Features

- Excellent Matching
- TPR86xxA: 0.0125% Matching at −40°C to 125°C
- TPR86xx: 0.025% Matching at −40°C to 125°C
- Matching Temperature Drift: 0.2ppm/°C
- Operation Temperature Range: −40°C to 125°C

Applications

- Instrumentation
- Industrial Control
- Building Block for the Precision Amplifier Circuit
- Precision Divider for Voltage Reference

Description

The TPR86xx is a matched resistor network that consists of four matched resistors. The device has excellent matching specifications over the operating temperature range. Matching is specified by gain and CMRR.

All four resistors can be used independently, making the device the best choice for any application that can benefit from matched resistors. These resistor networks provide precise ratio metric stability required in difference amplifiers, instrumentation amplifiers, dividers, or inverters for voltage references.

The device is available in the MSOP8 package.

Typical Application Circuit

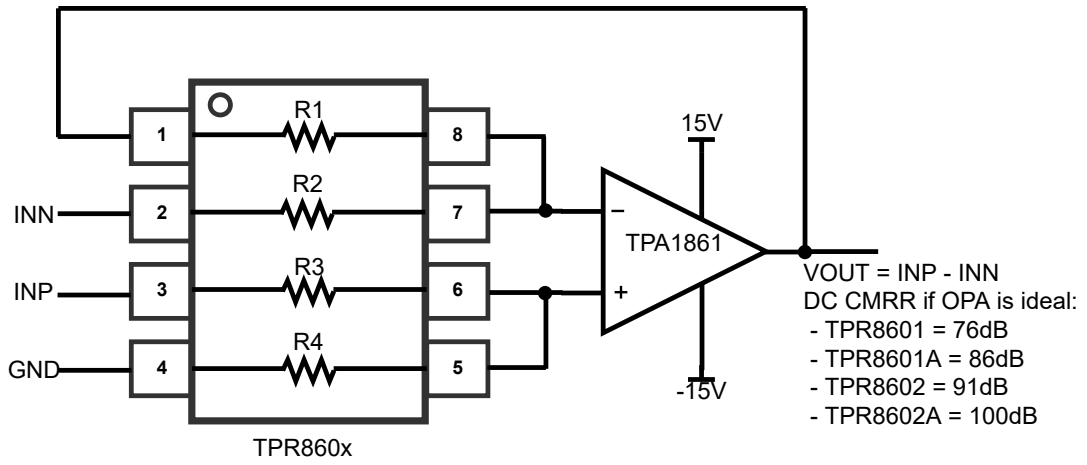


Table of Contents

Revision History

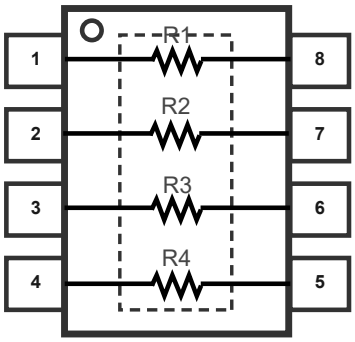
Date	Revision	Notes
2022-05-20	Rev.A.0	Initial version.
2023-08-17	Rev.A.1	Added a part number: TPR8600-EV1R. Updated status of part numbers to released: TPR8602-EV1R, TPR8603-EV1R. Updated specification of TPR8603-EV1R.
2023-09-29	Rev.A.2	Added part numbers: TPR8600-EV1R-S, TPR8601-EV1R-S, TPR8601A-EV1R-S, TPR8602-EV1R-S. Added typical values in Electrical Characteristics.
2024-02-26	Rev.A.3	Updated specification in Electrical Characteristics.
2025-03-19	Rev.A.4	Added part numbers: TPR8606,TPR8607,TPR8608,TPR8609,TPR8610,TPR8611,TPR8612,TPR8613,TPR8620,TPR8621,TPR8622. Updated specification in Electrical Characteristics.
2025-04-23	Rev.A.5	Corrected handwriting errors.

Pin Configuration and Functions

TPR86xx

MSOP8 Package

Top View



The E-PAD can be left floating or connected to any voltage in the range of working voltage.

Product	A Group, R2 = R3			B Group, R1 = R4			Resistor Ratio
	Resistor Value (Ω)	Working Voltage (V)	Absolute Maximum Voltage (V)	Resistor Value (Ω)	Working Voltage (V)	Absolute Maximum Voltage (V)	
TPR8600 TPR8601	10k	60	80	10k	60	80	1:1
TPR8602	10k	60	80	100k	60	80	1:10
TPR8603	300k	60	80	300k	60	80	1:1
TPR8606	1k	10	20	1k	10	20	1:1
TPR8607	1k	10	20	5k	10	20	1:5
TPR8608	1k	10	20	9k	36	50	1:9
TPR8609	100k	150	155	100k	150	155	1:1
TPR8610	1.25k	15	25	5k	35	50	1:4
TPR8611	30k	60	65	60k	100	105	1:2
TPR8612	10k	60	65	100k	136	140	1:10
TPR8613	1M	150	155	1M	150	155	1:1
TPR8620	1k	12	20	3k	12	20	1:3
TPR8621	10k	30	40	200k	150	155	1:20
TPR8622	10k	30	40	1M	150	155	1:100

Specifications

Absolute Maximum Ratings (1)

Parameter		Min	Max	Unit
	Maximum Voltage between Any PIN to EPAD	−205	205	V
T_J	Maximum Junction Temperature		150	°C
T_A	Operating Temperature Range	−40	125	°C
T_{STG}	Storage Temperature Range	−65	150	°C
T_L	Lead Temperature (Soldering 10 sec)		260	°C

(1) Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. Exposure to any Absolute Maximum Rating condition for extended periods may affect device reliability and lifetime.

ESD, Electrostatic Discharge Protection

Symbol	Parameter	Condition	Minimum Level	Unit
HBM	Human Body Model ESD	ANSI/ESDA/JEDEC JS-001 (1)	500	V
CDM	Charged Device Model ESD	ANSI/ESDA/JEDEC JS-002 (2)	1	kV

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

Thermal Information

Package Type	θ_{JA}	θ_{JC}	Unit
EMSOP8	60	20	°C/W

Electrical Characteristics

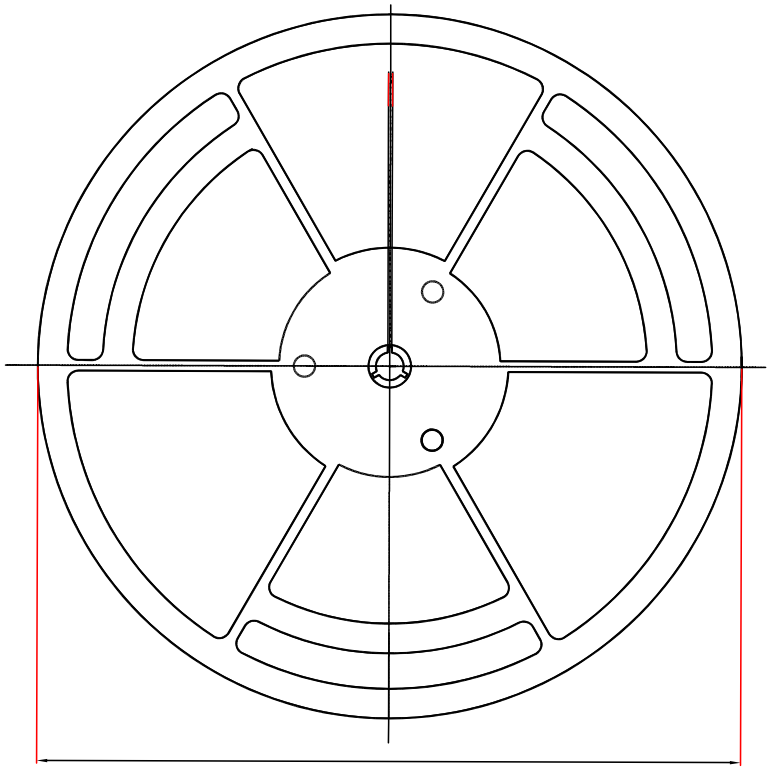
All test condition is T_A= 25°C, unless otherwise noted.

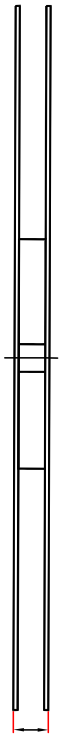
Parameter		Conditions	T_A	Min	Typ	Max	Unit
VCM	共模电压 Common-mode Voltage	Voltage between any pin to EPAD		-200		200	V
ΔR/R	电阻匹配比例 Resistor Matching Ratio	TPR8600 TPR8601 TPR8602 TPR8606 TPR8607 TPR8608 TPR8610 TPR8611 TPR8612	–40°C to 125°C	–0.025	±0.005	0.025	%
		TPR8603 TPR8609 TPR8613	–40°C to 125°C	–0.03	±0.005	0.03	%
		TPR8620	–40°C to 125°C	-0.05	±0.01	0.05	%
		TPR8621 TPR8622	–40°C to 125°C	-0.1	±0.02	0.1	%
		TPR86xxA		–0.01	±0.005	0.01	%
			–40°C to 125°C	–0.0125		0.0125	%
(ΔR/R)/ΔT	电阻匹配比例随温度的漂移 Resistor Matching Ratio Temperature Drift (1)		–40°C to 125°C	-1	±0.1	1	ppm/°C
	影响共模抑制比的电阻匹配度 Matching for CMRR = 1/2 * (R2/R1-R3/R4) * (R1/R2)	TPR8600 TPR8601 TPR8602 TPR8606 TPR8607 TPR8608 TPR8609 TPR8610	–40°C to 125°C	–0.015	±0.005	0.015	%
		TPR8603	–40°C to 125°C	–0.02	±0.005	0.02	%
		TPR8620 TPR8621	–40°C to 125°C	-0.025	±0.005	0.025	
		TPR8622	–40°C to 125°C	-0.04	±0.01	0.04	
		TPR8611 TPR8612 TPR86xxA	–40°C to 125°C	–0.005	±0.002	0.005	%
ΔR	绝对电阻精度		–40°C to 125°C	–15	±2	15	%

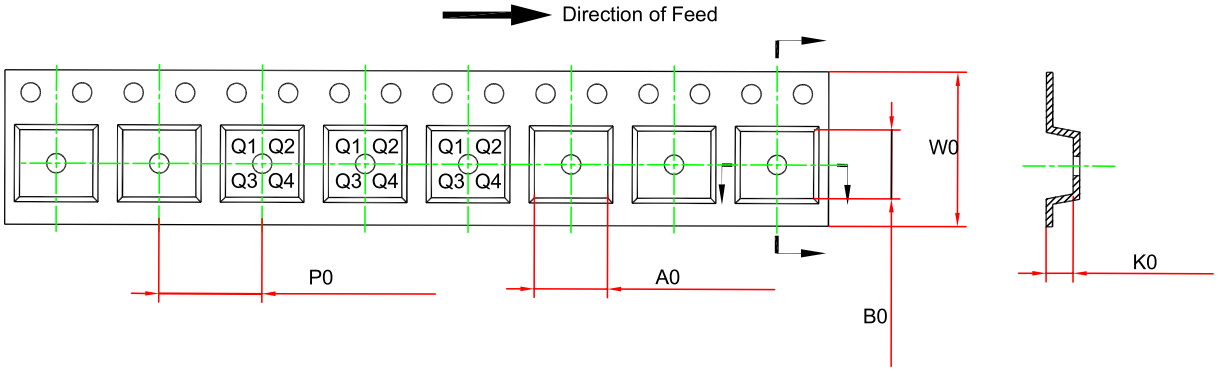
Parameter		Conditions	T_A	Min	Typ	Max	Unit
	Absolute Resistor Tolerance						
ΔR/ΔT	绝对电阻阻值随温度的漂移 Absolute Resistor Value Temperature Drift (1)		–40°C to 125°C	–20	±5	20	ppm/°C

(1) Provided by bench test and design simulation.

Tape and Reel Information





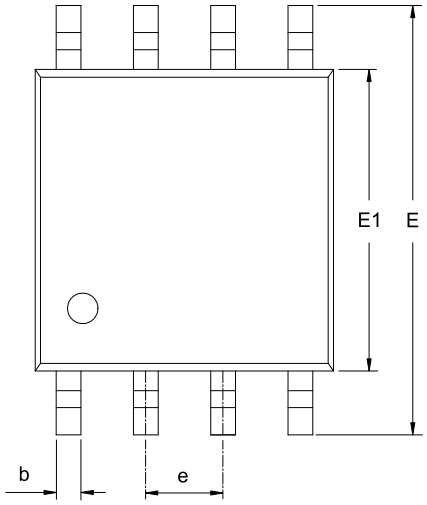


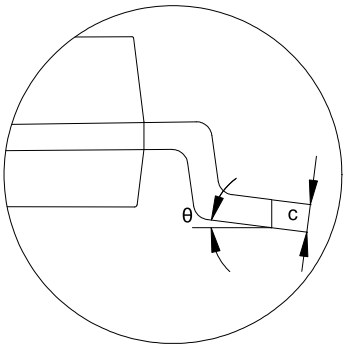
Order Number	Package	D1 (mm)	W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	W0 (mm)	Pin1 Quadrant
TPR86xx-EV1R TPR86xx-EV1R-S	EMSOP8	330.0	17.6	5.25	3.25	1.25	8.0	12.0	Q1

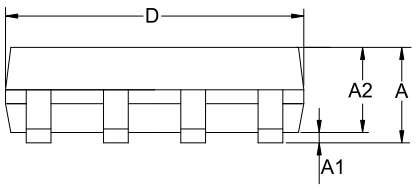
Package Outline Dimensions

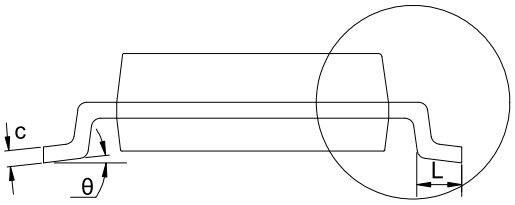
EMSOP8

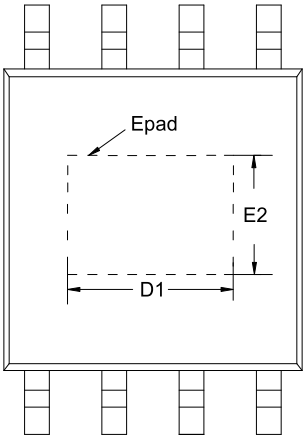
Package Outline Dimensions EV1(EMSOP-8-B)











Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.800	1.100	0.031	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
D1	1.920	2.220	0.076	0.087
E	4.700	5.100	0.185	0.201
E1	2.900	3.100	0.114	0.122
E2	1.450	1.750	0.057	0.069
e	0.650 BSC		0.026 BSC	
L	0.400	0.800	0.016	0.031
θ	0	8°	0	8°

NOTES

1. Do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

Order Information

Order Number	Operating Temperature Range	Package	Marking Information	MSL	Transport Media, Quantity	Eco Plan
TPR8600-EV1R-S (1)	−40 to 125°C	EMSOP8	R8600	3	Tape and Reel, 3000	Green
TPR8601-EV1R	−40 to 125°C	EMSOP8	R8601	3	Tape and Reel, 3000	Green
TPR8601-EV1R-S	−40 to 125°C	EMSOP8	R8601	3	Tape and Reel, 3000	Green
TPR8601A-EV1R-S	−40 to 125°C	EMSOP8	R8601	3	Tape and Reel, 3000	Green
TPR8602-EV1R-S	−40 to 125°C	EMSOP8	R8602	3	Tape and Reel, 3000	Green
TPR8602A-EV1R-S	−40 to 125°C	EMSOP8	R8602	3	Tape and Reel, 3000	Green
TPR8603-EV1R	−40 to 125°C	EMSOP8	R8603	3	Tape and Reel, 3000	Green
TPR8606-EV1R-S	−40 to 125°C	EMSOP8	8606	3	Tape and Reel, 3000	Green
TPR8606A-EV1R-S	−40 to 125°C	EMSOP8	8606	3	Tape and Reel, 3000	Green
TPR8607-EV1R-S	−40 to 125°C	EMSOP8	8607	3	Tape and Reel, 3000	Green
TPR8607A-EV1R-S	−40 to 125°C	EMSOP8	8607	3	Tape and Reel, 3000	Green
TPR8608-EV1R-S	−40 to 125°C	EMSOP8	8608	3	Tape and Reel, 3000	Green
TPR8608A-EV1R-S	−40 to 125°C	EMSOP8	8608	3	Tape and Reel, 3000	Green
TPR8609-EV1R-S (2)	−40 to 125°C	EMSOP8	R8609	3	Tape and Reel, 3000	Green
TPR8609A-EV1R-S (2)	−40 to 125°C	EMSOP8	R8609	3	Tape and Reel, 3000	Green
TPR8610-EV1R-S	−40 to 125°C	EMSOP8	R8610	3	Tape and Reel, 3000	Green
TPR8610A-EV1R-S (2)	−40 to 125°C	EMSOP8	R8610	3	Tape and Reel, 3000	Green
TPR8611-EV1R-S	−40 to 125°C	EMSOP8	R8611	3	Tape and Reel, 3000	Green
TPR8612-EV1R-S	−40 to 125°C	EMSOP8	R8612	3	Tape and Reel, 3000	Green
TPR8613-EV1R-S (2)	−40 to 125°C	EMSOP8	R8613	3	Tape and Reel, 3000	Green

Order Number	Operating Temperature Range	Package	Marking Information	MSL	Transport Media, Quantity	Eco Plan
TPR8613A-EV1R-S (2)	−40 to 125°C	EMSOP8	R8613	3	Tape and Reel, 3000	Green
TPR8620-EV1R-S (2)	−40 to 125°C	EMSOP8	R8620	3	Tape and Reel, 3000	Green
TPR8621-EV1R-S (2)	−40 to 125°C	EMSOP8	R8621	3	Tape and Reel, 3000	Green
TPR8622-EV1R-S (2)	−40 to 125°C	EMSOP8	R8622	3	Tape and Reel, 3000	Green

(1) The reflow process is validated for the order number with "-S" suffix.
(2) For future products, contact the 3PEAK factory for more information and samples.

Green: 3PEAK defines "Green" to mean RoHS compatible and free of halogen substances.

IMPORTANT NOTICE AND DISCLAIMER

Trademarks. Any of the 思瑞浦 or 3PEAK trade names, trademarks, graphic marks, and domain names contained in this document /material are the property of 3PEAK. You may NOT reproduce, modify, publish, transmit or distribute any Trademark without the prior written consent of 3PEAK.

Performance Information. Performance tests or performance range contained in this document/material are either results of design simulation or actual tests conducted under designated testing environment. Any variation in testing environment or simulation environment, including but not limited to testing method, testing process or testing temperature, may affect actual performance of the product.

Disclaimer. 3PEAK provides technical and reliability data (including data sheets), design resources (including reference designs), application or other design recommendations, networking tools, security information and other resources "As Is". 3PEAK makes no warranty as to the absence of defects, and makes no warranties of any kind, express or implied, including without limitation, implied warranties as to merchantability, fitness for a particular purpose or non-infringement of any third-party's intellectual property rights. Unless otherwise specified in writing, products supplied by 3PEAK are not designed to be used in any life-threatening scenarios, including critical medical applications, automotive safety-critical systems, aviation, aerospace, or any situations where failure could result in bodily harm, loss of life, or significant property damage. 3PEAK disclaims all liability for any such unauthorized use.