



**AMERICAN MICROWAVE
CORPORATION**

**TEST DATA
ON**

600 MHz TO 20 GHz

AND

10 GHz TO 20 GHz

LOW LOSS

HIGH SPEED

HIGH ISOLATION

DRIVERLESS, REFLECTIVE

SPST

PIN DIODE SWITCH

AMC MODEL No:

SW-2184-1 OPT. 0620

(DETAILED REPORT ON SERIAL NUMBER: 1MS903144)

SW-2184-1 OPT. 1020

**(DETAILED REPORT ON SERIAL NUMBER: 1MS903144 AND
DATA SHEETS ON SERIAL NUMBERS 1MS903133 AND 1MS903134)**

TESTED, REPORTED AND PREPARED

BY

FRANK RETHMEIER

RENE AFABLE

JULY 23, 1999

WEB PAGE: [HTTP://WWW.AMWAVE.COM](http://www.amwave.com)

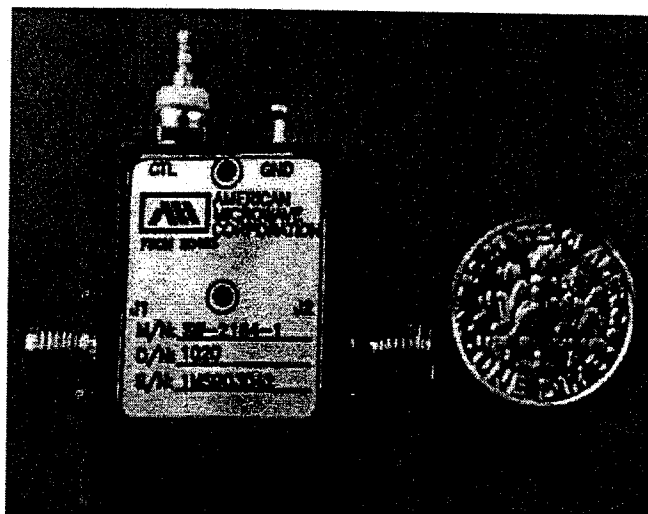
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**AMERICAN MICROWAVE
CORPORATION**

REFLECTIVE SPST PIN DIODE SWITCH



KEY FEATURES

- 600 MHz TO 20 GHz
- LOW INSERTION LOSS
- HIGH SPEED
- HIGH ISOLATION
- SMALL SIZE
- LIGHT WEIGHT

AMC MODEL No: SW-2184-1 OPT. 0620

SPECIFICATIONS: (REFLECTIVE)

● FREQUENCY RANGE	:	600 MHz TO 20 GHz
● INSERTION LOSS	:	2.5 dB MAX.
	:	1.0 dB MAX. ≤ 2.0 GHz
	:	1.2 dB MAX. ≤ 4.0 GHz
	:	1.5 dB MAX. ≤ 8.0 GHz
	:	2.0 dB MAX. ≤ 12.4 GHz
	:	2.5 dB MAX. ≤ 20.0 GHz
● ISOLATION	:	45 dB MIN.
	:	45 dB MIN. ≤ 1.0 GHz
	:	70 dB MIN. 1.0 to 2.0 GHz
	:	85 dB MIN. 2.0 to 12.4 GHz
	:	80 dB MIN. 12.4 to 18.0 GHz
	:	70 dB MIN. 18.0 to 20.0 GHz
● VSWR	:	2.0:1 MAX.
	:	1.4:1 MAX. ≤ 4.0 GHz
	:	1.6:1 MAX. ≤ 8.0 GHz
	:	1.9:1 MAX. ≤ 20.0 GHz
● SWITCHING SPEED	:	DELAY ON: 10 ns MAX.
	:	DELAY OFF: 10 ns MAX.
● VIDEO TRANSIENTS	:	≤ 450 mV PEAK TO PEAK, 300 MHz BANDWIDTH
	:	≤ 180 mV PEAK TO PEAK, 20 MHz BANDWIDTH
● RF INPUT POWER	:	2 W AVERAGE
	:	10 W PEAK, 1 μs PULSE WIDTH
● DC BIAS REQUIREMENTS	:	RATED INSERTION LOSS @ -10 V
	:	RATED ISOLATION @ +35 mA
● SIZE	:	0.79" X 0.88" X 0.48"
● WEIGHT	:	1.1 oz.

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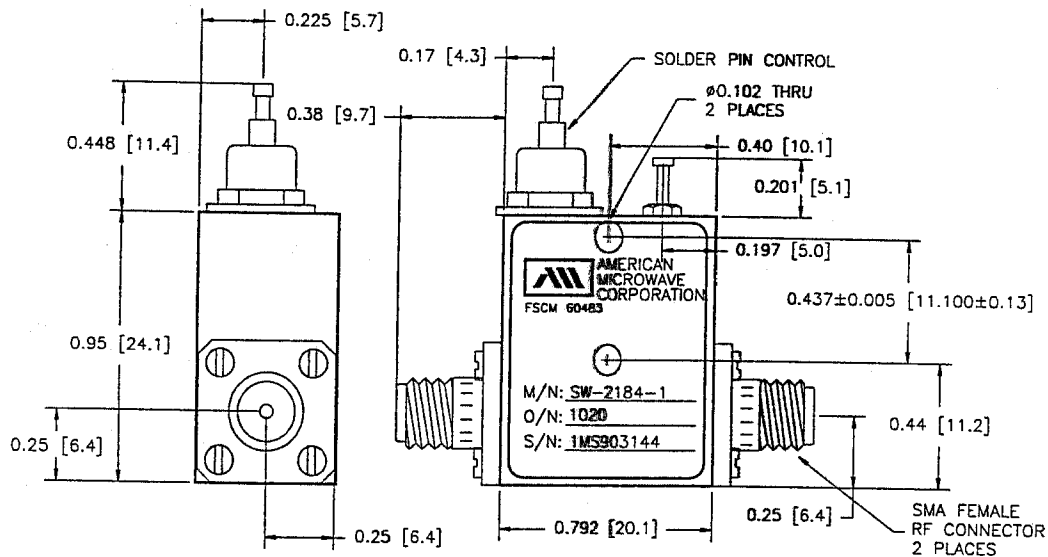
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SUMMARY TEST DATA



MODEL NUMBER
SERIAL NUMBER
ENGINEER
BIAS VOLTAGE & CURRENT

: SW-2184-1 OPT. 0620
: 1MS903144
: Frank Rethmeier
: -10 V "ON", +35 mA "OFF"



ALL DIMENSIONS ARE IN INCHES.
TOLERANCES:

X.XX	±0.02
X.XXX	±0.01

ENVIRONMENTAL RATINGS

- | | |
|---------------------|---|
| • TEMPERATURE | -54°C TO +85°C (OPERATING)
-65°C TO +125°C (STORAGE) |
| • HUMIDITY | MIL-STD-202F, METHOD 103B COND. B |
| • SHOCK | MIL-STD-202F, METHOD 213B COND. B |
| • VIBRATION | MIL-STD-202F, METHOD 204D COND. B |
| • ALTITUDE | MIL-STD-202F, METHOD 105C COND. B |
| • TEMPERATURE CYCLE | MIL-STD-202F, METHOD 107D COND. A |

NOTE: THE ABOVE SPECIFICATIONS ARE SUBJECT TO CHANGE OR REVISION.

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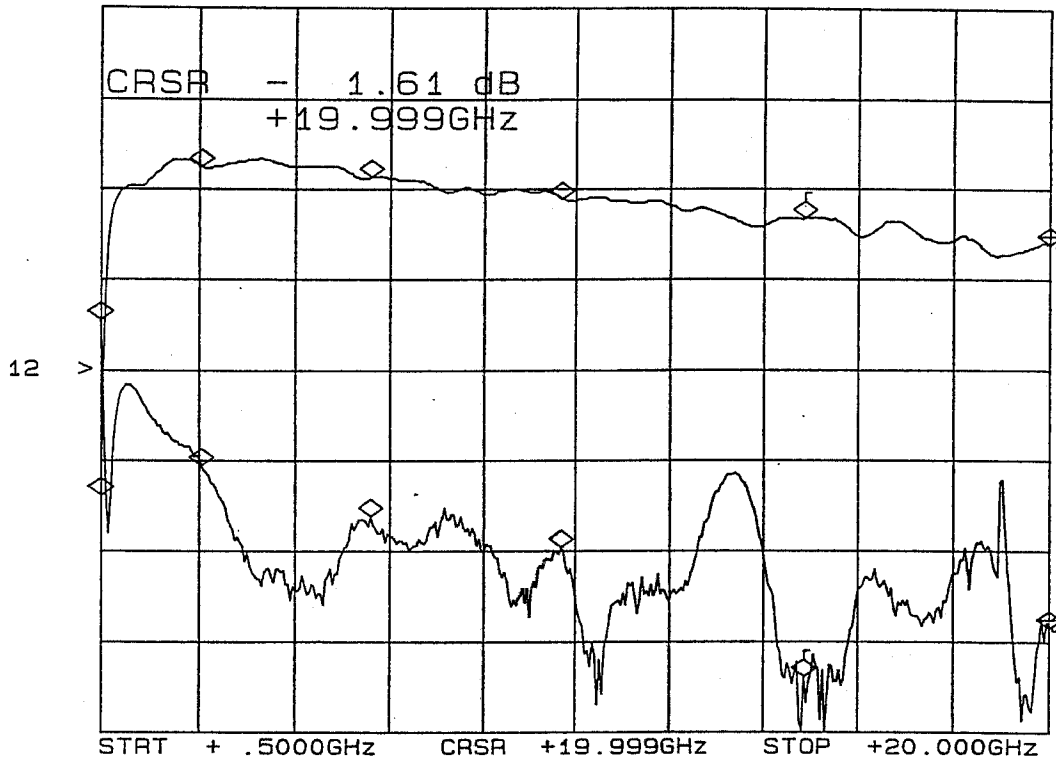
SUMMARY TEST DATA



MODEL NUMBER : SW-2184-1 OPT. 0620
 SERIAL NUMBER : 1MS903144
 ENGINEER : Frank Rethmeier
 BIAS VOLTAGE & CURRENT : -10 V "ON", +35 mA "OFF"

INSERTION LOSS & RETURN LOSS*
 J1-J2; BIAS VOLTAGE -10 V "ON"

CH1: A -M - 1.61 dB CH2: B -M - 23.73 dB
 1.0 dB/ REF - 3.00 dB 5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
500 MHz	4.39 dB	6.7 dB
2.5 GHz	0.75 dB	14.8 dB
6 GHz	0.87 dB	17.6 dB
10 GHz	1.10 dB	19.3 dB
15 GHz	1.32 dB	26.4 dB
20 GHz	1.61 dB	23.7 dB

*J1: INPUT ARM

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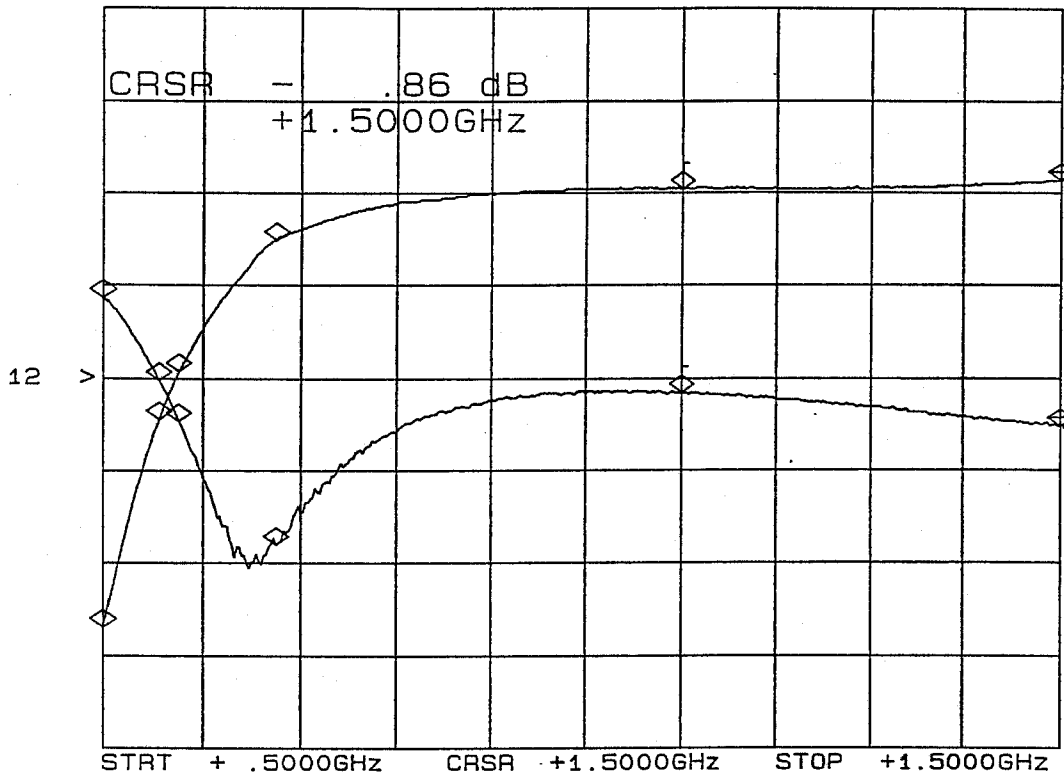
SUMMARY TEST DATA



MODEL NUMBER : SW-2184-1 OPT. 0620
 SERIAL NUMBER : 1MS903144
 ENGINEER : Frank Rethmeier
 BIAS VOLTAGE & CURRENT : -10 V "ON", +35 mA "OFF"

INSERTION LOSS & RETURN LOSS*
 J1-J2; BIAS VOLTAGE -10 V "ON"

CH1: A -M - .86 dB CH2: B -M - 12.06 dB
 1.0 dB/ REF - 3.00 dB 5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
500 MHz	5.68 dB	5.1 dB
555 MHz	3.43 dB	9.6 dB
575 MHz	2.92 dB	11.8 dB
675 MHz	1.50 dB	18.5 dB
1.1 GHz	0.95 dB	10.2 dB
1.5 GHz	0.86 dB	12.1 dB

*J1: INPUT ARM

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SUMMARY TEST DATA

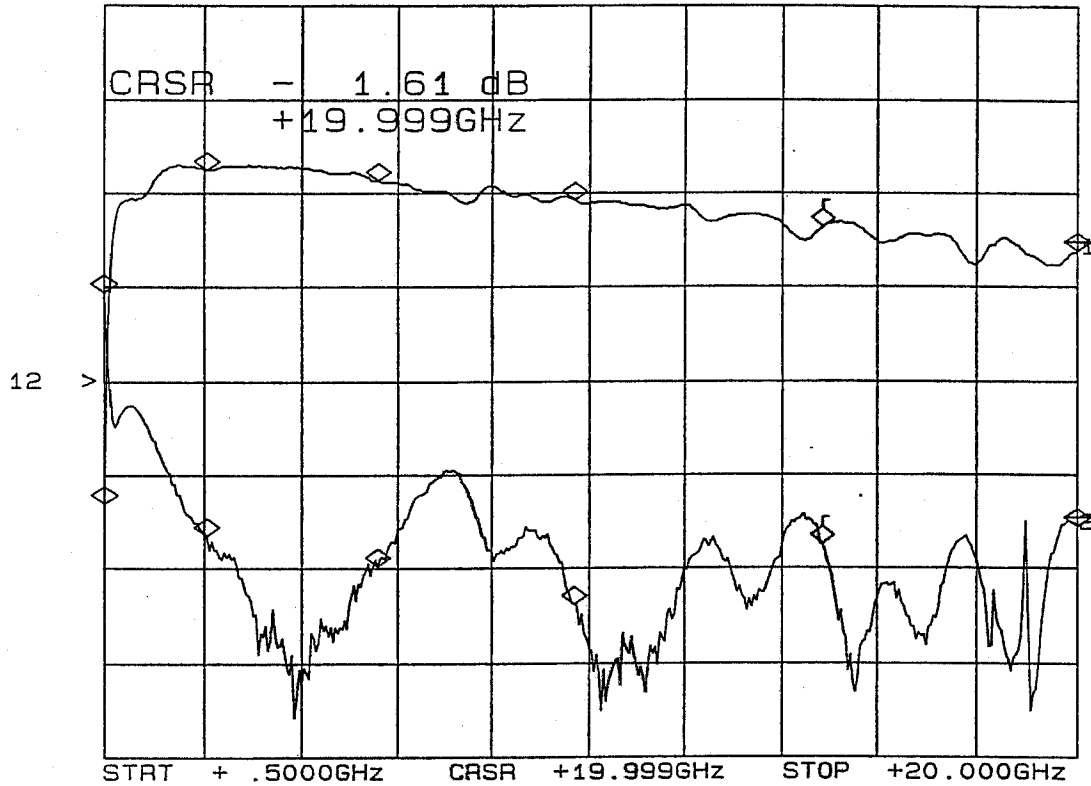


MODEL NUMBER : SW-2184-1 OPT. 0620
 SERIAL NUMBER : 1MS903144
 ENGINEER : Frank Rethmeier
 BIAS VOLTAGE & CURRENT : -10 V "ON", +35 mA "OFF"

INSERTION LOSS & RETURN LOSS*

J2-J1; BIAS VOLTAGE -10 V "ON"

CH1: A -M - 1.61 dB CH2: B -M - 17.30 dB
 1.0 dB/ REF - 3.00 dB 5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
500 MHz	4.30 dB	4.8 dB
2.5 GHz	0.74 dB	17.7 dB
6 GHz	0.87 dB	19.4 dB
10 GHz	1.07 dB	21.4 dB
15 GHz	1.35 dB	18.3 dB
20 GHz	1.61 dB	17.3 dB

*J2: INPUT ARM

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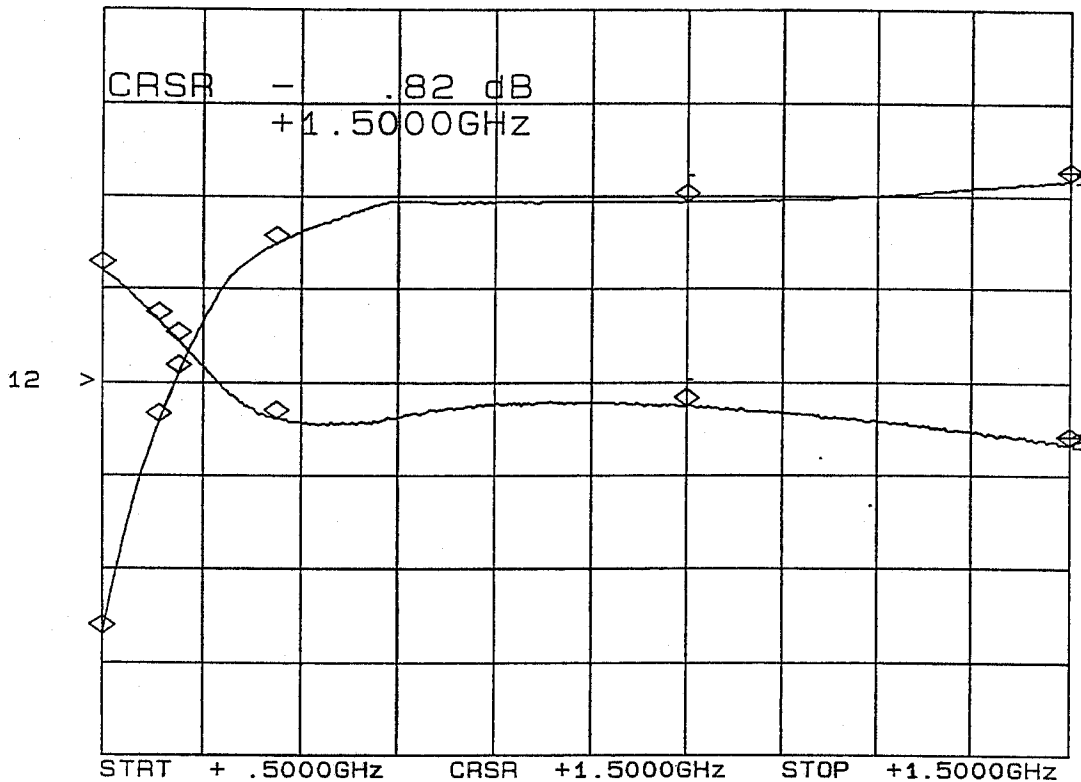
SUMMARY TEST DATA



MODEL NUMBER : SW-2184-1 OPT. 0620
 SERIAL NUMBER : 1MS903144
 ENGINEER : Frank Rethmeier
 BIAS VOLTAGE & CURRENT : -10 V "ON", +35 mA "OFF"

INSERTION LOSS & RETURN LOSS*
 J2-J1; BIAS VOLTAGE -10 V "ON"

CH1: A -M - .82 dB CH2: B -M - 12.86 dB
 1.0 dB/ REF - 3.00 dB 5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
500 MHz	5.68 dB	3.5 dB
555 MHz	3.41 dB	6.2 dB
575 MHz	2.89 dB	7.3 dB
675 MHz	1.50 dB	11.4 dB
1.1 GHz	1.05 dB	10.7 dB
1.5 GHz	0.82 dB	12.9 dB

*J2: INPUT ARM

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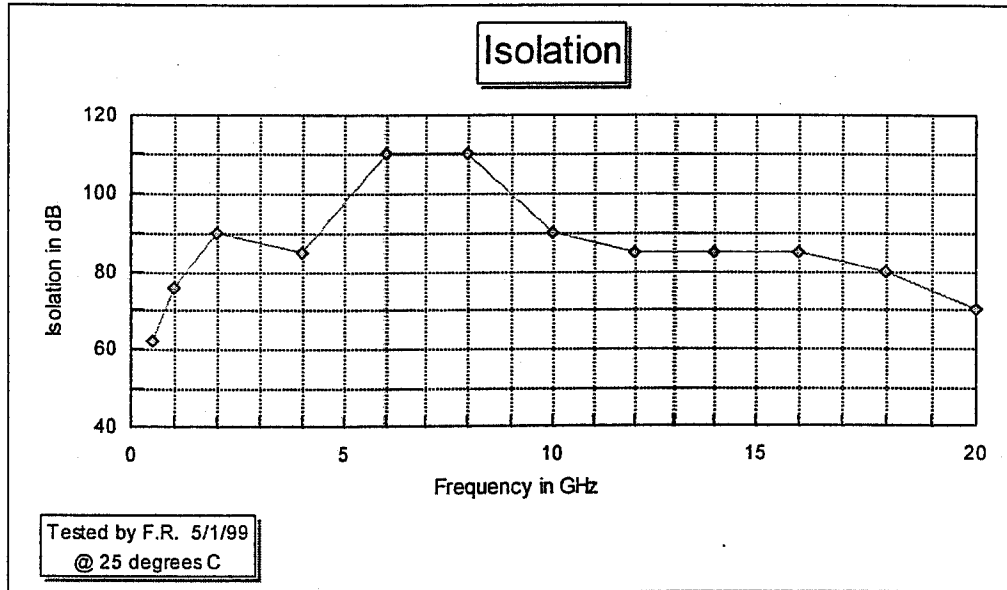
SUMMARY TEST DATA



MODEL NUMBER : SW-2184-1 OPT. 0620
SERIAL NUMBER : 1MS903144
ENGINEER : Frank Rethmeier
BIAS VOLTAGE & CURRENT : -10 V "ON", +35 mA "OFF"

ISOLATION*

(AS MEASURED ON SPECTRUM ANALYZER HP 8559A)
 BIAS CURRENT +35 mA "OFF"



FREQUENCY	ISOLATION
500 MHz	62 dB
1 GHz	76 dB
2 GHz	>90 dB
4 GHz	85 dB
6 GHz	>110 dB
8 GHz	>110 dB
10 GHz	>90 dB
12 GHz	>85 dB
14 GHz	>85 dB
16 GHz	>85 dB
18 GHz	>80 dB
20 GHz	>70 dB

*J1: INPUT ARM

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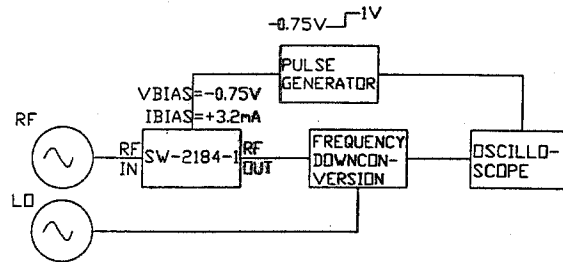
SUMMARY TEST DATA



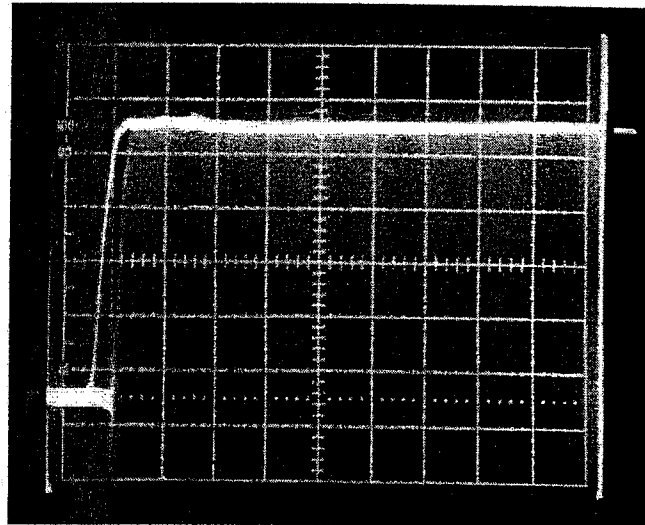
MODEL NUMBER : SW-2184-1 OPT. 0620
SERIAL NUMBER : 1MS903144
ENGINEER : Frank Rethmeier
BIAS VOLTAGE & CURRENT : -10 V "ON", +35 mA "OFF"

SWITCHING SPEED

"Rise/Fall" Time: 10% RF to 90% RF & 90% RF to 10% RF
 "On/Off" Time: 50% LOGIC to 90% RF or 10% RF

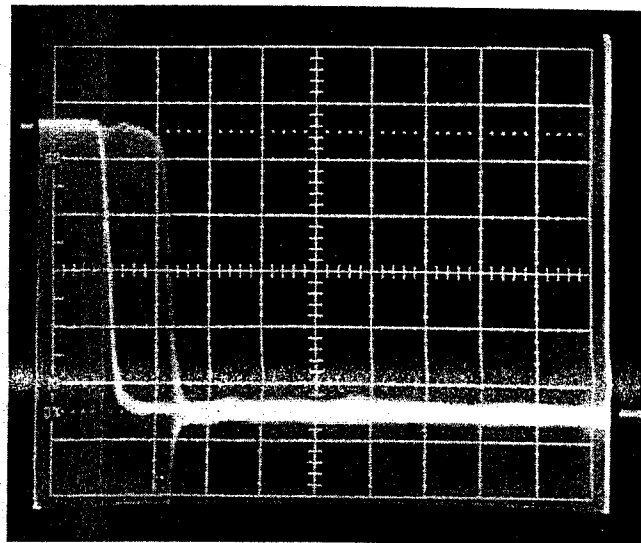


"DELAY ON": 5 ns
 "RISE TIME": ≤ 2 ns



HORIZONTAL SCALE: 10 ns PER DIVISION

"DELAY OFF": 11 ns
 "FALL TIME": ≤ 2 ns



HORIZONTAL SCALE: 10 ns PER DIVISION

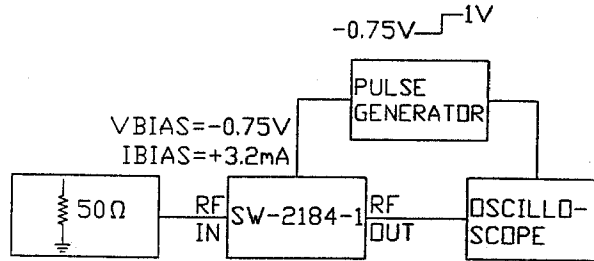
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SUMMARY TEST DATA



MODEL NUMBER : SW-2184-1 OPT. 0620
SERIAL NUMBER : 1MS903144
ENGINEER : Frank Rethmeier
BIAS VOLTAGE & CURRENT : -10 V "ON", +35 mA "OFF"

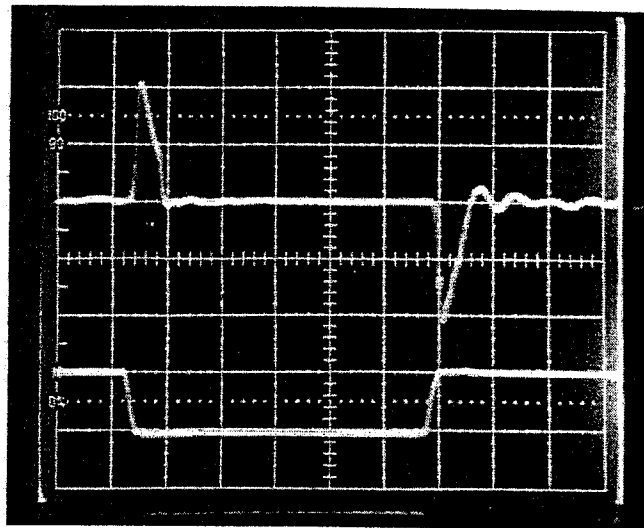
VIDEO TRANSIENTS



≤ 420 mV P-P
 MEASURED IN A
 300 MHZ BANDWIDTH

VERTICAL SCALE:
 100 mV PER DIVISION

CONTROL SIGNAL
 (NO VERTICAL SCALE)

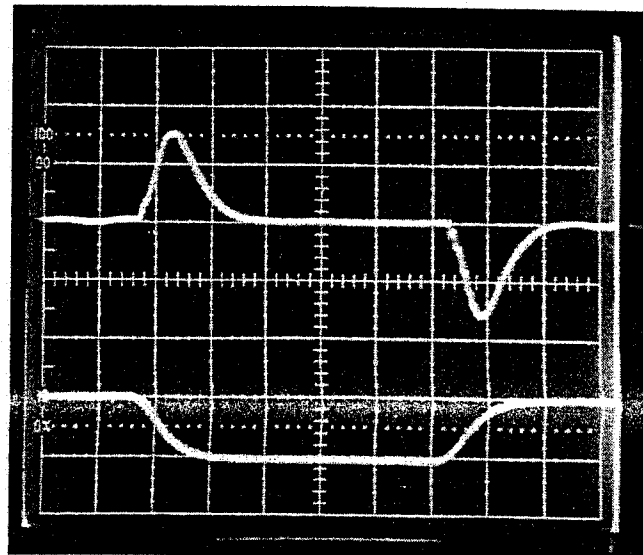


HORIZONTAL SCALE: 20 ns PER DIVISION

≤ 150 mV P-P
 MEASURED IN A
 20 MHZ BANDWIDTH

VERTICAL SCALE:
 50 mV PER DIVISION

CONTROL SIGNAL
 (NO VERTICAL SCALE)



HORIZONTAL SCALE: 20 ns PER DIVISION

July 23, 1999



**AMERICAN MICROWAVE
CORPORATION**

TEST DATA

ON

10 GHz TO 20 GHz

LOW LOSS

HIGH SPEED

HIGH ISOLATION

DRIVERLESS, REFLECTIVE

SPST

PIN DIODE SWITCH

AMC MODEL No:

SW-2184-1 OPT. 1020

**(DETAILED REPORT ON SERIAL NUMBER: 1MS903144 AND
DATA SHEETS ON SERIAL NUMBERS 1MS903133 AND 1MS903134)**

TESTED, REPORTED AND PREPARED

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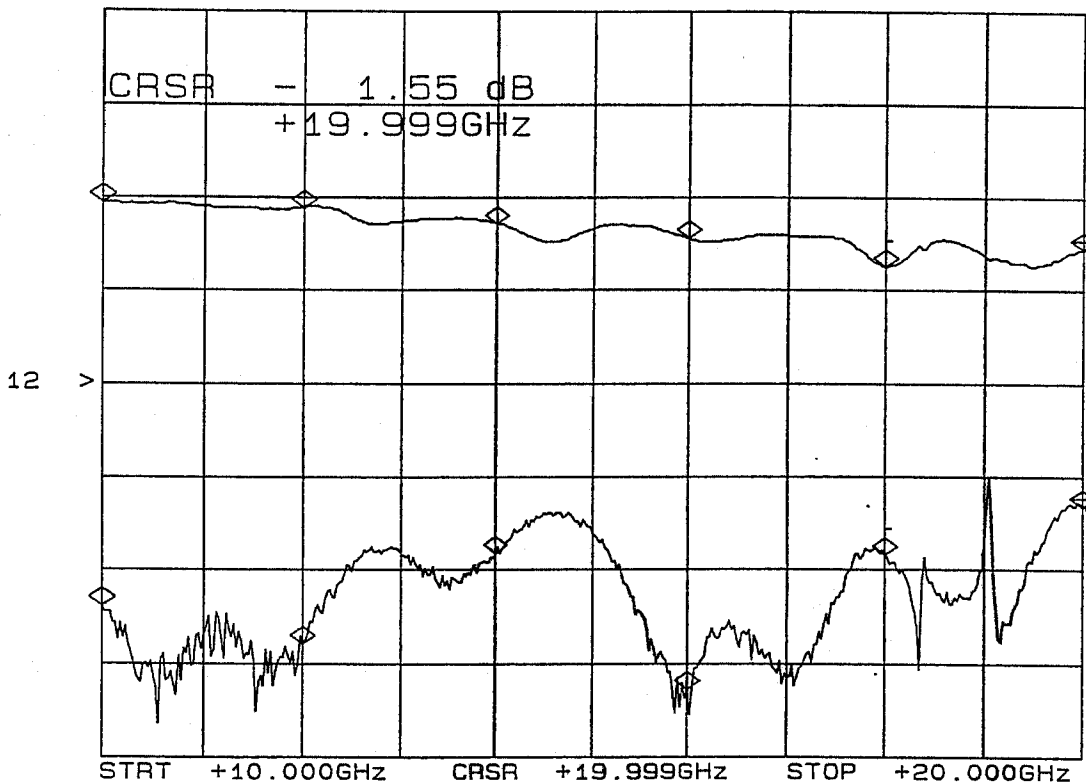
SUMMARY TEST DATA



MODEL NUMBER : SW-2184-1 OPT. 1020
SERIAL NUMBER : 1MS903144
ENGINEER : Frank Rethmeier
BIAS VOLTAGE & CURRENT : -10 V "ON", +35 mA "OFF"

INSERTION LOSS & RETURN LOSS*
J1-J2; BIAS VOLTAGE -10 V "ON"

CH1: A -M - 1.55 dB CH2: B -M - 16.10 dB
 1.0 dB/ REF - 3.00 dB 5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
10 GHz	1.04 dB	22.2 dB
12 GHz	1.10 dB	24.4 dB
14 GHz	1.27 dB	18.7 dB
16 GHz	1.45 dB	25.1 dB
18 GHz	1.74 dB	18.5 dB
20 GHz	1.55 dB	16.1 dB

*J1: INPUT ARM

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SUMMARY TEST DATA

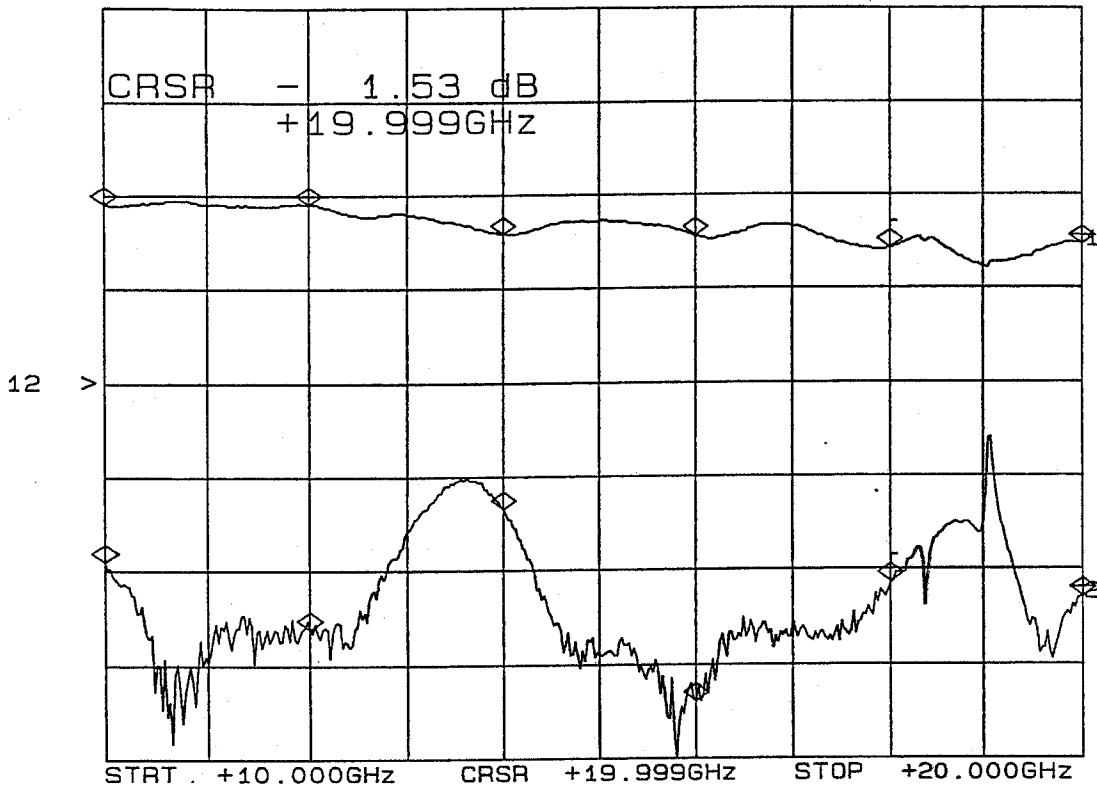


MODEL NUMBER : SW-2184-1 OPT. 1020
 SERIAL NUMBER : 1MS903144
 ENGINEER : Frank Rethmeier
 BIAS VOLTAGE & CURRENT : -10 V "ON", +35 mA "OFF"

INSERTION LOSS & RETURN LOSS*

J2-J1; BIAS VOLTAGE -10 V "ON"

CH1: A -M - 1.53 dB CH2: B -M - 20.94 dB
 1.0 dB/ REF - 3.00 dB 5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
10 GHz	1.09 dB	19.4 dB
12 GHz	1.07 dB	22.7 dB
14 GHz	1.40 dB	16.3 dB
16 GHz	1.43 dB	26.8 dB
18 GHz	1.56 dB	20.3 dB
20 GHz	1.53 dB	20.9 dB

*J2: INPUT ARM

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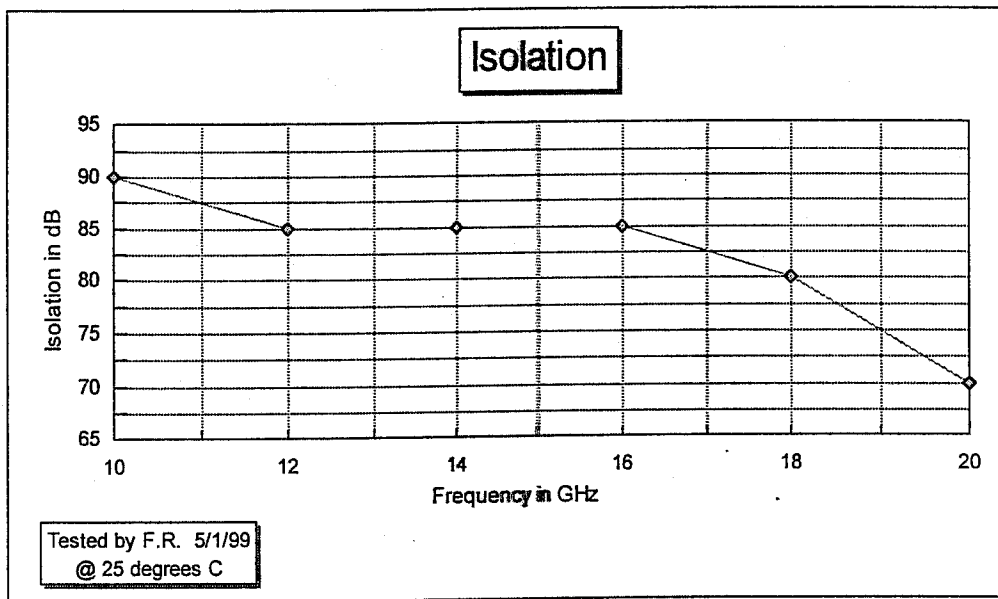
SUMMARY TEST DATA



MODEL NUMBER : SW-2184-1 OPT. 1020
SERIAL NUMBER : 1MS903144
ENGINEER : Frank Rethmeier
BIAS VOLTAGE & CURRENT : -10 V "ON", +35 mA "OFF"

ISOLATION*

(AS MEASURED ON SPECTRUM ANALYZER HP 8559A)
 BIAS CURRENT +35 mA "OFF"



FREQUENCY	ISOLATION
10 GHz	>90 dB
12 GHz	>85 dB
14 GHz	>85 dB
16 GHz	>85 dB
18 GHz	>80 dB
20 GHz	>70 dB

* J1: INPUT ARM

July 23, 1999



**AMERICAN MICROWAVE
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APPENDIX A

SUMMARY TEST DATA SHEETS

ON

DRIVERLESS

REFLECTIVE

SPST

PIN DIODE SWITCH

**AMC MODEL No:
SW-2184-1 OPT. 1020**

SERIAL NUMBERS 1MS903133 AND 1MS903134

MEASURED

AT

10 GHz TO 20 GHz

JULY 23, 1999

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SUMMARY TEST DATA



MODEL NUMBER : SW-2184-1 OPT. 1020
 SERIAL NUMBER : 1MS903133

FORM: SW-DATA 27/0199



AMERICAN MICROWAVE CORPORATION

DATE: 5/4/99

FINAL TEST DATA
 ON
 MICROWAVE SWITCH

CUSTOMER: Max-Planck-Institut, Germany TECHNICIAN: F.R.
 JOB NO: 303042E
 MODEL NO: SW-2184-1 Opt. 1020 FREQUENCY RANGE: 10 to 20 GHz
 SERIAL NO: 1MS 903133

INSERTION LOSS	RETURN LOSS					
	INPUT dB	INPUT VSWR	OUTPUT ON dB	OUTPUT ON VSWR	OUTPUT OFF dB	OUTPUT OFF VSWR
<u>max. 2.17 dB</u>	<u>min. 12.93</u>	<u>1.58:1 max.</u>	<u>min 11.62</u>	<u>1.71:1 max</u>		

ISOLATION	SWITCHING SPEED			
	DELAY ON	RISE TIME	DELAY OFF	FALL TIME
<u>> 70 dB</u>	<u>≤ 10 ns</u>		<u>≤ 10 ns</u>	

NOTE: Any additional test data on back

TESTED ON: HP 8757B

TEST: F.R.
 QA/QC: 03 MAY 06 1999
 DATED: 5/4/99

July 23, 1999

SUMMARY TEST DATA



MODEL NUMBER : SW-2184-1 OPT. 1020
 SERIAL NUMBER : 1MS903134

FORM: SW-DATA 27/0199



AMERICAN MICROWAVE CORPORATION

DATE: 5/4/99

FINAL TEST DATA
 ON
 MICROWAVE SWITCH

CUSTOMER: Max-Planck-Institut, Germany TECHNICIAN: F.R.
 JOB NO: 903042E
 MODEL NO: SW-2184-1 Opt. 1020 FREQUENCY RANGE: 10 to 20 GHz
 SERIAL NO: 1MS903134

INSERTION LOSS	RETURN LOSS					
	INPUT dB	INPUT VSWR	OUTPUT ON dB	OUTPUT ON VSWR	OUTPUT OFF dB	OUTPUT OFF VSWR
<u>max. 1.66dB</u>	<u>min. 12.42</u>	<u>max. 1.63:1</u>	<u>min. 12.40</u>	<u>max. 1.63:1</u>		

ISOLATION	SWITCHING SPEED			
	DELAY ON	RISE TIME	DELAY OFF	FALL TIME
<u>> 80dB</u>	<u>≤ 10ns</u>		<u>≤ 10ns</u>	

NOTE: Any additional test data on back

TESTED ON: HP 8757B

TEST: E 236 F.R.
 QA/QC: (03) MAY 06 1999
 DATED: 5/4/99

July 23, 1999



**AMERICAN MICROWAVE
CORPORATION**

APPENDIX B

MISCELLANEOUS

TEST DATA AND PLOTS

ON

ISOLATION

FROM 600 MHz TO 20 GHz

AND

10 GHz TO 20 GHz

DRIVERLESS

REFLECTIVE

SPST

PIN DIODE SWITCH

AMC MODEL No:

SW-2184-1 OPT. 0620

(SERIAL NUMBER: 1MS903144)

SW-2184-1 OPT. 1020

(SERIAL NUMBER: 1MS903144)

AS MEASURED

ON AN HP 8757A SCALAR NETWORK ANALYZER

(THE NOISE FLOOR OF THE SCALAR NETWORK ANALYZER IS ABOUT -70 dBm.)

JULY 23, 1999

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SUMMARY TEST DATA

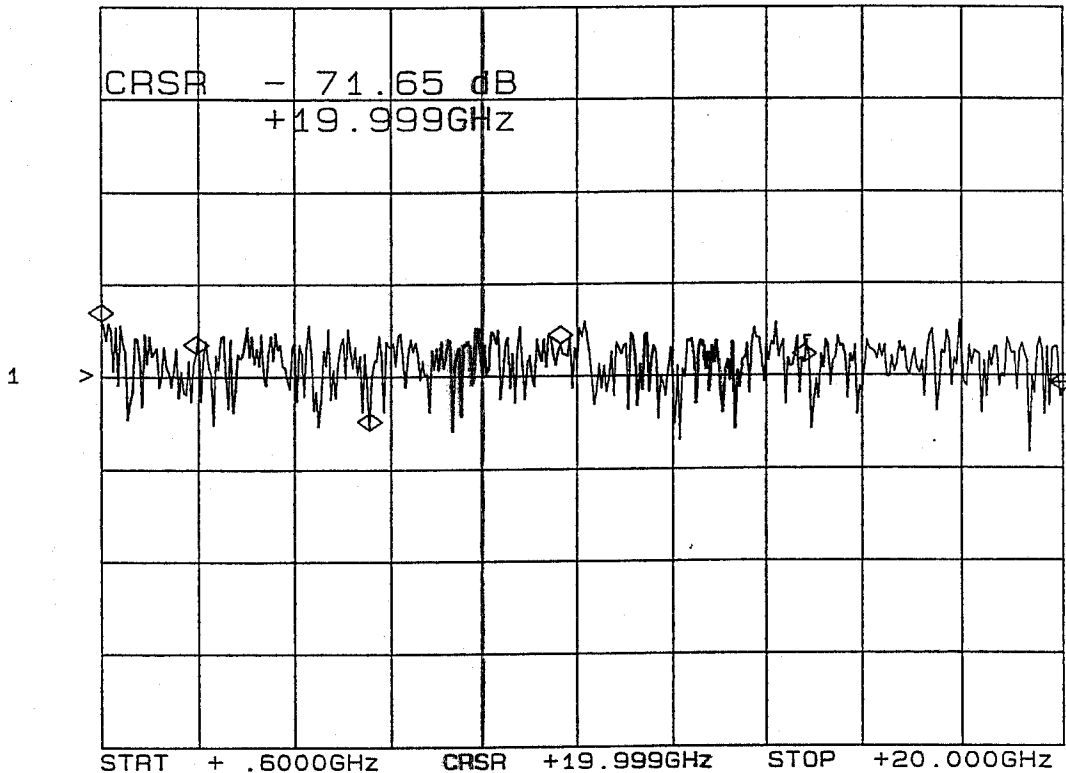


MODEL NUMBER : SW-2184-1 OPT. 1020
SERIAL NUMBER : 1MS903144
ENGINEER : Frank Rethmeier
BIAS VOLTAGE & CURRENT : -10 V "ON", +35 mA "OFF"

ISOLATION*

(AS MEASURED ON SCALAR NETWORK ANALYZER HP 8757A)
 J1-J2; BIAS CURRENT +35 mA "OFF"

CH1: A -M - 71.65 dB
 10.0 dB/ REF - 70.00 dB



FREQUENCY	ISOLATION
600 MHz	64.0 dB
2.5 GHz	67.5 dB
6 GHz	75.6 dB
10 GHz	66.4 dB
15 GHz	68.6 dB
20 GHz	71.6 dB

*J1: INPUT ARM

July 23, 1999

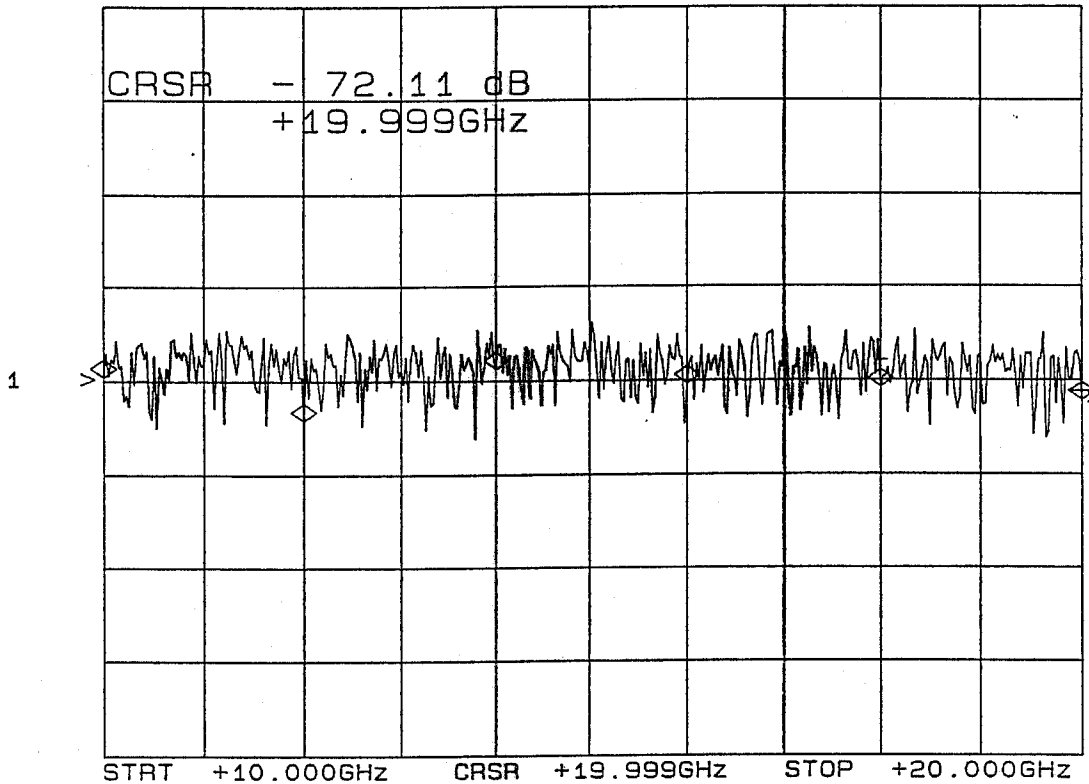
SUMMARY TEST DATA

MODEL NUMBER : SW-2184-1 OPT. 1020
SERIAL NUMBER : 1MS903144
ENGINEER : Frank Rethmeier
BIAS VOLTAGE & CURRENT : -10 V "ON", +35 mA "OFF"

ISOLATION*

(AS MEASURED ON SCALAR NETWORK ANALYZER HP 8757A)
 J1-J2; BIAS CURRENT +35 mA "OFF"

CH1: A -M - 72.11 dB
 10.0 dB/ REF - 70.00 dB



FREQUENCY	ISOLATION
10 GHz	69.5 dB
12 GHz	74.1 dB
14 GHz	68.7 dB
16 GHz	70.3 dB
18 GHz	70.8 dB
20 GHz	72.1 dB

*J1: INPUT ARM

July 23, 1999