Surface Mount

Directional Coupler

D18PA+

50Ω 19 dB 1700 to 2000 MHz

CASE STYLE: CA531

The Big Deal

- Good Directivity, 16 dB typ.
- Excellent Power Handling, 4W
- Small Size, 3.1 x 3.0 x 1.6mm

Product Overview

Mini-Circuits D18PA+ is a MMIC directional coupler designed for applications from 1700 to 2000 MHz. This model provides excellent power handling up to 4W in a tiny device package (3.1 x 3.0 x 1.6 mm). A built-in 50Ω termination on the isolated port simplifies circuit design and reduces component count. Manufactured using Silicon IPD technology, this model provides a high level of ESD protection and excellent reliability.

Key Features

Feature	Advantages
Low insertion loss, 0.3 dB including coupling loss	Can be used for sampling power amplifier output with minimal loss.
Excellent power handling; 4W (IN-OUT)	Ideal for sampling transmitter output power.
Good directivity, 16 dB typ.	Good directivity minimizes coupling of reverse power and enables accurate sampling of thru-signal.
High operating temperature -40 to 105°C	Operation up to 105°C allows the Coupler to be used near power amplifiers with minimal change in performance.
Excellent ESD Class 1B (500 to <1000V)-HBM Class M3 (200 to <400V)-MM	Rugged ESD design prevents ESD related failures.

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+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
7"	20, 50, 100, 200, 500,1000

Features

- low mainline loss, 0.3 dB typ.
- excellent VSWR, 1.2:1 typ. at input / output
- excellent repeatability
- miniature low profile package
- aqueous washable

Applications

- PCS

Electrical Specifications at 25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		1700		2000	MHz
Mainline Loss[1]	1700 - 2000	—	0.3	0.6	dB
Nominal Coupling	1700 - 2000	17.9	19.3	20.8	dB
Coupling Flatness(±)	1700 - 2000	—	0.7	—	dB
Directivity	1700 - 2000	13	16	—	dB
Return Loss (Input)	1700 - 2000	—	26	—	dB
Return Loss (Output)	1700 - 2000	—	26	—	dB
Return Loss (Coupling)	1700 - 2000	—	18	—	dB
Input Power[2]	1700 - 2000	—	—	4.0	W
Power at Internal Termination[3]	1700 - 2000	—	—	23	dBm

1. Mainline loss includes theoretical power loss at coupled port.
2. 4Watt at 85°C. Derate linearly to 3W at 105°C ground lead temperature.
3. 23 dBm to 85°C. Derate linearly to +22dBm at 105°C.

Maximum Ratings[4]

Parameter	Ratings
Operating Temperature[5]	-40°C to 105°C
Storage Temperature	-65°C to 150°C

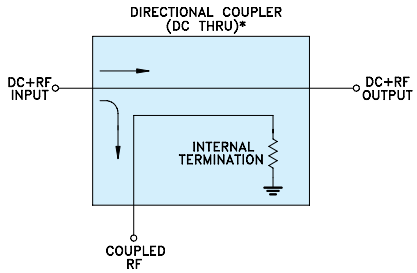
4. Permanent damage may occur if any of these limits are exceeded.
5. Ground lead temperature

Pin Connections

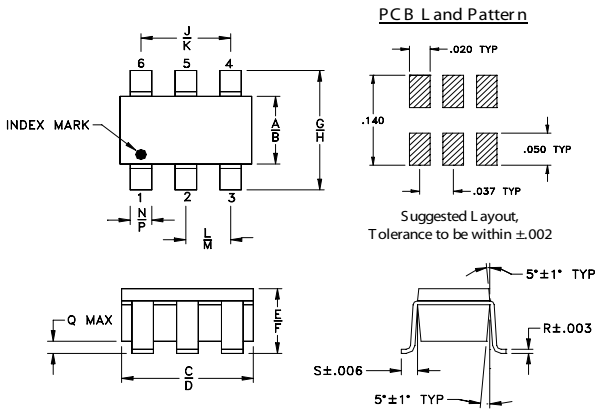
Function	Pin Number
INPUT	4
OUTPUT	6
COUPLED	3
GROUND	1,2,5

* ESD rating
Human body model (HBM): Class 1B(500 to <1000 V) in accordance with ANSI/ESD 5.1-2007
Machine model (MM): Class M3 (200 to <400 V) in accordance with ANSI/ESD SMT 5.2 1999

Electrical Schematic



Outline Drawing

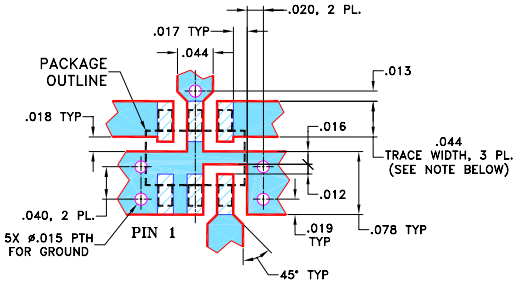


Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J
.052	.067	.106	.122	.035	.064	.087	.118	.067
1.32	1.70	2.69	3.10	0.89	1.63	2.21	3.00	1.70

K	L	M	N	P	Q	R	S	wt
.083	.033	.042	.012	.020	.012	.006	.018	grams
2.11	0.84	1.07	0.30	0.51	0.30	0.15	0.46	0.020

Demo Board MCL P/N: TB-396+
Suggested PCB Layout (PL-270)

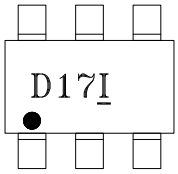


NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.020" ± 0.0015". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

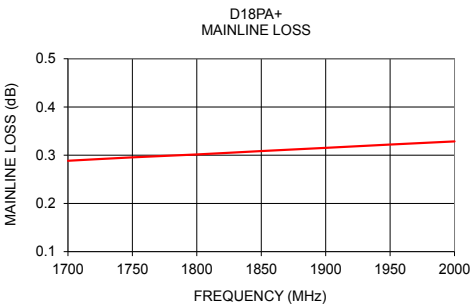
Product Marking

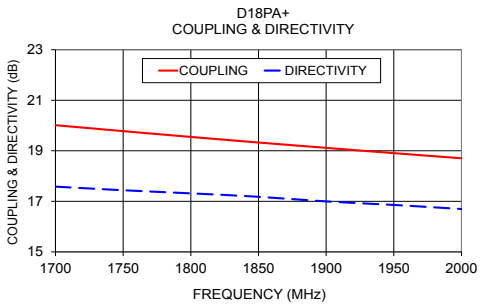


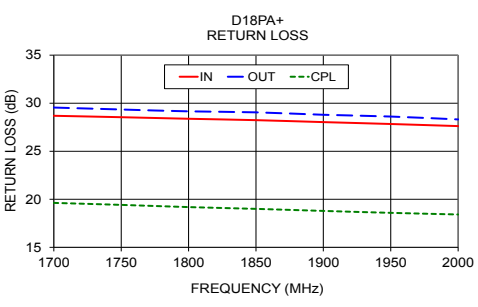
← Family marking

Typical Performance Data

Frequency (MHz)	Mainline Loss (dB) In-Out	Coupling (dB) In-Cpl	Directivity (dB)	Return Loss (dB) In	Return Loss (dB) Out	Return Loss (dB) Cpl
1700	0.29	20.01	17.58	28.69	29.55	19.63
1750	0.30	19.78	17.44	28.54	29.34	19.42
1800	0.30	19.55	17.32	28.38	29.15	19.19
1850	0.31	19.33	17.18	28.23	29.05	19.01
1900	0.32	19.12	17.00	28.03	28.79	18.79
1950	0.32	18.91	16.86	27.84	28.61	18.59
2000	0.33	18.71	16.70	27.62	28.31	18.42







Additional 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