

# Surface Mount High Isolation Switch

50Ω SPDT, Reflective DC<sup>3</sup> to 4500 MHz

SWM-2-50DR+

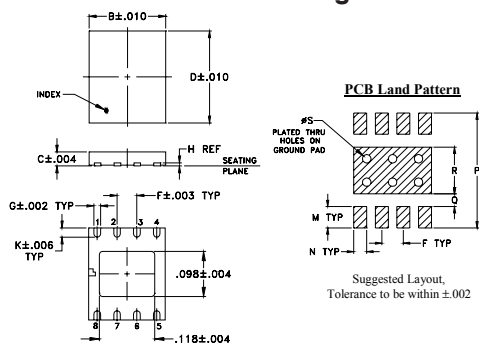
## Maximum Ratings

|                                                                 |                |
|-----------------------------------------------------------------|----------------|
| Operating Temperature                                           | -40°C to 85°C  |
| Storage Temperature                                             | -55°C to 100°C |
| Power and Voltage                                               | see note 1     |
| Permanent damage may occur if any of these limits are exceeded. |                |

## Pin Connections

|          |        |
|----------|--------|
| RF IN    | 6      |
| RF OUT 1 | 1      |
| RF OUT 2 | 4      |
| TTL IN   | 2      |
| +5V      | 5      |
| -5V      | 7      |
| TTL GND  | 3      |
| GND      | 8      |
| GND      | PADDLE |

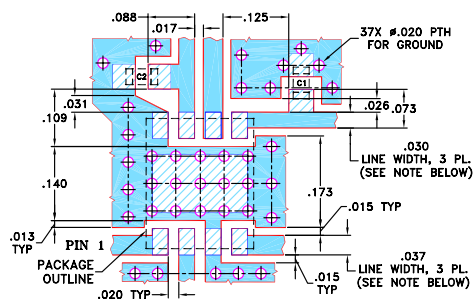
## Outline Drawing



## Outline Dimensions (inch)

| A     | B    | C    | D     | E    | F    | G     | H     | J     | K     |
|-------|------|------|-------|------|------|-------|-------|-------|-------|
| -.193 | .035 | .236 | -.050 | .017 | .008 | -.024 | -.060 | -.024 | -.060 |
| 4.90  | 0.90 | 6.00 | 1.27  | 0.43 | 0.20 | -.060 | 1.27  | 0.43  | 0.20  |
| L     | M    | N    | P     | Q    | R    | S     | T     | wt    |       |
| -.050 | .030 | .270 | .030  | .110 | .020 | -.051 | -.008 | grams |       |
| 1.27  | 0.76 | 6.86 | 0.76  | 2.79 | 0.51 | -.008 | -.008 | 0.08  |       |

## Demo Board MCL P/N: TB-161-1+ Suggested PCB Layout (PL-122)



## Features

- high isolation, 55 dB typ. at 1 GHz
- low insertion loss, 0.7 dB typ.
- integral TTL driver
- aqueous washable

## Applications

- automated switching networks
- transmitters/receiver isolation

## Electrical Specifications (T<sub>AMB</sub>=25°C)

| FREQ. <sup>3</sup><br>(MHz) | INSERTION LOSS<br>(dB) |                |               |      |                 |      |                  |      | 1dB COMPR.<br>(dBm) |      |                 |      |               |      |                 |      | IN-OUT ISOLATION<br>(dB) |      |                  |      |      |      |               |      |                 |      |                  |      |                  |      |
|-----------------------------|------------------------|----------------|---------------|------|-----------------|------|------------------|------|---------------------|------|-----------------|------|---------------|------|-----------------|------|--------------------------|------|------------------|------|------|------|---------------|------|-----------------|------|------------------|------|------------------|------|
|                             |                        |                | DC-100<br>MHz |      | 100-1000<br>MHz |      | 1000-2000<br>MHz |      | 2000-4500<br>MHz    |      |                 |      | DC-100<br>MHz |      | 100-1000<br>MHz |      | 1000-2000<br>MHz         |      | 2000-4500<br>MHz |      |      |      | DC-100<br>MHz |      | 100-1000<br>MHz |      | 1000-2000<br>MHz |      | 2000-4500<br>MHz |      |
|                             | f <sub>L</sub>         | f <sub>U</sub> | Typ.          | Max. | Typ.            | Max. | Typ.             | Max. | Typ.                | Max. | Typ.            | Max. | Typ.          | Max. | Typ.            | Max. | Typ.                     | Max. | Typ.             | Max. | Typ. | Max. | Typ.          | Max. | Typ.            | Max. | Typ.             | Max. | Typ.             | Max. |
| DC 4500                     |                        |                | 0.6           | 0.9  | 0.7             | 1.2  | 0.9              | 1.4  | 1.6                 | 1.9  | 20 <sup>1</sup> | 25   | 25            | 25   | 24              | 75   | 65                       | 55   | 45               | 45   | 37   | 35   | 27            |      |                 |      |                  |      |                  |      |

<sup>1</sup>drops to 17.0 dBm at 10 MHz

## Switching Specifications

|                                |                                        |             |
|--------------------------------|----------------------------------------|-------------|
| Power Supply Voltage           | Current, mA                            |             |
| +5V ±.20                       | 9 max.                                 |             |
| -5V ±.20                       | 9 max.                                 |             |
| TTL Control low threshold      | Voltage, V                             | Current, mA |
| high threshold                 | 0 min., 0.8 max.                       | 0.2 max.    |
|                                | 2 min., 5 max.                         | 5 max.      |
| VSWR* (:1)                     | 1.15 typ. to 2GHz, 1.3 typ. to 4.5 GHz |             |
| Rise/Fall Time, ns             | 5 typ., 15 max.                        |             |
| Switching Time, ns turn on/off | 10 typ., 20 max.                       |             |
| Video leakage**, mV p-p        | 30 typ.                                |             |

\* For all states of reflective switch in "ON" condition, "OFF port" 5:1 VSWR typ.

\*\* Video leakage or break through is defined as leakage of TTL switching signal to RF output ports

1. Absolute maximum power and voltage rating:

RF input power, 250mW

Supply voltage: ±6V DC

2. OFF state of RF output is low impedance.

3. All RF connections must be DC blocked or held at 0V DC.

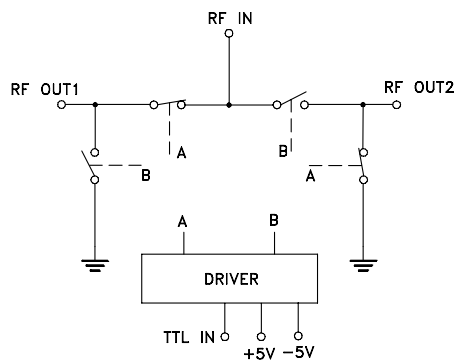
4. ESD ratings

Human Body Model (HBM): Class 1C(1000 to <2000V) in accordance with ESD STM5.1-2001

Machine Model(MM): Class M1(<100V) in accordance with ESD STM5.2-1999

| TTL  | CONTROL LOGIC |     |
|------|---------------|-----|
|      | RF1           | RF2 |
| LOW  | ON            | OFF |
| HIGH | OFF           | ON  |

## Electrical Schematic



## Notes

- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuits' applicable established test performance criteria and measurement instructions.
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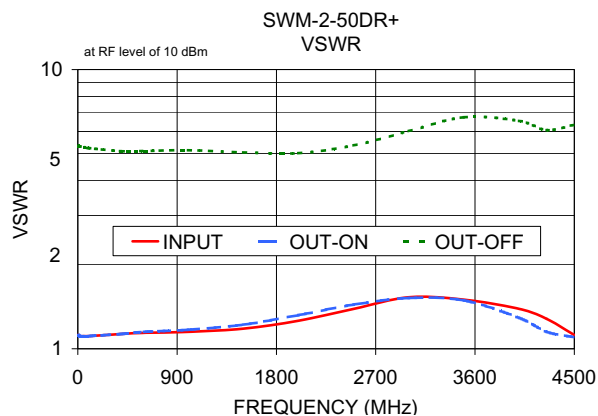
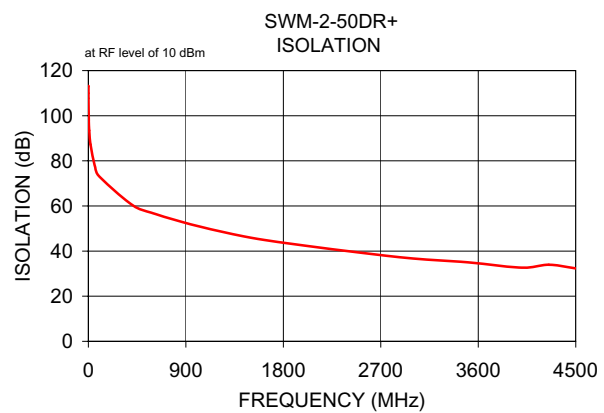
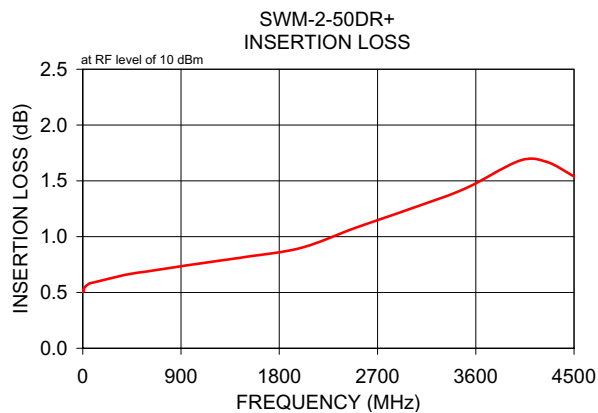


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M125593  
SWM-2-50DR+  
ED-10679  
RS/YB/CP  
140711  
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## Typical Performance Data

| FREQ.<br>(MHz) | ON INSERTION LOSS (dB) |          | OFF ISOLATION (dB) |          | VSWR           |                      |                       |
|----------------|------------------------|----------|--------------------|----------|----------------|----------------------|-----------------------|
|                | Control @ -5V          |          | Control @ 0V       |          | IN             | OUT                  |                       |
|                | IN-OUT                 |          | IN-OUT             |          |                |                      |                       |
|                | $\overline{x}$         | $\sigma$ | $\overline{x}$     | $\sigma$ | $\overline{x}$ | ON<br>$\overline{x}$ | OFF<br>$\overline{x}$ |
| 0.30           | 0.52                   | 0.00     | 113.18             | 10.77    | 1.12           | 1.12                 | 5.30                  |
| 0.50           | 0.51                   | 0.00     | 113.06             | 3.58     | 1.12           | 1.12                 | 5.33                  |
| 0.80           | 0.51                   | 0.00     | 109.96             | 6.86     | 1.12           | 1.12                 | 5.34                  |
| 1.00           | 0.51                   | 0.00     | 107.70             | 6.84     | 1.12           | 1.12                 | 5.34                  |
| 4.00           | 0.52                   | 0.00     | 97.85              | 1.38     | 1.12           | 1.12                 | 5.33                  |
| 8.00           | 0.53                   | 0.00     | 93.45              | 0.78     | 1.12           | 1.12                 | 5.32                  |
| 20.00          | 0.55                   | 0.00     | 87.22              | 1.53     | 1.11           | 1.11                 | 5.31                  |
| 60.00          | 0.58                   | 0.01     | 77.63              | 1.27     | 1.11           | 1.11                 | 5.27                  |
| 100.00         | 0.59                   | 0.01     | 73.10              | 1.40     | 1.11           | 1.11                 | 5.23                  |
| 400.00         | 0.66                   | 0.01     | 60.63              | 1.23     | 1.13           | 1.13                 | 5.10                  |
| 600.00         | 0.69                   | 0.01     | 56.70              | 1.15     | 1.14           | 1.15                 | 5.11                  |
| 1000.00        | 0.75                   | 0.01     | 51.22              | 1.02     | 1.15           | 1.17                 | 5.14                  |
| 1500.00        | 0.82                   | 0.01     | 45.93              | 0.87     | 1.18           | 1.22                 | 5.05                  |
| 2000.00        | 0.90                   | 0.01     | 42.42              | 0.87     | 1.26           | 1.32                 | 5.02                  |
| 2500.00        | 1.08                   | 0.02     | 39.36              | 0.87     | 1.39           | 1.44                 | 5.35                  |
| 3000.00        | 1.25                   | 0.03     | 36.68              | 0.73     | 1.53           | 1.52                 | 6.02                  |
| 3500.00        | 1.43                   | 0.02     | 35.06              | 0.72     | 1.50           | 1.49                 | 6.75                  |
| 4000.00        | 1.68                   | 0.02     | 32.67              | 0.53     | 1.39           | 1.29                 | 6.55                  |
| 4250.00        | 1.67                   | 0.01     | 33.95              | 0.58     | 1.28           | 1.15                 | 6.07                  |
| 4500.00        | 1.54                   | 0.01     | 32.31              | 0.44     | 1.12           | 1.10                 | 6.34                  |



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