Surface Mount, High Power

Bi-Directional Coupler SYDC-10-52VHP+

50Ω 10 dB Coupling 30 to 512 MHz 35 Watt

The Big Deal

- High power handling, 35W
- Very low mainline loss, 0.5 dB
- Excellent VSWR, 1.18

CASE STYLE: PD1647-1

Product Overview

Mini-Circuits' SYDC-10-52VHP+ surface mount bi-directional coupler provides high power handling up to 35W and low mainline loss of 0.5 dB for applications from 30 to 512 MHz. This model features a unique heat sinking design that enables reliable operation at high power without overheating, making it an ideal choice for systems where high power capability and small size are desired. The coupler features core and wire construction mounted on an 8 -lead printed laminate base with wraparound terminations for excellent solderability. The unit measures 0.75 x 0.52 x 0.43", accommodating dense circuit board layouts.

Key Features

Feature	Advantages
High power handling • 35W, 2.0 VSWR max. • 10W, output open or short	Usable in many systems with high-power requirements
Low mainline loss, 0.5 dB	Provides excellent through-path signal power transmission.
Good directivity, up to 22 dB	High directivity allows accurate signal sampling through the coupled port with minimal measurement error.
Excellent return loss, up to 25 dB (input/output/coupling)	Provides excellent matching in 50Ω systems with minimal signal reflection.
Small size, 0.75 x 0.52 x 0.43"	Provides high power capability while saving space in systems with tight layouts.

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Generic photo used for illustration purposes only

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***This model is not intended for pick & place use. Please contact Applications Dept . for assistance*

+RoHS Compliant

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

Maximum Ratings

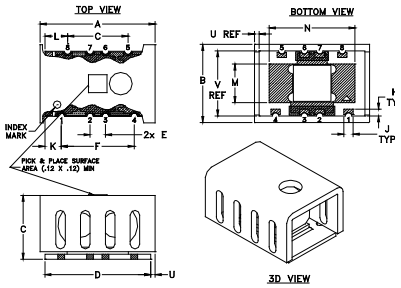
Operating Temperature	-40°C to 65°C Case*
Storage Temperature	-55°C to 100°C

*Case temperature is defined as temperature on ground leads. Permanent damage may occur if any of these limits are exceeded.

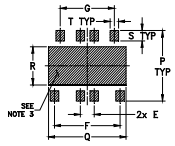
Pad Connections

Input	1
Output	8
Coupled (Forward)	4
Coupled (Reverse)	5
Ground	2,3,6,7

Outline Drawing



PCB Land Pattern



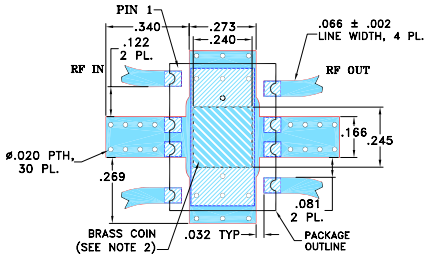
Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	L
.750	.520	.43	.690	.100	.476	.394	.045	.060	.107	.148
19.05	13.21	10.92	17.53	2.54	12.09	10.01	1.14	1.52	2.72	3.76

M	N	P	Q	R	S	T	U	V	wt
.257	.560	.475	.561	.258	.069	.061	.03	.433	grams
6.53	14.22	12.07	14.25	6.55	1.75	1.55	0.76	11.00	3.00

Demo Board MCL P/N: TB-630+
Suggested PCB Layout (PL-351)
Refer to Application Note: AN-00-017



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. SUGGEST TO PROVIDE BRASS COIN FOR BETTER HEAT TRANSFER FROM THE UNIT. OTHERWISE PROVIDE ARRAY OF THERMAL VIAS ADEQUATE TO LIMIT TEMPERATURE OF GROUND CONNECTIONS UNDER THE UNIT TO 65°C.
3. 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
DENOTES BRASS COIN.

Features

- high power, 35 W max. with output load VSWR 2.0 max
- high power, 10 W max. with output open or short
- low mainline loss, 0.5 dB typ.
- good VSWR, 1.18 typ.

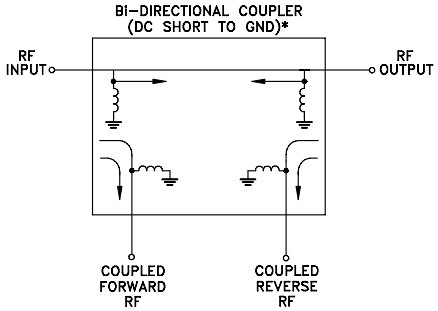
Applications

- military mobile

Parameter	Condition (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		30	—	512	MHz
Mainline Loss[1] (above theoretical 0.5 dB)	30	—	0.3	0.5	dB
	450	—	0.45	0.8	
	512	—	0.65	0.9	
Coupling	30-512	—	10±0.8		
Coupling Flatness(±)	30-512	—	0.4	0.6	
Directivity	30-250	18	22	—	dB
	250-450	16	20	—	
	450-512	14	18	—	
Return Loss (Input)	30-250	18	20	—	dB
	250-450	20	25	—	
	450-512	17	23	—	
Return Loss (Output)	30-250	18	20	—	dB
	250-450	20	26	—	
	450-512	18	25	—	
Return Loss (Coupling)	30-250	18	20	—	dB
	250-450	16	20	—	
	450-512	15	18	—	
Input Power[1]	30-512	—	—	35	W

1. The user must provide adequate means of heat removal to limit the temperature of ground connections under the PCB to 65°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 3.5°C/W.

Electrical Schematic



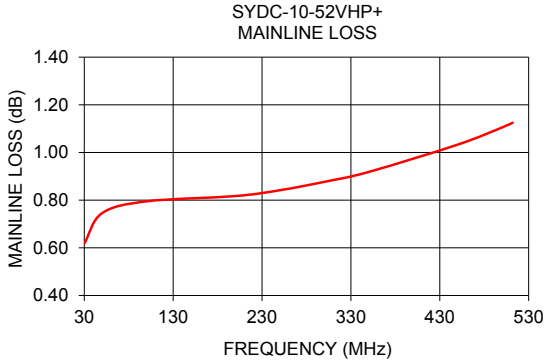
* ELECTRICAL SCHEMATIC IS FOR BI-DIRECTIONAL COUPLER WITH INTERNAL TRANSFORMER(S) THAT ROUTES DC FROM RF PORTS TO GROUND.

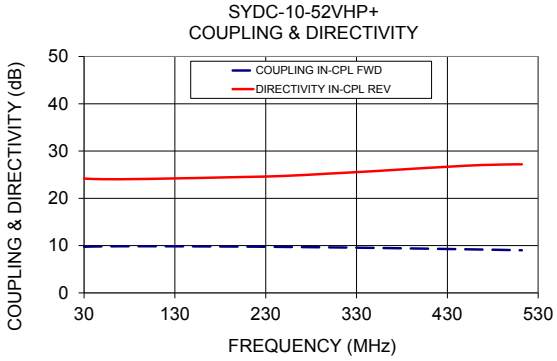
Notes

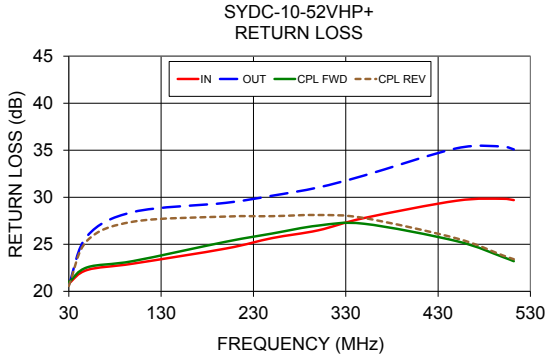
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

Typical Performance Data

Frequency (MHz)	Mainline Loss (dB)	Coupling (dB)		Directivity (dB)		Return Loss (dB)			
	In-Out	In-Cpl Fwd	Out-Cpl Rev	Out-Cpl Fwd	In-Cpl Rev	In	Out	Cpl Fwd	Cpl Rev
30.0	0.62	9.8	9.8	22.4	24.2	20.8	20.7	21.0	20.6
50.0	0.75	9.8	10.0	22.7	24.0	22.3	25.9	22.5	25.4
100.0	0.79	9.9	10.0	22.2	24.1	22.9	28.4	23.2	27.4
200.0	0.82	9.8	9.9	21.5	24.5	24.5	29.4	25.3	27.9
250.0	0.84	9.7	9.8	21.1	24.7	25.7	30.2	26.1	28.0
300.0	0.88	9.6	9.7	20.8	25.2	26.5	31.0	27.0	28.1
350.0	0.92	9.5	9.6	20.3	25.8	27.8	32.3	27.2	27.8
450.0	1.03	9.2	9.3	19.6	26.9	29.6	35.2	25.3	25.6
500.0	1.10	9.1	9.1	19.2	27.2	29.8	35.4	23.6	23.8
512.0	1.12	9.0	9.1	19.1	27.2	29.7	35.1	23.2	23.4







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