

# Surface Mount RF Transformer

50Ω 0.07 to 200 MHz

## Maximum Ratings

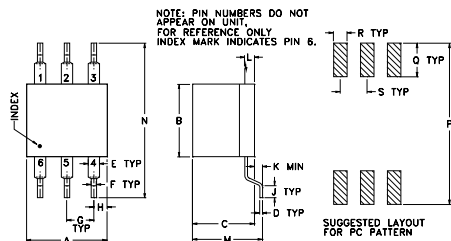
|                       |                |
|-----------------------|----------------|
| Operating Temperature | -20°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| RF Power              | 0.25W          |
| DC Current            | 30mA           |

Permanent damage may occur if any of these limits are exceeded.

## Pin Connections

|             |          |
|-------------|----------|
| PRIMARY DOT | X1,Y5,Z3 |
| PRIMARY     | X2,Y6,Z4 |

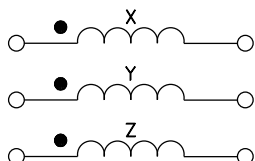
## Outline Drawing



## Outline Dimensions (inch)

| A    | B    | C    | D     | E     | F    | G    | H    | J     |
|------|------|------|-------|-------|------|------|------|-------|
| .30  | .27  | .23  | .010  | .042  | .020 | .100 | .05  | .05   |
| 7.62 | 6.86 | 5.84 | 0.25  | 1.07  | 0.51 | 2.54 | 1.27 | 1.27  |
| K    | L    | M    | N     | P     | Q    | R    | S    | wt    |
| .020 | .036 | .26  | .575  | .600  | .125 | .050 | .100 | grams |
| 0.51 | 0.91 | 6.60 | 14.61 | 15.24 | 3.18 | 1.27 | 2.54 | 0.50  |

## Config. F



## Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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

- wideband, 0.07 to 200 MHz
- single ended to balanced with impedance ratio selection
- also available with plug-in (X65) & flat pack (W38) leads

## Applications

- HF/VHF
- test equipment

# T2-613-1-KK81+ T2-613-1-KK81



Generic photo used for illustration purposes only

CASE STYLE: KK81

**+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 |
|-----------|--------------|
| 13"       | 900          |

## Transformer Electrical Specifications

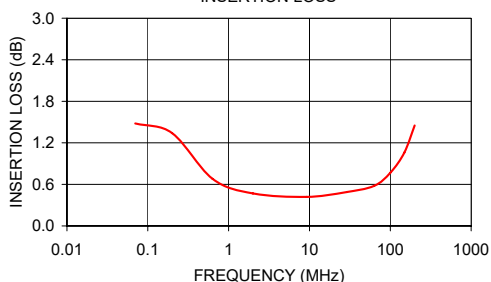
| Ω<br>RATIO | FREQUENCY<br>(MHz) | INSERTION LOSS* |             |             |
|------------|--------------------|-----------------|-------------|-------------|
|            |                    | 3 dB<br>MHz     | 2 dB<br>MHz | 1 dB<br>MHz |
| 1:1:2      | 0.07-200           | 0.07-200        | 0.1-100     | 0.5-50      |

\* Insertion Loss is referenced to mid-band loss, 0.4 dB typ.

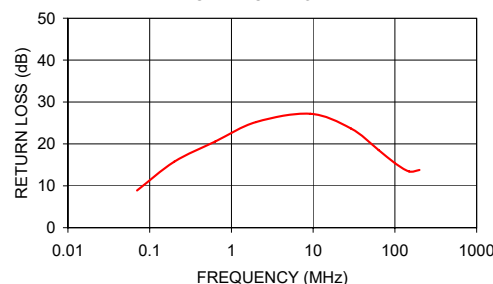
## Typical Performance Data

| FREQUENCY<br>(MHz) | INSERTION<br>LOSS<br>(dB) | INPUT<br>R. LOSS<br>(dB) |
|--------------------|---------------------------|--------------------------|
| 0.07               | 1.48                      | 8.88                     |
| 0.20               | 1.34                      | 15.76                    |
| 0.63               | 0.68                      | 20.56                    |
| 2.00               | 0.47                      | 25.22                    |
| 9.20               | 0.42                      | 27.19                    |
| 29.09              | 0.49                      | 23.67                    |
| 63.25              | 0.58                      | 18.52                    |
| 100.24             | 0.77                      | 15.39                    |
| 149.06             | 1.06                      | 13.44                    |
| 200.00             | 1.45                      | 13.77                    |

T2-613-1-KK81  
INSERTION LOSS



T2-613-1-KK81  
INPUT RETURN LOSS



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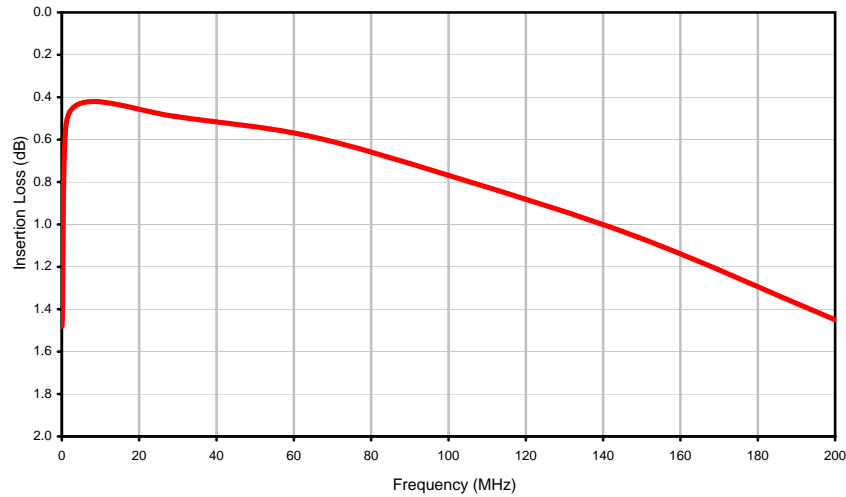
REV. B  
M151107  
T2-613-1-KK81  
IG/TD/CP/AM  
200721

***Typical Performance Data***

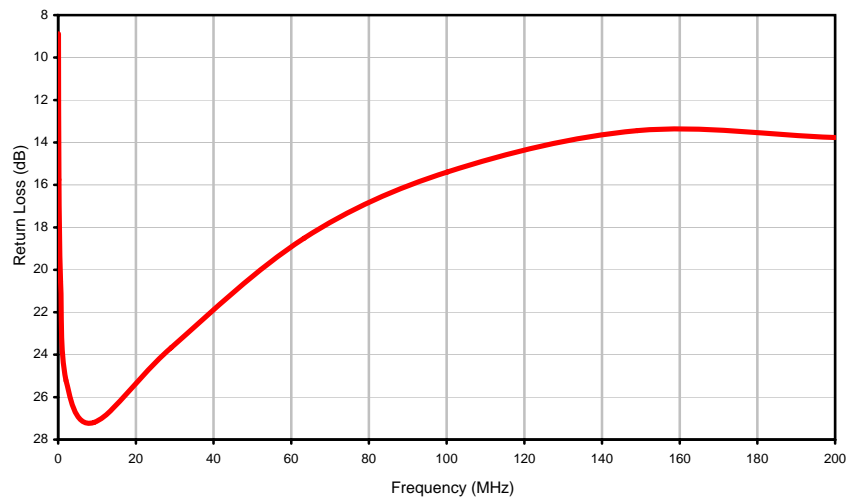
| <b>FREQUENCY<br/>(MHz)</b> | <b>INSERTION<br/>LOSS<br/>(dB)</b> | <b>RETURN<br/>LOSS<br/>(dB)</b> |
|----------------------------|------------------------------------|---------------------------------|
| 0.07                       | 1.48                               | 8.88                            |
| 0.20                       | 1.34                               | 15.76                           |
| 0.63                       | 0.68                               | 20.56                           |
| 2.00                       | 0.47                               | 25.22                           |
| 9.20                       | 0.42                               | 27.19                           |
| 29.09                      | 0.49                               | 23.67                           |
| 63.25                      | 0.58                               | 18.52                           |
| 100.24                     | 0.77                               | 15.39                           |
| 149.06                     | 1.06                               | 13.44                           |
| 200.00                     | 1.45                               | 13.77                           |

## Typical Performance Curves

Insertion Loss



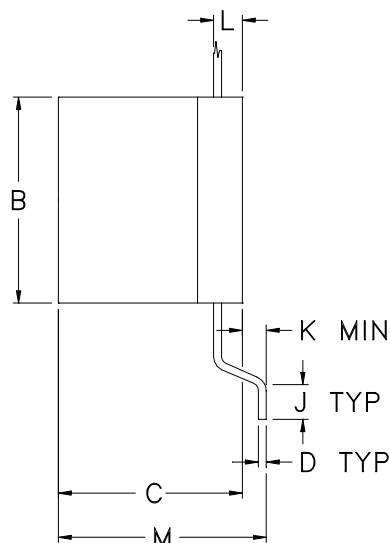
Return Loss



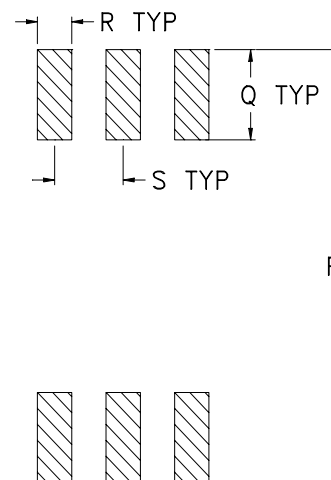
## Outline Dimensions

**KK81**  
**KK265**

NOTE: PIN NUMBERS DO NOT  
APPEAR ON UNIT,  
FOR REFERENCE ONLY  
INDEX MARK INDICATES PIN 6.



## 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               | P               |
|--------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|---------------|-----------------|-----------------|
| KK81   | .30<br>(7.62) | .27<br>(6.86) | .23<br>(5.84) | .010<br>(0.25) | 0.42<br>(1.07) | .020<br>(0.51) | .100<br>(2.54) | .05<br>(1.27) | .05<br>(1.27) | .020<br>(0.51) | .036<br>(0.91) | .26<br>(6.60) | .575<br>(14.61) | .600<br>(15.24) |
| KK265  | .30<br>(7.62) | .27<br>(6.86) | .22<br>(5.84) | .010<br>(0.25) | .020<br>(0.50) | .020<br>(0.51) | .100<br>(2.54) | .05<br>(1.27) | .05<br>(1.27) | 0.1<br>(0.25)  | .032<br>(0.81) | .23<br>(5.84) | .450<br>(10.62) | .475<br>(12.07) |

| CASE # | Q              | R              | S              | WT. GRAM |
|--------|----------------|----------------|----------------|----------|
| KK81   | .125<br>(3.18) | .050<br>(1.27) | .100<br>(2.54) | .50      |
| KK265  | .125<br>(3.18) | .050<br>(1.27) | .100<br>(2.54) | .65      |

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .03$ ; 3 Pl.  $\pm .015$

### Notes:

- Case material: Plastic.
- Termination finish:  
For RoHS Case Styles: Tin plate over Nickel plate.  
For RoHS-5 Case Styles: Tin-Lead plate.
- Special Tolerances: Termination width  $\pm .005$  inch, termination thickness  $\pm .003$  inch.



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Mini-Circuits ISO 9001 & ISO 14001 Certified

# Tape & Reel Packaging TR-F1

## DEVICE ORIENTATION IN T&R



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>inches | Devices per Reel |
|-------------------|----------------------------|----------------------|------------------|
| 24                | 12                         | 13                   | 900              |

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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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          | -20° to 85°C<br>Ambient Environment   | Individual Model Data Sheet                           |
| Storage Temperature            | -55° to 100° C<br>Ambient Environment   | Individual Model Data Sheet                           |
| Thermal Shock                  | -55° to 100°C, 100 cycles   | MIL-STD-202, Method 107, Condition A-3, except +100°C |
| Solder Reflow Heat             | Sn-Pb Eutetic Process: 225°C peak<br>Pb-Free Process 245° - 250°C peak  | J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1         |
| Solderability                  | 10X Magnification   | J-STD-002, Para 4.2.5, Test S, 95% Coverage           |
| Vibration (High Frequency)     | 20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)   | MIL-STD-202, Method 204, Condition D                  |
| Mechanical Shock               | 50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes   | MIL-STD-202, Method 213, Condition A                  |
| Lead Integrity                 | 2 Pound Pull, perpendicular to edge of unit   | MIL-STD-202, Method 211, Condition A                  |
| 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                               |