



Mini-Circuits

SURFACE MOUNT

Bi-Directional Coupler

SYDC-20-13HP+

50Ω 20 dB Coupling 40 to 1000 MHz 10 Watt

FEATURES

- Wideband frequency, 40 to 1000 MHz
- Low mainline loss, 0.4 dB typ.
- High power handling, 10 Watt

APPLICATIONS

- VHF/UHF reverse / transmitters
- Cellular



CASE STYLE: AH202-1

Generic photo used for illustration purposes only

+RoHS CompliantThe +Suffix identifies RoHS Compliance.
See our website for methodologies and qualificationsELECTRICAL SPECIFICATIONS AT 25°C¹

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		40		1000	MHz
Mainline Loss ²	40 - 1000	—	0.4	1.1	dB
Nominal Coupling	40 - 1000	—	20±1.0	—	dB
Coupling Flatness (±)	40 - 1000	—	0.9	—	dB
Directivity	40 - 1000	14	28	—	dB
Return Loss (Input)	40 - 1000	—	13	—	dB
Input Power ³	40 - 1000	—	—	10	W

1. Tested on Evaluation Board TB-SYDC20-13HP+

2. Mainline loss includes theoretical power loss at coupled port.

3. The user must provide adequate means of heat removal to limit the temperature of ground connections 2,3,6,7 to 85°C, in order to ensure proper performance.

At 25°C ambient temperature this requires thermal resistance of the user's PC board heat sink to be 27°C/W or less when the unit is driven at maximum specified RF input power, 10W.

At higher ambient temperature, with the same heat sink. Input power in watts must not exceed 10W x (85°C - Tambient) ÷ 60°C.

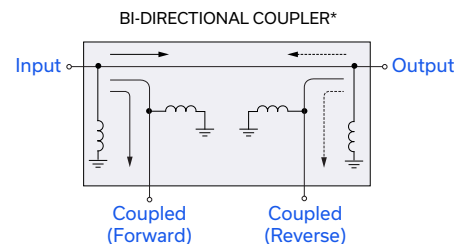
MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-40°C to 85°C Case*
Storage Temperature	-55°C to 100°C

* Case temperature is defined as temperature on ground leads.

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

ELECTRICAL SCHEMATIC



*Electrical schematic is for Bi-Directional coupler with internal transformer(s) that routes DC from all ports to ground

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ECO-015468
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SYDC-20-13HP+
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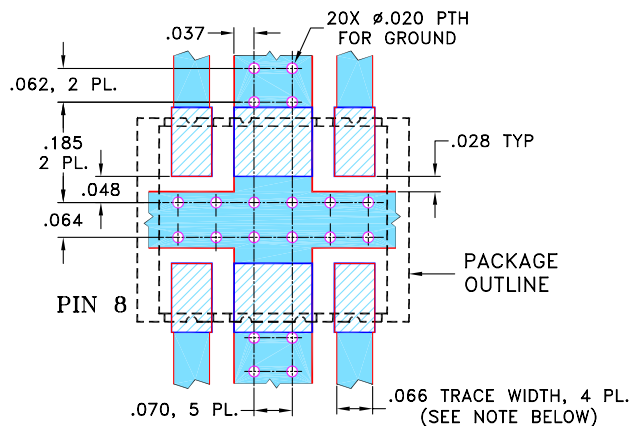
PAD CONNECTIONS

INPUT	8
OUTPUT	1
COUPLED (FORWARD)	5
COUPLED (REVERSE)	4
GROUND	2, 3, 6, 7

***PRODUCT MARKING:** SYBDC-20-13HP

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

SUGGESTED PCB LAYOUT (PL-246)

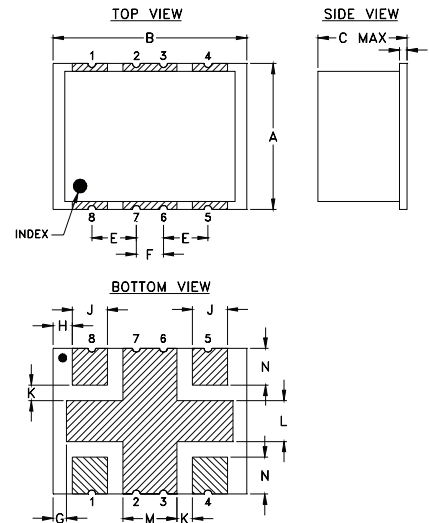


NOTES:

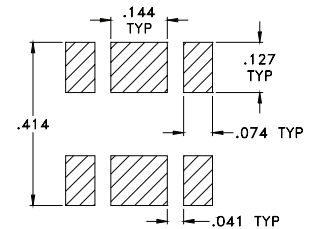
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" $\pm$.002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

-  DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
-  DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

OUTLINE DRAWING



PCB Land Pattern



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

OUTLINE DIMENSIONS (Inches)

A	B	C	D	E	F	G
.38	.50	.25	.020	.115	.070	.035
9.65	12.70	6.35	0.51	2.92	1.78	0.89
H	J	K	L	M	N	wt
.050	.090	.040	.105	.140	.095	grams
1.27	2.29	1.02	2.67	3.56	2.41	0.80

TAPE & REEL INFORMATION: F61





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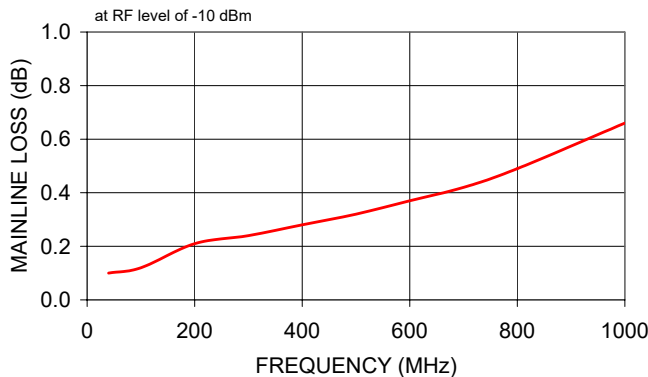
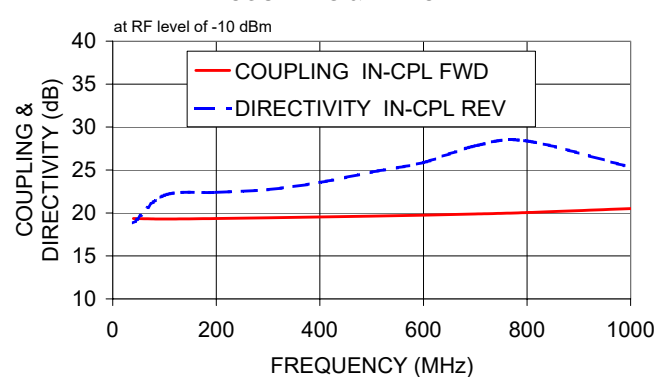
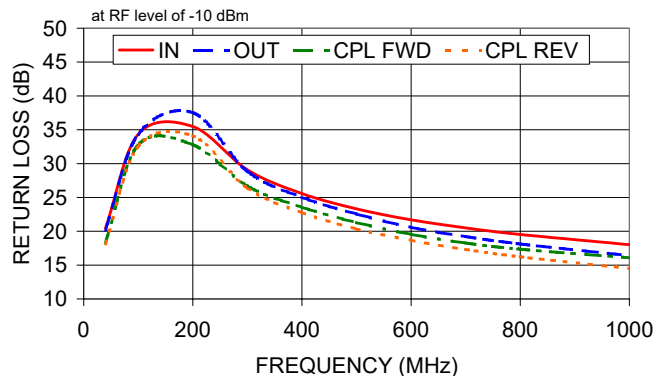
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TYPICAL PERFORMANCE DATA

Frequency (MHz)	Mainline Loss (dB)		Coupling (dB)		Directivity (dB)		Return Loss (dB)			
	In-Out	Fwd - Rev	In-Cpl Fwd	Out-Cpl Rev	Out-Cpl Fwd	In-Cpl Rev	In	Out	Cpl Fwd	Cpl Rev
40.00	0.10	0.15	19.36	19.51	18.84	19.01	20.45	20.20	18.37	18.14
50.00	0.09	0.12	19.37	19.45	20.01	20.60	22.82	22.53	20.74	20.48
60.00	0.08	0.11	19.37	19.41	20.99	21.87	25.11	24.66	23.00	22.61
70.00	0.08	0.11	19.36	19.38	21.70	22.90	27.45	26.77	25.34	24.75
80.00	0.09	0.11	19.33	19.35	22.06	23.85	29.93	29.09	27.87	27.10
90.00	0.10	0.12	19.31	19.34	22.15	24.62	32.34	31.55	30.43	29.70
100.00	0.12	0.14	19.30	19.34	22.07	25.29	34.36	34.34	32.77	32.57
200.00	0.21	0.25	19.35	19.50	22.40	28.64	35.48	37.54	32.79	34.08
300.00	0.24	0.29	19.44	19.64	22.72	30.84	29.08	28.84	26.69	26.39
400.00	0.28	0.33	19.54	19.79	23.56	33.82	25.58	25.01	23.56	22.77
500.00	0.32	0.37	19.64	19.95	24.76	37.70	23.31	22.56	21.29	20.34
600.00	0.37	0.43	19.75	20.12	25.88	38.46	21.69	20.56	19.54	18.67
700.00	0.42	0.50	19.88	20.29	27.81	33.39	20.49	19.21	18.26	17.32
800.00	0.49	0.59	20.05	20.48	28.38	28.31	19.53	18.13	17.35	16.22
900.00	0.57	0.69	20.25	20.66	27.74	24.41	18.71	17.29	16.59	15.27
1000.00	0.66	0.80	20.51	20.83	25.33	20.87	18.01	16.40	16.08	14.50

Total Loss= Mainline Loss + Theoretical Loss 1.10 dB.

SYDC-20-13HP+
MAINLINE LOSSSYDC-20-13HP+
COUPLING & DIRECTIVITYSYDC-20-13HP+
RETURN LOSS

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.
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