



Mini-Circuits

LTCC SURFACE MOUNT

Directional Coupler

HPCJ-20-43+

50Ω 3300 to 4000 MHz 20 dB

THE BIG DEAL

- High Input Power Handling, Max, 50 W
- Mainline Loss, Typ. 0.09 dB
- Coupling, Typ. 20 dB
- Directivity, Typ. 30 dB
- Small size: 0.125" x 0.2" x 0.047"

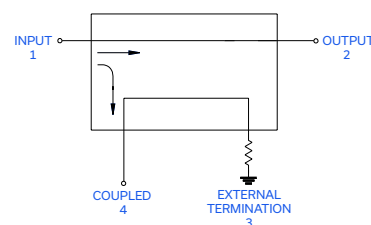


Generic photo used for illustration purposes only

APPLICATIONS

- 5G Sub6, MIMO, n78 Wireless Infrastructure Systems
- Microwave Backhaul Radio Systems
- Radar Systems
- Satellite Communications

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

Mini-Circuits' HPCJ-20-43+ is an LTCC directional coupler from 3300 to 4000 MHz, supporting a variety of applications. This model provides 0.09 dB typical mainline loss, 20 dB coupling, and 30 dB directivity. It handles up to 50 W RF input power and provides a wide operating temperature range from -55 to +125°C. Housed in a small 0.125" x 0.2" x 0.047" form factor, the coupler is ideal for dense PCB layouts and with minimal performance variation due to parasitics.

KEY FEATURES

Features	Advantages
High Power Handling, 50 W Maximum	Capable of operating up to 50 W maximum, the construction of HPCJ-20-43+ makes this directional coupler a robust, rugged product that can be used effectively in either the transmit or receive paths.
Low Mainline Loss, 0.09 dB	Capable of being used to sample the power amplifier output with minimal loss.
High Directivity, 30 dB	High directivity minimizes coupling of reverse power and enables accurate sampling of thru-signal.
High operating temperature range, -55 to +125°C	Operation up to +125°C allows the coupler to be used near power amplifiers with minimal change in performance.

REV. OR
ECO-027040
HPCJ-20-43+
MCL NY
250922





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ELECTRICAL SPECIFICATIONS^{1,2} AT +25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Frequency Range		3300		4000	MHz
Mainline Loss ³	3300 - 4000		0.09	0.15	dB
Coupling	3300 - 4000	18.5	20	21.5	dB
Directivity	3300 - 3800	20	30		dB
	3800 - 4000	18	26		
Return Loss (Input, Output, Coupled)	3300 - 4000	18	24		dB

1. Tested on Evaluation Board TB-HPCJ-20-43C+. De-embedded to the device reference plane using TRL.

2. Symmetrical, all ports are interchangeable. See Pad Configuration Table and S-Parameters for actual performance.

3. Mainline Loss includes coupling loss.

ABSOLUTE MAXIMUM RATINGS⁴

Parameter	Ratings
Operating Temperature	-55 °C to +125 °C
Storage Temperature	-55 °C to +125 °C
Input Power ⁵	50 W at +25 °C

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

5. At +25°C derate linearly to 17 W at +125 °C.



LTCC SURFACE MOUNT

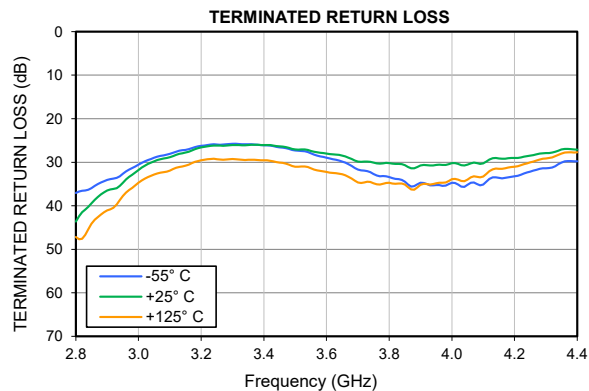
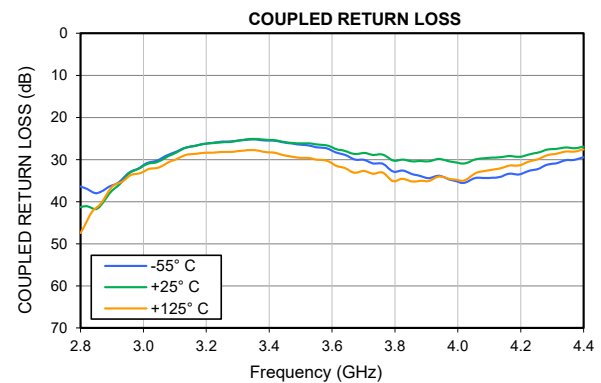
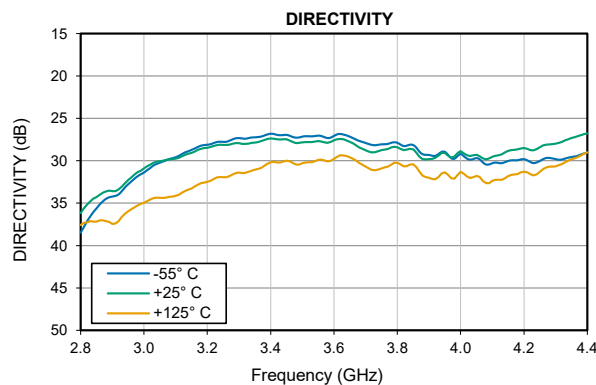
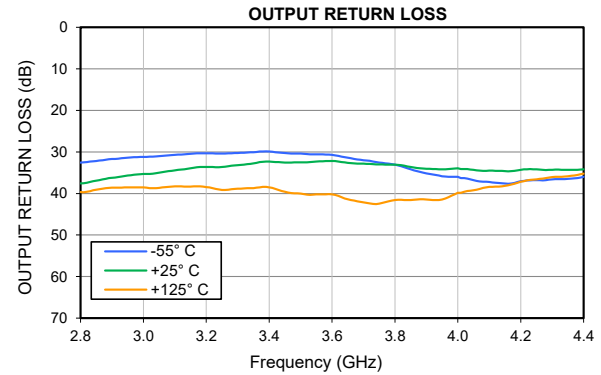
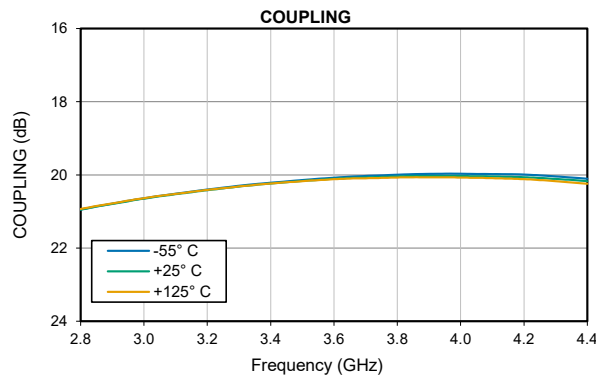
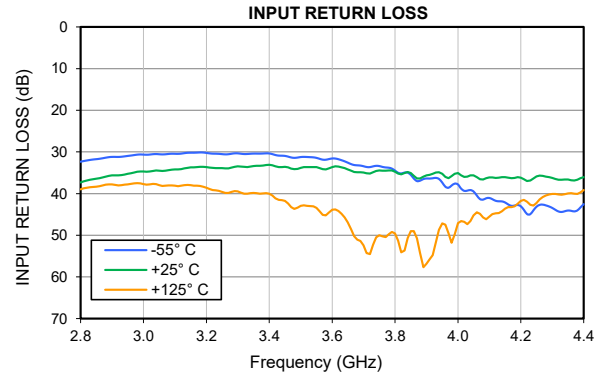
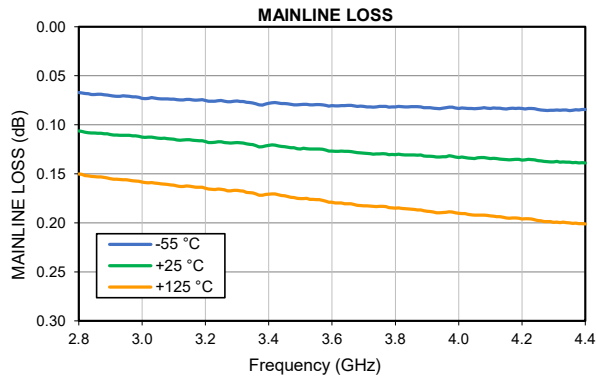
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TYPICAL PERFORMANCE GRAPHS



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FUNCTIONAL DIAGRAM

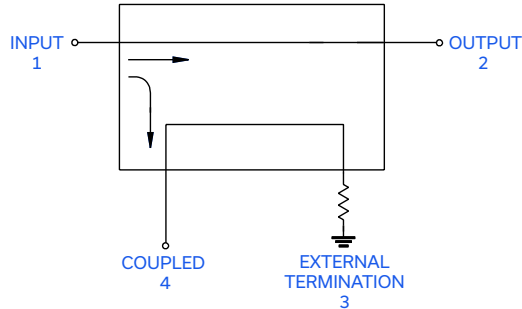
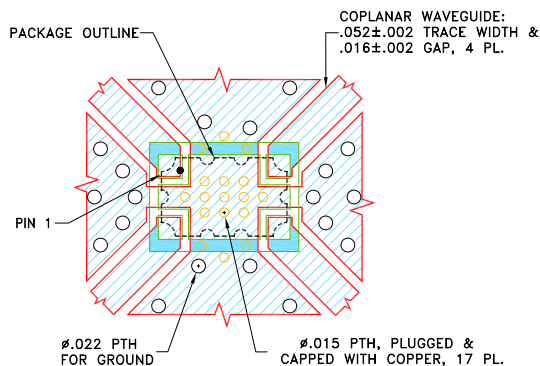


Figure 1. HPCJ-20-43+ Functional Diagram

PAD DESCRIPTION/CONFIGURATION

Function	Pad Number	Description
Input	1	Connects to RF Input Port
Output	2	Connects to RF Output Port
Termination	3	Connects to External Termination
Coupled	4	Connects to Coupled Port

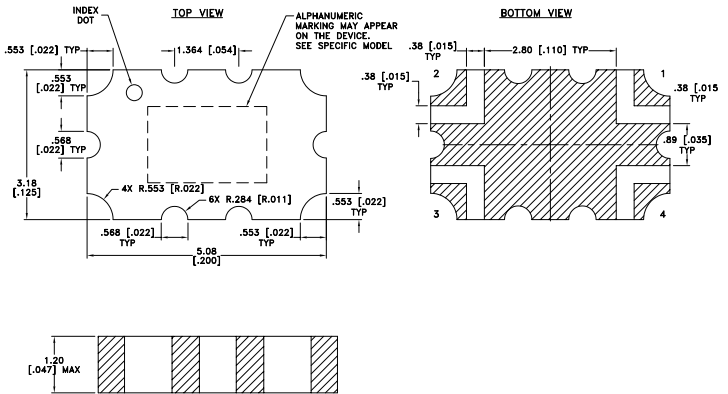
SUGGESTED PCB LAYOUT (PL-834)



- NOTES:**
- TRACE WIDTH & GAP ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS: .030±.002; COPPER: 1/2 OZ. ON EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).
 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

Figure 2. Suggested PCB Layout PL-834

CASE STYLE DRAWING



DENOTES METALLIZATION

Weight: 0.049 grams

Dimensions are in mm [inches]. Tolerances: 2 PL± 0.25; 3 PL± 0.127 mm

PRODUCT MARKING*: Z3

*Marking may contain other features or characters for internal lot control.



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ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASHBOARD.

[CLICK HERE](#)

Performance Data & Graphs	Data Graphs S-Parameter (SXP Files) Data Set (.zip file) De-embedded to device pads
Case Style	AAE3610-1 Lead Finish: Tin over Nickel Plating
RoHS Status	Compliant
Tape and Reel	F110
Suggested Layout for PCB Design	PL-834
Evaluation Board	TB-HPCJ-20-43C+ Gerber File
Environmental Rating	ENV06T10

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-Circuits' 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/terms/viewterm.html

