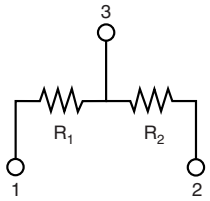
Matched Pair, Molded, Automotive, Thin Film, SOT-23, Resistor, Surface Mount Network, AEC-Q200 Qualified

Vishay Thin Film MPMA Series dividers provide ± 2 ppm/°C tracking and a ratio tolerance as tight as ± 0.05 %, small size, and exceptional stability for all surface mount applications. The standard SOT-23 package format with unity and common standard resistance divider ratios provide easy selection for most applications requiring matched pair resistor elements. MPMA is AEC-Q200 qualified and ideal for high precision automotive applications. The ratios listed are available for off the shelf delivery. If you require a non-standard ratio, consult the applications engineering group as we may be able to meet your requirements.

SCHEMATIC



FEATURES

- AEC-Q200 qualified
- Resistance range 250 Ω to 50 kΩ
- Excellent long term ratio stability ± 0.03 % over 1000 h, 125 °C
- Ratio tolerances to ± 0.05 %
- Tracking as low as ± 2 ppm/°C
- Very low noise and voltage coefficient (< -30 dB, 0.1 ppm/V)
- Standard JEDEC TO-236 package variation AB
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

RoHS COMPLIANT

HALOGEN FREE

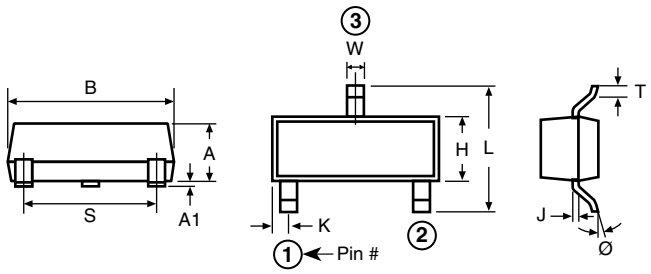
STANDARD DIVIDER RATIO (R_2/R_1)

RATIO	R_2 (Ω)	R_1 (Ω)	TCR TRACKING
50:1	50K	1K	10 ppm/°C
25:1	25K	1K	5 ppm/°C
20:1	20K	1K	
10:1	10K	1K	3 ppm/°C
9:1	9K	1K	
6:1	6K	1K	
5:1	10K	2K	
5:1	5K	1K	
4:1	8K	2K	
4:1	4K	1K	
2:1	10K	5K	2 ppm/°C
2:1	2K	1K	
1:1	50K	50K	
1:1	25K	25K	
1:1	10K	10K	
1:1	5K	5K	
1:1	2.5K	2.5K	
1:1	1K	1K	
1:1	500	500	
1:1	250	250	

STANDARD ELECTRICAL SPECIFICATIONS

TEST	SPECIFICATIONS	CONDITIONS
Material	Ta2N	-
Pin/Lead Number	3	-
Resistance Range	250 Ω to 50 kΩ per resistor	-
TCR: Absolute	± 25 ppm/°C	-55 °C to +125 °C
TCR: Tracking	Down to ± 2 ppm/°C	-55 °C to +125 °C
Tolerance: Absolute	± 0.1 % to ± 1.0 %	+25 °C
Tolerance: Ratio	± 0.05 % to 0.5 %	+25 °C
Power Rating: Resistor	100 mW	Maximum at +70 °C
Power Rating: Package	200 mW	Maximum at +70 °C
Stability: Absolute	< 1 kΩ: ± 0.35 %; > 1 kΩ: ± 0.04 %	1000 h at +125 °C
Stability: Ratio	< 1 kΩ: ± 0.35 %; > 1 kΩ: ± 0.03 %	1000 h at +125 °C
Voltage Coefficient	0.1 ppm/V	-
Working Voltage	100 V max. not to exceed $\sqrt{P \times R}$	-
Operating Temperature Range	-55 °C to +155 °C	-
Storage Temperature Range	-55 °C to +155 °C	-
Noise	< - 30 dB	-
Thermal EMF	0.2 µV/°C	-
Shelf Life Stability: Absolute	$\Delta R/R$ ± 0.01 %	1 year at +25 °C
Shelf Life Stability: Ratio	$\Delta R/R$ ± 0.002 %	1 year at +25 °C

DIMENSIONS AND IMPRINTING in inches and millimeters

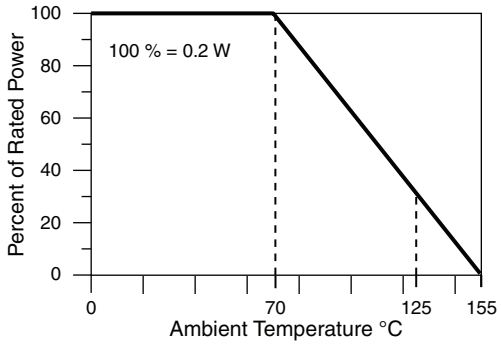


DIMENSION	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.031	0.040	0.79	1.02
A1	0.001	0.004	0.02	0.10
B	0.105	0.120	2.67	3.05
S	0.071	0.079	1.80	2.00
W	0.015	0.021	0.38	0.54
L	0.083	0.098	2.10	2.50
H	0.047	0.055	1.20	1.40
T	0.005	0.010	0.13	0.25
J	0.0035	0.0059	0.089	0.15
K	0.017	0.022	0.44	0.55
Ø	0	8°	0	8°

MECHANICAL SPECIFICATIONS

Resistive Element	Tantalum nitride
Substrate Material	Ceramic
Body	Molded epoxy
Terminals	Copper alloy
Lead (Pb)-free Option	Solder free leads, Ni/Pd/Au plated

DERATING CURVE



ENVIRONMENTAL TESTS

ENVIRONMENTAL TEST	CONDITIONS	SUGGESTED PRODUCT LIMITS ABS/RATIO	MAX. VALUES ABS/RATIO
High Temperature Exposure	< 1 kΩ: MIL-STD-202, 108, 1000 h at 125 °C	± 0.5 %/± 0.5 %	± 0.35 %/± 0.35 %
	> 1 kΩ: MIL-STD-202, 108, 1000 h at 125 °C	± 0.25 %/± 0.1 %	± 0.02 %/± 0.008 %
Temperature Cycling	JESD22, JA-104, 1000 cycles at -55 °C to +125 °C	± 0.25 %/± 0.1 %	± 0.1%/± 0.027 %
Moisture Resistance	MIL-STD-202, 106	± 0.25 %/± 0.1 %	± 0.03%/± 0.012 %
Biased Humidity	MIL-STD-202, 103, 1000 h at 85 °C, 85 % RH, 10 % P	± 1.0 %/± 0.5 %	± 0.4 %/± 0.34 %
Life	< 1 kΩ: MIL-STD-202, 108 at 125 °C, 1000 h	± 0.5 %/± 0.5 %	± 0.35 %/± 0.35 %
	> 1 kΩ: MIL-STD-202, 108 at 125 °C, 1000 h	± 0.5 %/± 0.1 %	± 0.04 %/± 0.03 %
Mechanical Shock	MIL-STD-202, 213, condition C	± 0.25 %/± 0.1 %	± 0.03 %/± 0.018 %
Vibration	MIL-STD-204, 10 Hz to 2 kHz	± 0.25 %/± 0.1 %	± 0.02 %/± 0.047 %
Resistance to Soldering Heat	MIL-STD-202, 210, condition B	± 0.25 %/± 0.1 %	± 0.13 %/± 0.24 %
Electrostatic Discharge	< 1 kΩ: AEC-Q200-002 at 500 V human body	± 0.5 %	± 0.50 %
	> 1 kΩ: AEC-Q200-002 at 1000 V human body	± 0.5 %	± 0.25 %
Solderability	J-STD-002 method B and B1	Visual	Visual
Terminal Strength	AEC-Q200-006 at 1 kg for 60 s	± 0.25 %/± 0.1 %	± 0.02 %/± 0.018 %
Flame Retardance	AEC-Q200-001 para 4.0	Visual	Visual

GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: MPMA1003AWS

M	P	M	A		1	0	0	3				A	T	1
M	P	M	A	1	0	0	1	5	0	0	1	A	T	1

GLOBAL MODEL (3 or 4 digits)	RESISTANCE (4 or 8 digits)	TOLERANCE AND RATIO TOLERANCE	PACKAGING
MPMA Ni/Pd/Au = e4 termination	First 3 digits are significant figures and the last digit specifies the number of zeros to follow. When like values are required use total resistance. When dual values are required list both values. Example: (List R_1 first in part number with dual values) **1002** = 10K (5K/5K) **1003** = 100K (50K/50K) **10011002** = 1K/10K divider	Abs. Tol. / Ratio **A** = 0.1 % / 0.05 % **B** = 0.1 % / 0.1 % **C** = 0.25 % / 0.1 % **D** = 0.5 % / 0.1 % **F** = 1 % / 0.5 %	TAPE AND REEL **T1** = 1000 min., 1000 mult (1) **T5** = 500 min., 500 mult **TF** = Full reel 4000 **TP** = 100 min., 1 mult (package unit single lot date code) **TS** = 100 min., 1 mult

Note

(1) Preferred packaging code

Vishay Dale Thin Film Land Patterns

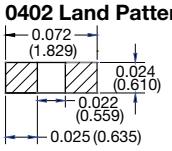
1. Scope

This technical note provides sample land patterns for Vishay Dale Thin Film SMT resistive products. The following drawings are based on IPC-SM-782 Surface Mount Design and Land Pattern Standard. These drawings are for reference only Vishay Thin Film recommends that the user contacts their PC board supplier for actual land patterns required. The pads are intended for lead (Pb)-free and tin / lead solder types.

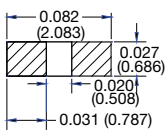
2. Product Series

Thin Film Surface Mount Chip Resistors (FC, L, P, PTN, PLT, PLTT. PLTU, PAT, PATT, PNM, M/D55342 QPL Series)

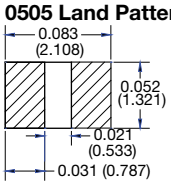
0402 Land Pattern



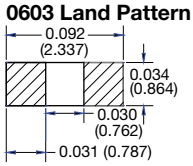
0502 Land Pattern



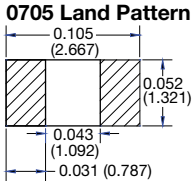
0505 Land Pattern



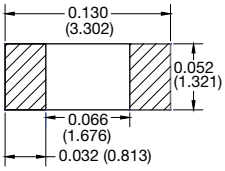
0603 Land Pattern



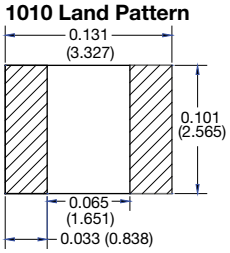
0705 Land Pattern



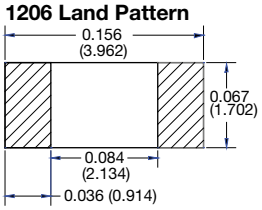
1005 Land Pattern



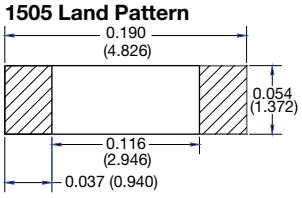
1010 Land Pattern



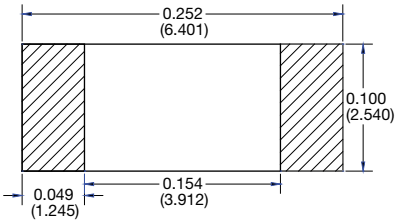
1206 Land Pattern



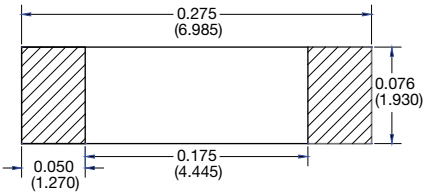
1505 Land Pattern



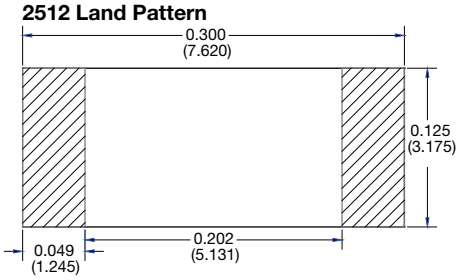
2010 Land Pattern



2208 Land Pattern

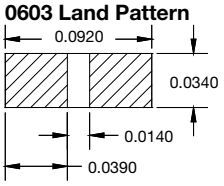


2512 Land Pattern

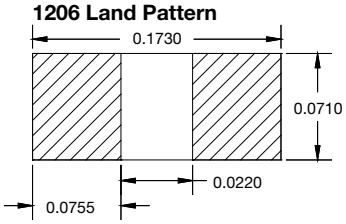


Thin Film Surface Mount Chip Resistors (PHP, PCAN Series)

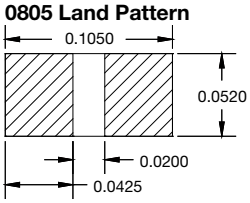
0603 Land Pattern



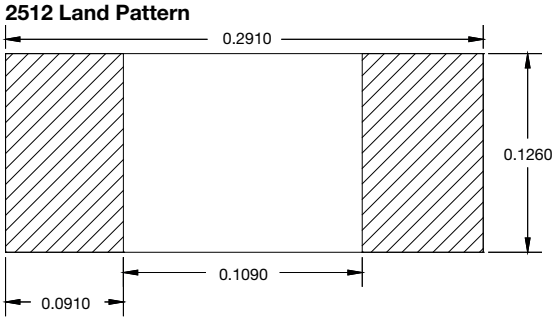
1206 Land Pattern



0805 Land Pattern

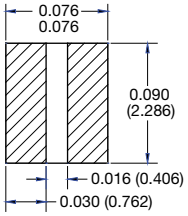


2512 Land Pattern

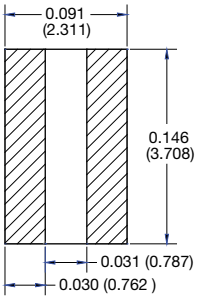


Thin Film Surface Mount Chip Resistors Long Axis Termination (L Series)

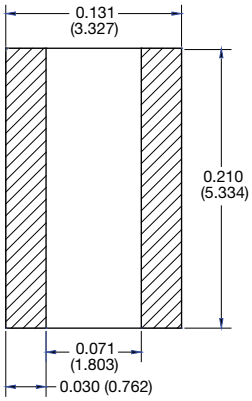
0508 Land Pattern



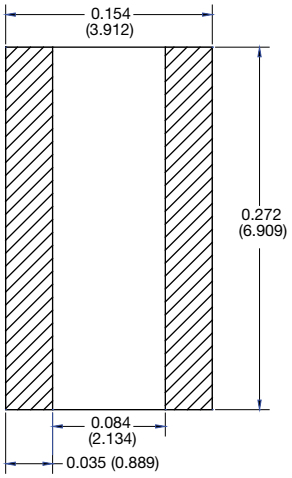
0612 Land Pattern



1020 Land Pattern

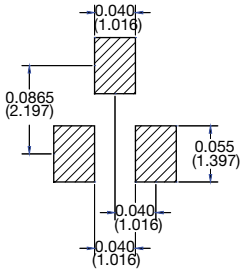


1225 Land Pattern

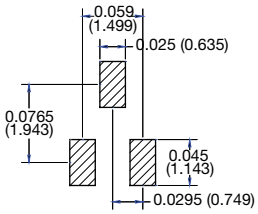


Surface Mount Networks (MPM, MP3, MP4 Series)

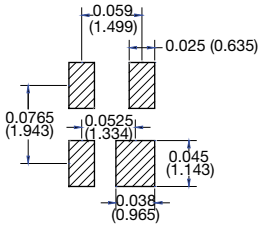
SOT-23 (MPM, MPMA)



SC70-3 (MP3)

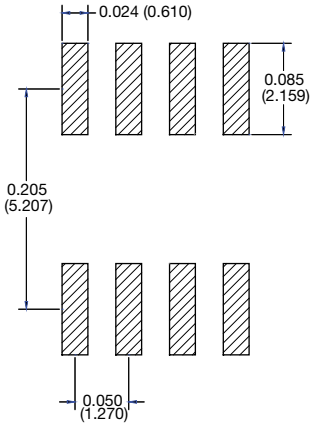


SC70-4 (MP4)

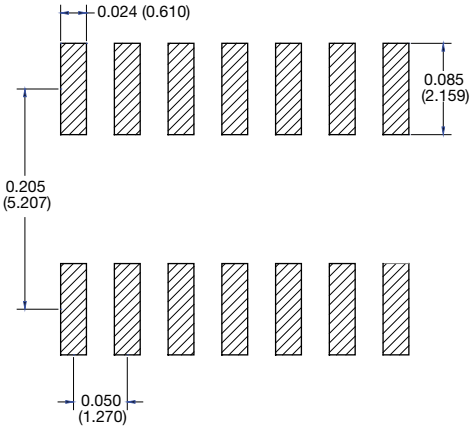


Surface Mount Networks SOIC Narrow Body 150 mils (ORN, CSO, MOMC, HTRN, AORN, MORN Series)

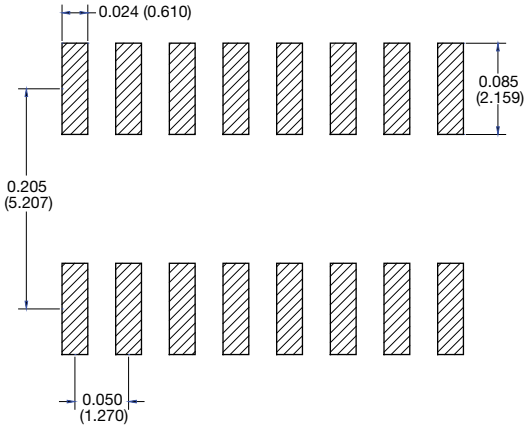
SOIC-8
(ORN, HTRN, AORN, CSO-8)



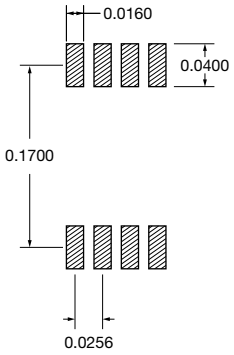
SOIC-14
(NOMC-14, NOMCA-14, CSO-14)



SOIC-16
(NOMC-16, NOMCA-16, CSO-16, VSOR-16)

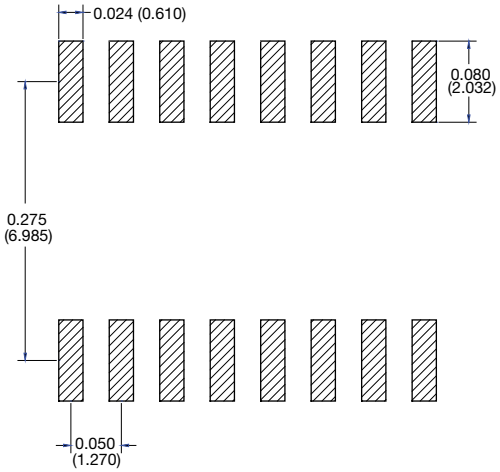


MORN MSOP MO-187AA
(MORN-8)



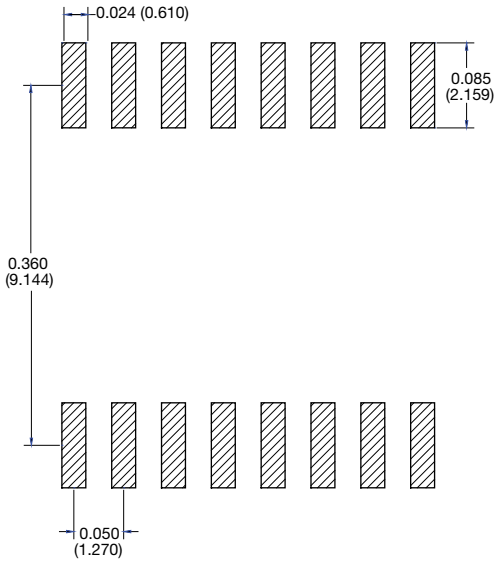
Surface Mount Networks SOIC Medium Body 220 mils (TOMC Series)

SOIC-16 (TOMC)

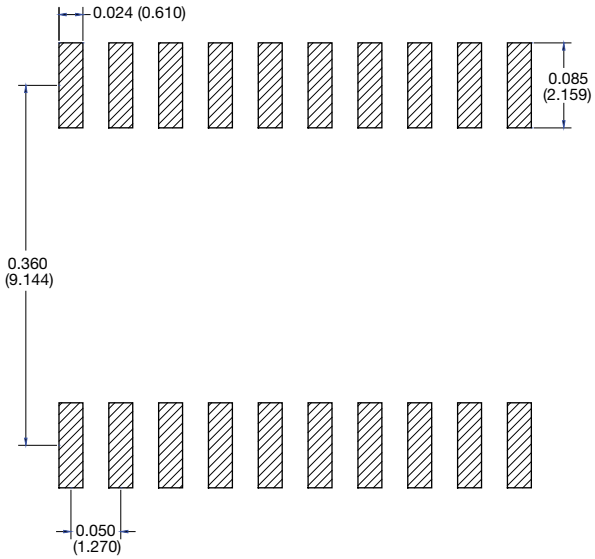


Surface Mount Networks SOIC Wide Body 300 mils (WOMC Series)

SOIC-16 (WOMC-16)



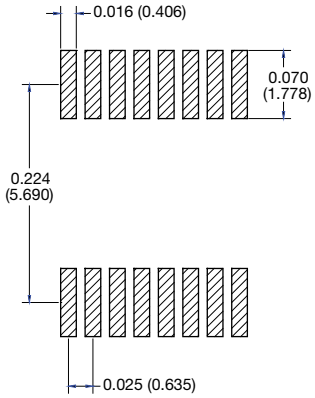
SOIC-20 (WOMC-20)



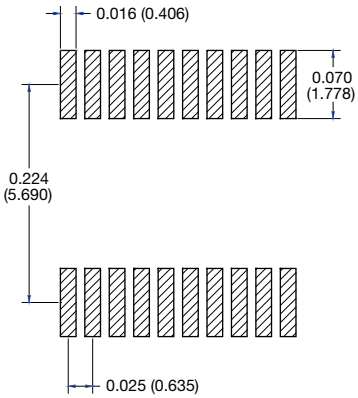
Surface Mount Networks High Density SSOP, TSOP (VSSR, VTSR Series)

SSOP MO-137

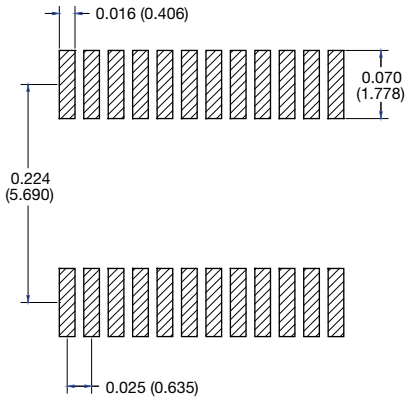
VSSR-16



OSOP-16, OSOP-20, OSOP-24, VSSR-20

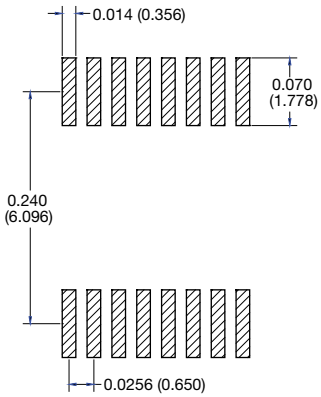


VSSR-24, HD-CSO-24

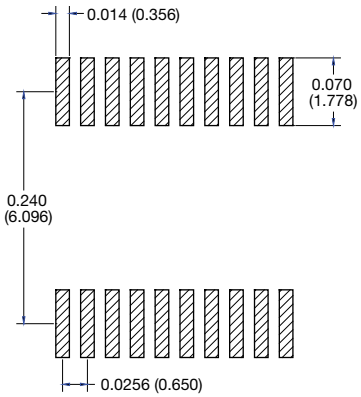


TSSOP MO-153

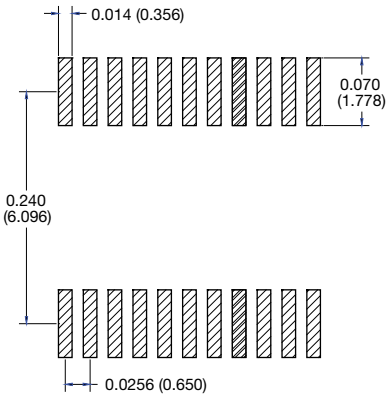
VTSR-16



VTSR-20

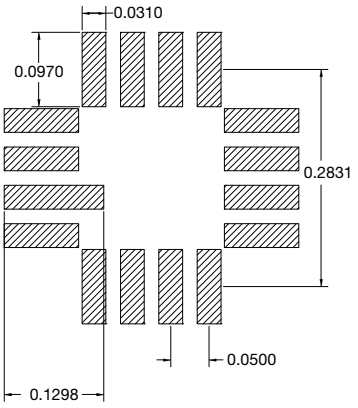


VTSR-24

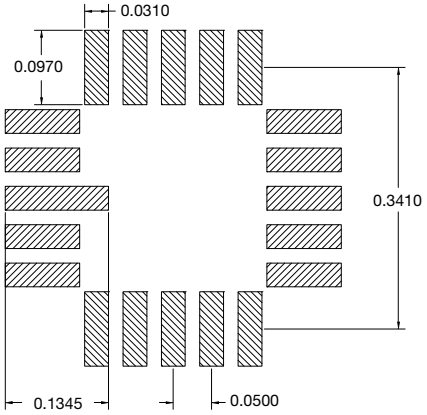


Surface Mount Leadless Networks (LCC Series)

16 Pin LCC

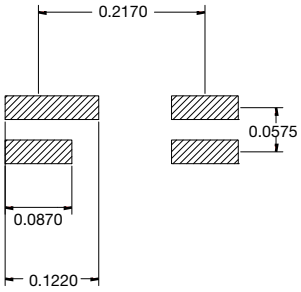


20 Pin LCC



Surface Mount Leadless Networks (MPH Series)

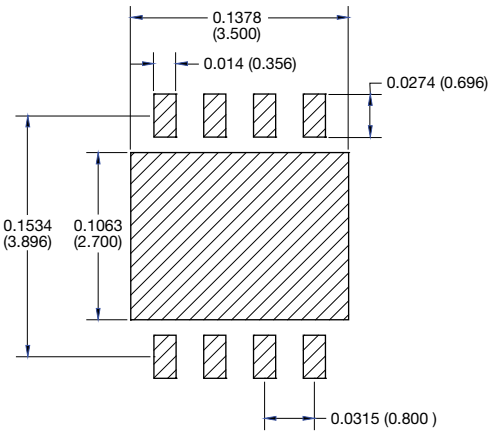
4 Pin LCC



Surface Mount Leadless Packages DUAL/ QUAD Flat No Lead (DFN, QFN Series)

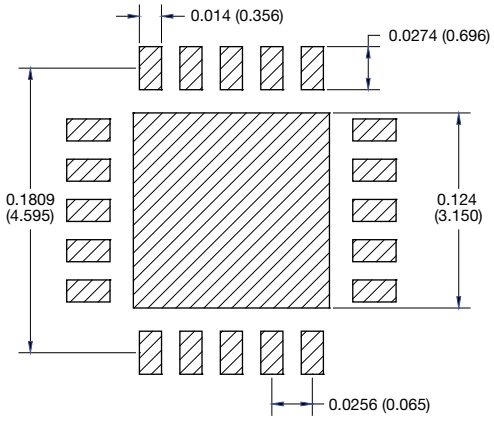
DFN MLP

DFN-8 4 x 5 mm Sq



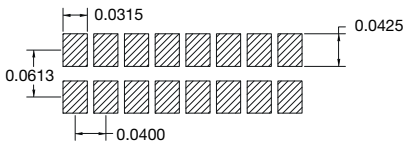
QFN MLP

QFN-20 5 x 5 mm Sq

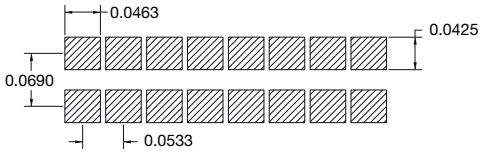


Surface Mount Leadless Resistor Arrays (PR Series)

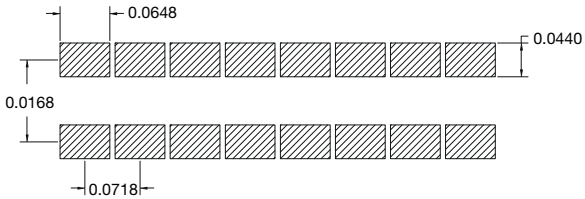
PR 100 (2 to 8 resistors)



PR 135 (2 to 8 resistors)



PR 182 (2 to 8 resistors)

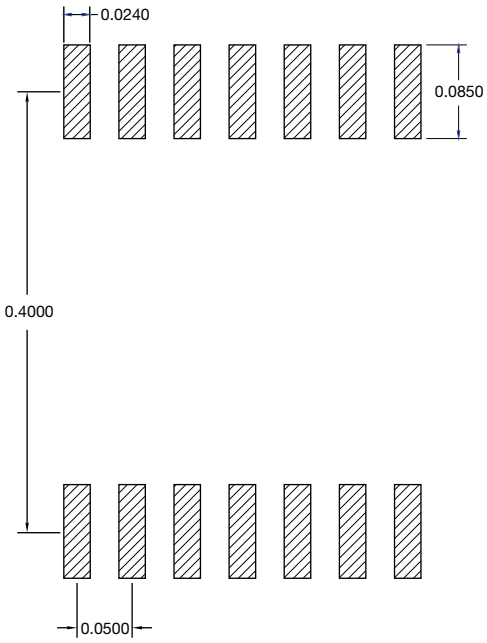


Note

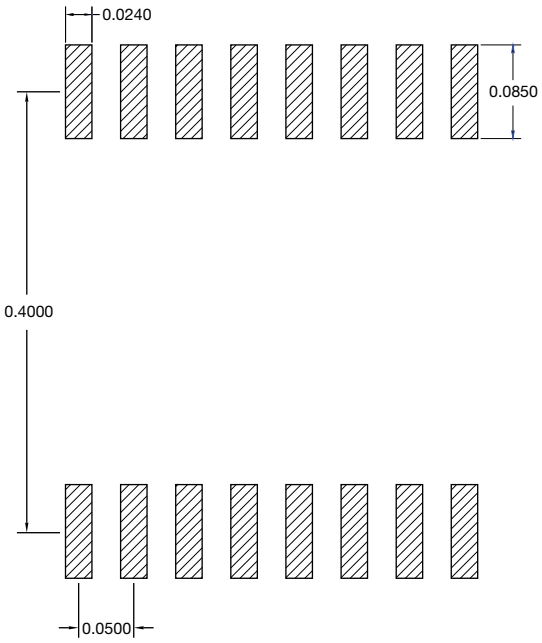
- All dimensions in inches (mm)

Flatpack

14 Pin Bottom Brazed Flatpack



16 Pin Bottom Brazed Flatpack



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