



**TEST DATA**

**ON**

**40 MHz TO 18 GHz**

**40 MHz TO 4 GHz**

**AND**

**9.5 GHz TO 10 GHz**

**HIGH SPEED**

**LOW INSERTION LOSS**

**HIGH ISOLATION**

**SLIMLINE REFLECTIVE**

**SP2T**

**SOLID STATE SWITCH**

**(SURFACE MOUNTABLE)**

**AMC MODEL No:**

**MSNN-2DR-024T-UF15 OPTION 10F**

**(Serial Number: 2MS90133)**

**PREPARED  
BY  
KATIE BAISEY**

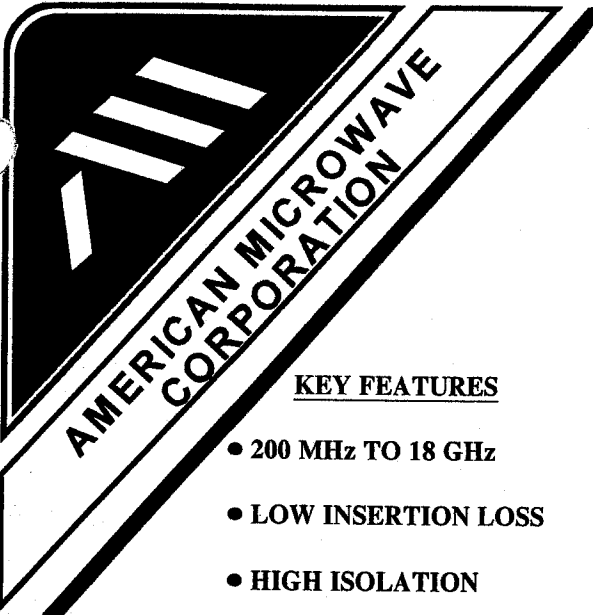
**TESTED  
BY  
RENE AFABLE**

**SEPTEMBER 11, 2000**

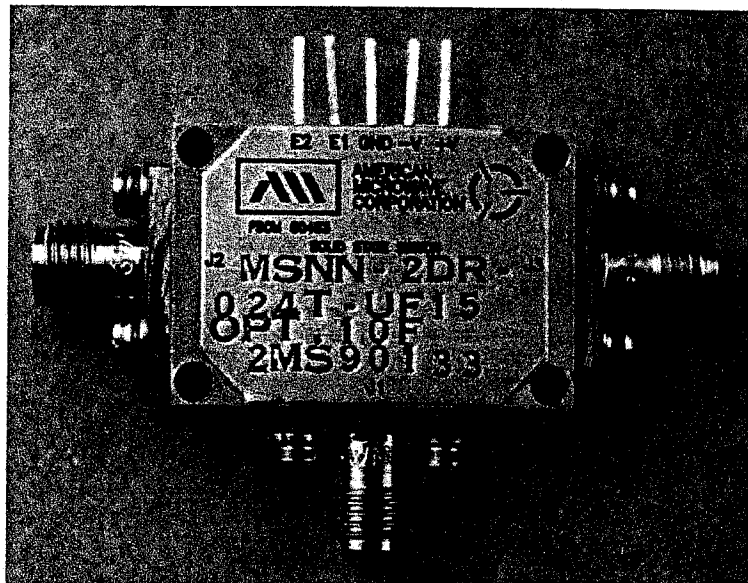
**WEB PAGE: [HTTP://WWW.AMWAVE.COM](http://www.amwave.com)**

**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**



**SLIMLINE HIGH SPEED, LOW  
INSERTION LOSS, REFLECTIVE  
SP2T SOLID STATE SWITCH**



**KEY FEATURES**

- 200 MHz TO 18 GHz
- LOW INSERTION LOSS
- HIGH ISOLATION
- SURFACE MOUNTABLE
- HIGH SPEED
- TTL COMPATIBLE

**AMC MODEL No: MSNN-2DR-024T-UF15 OPTION 10F**

**SPECIFICATIONS: (REFLECTIVE)**

|                                   |   |   |
|-----------------------------------|---|---|
| • FREQUENCY RANGE                 | : | 200 MHz to 18 GHz (10 MHz TO 18 GHz optional) |
| • INSERTION LOSS                  | : | 2.5 dB MAX.                                   |
|                                   | : | 0.8 dB TYP. @ 200 MHz                         |
|                                   | : | 0.75 dB TYP. @ 2 GHz                          |
|                                   | : | 1.5 dB TYP. @ 10 GHz                          |
|                                   | : | 2.0 dB TYP. @ 14 GHz                          |
|                                   | : | 2.5 dB TYP. @ 18 GHz                          |
| • ISOLATION                       | : | ≥ 70 dB MIN.                                  |
|                                   | : | ≥ 80 dB TYP. @ 200 MHz                        |
|                                   | : | ≥ 80 dB TYP. @ 2 GHz                          |
|                                   | : | ≥ 80 dB TYP. @ 10 GHz                         |
|                                   | : | ≥ 75 dB TYP. @ 14 GHz                         |
|                                   | : | ≥ 70 dB TYP. @ 18 GHz                         |
| • VSWR                            | : | 2.0:1   |
| • SWITCHING SPEED                 | : | "RISE" 10nS MAX., 5nS TYP.                    |
|                                   | : | "FALL" 10nS MAX., 5nS TYP.                    |
|                                   | : | "ON" 35nS MAX., 30nS TYP.                     |
|                                   | : | "OFF" 35nS MAX., 30nS TYP.                    |
| • CONTROL                         | : | Single Control TTL compatible                 |
| • VIDEO TRANSIENT                 | : | ≤ 2.3 V peak to peak at 300 MHz bandwidth     |
|                                   | : | ≤ 0.64 V peak to peak at 20 MHz bandwidth     |
| • RF INPUT POWER                  | : | +20dBm (CW)(other power levels available)     |
| • DC POWER SUPPLY                 | : | +5vdc @ 100mA MAX.                            |
| (Other supply voltages available) | : | -15vdc @ 75mA MAX.                            |
| • SIZE                            | : | 1.1" (L) X 0.75" (W) X 0.24" (H)              |
| • WEIGHT                          | : | ≤ 0.75 oz. TYPICAL                            |

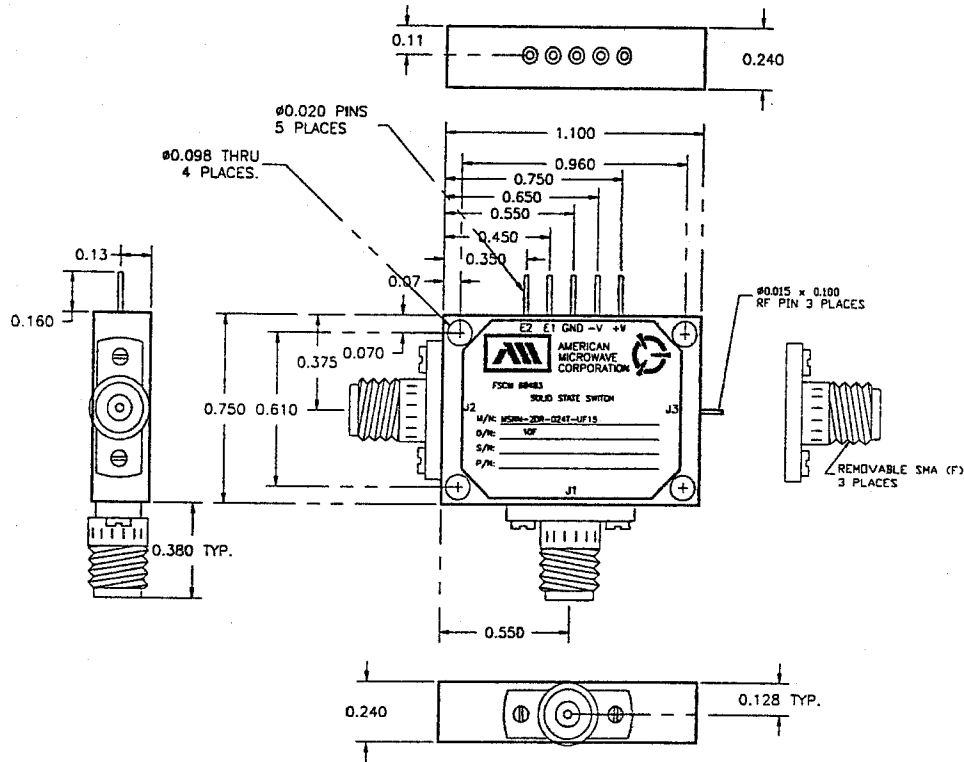
SEPTEMBER 11, 2000

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### SUMMARY TEST DATA

|                                   |                                       |
|-----------------------------------|---------------------------------------|
| <b>MODEL NUMBER</b>               | <b>: MSNN-2DR-024T-UF15</b>           |
| <b>OPTION NUMBER</b>              | <b>: 10F</b>                          |
| <b>SERIAL NUMBER</b>              | <b>: 2MS90133</b>                     |
| <b>ENGINEER</b>                   | <b>: RENE AFABLE</b>                  |
| <b>VOLTAGE &amp; CURRENT DRAW</b> | <b>: +5vdc @ 50mA; -15vdc @ 58 mA</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.

SEPTEMBER 11, 2000

DESCRIPTOR: AMC MOD. MSNN-2DR-024T-UF15 OPTIONS 10F IS A SLIMLINE SINGLE POLE TWO THROW, REFLECTIVE SWITCH MODULE WITH LOW INSERTION LOSS, HIGH ISOLATION, HIGH SPEED AND WITH INTEGRAL TTL DRIVER, DESIGNED FOR 9.5 GHz TO 10 GHz OPERATION.

**SPECIFICATIONS:**

- FREQUENCY: 9.5 GHz - 10 GHz
- INSERTION LOSS: 2.0dB MAXIMUM
- ISOLATION: 65dB MINIMUM
- VSWR: 2.0:1 MAXIMUM
- SWITCHING SPEED: 250 nS MAXIMUM
- INPUT RF POWER: +22 dBm MAXIMUM
- CONTROL LOGIC: SEE TABLE BELOW
- POWER SUPPLY: +5V @ +125 mA MAXIMUM  
-15V @ -75 mA MAXIMUM
- OPERATING TEMPERATURE: -54°C TO +85°C
- STORAGE TEMPERATURE: -85°C TO +125°C
- THERMAL SHOCK: -55°C TO +85°C WITH 1 HOUR DWELL AT EACH TEMPERATURE EXTREME
- CYCLES: 24 MINIMUM
- RF CONNECTORS: SMA FEMALE (REMOVABLE)
- SIZE: 1.1" (L) x 0.75" (W) x 0.24" (H)
- WEIGHT: 0.75 OZ. TYPICAL

TABLE 1: SWITCHING LOGIC

| PORT STATUS             | E1 | E2  |
|-------------------------|----|-----|
| J1-J2 ( J3 TERMINATED ) | 1  | 0   |
| J1-J3 ( J2 TERMINATED ) | 1  | 1   |
| J2 & J3 TERMINATED      | 1/ | 0 X |

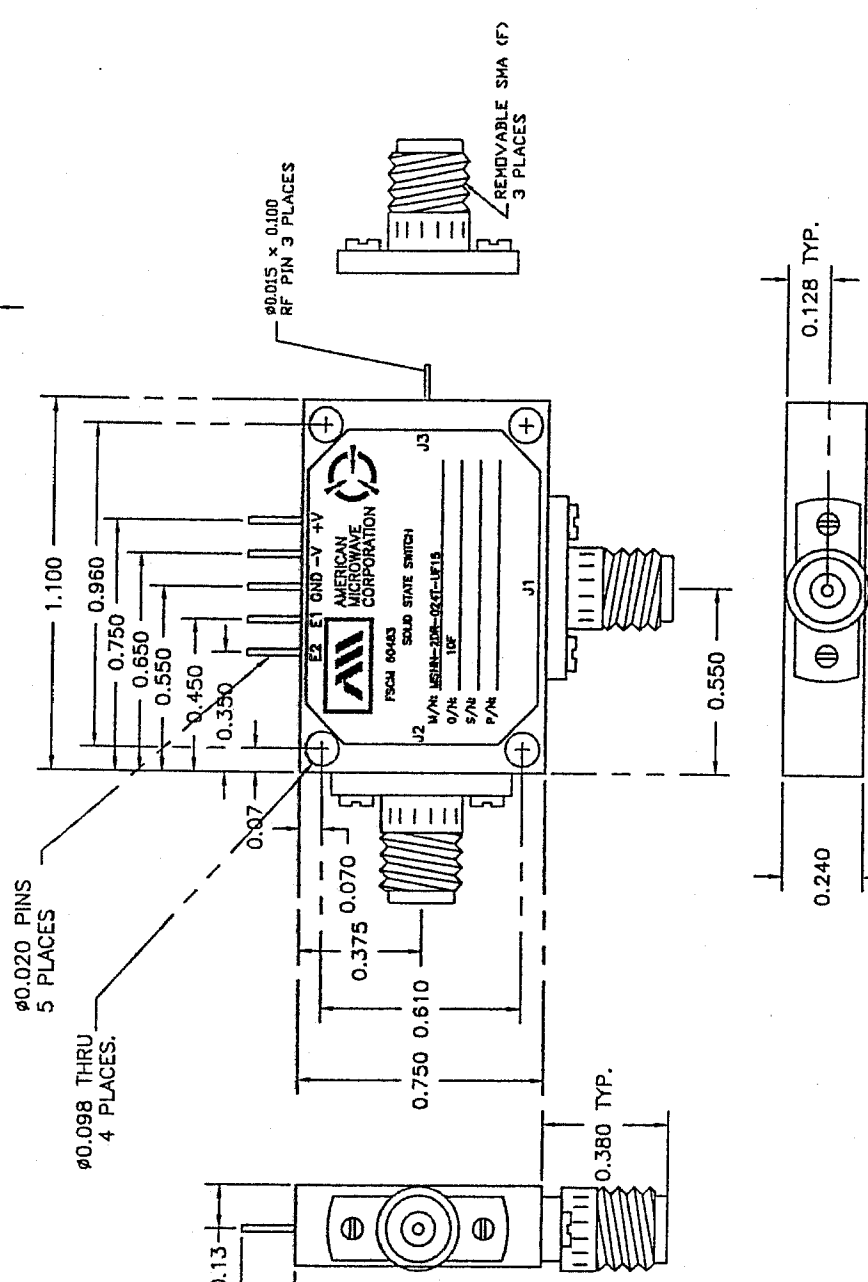
0-LOGIC LOW, 1-LOGIC HIGH, X-LOGIC DON'T CARE  
 1/ THERE SHALL BE A MINIMUM 65 dB ISOLATION BETWEEN PORT J1 TO PORT J2 AND PORT J1 TO PORT J3 WHEN PIN E1 IS LOGIC LOW

**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

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



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

**CONFIDENTIAL AND PROPRIETARY**

|                       |  |                                |  |                     |  |
|-----------------------|--|--------------------------------|--|---------------------|--|
| PART NO.              |  | APPROVALS                      |  | DATE                |  |
| DRAWN                 |  | KS & RA                        |  | 09/11/00            |  |
| CHECKED               |  | [Signature]                    |  | 9/13/00             |  |
| ISSUED                |  | [Signature]                    |  | 9/13/00             |  |
| TITLE                 |  | AMERICAN MICROWAVE CORPORATION |  | FREDERICK, MARYLAND |  |
| PRODUCT FEATURE       |  | MSNN-2DR-024T-UF15             |  | OPTION 10F          |  |
| RAYTHEON H8000369-001 |  | SIZE / FSM NO.                 |  | A 60483             |  |
| DWG NO.               |  | 100-4691-3                     |  | SHEET 1 OF 3        |  |

AMC MSNN-2DR/2DT-024T-STANDARD IS A SLIMLINE SINGLE POLE TWO THROW, REFLECTIVE SWITCH MODULE WITH LOW INSERTION LOSS, HIGH ISOLATION, HIGH SPEED AND WITH INTEGRAL TTL DRIVER, DESIGNED FOR 500 MHz TO 18 GHz OPERATION.

**SPECIFICATIONS:**

- FREQUENCY: 0.5 GHz TO 18 GHz
- INSERTION LOSS: 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
- POWER SUPPLY: +5V @ 100 mA MAX.  
-5V @ 75mA MAX.(ABSORPTIVE/NON-REFLECTIVE)
- CONTROL: TTL LOGIC "0"=ON "1"=OFF
- SIZE: 1.1" (L) x 0.75" (W) x 0.24" (H)
- WEIGHT: 0.75 OZ. TYPICAL

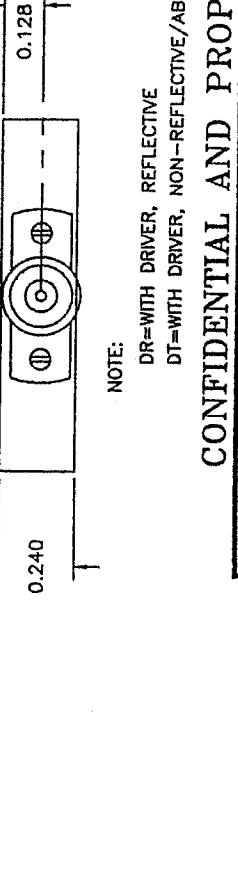
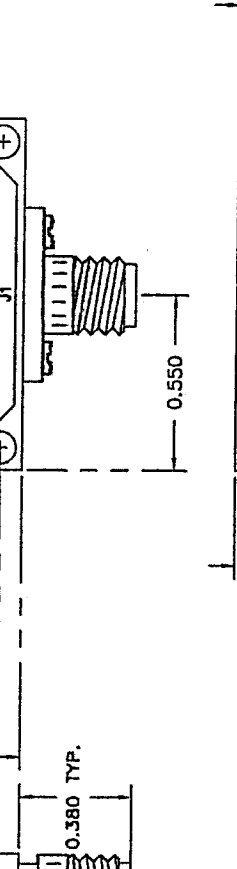
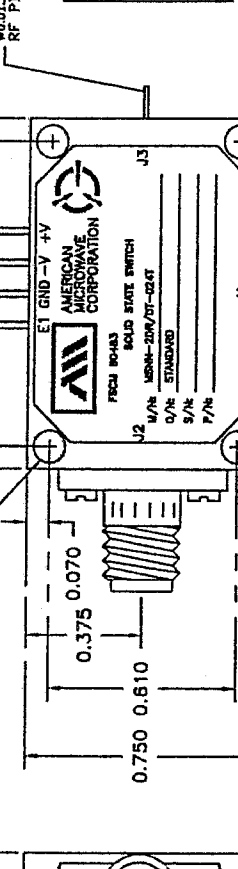
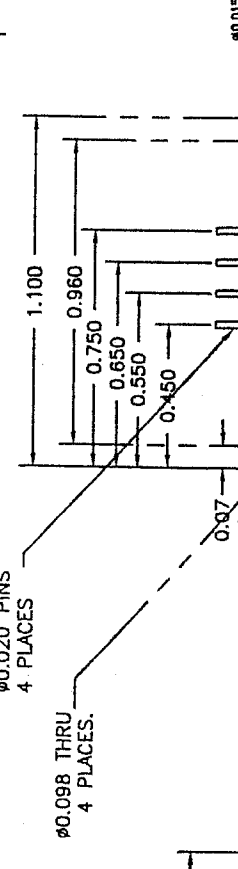
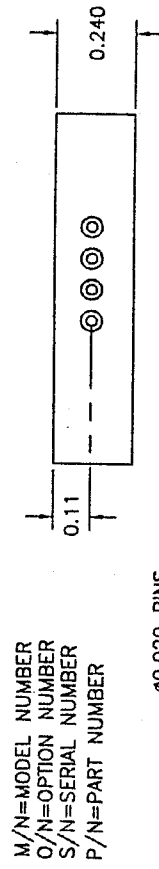
**OPTIONS:**

- SINGLE CONTROL WITH SOLDER PIN STANDARD
- IND-SP INDEPENDANT CONTROL WITH SOLDER PIN
- 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)
- 418 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, 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 HIGHER 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 OR REVISION



**CONFIDENTIAL AND PROPRIETARY**

|   |             |  |  |
|---|-------------|--|--|
| PART NO.  |             | DATE   |  |
| APPROVALS   |             | DATE   |  |
| DRAWN   | KS & RA     | 09/11/00   |  |
| CHECKED   | [Signature] | 9/13/00  |  |
| ISSUED  | [Signature] | 9/13/00  |  |
| TITLE   |             | PRODUCT FEATURE  |  |
| AMERICAN MICROWAVE CORPORATION<br>FREDERICK, MARYLAND |             | MSNN-2DR/DT-024T-STANDARD<br>REFLECTIVE OR NON-REFLECTIVE/ABSORPTIVE<br>SOLID STATE SWITCH |  |
| SIZE  | FED. NO.    | REV.   |  |
| A   | 60483       | 100-4691-1   |  |
| SCALE   |             | SHEET 1 OF 3   |  |

**DESCRIP**

AMC MOD.- MSNN-2DR/2DT-024T-IND-SP IS A SLIMLINE SINGLE POLE TWO THROW, REFLECTIVE SWITCH MODULE WITH LOW INSERTION LOSS, HIGH ISOLATION, HIGH SPEED AND WITH INTEGRAL TTL DRIVER, DESIGNED FOR 500 MHz TO 18 GHz OPERATION.

**SPECIFICATIONS:**

- FREQUENCY: 0.5 GHz TO 18 GHz
- INSERTION LOSS: 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  
REFLECTIVE OUT/OFF: 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: +5V @ 100 mA MAX.
- POWER SUPPLY: +5V @ 75mA MAX (REFLECTIVE)  
-5V @ 100mA MAX (ABSORPTIVE/NON-REFLECTIVE)
- CONTROL: TTL LOGIC "0"=ON "1"=OFF
- SIZE: 1.1" (L) x 0.75" (W) x 0.24" (H)
- WEIGHT: 0.75 OZ. TYPICAL

**OPTIONS:**

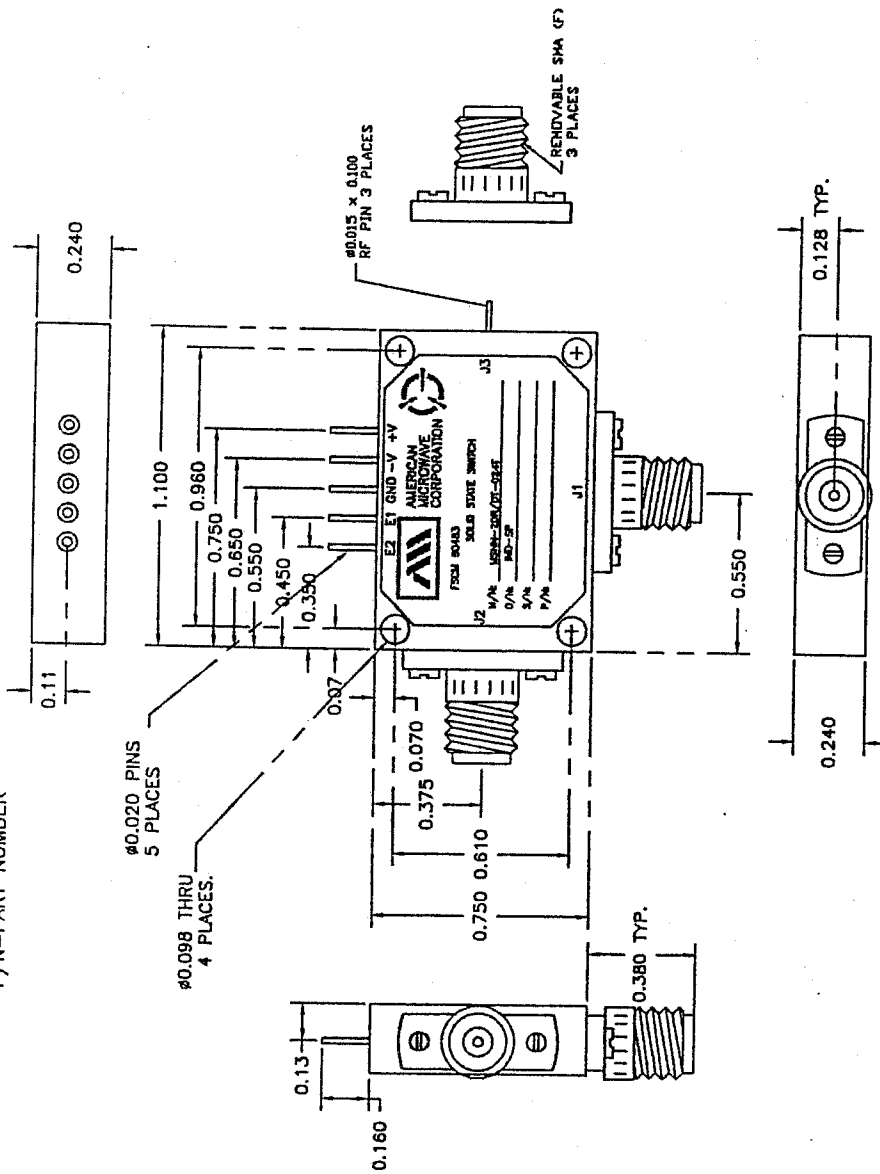
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- 218 2 GHz TO 18 GHz (NO CHANGE IN INSERTION LOSS)
- 412 4 GHz TO 12.4 GHz (NO CHANGE IN INSERTION LOSS)
- 618 6 GHz TO 18 GHz (NO CHANGE IN INSERTION LOSS)
- 1218 12 GHz TO 18 GHz (NO CHANGE IN INSERTION LOSS)
- 100M20 100 MHz TO 20 GHz (INSERTION 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
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- B05 HIGH SPEED, TURNON/TURNOFF 20 nsec MAXIMUM WHEN APPLICABLE OR OPTION HS
- B06 HIGH POWER - SPECIFY CW POWER, PULSE WIDTH, DUTY CYCLE, RF FREQUENCY AND BANDWIDTH
- B07 CUSTOM DESIGNED PRODUCT- SPECIFY INITIALS OF CUSTOMER
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**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

| ZONE | REV. | DESCRIPTION             | DATE     | APPROVED |
|------|------|-------------------------|----------|----------|
|      |      | ORIGINAL JOB# 812407-1E | 09/11/00 |          |

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



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

**CONFIDENTIAL AND PROPRIETARY**

|                                |  |                         |  |   |  |
|--------------------------------|--|-------------------------|--|---|--|
| PART NO.                       |  | APPROVALS               |  | DATE                                    |  |
| DRAWN                          |  | KS & RA                 |  | 09/11/00                                |  |
| CHECKED                        |  | [Signature]             |  | 9/13/00                                 |  |
| ISSUED                         |  | [Signature]             |  | 9/13/00                                 |  |
| TITLE                          |  | MSNN-2DR/DT-024T-IND-SP |  | REFLECTIVE OR NON-REFLECTIVE/ABSORPTIVE |  |
| PRODUCT FEATURE                |  | SOLID STATE SWITCH      |  |   |  |
| AMERICAN MICROWAVE CORPORATION |  | FREDERICK, MARYLAND     |  |   |  |
| SCALE                          |  | 60483                   |  | 100-4691-2                              |  |
| SHEET                          |  | 1                       |  | of 3                                    |  |



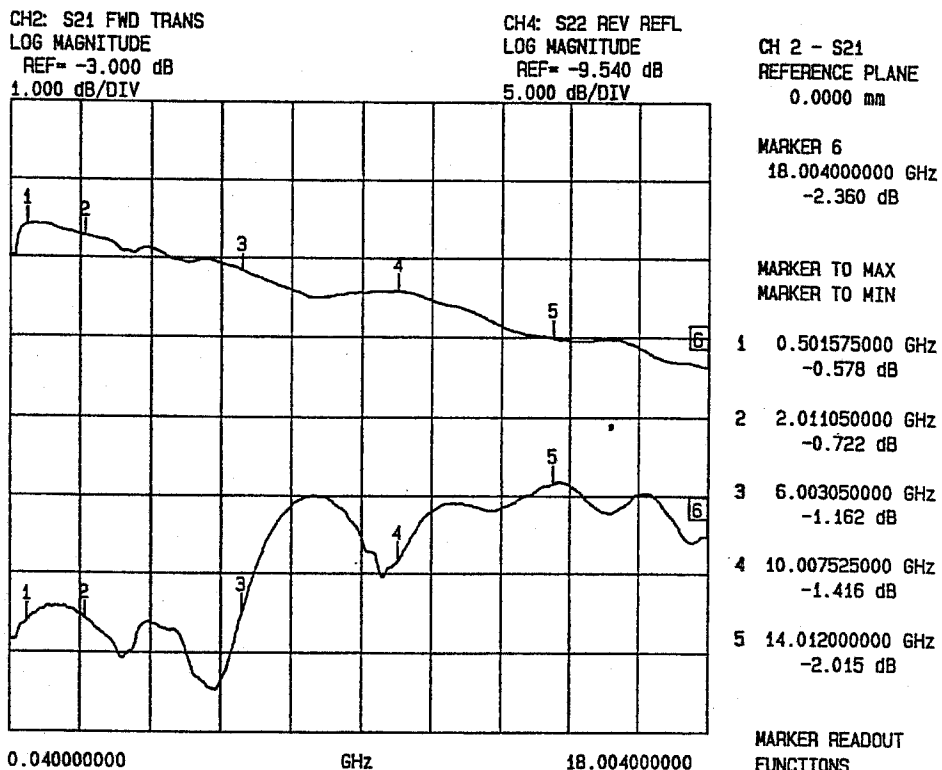


### SUMMARY TEST DATA

|                        |                               |
|------------------------|-------------------------------|
| MODEL NUMBER           | : MSNN-2DR-024T-UF15          |
| OPTION NUMBER          | : 10F                         |
| SERIAL NUMBER          | : 2MS90133                    |
| ENGINEER               | : RENE AFABLE                 |
| VOLTAGE & CURRENT DRAW | : +5vdc @ 50mA; -15vdc @ 58mA |

### INSERTION LOSS & RETURN LOSS\*

J2-J1



\*J2: INPUT ARM

| FREQUENCY | INSERTION LOSS | RETURN LOSS |
|-----------|----------------|-------------|
| 500 MHz   | 0.57 dB        | 22.56 dB    |
| 2.0 GHz   | 0.72 dB        | 22.43 dB    |
| 6.0 GHz   | 1.16 dB        | 21.96 dB    |
| 10.0 GHz  | 1.41 dB        | 18.65 dB    |
| 14.0 GHz  | 2.01 dB        | 13.70 dB    |
| 18.0 GHz  | 2.36 dB        | 17.14 dB    |





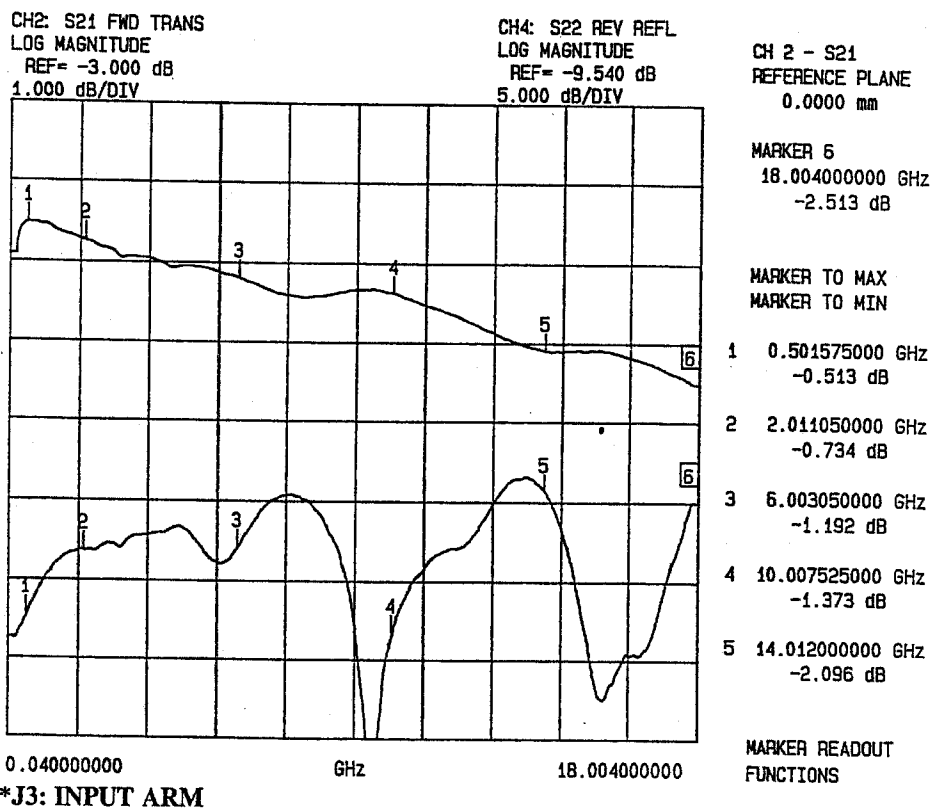


### SUMMARY TEST DATA

|                        |                               |
|------------------------|-------------------------------|
| MODEL NUMBER           | : MSNN-2DR-024T-UF15          |
| OPTION NUMBER          | : 10F                         |
| SERIAL NUMBER          | : 2MS90133                    |
| ENGINEER               | : RENE AFABLE                 |
| VOLTAGE & CURRENT DRAW | : +5vdc @ 50mA; -15vdc @ 58mA |

### INSERTION LOSS & RETURN LOSS\*

J3-J1



| FREQUENCY | INSERTION LOSS | RETURN LOSS |
|-----------|----------------|-------------|
| 500 MHz   | 0.51 dB        | 21.79 dB    |
| 2.0 GHz   | 0.73 dB        | 17.64 dB    |
| 6.0 GHz   | 1.19 dB        | 17.43 dB    |
| 10.0 GHz  | 1.37 dB        | 22.76 dB    |
| 14.0 GHz  | 2.09 dB        | 13.91 dB    |
| 18.0 GHz  | 2.51 dB        | 14.49 dB    |



## SUMMARY TEST DATA

|                        |                                |
|------------------------|--------------------------------|
| MODEL NUMBER           | : MSNN-2DR-024T-UF15           |
| OPTION NUMBER          | : 10F                          |
| SERIAL NUMBER          | : 2MS90133                     |
| ENGINEER               | : RENE AFABLE                  |
| VOLTAGE & CURRENT DRAW | : +5vdc @ 50mA; -15vdc @ 58 mA |

### ISOLATION\*

(AS MEASURED ON A VECTOR NETWORK ANALYZER CW MODE)

| FREQUENCY | J2    | J3    |
|-----------|-------|-------|
| 100 MHz   | 82 dB | 82 dB |
| 200 MHz   | 80 dB | 80 dB |
| 500 MHz   | 78 dB | 78 dB |
| 1 GHz     | 80 dB | 81 dB |
| 2 GHz     | 84 dB | 82 dB |
| 4 GHz     | 88 dB | 90 dB |
| 6 GHz     | 90 dB | 91 dB |
| 8 GHz     | 86 dB | 88 dB |
| 10 GHz    | 83 dB | 84 dB |
| 12 GHz    | 75 dB | 82 dB |
| 14 GHz    | 78 dB | 78 dB |
| 16 GHz    | 70 dB | 79 dB |
| 18 GHz    | 70 dB | 70 dB |

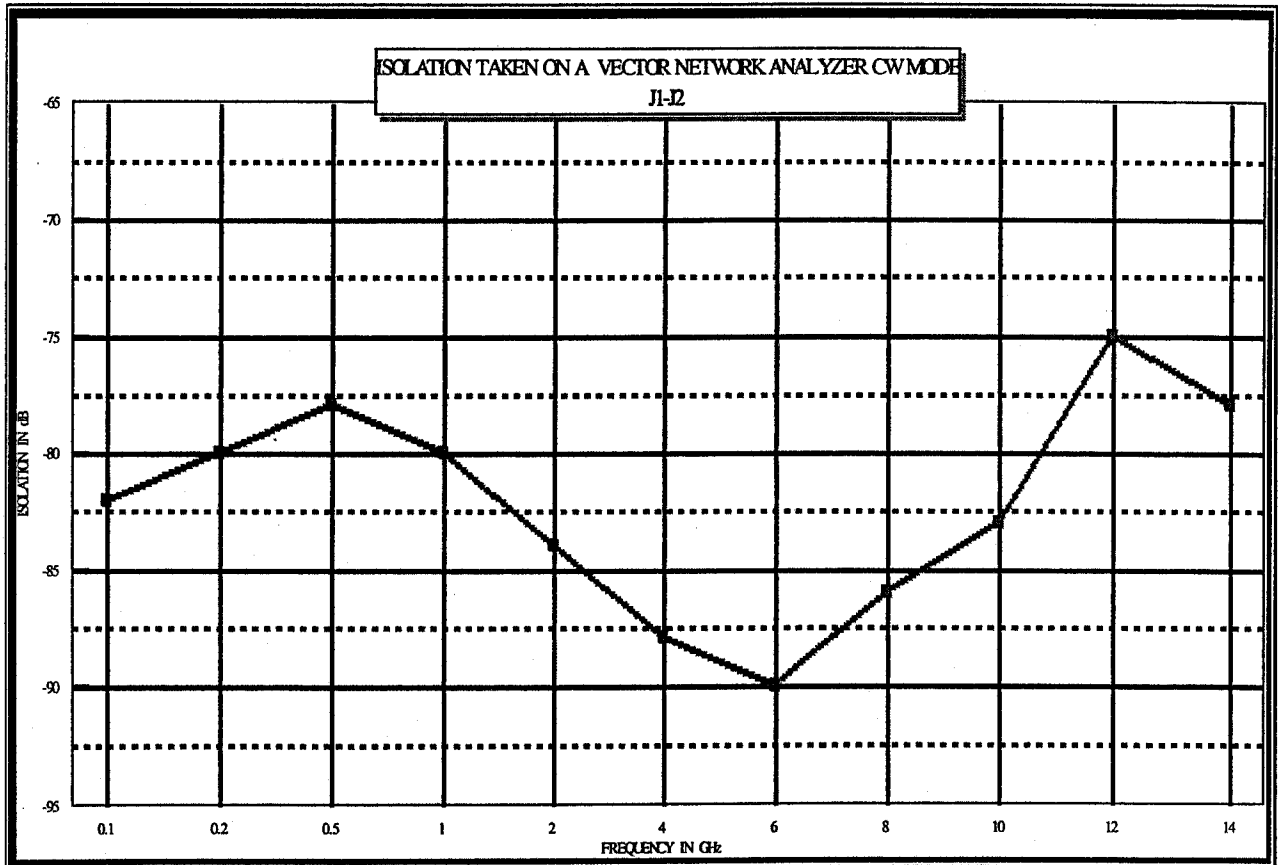
\*J1: INPUT ARM

SEPTEMBER 11, 2000



MODEL NUMBER : MSNN-2DR-024T-UF15  
OPTION NUMBER : 10F  
SERIAL NUMBER : 2MS90133  
ENGINEER : RENE AFABLE  
VOLTAGE & CURRENT DRAW : +5vdc @ 50mA; -15vdc @ 58mA

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



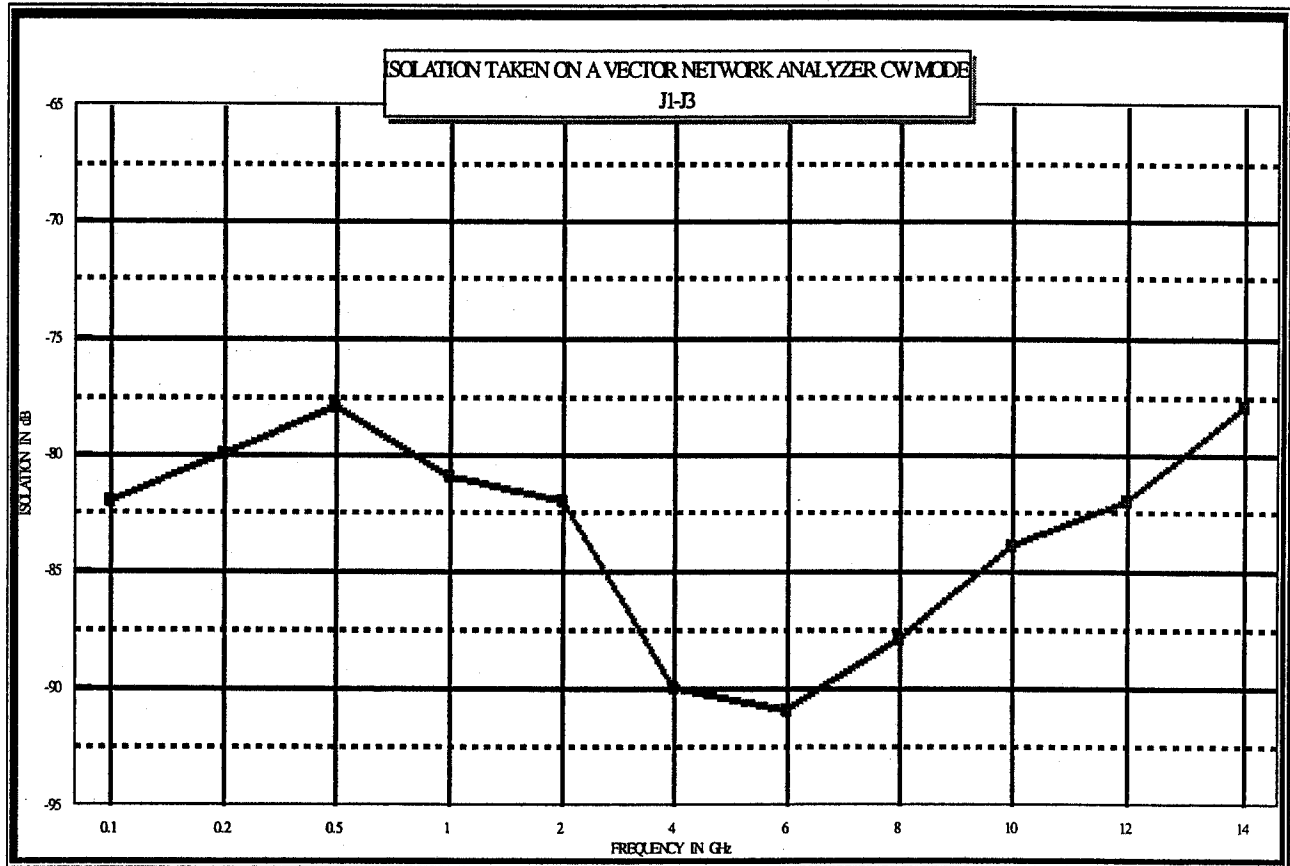
\*J1: INPUT ARM

SEPTEMBER 11, 2000



|                        |                               |
|------------------------|-------------------------------|
| MODEL NUMBER           | : MSNN-2DR-024T-UF15          |
| OPTION NUMBER          | : 10F                         |
| SERIAL NUMBER          | : 2MS90133                    |
| ENGINEER               | : RENE AFABLE                 |
| VOLTAGE & CURRENT DRAW | : +5vdc @ 50mA; -15vdc @ 58mA |

**ISOLATION\***  
(AS MEASURED ON A VECTOR NETWORK ANALYZER CW MODE)  
J1-J3



\*J1: INPUT ARM

SEPTEMBER 11, 2000



**TEST DATA**

**FROM**

**40 MHz TO 4 GHz**

**HIGH SPEED**

**LOW INSERTION LOSS**

**HIGH ISOLATION**

**SLIMLINE REFLECTIVE**

**SP2T**

**SOLID STATE SWITCH**

**(SURFACE MOUNTABLE)**

**AMC MODEL No:**

**MSNN-2DR-024T-UF15 OPTION 10F**

**(Serial Number: 2MS90133)**

**PREPARED  
BY  
KATIE BAISEY**

**TESTED  
BY  
RENE AFABLE**

**SEPTEMBER 11, 2000**



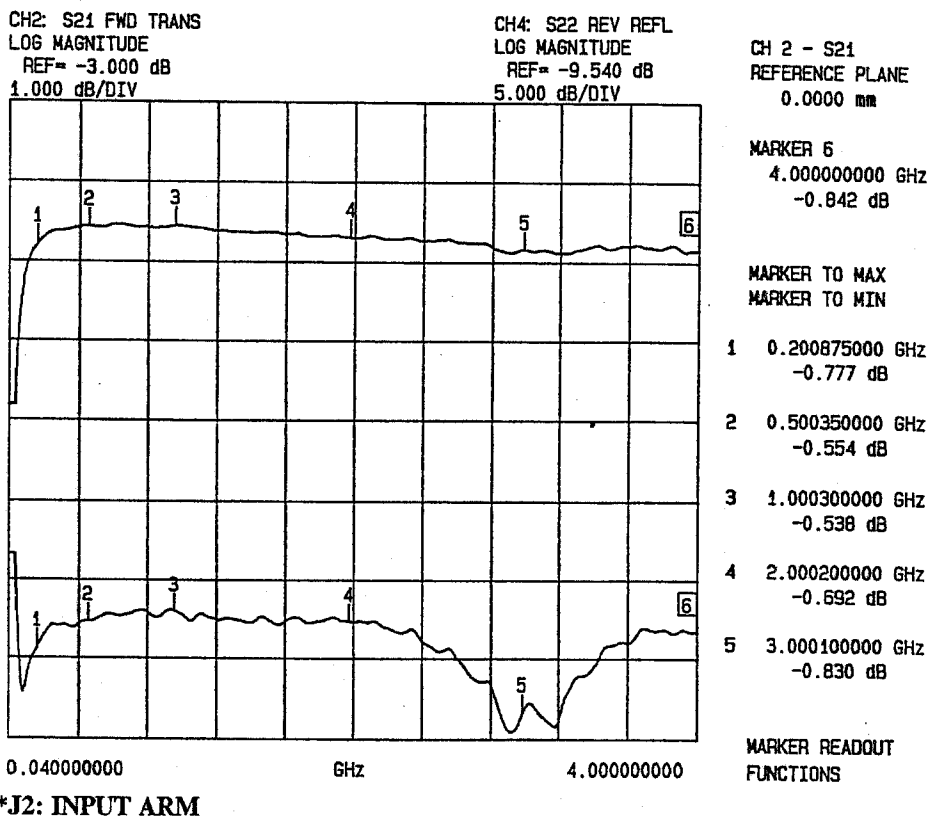


### SUMMARY TEST DATA

|                        |                               |
|------------------------|-------------------------------|
| MODEL NUMBER           | : MSNN-2DR-024T-UF15          |
| OPTION NUMBER          | : 10F                         |
| SERIAL NUMBER          | : 2MS90133                    |
| ENGINEER               | : RENE AFABLE                 |
| VOLTAGE & CURRENT DRAW | : +5vdc @ 50mA; -15vdc @ 58mA |

### INSERTION LOSS & RETURN LOSS\*

J2-J1



| FREQUENCY | INSERTION LOSS | RETURN LOSS |
|-----------|----------------|-------------|
| 200 MHz   | 0.77 dB        | 23.87 dB    |
| 200 MHz   | 0.55 dB        | 22.18 dB    |
| 1.0 GHz   | 0.53 dB        | 21.52 dB    |
| 2.0 GHz   | 0.69 dB        | 22.18 dB    |
| 3.0 GHz   | 0.83 dB        | 27.91 dB    |
| 4.0 GHz   | 0.84 dB        | 22.82 dB    |



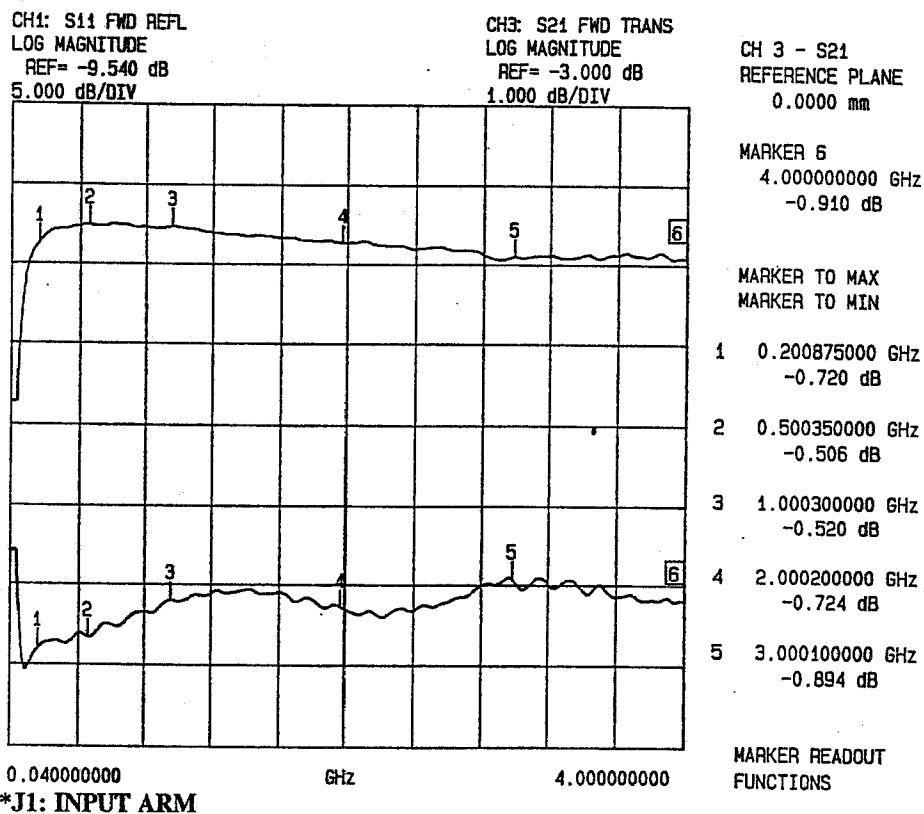


### SUMMARY TEST DATA

|                        |                               |
|------------------------|-------------------------------|
| MODEL NUMBER           | : MSNN-2DR-024T-UF15          |
| OPTION NUMBER          | : 10F                         |
| SERIAL NUMBER          | : 2MS90133                    |
| ENGINEER               | : RENE AFABLE                 |
| VOLTAGE & CURRENT DRAW | : +5vdc @ 50mA; -15vdc @ 58mA |

### INSERTION LOSS & RETURN LOSS\*

J1-J3



| FREQUENCY | INSERTION LOSS | RETURN LOSS |
|-----------|----------------|-------------|
| 200 MHz   | 0.72 dB        | 23.55 dB    |
| 500 MHz   | 0.50 dB        | 22.84 dB    |
| 1.0 GHz   | 0.52 dB        | 20.50 dB    |
| 2.0 GHz   | 0.72 dB        | 20.95 dB    |
| 3.0 GHz   | 0.89 dB        | 19.15 dB    |
| 4.0 GHz   | 0.91 dB        | 20.52 dB    |



### SUMMARY TEST DATA

|                        |                               |
|------------------------|-------------------------------|
| MODEL NUMBER           | : MSNN-2DR-024T-UF15          |
| OPTION NUMBER          | : 10F                         |
| SERIAL NUMBER          | : 2MS90133                    |
| ENGINEER               | : RENE AFABLE                 |
| VOLTAGE & CURRENT DRAW | : +5vdc @ 50mA; -15vdc @ 58mA |

### INSERTION LOSS & RETURN LOSS\*

J3-J1

CH2: S21 FWD TRANS  
LOG MAGNITUDE  
REF= -3.000 dB  
1.000 dB/DIV

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

CH 2 - S21  
REFERENCE PLANE  
0.0000 mm

MARKER 6  
4.000000000 GHz  
-0.912 dB

MARKER TO MAX  
MARKER TO MIN

1 0.200875000 GHz  
-0.718 dB

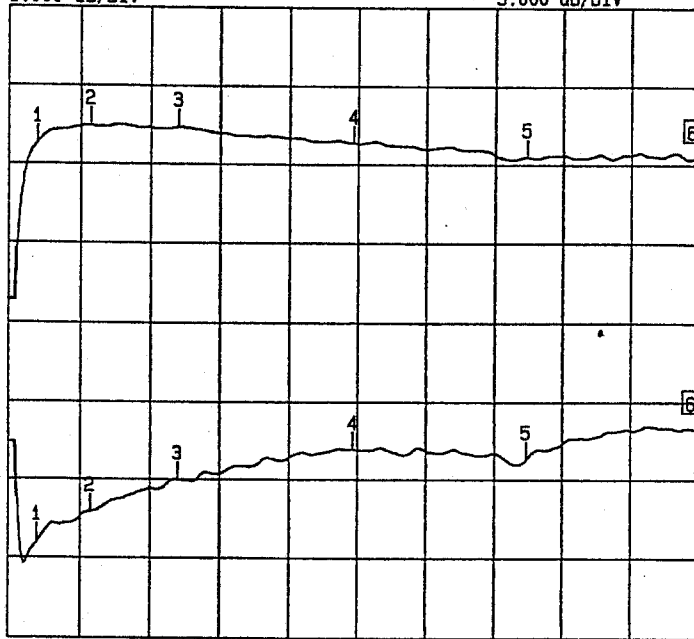
2 0.500350000 GHz  
-0.506 dB

3 1.000300000 GHz  
-0.521 dB

4 2.000200000 GHz  
-0.726 dB

5 3.000100000 GHz  
-0.897 dB

MARKER READOUT  
FUNCTIONS



0.040000000

GHz

4.000000000

\*J3: INPUT ARM

| FREQUENCY | INSERTION LOSS | RETURN LOSS |
|-----------|----------------|-------------|
| 200 MHz   | 0.71 dB        | 23.54 dB    |
| 500 MHz   | 0.50 dB        | 21.59 dB    |
| 1.0 GHz   | 0.52 dB        | 19.56 dB    |
| 2.0 GHz   | 0.72 dB        | 17.57 dB    |
| 3.0 GHz   | 0.89 dB        | 18.21 dB    |
| 4.0 GHz   | 0.91 dB        | 16.26 dB    |



**TEST DATA**

**FROM**

**9.5 GHz TO 10 GHz**

**HIGH SPEED**

**LOW INSERTION LOSS**

**HIGH ISOLATION**

**SLIMLINE REFLECTIVE**

**SP2T**

**SOLID STATE SWITCH**

**(SURFACE MOUNTABLE)**

**AMC MODEL No:**

**MSNN-2DR-024T-UF15 OPTION 10F**

**(Serial Number: 2MS90133)**

**PREPARED**

**BY**

**KATIE BAISEY**

**TESTED**

**BY**

**RENE AFABLE**

**SEPTEMBER 11, 2000**

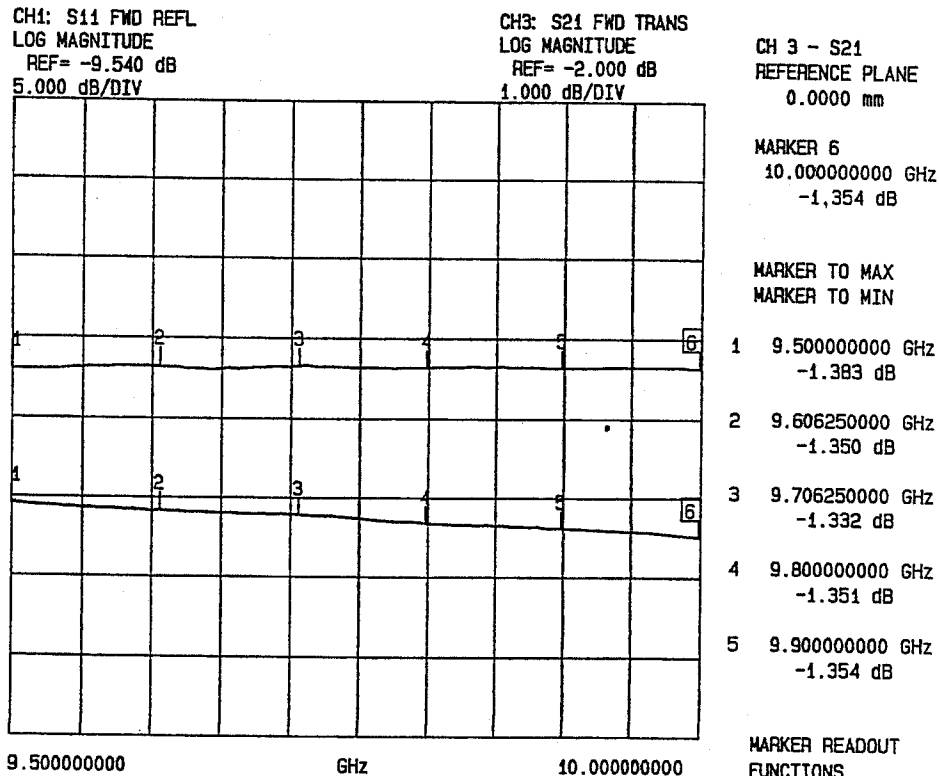


**SUMMARY TEST DATA**

|                                   |                                      |
|-----------------------------------|--------------------------------------|
| <b>MODEL NUMBER</b>               | <b>: MSNN-2DR-024T-UF15</b>          |
| <b>OPTION NUMBER</b>              | <b>: 10F</b>                         |
| <b>SERIAL NUMBER</b>              | <b>: 2MS90133</b>                    |
| <b>ENGINEER</b>                   | <b>: RENE AFABLE</b>                 |
| <b>VOLTAGE &amp; CURRENT DRAW</b> | <b>: +5vdc @ 50mA; -15vdc @ 58mA</b> |

**INSERTION LOSS & RETURN LOSS\***

J1-J2



\*J1: INPUT ARM

| FREQUENCY | INSERTION LOSS | RETURN LOSS |
|-----------|----------------|-------------|
| 9.5 GHz   | 1.38 dB        | 14.89 dB    |
| 9.6 GHz   | 1.35 dB        | 15.38 dB    |
| 9.7 GHz   | 1.33 dB        | 15.62 dB    |
| 9.8 GHz   | 1.35 dB        | 16.17 dB    |
| 9.9 GHz   | 1.35 dB        | 16.47 dB    |
| 10.0 GHz  | 1.35 dB        | 17.01 dB    |

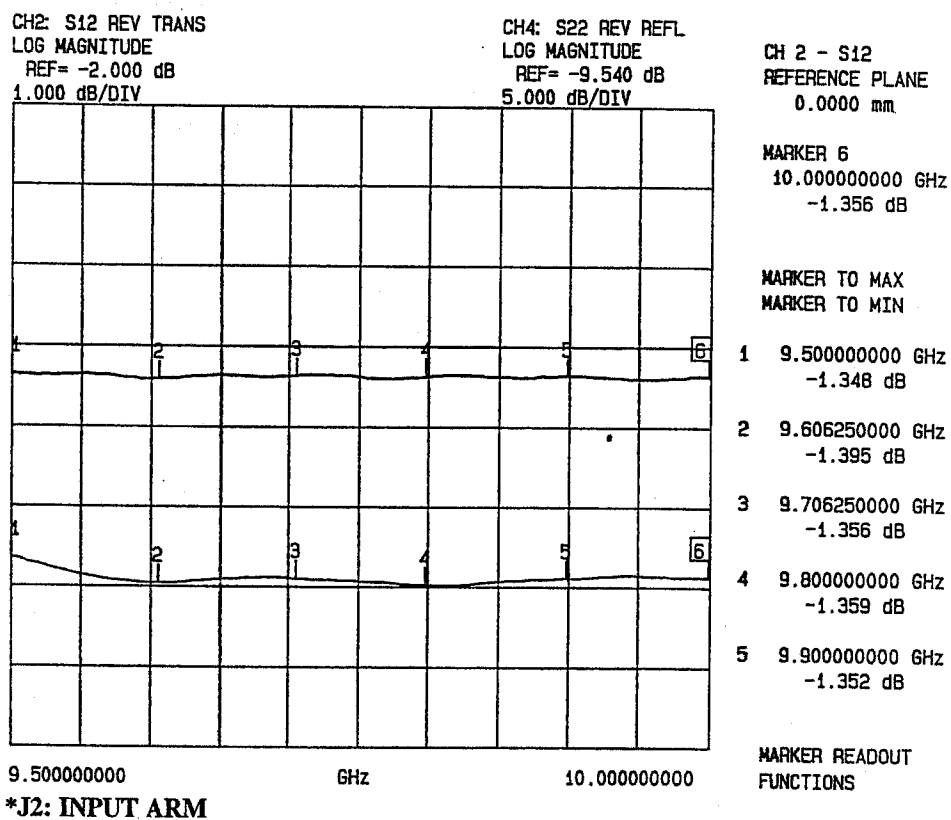


## SUMMARY TEST DATA

|                        |                               |
|------------------------|-------------------------------|
| MODEL NUMBER           | : MSNN-2DR-024T-UF15          |
| OPTION NUMBER          | : 10F                         |
| SERIAL NUMBER          | : 2MS90133                    |
| ENGINEER               | : RENE AFABLE                 |
| VOLTAGE & CURRENT DRAW | : +5vdc @ 50mA; -15vdc @ 58mA |

**INSERTION LOSS & RETURN LOSS\***

J2-J1



| FREQUENCY | INSERTION LOSS | RETURN LOSS |
|-----------|----------------|-------------|
| 9.5 GHz   | 1.34 dB        | 17.75 dB    |
| 9.6 GHz   | 1.39 dB        | 19.33 dB    |
| 9.7 GHz   | 1.35 dB        | 19.04 dB    |
| 9.8 GHz   | 1.35 dB        | 19.43 dB    |
| 9.9 GHz   | 1.35 dB        | 18.96 dB    |
| 10.0 GHz  | 1.35 dB        | 18.91 dB    |

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**SUMMARY TEST DATA**

**MODEL NUMBER** : MSNN-2DR-024T-UF15  
**OPTION NUMBER** : 10F  
**SERIAL NUMBER** : 2MS90133  
**ENGINEER** : RENE AFABLE  
**VOLTAGE & CURRENT DRAW** : +5vdc @ 50mA; -15vdc @ 58mA

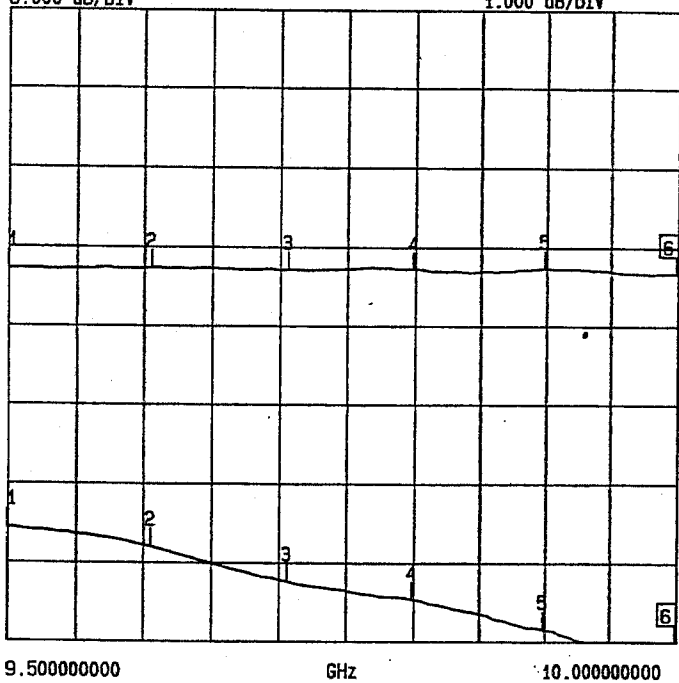
**INSERTION LOSS & RETURN LOSS\***

J1-J3

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

CH3: S21 FWD TRANS  
 LOG MAGNITUDE  
 REF= -2.000 dB  
 1.000 dB/DIV

CH 3 - S21  
 REFERENCE PLANE  
 0.0000 mm



MARKER 6  
 10.000000000 GHz  
 -1.319 dB

MARKER TO MAX  
 MARKER TO MIN

- 1 9.500000000 GHz  
-1.265 dB
- 2 9.606250000 GHz  
-1.258 dB
- 3 9.706250000 GHz  
-1.275 dB
- 4 9.800000000 GHz  
-1.269 dB
- 5 9.900000000 GHz  
-1.255 dB

MARKER READOUT  
 FUNCTIONS

\*J1: INPUT ARM

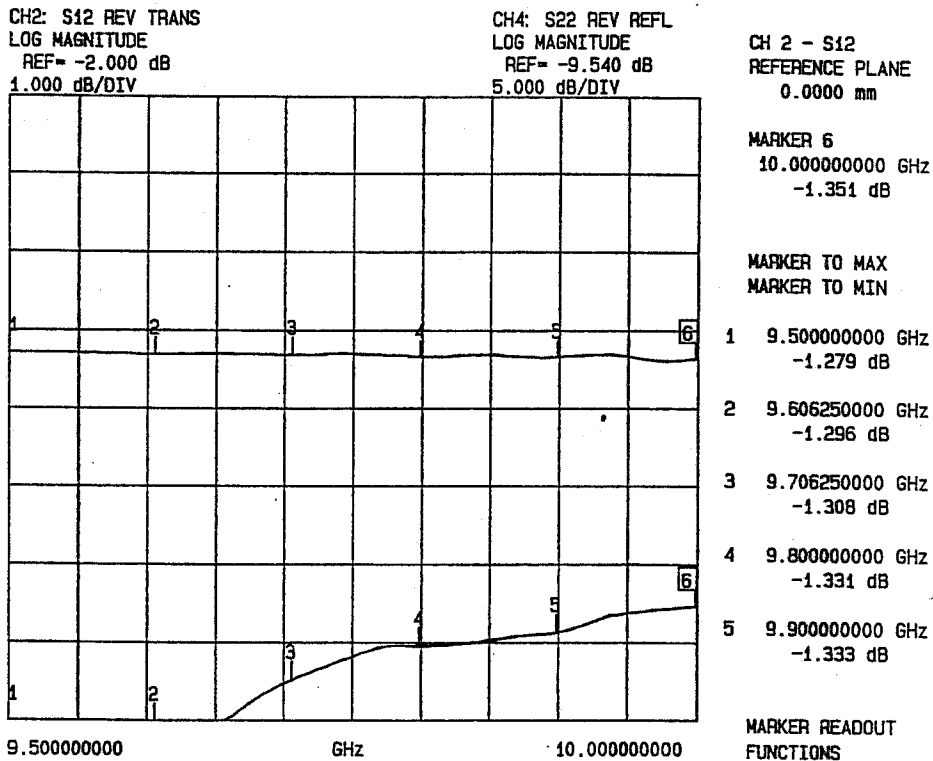
| FREQUENCY | INSERTION LOSS | RETURN LOSS |
|-----------|----------------|-------------|
| 9.5 GHz   | 1.26 dB        | 27.25 dB    |
| 9.6 GHz   | 1.25 dB        | 23.52 dB    |
| 9.7 GHz   | 1.27 dB        | 25.74 dB    |
| 9.8 GHz   | 1.26 dB        | 26.88 dB    |
| 9.9 GHz   | 1.25 dB        | 28.79 dB    |
| 10.0 GHz  | 1.31 dB        | 30.47 dB    |



### SUMMARY TEST DATA

**MODEL NUMBER** : MSNN-2DR-024T-UF15  
**OPTION NUMBER** : 10F  
**SERIAL NUMBER** : 2MS90133  
**ENGINEER** : RENE AFABLE  
**VOLTAGE & CURRENT DRAW** : +5vdc @ 50mA; -15vdc @ 58mA

### INSERTION LOSS & RETURN LOSS\* J3-J1



\*J3: INPUT ARM

| FREQUENCY | INSERTION LOSS | RETURN LOSS |
|-----------|----------------|-------------|
| 9.5 GHz   | 1.27 dB        | 35.47 dB    |
| 9.6 GHz   | 1.29 dB        | 32.17 dB    |
| 9.7 GHz   | 1.30 dB        | 26.94 dB    |
| 9.8 GHz   | 1.33 dB        | 24.75 dB    |
| 9.9 GHz   | 1.33 dB        | 23.84 dB    |
| 10.0 GHz  | 1.35 dB        | 22.21 dB    |



**AMERICAN MICROWAVE  
CORPORATION**

**AMPLITUDE  
DATA  
BETWEEN  
PORT TO PORT**

**FROM  
500 MHz TO 18 GHz**

**ON A**

**SP2T**

**SOLID STATE SWITCH  
(SURFACE MOUNTABLE)**

**AMC MODEL No:  
MSNN-2DR-024T-UF15 OPTION 10F  
(Serial Number: 2MS90133)**

**PREPARED  
BY  
KATIE BAISEY**

**TESTED  
BY  
RENE AFABLE**

**SEPTEMBER 11, 2000**

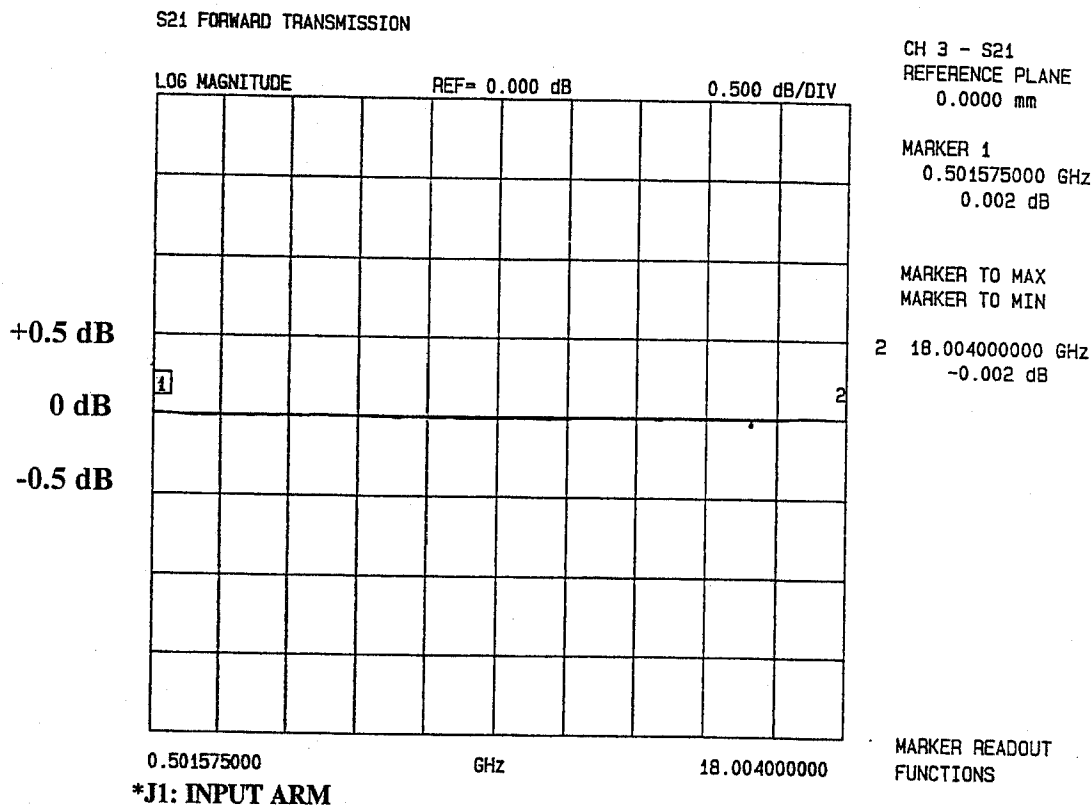




### SUMMARY TEST DATA

|                        |                               |
|------------------------|-------------------------------|
| MODEL NUMBER           | : MSNN-2DR-024T-UF15          |
| OPTION NUMBER          | : 10F                         |
| SERIAL NUMBER          | : 2MS990133                   |
| ENGINEER               | : RENE AFABLE                 |
| VOLTAGE & CURRENT DRAW | : +5vdc @ 50mA; -15vdc @ 58mA |

#### AMPLITUDE\* J1-J2 (REFERENCE)



| FREQUENCY | AMPLITUDE (PEAK)<br>(POSITIVE SIDE) | AMPLITUDE (PEAK)<br>(NEGATIVE SIDE) |
|-----------|-------------------------------------|-------------------------------------|
| 500 MHz   | 0.002 dB                            |                                     |
| 18.0 GHz  |                                     | -0.002 dB                           |

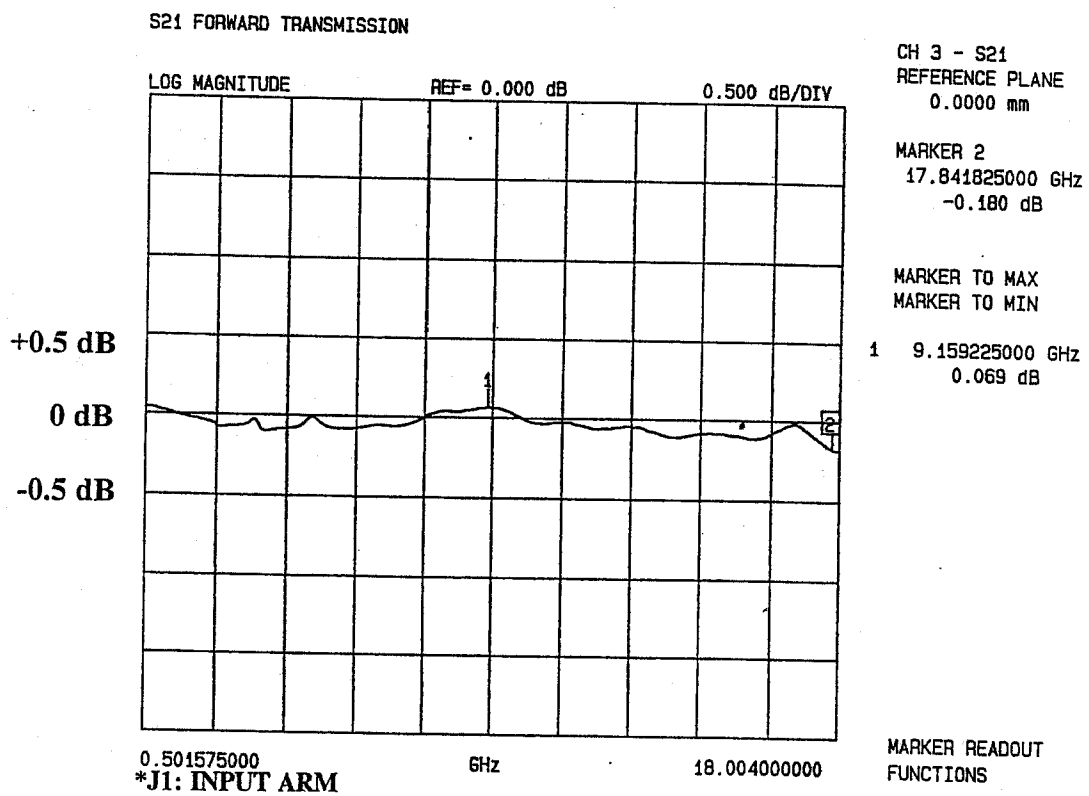
SEPTEMBER 11, 2000



### SUMMARY TEST DATA

|                        |                               |
|------------------------|-------------------------------|
| MODEL NUMBER           | : MSNN-2DR-024T-UF15          |
| OPTION NUMBER          | : 10F                         |
| SERIAL NUMBER          | : 2MS990133                   |
| ENGINEER               | : RENE AFABLE                 |
| VOLTAGE & CURRENT DRAW | : +5vdc @ 50mA; -15vdc @ 58mA |

#### AMPLITUDE\* J1-J3



| FREQUENCY | AMPLITUDE (PEAK)<br>(POSITIVE SIDE) | AMPLITUDE (PEAK)<br>(NEGATIVE SIDE) |
|-----------|-------------------------------------|-------------------------------------|
| 9.15 GHz  | 0.069 dB                            |                                     |
| 17.84 GHz |                                     | -0.180 dB                           |



## SUMMARY TEST DATA

|                        |                                |
|------------------------|--------------------------------|
| MODEL NUMBER           | : MSNN-2DR-024T-UF15           |
| OPTION NUMBER          | : 10F                          |
| SERIAL NUMBER          | : 2MS90133                     |
| ENGINEER               | : RENE AFABLE                  |
| VOLTAGE & CURRENT DRAW | : +5vdc @ 50mA; -15vdc @ 58 mA |

### SWITCHING SPEED

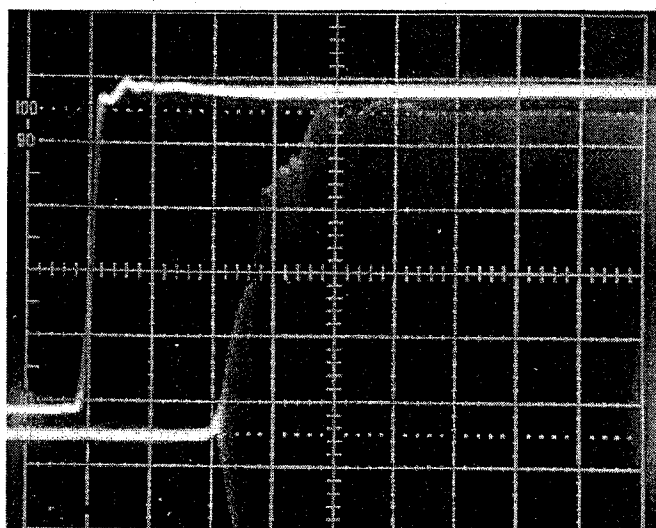
"Rise/Fall" Time: 10% RF to 90% RF & 90% RF to 10% RF  
 "On/Off" Time: 50% TTL to 90% RF or 10% RF

TYPICAL OF ALL ARMS

"DELAY ON": 35 nS  
 "RISE TIME": 10 nS

HORIZONTAL SCALE:  
 10 nS PER DIVISION

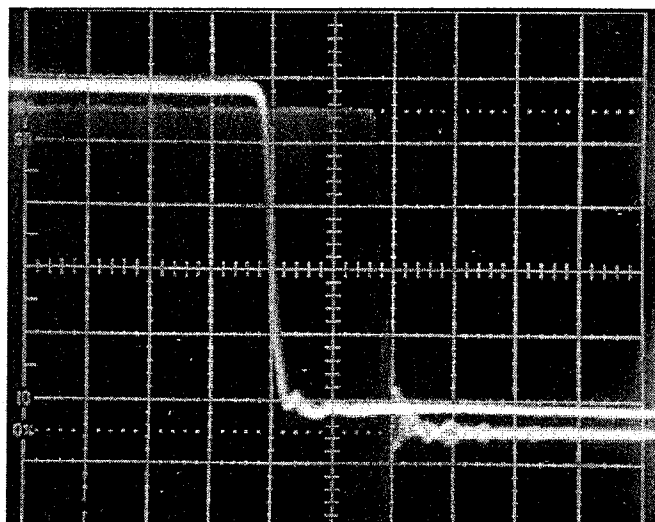
VERTICAL SCALE:  
 20 mV PER DIVISION



"DELAY OFF": 22 nS  
 "FALL TIME": 4 nS

HORIZONTAL SCALE:  
 10 nS PER DIVISION

VERTICAL SCALE:  
 20 mV PER DIVISION



SEPTEMBER 11, 2000



## SUMMARY TEST DATA

|                        |                                |
|------------------------|--------------------------------|
| MODEL NUMBER           | : MSNN-2DR-024T-UF15           |
| OPTION NUMBER          | : 10F                          |
| SERIAL NUMBER          | : 2MS90133                     |
| ENGINEER               | : RENE AFABLE                  |
| VOLTAGE & CURRENT DRAW | : +5vdc @ 50mA; -15vdc @ 58 mA |

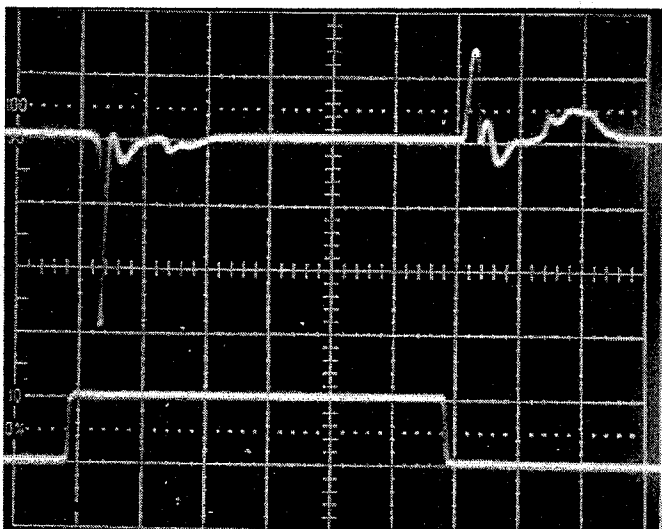
### VIDEO TRANSIENTS

TYPICAL OF ALL ARMS

$\leq 2.3$  V P-P  
MEASURED IN A  
300 MHZ BANDWIDTH

VERTICAL SCALE:  
0.5 V PER DIVISION

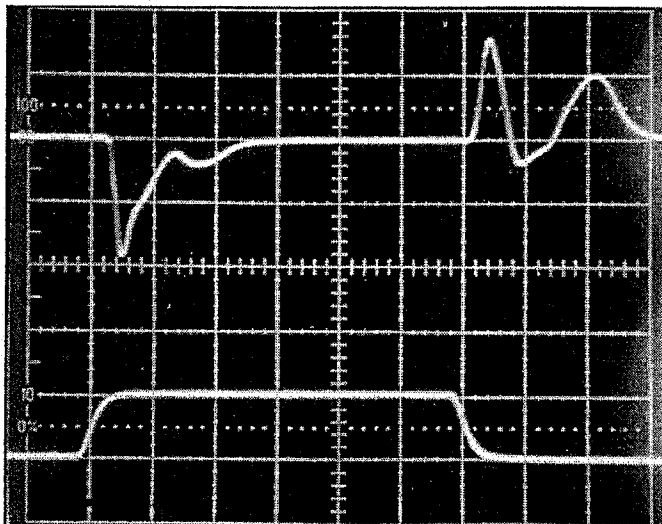
HORIZONTAL SCALE:  
50 nS PER DIVISION



$\leq 0.64$  V P-P  
MEASURED IN A  
20 MHZ BANDWIDTH

VERTICAL SCALE:  
0.2 V PER DIVISION

HORIZONTAL SCALE:  
50 nS PER DIVISION



SEPTEMBER 11, 2000



**APPENDIX A**  
**MISCELLANEOUS**  
**TEST DATA AND PLOTS**  
**ON**  
**ISOLATION**  
**AS**  
**MEASURED**  
**ON A VECTOR NETWORK ANALYZER**  
**ON A**  
**SP2T**  
**SOLID STATE SWITCH**  
**(SURFACE MOUNTABLE)**  
**AMC MODEL No:**  
**MSNN-2DR-024T-UF15 OPTION 10F**  
**(Serial Number: 2MS90133)**  
**FROM**  
**40 MHz TO 18 GHz**  
**40 MHz TO 4 GHz**  
**AND FROM**  
**9.5 GHz TO 10 GHz**

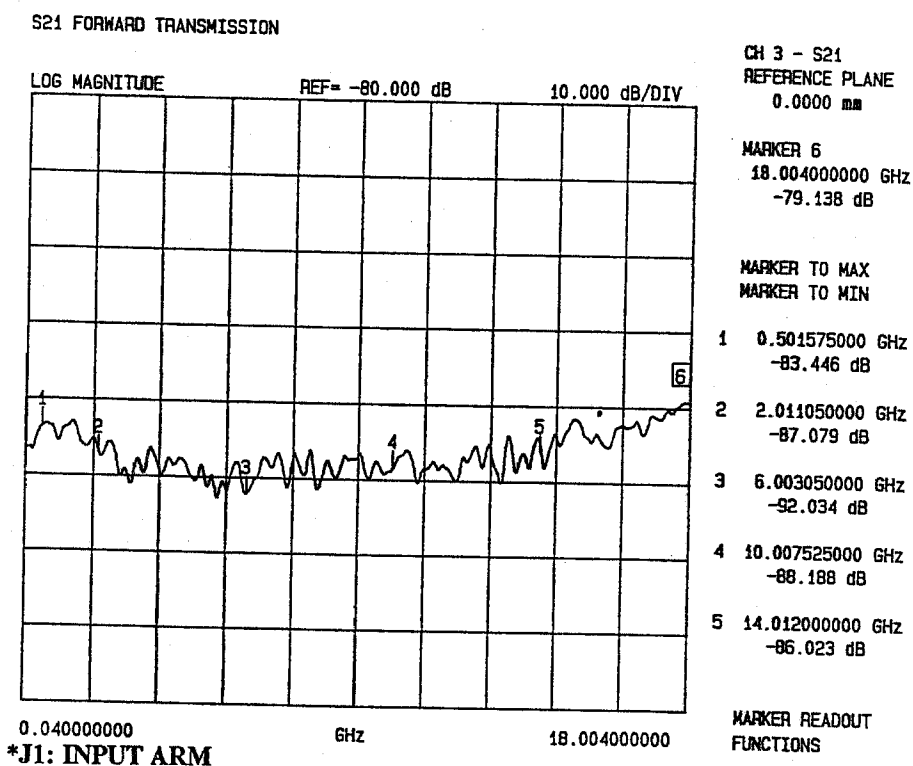
**SEPTEMBER 11, 2000**



### SUMMARY TEST DATA

|                                   |                                      |
|-----------------------------------|--------------------------------------|
| <b>MODEL NUMBER</b>               | <b>: MSNN-2DR-024T-UF15</b>          |
| <b>OPTION NUMBER</b>              | <b>: 10F</b>                         |
| <b>SERIAL NUMBER</b>              | <b>: 2MS90133</b>                    |
| <b>ENGINEER</b>                   | <b>: RENE AFABLE</b>                 |
| <b>VOLTAGE &amp; CURRENT DRAW</b> | <b>: +5vdc @ 50mA; -15vdc @ 58mA</b> |

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



| FREQUENCY | ISOLATION |
|-----------|-----------|
| 500 MHz   | 83.44 dB  |
| 2.0 GHz   | 87.07 dB  |
| 6.0 GHz   | 92.03 dB  |
| 10.0 GHz  | 88.18 dB  |
| 14.0 GHz  | 86.02 dB  |
| 18.0 GHz  | 79.13 dB  |

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## SUMMARY TEST DATA

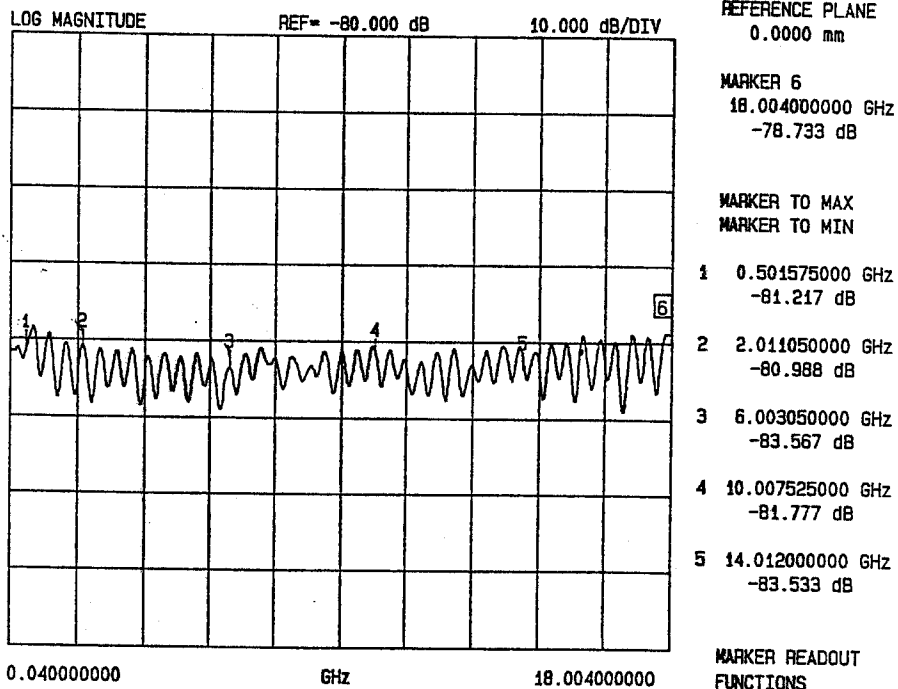
|                        |                               |
|------------------------|-------------------------------|
| MODEL NUMBER           | : MSNN-2DR-024T-UF15          |
| OPTION NUMBER          | : 10F                         |
| SERIAL NUMBER          | : 2MS90133                    |
| ENGINEER               | : RENE AFABLE                 |
| VOLTAGE & CURRENT DRAW | : +5vdc @ 50mA; -15vdc @ 58mA |

### ISOLATION\*

(AS MEASURED ON A VECTOR NETWORK ANALYZER )

J1-J3

S21 FORWARD TRANSMISSION



\*J1: INPUT ARM

| FREQUENCY | ISOLATION |
|-----------|-----------|
| 500 MHz   | 81.21 dB  |
| 2.0 GHz   | 80.98 dB  |
| 6.0 GHz   | 83.56 dB  |
| 10.0 GHz  | 81.77 dB  |
| 14.0 GHz  | 83.53 dB  |
| 18.0 GHz  | 78.73 dB  |

SEPTEMBER 11, 2000



**AMERICAN MICROWAVE  
CORPORATION**

**ISOLATION  
DATA AND PLOTS  
FROM  
40 MHz TO 4 GHz  
AS  
MEASURED  
ON A VECTOR NETWORK ANALYZER**

**ON A**

**SP2T**

**SOLID STATE SWITCH  
(SURFACE MOUNTABLE)**

**AMC MODEL No:  
MSNN-2DR-024T-UF15 OPTION 10F  
(Serial Number: 2MS90133)**

**PREPARED  
BY  
KATIE BAISEY**

**TESTED  
BY  
RENE AFABLE**

**SEPTEMBER 11, 2000**

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

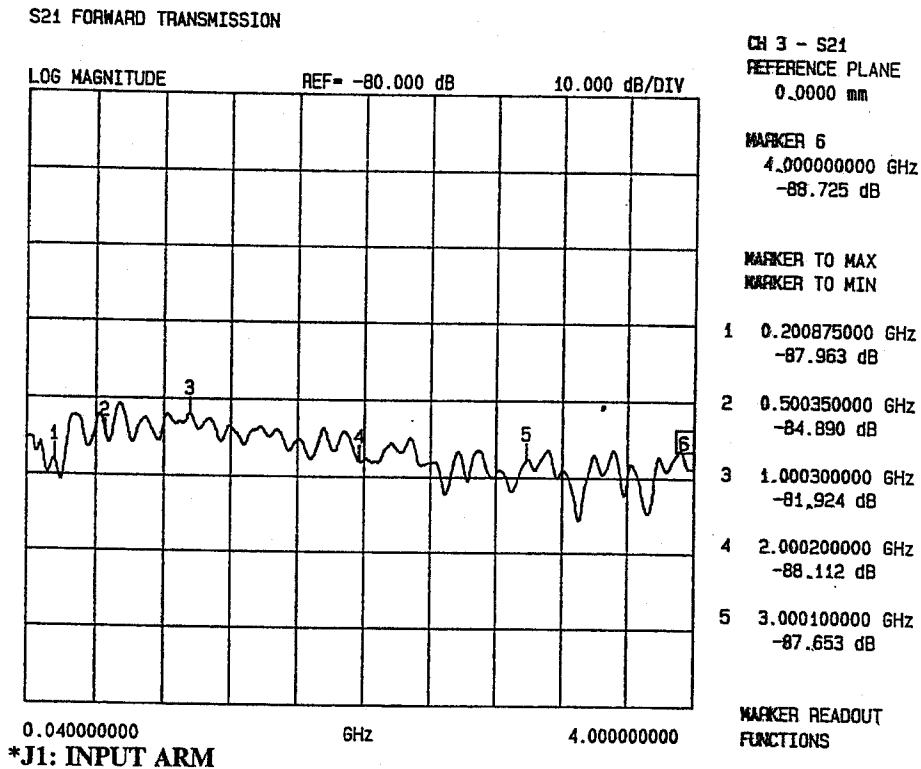




**SUMMARY TEST DATA**

|                                   |                                      |
|-----------------------------------|--------------------------------------|
| <b>MODEL NUMBER</b>               | <b>: MSNN-2DR-024T-UF15</b>          |
| <b>OPTION NUMBER</b>              | <b>: 10F</b>                         |
| <b>SERIAL NUMBER</b>              | <b>: 2MS90133</b>                    |
| <b>ENGINEER</b>                   | <b>: RENE AFABLE</b>                 |
| <b>VOLTAGE &amp; CURRENT DRAW</b> | <b>: +5vdc @ 50mA; -15vdc @ 58mA</b> |

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



| FREQUENCY | ISOLATION |
|-----------|-----------|
| 200 MHz   | 87.96 dB  |
| 500 MHz   | 84.89 dB  |
| 1.0 GHz   | 81.92 dB  |
| 2.0 GHz   | 88.11 dB  |
| 3.0 GHz   | 87.65 dB  |
| 4.0 GHz   | 88.72 dB  |

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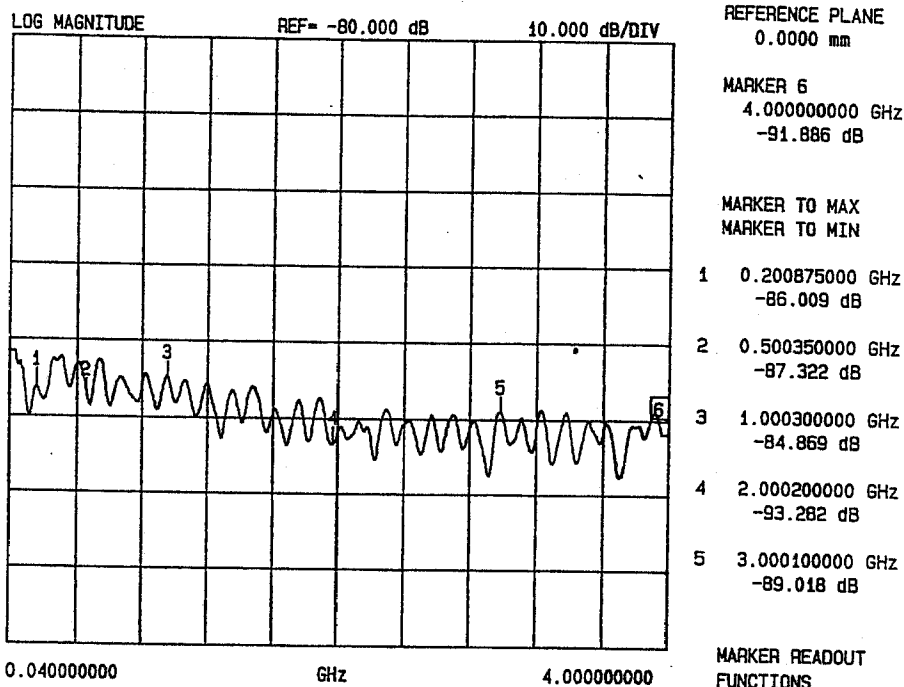


## SUMMARY TEST DATA

**MODEL NUMBER** : MSNN-2DR-024T-UF15  
**OPTION NUMBER** : 10F  
**SERIAL NUMBER** : 2MS90133  
**ENGINEER** : RENE AFABLE  
**VOLTAGE & CURRENT DRAW** : +5vdc @ 50mA; -15vdc @ 58mA

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

S21 FORWARD TRANSMISSION



\*J1: INPUT ARM

| FREQUENCY | ISOLATION |
|-----------|-----------|
| 200 MHz   | 86.00 dB  |
| 500 MHz   | 87.32 dB  |
| 1.0 GHz   | 84.86 dB  |
| 2.0 GHz   | 93.28 dB  |
| 3.0 GHz   | 89.01 dB  |
| 4.0 GHz   | 91.88 dB  |

SEPTEMBER 11, 2000



**AMERICAN MICROWAVE  
CORPORATION**

**ISOLATION  
DATA AND PLOTS  
FROM  
9.5 GHz TO 10 GHz  
AS  
MEASURED  
ON A VECTOR NETWORK ANALYZER  
ON A  
SP2T  
SOLID STATE SWITCH  
(SURFACE MOUNTABLE)  
AMC MODEL No:  
MSNN-2DR-024T-UF15 OPTION 10F  
(Serial Number: 2MS90133)**

**PREPARED  
BY  
KATIE BAISEY**

**TESTED  
BY  
RENE AFABLE**

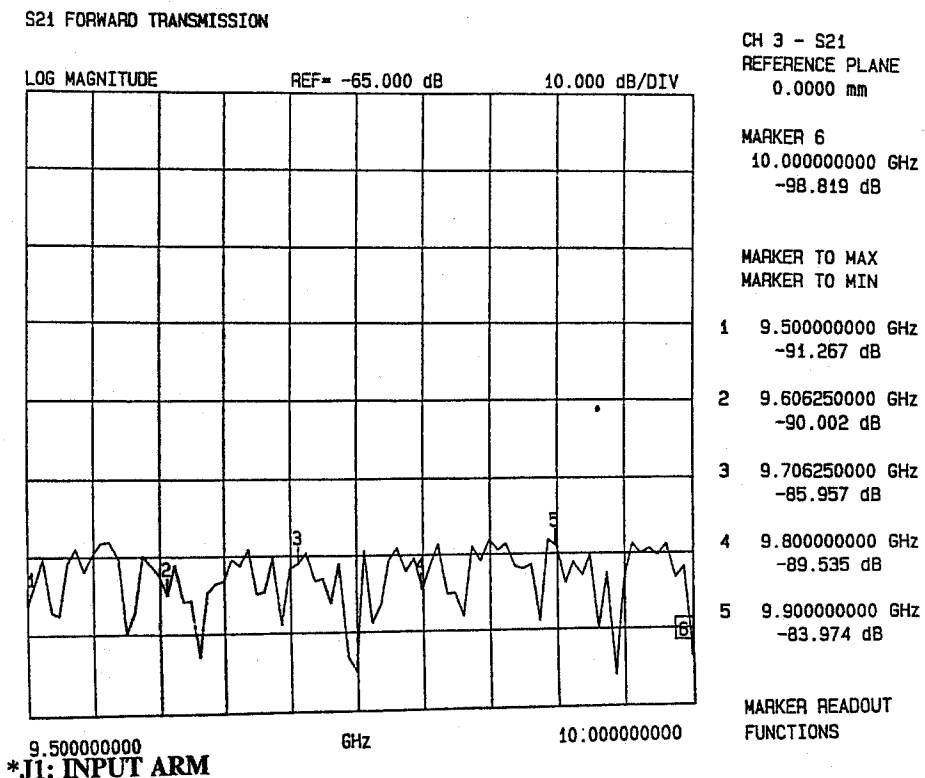
**SEPTEMBER 11, 2000**



### SUMMARY TEST DATA

|                        |                               |
|------------------------|-------------------------------|
| MODEL NUMBER           | : MSNN-2DR-024T-UF15          |
| OPTION NUMBER          | : 10F                         |
| SERIAL NUMBER          | : 2MS90133                    |
| ENGINEER               | : RENE AFABLE                 |
| VOLTAGE & CURRENT DRAW | : +5vdc @ 50mA; -15vdc @ 58mA |

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



| FREQUENCY | ISOLATION |
|-----------|-----------|
| 9.5 GHz   | 91.26 dB  |
| 9.6 GHz   | 90.00 dB  |
| 9.7 GHz   | 85.95 dB  |
| 9.8 GHz   | 89.53 dB  |
| 9.9 GHz   | 83.97 dB  |
| 10.0 GHz  | 98.81 dB  |

SEPTEMBER 11, 2000