SURFACE MOUNT

Directional Coupler SYDC-20-61VHP+

50Ω 20 dB Coupling 1.5 to 60 MHz 40 Watt

THE BIG DEAL

- Very High Input Power, 40W
- Very low insertion loss, 0.1 dB
- Very Flat Coupling, 0.1 dB
- Very High Directivity, 30 dB



Generic photo used for illustration purposes only

CASE STYLE: AH1503

+RoHS Compliant
The +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

APPLICATIONS

- Military mobile

PRODUCT OVERVIEW

SYDC-20-61VHP+ is a high power, low cost surface mount directional coupler, operating over 1.5-60 MHz, using an open case construction to lower size, measuring 0.63" x 0.43" x 0.36" (16 mm x 11 mm x 9 mm). Ground plane at the bottom of the unit serves as an excellent heat sink to minimize temperature rise.

KEY FEATURES

Feature	Advantages
Very High Input Power: 40 Watt	Designed for monitoring of output power of transmitters with minimal power loss.
Very Low Loss: 0.1 dB typ.	Low loss minimizes the loss of transmit power and temperature rise of surrounding components, thus preserving performance and improving reliability.
Very Flat coupling: ± 0.1 dB	Flat Coupling over the entire frequency range eliminating need for compensation circuits.
High Directivity: 22-40 dB typ.	Minimizes the undesired power entering the coupled port due to imperfect load impedance.
Excellent Return loss: 20-40 dB typ.	Excellent Return loss of SYDC minimizes interaction effects with adjacent circuits and resulting gain ripple.

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ELECTRICAL SPECIFICATIONS AT 25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Unit
Frequency Range	—	1.5	—	60	MHz
Mainline Loss (above theoretical 0.04 dB)	1.5	—	0.1	0.1	dB
	30	—	0.1	0.2	
	60	—	0.1	0.2	
Coupling	1.5-60	—	21.0	—	dB
	1.5	—	20.9	21.4	
	30	—	21.0	21.5	
	60	—	21.0	21.6	
Coupling Flatness(±)	1.5-30	—	0.1	0.3	dB
	30-60	—	0.1	0.3	
Directivity	1.5	13	42.5	—	dB
	30	11	30.5	—	
	60	10	22.7	—	
Return Loss (Input)	1.5	14	42	—	dB
	30	18	41	—	
	60	16	37	—	
Return Loss (Output)	1.5	14	43	—	dB
	30	18	39	—	
	60	16	33	—	
Return Loss (Coupling)	1.5	15	41	—	dB
	30	17	26	—	
	60	14	20	—	
Input Power[1]		—	—	40	W

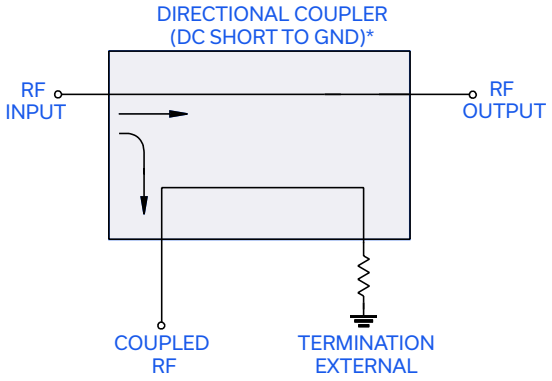
1. The user must provide adequate means of heat removal to limit the temperature of ground connections 2,3,6,7 to 85°C, in order to ensure proper performance. At 25°C ambient temperature this requires thermal resistance of the user's PC board heat sink to be 40°C/W or less when the unit is driven at maximum specified RF input power, 40W. At higher ambient temperature, with the same heat sink, input power in watts must not exceed 40W x (85°C-Tambient) ÷ 60°C.ture of ground connection under the PCB to 65°C, in order to ensure the proper performance. At 25°C ambient temperature this requires thermal resistance of PCB heatsink 3.5°C/W.

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 Directional coupler with internal transformer(s) and external termination

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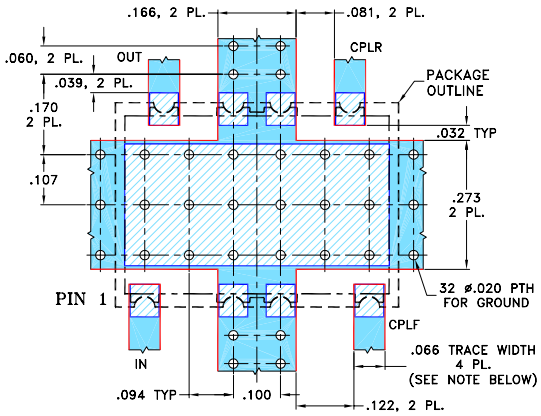
PAD CONNECTIONS

INPUT	1
OUTPUT	8
COUPLED	4
50Ω TERM EXTERNAL**	5
GROUND	2, 3, 6, 7

** External termination must be able to handle 250mW min.

PRODUCT MARKING: N/A

SUGGESTED PCB LAYOUT (PL-330)

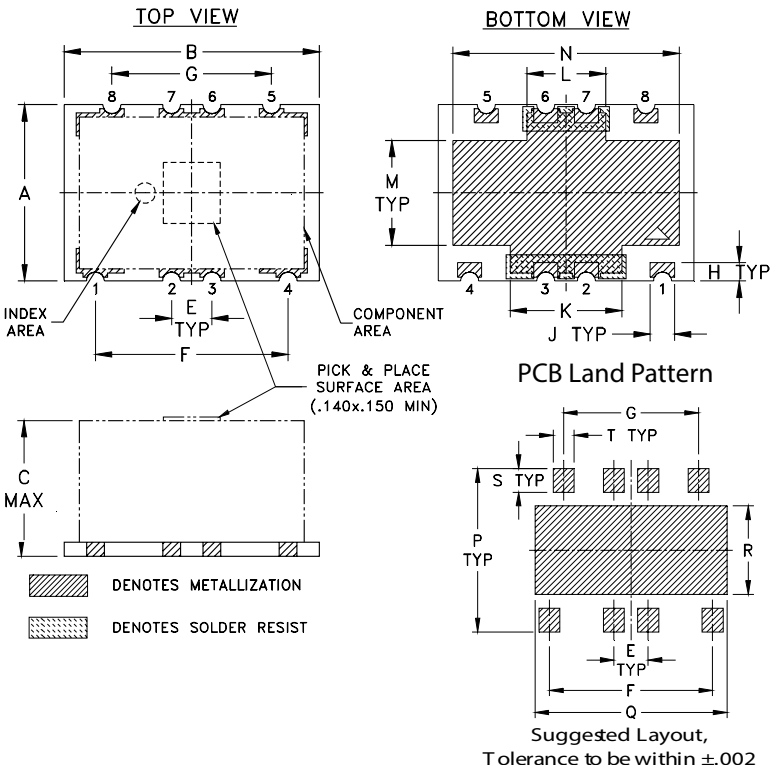


NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

OUTLINE DRAWING



Suggested Layout, Tolerance to be within ±.002

OUTLINE DIMENSIONS (Inches / mm)

A	B	C	E	F	G	H	J	K
.433	.630	.355	.100	.476	.394	.045	.060	.276
11.00	16.00	9.02	2.54	12.09	10.01	1.14	1.52	7.01

L	M	N	P	Q	R	S	T	wt
.194	.257	.560	.475	.561	.258	.069	.061	grams
4.93	6.53	14.22	12.07	14.25	6.55	1.75	1.55	2.50

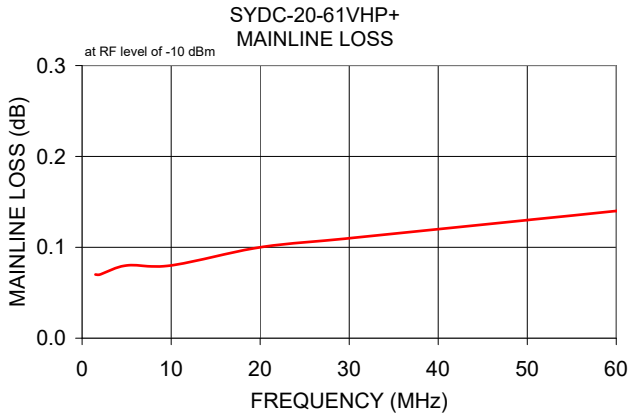
SURFACE MOUNT

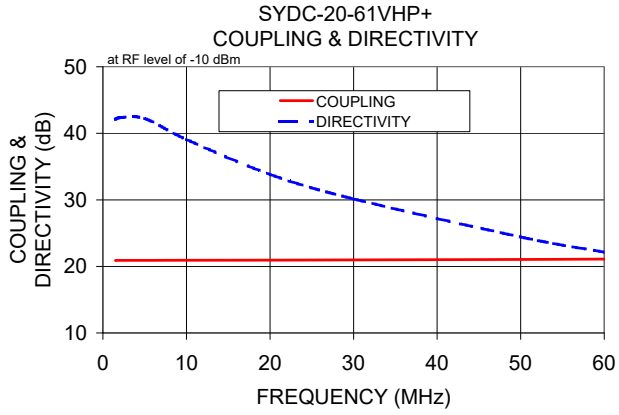
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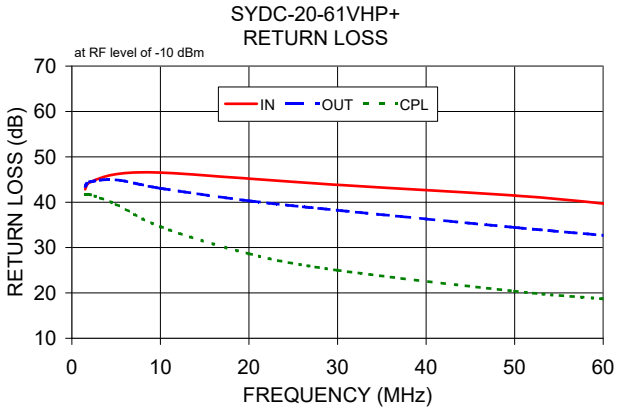
50Ω 20 dB Coupling 1.5 to 60 MHz 40 Watt

TYPICAL PERFORMANCE DATA

Frequency (MHz)	Mainline Loss (dB) In-Out	Coupling (dB) In-Cpl	Directivity (dB)	Return Loss (dB) In	Out	Cpl
1.50	0.07	20.89	42.10	42.83	43.50	41.69
2.00	0.07	20.90	42.35	44.35	44.45	41.71
4.00	0.08	20.91	42.43	45.76	44.90	40.48
5.00	0.08	20.91	42.22	46.17	44.92	39.52
10.00	0.08	20.92	39.08	46.52	43.05	34.60
20.00	0.10	20.94	33.83	45.20	40.30	28.62
30.00	0.11	20.97	30.15	43.81	38.21	25.00
40.00	0.12	21.00	27.09	42.58	36.30	22.41
50.00	0.13	21.04	24.42	41.47	34.44	20.38
60.00	0.14	21.09	22.14	39.72	32.72	18.69







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/terms/viewterm.html

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