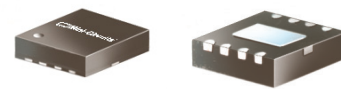


50Ω SPDT, Absorptive DC<sup>2</sup> to 4500 MHz

CASE STYLE: DL805

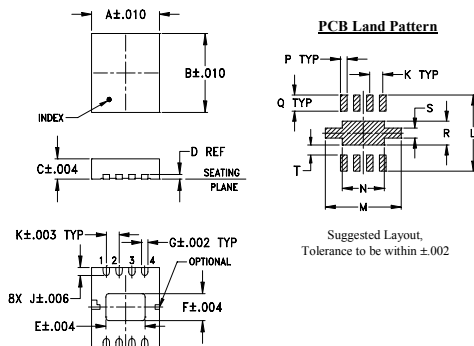
## Maximum Ratings

|                                                                 |                |
|-----------------------------------------------------------------|----------------|
| Operating Temperature                                           | -55°C to 100°C |
| Storage Temperature                                             | -55°C to 100°C |
| Supply V, Input Power                                           | see notes      |
| 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

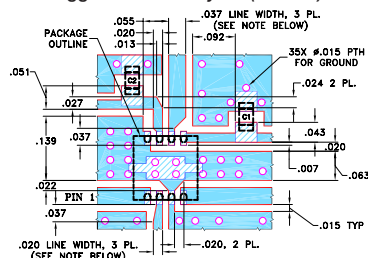


## Outline Dimensions (inch)

|       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| A     | B     | C     | D     | E     | F     | G     | H     | J     | K     |
| 0.128 | 0.128 | 0.035 | 0.008 | 0.080 | 0.047 | 0.013 | --    | 0.014 | 0.026 |
| 3.25  | 3.25  | 0.89  | 0.20  | 2.03  | 1.19  | 0.33  | --    | 0.36  | 0.66  |
| L     | M     | N     | P     | Q     | R     | S     | T     | wt    |       |
| 0.158 | 0.158 | 0.084 | 0.013 | 0.030 | 0.048 | 0.020 | 0.025 | grams |       |
| 4.01  | 4.01  | 2.13  | 0.33  | 0.76  | 1.22  | 0.51  | 0.64  | 0.02  |       |

## Demo Board MCL P/N: TB-159

## Suggested PCB Layout (PL-120)



CAPACITORS C1 &amp; C2: 10 ± 2% pF, 0603 SIZE.

- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.020" ± 0.0015"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
3. DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
4. DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

## Notes

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- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)

## Features

- high isolation, 65 dB typ. at 1 GHz
- low insertion loss, 0.7 dB typ.
- integral TTL driver
- miniature case style DL805

## Applications

- automated switching networks
- transmitters/receivers

## +RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications



Available Tape and Reel  
at no extra cost

| Reel Size | Devices/Reel                |
|-----------|-----------------------------|
| 7"        | 20, 50, 100, 200, 500, 1000 |

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

| FREQ. <sup>2</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 | 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.             | Typ.                     | Min.            | Typ.             | Min.             | Typ.          | Min.            | Typ.             | Min.             |
| DC                          | 4500                   | 0.6             | 1.0              | 0.7              | 1.2           | 0.9             | 1.4              | 1.4              | 2.0                 | 20 <sup>1</sup> | 25               | 25               | 20                       | 80              | 65               | 65               | 53            | 57              | 45               | 36               |

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

## Additional Specifications

|                                                                               |                                                        |                                   |
|-------------------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------|
| Power Supply<br>Voltage @ -40°C to 85°C<br>+4.80 to +5.25V<br>-5.25 to -4.80V | @ -55°C to 100°C<br>+4.90 to +5.25V<br>-5.25 to -4.90V | Current, mA<br>9 max.<br>9 max.   |
| TTL Control<br>low threshold<br>high threshold                                | Voltage, V<br>0 min., 0.8 max.<br>2 min., 5 max.       | Current, mA<br>0.2 max.<br>5 max. |
| VSWR* (:1)                                                                    | 1.1 Typ. to 2GHz, 1.25 Typ. to 4.5 GHz                 |                                   |
| Rise/Fall Time, ns                                                            | 5 Typ., 10 Max.                                        |                                   |
| Switching Time, ns turn on/off                                                | 10 Typ., 15 Max.                                       |                                   |
| Video Leakage**, mVp-p                                                        | 30 Typ.                                                |                                   |

\* For all states of absorptive switch

\*\* 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

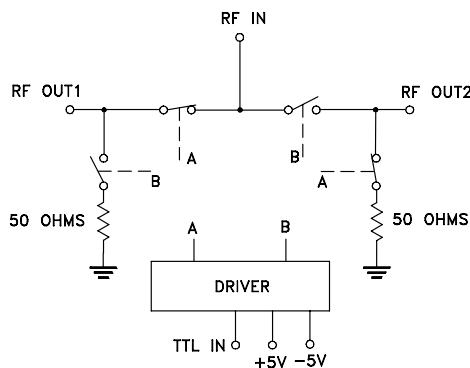
2. All RF connections must be DC blocked or held at 0V DC.

3. 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

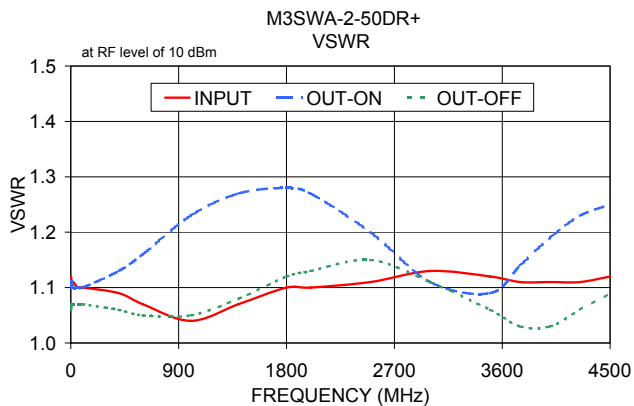
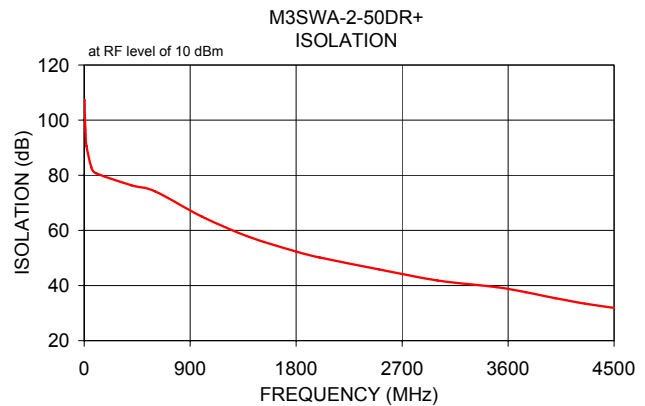
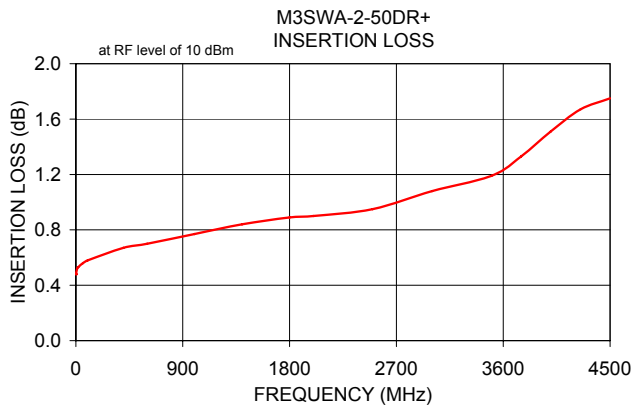
| TTL  | CONTROL LOGIC |     |
|------|---------------|-----|
|      | RF1           | RF2 |
| LOW  | ON            | OFF |
| HIGH | OFF           | ON  |

## Electrical Schematic



## Typical Performance Data

| FREQ.<br>(MHz) | ON   | INSERTION LOSS (dB) |          | OFF ISOLATION (dB) |          | IN        | VSWR      |           |
|----------------|------|---------------------|----------|--------------------|----------|-----------|-----------|-----------|
|                |      | IN-OUT              |          | IN-OUT             |          |           | ON        | OUT OFF   |
|                |      | $\bar{x}$           | $\sigma$ | $\bar{x}$          | $\sigma$ | $\bar{x}$ | $\bar{x}$ | $\bar{x}$ |
| 0.30           | 0.49 | 0.01                |          | 103.98             | 6.45     | 1.11      | 1.10      | 1.07      |
| 0.50           | 0.48 | 0.00                |          | 105.78             | 6.54     | 1.11      | 1.11      | 1.07      |
| 1.00           | 0.48 | 0.01                |          | 107.21             | 4.74     | 1.12      | 1.11      | 1.06      |
| 10.00          | 0.52 | 0.00                |          | 96.42              | 1.62     | 1.11      | 1.11      | 1.07      |
| 20.00          | 0.53 | 0.01                |          | 90.58              | 2.13     | 1.11      | 1.10      | 1.07      |
| 60.00          | 0.56 | 0.01                |          | 82.97              | 2.47     | 1.10      | 1.10      | 1.07      |
| 100.00         | 0.58 | 0.01                |          | 80.77              | 1.90     | 1.10      | 1.10      | 1.07      |
| 400.00         | 0.67 | 0.01                |          | 76.40              | 4.07     | 1.09      | 1.13      | 1.06      |
| 600.00         | 0.70 | 0.01                |          | 74.22              | 3.92     | 1.07      | 1.16      | 1.05      |
| 1000.00        | 0.77 | 0.01                |          | 64.99              | 2.65     | 1.04      | 1.23      | 1.05      |
| 1400.00        | 0.84 | 0.01                |          | 57.65              | 1.44     | 1.07      | 1.27      | 1.08      |
| 1800.00        | 0.89 | 0.01                |          | 52.33              | 1.01     | 1.10      | 1.28      | 1.12      |
| 2000.00        | 0.90 | 0.01                |          | 50.16              | 0.87     | 1.10      | 1.27      | 1.13      |
| 2500.00        | 0.95 | 0.01                |          | 45.87              | 0.68     | 1.11      | 1.20      | 1.15      |
| 3000.00        | 1.08 | 0.01                |          | 41.83              | 0.59     | 1.13      | 1.11      | 1.11      |
| 3500.00        | 1.19 | 0.01                |          | 39.43              | 0.53     | 1.12      | 1.09      | 1.06      |
| 3750.00        | 1.33 | 0.01                |          | 37.59              | 0.52     | 1.11      | 1.14      | 1.03      |
| 4000.00        | 1.51 | 0.02                |          | 35.39              | 0.43     | 1.11      | 1.19      | 1.03      |
| 4250.00        | 1.67 | 0.02                |          | 33.43              | 0.33     | 1.11      | 1.23      | 1.06      |
| 4500.00        | 1.75 | 0.03                |          | 31.86              | 0.29     | 1.12      | 1.25      | 1.09      |



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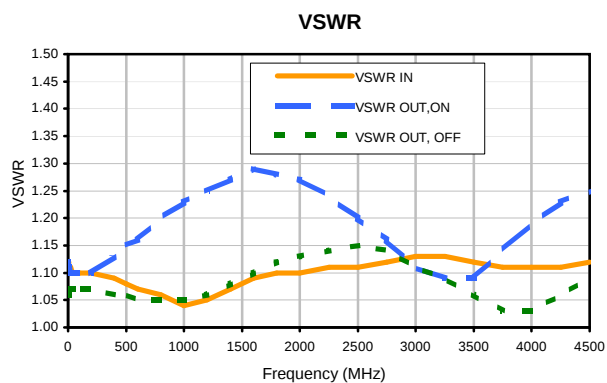
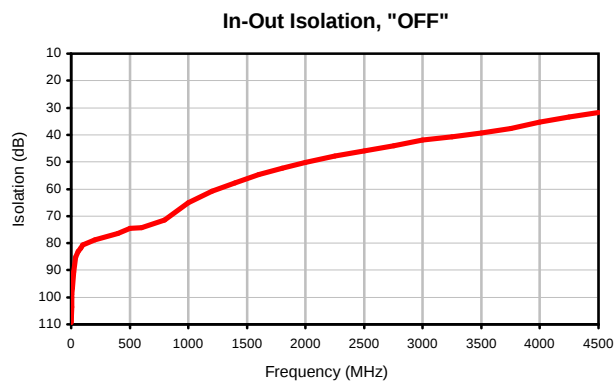
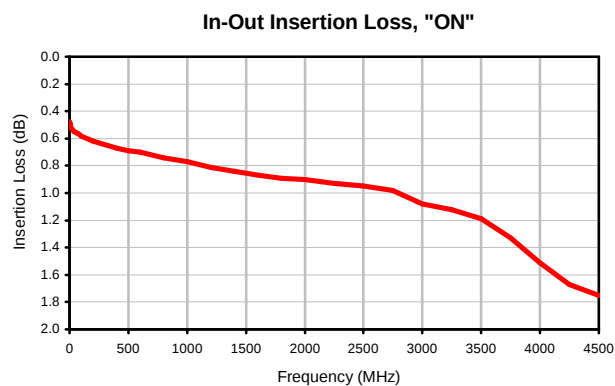
# Switch SPDT , 50W

# M3SWA-2-50DR+

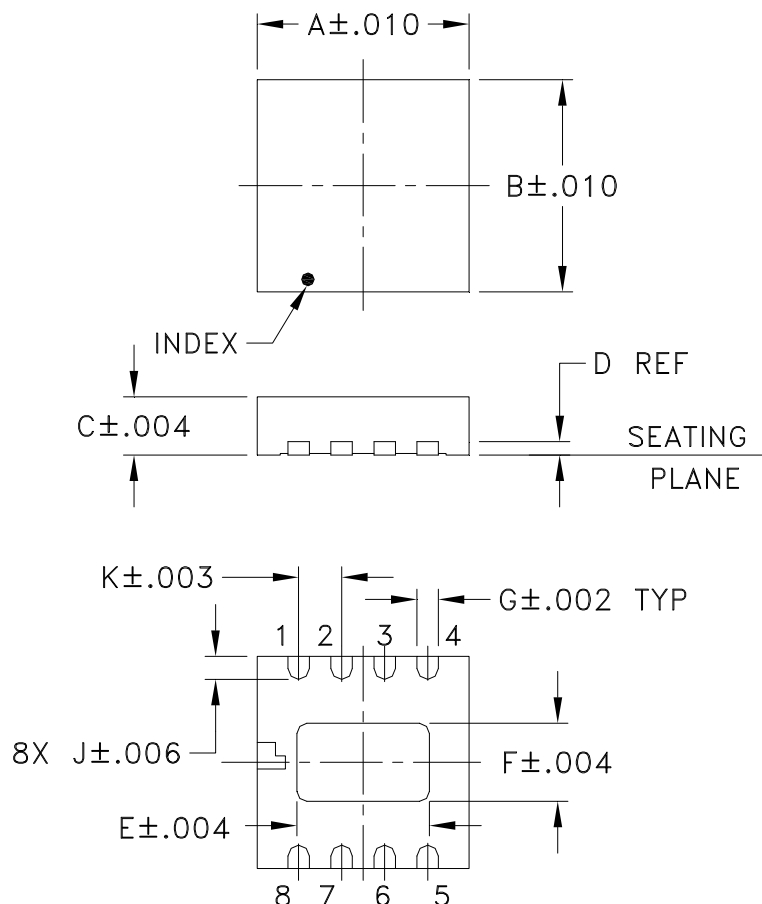
## Typical Performance Data

| FREQUENCY<br>(MHz) | INSERTION LOSS<br>TTL Low @ 0V<br>(dB)<br>IN-OUT , "ON" | ISOLATION<br>TTL High @ 5V<br>(dB)<br>IN-OUT , "OFF" | VSWR |                    |             |
|--------------------|---------------------------------------------------------|------------------------------------------------------|------|--------------------|-------------|
|                    |                                                         |                                                      | IN   | OUT , "ON"<br>(:1) | OUT , "OFF" |
| 0.3                | 0.49                                                    | 103.98                                               | 1.11 | 1.10               | 1.07        |
| 0.4                | 0.48                                                    | 106.54                                               | 1.11 | 1.11               | 1.07        |
| 0.5                | 0.48                                                    | 105.78                                               | 1.11 | 1.11               | 1.07        |
| 1                  | 0.48                                                    | 107.21                                               | 1.12 | 1.11               | 1.06        |
| 2                  | 0.49                                                    | 109.36                                               | 1.12 | 1.12               | 1.06        |
| 4                  | 0.49                                                    | 103.65                                               | 1.12 | 1.12               | 1.06        |
| 6                  | 0.49                                                    | 100.18                                               | 1.11 | 1.11               | 1.06        |
| 8                  | 0.50                                                    | 98.99                                                | 1.11 | 1.11               | 1.06        |
| 10                 | 0.52                                                    | 96.42                                                | 1.11 | 1.11               | 1.07        |
| 20                 | 0.53                                                    | 90.58                                                | 1.11 | 1.10               | 1.07        |
| 40                 | 0.55                                                    | 85.09                                                | 1.10 | 1.10               | 1.07        |
| 60                 | 0.56                                                    | 82.97                                                | 1.10 | 1.10               | 1.07        |
| 80                 | 0.57                                                    | 81.86                                                | 1.10 | 1.10               | 1.07        |
| 100                | 0.58                                                    | 80.77                                                | 1.10 | 1.10               | 1.07        |
| 200                | 0.62                                                    | 78.68                                                | 1.10 | 1.10               | 1.07        |
| 400                | 0.67                                                    | 76.40                                                | 1.09 | 1.13               | 1.06        |
| 500                | 0.69                                                    | 74.50                                                | 1.08 | 1.15               | 1.06        |
| 600                | 0.70                                                    | 74.22                                                | 1.07 | 1.16               | 1.05        |
| 800                | 0.74                                                    | 71.39                                                | 1.06 | 1.20               | 1.05        |
| 1000               | 0.77                                                    | 64.99                                                | 1.04 | 1.23               | 1.05        |
| 1200               | 0.81                                                    | 60.78                                                | 1.05 | 1.25               | 1.06        |
| 1400               | 0.84                                                    | 57.65                                                | 1.07 | 1.27               | 1.08        |
| 1600               | 0.87                                                    | 54.64                                                | 1.09 | 1.29               | 1.10        |
| 1800               | 0.89                                                    | 52.33                                                | 1.10 | 1.28               | 1.12        |
| 2000               | 0.90                                                    | 50.16                                                | 1.10 | 1.27               | 1.13        |
| 2250               | 0.93                                                    | 47.76                                                | 1.11 | 1.24               | 1.14        |
| 2500               | 0.95                                                    | 45.87                                                | 1.11 | 1.20               | 1.15        |
| 2750               | 0.98                                                    | 44.03                                                | 1.12 | 1.16               | 1.14        |
| 3000               | 1.08                                                    | 41.83                                                | 1.13 | 1.11               | 1.11        |
| 3250               | 1.12                                                    | 40.80                                                | 1.13 | 1.09               | 1.09        |
| 3500               | 1.19                                                    | 39.43                                                | 1.12 | 1.09               | 1.06        |
| 3750               | 1.33                                                    | 37.59                                                | 1.11 | 1.14               | 1.03        |
| 4000               | 1.51                                                    | 35.39                                                | 1.11 | 1.19               | 1.03        |
| 4250               | 1.67                                                    | 33.43                                                | 1.11 | 1.23               | 1.06        |
| 4500               | 1.75                                                    | 31.86                                                | 1.12 | 1.25               | 1.09        |

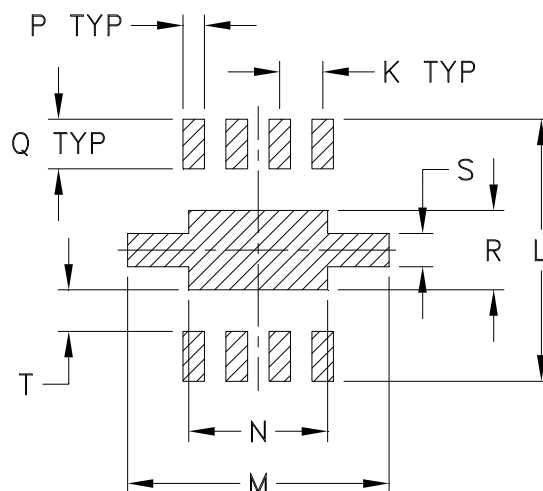
## Typical Performance Curves



### Outline Dimensions



### PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm.002$

| CASE # | A              | B              | C              | D              | E              | F              | G              | H        | J              | K              | L              | M              | N              |
|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------|----------------|----------------|----------------|----------------|----------------|
| DL805  | .128<br>(3.25) | .128<br>(3.25) | .035<br>(0.90) | .008<br>(0.20) | .080<br>(2.03) | .047<br>(1.19) | .013<br>(0.33) | --<br>-- | .014<br>(0.36) | .026<br>(0.66) | .158<br>(4.01) | .158<br>(4.01) | .084<br>(2.13) |

| CASE # | P              | Q              | R              | S              | T              | WT. GRAM |
|--------|----------------|----------------|----------------|----------------|----------------|----------|
| DL805  | .013<br>(0.33) | .030<br>(0.76) | .048<br>(1.22) | .020<br>(0.51) | .025<br>(0.64) | .02      |

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm.01$ ; 3Pl.  $\pm.004$

### Notes:

- Case material: Plastic.
- Termination finish:

For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier or Matte-Tin. All models, (+) suffix.  
See model data sheet.

For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site

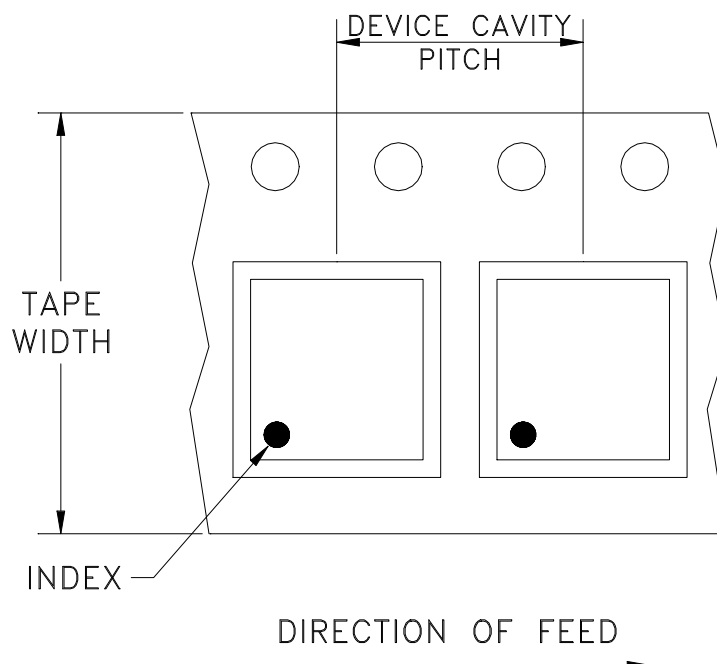


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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F58

## DEVICE ORIENTATION IN T&R



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel |
|-------------------|----------------------------|----------------------|------------------|
| 12                | 8                          | 7                    | 1000             |
|                   |                            | 13                   | 2000, 4000       |

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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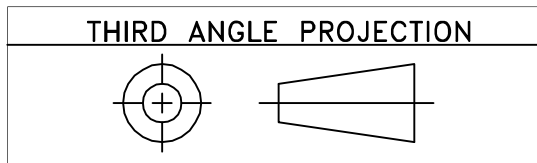


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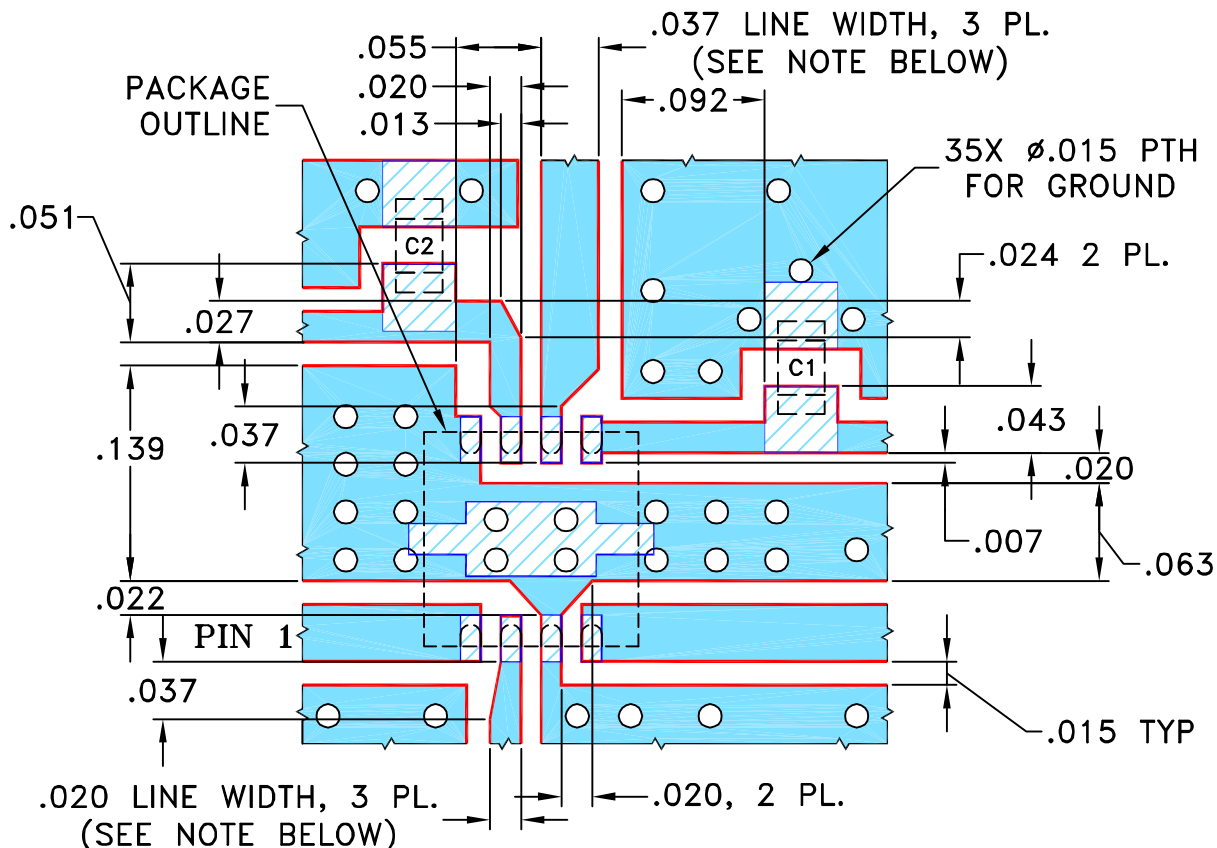
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| REVISIONS |         |                                         |          |     |      |
|-----------|---------|-----------------------------------------|----------|-----|------|
| REV       | ECN No. | DESCRIPTION                             | DATE     | DR  | AUTH |
| OR        | M82940  | NEW RELEASE                             | 11/15/02 | MMG | MM   |
| A         | M91639  | REMOVED NOTE 2                          | 04/14/04 | AV  | DJ   |
| B         | M102713 | CHNG DESCRIPTION, ADDED "...WITH SMOBC" | 01/16/06 | GF  | IL   |
| C         | M175851 | UPDATED DESCRIPTION INFORMATION         | 08/09/19 | CA  | IL   |

**SUGGESTED MOUNTING CONFIGURATION  
FOR DL805 CASE STYLE, "08SW06" PIN CONNECTION.**

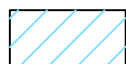


CAPACITORS C1 & C2: 0603 SIZE.

- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.020"  $\pm$  0.0015"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. CHIP COMPONENTS FOOT PRINTS SHOWN FOR REFERENCE, FOR COMPONENT VALUES REFER TO TB-M3SW-250DRA+/TB-M3SWA250DRB+.
3. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

| UNLESS OTHERWISE SPECIFIED | INITIALS | DATE         |
|----------------------------|----------|--------------|
| DIMENSIONS ARE IN INCHES   | DRAWN    | MMG 11/13/02 |
| TOLERANCES ON:             | CHECKED  | AV 11/15/02  |
| 2 PL DECIMALS $\pm$        | APPROVED | MM 11/15/02  |
| 3 PL DECIMALS $\pm$ .005   |          |              |
| ANGLES $\pm$ 1°            |          |              |
| FRACTIONS $\pm$            |          |              |



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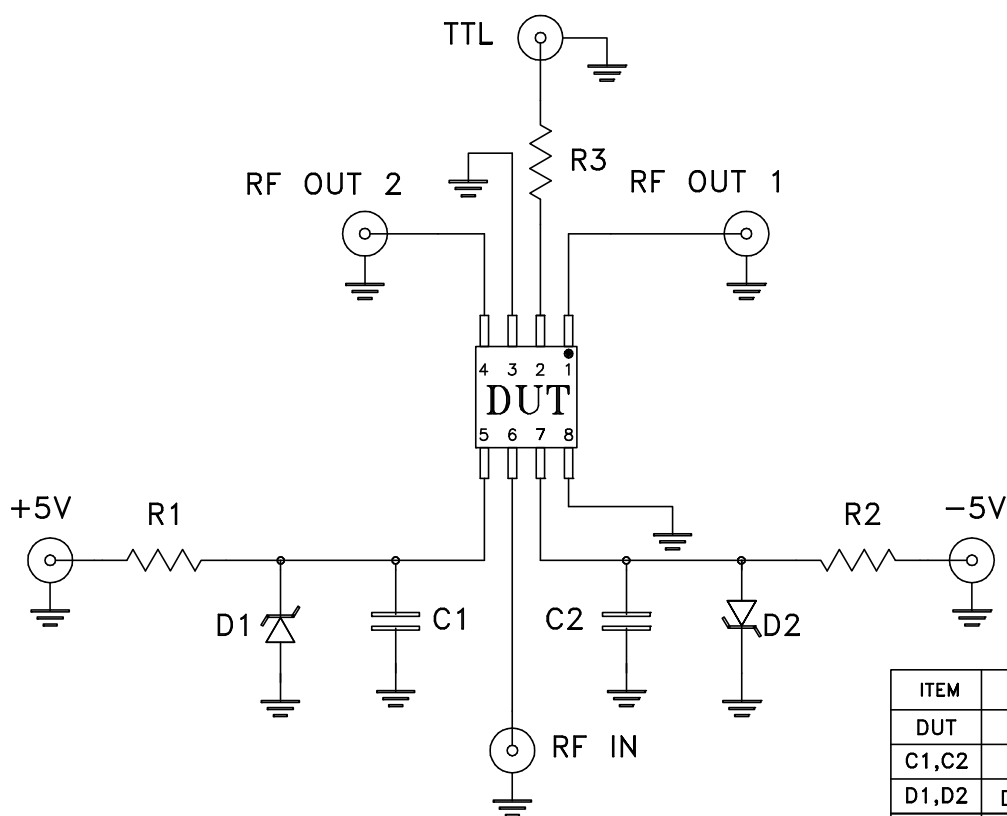
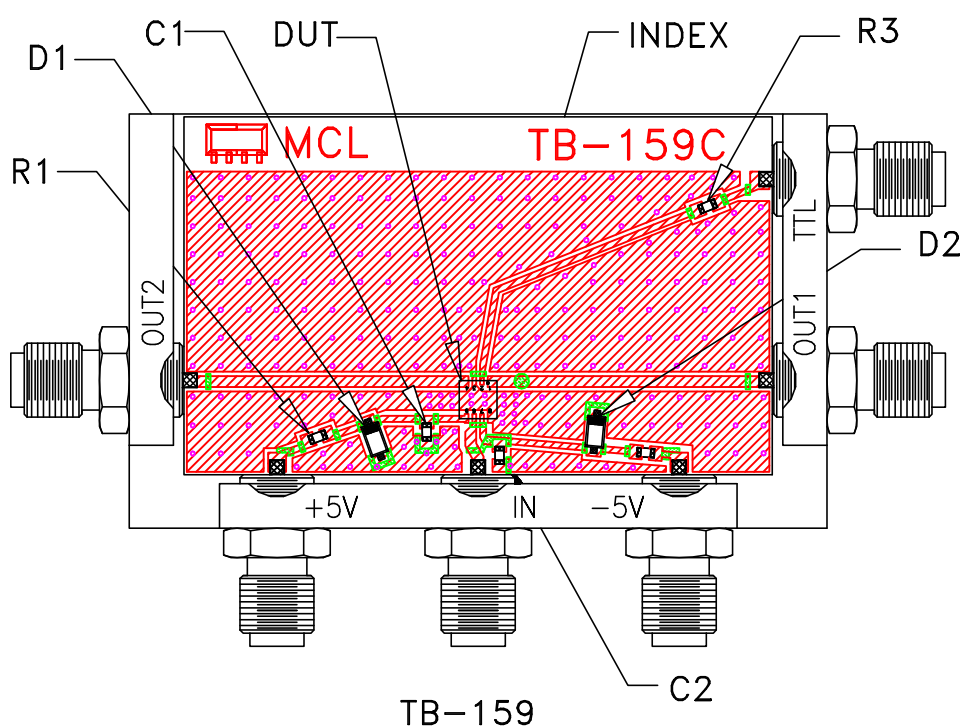
PL, DL805, TB-M3SW-250DRA+/TB-M3SWA250DRB+

| SIZE  | CODE IDENT | DRAWING NO: | REV:   |
|-------|------------|-------------|--------|
| A     | 15542      | 98-PL-120   | C      |
| FILE: | 98PL120    | SCALE:      | 8:1    |
|       |            | SHEET:      | 1 OF 1 |

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ASHEETA1.DWG REV:A DATE:01/12/95

## Evaluation Board and Circuit



### Schematic Diagram

| ITEM  | DESCRIPTION       | SIZE         |
|-------|-------------------|--------------|
| DUT   | MCL SWITCH        | 3.25X3.25 MM |
| C1,C2 | Capacitor 10 pF   | 0603         |
| D1,D2 | Diod Zener 5.6V   | SOT-123      |
| R1,R2 | Resistor 11.5 Ohm | 0603         |
| R3    | Resistor 100 Ohm  |              |

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent, Dielectric Constant=3.5, Thickness=.020 inch.

 Mini-Circuits®



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

| Specification                  | Test/Inspection Condition                                                                                                                                       | Reference/Spec                                                  |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| Operating Temperature          | -55° to 100°C<br>Ambient Environment                                                                                                                            | Individual Model Data Sheet                                     |
| Storage Temperature            | -55° to 100° C<br>Ambient Environment                                                                                                                           | Individual Model Data Sheet                                     |
| Temperature Cycling            | -55° to 100°C, 100 cycles                                                                                                                                       | MIL-STD-883, Method 1010, Condition B, except 100°C             |
| Solder Reflow Profile          | Sn-Pb Eutetic Process: 240°C peak<br>PB-Free Process: 250°C peak                                                                                                | J-STD-020, table 4-1,4-2 and 5-2; figure 5-1                    |
| Vibration (Variable Frequency) | 50g peak                                                                                                                                                        | MIL-STD-883, Method 2007, Condition B                           |
| Mechanical Shock               | 1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only                                                                                                                | MIL-STD-883, Method 2002, Condition B, except Y1 direction only |
| Moisture Sensitivity: Level 1  | Bake at 125°C for 24 hours. Soak at 85°C/85%RH for 168 hours<br>Reflow 3 cycles at 260°C peak                                                                   | J-STD-020                                                       |
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C;<br>distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215                                         |