CERAMIC

Power Splitter/Combiner SCW-2-722+

2 Way-0° 50Ω 4800 to 7200 MHz

THE BIG DEAL

- Isolation resistor, external 100 ohms
- Small size, (1.6x0.8mm)
- ESD non-sensitive
- Temperature stable LTCC technology
- Wrap around terminations for excellent solderability
- Low cost

Generic photo used for illustration purposes only

CASE STYLE: JC0603C

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

APPLICATIONS

- WLAN
- 5G sub 6GHz

PRODUCT OVERVIEW

Mini-Circuits new LTCC 0° Power Splitter SCW-2-722+, offers industry leading combination of operating performance and size. The outstanding phase and amplitude unbalance make this component a versatile building block for use in a variety of systems and sub-system designs.

KEY FEATURES

Feature	Advantages
Small Size	Offered in the package size, SCW-2-722+ offers an industry leading combination of size, power handling, and frequency. The small footprint allows for reduced parasitics in systems with improved performance and simplified layout.
Wrap-Around Terminations	Provides excellent solderability and easy visual inspection.
LTCC Construction	Provides repeatable performance in the rugged, ceramic package well suited for tough environments such as high humidity and temperature extremes.

REV. OR
ECO-012339
SCW-2-722+
SL/CP/AM
220321

ELECTRICAL SPECIFICATIONS AT 25°C

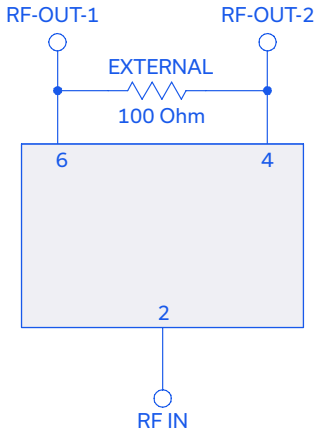
Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		4800		7200	MHz
Average Insertion Loss, above 3.0 dB	4800 - 7200	—	1.2	1.6	dB
Isolation	4800 - 7200	12	16	—	dB
Phase Unbalance	4800 - 7200	—	4	7	Degree
Amplitude Unbalance	4800 - 7200	—	0.1	0.5	dB
Return Loss (Input)	4800 - 7200	—	13	—	dB
Return Loss (Output)	4800 - 7200	—	13	—	dB

MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-55°C to 125°C
Storage Temperature	-55°C to 125°C
Power Input (as a splitter)	2W* max.

* Power input as combiner is limited by rating of external resistor 100Ω resistor.
Permanent damage may occur if any of these limits are exceeded.

ELECTRICAL SCHEMATIC

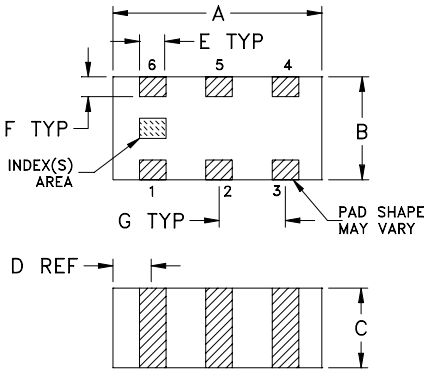


Power Splitter/Combiner SCW-2-722+

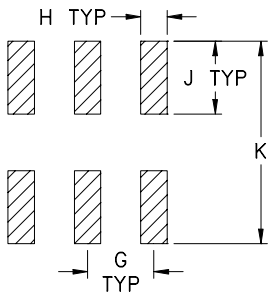
PAD CONNECTIONS

SUM PORT	2
PORT 1	6
PORT 2	4
GROUND	1,3,5
PORT 1-2	resistor external 100 ohms

OUTLINE DRAWING



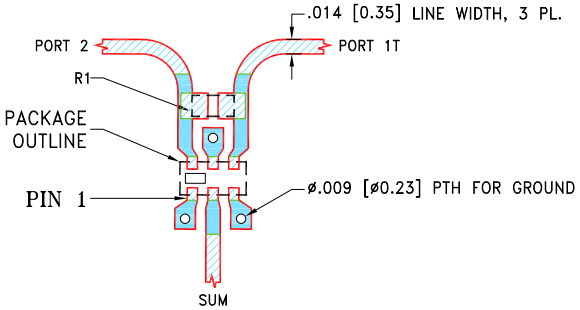
PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

PRODUCT MARKING: 2

DEMO BOARD MCL P/N: TB-SCW-2-722+
SUGGESTED PCB LAYOUT (PL-727)



COMPONENT	SIZE
R1	0402

NOTES:
1. LINE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .0066±.0007"; COPPER: 1/2 OZ. EACH SIDE.
   FOR OTHER MATERIALS LINE WIDTH MAY NEED TO BE MODIFIED.
2. CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-1224+.
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.

OUTLINE DIMENSIONS (Inches / mm)

A	B	C	D	E	F
.063	.031	.024	.012	.008	.006
1.60	0.79	0.61	0.30	0.20	0.15

G	H	J	K	wt
.020	.010	.022	.053	grams
0.51	0.25	0.56	1.35	0.005

TAPE & REEL INFORMATION: F114

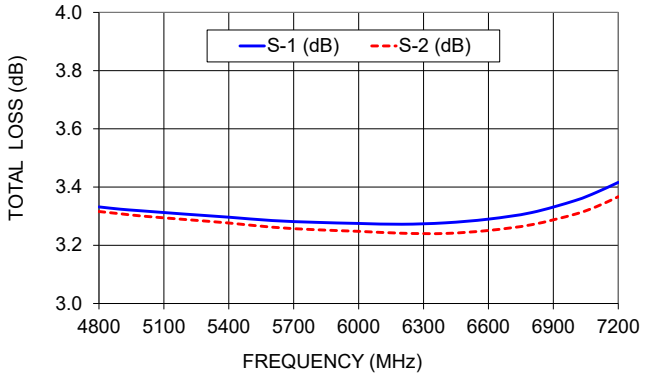
Power Splitter/Combiner SCW-2-722+

TYPICAL PERFORMANCE DATA

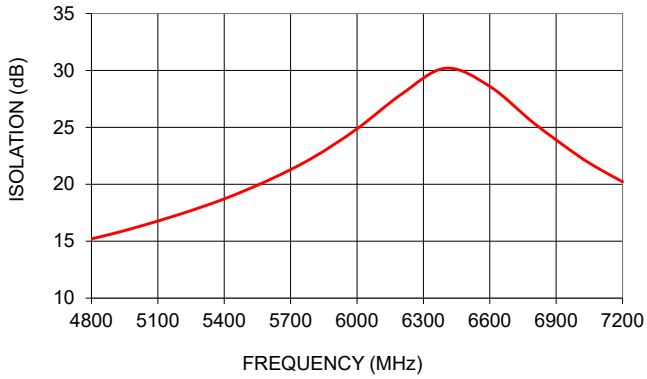
Frequency (MHz)	Total Loss[1] (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	Return Loss (dB)		
	S-1	S-2				S	1	2
4800	3.39	3.36	0.03	14.06	2.73	14.49	33.56	33.80
4900	3.37	3.34	0.03	14.71	2.83	14.99	34.75	34.83
5000	3.36	3.33	0.03	15.40	2.92	15.49	36.07	37.99
5200	3.35	3.32	0.03	16.14	3.03	16.01	37.85	39.77
5400	3.34	3.30	0.04	16.92	3.12	16.51	38.73	45.93
5600	3.33	3.29	0.04	17.77	3.21	17.09	37.47	45.07
5800	3.33	3.28	0.04	18.69	3.29	17.59	35.63	42.75
6000	3.32	3.28	0.04	19.67	3.37	18.14	33.38	39.02
6200	3.32	3.27	0.05	20.68	3.45	18.57	31.39	35.69
6400	3.32	3.27	0.05	21.72	3.53	18.94	29.40	33.39
6600	3.32	3.27	0.05	22.72	3.61	19.13	27.66	31.06
6800	3.33	3.27	0.06	23.65	3.69	19.21	26.03	29.27
7000	3.34	3.28	0.06	24.27	3.76	19.09	24.54	27.50
7100	3.35	3.28	0.06	24.46	3.83	18.78	23.20	25.80
7200	3.39	3.31	0.07	23.39	3.98	17.54	20.82	22.84

1. Total Loss = Insertion Loss + 3dB splitter loss.

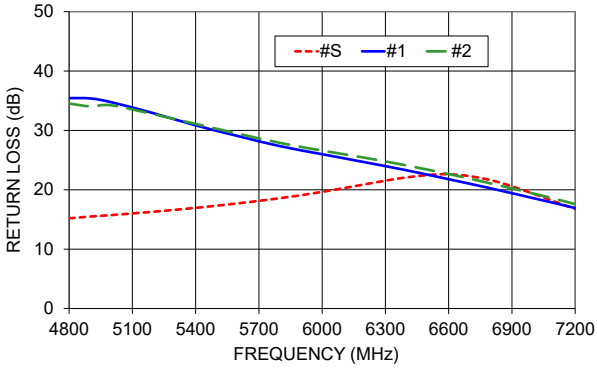
SCW-2-722+
TOTAL LOSS



SCW-2-722+
ISOLATION



SCW-2-722+
RETURN LOSS



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

2 Way-0° Power Splitter/Combiner SCW-2-722+

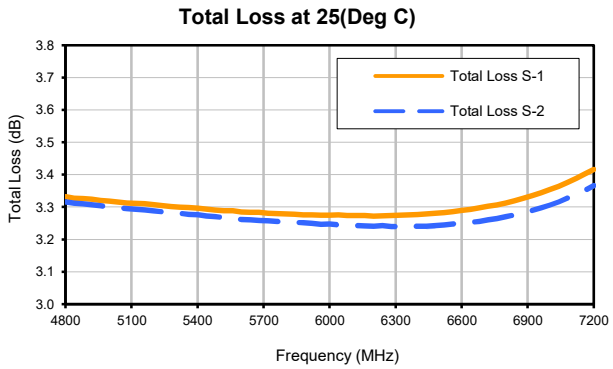
Typical Performance Data

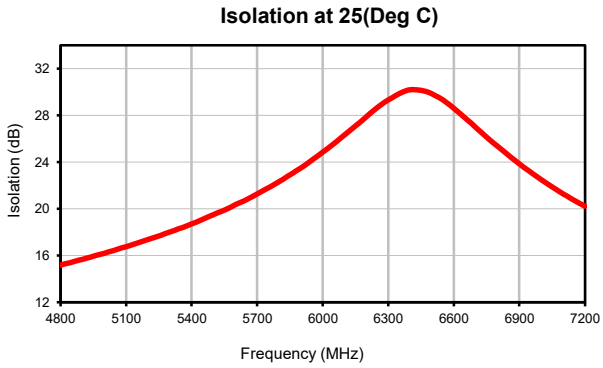
FREQUENCY (MHz)	TOTAL LOSS[1] (dB) S-1	TOTAL LOSS[1] (dB) S-2	AMPLITUDE UNBALANCE (dB)	ISOLATION (dB) 1-2	PHASE UNBALANCE (deg.)
4800	3.33	3.32	0.02	15.20	1.74
4840	3.33	3.31	0.01	15.39	1.75
4880	3.33	3.31	0.02	15.59	1.76
4920	3.32	3.31	0.02	15.79	1.77
4960	3.32	3.30	0.02	16.00	1.79
5000	3.32	3.30	0.02	16.21	1.81
5040	3.31	3.30	0.02	16.43	1.82
5080	3.31	3.30	0.02	16.66	1.83
5120	3.31	3.29	0.02	16.89	1.84
5160	3.31	3.29	0.02	17.13	1.86
5200	3.31	3.29	0.02	17.37	1.88
5240	3.30	3.29	0.02	17.63	1.89
5280	3.30	3.28	0.02	17.89	1.90
5320	3.30	3.28	0.02	18.15	1.91
5360	3.30	3.28	0.02	18.43	1.93
5400	3.30	3.28	0.02	18.72	1.93
5440	3.29	3.27	0.02	19.02	1.96
5480	3.29	3.27	0.02	19.36	1.97
5520	3.29	3.27	0.02	19.67	1.98
5560	3.29	3.27	0.02	19.99	2.00
5600	3.29	3.26	0.02	20.36	2.01
5640	3.28	3.26	0.02	20.70	2.03
5680	3.28	3.26	0.02	21.08	2.04
5720	3.28	3.26	0.02	21.48	2.05
5760	3.28	3.26	0.02	21.90	2.06
5800	3.28	3.25	0.03	22.34	2.08
5840	3.28	3.25	0.02	22.79	2.09
5880	3.28	3.25	0.02	23.27	2.11
5920	3.28	3.25	0.03	23.77	2.12
5960	3.27	3.25	0.03	24.30	2.14
6000	3.28	3.25	0.03	24.86	2.15
6040	3.28	3.24	0.03	25.42	2.16
6080	3.27	3.24	0.03	26.02	2.18
6120	3.27	3.24	0.03	26.64	2.20
6160	3.27	3.24	0.03	27.26	2.21
6200	3.27	3.24	0.03	27.90	2.22
6240	3.27	3.24	0.03	28.53	2.24
6280	3.27	3.24	0.03	29.09	2.26
6320	3.27	3.24	0.03	29.55	2.27
6360	3.28	3.24	0.04	29.95	2.29
6400	3.28	3.24	0.04	30.20	2.30
6440	3.28	3.24	0.04	30.17	2.32
6480	3.28	3.24	0.04	30.01	2.33
6520	3.28	3.24	0.04	29.66	2.35
6560	3.29	3.25	0.04	29.19	2.36
6600	3.29	3.25	0.04	28.60	2.38
6640	3.29	3.25	0.04	27.99	2.39
6680	3.30	3.26	0.04	27.31	2.40
6720	3.30	3.26	0.04	26.63	2.42
6760	3.31	3.26	0.04	25.98	2.44
6800	3.31	3.27	0.04	25.36	2.45
6840	3.32	3.28	0.04	24.73	2.47
6880	3.33	3.28	0.04	24.14	2.48
6920	3.34	3.29	0.05	23.57	2.51
6960	3.34	3.30	0.05	23.03	2.53
7000	3.35	3.31	0.05	22.50	2.53
7040	3.36	3.32	0.05	22.01	2.55
7080	3.38	3.33	0.05	21.52	2.56
7120	3.39	3.34	0.05	21.07	2.58
7160	3.40	3.35	0.05	20.64	2.60
7200	3.42	3.37	0.05	20.22	2.61

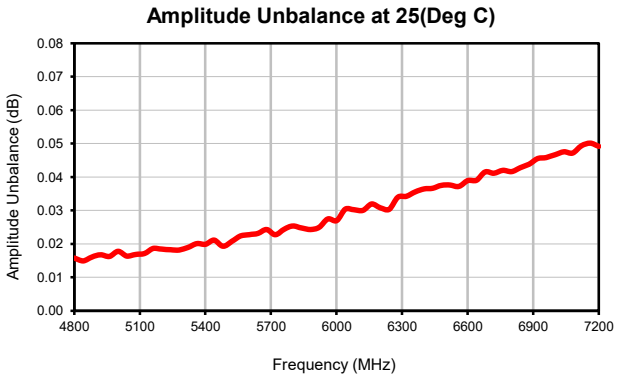
FREQUENCY (MHz)	VSWR (:1) S	VSWR (:1) 1	VSWR (:1) 2
4800	1.42	1.03	1.04
4840	1.41	1.03	1.04
4880	1.41	1.03	1.04
4920	1.40	1.04	1.04
4960	1.40	1.04	1.04
5000	1.39	1.04	1.04
5040	1.38	1.04	1.04
5080	1.38	1.04	1.04
5120	1.37	1.04	1.05
5160	1.37	1.04	1.05
5200	1.36	1.05	1.05
5240	1.35	1.05	1.05
5280	1.35	1.05	1.05
5320	1.34	1.05	1.05
5360	1.34	1.06	1.06
5400	1.33	1.06	1.06
5440	1.32	1.06	1.06
5480	1.32	1.06	1.06
5520	1.31	1.07	1.06
5560	1.31	1.07	1.07
5600	1.30	1.07	1.07
5640	1.29	1.08	1.07
5680	1.29	1.08	1.07
5720	1.28	1.08	1.08
5760	1.27	1.09	1.08
5800	1.27	1.09	1.08
5840	1.26	1.09	1.09
5880	1.25	1.10	1.09
5920	1.25	1.10	1.09
5960	1.24	1.10	1.09
6000	1.23	1.11	1.10
6040	1.23	1.11	1.10
6080	1.22	1.11	1.10
6120	1.21	1.12	1.11
6160	1.20	1.12	1.11
6200	1.20	1.12	1.11
6240	1.19	1.13	1.12
6280	1.19	1.13	1.12
6320	1.18	1.14	1.12
6360	1.18	1.14	1.13
6400	1.17	1.15	1.13
6440	1.17	1.15	1.14
6480	1.16	1.16	1.14
6520	1.16	1.16	1.14
6560	1.16	1.17	1.15
6600	1.16	1.18	1.16
6640	1.16	1.18	1.16
6680	1.16	1.19	1.17
6720	1.17	1.20	1.18
6760	1.17	1.21	1.18
6800	1.18	1.22	1.19
6840	1.19	1.22	1.20
6880	1.20	1.23	1.21
6920	1.21	1.24	1.22
6960	1.23	1.25	1.23
7000	1.24	1.27	1.24
7040	1.26	1.28	1.25
7080	1.28	1.29	1.26
7120	1.30	1.30	1.27
7160	1.32	1.32	1.29
7200	1.34	1.33	1.30

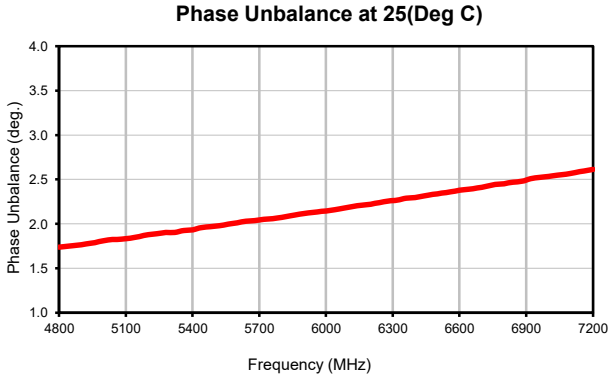
2 Way-0° Power Splitter/Combiner SCW-2-722+

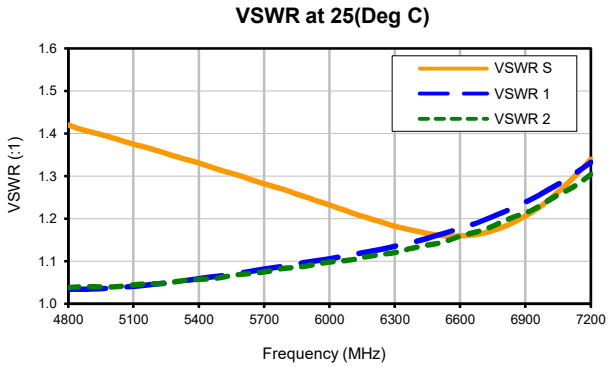
Typical Performance Curves







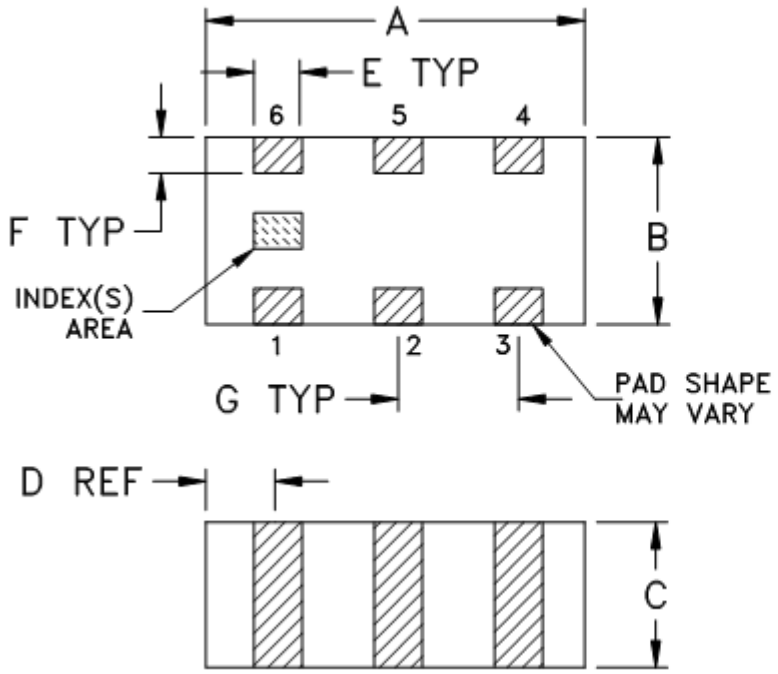




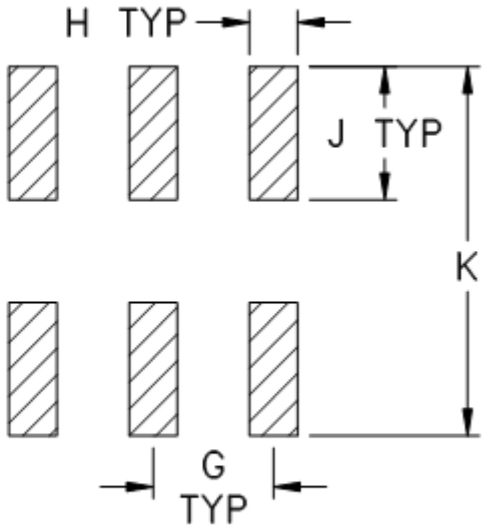
Case Style JC

Outline Dimensions

JC0603C



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	WT. GRAM
JC0603C	.063 (1.60)	.031 (0.80)	.024 (0.60)	.012 (0.30)	.008 (0.20)	.006 (0.15)	.020 (0.50)	.010 (0.25)	.022 (0.55)	0.053 (1.35)	.005

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .01; 3 Pl. ± .005

Notes:

1. Open style, ceramic base.
2. Termination finish:
   For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.

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Tape & Reel Packaging TR-F114

DEVICE ORIENTATION IN T&R

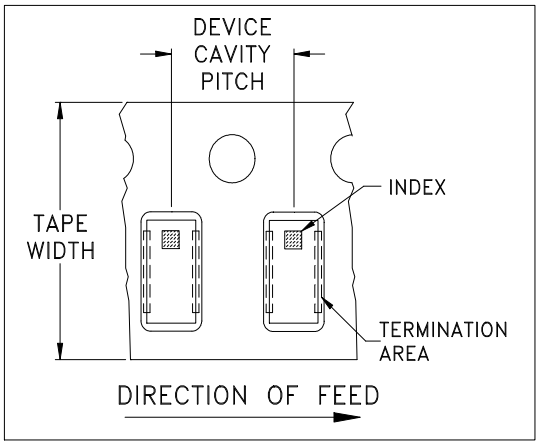

ILLUSTRATION 1

Applicable Case Styles	
GE0805C	JC0603C
GE0805C-1	JC0603C-4
GE0805C-1AP	JC0603C-6
GE0805C-7	
GE0805C-9	
GE0805C-10	
GE0805C-11	
GE0805C-12	

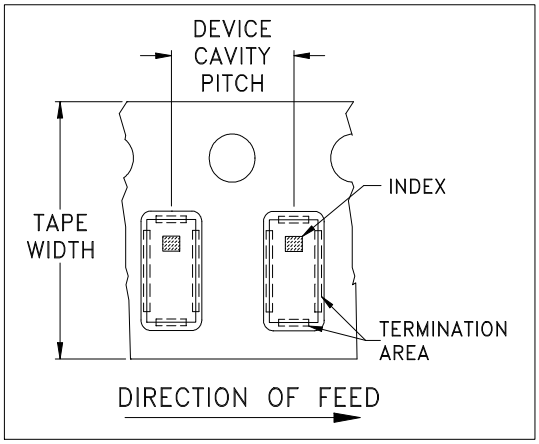

ILLUSTRATION 2

Applicable Case Styles	
GE0805C-2	JC0603C-1
GE0805C-3	JC0603C-2
GE0805C-4	JC0603C-3
GE0805C-5	JC0603C-5
GE0805C-6	JC0603C-7
GE0805C-8	JV1210C-1
GE0805C-15	

Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
8	4	7	Small quantity standards (see note)	20
				50
				100
				200
				500
				1000
			Standard	4000

Note: Please Consult individual model data sheet to determine device per reel availability.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

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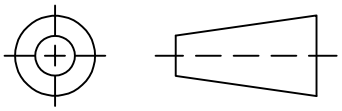
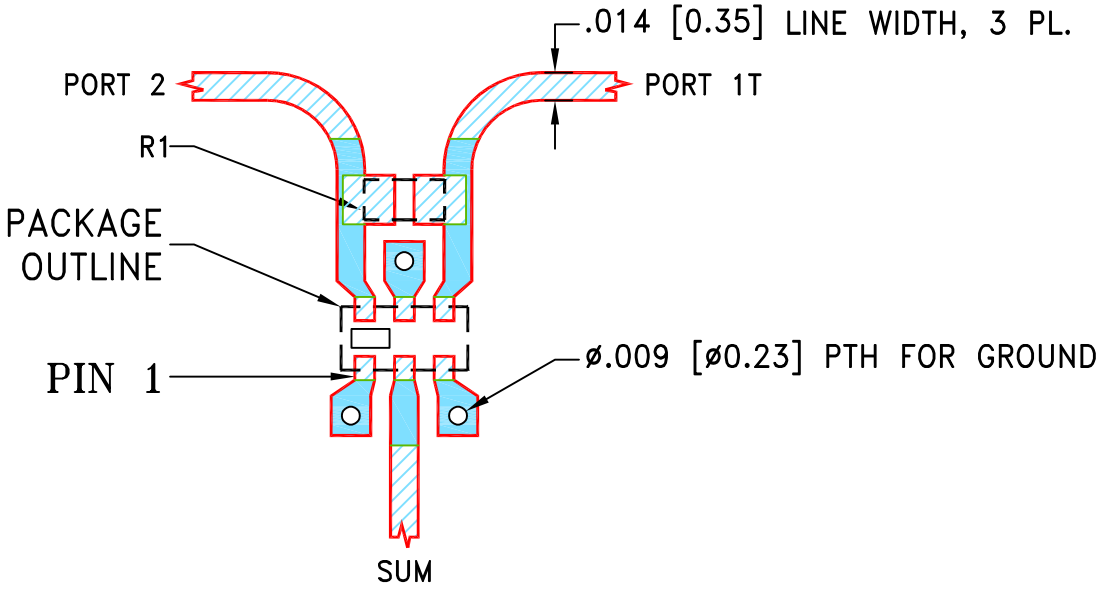
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-011925	NEW RELEASE	02/17/22	ITG	IL

SUGGESTED MOUNTING CONFIGURATION FOR JC0603C CASE STYLE



COMPONENT	SIZE
R1	0402

NOTES:

1. LINE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .0066±.0007"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS LINE WIDTH MAY NEED TO BE MODIFIED.
2. CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-1224+.
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.

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	ITG	02/17/22
TOLERANCES ON:	CHECKED	GF	02/17/22
2 PL DECIMALS ±	APPROVED	IL	02/17/22
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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ASHEETA1.DWG REV:A DATE:01/12/95

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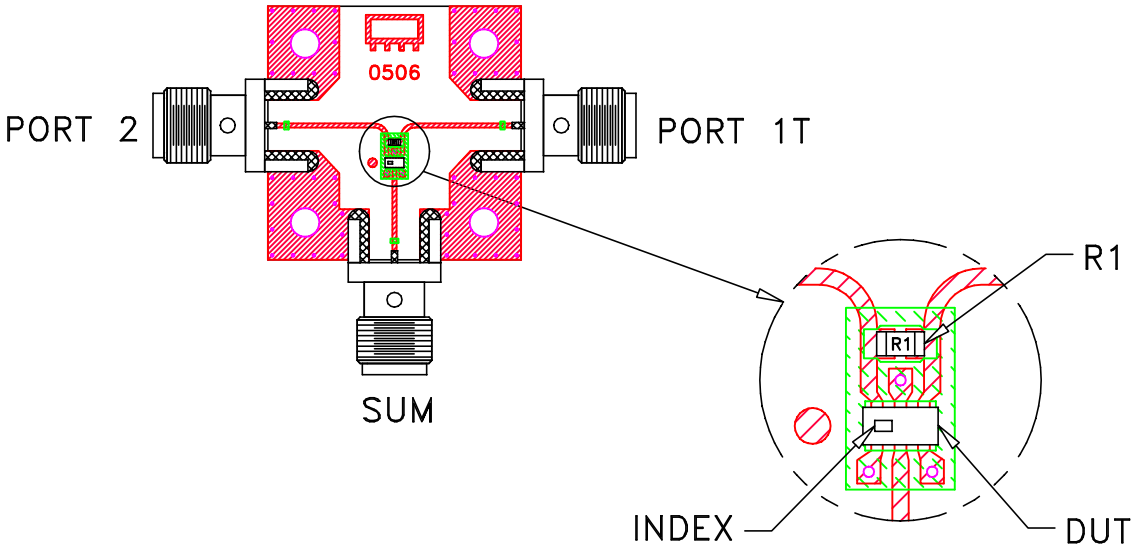
13 Neptune Avenue
Brooklyn NY 11235

PL, SCW-2series, JC0603C, TB-1224+

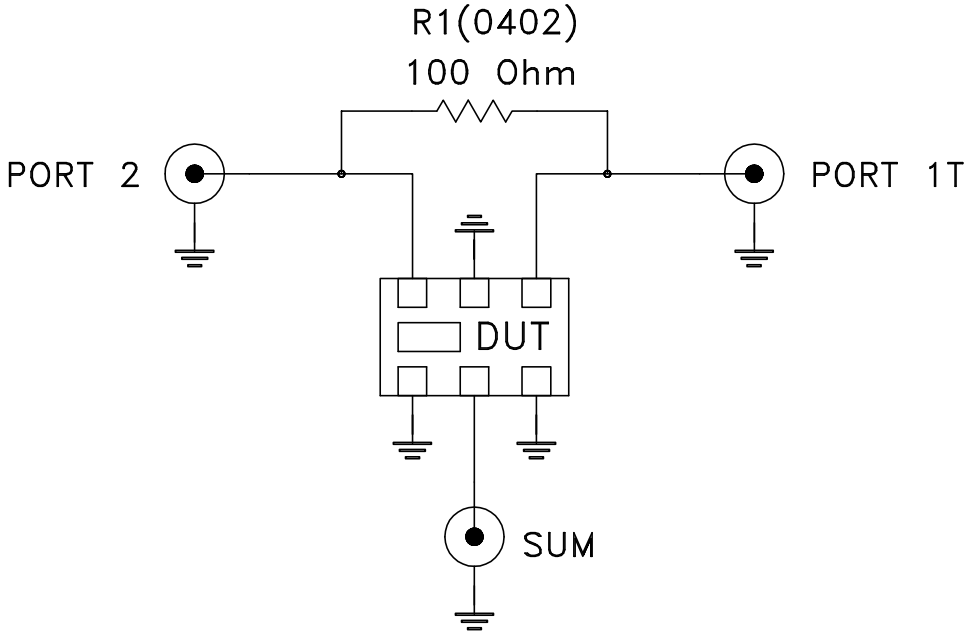
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-727	OR

FILE:	SCALE:	SHEET:
98PL727	10:1	1 OF 1

Evaluation Board and Circuit



TB-1224+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: RO4350 or equivalent,
   Dielectric Constant=3.5, Thickness=.0066 inch.

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Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-55° to 125° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 125° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process: 250°C peak	J-STD-020C, Table 4-1, 4-2 and 5-2; Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A

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