

Surface Mount

Phase Shifter

SCPHS-13.6+

50Ω 360° Voltage Variable 10 to 16 MHz

The Big Deal

- Low insertion loss, 2 dB typ.
- Wide phase shift, 360°
- Low frequency and small size



CASE STYLE: HU1371

Product Overview

Mini-Circuits' SCPHS-13.6+ is a voltage variable phase shifter providing 360° phase control from 10 to 16 MHz in a miniature surface mount package. This model has a control bandwidth of DC to 30 kHz and a control voltage range from 0 to +12V. Housed in a shielded, 14-lead package with wrap-around terminations, the unit measures only 0.87 x 0.80 x 0.25", offering a space efficient, low-cost alternative to larger, expensive connectorized phase shifters typical for low frequency operation.

Feature	Advantages
Low insertion loss, 2 dB typ.	Enables good transmission of signal power from input to output and minimizes effect on system noise figure.
Wide phase shift, 360°	In test environments, 360° phase control allows the user to experiment with various incident phases. This can be used to test residual phase noise of amplifiers and to determine the influence of phase between two mismatched components in a system.

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



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Generic photo used for illustration purposes only
CASE STYLE: HU1371

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

Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
13"	200

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Input Power	24 dBm max.
Control Voltage	20V

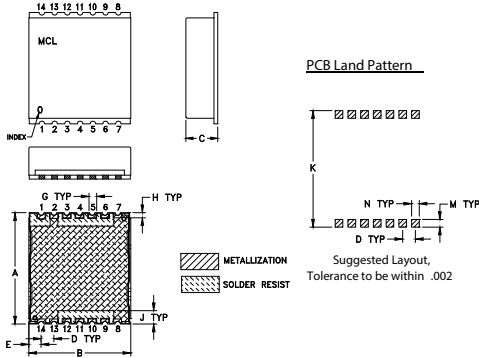
Permanent damage may occur if any of these limits are exceeded.

Pin Connections

IN	1
OUT	6
BIAS	10,11 [^]
GROUND	2,3,4,5,7,8,9,12,13,14

[^] proper operation is achieved with pins 10 or 11 or both connected to BIAS.

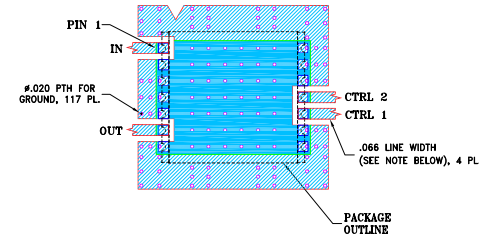
Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H
.870	.800	.250	.100	.097	-	.060	.040
22.10	20.32	6.35	2.54	2.46	-	1.52	1.02
J	K	L	M	N	P	wt	
.105	.910	-	.060	.060	-	grams	
2.67	23.11	-	1.52	1.52	-		2.85

Demo Board MCL P/N: TB-1141+ Suggested PCB Layout (PL-690)



- NOTES:**
- TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS ± 0.02 . COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH 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.

Features

- low insertion loss, 2 dB typ.
- wide phase shift, 360°
- aqueous washable

Applications

- cellular
- PCS
- DCS

Electrical Specifications at 25°C

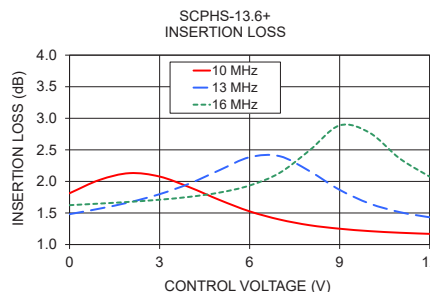
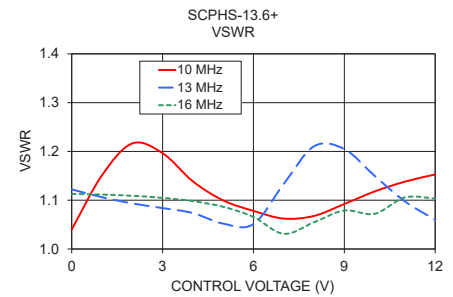
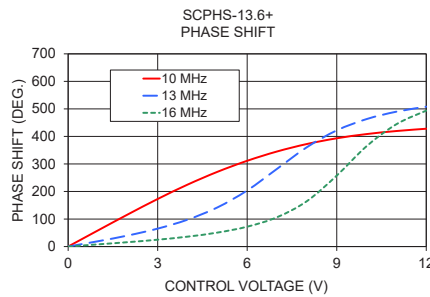
Parameter	Condition (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		10		16	MHz
Phase Range	10 - 16	360	—	—	Degrees
Insertion Loss	10 - 16	—	2	3.5	dB
Control Voltage	10 - 16	—	0-12	—	V
Control Bandwidth	10 - 16	—	DC-30	—	kHz
VSWR	10 - 16	—	1.2	1.6	:1

DC input resistance at Control port: 1750 ohms typ.

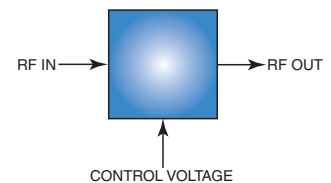
Typical Performance Data

Control Voltage (V)	Phase Shift* (Degrees)			VSWR (:1)			Insertion Loss (dB)		
	10 MHz	13 MHz	16 MHz	10 MHz	13 MHz	16 MHz	10 MHz	13 MHz	16 MHz
0.00	0.07	0.08	0.07	1.04	1.12	1.11	1.81	1.48	1.62
1.00	58.74	19.34	7.98	1.15	1.11	1.11	2.02	1.57	1.65
2.00	116.79	40.19	15.96	1.22	1.09	1.11	2.13	1.67	1.68
3.00	172.84	65.21	24.94	1.20	1.08	1.10	2.08	1.80	1.71
4.00	224.93	97.66	36.01	1.14	1.07	1.10	1.91	1.97	1.76
5.00	271.40	142.07	50.72	1.10	1.05	1.09	1.71	2.18	1.82
6.00	311.60	203.85	72.22	1.08	1.05	1.07	1.53	2.38	1.94
7.00	345.37	282.31	106.64	1.06	1.13	1.03	1.40	2.40	2.14
8.00	372.53	360.90	164.94	1.07	1.21	1.05	1.31	2.16	2.49
9.00	393.29	421.96	257.78	1.09	1.20	1.08	1.25	1.87	2.89
10.00	408.59	463.04	364.48	1.12	1.15	1.07	1.21	1.65	2.77
11.00	419.70	489.97	444.42	1.14	1.10	1.11	1.19	1.51	2.36
12.00	427.99	508.08	493.77	1.15	1.06	1.10	1.17	1.43	2.08

* Normalized at control voltage = 0V



Electrical Schematic



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