



**TEST DATA**  
**ON**  
**10 MHz TO 6 GHz**  
**AND**  
**FROM 10 MHz TO 1 GHz**  
**LOW VIDEO TRANSIENT**  
**HIGH SPEED**  
**NON-REFLECTIVE/ABSORPTIVE**  
**SPST**

**GaAs MMIC SWITCH**

**AMC MODEL No:**  
**SWM-6000-1DTU OPTION 011**  
**(Serial Number: 2MS908284)**

**REPORTED AND PREPARED**  
**BY**  
**RENE AFABLE**

**NOVEMBER 23, 1999**

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

**E-MAIL ADDRESS: [AMCPMI@AOL.COM](mailto:AMCPMI@AOL.COM)**

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

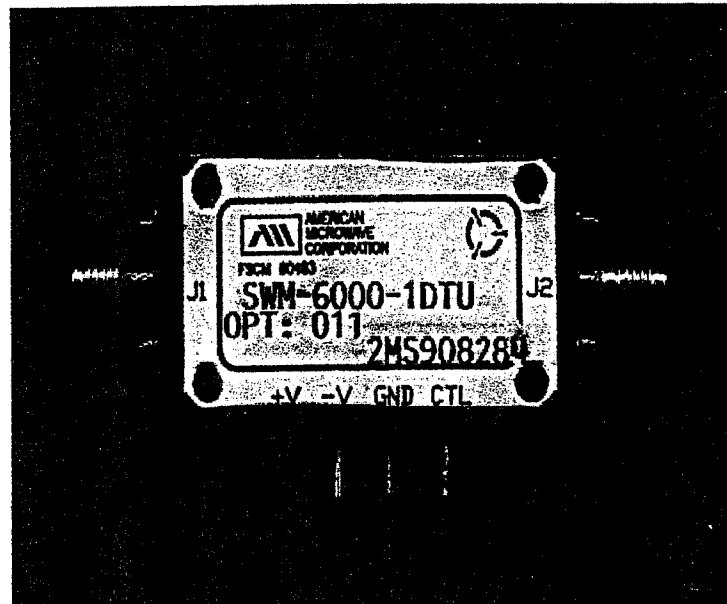


AMERICAN MICROWAVE  
CORPORATION

## SPST NON-REFLECTIVE/ABSORPTIVE GaAs MMIC SWITCH

### KEY FEATURES

- 10 MHz TO 6 GHz  
(10MHz to 18GHz optional)
- LOW INSERTION LOSS
- HIGH SPEED
- TTL LOGIC COMPATIBLE
- SURFACE MOUNTABLE
- SLIMLINE



**AMC MODEL No: SWM-6000-1DTU OPTION 011**

### SPECIFICATIONS: (NON-REFLECTIVE)

• FREQUENCY RANGE	:	10 MHz to 6 GHz (10MHz to 18GHz Optional)
• INSERTION LOSS	:	3.5 dB MAX.
	:	1.25 dB TYP. @ 10 MHz
	:	1.50 dB TYP. @ 500 MHz
	:	2.00 dB TYP. @ 2.0 GHz
	:	2.50 dB TYP. @ 4.0 GHz
	:	3.50 dB TYP. @ 6.0 GHz
• ISOLATION	:	≥ 30 dB MIN.
	:	≥ 100 dB TYP. @ 10 MHz
	:	≥ 85 dB TYP. @ 500 MHz
	:	≥ 60 dB TYP. @ 2.0 GHz
	:	≥ 40 dB TYP. @ 4.0 GHz
	:	≥ 30 dB TYP. @ 6.0 GHz
• VSWR	:	1.5:1
• SWITCHING SPEED	:	"RISE" 5nS MAX., 3nS TYP.
(10% RF TO 90% RF)	:	"FALL" 5nS MAX., 3nS TYP.
(50% TTL TO 90% RF)	:	"ON" 15nS MAX., 10nS TYP.
	:	"OFF" 15nS MAX., 10nS TYP.
• CONTROL	:	SINGLE CONTROL TTL COMPATIBLE
• VIDEO TRANSIENTS	:	≤42 mV Peak to Peak, 300 MHz Bandwidth
	:	≤13 mV Peak to Peak, 20 MHz Bandwidth
• RF INPUT POWER	:	+20dBm Operating, 1 Watt Survival (Other power Levels available)
• DC POWER SUPPLY	:	+5vdc @ +40mA MAX.
(Other supply voltages available)	:	- 5vdc @ -40mA MAX.
• SIZE	:	1.40" (L) X 0.80" (W) X 0.40" (H)
• WEIGHT	:	≤ 1.0 oz.

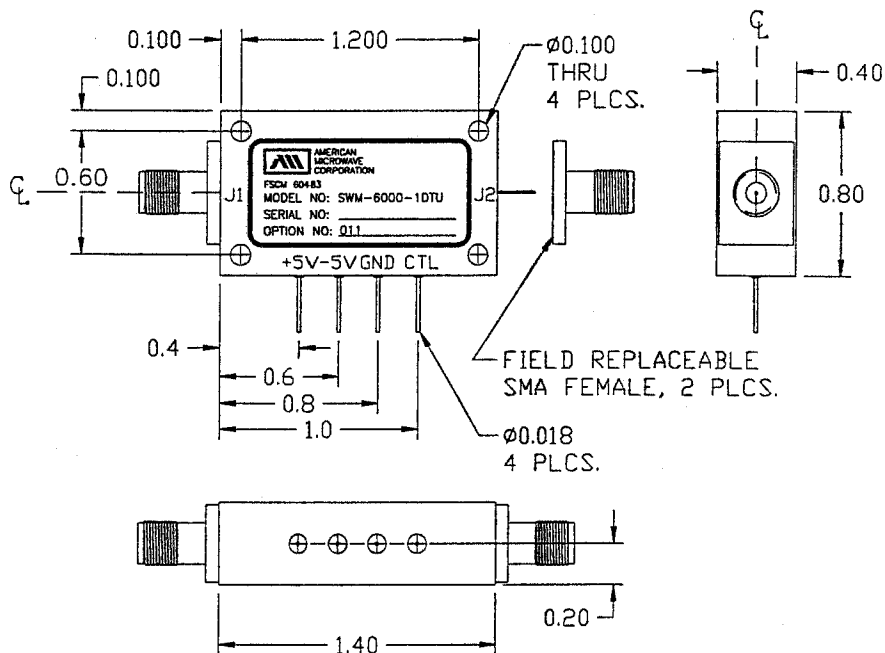
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## SUMMARY TEST DATA

<b>MODEL NUMBER</b>	<b>: SWM-6000-1DTU OPTIONS 011</b>
<b>SERIAL NUMBER</b>	<b>: 6MS908284</b>
<b>ENGINEER</b>	<b>: RENE AFABLE</b>
<b>VOLTAGE &amp; CURRENT DRAW</b>	<b>: +5vdc: +2.37mA; -5vdc: -3.92mA</b>



ALL DIMENSIONS ARE IN INCHES

TOLERANCES:

X.XX	±0.020
X.XXX	±0.010

### ENVIRONMENTAL RATINGS:

- TEMPERATURE:..... -55°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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## DESCRIPTION

AMC MODEL SWM-6000-1DTU IS AN ABSORPTIVE GaAs MMIC SPST SWITCH/MODULATOR WITH INTEGRAL TTL DRIVER, LOW VIDEO TRANSIENT, ULTRA FAST SWITCHING SPEED AND PACKAGED IN A SMALL RUGGED HOUSING.

## SPECIFICATIONS

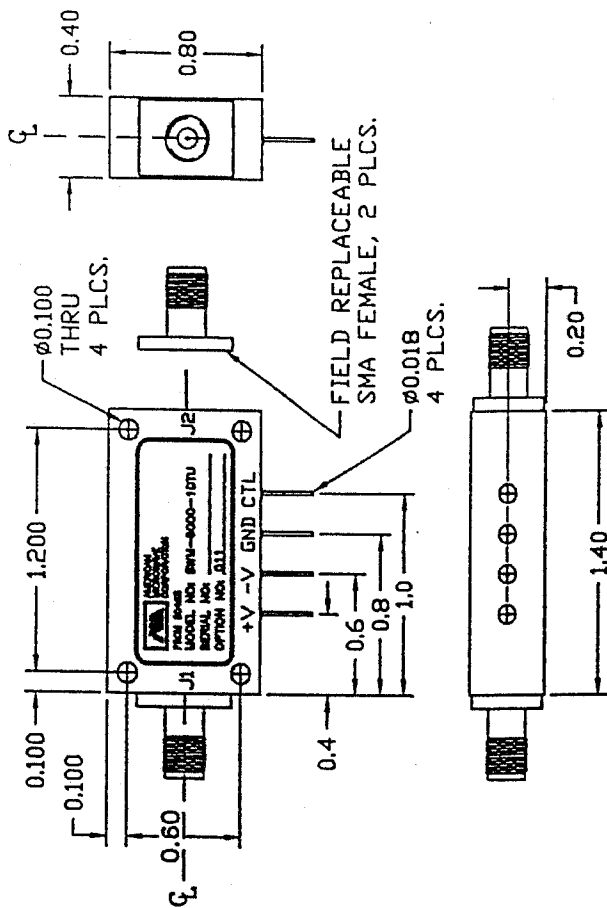
- FREQUENCY RANGE ..... DC-6.0 GHz
- INSERTION LOSS ..... DC-500 MHz, 2.0 dB MAXIMUM  
0.5-3.0 GHz, 2.5 dB MAXIMUM  
3.0-5.0 GHz, 3.0 dB MAXIMUM  
5.0-6.0 GHz, 3.5 dB MAXIMUM
- ISOLATION ..... DC-3.0 GHz, 50 dB MAXIMUM  
3.0-4.0 GHz, 40 dB MINIMUM  
4.0-6.0 GHz, 30 dB MINIMUM  
1.5:1 MAXIMUM
- VSWR (ON/OFF) ..... 1.5:1 MAXIMUM
- SWITCHING TIME  
RISE (10% RF TO 90% RF) ..... 5 nS MAXIMUM  
FALL (90% RF TO 10% RF) ..... 5 nS MAXIMUM  
ON (50% TTL TO 90% RF) ..... 15 nS MAXIMUM  
OFF (50% TTL TO 10% RF) ..... 15 nS MAXIMUM
- RF POWER RATINGS  
DC-2.0 GHz ..... +22 dBm MAXIMUM  
2.0-6.0 GHz ..... +26 dBm MAXIMUM
- CONTROL ..... TTL COMPATIBLE, UNITY LOAD,  
LOGIC "0" ISOLATION  
LOGIC "1" INSERTION LOSS.
- VOLTAGE TRANSIENTS ..... 50 mV P-P, 100 MHz BANDWIDTH
- POWER SUPPLY ..... +5VDC  $\pm 5\%$  @ 40 mA MAXIMUM  
-5VDC  $\pm 5\%$  @ 40 mA MAXIMUM
- CONNECTORS  
RF INPUT/OUTPUT ..... FIELD REPLACEABLE SMA (FEMALE)  
POWER ..... SOLDER PIN  
CONTROL ..... SOLDER PIN
- SIZE ..... 1.40" x 0.80" x 0.40"

## AVAILABLE OPTIONS

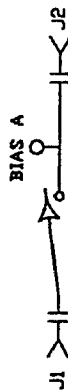
- A01 ..... 50  $\Omega$  CONTROL IMPEDANCE
- A02 ..... 100  $\Omega$  CONTROL IMPEDANCE
- A03 ..... INVERSE CONTROL LOGIC (LOGIC "0" INSERTION LOSS)
- A10 .....  $\pm 9$ VDC TO  $\pm 18$ VDC SUPPLY
- A11 ..... SMC MALE CONTROL CONNECTOR
- A12 ..... SMC FEMALE CONTROL CONNECTOR
- A13 ..... DIFFERENTIAL TTL LOGIC CONTROLS
- A14 ..... J1 SMA MALE, J2 SMA FEMALE
- A15 ..... TWO SMA MALE CONNECTORS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
B		ORIGINAL JOB # 809191	11/22/92	

## MECHANICAL OUTLINE



## BLOCK DIAGRAM



- NOTES:
- 1) DIMENSIONS ARE IN INCHES
  - 2) TOLERANCES: X.XX  $\pm 0.020$   
X.XXX  $\pm 0.010$
  - 3) WEIGHT: APPROX. 2.5 OZ

## ENVIRONMENTAL RATINGS

- TEMPERATURE ..... -55°C TO +95°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



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TEL: (301) 662-4700 FAX: (301) 662-4938

## PRODUCT FEATURE

**SWM-6000-1DTU**

DC TO 6 GHz, NON-REFLECTIVE, GaAs MMIC SPST SWITCH/MODULATOR

SIZE A

SHEET 1 OF 3

DWG. # 100-2826



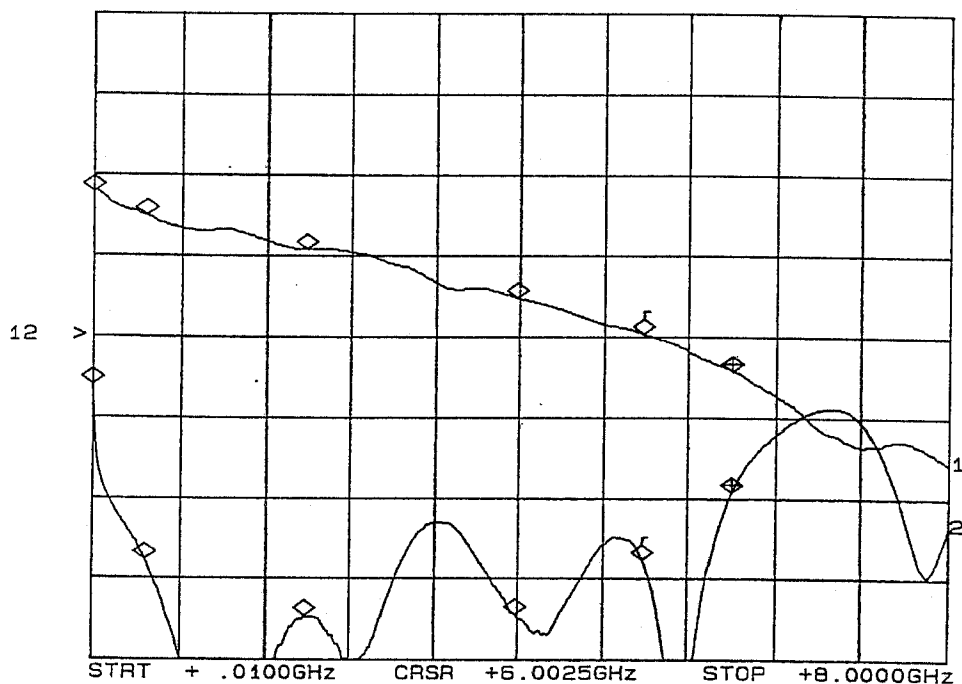
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SERIAL NUMBER	: 6MS908284
ENGINEER	: RENE AFABLE
VOLTAGE & CURRENT DRAW	: +5vdc: +2.37mA; -5vdc: -3.92mA

### INSERTION LOSS & RETURN LOSS\*

J1-J2

CH1: A -M S - 3.40 dB	CH2: B -M - 19.10 dB
1.0 dB/ REF - 3.00 dB	5.0 dB/ REF - 9.54 dB



\*J1: INPUT ARM

FREQUENCY	INSERTION LOSS	RETURN LOSS
10 MHz	0.67 dB	12.45 dB
500 MHz	1.51 dB	23.65 dB
2.0 GHz	1.92 dB	26.85 dB
4.0 GHz	2.51 dB	26.71 dB
5.2 GHz	2.97 dB	23.63 dB
6.0 GHz	3.40 dB	19.10 dB

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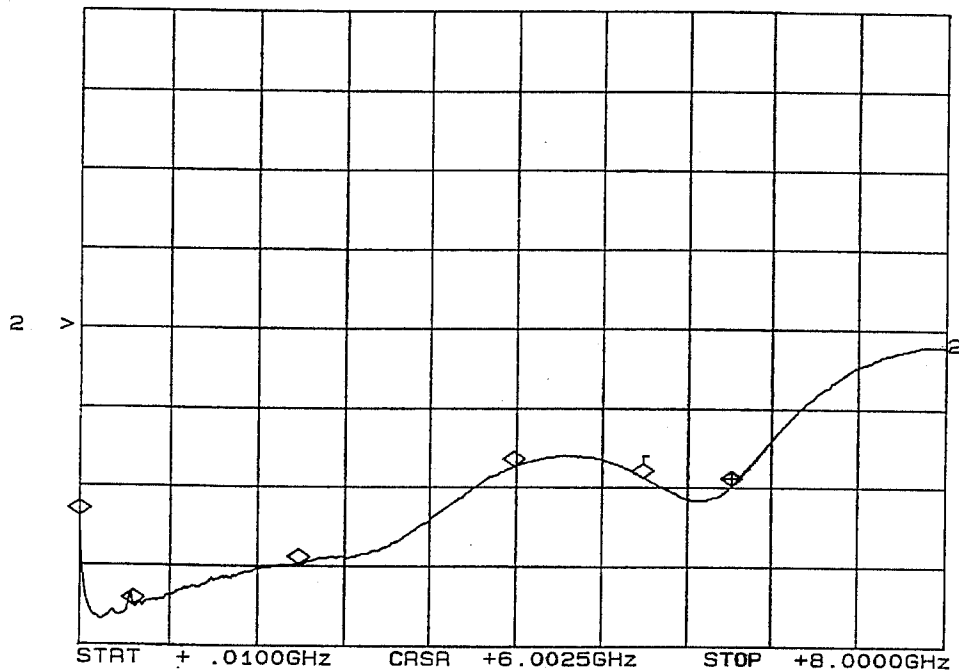
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**SERIAL NUMBER** : 6MS908284  
**ENGINEER** : RENE AFABLE  
**VOLTAGE & CURRENT DRAW** : +5vdc: +2.37mA; -5vdc: -3.92mA

### OFF ARM TERMINATION\*

J1-J2

CH2: B -M REF - 19.42 dB  
 5.0 dB/ REF - 9.54 dB



\*J1: INPUT ARM

FREQUENCY	RETURN LOSS
10 MHz	21.42 dB
500 MHz	27.10 dB
2.0 GHz	24.26 dB
4.0 GHz	18.14 dB
5.2 GHz	18.95 dB
6.0 GHz	19.42 dB

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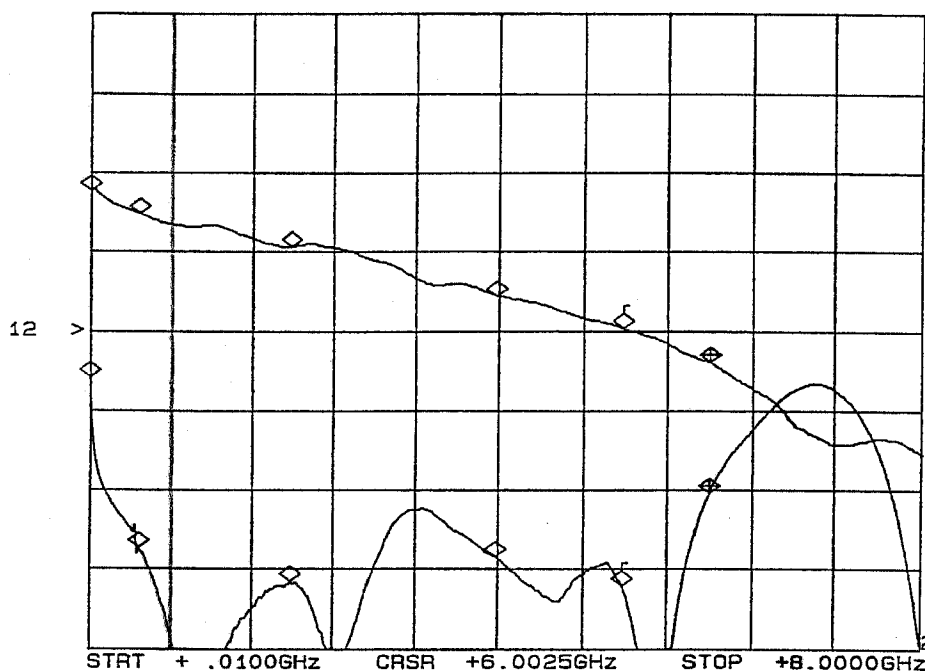
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 SERIAL NUMBER : 6MS908284  
 ENGINEER : RENE AFABLE  
 VOLTAGE & CURRENT DRAW : +5vdc: +2.37mA; -5vdc: -3.92mA

## INSERTION LOSS &amp; RETURN LOSS\*

J2-J1

CH1: A -M S - 3.38 dB      CH2: B -M - 19.63 dB  
 1.0 dB/ REF - 3.00 dB      5.0 dB/ REF - 9.54 dB



\*J2: INPUT ARM

FREQUENCY	INSERTION LOSS	RETURN LOSS
10 MHz	1.22 dB	12.41 dB
500 MHz	1.53 dB	23.39 dB
2.0 GHz	1.93 dB	25.46 dB
4.0 GHz	2.55 dB	23.87 dB
5.2 GHz	2.96 dB	25.90 dB
6.0 GHz	3.38 dB	19.63 dB

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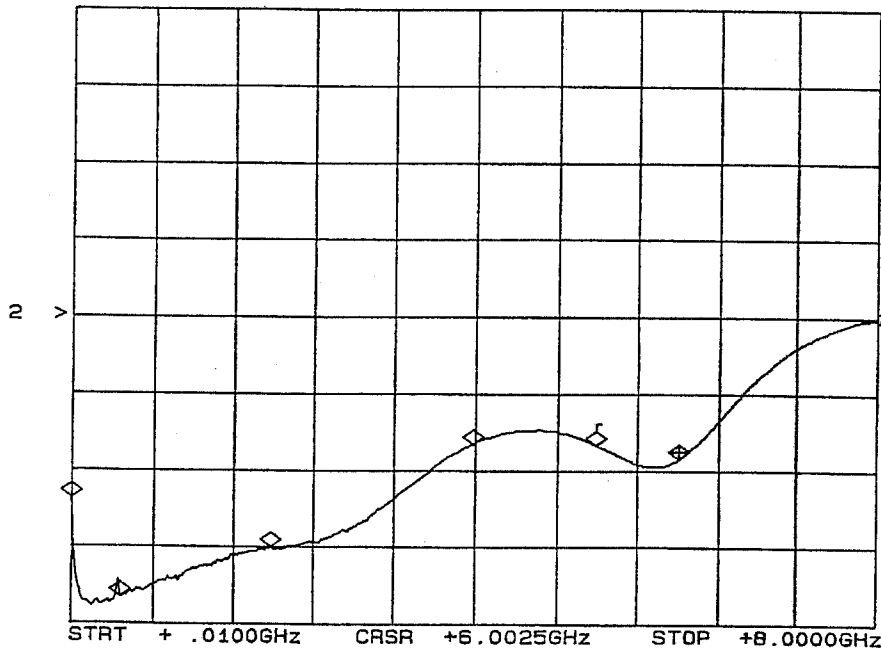


### SUMMARY TEST DATA

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 SERIAL NUMBER : 6MS908284  
 ENGINEER : RENE AFABLE  
 VOLTAGE & CURRENT DRAW : +5vdc: +2.37mA; -5vdc: -3.92mA

#### OFF ARM TERMINATION\* J2-J1

CH2: B -M - 18.70 dB  
 5.0 dB/ REF - 9.54 dB



\*J2: INPUT ARM

FREQUENCY	RETURN LOSS
10 MHz	21.34 dB
500 MHz	27.79 dB
2.0 GHz	24.58 dB
4.0 GHz	17.66 dB
5.2 GHz	17.92 dB
6.0 GHz	18.70 dB

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## SUMMARY TEST DATA

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**SERIAL NUMBER** : 6MS908284  
**ENGINEER** : RENE AFABLE  
**VOLTAGE & CURRENT DRAW** : +5vdc: +2.37mA; -5vdc: -3.92mA

### ISOLATION\*

(AS MEASURED ON A SPECTRUM ANALYZER)

FREQUENCY	J1
50 MHz	100 dB
100 MHz	100 dB
500 MHz	84 dB
1 GHz	70 dB
2 GHz	61 dB
3 GHz	51 dB
4 GHz	44 dB
5 GHz	37 dB
6 GHz	32 dB
7 GHz	26 dB
8 GHz	22 dB
9 GHz	15 dB
10 GHz	10 dB

\* J1: INPUT ARM

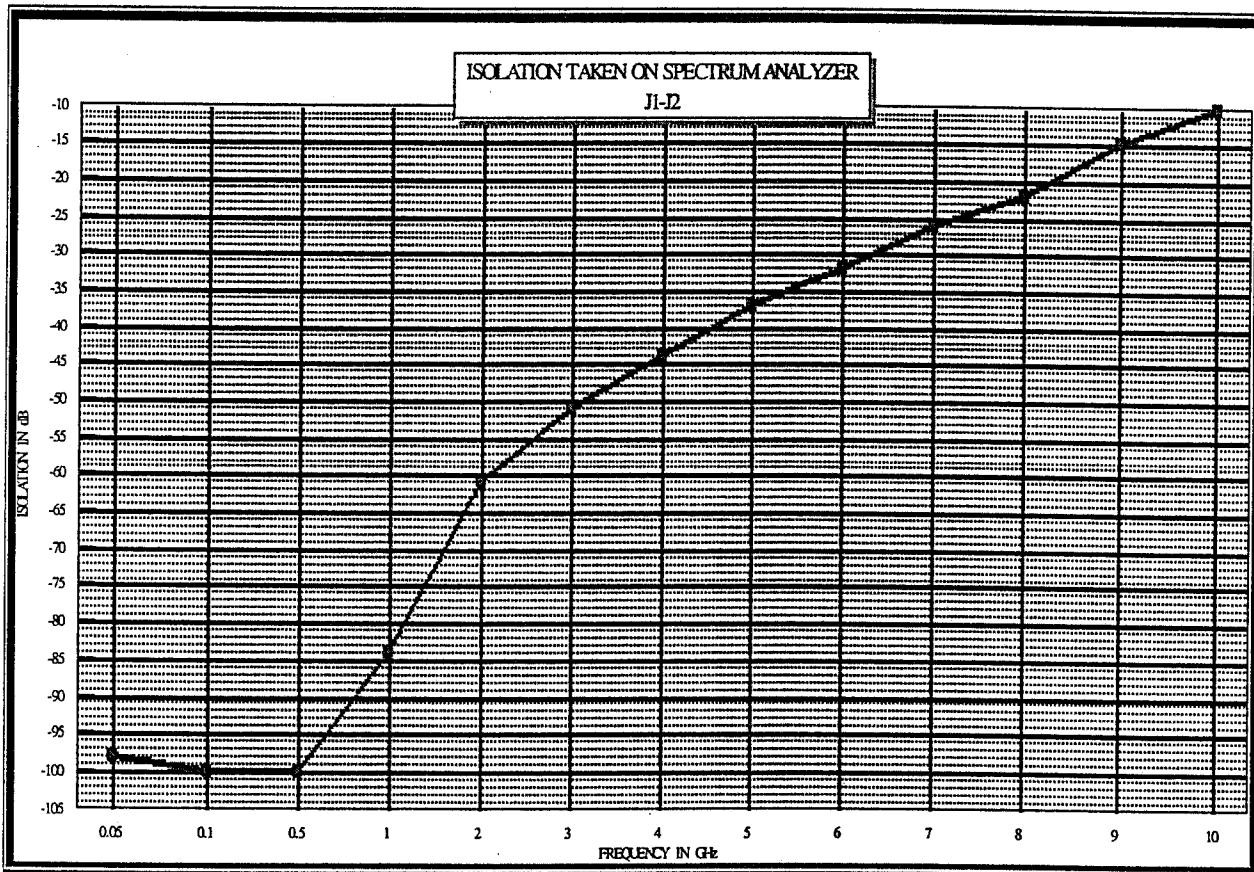
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SERIAL NUMBER : 6MS908284  
ENGINEER : RENE AFABLE  
VOLTAGE & CURRENT DRAW : +5vdc: +2.37mA; -5vdc: -3.92mA

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



\*J1: INPUT ARM

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**TEST DATA**  
**FROM**  
**10 MHz TO 1 GHz**  
**LOW VIDEO TRANSIENT**  
**HIGH SPEED**  
**NON-REFLECTIVE/ABSORPTIVE**  
**SPST**  
**GaAs MMIC SWITCH**  
**AMC MODEL No:**  
**SWM-6000-1DTU OPTION 011**  
**(Serial Number: 2MS908284)**  
**REPORTED AND PREPARED**  
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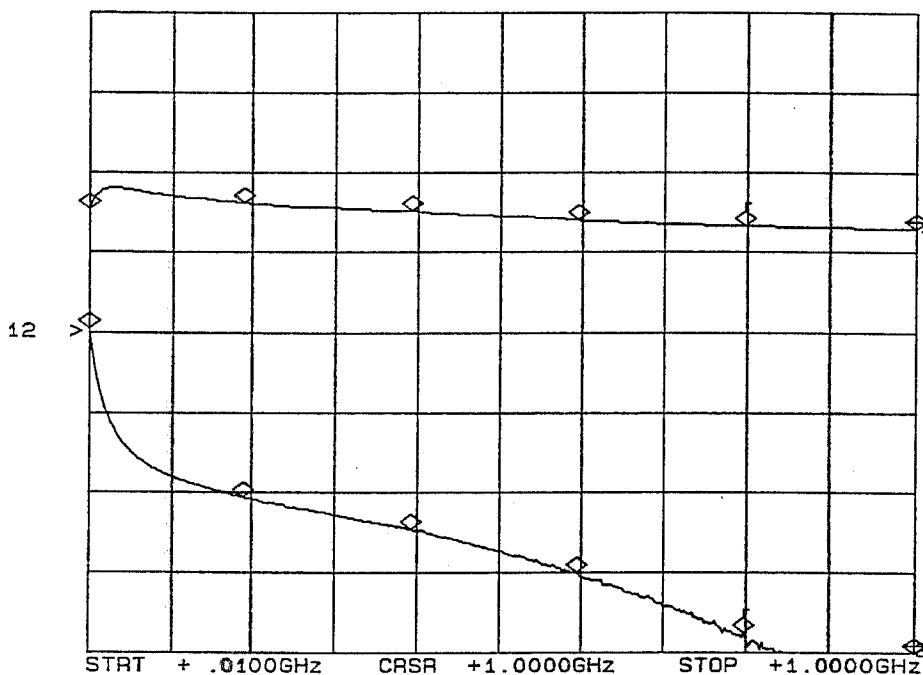
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 SERIAL NUMBER : 6MS908284  
 ENGINEER : RENE AFABLE  
 VOLTAGE & CURRENT DRAW : +5vdc: +2.37mA; -5vdc: -3.92mA

## INSERTION LOSS &amp; RETURN LOSS\*

J1-J2

CH1: A -M S - 1.71 dB      CH2: B -M - 33.79 dB  
 1.0 dB/ REF - 3.00 dB      5.0 dB/ REF - 9.54 dB



\*J1: INPUT ARM

FREQUENCY	INSERTION LOSS	RETURN LOSS
10 MHz	1.45 dB	9.20 dB
200 MHz	1.38 dB	19.83 dB
400 MHz	1.48 dB	21.86 dB
600 MHz	1.60 dB	24.68 dB
800 MHz	1.67 dB	28.57 dB
1.0 GHz	1.71 dB	33.79 dB

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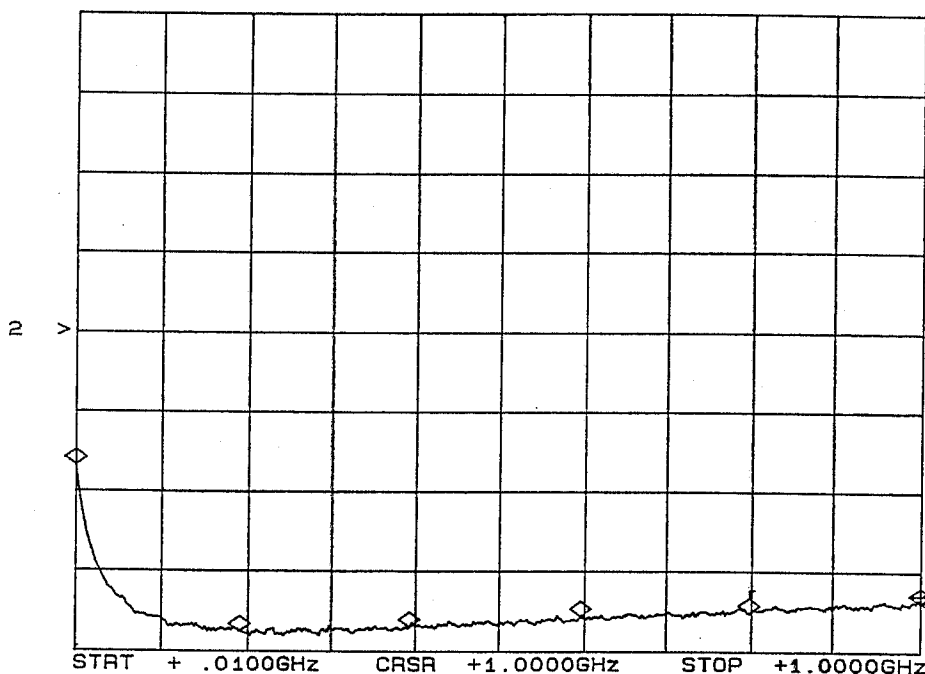
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**SERIAL NUMBER** : 6MS908284  
**ENGINEER** : RENE AFABLE  
**VOLTAGE & CURRENT DRAW** : +5vdc: +2.37mA; -5vdc: -3.92mA

**OFF ARM TERMINATION\***

J1-J2

CH2: B -M - 26.40 dB  
5.0 dB/ REF - 9.54 dB



\*J1: INPUT ARM

FREQUENCY	RETURN LOSS
10 MHz	17.86 dB
200 MHz	28.24 dB
400 MHz	27.71 dB
600 MHz	27.38 dB
800 MHz	26.96 dB
1.0 GHz	26.40 dB

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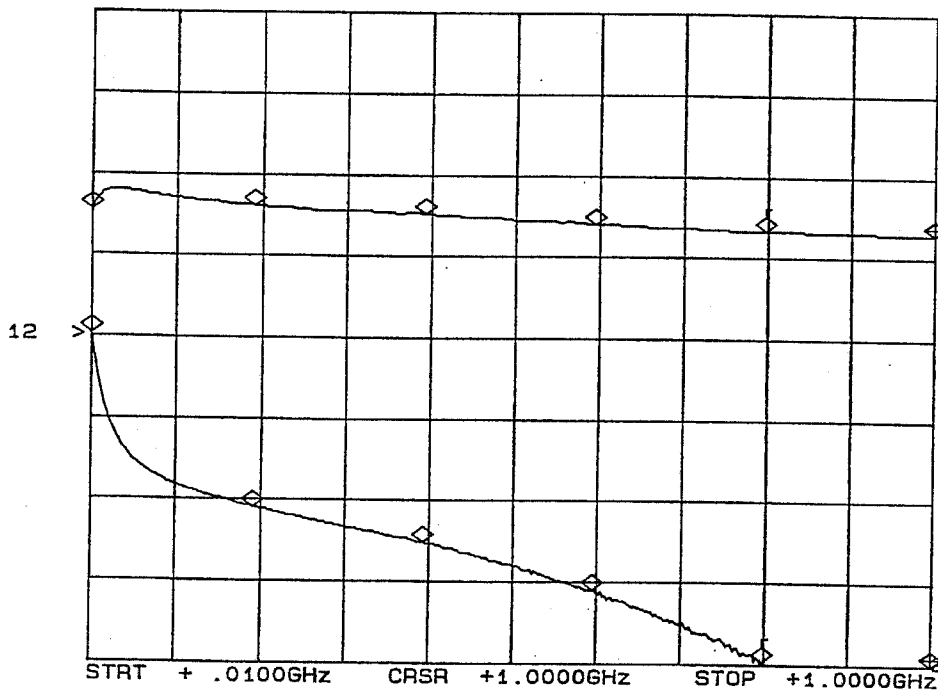
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**SERIAL NUMBER** : 6MS908284  
**ENGINEER** : RENE AFABLE  
**VOLTAGE & CURRENT DRAW** : +5vdc: +2.37mA; -5vdc: -3.92mA

#### INSERTION LOSS & RETURN LOSS\*

J2-J1

CH1: A -M S - 1.71 dB      CH2: B -M - 34.05 dB  
 1.0 dB/ REF - 3.00 dB      5.0 dB/ REF - 9.54 dB



\*J2: INPUT ARM

FREQUENCY	INSERTION LOSS	RETURN LOSS
10 MHz	1.44 dB	9.33 dB
200 MHz	1.38 dB	19.98 dB
400 MHz	1.47 dB	22.15 dB
600 MHz	1.60 dB	25.04 dB
800 MHz	1.67 dB	29.36 dB
1.0 GHz	2.17 dB	21.1 dB

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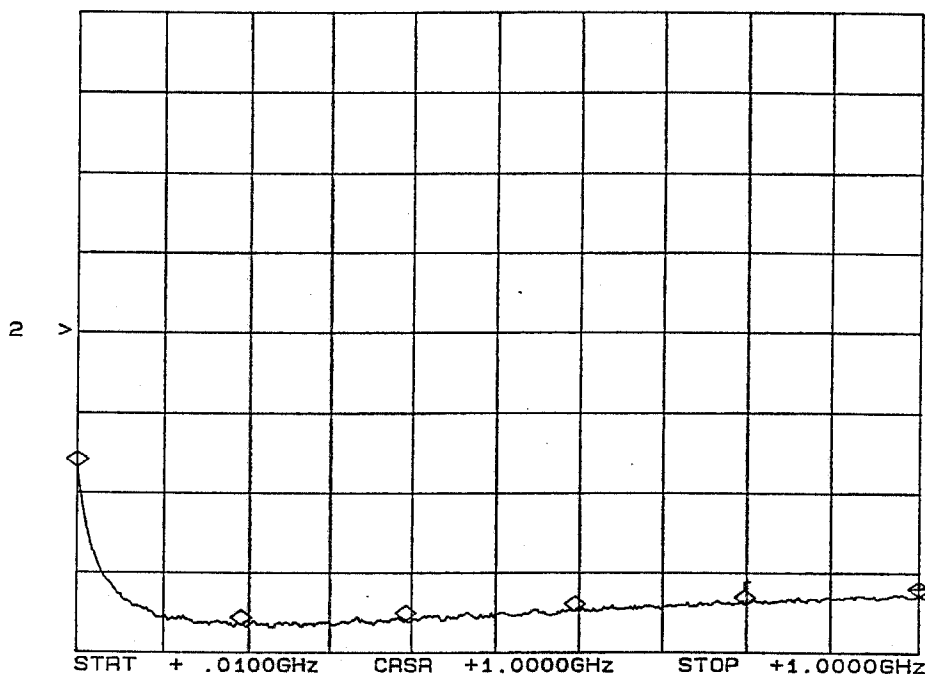
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 SERIAL NUMBER : 6MS908284  
 ENGINEER : RENE AFABLE  
 VOLTAGE & CURRENT DRAW : +5vdc: +2.37mA; -5vdc: -3.92mA

### OFF ARM TERMINATION\*

J2-J1

CH2: B -M - 25.95 dB  
 5.0 dB/ REF - 9.54 dB



\*J2: INPUT ARM

FREQUENCY	RETURN LOSS
10 MHz	17.82 dB
200 MHz	27.69 dB
400 MHz	27.53 dB
600 MHz	26.74 dB
800 MHz	26.40 dB
1.0 GHz	25.95 dB

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## SUMMARY TEST DATA

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SERIAL NUMBER	: 6MS908284
ENGINEER	: RENE AFABLE
VOLTAGE & CURRENT DRAW	: +5vdc: +2.37mA; -5vdc: -3.92mA

### SWITCHING SPEED

"Rise/Fall" Time: 10% RF to 90% RF & 90% RF to 10% RF

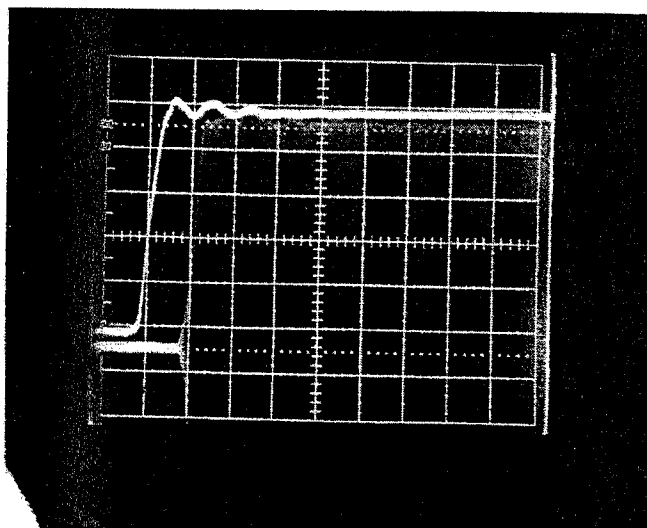
"On/Off" Time: 50% TTL to 90% RF or 10% RF

TYPICAL OF ALL ARMS

"DELAY ON": 12 nS  
"RISE TIME": 3 nS

HORIZONTAL SCALE:  
10 nS PER DIVISION

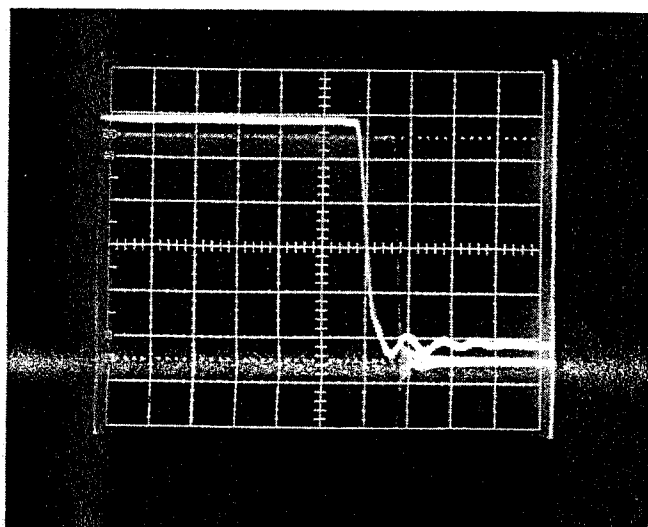
VERTICAL SCALE:  
10 mV PER DIVISION



"DELAY OFF": 8 nS  
"FALL TIME": 2 nS

HORIZONTAL SCALE:  
10 nS PER DIVISION

VERTICAL SCALE:  
10 mV PER DIVISION



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ENGINEER	: RENE AFABLE
VOLTAGE & CURRENT DRAW	: +5vdc: +2.37mA; -5vdc: -3.92mA

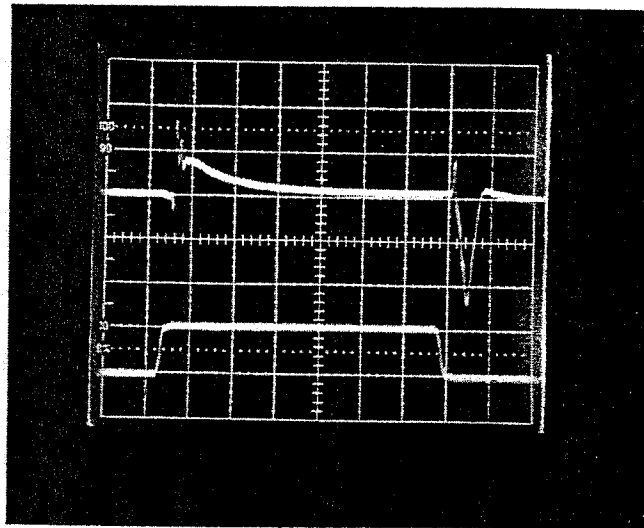
### VIDEO TRANSIENTS

TYPICAL OF ALL ARMS

$\leq 42$  mV P-P  
MEASURED IN A  
300 MHZ BANDWIDTH

VERTICAL SCALE:  
10 mV PER DIVISION

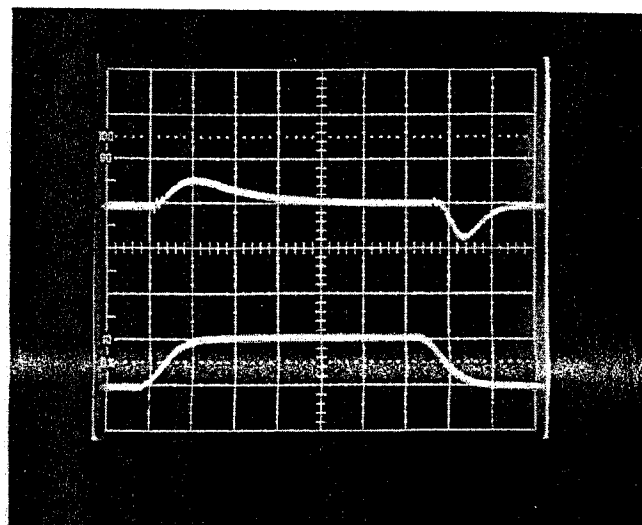
HORIZONTAL SCALE:  
20 nS PER DIVISION



$\leq 13$  mV P-P  
MEASURED IN A  
20 MHZ BANDWIDTH

VERTICAL SCALE:  
10 mV PER DIVISION

HORIZONTAL SCALE:  
20 nS PER DIVISION



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**APPENDIX A**  
**MISCELLANEOUS**  
**TEST DATA AND PLOTS**  
**ON**  
**ISOLATION**  
**AS**  
**MEASURED**  
**ON A SCALAR NETWORK**  
**ANALYZER**  
(NOISE FLOOR OF SCALAR NETWORK ANALYZER IS -70 dB)  
**ON A**  
**SPST**  
**AMC MODEL No:**  
**SWM-6000-1DTU OPTION 011**  
(Serial Number: 2MS908284)  
**FROM 10 MHz TO 6 GHz**  
**AND**  
**FROM 10 MHz TO 1 GHz**

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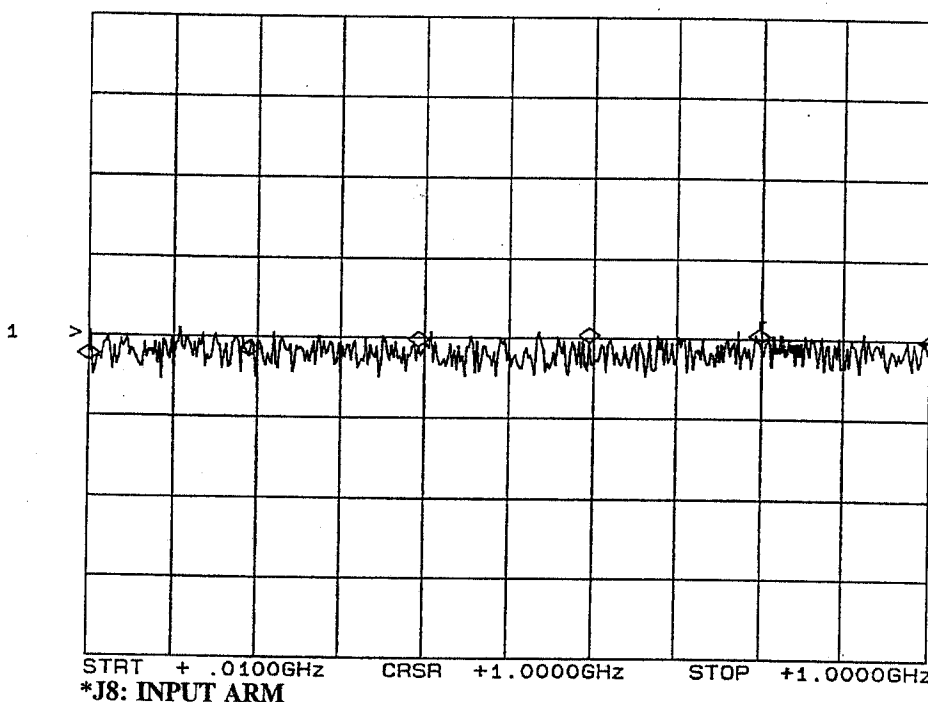


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 ENGINEER : RENE AFABLE  
 VOLTAGE & CURRENT DRAW : +5vdc: +2.37mA; -5vdc: -3.92mA

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

CH1: A -M - 62.01 dB  
 20.0 dB/ REF - 60.00 dB



FREQUENCY	ISOLATION
10 MHz	65.10 dB
500 MHz	63.75 dB
2.0 GHz	58.33 dB
4.0 GHz	43.72 dB
5.2 GHz	36.40 dB
6.0 GHz	31.82 dB

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**ISOLATION  
DATA AND PLOTS  
FROM  
10 MHz TO 1 GHz  
AS  
MEASURED  
ON A SCALAR NETWORK  
ANALYZER  
(NOISE FLOOR OF SCALAR NETWORK ANALYZER IS -70 dB)  
ON A  
SPST  
AMC MODEL No:  
SWM-6000-1DTU OPTIONS 011  
(Serial Number: 2MS908284)  
REPORTED AND PREPARED  
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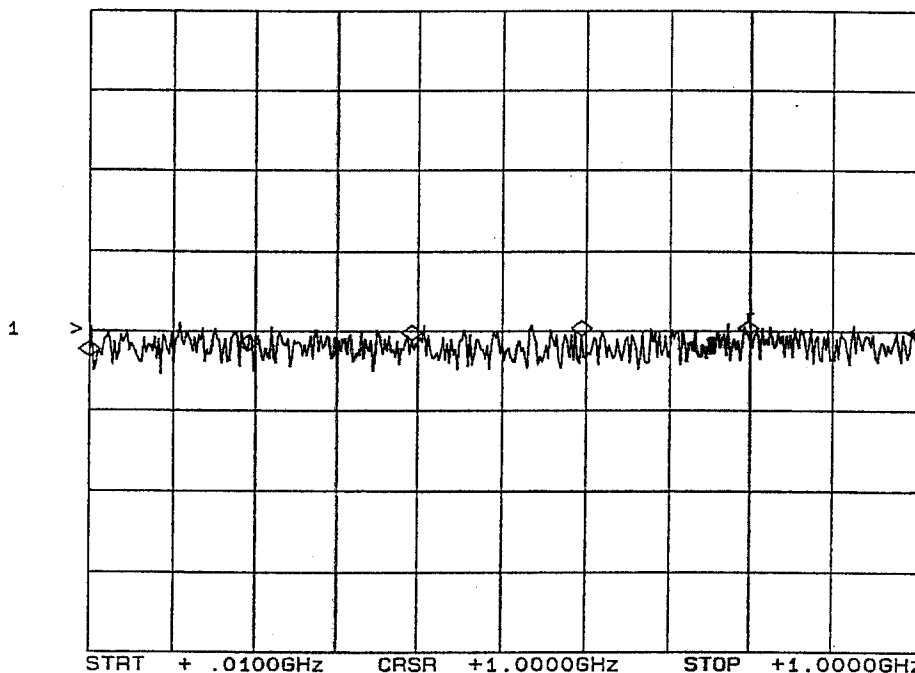


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**ISOLATION\***  
 (AS MEASURED ON A SCALAR NETWORK ANALYZER )  
 J1-J2

CH1: A -M - 62.01 dB  
 20.0 dB/ REF - 60.00 dB



\*J8: INPUT ARM

FREQUENCY	ISOLATION
10 MHz	66.50 dB
200 MHz	60.41 dB
400 MHz	64.30 dB
600 MHz	66.31 dB
800 MHz	62.43 dB
1.0 GHz	62.01 dB

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