



TEST DATA
ON
DC TO 20 GHz
ULTRA HIGH SPEED
VERY LOW VIDEO TRANSIENT
SINGLE POWER SUPPLY
NON-REFLECTIVE/ABSORPTIVE

SPST

PULSE MODULATOR

AMC MODEL No:
SWM-DJV-1DT-2ATT
(Serial Number: 1MS007165)

PREPARED
BY
KATIE BAISEY

TESTED
BY
RENE AFABLE

DESIGN
BY
DANIEL VESCUSO

JULY 15, 2000

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



AMERICAN MICROWAVE CORPORATION

SPST NON-REFLECTIVE ULTRA HIGH SPEED PULSE MODULATOR

KEY FEATURES

- DC TO 20 GHz
- ULTRA HIGH SPEED
- VERY LOW VIDEO TRANSIENT
- TTL LOGIC COMPATIBLE



AMC MODEL No: SWM-DJV-1DT-2ATT

SPECIFICATIONS: (NON-REFLECTIVE)

• FREQUENCY RANGE	:	DC to 20 GHz
• INSERTION LOSS	:	4.50 dB MAX.
	:	1.75 dB TYP. @ 40 MHz
	:	2.25 dB TYP. @ 2.0 GHz
	:	3.00 dB TYP. @ 12 GHz
	:	4.50 dB TYP. @ 20 GHz
• ISOLATION	:	≥ 60 dB MIN.
	:	≥ 60 dB TYP. @ 40 MHz
	:	≥ 60 dB TYP. @ 2.0 GHz
	:	≥ 75 dB TYP. @ 12 GHz
	:	≥ 70 dB TYP. @ 20 GHz
• VSWR	:	2.0:1
• SWITCHING SPEED	:	"RISE" 2nS MAX., 1nS TYP.
	:	"FALL" 2nS MAX., 1nS TYP.
	:	"ON" 15nS MAX., 12nS TYP.
	:	"OFF" 15nS MAX., 12nS TYP.
• CONTROL	:	TTL Compatible (Independent control available)
• VIDEO TRANSIENTS	:	≤20 mV Peak to Peak @ 300 MHz Bandwidth
	:	≤4 mV Peak to Peak @ 20 MHz Bandwidth
• RF INPUT POWER	:	+20 dBm (Other power Levels available)
• DC POWER SUPPLY	:	-5vdc @ -25mA MAX.
(Other supply voltages available)	:	
• SIZE	:	1.00" X 1.00" X 0.50"
• WEIGHT	:	≤ 1.5 oz.

JULY 15, 2000

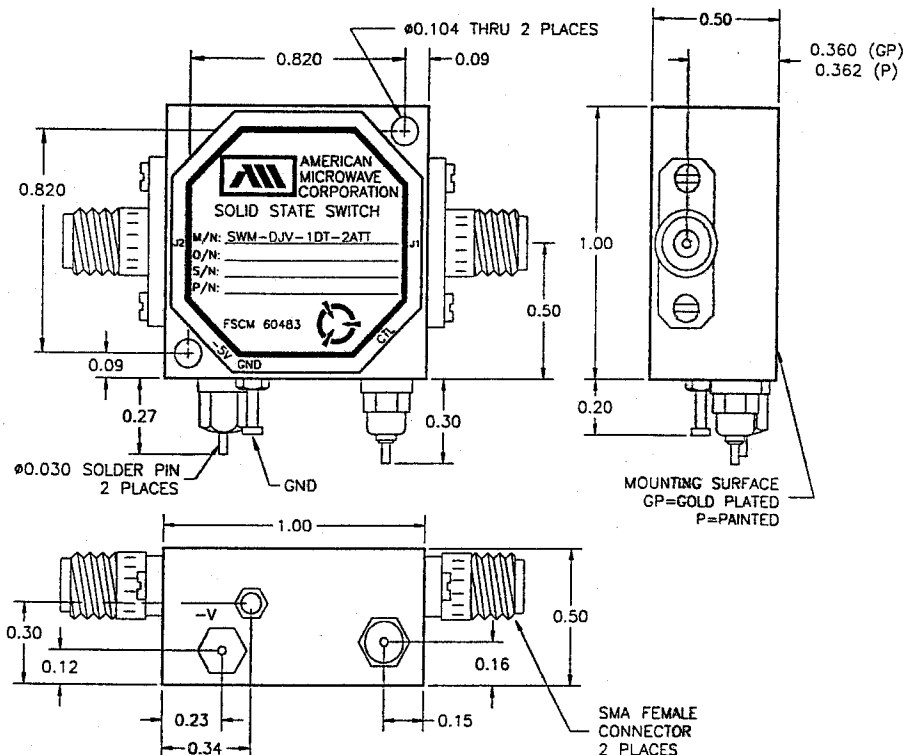
7311 G GROVE ROAD, FREDERICK, MARYLAND 21704 • Tel. (301) 662-4700 • Fax (301) 662-4938



SUMMARY TEST DATA

MODEL NUMBER
 SERIAL NUMBER
 ENGINEER
 VOLTAGE & CURRENT DRAW

: SWM-DJV-1DT-2ATT
 : IMS007165
 : DANIEL VESCUSO
 : -5vdc @ -18.3mA



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

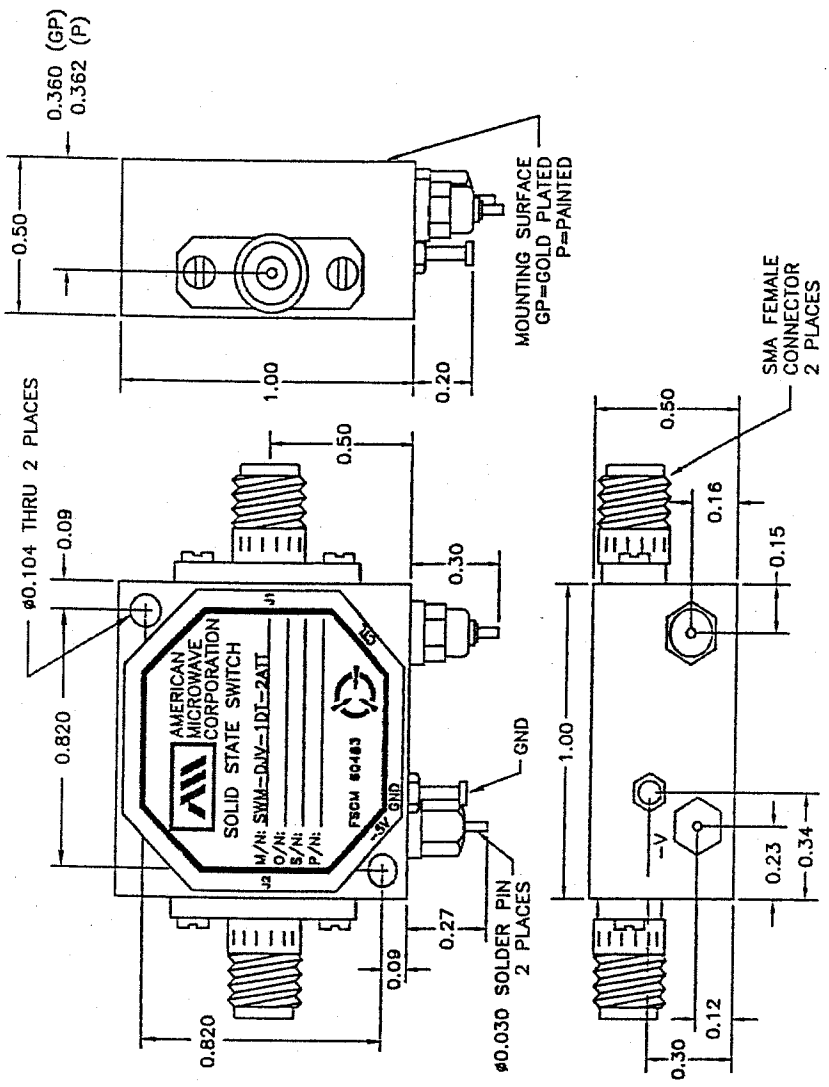
NOTE: THE ABOVE SPECIFICATIONS ARE SUBJECT TO CHANGE OR REVISION.

JULY 15, 2000

AMC MODEL SWM-DJV-1DT-2AIT IS A SINGLE POLE SINGLE THROW, NON-REFLECTIVE/ABSORPTIVE SWITCH MODULE WITH VERY LOW VIDEO TRANSIENT, ULTRA HIGH SPEED, HIGH ISOLATION, AND WITH INTEGRAL TTL DRIVER, DESIGNED FOR DC TO 20 GHz OPERATION.

SPECIFICATIONS:

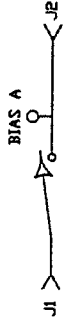
- FREQUENCY: DC TO 20 GHz
- INSERTION LOSS: ABSORPTIVE: 4.5dB
- ISOLATION: 10 MHz TO 12 GHz: 60dB
12 GHz TO 20 GHz: 70dB
- VSWR: ABSORPTIVE IN/OUT: 2.0:1
ABSORPTIVE OUT/OFF: 2.0:1
- SPEED: RISE: 1ns TYPICAL, 2ns MAX.
FALL: 1ns TYPICAL, 2ns MAX.
DELAY ON: 12ns TYPICAL, 15ns MAX.
DELAY OFF: 12ns TYPICAL, 15ns MAX.
- VIDEO TRANSIENT: 20mV P-P @ 300MHz BANDWIDTH
4mV P-P @ 20MHz BANDWIDTH
- POWER INPUT: (CW)+20dBm (STANDARD)
- SURVIVAL POWER: 1 WATT CW, 10 WATTS PEAK 1 usec
- CONTROL: TTL LOGIC "0"-ON "1"-OFF
- POWER SUPPLY: -5V @ 25 mA MAX.



M/N = MANUFACTURER PART NUMBER
O/N = OPTION NUMBER
S/N = SERIAL NUMBER
P/N = PART NUMBER

NOTE:
DR=WITH DRIVER, REFLECTIVE
DT=WITH DRIVER, NON-REFLECTIVE/ABSORPTIVE

BLOCK DIAGRAM



ENVIRONMENTAL RATINGS:

- TEMPERATURE: -55°C TO +65°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

AMC CONFIDENTIAL AND PROPRIETARY

APPROVALS		DATE	TITLE
WSP & RRA	8/14/00	8/14/00	AMERICAN MICROWAVE CORPORATION FREDERICK, MARYLAND
CHECKED JA	8/14/00		PRODUCT FEATURE SWM-DJV-1DT-2AIT PULSE MODULATOR
ISSUED WSP	8/14/00		
SIZE FSCH NO.	DWG NO.	REV.	
A 60483	100-5653	-	
SCALE N/S			SHEET 1 of 3

ALL DIMENSIONS ARE IN INCHES
TOLERANCES:
X.XX ±0.020
X.XXX ±0.010

DESCRIPTION
 2184-1DR/DT IS A SINGLE POLE SINGLE THROW, REFLECTIVE OR NON-REFLECTIVE/ABSORPTIVE SWITCH MODULE WITH LOW INSERTION LOSS, HIGH ISOLATION, HIGH SPEED AND WITH INTEGRAL TTL DRIVER, DESIGNED FOR 0.5 GHz TO 18 GHz OPERATION.

SPECIFICATIONS:

- FREQUENCY: 0.5 GHz TO 18 GHz
- REFLECTIVE: 2.5db
- ABSORPTIVE: 3.5db
- ISOLATION: 0.5 GHz TO 2 GHz: 60db
2 GHz TO 18 GHz: 70db
- VSWR: REFLECTIVE IN/OUT: 2.0:1
ABSORPTIVE IN/OUT: 2.0:1
ABSORPTIVE OUT/OFF: 2.0:1
- SPEED: RISE: 10ns TYPICAL, 15ns MAX.
FALL: 10ns TYPICAL, 15ns MAX.
DELAY ON: 75ns TYPICAL, 100ns MAX.
DELAY OFF: 75ns TYPICAL, 100ns MAX.
- POWER INPUT: (CW)+20dBm (STANDARD), +10 dBm (HIGH SPEED)
- SURVIVAL POWER: 1 WATT CW, 10 WATTS PEAK 1 usec
- CONTROL: TTL LOGIC "0"-ON "1"-OFF
- POWER SUPPLY: +5V @ 50 mA MAX.(REFLECTIVE)
-5V @ 50 mA MAX.(ABSORPTIVE/NON-REFLECTIVE)
100mA MAX.(ABSORPTIVE/NON-REFLECTIVE)

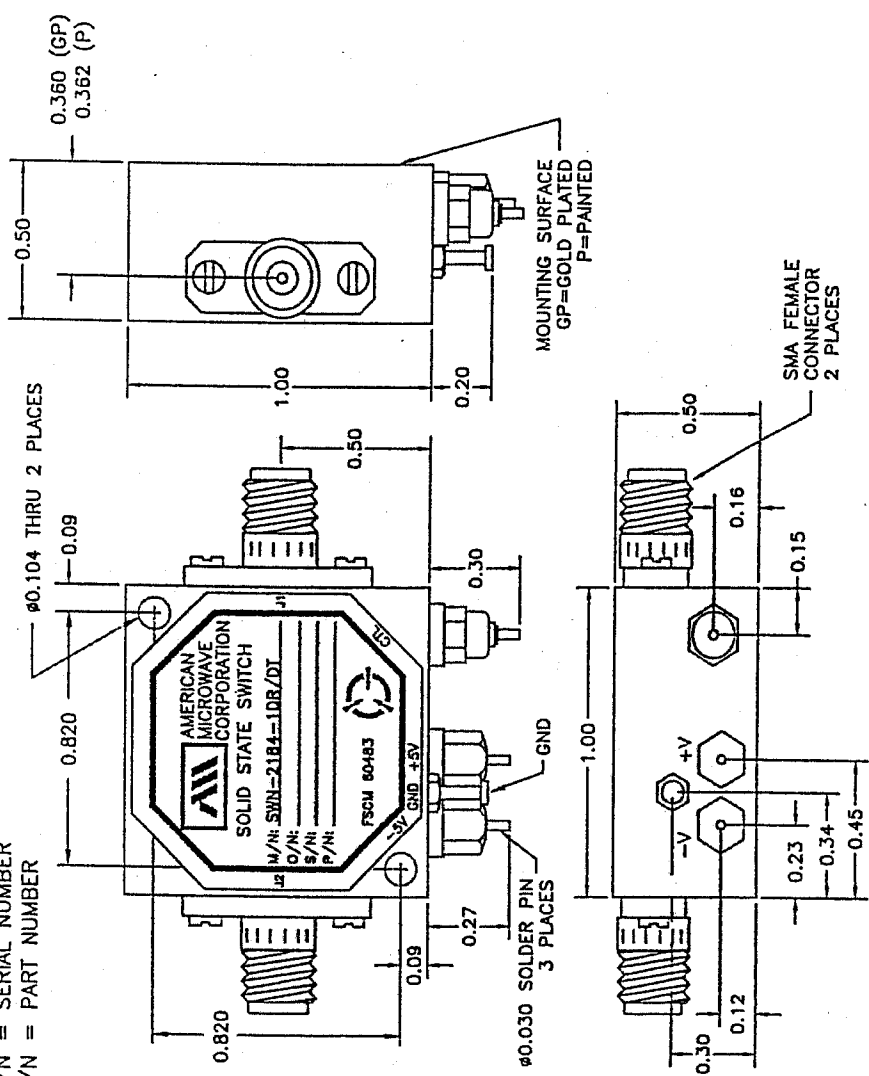
OPTIONS:

- 10M18 10 MHz TO 18 GHz (INSERTION LOSS INCREASES BY 1.5db AT 10 MHz AND 0.5db AT 18 GHz)
- 100M18 100 MHz TO 18 GHz (INSERTION LOSS INCREASES BY 1.5db AT 100 MHz AND 0.5db AT 18 GHz)
- 118 1 GHz TO 18 GHz (NO CHANGE IN INSERTION LOSS)
- 218 2 GHz TO 18 GHz (NO CHANGE IN INSERTION LOSS)
- 412 4 GHz TO 12.4 GHz (NO CHANGE IN INSERTION LOSS)
- 618 6 GHz TO 18 GHz (NO CHANGE IN INSERTION LOSS)
- 1218 12 GHz TO 18 GHz (NO CHANGE IN INSERTION LOSS)
- 100M20 100 MHz TO 20 GHz (INSERTION LOSS INCREASES BY 1.5db AT 100 MHz AND 1.0db AT 20 GHz)
- 220 2 GHz TO 20 GHz (INSERTION LOSS INCREASES BY 1.0db AT 20 GHz)
- 1020 10 GHz TO 20 GHz (INSERTION LOSS INCREASES BY 1.0db AT 20 GHz)
- B01 -12V POWER SUPPLIES
- B02 -15V POWER SUPPLIES
- B03 REVERSE LOGIC "1"-ON "0"-OFF
- B04 DRIVERLESS, CURRENT CONTROLLED
- B05 HIGH SPEED, TURNON/TURNOFF 20 nsec MAXIMUM WHEN APPLICABLE OR OPTION HS
- B06 HIGH POWER - SPECIFY CW POWER, PEAK POWER, PULSE WIDTH, DUTY CYCLE, RF FREQUENCY AND BANDWIDTH
- B07 CUSTOM DESIGNED PRODUCT- SPECIFY INITIALS OF CUSTOMER
- B08 LOW VIDEO TRANSIENTS - SPECIFY VIDEO BANDWIDTH
- B09 LOW INSERTION LOSS VERSION
- B10 HIGH ISOLATION VERSION

ENVIRONMENTAL RATINGS:

- TEMPERATURE: -55C TO +85C (OPERATING)
-65C TO +125C (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 DR REVISION

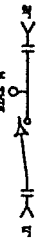
M/N = MANUFACTURER PART NUMBER
 O/N = OPTION NUMBER
 S/N = SERIAL NUMBER
 P/N = PART NUMBER



NOTE:

DR=WITH DRIVER, REFLECTIVE
 DT=WITH DRIVER, NON-REFLECTIVE/ABSORPTIVE

BLOCK DIAGRAM



AMC CONFIDENTIAL AND PROPRIETARY

APPROVALS		DATE	TITLE
DESIGNED WSP	BY RRA	08/07/00	PRODUCT FEATURE
CHECKED A	DATE 8/8/00		SWN-2184-1DR/DT
ISSUED JUP	REV. 01/02		STANDARD ONE WAY
SCALE N/S	FSCM NO. A 60483	DWG NO. 100-5652	REV. -
AMERICAN MICROWAVE CORPORATION FREDERICK, MARYLAND		SHEET 1 of 3	



SUMMARY TEST DATA

MODEL NUMBER
 SERIAL NUMBER
 ENGINEER
 VOLTAGE & CURRENT DRAW

: SWM-DJV-1DT-2ATT
 : 1MS007165
 : DANIEL VESCUSO
 : -5vdc @ 18.3mA

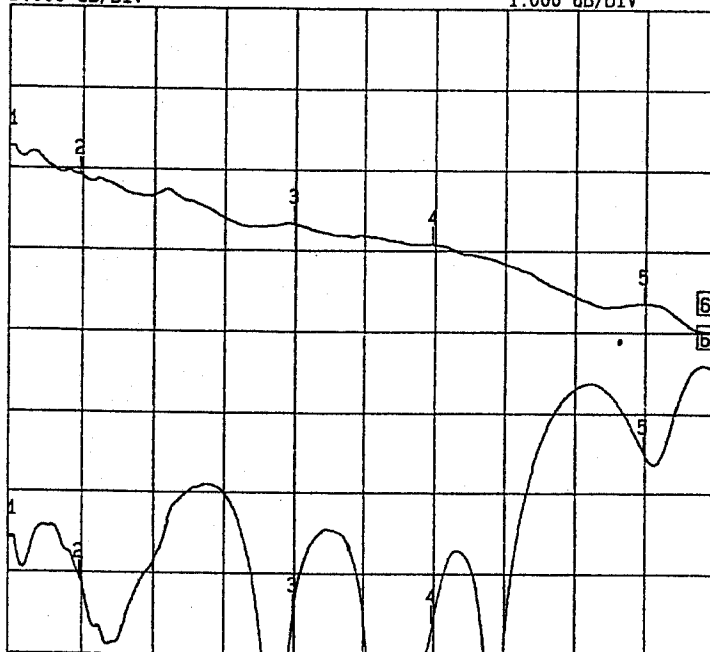
INSERTION LOSS & RETURN LOSS*

J1-J2

CH1: S11 FWD REFL
 LOG MAGNITUDE
 REF= -9.540 dB
 5.000 dB/DIV

CH3: S21 FWD TRANS
 LOG MAGNITUDE
 REF= -4.000 dB
 1.000 dB/DIV

CH 3 - S21
 REFERENCE PLANE
 0.0000 mm



MARKER 6
 20.00000000 GHz
 -3.996 dB

MARKER TO MAX
 MARKER TO MIN

- 1 0.040000000 GHz
-1.727 dB
- 2 2.011050000 GHz
-2.075 dB
- 3 8.011525000 GHz
-2.678 dB
- 4 12.003525000 GHz
-2.921 dB
- 5 18.004000000 GHz
-3.646 dB

0.040000000
 *J1: INPUT ARM

MARKER READOUT
 FUNCTIONS

FREQUENCY	INSERTION LOSS	RETURN LOSS
40 MHz	1.72 dB	22.3 dB
2.0 GHz	2.07 dB	24.9 dB
8.0 GHz	2.67 dB	26.9 dB
12.0 GHz	2.92 dB	27.6 dB
18.0 GHz	3.64 dB	17.0 dB
20.0 GHz	3.99 dB	11.5 dB



SUMMARY TEST DATA

MODEL NUMBER : SWM-DJV-1DT-2ATT
SERIAL NUMBER : 1MS007165
ENGINEER : DANIEL VESCUSO
VOLTAGE & CURRENT DRAW : -5vdc @ 18.3mA

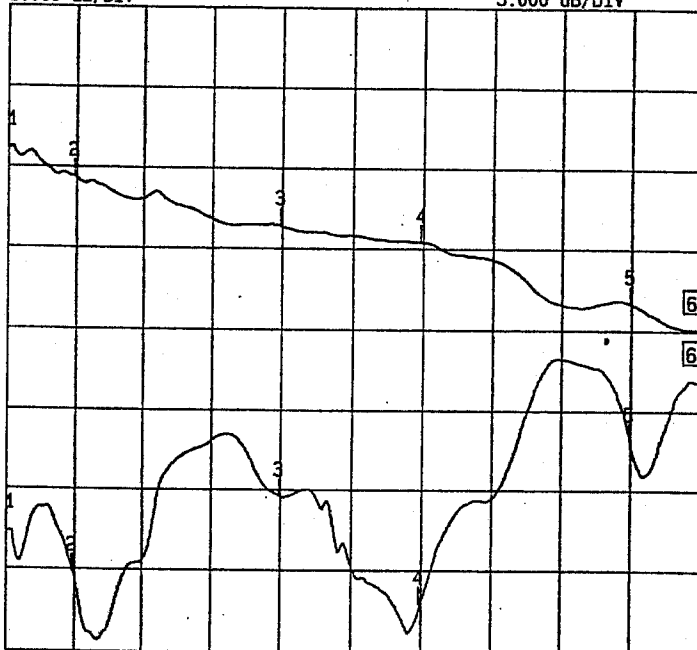
INSERTION LOSS & RETURN LOSS*

J2-J1

CH2: S12 REV TRANS
 LOG MAGNITUDE
 REF= -4.000 dB
 1.000 dB/DIV

CH4: S22 REV REFL
 LOG MAGNITUDE
 REF= -9.540 dB
 5.000 dB/DIV

CH 2 - S12
 REFERENCE PLANE
 0.0000 mm



MARKER 6
 20.000000000 GHz
 -3.979 dB

MARKER TO MAX
 MARKER TO MIN

- 1 0.040000000 GHz
-1.758 dB
- 2 2.011050000 GHz
-2.124 dB
- 3 8.011525000 GHz
-2.721 dB
- 4 12.003525000 GHz
-2.919 dB
- 5 18.004000000 GHz
-3.670 dB

MARKER READOUT FUNCTIONS

0.040000000
 *J2: INPUT ARM

GHz

20.000000000

FREQUENCY	INSERTION LOSS	RETURN LOSS
40 MHz	1.75 dB	22.2 dB
2.0 GHz	2.12 dB	24.7 dB
8.0 GHz	2.72 dB	19.9 dB
12.0 GHz	2.91 dB	26.6 dB
18.0 GHz	3.67 dB	16.4 dB
20.0 GHz	3.97 dB	12.6 dB

JULY 15, 2000

PAGE 7



SUMMARY TEST DATA

MODEL NUMBER	: SWM-DJV-1DT-2ATT
SERIAL NUMBER	: 1MS007165
ENGINEER	: DANIEL VESCUSO
VOLTAGE & CURRENT DRAW	: -5vdc: @ 18.3mA

OFF ARM TERMINATION*

J1

CH1: S11 FWD REFL
LOG MAGNITUDE
REF= -9.540 dB
5.000 dB/DIV

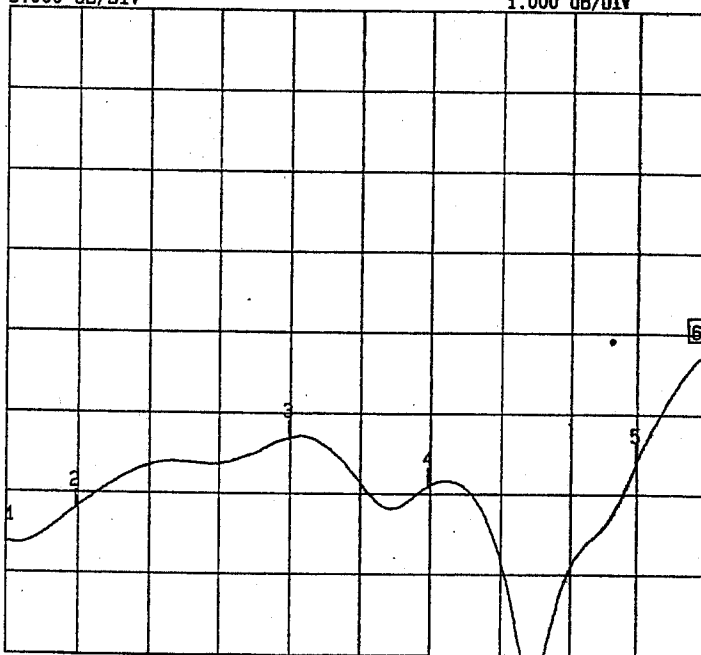
CH3: S21 FWD TRANS
LOG MAGNITUDE
REF= -4.000 dB
1.000 dB/DIV

CH 1 - S11
REFERENCE PLANE
0.0000 mm

MARKER 6
20.00000000 GHz
-11.024 dB

MARKER TO MAX
MARKER TO MIN

- 1 0.04000000 GHz
-22.683 dB
- 2 2.01105000 GHz
-20.442 dB
- 3 8.01152500 GHz
-16.091 dB
- 4 12.00352500 GHz
-19.012 dB
- 5 18.00400000 GHz
-17.583 dB



0.040000000 GHz 20.000000000

*J1: INPUT ARM

MARKER READOUT
FUNCTIONS

FREQUENCY	RETURN LOSS
40 MHz	22.68 dB
2.0 GHz	20.44 dB
8.0 GHz	16.09 dB
12.0 GHz	19.01 dB
18.0 GHz	17.58 dB
20.0 GHz	11.02 dB

JULY 15, 2000



SUMMARY TEST DATA

MODEL NUMBER : SWM-DJV-1DT-2ATT
SERIAL NUMBER : 1MS007165
ENGINEER : DANIEL VESCUSO
VOLTAGE & CURRENT DRAW : -5vdc: @ 18.3mA

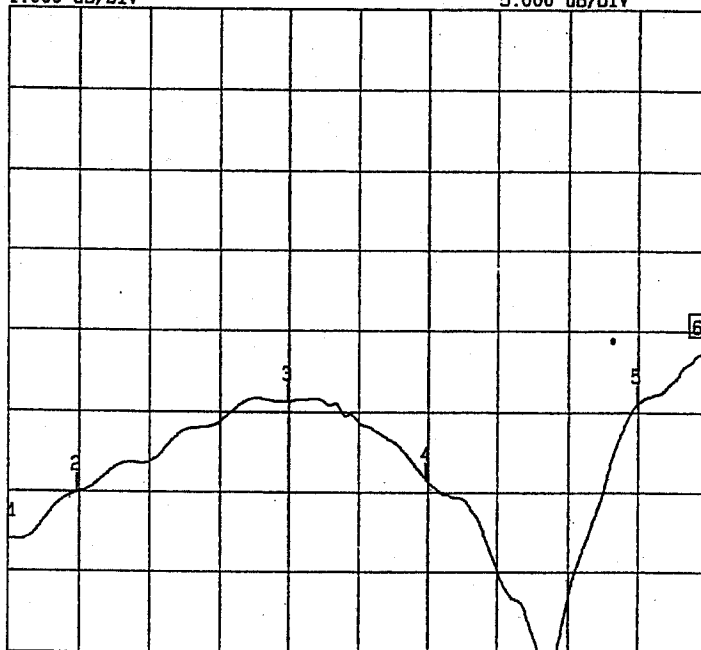
OFF ARM TERMINATION*

J2

CH2: S12 REV TRANS
 LOG MAGNITUDE
 REF= -4.000 dB
 1.000 dB/DIV

CH4: S22 REV REFL
 LOG MAGNITUDE
 REF= -9.540 dB
 5.000 dB/DIV

CH 4 - S22
 REFERENCE PLANE
 0.0000 mm



MARKER 6
 20.000000000 GHz
 -10.938 dB

MARKER TO MAX
 MARKER TO MIN

- 1 0.040000000 GHz
-22.515 dB
- 2 2.011050000 GHz
-19.563 dB
- 3 8.011525000 GHz
-13.867 dB
- 4 12.003525000 GHz
-18.834 dB
- 5 18.004000000 GHz
-13.984 dB

MARKER READOUT FUNCTIONS

0.040000000
 *J2: INPUT ARM

GHz

20.000000000

FREQUENCY	RETURN LOSS
40 MHz	22.51 dB
2.0 GHz	19.56 dB
8.0 GHz	13.86 dB
12.0 GHz	18.83 dB
18.0 GHz	13.98 dB
20.0 GHz	10.93 dB

JULY 15, 2000



SUMMARY TEST DATA

MODEL NUMBER	: SWM-DJV-1DT-2ATT
SERIAL NUMBER	: IMS007165
ENGINEER	: DANIEL VESCUSO
VOLTAGE & CURRENT DRAW	: -5vdc @ -18.3mA

ISOLATION*

(AS MEASURED ON A SPECTRUM ANALYZER)

FREQUENCY	J1-J2
50 MHz	61 dB
100 MHz	62 dB
200 MHz	62 dB
500 MHz	63 dB
1 GHz	58 dB
2 GHz	62 dB
4 GHz	65 dB
6 GHz	69 dB
8 GHz	77 dB
10 GHz	68 dB
12 GHz	78 dB
14 GHz	74 dB
16 GHz	75 dB
18 GHz	74 dB
20 GHz	72 dB

*J1: INPUT ARM

JULY 15, 2000



SUMMARY TEST DATA

MODEL NUMBER	: SWM-DJV-1DT-2ATT
SERIAL NUMBER	: 1MS007165
ENGINEER	: DANIEL VESCUSO
VOLTAGE & CURRENT DRAW	: -5vdc @ -18.3mA

SWITCHING SPEED

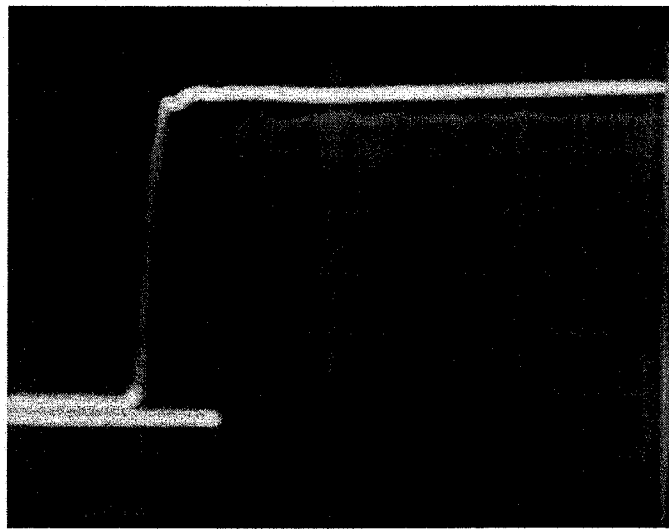
"Rise/Fall" Time: 10% RF to 90% RF & 90% RF to 10% RF
 "On/Off" Time: 50% TTL to 90% RF or 10% RF

TYPICAL OF ALL ARMS

"DELAY ON": 13 nS
 "RISE TIME": 2 nS

HORIZONTAL SCALE:
 10 nS PER DIVISION

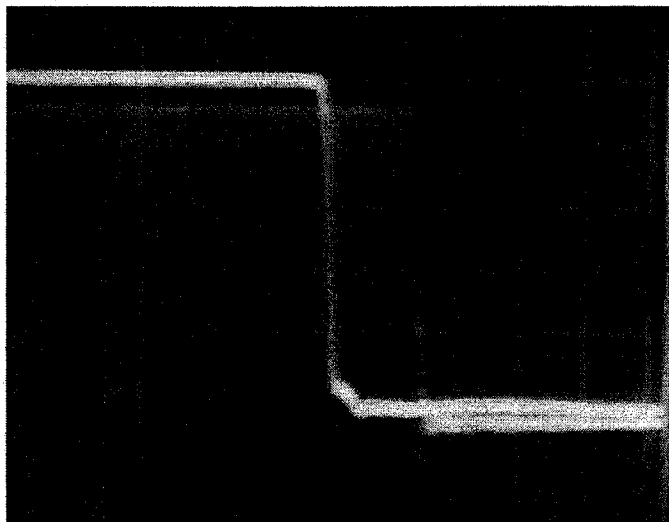
VERTICAL SCALE:
 10 mV PER DIVISION



"DELAY OFF": 15 nS
 "FALL TIME": 2 nS

HORIZONTAL SCALE:
 10 nS PER DIVISION

VERTICAL SCALE:
 10 mV PER DIVISION



JULY 15, 2000

PAGE 11



SUMMARY TEST DATA

MODEL NUMBER	: SWM-DJV-1DT-2ATT
SERIAL NUMBER	: 1MS007165
ENGINEER	: DANIEL VESCUSO
VOLTAGE & CURRENT DRAW	: -5vdc @ -18.3mA

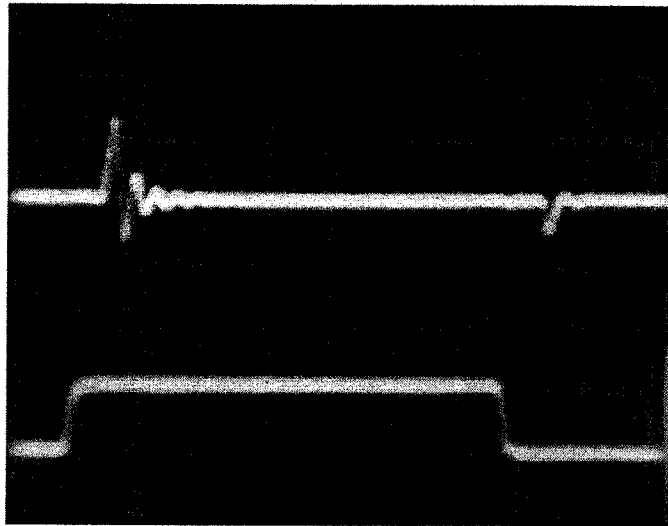
VIDEO TRANSIENTS

TYPICAL OF ALL ARM

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

VERTICAL SCALE:
10 mV PER DIVISION

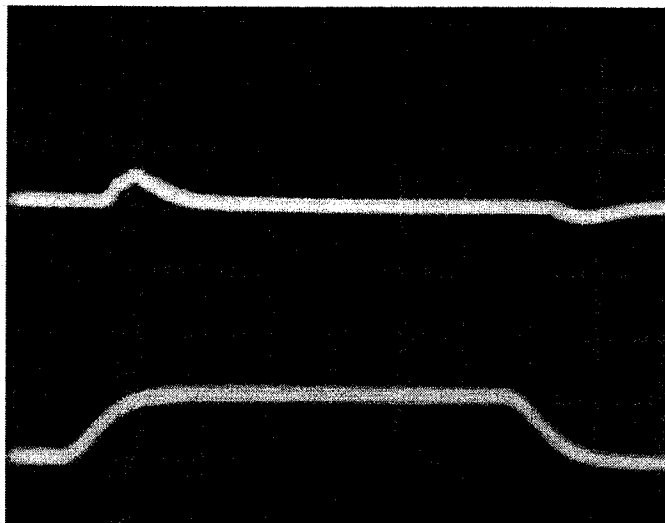
HORIZONTAL SCALE:
20 nS PER DIVISION



≤ 4 mV P-P
MEASURED IN A
20 MHZ BANDWIDTH

VERTICAL SCALE:
5 mV PER DIVISION

HORIZONTAL SCALE:
20 nS PER DIVISION



The logo for American Microwave Corporation is located in the top-left corner. It features a stylized graphic of three slanted parallel lines above the company name, which is written in a bold, sans-serif font and rotated 45 degrees counter-clockwise.

**AMERICAN MICROWAVE
CORPORATION**

APPENDIX A

**MISCELLANEOUS
TEST DATA AND PLOTS
ON
ISOLATION
AS
MEASURED
ON A VECTOR NETWORK ANALYZER
ON A
SPST
PULSE MODULATOR**

**AMC MODEL No:
SWM-DJV-1DT-2ATT
(Serial Number: 1MS007165)**

JULY 15, 2000

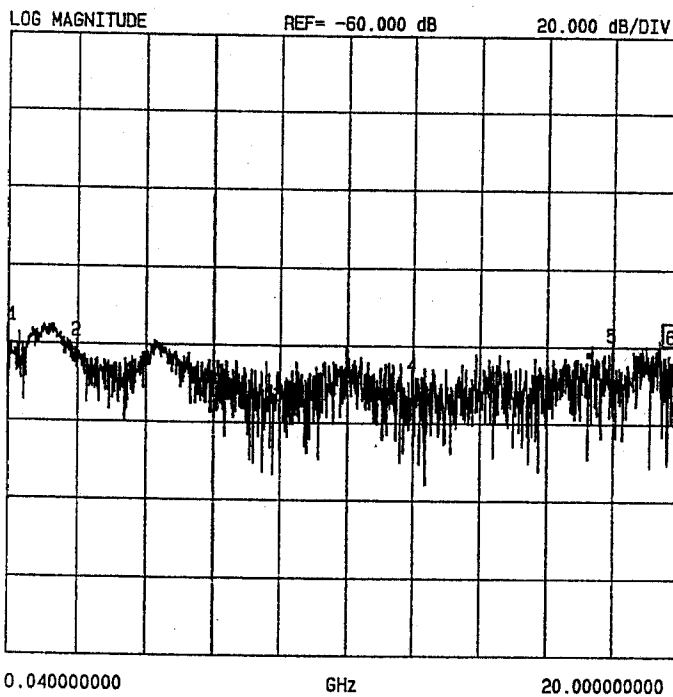


SUMMARY TEST DATA

MODEL NUMBER	: SWM-DJV-1DT-2ATT
SERIAL NUMBER	: IMS007165
ENGINEER	: DANIEL VESCUSO
VOLTAGE & CURRENT DRAW	: -5vdc @ 18.3mA

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

S21 FORWARD TRANSMISSION



CH 3 - S21
REFERENCE PLANE
0.0000 mm

MARKER 6
20.000000000 GHz
-63.993 dB

MARKER TO MAX
MARKER TO MIN

- 1 0.040000000 GHz
-59.276 dB
- 2 2.036000000 GHz
-63.349 dB
- 3 8.024000000 GHz
-79.472 dB
- 4 12.016000000 GHz
-71.523 dB
- 5 18.004000000 GHz
-63.527 dB

MARKER READOUT
FUNCTIONS

0.040000000 GHz 20.000000000
*J1: INPUT ARM

FREQUENCY	ISOLATION
40 MHz	59.27 dB
2.0 GHz	63.34 dB
8.0 GHz	79.47 dB
12.0 GHz	71.52 dB
18.0 GHz	63.52 dB
20.0 GHz	63.99 dB

JULY 15, 2000