches ribbon cable
- 320 : 19 inches ribbon cable
- 420 : Viking connector jack.
- 530 : TTL driver / D.Sub connector socket.

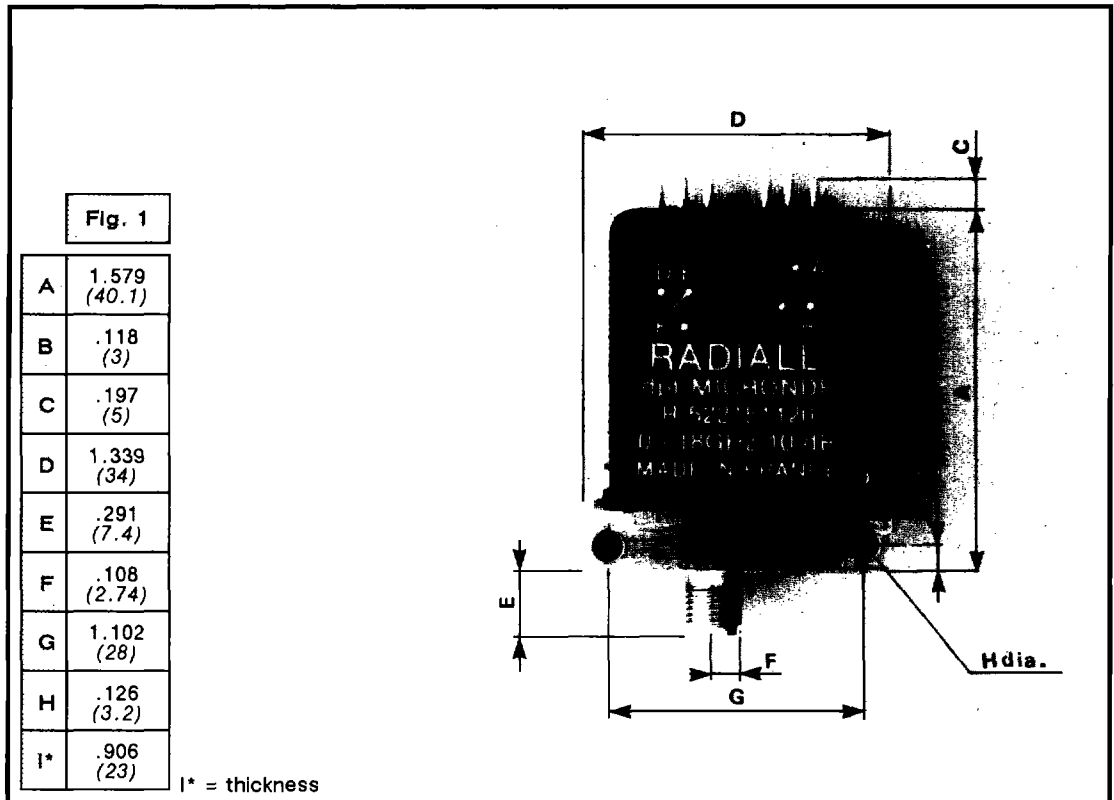
Ex : R 552 221 320



SMA Switchable Attenuators

DC – 18 GHz

ATTENUATION (dB)	PART NUMBER	Actuator Voltage (V)	Switching time (ms)	Switching current (mA)	Loss (dB)	Weight (g)	Fig.
DC – 18 GHz							
5	R 522 301 120	24 – 30	< 20	< 80	0.5	52	1
10	R 522 111 120	24 – 30	< 20	< 80	0.5	52	1
20	R 522 131 120	24 – 30	< 20	< 80	0.5	52	1
30	R 522 151 120	24 – 30	< 20	< 80	0.5	52	1



XVIII