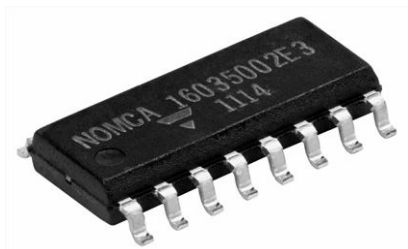


Molded, 50 mil Pitch, Dual-In-Line Thin Film Resistor, Precision Automotive, AEC-Q200 Qualified, Networks



The NOMCA series features a standard 14 pin or 16 pin narrow body (0.150") small outline SMT package. The network is constructed with tantalum nitride resistor film on high purity alumina substrate for improved ESD and moisture protection. Custom schematics are available consult factory.

FEATURES

- Standard 14 pins and 16 pins counts (0.150" narrow body) JEDEC MS-012 variation AB and AC
- Rugged molded case construction
- Excellent long term ratio stability ($\Delta R \pm 0.015\%$)
- Low TCR tracking ± 5 ppm/ $^{\circ}\text{C}$
- AEC-Q200 ESD rated 1 kV ($< 10\text{ k}\Omega$)
- AEC-Q200 ESD rated 2 kV ($> 10\text{ k}\Omega$)
- Compliant to RoHS Directive 2011/65/EU
- Halogen-free according to IEC 61249-2-21 definition



RoHS*
COMPLIANT
HALOGEN
FREE

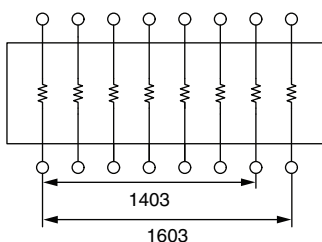
Note

* Pb containing terminations are not RoHS compliant, exemptions may apply

TYPICAL PERFORMANCE

	ABSOLUTE	TRACKING
TCR	25	5
	ABSOLUTE	RATIO
TOL.	0.10	0.05

SCHEMATICS



The 03 circuit provides a choice of 7 or 8 equal value resistors each connected between a common lead (14 or 16). Custom schematics available.

STANDARD RESISTANCE OFFERING (Equal Value Resistors)	
ISOLATED (03) SCHEMATIC	
	1 k Ω
	2 k Ω
	5 k Ω
	10 k Ω
	20 k Ω
	50 k Ω

Note

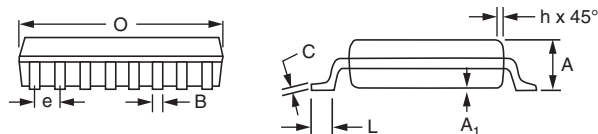
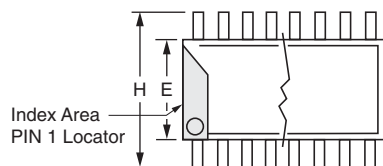
- Consult factory for additional values

STANDARD ELECTRICAL SPECIFICATIONS

TEST	SPECIFICATIONS	CONDITIONS
Material	Tantalum nitride (Ta ₂ N)	-
Pin/Lead Number	14, 16	-
Resistance Range	1 k Ω to 50 k Ω each resistor	-
TCR: Absolute	± 25 ppm/ $^{\circ}$ C (standard)	- 55 $^{\circ}$ C to + 125 $^{\circ}$ C
TCR: Tracking	± 5 ppm/ $^{\circ}$ C (typical)	- 55 $^{\circ}$ C to + 125 $^{\circ}$ C
Tolerance: Absolute	± 0.10 % to ± 1 %	+ 25 $^{\circ}$ C
Tolerance: Ratio	± 0.05 % to ± 0.1 %	+ 25 $^{\circ}$ C
Power Rating: Resistor	100 mW (typical) (03) schematic	Maximum at + 70 $^{\circ}$ C
Power Rating: Package	400 mW/500 mW	Maximum at + 70 $^{\circ}$ C
Stability: Absolute	$\Delta R \pm 0.05$ %	1000 h at + 125 $^{\circ}$ C
Stability: Ratio	$\Delta R \pm 0.015$ %	1000 h at + 125 $^{\circ}$ C
Voltage Coefficient	< 0.1 ppm/V	-
Working Voltage	100 V max. not to exceed $\sqrt{P \times R}$	-
Operating Temperature Range	- 55 $^{\circ}$ C to + 125 $^{\circ}$ C	-
Storage Temperature Range	- 55 $^{\circ}$ C to + 150 $^{\circ}$ C	-
Noise	≤ -30 dB	-
Thermal EMF	0.08 μ V/ $^{\circ}$ C	-
Shelf Life Stability: Absolute	$\Delta R \pm 0.01$ %	1 year at + 25 $^{\circ}$ C
Shelf Life Stability: Ratio	$\Delta R \pm 0.002$ %	1 year at + 25 $^{\circ}$ C

DIMENSIONS AND IMPRINTING in inches and millimeters

DIMENSION	14		16	
	INCHES	MILLIMETERS	INCHES	MILLIMETERS
H	0.235	5.969	0.235	5.969
E	0.154	3.911	0.154	3.910
O	0.340	8.363	0.390	9.906
A	0.063	1.600	0.063	1.600
e	0.050	1.270	0.050	1.270
B	0.015	0.381	0.015	0.381
C	0.008	0.203	0.008	0.203
L	0.025	0.635	0.025	0.635
A ¹	0.006	0.152	0.006	0.152
h	0.015	0.381	0.015	0.381


MECHANICAL SPECIFICATIONS

Resistive Element	Tantalum nitride (Ta ₂ N)
Substrate Material	Ceramic
Body	Molded epoxy
Terminals	Copper alloy
Lead (Pb)-free Option	100 % matte tin plate or Ni/Pd/Au solder free option

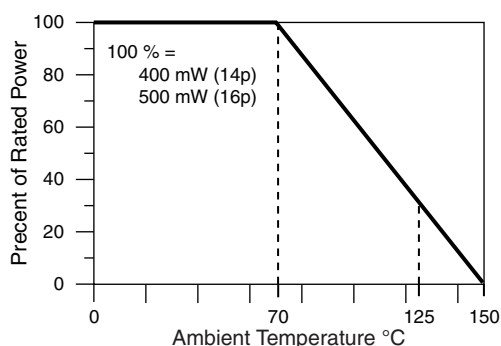
**ORDERING INFORMATION CHECK LIST (Customs)**

Special requirements should be identified in advance, but as a minimum, you should have the following information ready.

ELECTRICAL	MECHANICAL
1. Resistors, by value and tolerance 2. Reference resistor(s) and matching of which resistors to which reference resistors 3. Reference by ratio 4. Absolute temperature coefficient of resistivity 5. Temperature tracking of subordinate resistors to reference resistor(s) 6. Maximum operating voltage 7. Resistor power ratings 8. Operating temperature range	1. Maximum allowable seated height (from PC board to top of network) 2. Special marking concerns 3. Schematic pin out of package

ENVIRONMENTAL TESTS (Vishay Performance vs. AEC-Q200 Requirements)

ENVIRONMENTAL TEST		CONDITONS	LIMITS PER AEC-Q200	TYPICAL VISHAY PERFORMANCE < 10K	TYPICAL VISHAY PERFORMANCE > 10K
Resistance Temperature Characteristic		- 55 °C to + 125 °C	± 25 ppm/°C	15 ppm/°C	15 ppm/°C
Max. Ambient Temperature at Rated Wattage			+ 70 °C	+ 70 °C	+ 70 °C
Max. Ambient Temperature at Power Derating			+ 150 °C	+ 150 °C	+ 150 °C
High Temperature Exposure	ΔR	MIL-STD-202, 108, 1000 h at 125 °C	± 0.20 %	0.005 %	0.012 %
Temperature Cycling	ΔR	JESD22, A104, 1000 cycles, - 55 °C to + 125 °C	± 0.25 %	0.004 %	0.004 %
Moisture Resistance	ΔR	MIL-STD-202 method 106	± 0.20 %	0.007 %	0.007 %
Biased Humidity	ΔR	MIL-STD-202, 103, 1000 h at 85 °C, 85 % RH, 10 % P	± 0.25 %	0.021 %	0.033 %
Life	ΔR	MIL-STD-202, 108, 1000 h at 125 °C	± 0.10 %	0.012 %	0.029 %
Mechanical Shock	ΔR	MIL-STD-202 method 213, condition C	± 0.25 %	0.001 %	0.001 %
Vibration	ΔR	MIL-STD-202 method 204, 10 Hz to 2 kHz	± 0.25 %	0.001 %	0.001 %
Resistance to Soldering Heat	ΔR	MIL-STD-202, 204, condition B	± 0.10 %	- 0.002 %	0.001 %
Electrostatic Discharge	ΔR	AEC-Q200-002 at 1 kV, human body	± 0.50 %	0.065 %	
		AEC-Q200-002 at 2 kV, human body	± 0.50 %		0.170 %
Solderability		J-STD-002 method B and B1	95 %	Acceptable	Acceptable
Terminal Strength	ΔR	AEC-Q200-006 at 1 kg for 60 s		Acceptable	Acceptable
Flame Retardance		AEC-Q200-001 Para 4.0		Acceptable	Acceptable

DERATING CURVE



GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: NOMCA14031002BUF

N	O	M	C	A	1	4	0	3	1	0	0	2	A	T	1
GLOBAL MODEL (4 or 5 digits)		PINS		SCHEMATIC		RESISTANCE		TOLERANCE AND RATIO TOLERANCE		PACKAGING					
NOMCA (Lead (Pb)-free) (e3)		14 16		03 = 7 or 8 isolated equal value resistors		First 3 digits are significant figures and the last digit specifies the number of zeros to follow. Example: 1002 = 10K		Abs. Tol. Ratio A = 0.1 % ⁽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 T0 = 100 min., 100 mult T1 = 1000 min., 1000 mult ⁽²⁾ T3 = 300 min., 300 mult T5 = 500 min., 500 mult TF = Full reel 2500 TS = 100 min., 1 mult UF = TUBED					

Notes

⁽¹⁾ Tolerance available 1K and up

⁽²⁾ Preferred packaging code



Vishay Dale Thin Film Land Patterns

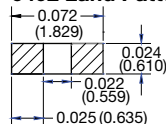
1. Scope

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.

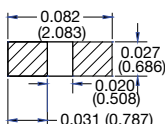
2. Product Series

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

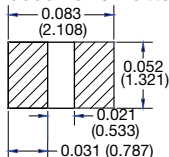
0402 Land Pattern



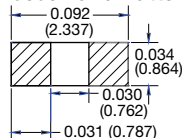
0502 Land Pattern



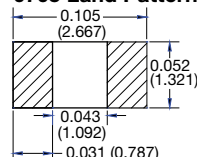
0505 Land Pattern



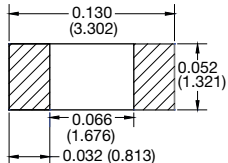
0603 Land Pattern



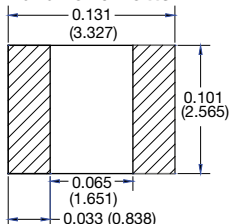
0705 Land Pattern



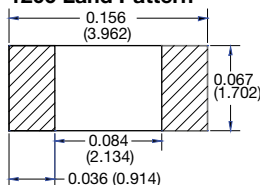
1005 Land Pattern



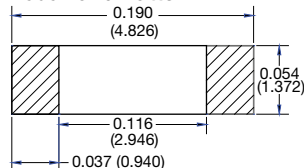
1010 Land Pattern



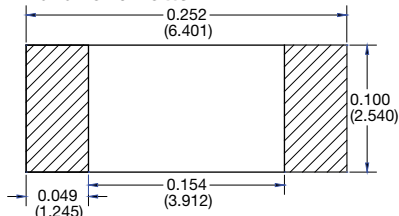
1206 Land Pattern



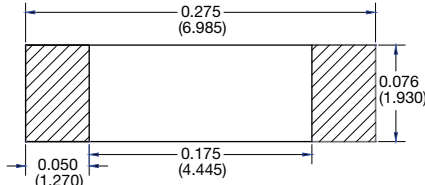
1505 Land Pattern



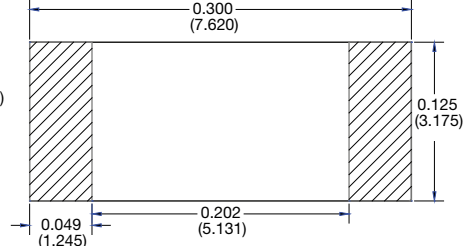
2010 Land Pattern



2208 Land Pattern



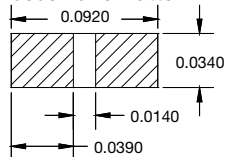
2512 Land Pattern



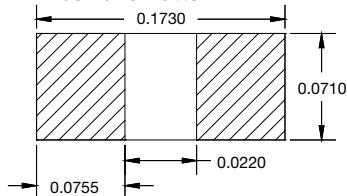


Thin Film Surface Mount Chip Resistors (PHP, PCAN Series)

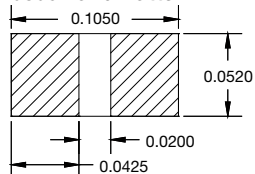
0603 Land Pattern



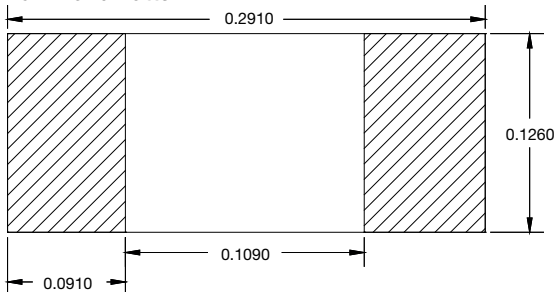
1206 Land Pattern



0805 Land Pattern

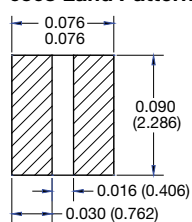


2512 Land Pattern

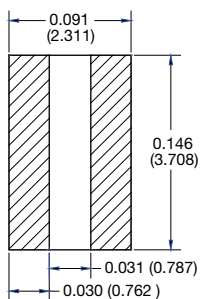


Thin Film Surface Mount Chip Resistors Long Axis Termination (L Series)

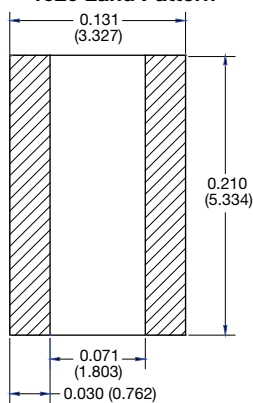
0508 Land Pattern



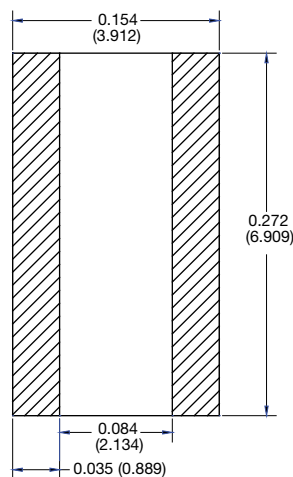
0612 Land Pattern



1020 Land Pattern



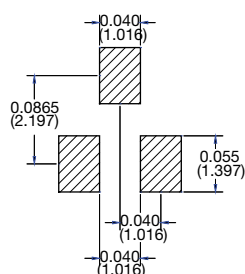
1225 Land Pattern



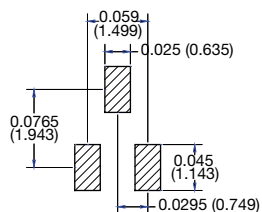


Surface Mount Networks (MPM, MP3, MP4 Series)

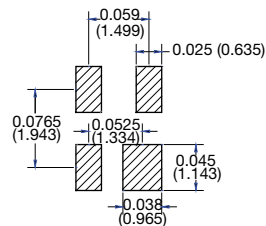
SOT-23 (MPM, MPMA)



SC70-3 (MP3)

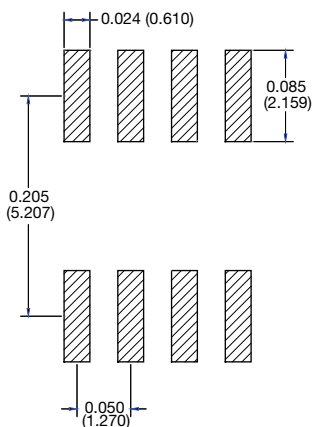


SC70-4 (MP4)

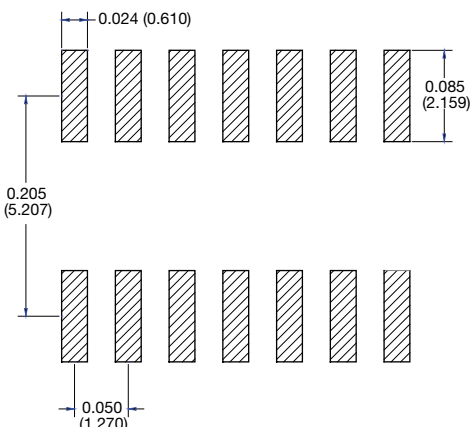


Surface Mount Networks SOIC Narrow Body 150 mils (ORN, CSO, MOMC, HTRN, AORN, MORN Series)

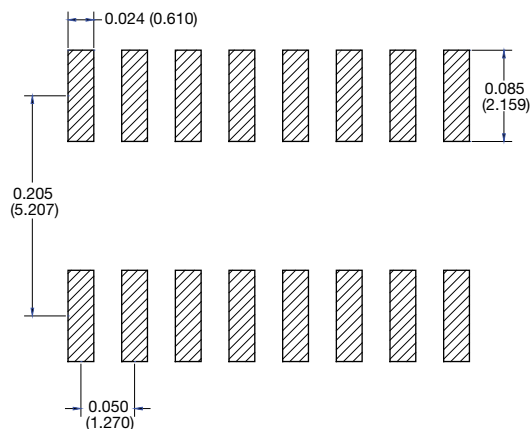
SOIC-8 (ORN, HTRN, AORN, CSO-8)



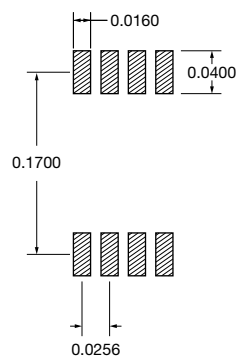
SOIC-14 (NOMC-14, NOMCA-14, CSO-14)



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

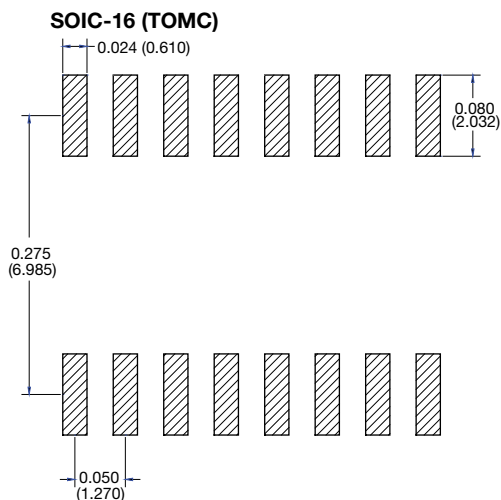


MORN MSOP MO-187AA (MORN-8)

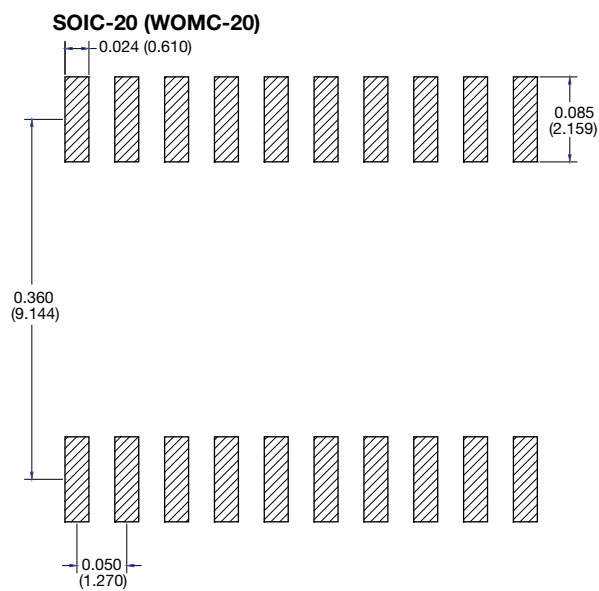
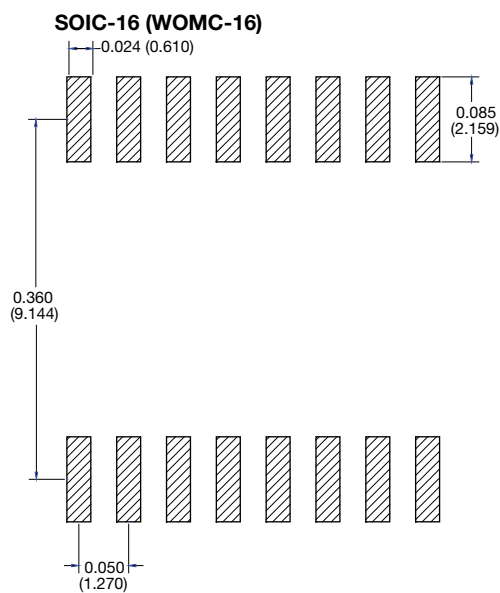




Surface Mount Networks SOIC Medium Body 220 mils (TOMC Series)



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

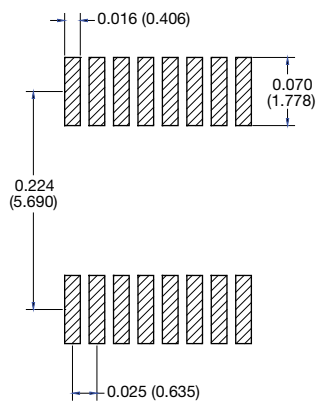




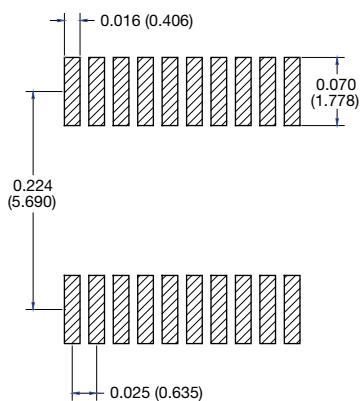
Surface Mount Networks High Density SSOP, TSOP (VSSR, VTSR Series)

SSOP MO-137

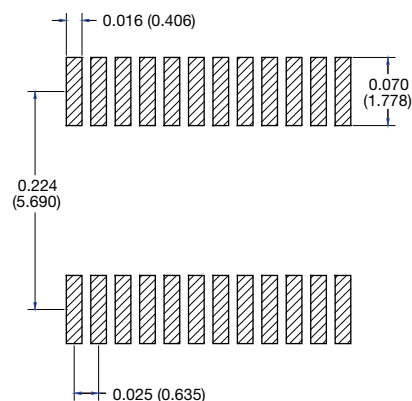
OSOP-16, VSSR-16



OSOP-20, VSSR-20

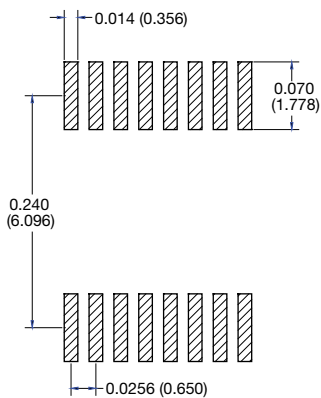


OSOP-24, VSSR-24, HD-CSO-24

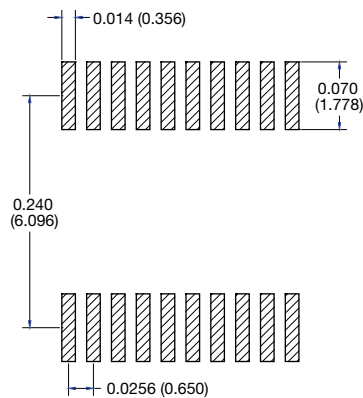


TSSOP MO-153

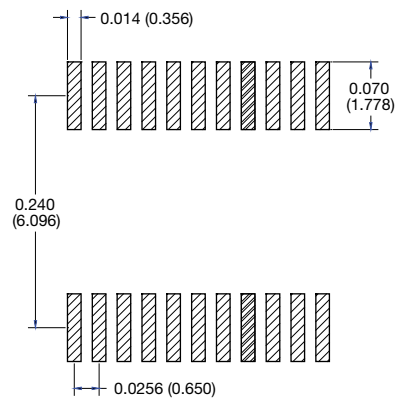
VTSR-16



VTSR-20

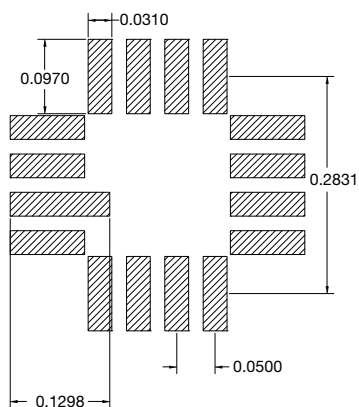


VTSR-24

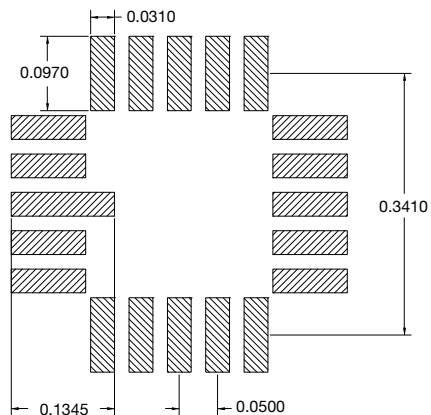


Surface Mount Leadless Networks (LCC Series)

16 Pin LCC

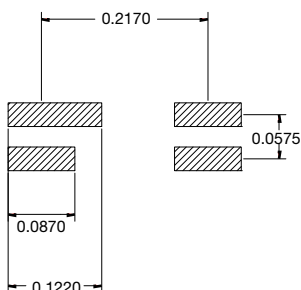


20 Pin LCC



Surface Mount Leadless Networks (MPH Series)

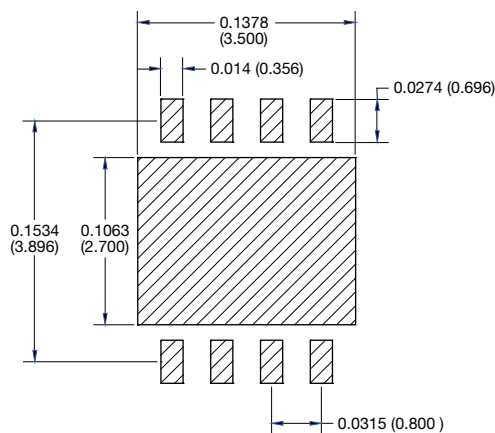
4 Pin LCC



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

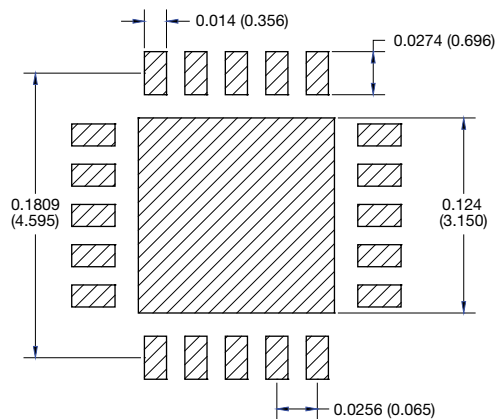
DFN MLP

DFN-8 4 x 5 mm Sq



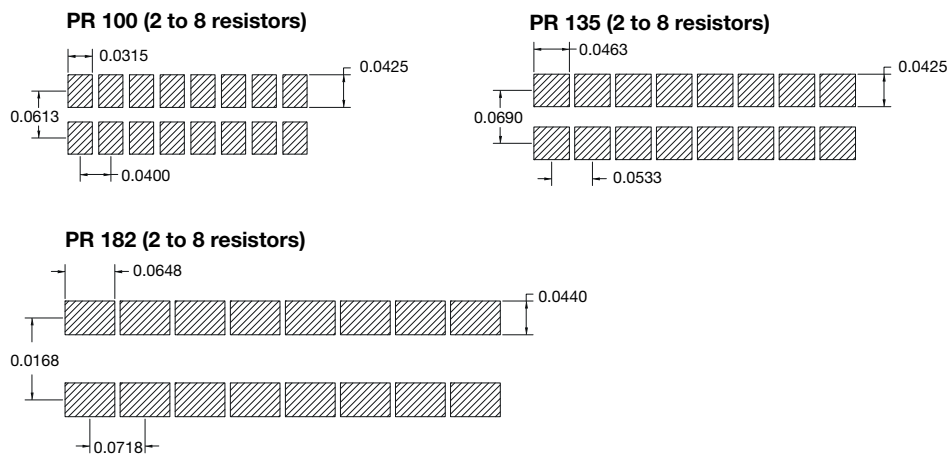
QFN MLP

QFN-20 5 x 5 mm Sq





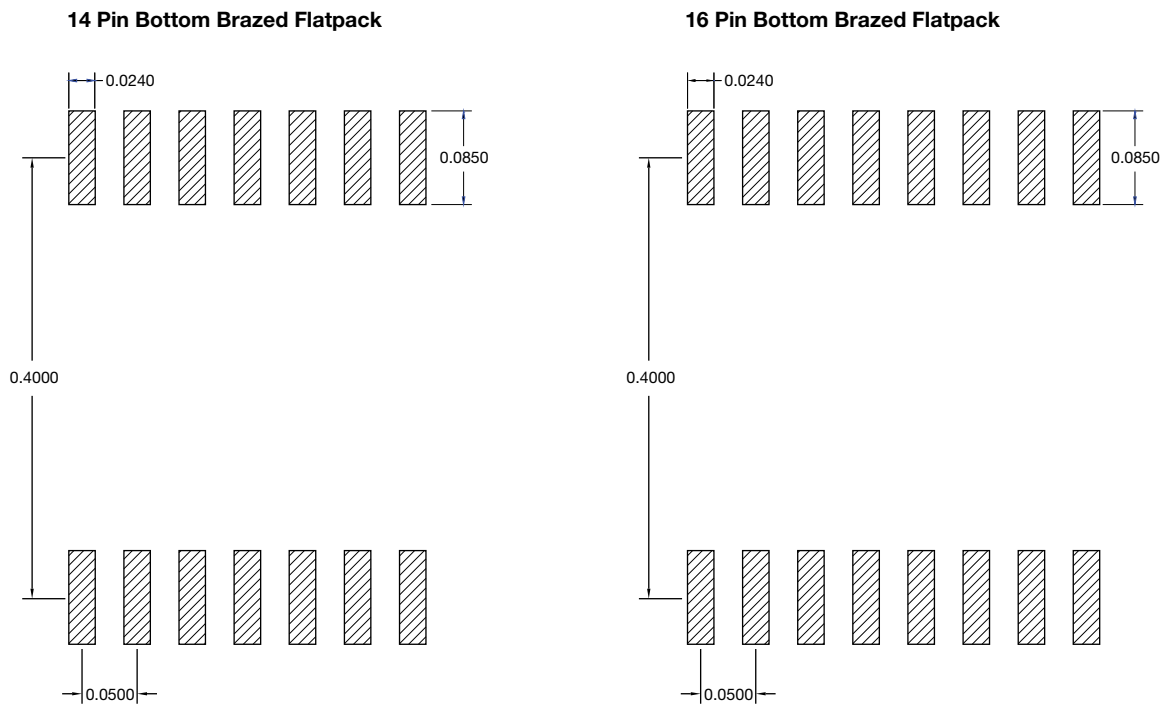
Surface Mount Leadless Resistor Arrays (PR Series)



Note

- All dimensions in inches (mm)

Flatpack





Disclaimer

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Mouser Electronics

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Vishay:

<u>NOMCA14031001ATS</u>	<u>NOMCA14031002ATS</u>	<u>NOMCA14032001ATS</u>	<u>NOMCA14032002ATS</u>	<u>NOMCA14035001ATS</u>
<u>NOMCA14035002ATS</u>	<u>NOMCA16031001ATS</u>	<u>NOMCA16031002ATS</u>	<u>NOMCA16032001ATS</u>	<u>NOMCA16032002ATS</u>
<u>NOMCA16035001ATS</u>	<u>NOMCA16035002ATS</u>	<u>NOMCA14031001AT5</u>	<u>NOMCA14032001AT5</u>	<u>NOMCA14035001AT5</u>
<u>NOMCA14031002AT5</u>	<u>NOMCA14032002AT5</u>	<u>NOMCA14035002AT5</u>	<u>NOMCA16031001AT5</u>	<u>NOMCA16032001AT5</u>
<u>NOMCA16035001AT5</u>	<u>NOMCA16031002AT5</u>	<u>NOMCA16032002AT5</u>	<u>NOMCA16035002AT5</u>	