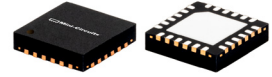


50Ω 21 dB 4 to 20 GHz

The Big Deal

- Wideband, 4-20 GHz
- Excellent coupling flatness 21±2 dB typ.
- Highly repeatable performance (GaAs based design)
- Small Size, 4 x 4 mm
- No external termination required



CASE STYLE: DG1847

Product Overview

Mini-Circuits' EDC21-24+ is a 21 dB directional coupler that operates from 4 to 20 GHz packaged in MCLP 4 x 4mm, 24-lead package. It provides excellent coupling flatness over a broad bandwidth and good return loss. This coupler also provides a quadrature phase shift between the signal at the through port and coupler port. Manufacturing using GaAs Technology, this model results in relatively high repeatability in performance.

Key Features

| Feature | Advantages |
|-------------------------------|--|
| Wideband, 4-20 GHz | EDC21-24+ can be used in many applications, saving component count. Also ideal for wideband applications such as military and instrumentation. |
| Excellent coupling flatness | Excellent coupling flatness yields higher accuracy. |
| Small size, 4x4 MCLP package. | Tiny footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB. |

MMIC Surface Mount Directional Coupler

EDC21-24+

50Ω 21 dB 4 to 20 GHz



Generic photo used for illustration purposes only

CASE STYLE: DG1847

+RoHS Compliant

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

Features

- low mainline loss, 0.7 dB typ.
- excellent coupling flatness, ±2dB
- small size, 4x4 mm
- highly repeatable performance (GaAs based design)
- no external termination required.

Applications

- satellite communications
- wireless infrastructure
- test and measurements

Electrical Specifications at 25°C

| Parameter | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|----------------------------|-----------------|------|------|-------|------|
| Frequency Range | | 4000 | | 20000 | MHz |
| Mainline Loss ¹ | 4000 - 8000 | — | 0.4 | 1.0 | dB |
| | 8000 - 10000 | — | 0.7 | 1.4 | |
| | 10000 - 15000 | — | 0.8 | 1.5 | |
| | 15000 - 20000 | — | 0.9 | 2.0 | |
| Nominal Coupling | 4000 - 8000 | 18.7 | 22 | 25.8 | dB |
| | 8000 - 10000 | 17.8 | 21 | 24.6 | |
| | 10000 - 15000 | 18.0 | 21 | 24.8 | |
| | 15000 - 20000 | 17.5 | 21 | 24.2 | |
| Coupling Flatness(±) | 4000 - 20000 | — | 2.0 | — | dB |
| Directivity | 4000 - 8000 | 17.2 | 21 | — | dB |
| | 8000 - 10000 | 12.5 | 19 | — | |
| | 10000 - 15000 | 11 | 16 | — | |
| | 15000 - 20000 | 9.1 | 14 | — | |
| Return Loss (Input) | 4000 - 8000 | | 26 | | dB |
| | 8000 - 10000 | | 16 | | |
| | 10000 - 15000 | | 17 | | |
| | 15000 - 20000 | | 21 | | |
| Return Loss (Output) | 4000 - 8000 | | 26 | | dB |
| | 8000 - 10000 | | 16 | | |
| | 10000 - 15000 | | 17 | | |
| | 15000 - 20000 | | 21 | | |
| Return Loss (Coupled) | 4000 - 8000 | | 19 | | dB |
| | 8000 - 10000 | | 16 | | |
| | 10000 - 15000 | | 15 | | |
| | 15000 - 20000 | | 21 | | |

Maximum Ratings

| Parameter | Ratings |
|-------------------------------|---|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -65°C to 150°C |
| Input Power | 32.5 dBm (5 minute max.) 29.5 dBm (continuous) |
| Power at internal termination | 15 dBm (5 minute max.) 12 dBm (continuous) |

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

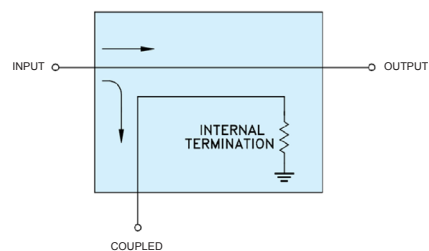
* ESD rating

Human body model (HBM): Class 1B(500V) in accordance with ANSI/ESD 5.1-2007

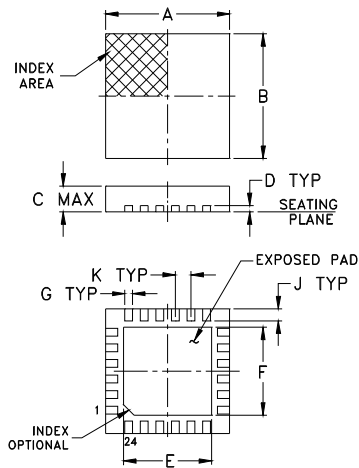
Pad Connections

| Function | Pad Number |
|----------|------------------------------|
| INPUT | 3 |
| COUPLED | 7 |
| OUTPUT | 16 |
| GROUND | 1,2,4-6,8-15, 17-24 & paddle |

Electrical Schematic

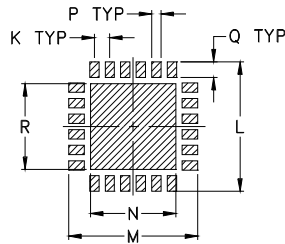


Outline Drawing



Lead Finish: Matte-Tin

PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

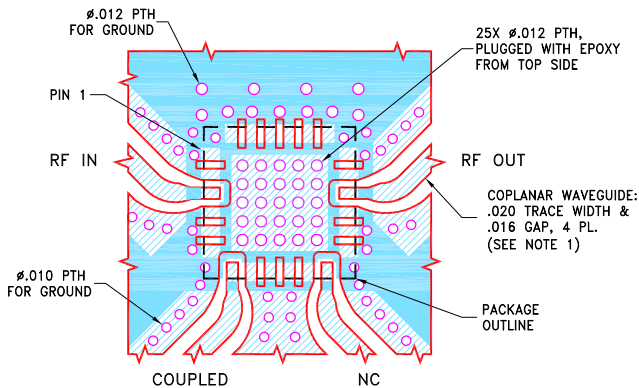
Product Marking



Outline Dimensions (inch/mm)

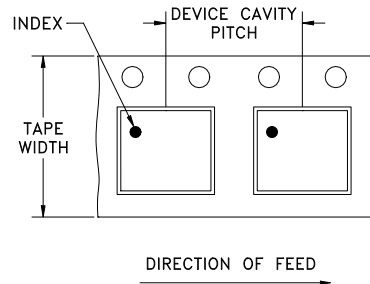
| | | | | | | | | |
|------|------|------|------|------|------|------|----|-------|
| A | B | C | D | E | F | G | H | J |
| .157 | .157 | .039 | .008 | .104 | .104 | .009 | -- | .016 |
| 4.0 | 4.0 | 1.0 | 0.20 | 2.64 | 2.64 | 0.23 | -- | 0.41 |
| K | L | M | N | P | Q | R | | wt |
| .020 | .166 | .166 | .102 | .012 | .020 | .102 | | grams |
| 0.50 | 4.22 | 4.22 | 2.59 | 0.30 | 0.51 | 2.59 | | 0.04 |

Demo Board MCL P/N: TB-978+
Suggested PCB Layout (PL-532)



Tape and Reel (F68)

DEVICE ORIENTATION IN T&R



| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel see note | |
|----------------|-------------------------|-------------------|---------------------------|------|
| 12 | 8 | 7 | Small quantity standard | 20 |
| | | | | 50 |
| | | | | 100 |
| | | 7 | Standard | 1000 |
| | | | | 2000 |
| | | | | 3000 |
| 13 | Standard | 2000 | | |
| | | 4000 | | |

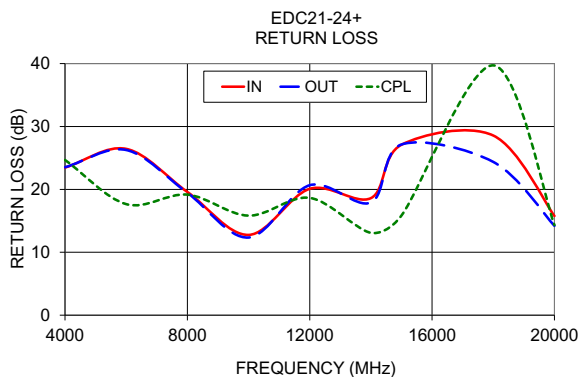
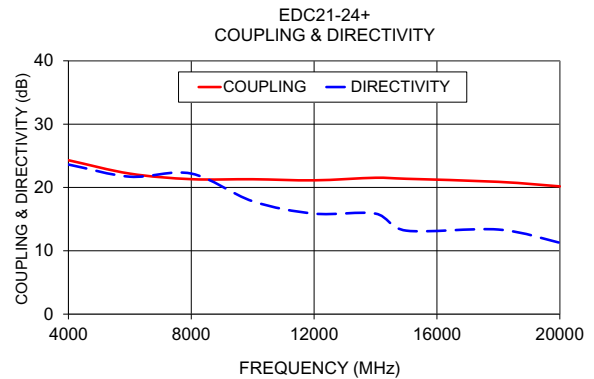
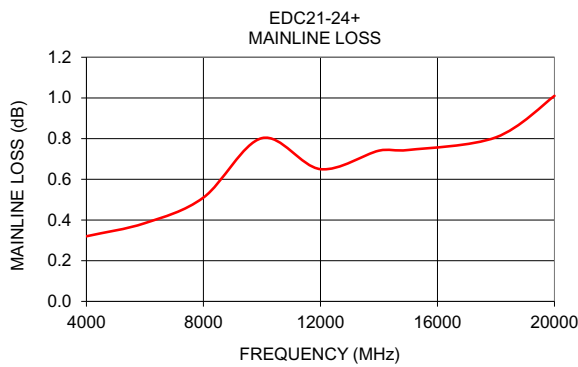
NOTES:

- TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .010"±.001". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
- 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.

Typical Performance Data

| Frequency (MHz) | Mainline Loss (dB) | | Coupling (dB) In-Cpl | Directivity (dB) | Return Loss (dB) | | |
|-----------------|--------------------|--|----------------------|------------------|------------------|-------|-------|
| | In-Out | | | | In | Out | Cpl |
| 4000 | 0.32 | | 24.30 | 23.62 | 23.47 | 23.52 | 24.68 |
| 6000 | 0.38 | | 22.19 | 21.70 | 26.44 | 26.26 | 17.66 |
| 8000 | 0.51 | | 21.31 | 22.20 | 19.59 | 19.45 | 19.17 |
| 10000 | 0.80 | | 21.30 | 17.82 | 12.76 | 12.34 | 15.83 |
| 12000 | 0.65 | | 21.13 | 15.88 | 20.09 | 20.67 | 18.65 |
| 14000 | 0.74 | | 21.54 | 15.87 | 18.61 | 17.91 | 13.09 |
| 15000 | 0.74 | | 21.37 | 13.19 | 27.10 | 27.14 | 15.85 |
| 18000 | 0.81 | | 20.89 | 13.36 | 28.56 | 24.37 | 39.71 |
| 20000 | 1.01 | | 20.17 | 11.27 | 15.77 | 14.20 | 14.33 |



Additional 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-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

