

DATA

ON

0.5 GHz TO 18.0 GHz

(10MHz to 18GHz optional)

AND

0.5 GHz TO 10.0 GHz

LOW LOSS

HIGH SPEED

SINGLE SUPPLY

NON-REFLECTIVE/ABSORPTIVE

SP2T

RECTANGULAR

SOLID-STATE SWITCH/MODULATOR

SWN-218-2A OPTION 011,GH (Absorptive)

(Serial Number: 2MS801678)

DESIGNED

BY

ASH GORWARA, RENE AFABLE, & WAYNE PURDHAM

REPORT PREPARED

BY

RENE AFABLE

APRIL 13,1998

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

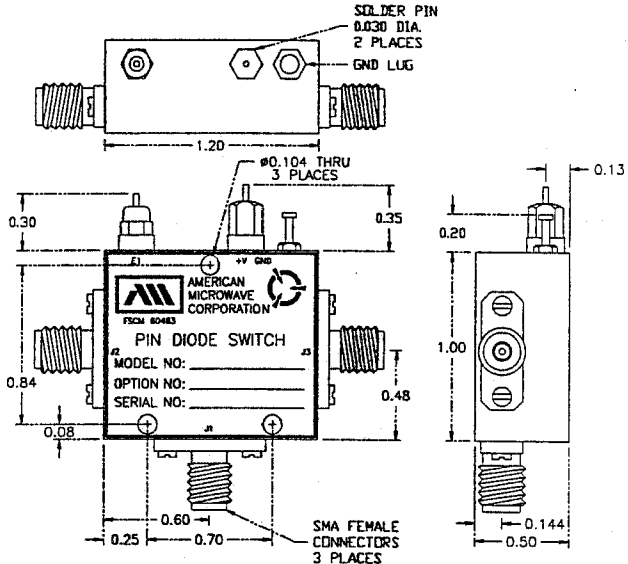
E-MAIL ADDRESS: AMCPMI@AOL.COM

7311 G GROVE ROAD, FREDERICK, MARYLAND 21704 • Tel. (301) 662-4700 • Fax (301) 662-4938

**SP2T NON-REFLECTIVE/ABSORPTIVE
PIN-DIODE SWITCH**

KEY FEATURES

- 0.5 GHz TO 18 GHz
(10MHz to 18GHz optional)
- HIGH SPEED
- SINGLE SUPPLY
- MINIATURE
- TTL LOGIC COMPATIBLE



AMC MODEL No: SWN-218-2A OPTION 011, GH

SPECIFICATIONS: (ABSORPTIVE)

• FREQUENCY RANGE	:	0.5 GHz to 18.0 GHz (10MHz to 18GHz Optional)
• INSERTION LOSS	:	2.5 dB MAX.
	:	1.25 dB TYP. @ 0.5 GHz
	:	0.85 dB TYP. @ 2.0 GHz
	:	1.50 dB TYP. @ 8.0 GHz
	:	2.50 dB TYP. @ 18.0 GHz
• ISOLATION	:	≥ 30 dB MIN.
	:	≥ 65 dB TYP. @ 0.5 GHz
	:	≥ 65 dB TYP. @ 2.0 GHz
	:	≥ 45 dB TYP. @ 8.0 GHz
	:	≥ 30 dB TYP. @ 18.0 GHz
• VSWR	:	2.0:1
• SWITCHING SPEED	:	"RISE" 20ns MAX., 15ns TYP.
	:	"FALL" 20ns MAX., 15ns TYP.
	:	"ON" 100ns MAX., 75ns TYP.
	:	"OFF" 100ns MAX., 75ns TYP.
• CONTROL	:	TTL Compatible (Independent or with Decoder)
• VIDEO TRANSIENTS	:	≤1.2 V Peak to Peak, 300 MHZ Bandwidth
(Low video transients available)	:	≤0.40 V Peak to Peak, 20 MHZ Bandwidth
• RF INPUT POWER	:	+20dBm Operating, 1 Watt Survival (Other power Levels available)
• DC POWER SUPPLY	:	+5vdc @ +50mA MAX.
(Other supply voltages available)	:	
• SIZE	:	1.2" X 1.0" X 0.5"
• WEIGHT	:	≤ 2.0 oz.

APRIL 13, 1998

DESCRIPTION

AMC MODEL SWN-218-2A OPTION 011, GH IS AN ABSORPTIVE/NON-REFLECTIVE, LOW INSERTION LOSS, SPDT SWITCH MODULE WITH SINGLE POWER SUPPLY AND INTEGRAL TTL DRIVER.

SPECIFICATIONS

- FREQUENCY RANGE 0.5-18 GHz
- INSERTION LOSS 0.5-18 GHz, 2.5 dB MAXIMUM
- ISOLATION 0.5-18 GHz, 30 dB MINIMUM
- VSWR (ON) 40 TO 60 dB TYPICAL
- RF POWER RATING 2.0:1 MAXIMUM
- SWITCHING TIME 0.5W CW, 5W PEAK (11S, PW MAXIMUM)
- RISE (10% RF TO 90% RF) 20 ns TYPICAL, 30 ns MAXIMUM
- FALL (90% RF TO 10% RF) 20 ns TYPICAL, 30 ns MAXIMUM
- ON (50% TTL TO 90% RF) 75 ns TYPICAL, 100 ns MAXIMUM
- OFF (50% TTL TO 10% RF) 75 ns TYPICAL, 100 ns MAXIMUM
- CONTROL TTL, LOW POWER SCHOTTKY, (UNITY LOAD) (SEE TRUTH TABLE)
- POWER SUPPLY +5VDC ±5% @ 50 mA MAXIMUM
- CONNECTORS
RF INPUT/OUTPUT SMA (FEMALE), REMOVABLE
POWER SOLDER PIN
CONTROL SOLDER PIN
- SIZE 1.20" x 1.00" x 0.5"

AVAILABLE OPTIONS

- 011 ABSORPTIVE/NON-REFLECTIVE
- GH SPECIAL CUSTOMER SPECIFICATION

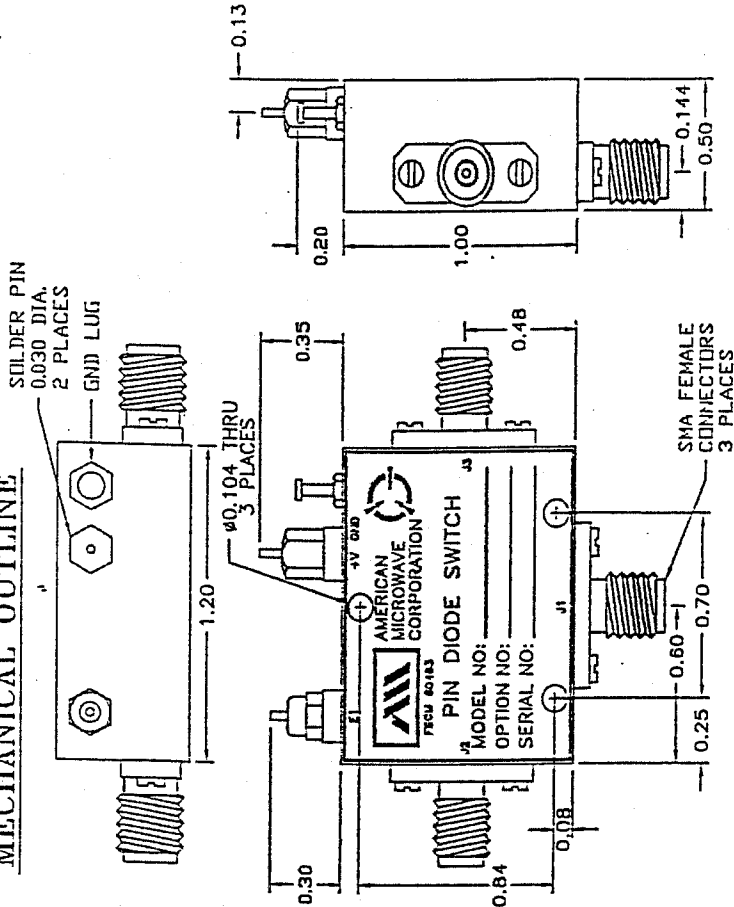
TRUTH TABLE	
E7	RF PATH OR
0	J1-J2
1	J1-J3

NOTES:

- 1) DIMENSIONS ARE IN INCHES [MILLIMETERS]
- 2) TOLERANCES: X.XX ±0.020
X.XXX ±0.010
- 3) WEIGHT: APPROX. 2.0 OZ

ZONE	REV.	DESCRIPTION	DATE	APPROVED
		A ORIGINAL RELEASE, JOB # 712247E	04/20/98	

MECHANICAL OUTLINE



ENVIRONMENTAL RATINGS

- TEMPERATURE:
OPERATING -55°C TO +85°C
NON-OPERATING -65°C TO +125°C
- 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



AMERICAN MICROWAVE CORPORATION
7311G GROVE RD., FREDERICK, MD. 21701
TEL: (301) 662-4700 FAX: (301) 662-4938

PRODUCT FEATURE

SWN-218-2A OPTION 011, GH
SINGLE SUPPLY SPDT SWITCH MODULE

SIZE A SHEET 1 OF 2 DWG. # 100-4383



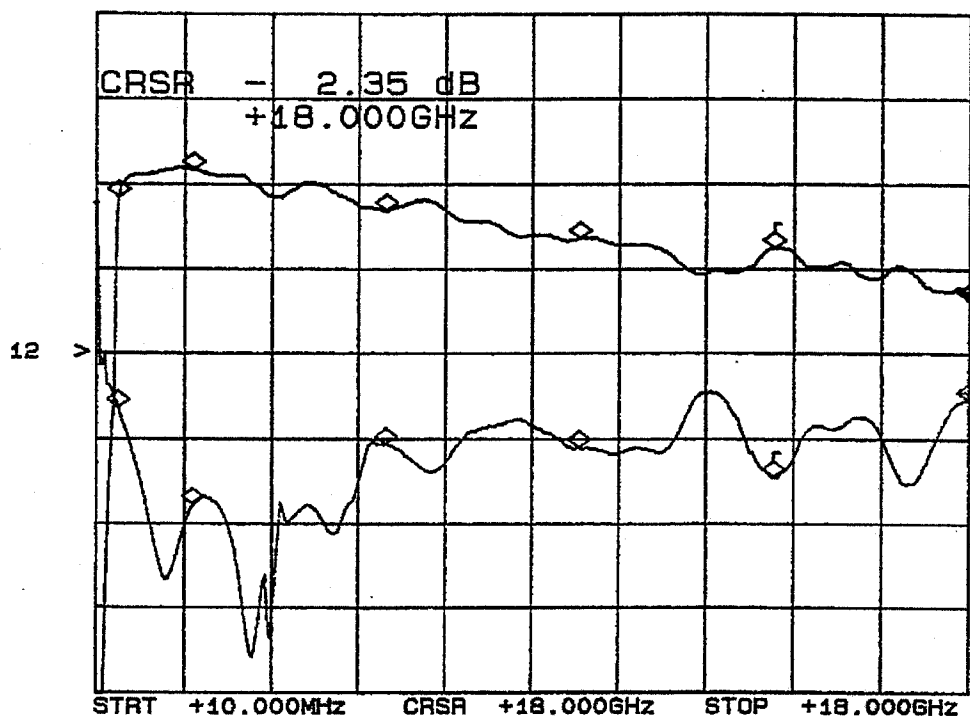
SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

INSERTION LOSS & RETURN LOSS*

J1-J2

CH1: C -M S - 2.35 dB CH2: R -M REF - 12.21 dB
1.0 dB/ REF - 3.00 dB 5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.5 GHz	-1.13 dB	-12.6 dB
2.0 GHz	-0.82 dB	-18.3 dB
6.0 GHz	-1.30 dB	-14.8 dB
10.0 GHz	-1.63 dB	-15.0 dB
14.0 GHz	-1.73 dB	-16.7 dB
18.0 GHz	-2.35 dB	-12.2 dB

*J1: COMMOM ARM

APRIL 13, 1998



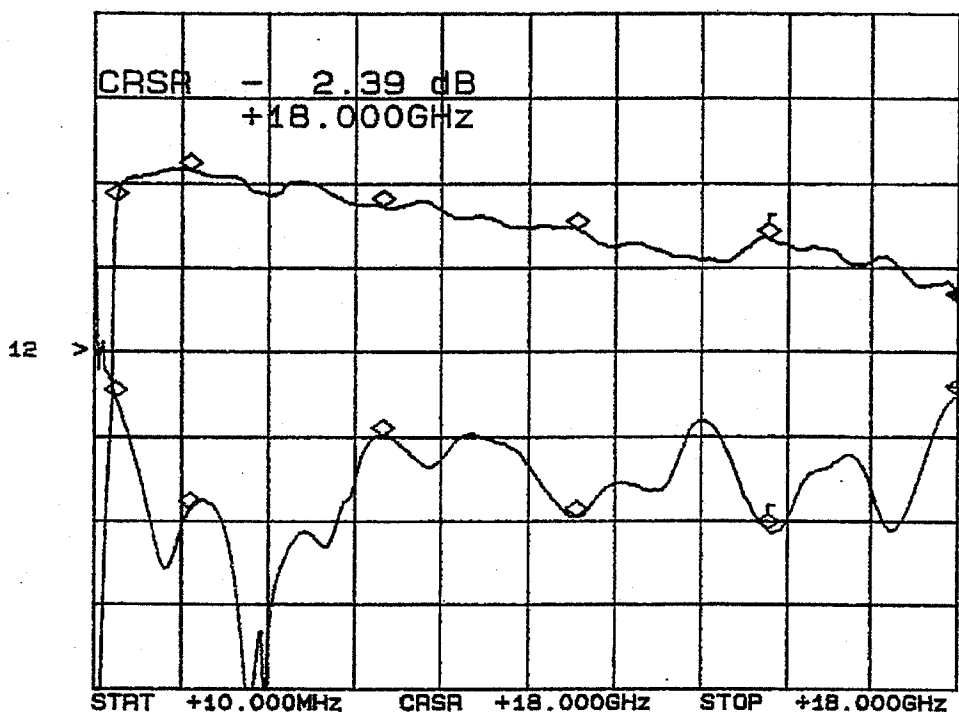
SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011, GH
 SERIAL NUMBER : 2MS801678
 TECHNICIAN : RENE AFABLE
 VOLTAGE & CURRENT DRAW : +5vdc: +50mA

INSERTION LOSS & RETURN LOSS*

J1-J3

CH1: C -M S - 2.39 dB CH2: R -M REF - 12.01 dB
 1.0 dB/ REF - 3.00 dB 5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.5 GHz	-1.19 dB	-12.1 dB
2.0 GHz	-0.83 dB	-18.6 dB
6.0 GHz	-1.26 dB	-14.3 dB
10.0 GHz	-1.53 dB	-19.2 dB
14.0 GHz	-1.64 dB	-20.0 dB
18.0 GHz	-2.39 dB	-12.0 dB

*J1: COMMOM ARM

APRIL 13, 1998



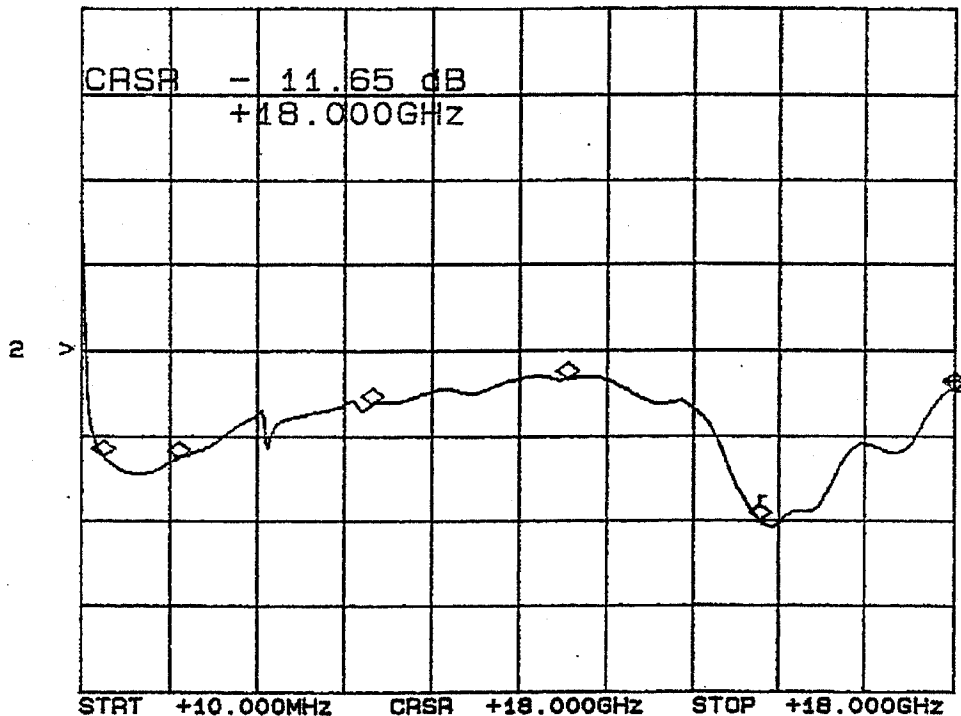
SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

OFF ARM TERMINATION*

J2-J1

CH2: R -M - 11.65 dB
 5.0 dB/ REF - 9.54 dB



FREQUENCY	RETURN LOSS
0.5 GHz	-15.6 dB
2.0 GHz	-15.7 dB
6.0 GHz	-12.5 dB
10.0 GHz	-11.1 dB
14.0 GHz	-19.5 dB
18.0 GHz	-11.6 dB

*J1: COMMON ARM

APRIL 13, 1998



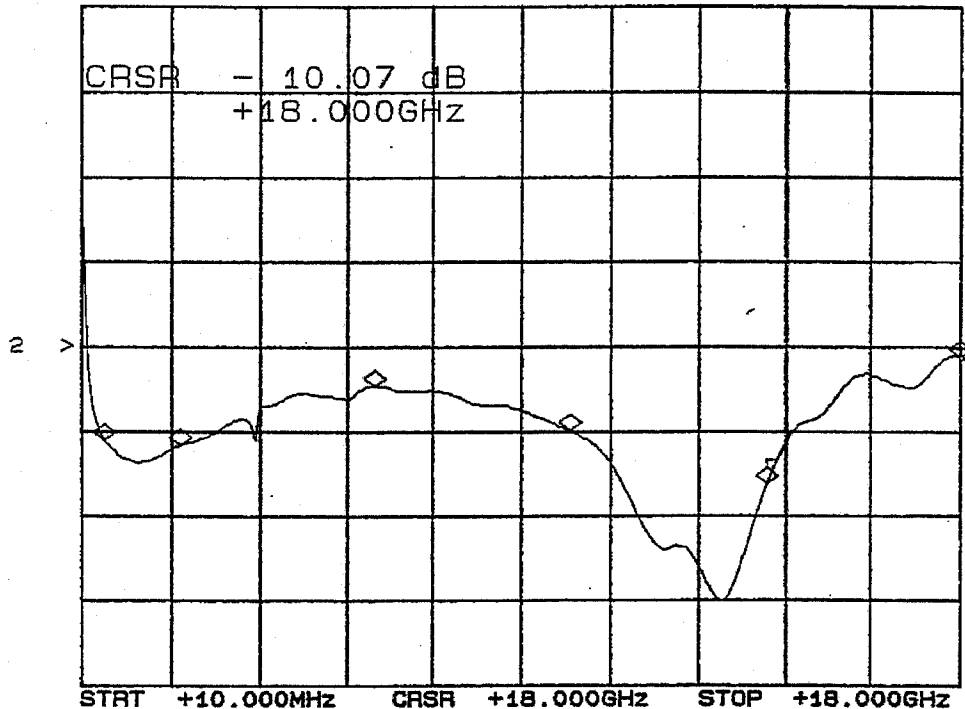
SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

OFF ARM TERMINATION*

J3-J1

CH2: R -M - 10.07 dB
5.0 dB/ REF - 9.54 dB



FREQUENCY	RETURN LOSS
0.5 GHz	-14.9 dB
2.0 GHz	-15.2 dB
6.0 GHz	-11.7 dB
10.0 GHz	-14.4 dB
14.0 GHz	-17.5 dB
18.0 GHz	-10.0 dB

*J1: COMMON ARM

APRIL 13, 1998



SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

ISOLATION*

(AS MEASURED ON A SPECTRUM ANALYZER)

FREQUENCY	J2	J3
200 MHZ	-48 dB	-50 dB
500 MHZ	-65 dB	-65 dB
1 GHz	-60 dB	-60 dB
2 GHz	-66 dB	-66 dB
4 GHz	-50 dB	-49 dB
6 GHz	-55 dB	-53 dB
8 GHz	-45 dB	-45 dB
10 GHz	-46 dB	-44 dB
12 GHz	-46 dB	-44 dB
14 GHz	-40 dB	-40 dB
16 GHz	-32 dB	-33 dB
18 GHz	-35 dB	-33 dB

* J1: COMMON ARM

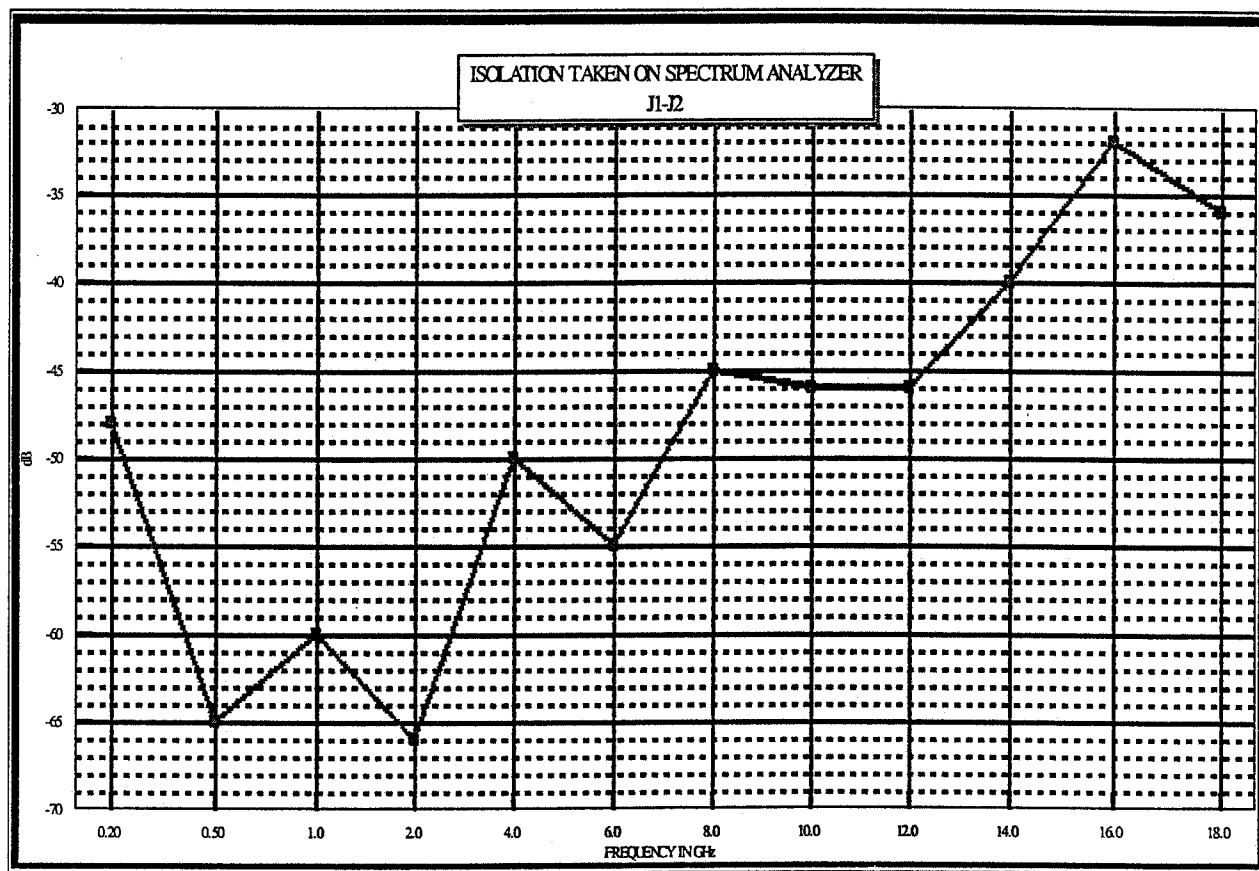
APRIL13, 1998



SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

ISOLATION* (AS MEASURED ON A SPECTRUM ANALYZER) J1-J2



*J1: COMMON ARM

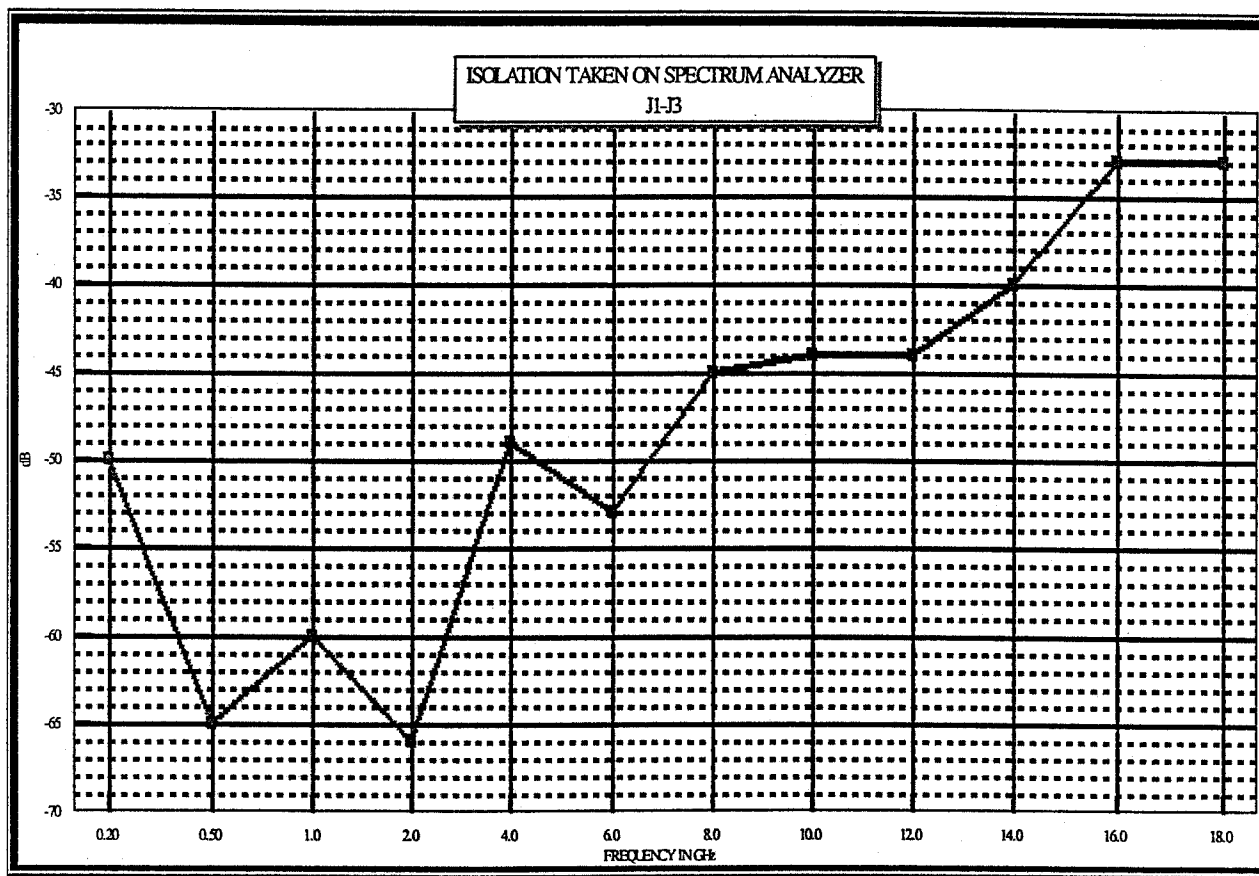
APRIL 13, 1998



SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

ISOLATION* (AS MEASURED ON A SPECTRUM ANALYZER) J1-J3



*J1: COMMON ARM

APRIL 13, 1998

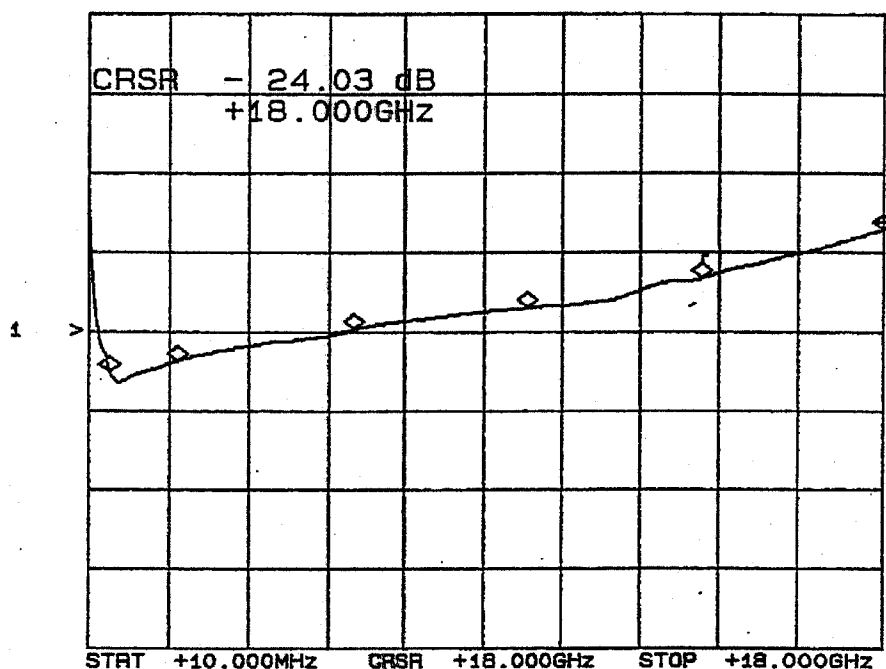


SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

ISOLATION* (AS MEASURED ON A SCALAR NETWORK ANALYZER) J1-J2

CH1: C -M S - 24.03 dB
20.0 dB/ REF - 50.00 dB



FREQUENCY	ISOLATION
0.5 GHz	<-59.6 dB
2.0 GHz	<-57.0 dB
6.0 GHz	<-49.1 dB
10.0 GHz	<-43.9 dB
14.0 GHz	<-36.2 dB
18.0 GHz	<-24.0 dB

*J1: COMMON ARM

APRIL 13, 1998

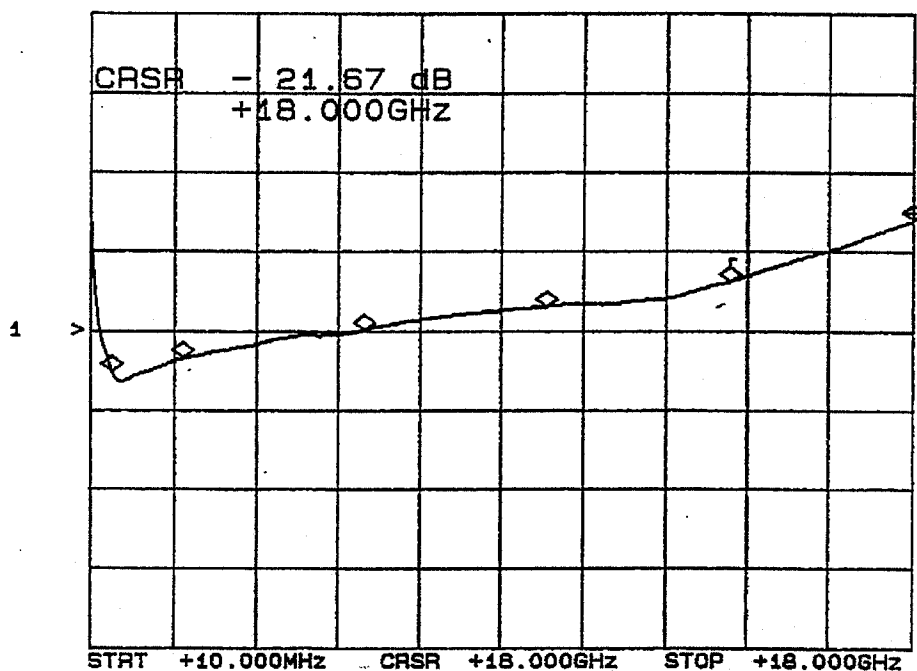


SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

ISOLATION* (AS MEASURED ON A SCALAR NETWORK ANALYZER) J1-J3

CH1: C -M S - 21.67 dB
20.0 dB/ REF - 50.00 dB



FREQUENCY	ISOLATION
0.5 GHz	<-59.8 dB
2.0 GHz	<-56.6 dB
6.0 GHz	<-49.4 dB
10.0 GHz	<-43.4 dB
14.0 GHz	<-37.3 dB
18.0 GHz	<-21.6 dB

*J1: COMMON ARM

APRIL 13, 1998



SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

SWITCHING SPEED

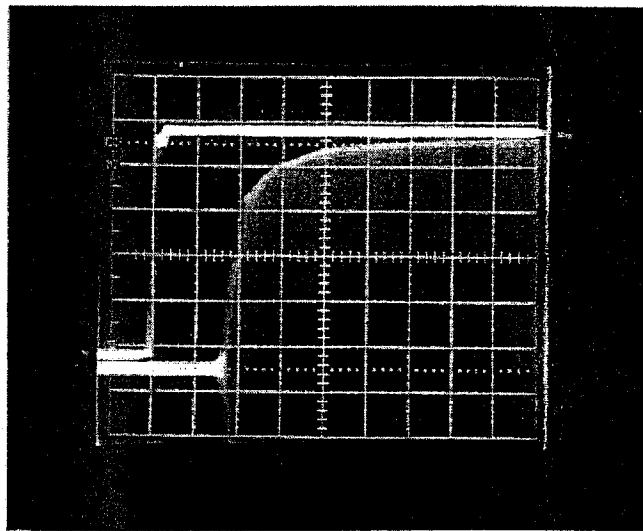
"Rise/Fall" Time: 10% RF to 90% RF & 90% RF to 10% RF
"On/Off" Time: 50% TTL to 90% RF or 10% RF

TYPICAL OF ALL ARMS

"DELAY ON": 56nS
"RISE TIME": 20nS

HORIZONTAL SCALE:
20nS PER DIVISION

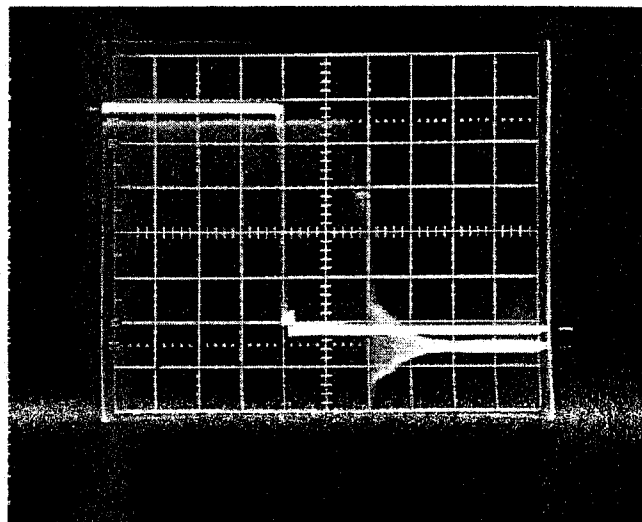
VERTICAL SCALE:
10mV PER DIVISION



"DELAY OFF": 50nS
"FALL TIME": 16nS

HORIZONTAL SCALE:
20nS PER DIVISION

VERTICAL SCALE:
10mV PER DIVISION



APRIL 13, 1998



SUMMARY TEST DATA

MODEL NUMBER	: SWN-218-2A OPTION 011, GH
SERIAL NUMBER	: 2MS801678
TECHNICIAN	: RENE AFABLE
VOLTAGE & CURRENT DRAW	: +5vdc: +50mA

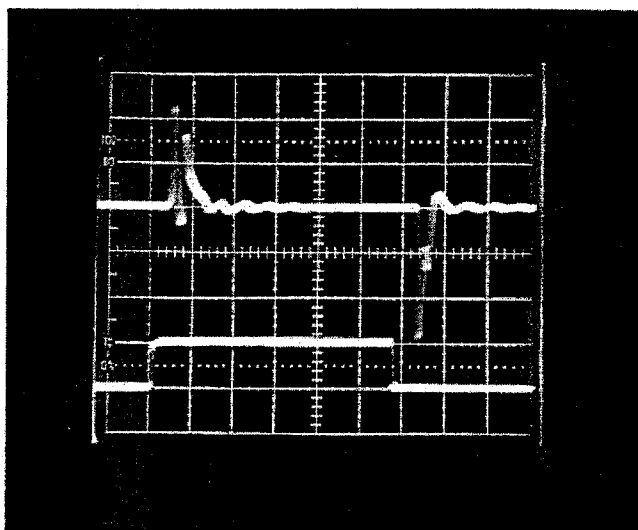
VIDEO TRANSIENTS

TYPICAL OF ALL ARMS

≤ 1.0 V P-P
MEASURED IN A
300 MHZ BANDWIDTH

VERTICAL SCALE:
0.2V PER DIVISION

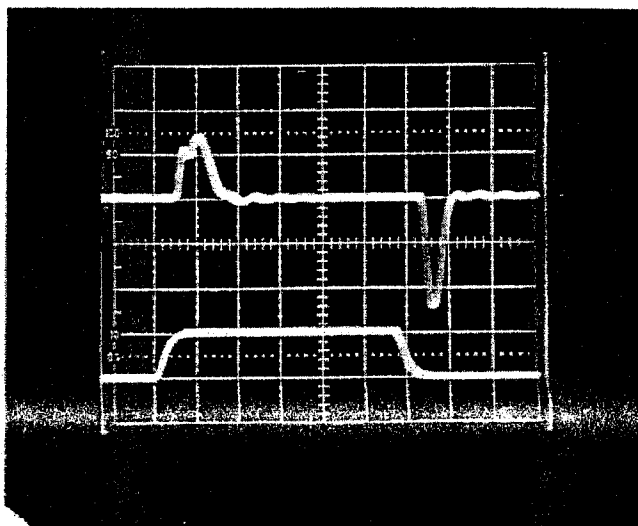
HORIZONTAL SCALE:
50nS PER DIVISION



≤ 0.40 V P-P
MEASURED IN A
20 MHZ BANDWIDTH

VERTICAL SCALE:
0.1V PER DIVISION

HORIZONTAL SCALE:
50nS PER DIVISION



APRIL 13, 1998



**AMERICAN MICROWAVE
CORPORATION**

MEASURED

DATA

ON

0.5 GHz TO 10.0 GHz

LOW LOSS

HIGH SPEED

SINGLE SUPPLY

ABSORPTIVE

SP2T

SOLID-STATE SWITCH/MODULATOR

FOR

BOEING/McDONNELL DOUGLAS CORPORATION

Box 516, Sainlt Louis, Missouri 63166

SWN-218-2A OPTION 011,GH (Absorptive)

(Serial Number: 2MS801678)

APRIL 13,1998

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

E-MAIL ADDRESS: AMCPMI@AOL.COM

7311 G GROVE ROAD, FREDERICK, MARYLAND 21704 • Tel. (301) 662-4700 • Fax (301) 662-4938



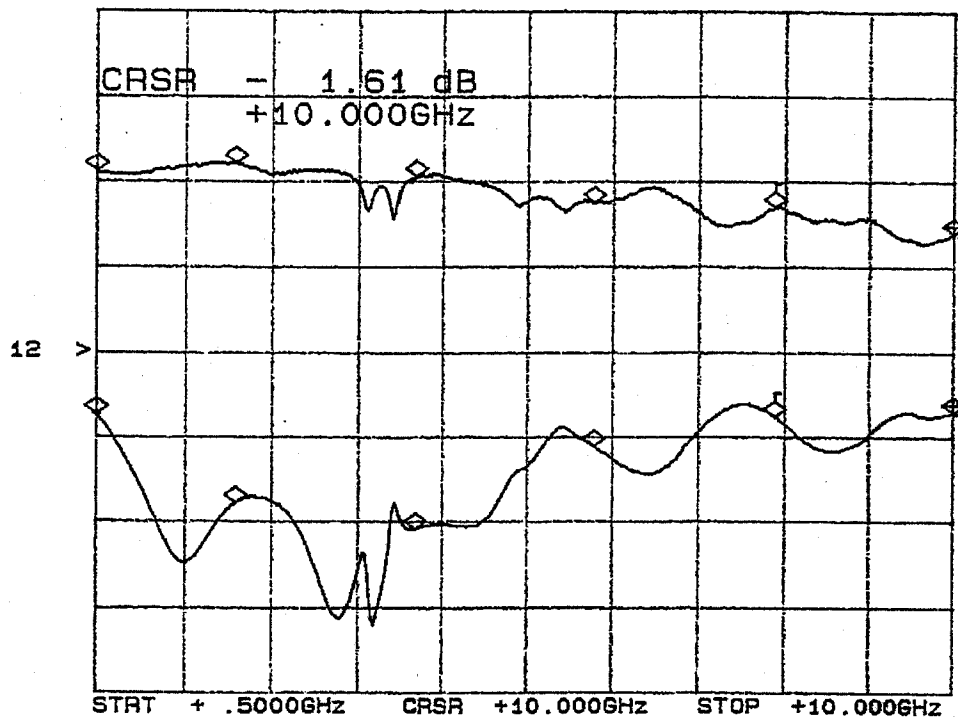
SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

INSERTION LOSS & RETURN LOSS*

J1-J2

CH1: C -M - 1.61 dB CH2: R -M - 13.03 dB
1.0 dB/ REF - 3.00 dB 5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.5 GHz	-0.87 dB	-13.1 dB
2.0 GHz	-0.78 dB	-18.3 dB
4.0 GHz	-0.94 dB	-19.9 dB
6.0 GHz	-1.23 dB	-15.0 dB
8.0 GHz	-1.29 dB	-13.2 dB
10.0 GHz	-1.61 dB	-13.0 dB

*J1: COMMOM ARM

APRIL 13, 1998



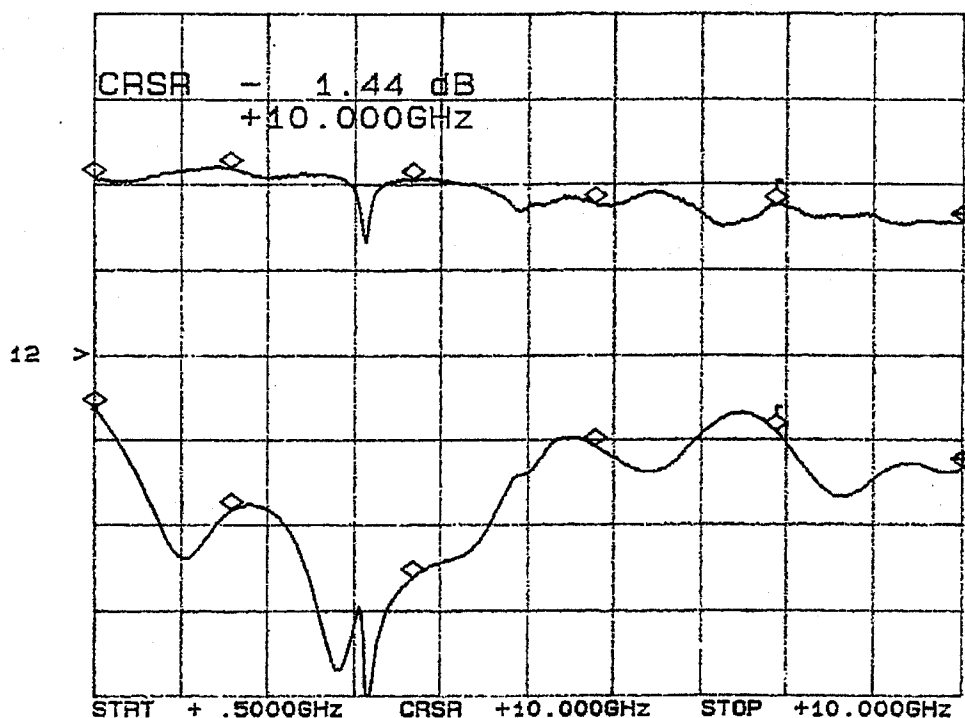
SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

INSERTION LOSS & RETURN LOSS*

J1-J3

CH1: C -M - 1.44 dB CH2: R -M - 16.16 dB
1.0 dB/ REF - 3.00 dB 5.0 dB/ REF - 9.54 dB



FREQUENCY	INSERTION LOSS	RETURN LOSS
0.5 GHz	-0.19 dB	-12.5 dB
2.0 GHz	-0.80 dB	-18.6 dB
4.0 GHz	-0.94 dB	-22.6 dB
6.0 GHz	-1.22 dB	-14.9 dB
8.0 GHz	-1.23 dB	-14.0 dB
10.0 GHz	-1.44 dB	-16.1 dB

*J1: COMMOM ARM

APRIL 13, 1998



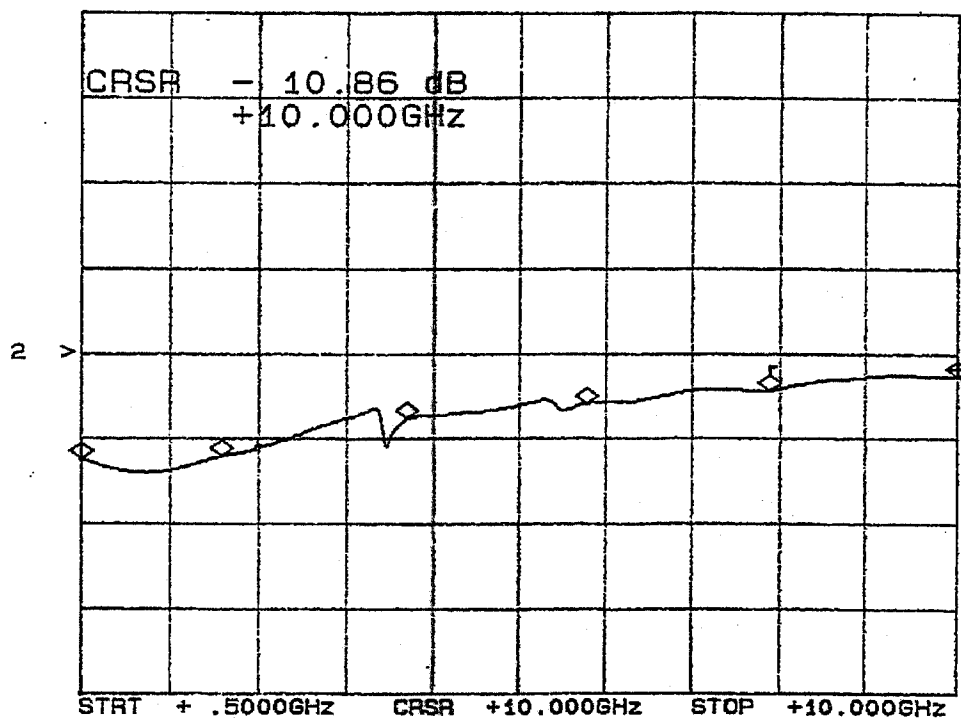
SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

OFF ARM TERMINATION*

J2-J1

CH2: R -M - 10.86 dB
5.0 dB/ REF - 9.54 dB



FREQUENCY	RETURN LOSS
0.5 GHz	-15.6 dB
2.0 GHz	-15.5 dB
4.0 GHz	-13.3 dB
6.0 GHz	-12.4 dB
8.0 GHz	-11.6 dB
10.0 GHz	-10.8 dB

*J1: COMMON ARM

APRIL 13, 1998



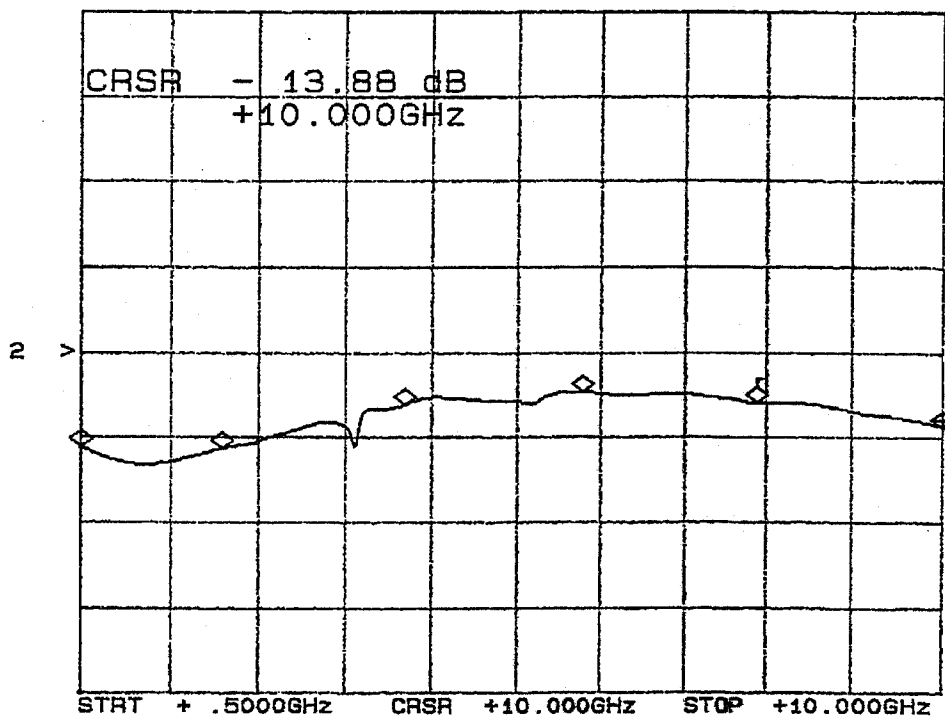
SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

OFF ARM TERMINATION*

J3-J1

CH2: R -M - 13.88 dB
5.0 dB/ REF - 9.54 dB



FREQUENCY	RETURN LOSS
0.5 GHz	-15.0 dB
2.0 GHz	-15.1 dB
4.0 GHz	-12.5 dB
6.0 GHz	-11.7 dB
8.0 GHz	-12.4 dB
10.0 GHz	-13.8 dB

*J1: COMMON ARM

APRIL 13, 1998



SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

ISOLATION*
(AS MEASURED ON A SPECTRUM ANALYZER)

FREQUENCY	J2	J3
200 MHZ	-48 dB	-50 dB
500 MHZ	-65 dB	-65 dB
1 GHz	-60 dB	-60 dB
2 GHz	-66 dB	-66 dB
4 GHz	-50 dB	-49 dB
6 GHz	-55 dB	-53 dB
8 GHz	-45 dB	-45 dB
10 GHz	-46 dB	-44 dB

* J1: COMMON ARM

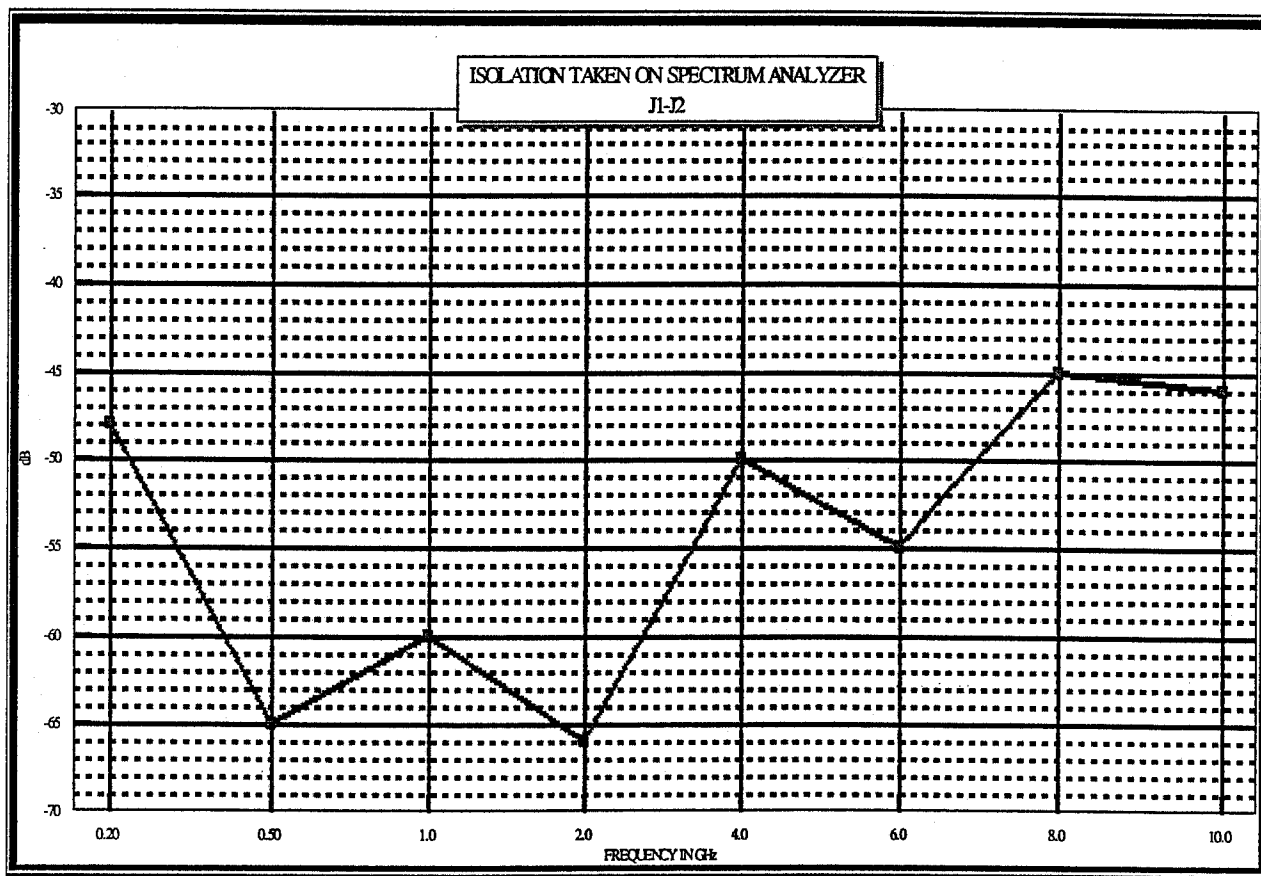
APRIL 13, 1998



SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

ISOLATION* (AS MEASURED ON A SPECTRUM ANALYZER) J1-J2



*J1: COMMON ARM

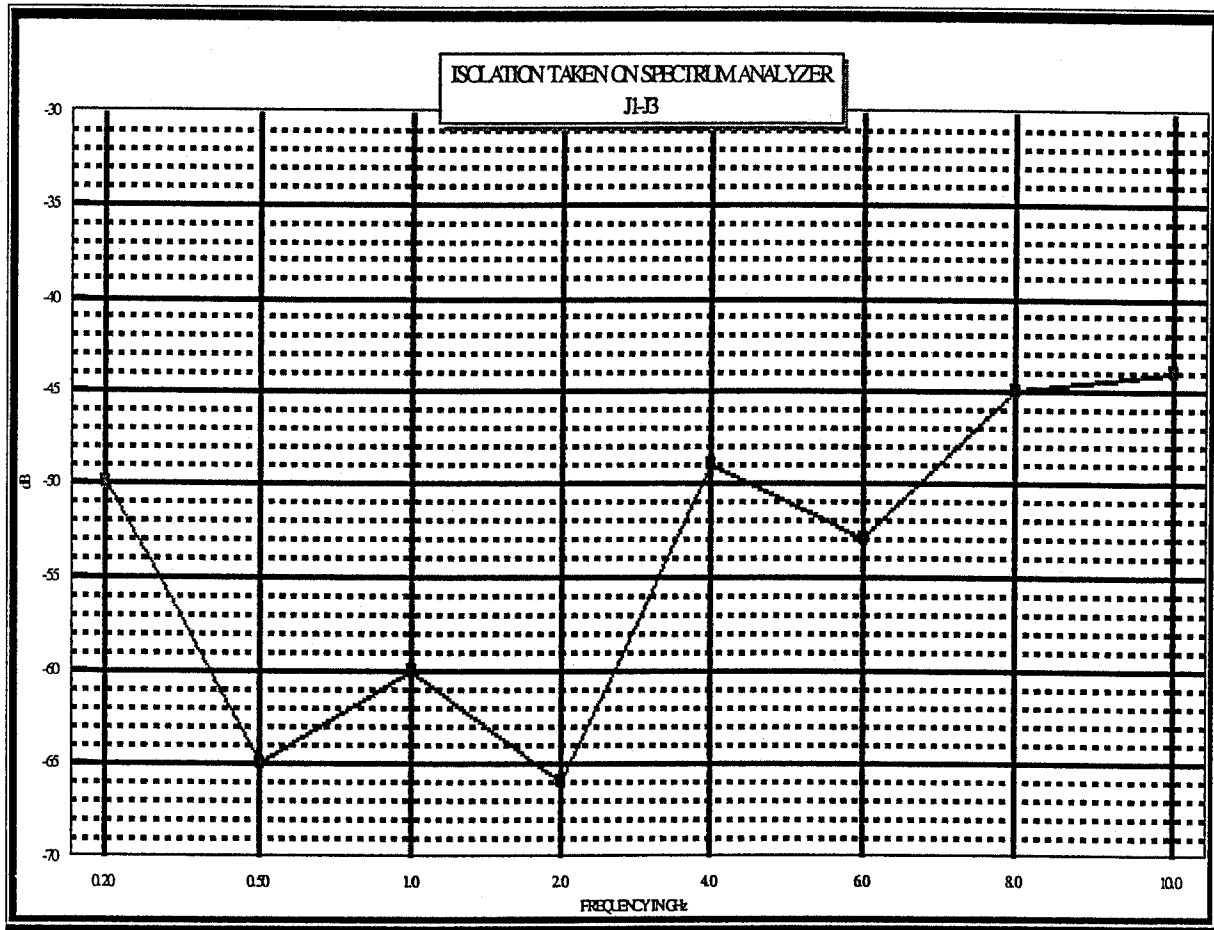
APRIL 13, 1998



SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

ISOLATION (AS MEASURED ON A SPECTRUM ANALYZER) J1-J3



*J1: COMMON ARM

APRIL 13, 1998

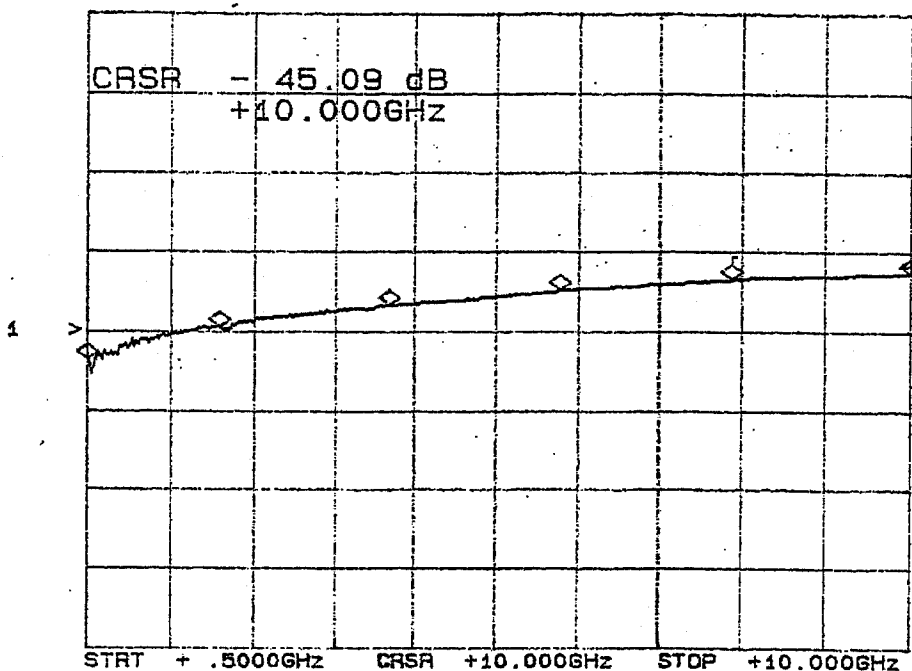


SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

ISOLATION* (AS MEASURED ON A SCALAR NETWORK ANALYZER) J1-J2

CH1: C -M - 45.09 dB
20.0 dB/ REF - 60.00 dB



FREQUENCY	ISOLATION
0.5 GHz	<-70.3 dB
2.0 GHz	<-58.5 dB
4.0 GHz	<-53.3 dB
6.0 GHz	<-49.4 dB
8.0 GHz	<-46.7 dB
10.0 GHz	<-45.0 dB

*J1: COMMON ARM

APRIL 13, 1998

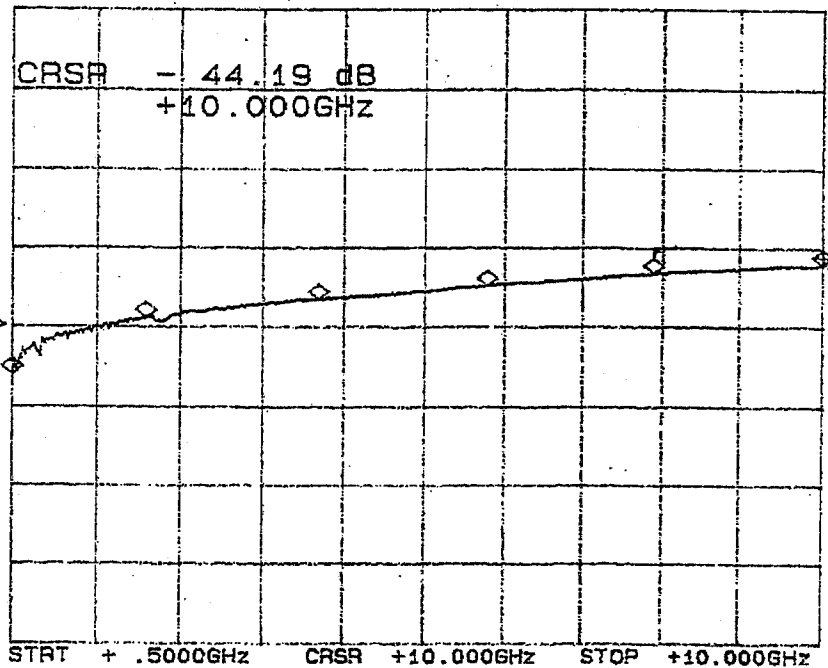


SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

ISOLATION* (AS MEASURED ON A SCALAR NETWORK ANALYZER) J1-J3

CH1: C -M - 44.19 dB
20.0 dB/ REF - 60.00 dB



FREQUENCY	ISOLATION
0.5 GHz	<-67.0 dB
2.0 GHz	<-57.4 dB
4.0 GHz	<-52.9 dB
6.0 GHz	<-49.3 dB
8.0 GHz	<-48.3 dB
10.0 GHz	<-44.1 dB

*J1: COMMON ARM

APRIL 13, 1998



SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

SWITCHING SPEED

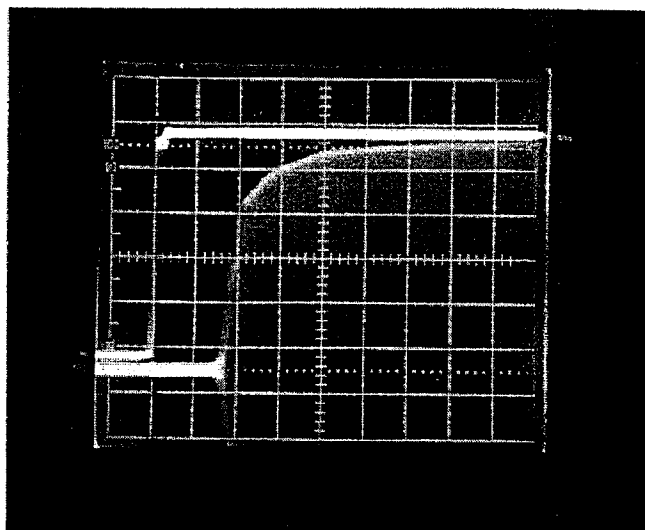
"Rise/Fall" Time: 10% RF to 90% RF & 90% RF to 10% RF
"On/Off" Time: 50% TTL to 90% RF or 10% RF

TYPICAL OF ALL ARMS

"DELAY ON": 56nS
"RISE TIME": 20nS

HORIZONTAL SCALE:
20nS PER DIVISION

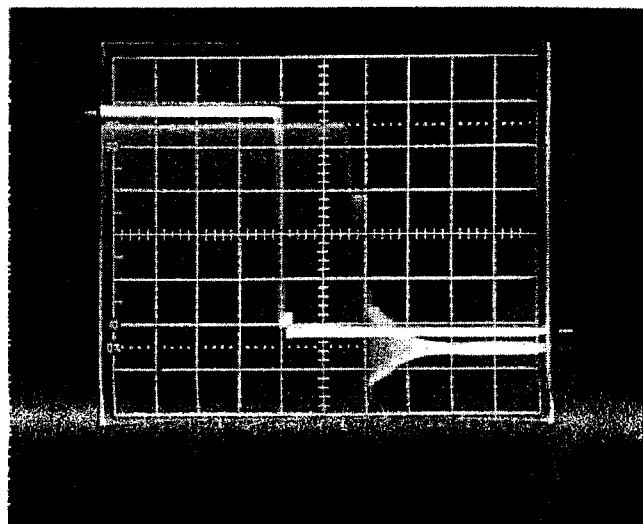
VERTICAL SCALE:
10mV PER DIVISION



"DELAY OFF": 50nS
"FALL TIME": 16nS

HORIZONTAL SCALE:
20nS PER DIVISION

VERTICAL SCALE:
10mV PER DIVISION



APRIL 13, 1998



SUMMARY TEST DATA

MODEL NUMBER : SWN-218-2A OPTION 011,GH
SERIAL NUMBER : 2MS801678
TECHNICIAN : RENE AFABLE
VOLTAGE & CURRENT DRAW : +5vdc: +50mA

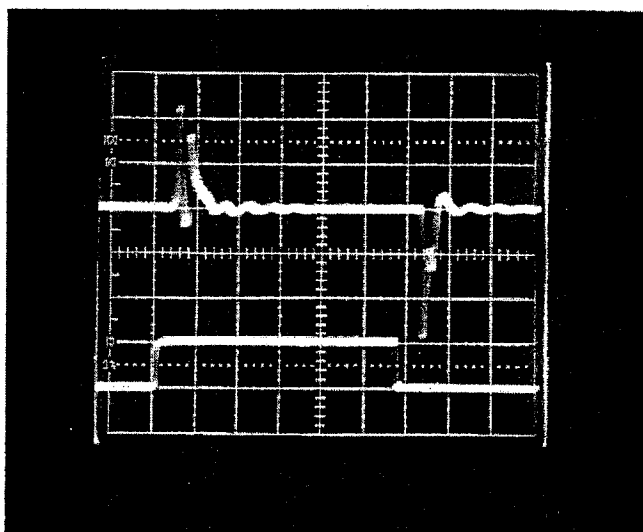
VIDEO TRANSIENTS

TYPICAL OF ALL ARMS

≤ 1.0 V P-P
MEASURED IN A
300 MHZ BANDWIDTH

VERTICAL SCALE:
0.2V PER DIVISION

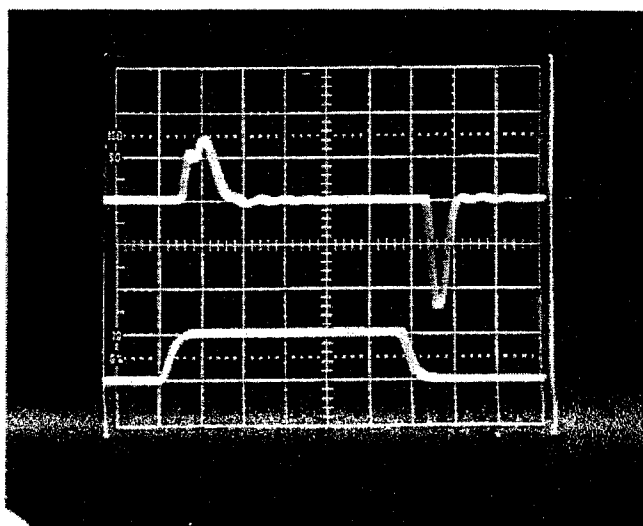
HORIZONTAL SCALE:
50nS PER DIVISION



≤ 0.40 V P-P
MEASURED IN A
20 MHZ BANDWIDTH

VERTICAL SCALE:
0.1V PER DIVISION

HORIZONTAL SCALE:
50nS PER DIVISION



APRIL 13, 1998