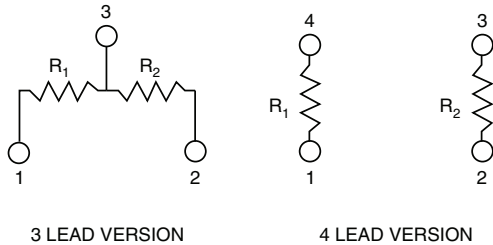


# Molded, SC70 Thin Film Resistor, Surface Mount Network



Vishay Dale Thin Film MP Series Dividers provide  $\pm 2$  ppm/ $^{\circ}\text{C}$  tracking and a ratio tolerance as tight as  $\pm 0.05\%$ , ultra small size, 3 or 4 lead package and exceptional stability for all surface mount applications. The standard SC70 package format with common standard resistance values provide easy selection for most applications requiring matched pair resistor elements. If you require a non-standard ratio, consult the applications engineering group as we may be able to meet your requirements.

## SCHEMATIC



## FEATURES

- Small physical size EIAJ SC70 format
- Tight resistance ratio tolerances  $\pm 0.05\%$
- Low TCR tracking  $\pm 2$  ppm
- Excellent long term ratio stability ( $\Delta R \pm 0.015\%$  at  $70^{\circ}\text{C}$  for 2000 h)
- Center-tapped or isolated matched pair resistors
- Compliant to RoHS Directive 2002/95/EC
- 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	2
	ABSOLUTE	RATIO
TOL.	0.1	0.05

## STANDARD RESISTANCE VALUES

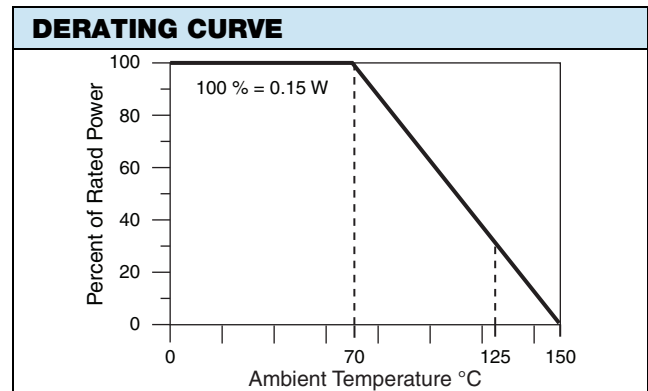
TYPE	STANDARD VALUES	
	R <sub>1</sub> ( $\Omega$ )	R <sub>2</sub> ( $\Omega$ )
MP3	500	500
	1K	1K
	10K	10K
MP4	1K	1K
	10K	10K
	50K	50K

## STANDARD ELECTRICAL SPECIFICATIONS

TEST	SPECIFICATIONS	CONDITIONS
Material	Passivated nichrome	-
Pin/Lead Number	3, 4	-
Resistance Range	100 $\Omega$ to 50 k $\Omega$ per resistor	-
TCR: Absolute	$\pm 25$ ppm/ $^{\circ}\text{C}$	- 55 $^{\circ}\text{C}$ to + 125 $^{\circ}\text{C}$
TCR: Tracking	$\pm 2$ ppm/ $^{\circ}\text{C}$ (typical)	- 55 $^{\circ}\text{C}$ to + 125 $^{\circ}\text{C}$
Tolerance: Absolute	$\pm 0.10\%$ to $\pm 1.0\%$	+ 25 $^{\circ}\text{C}$
Tolerance: Ratio	$\pm 0.05\%$ (standard), $\pm 1.0\%$	-
Power Rating: Resistor	0.075 W	Maximum at + 70 $^{\circ}\text{C}$
Power Rating: Package	0.150 W	Maximum at + 70 $^{\circ}\text{C}$
Stability: Absolute	$\Delta R \pm 0.05\%$	2000 h at + 70 $^{\circ}\text{C}$
Stability: Ratio	$\Delta R \pm 0.015\%$	2000 h at + 70 $^{\circ}\text{C}$
Voltage Coefficient	0.1 ppm/V	-
Working Voltage	100 V max. not to exceed $\sqrt{P \times R}$	-
Operating Temperature Range	- 55 $^{\circ}\text{C}$ to + 125 $^{\circ}\text{C}$	-
Storage Temperature Range	- 55 $^{\circ}\text{C}$ to + 150 $^{\circ}\text{C}$	-
Noise	< - 30 dB	-
Thermal EMF	0.1 $\mu\text{V}/^{\circ}\text{C}$	-
Shelf Life Stability: Absolute	$\Delta R \pm 0.01\%$	1 year at + 25 $^{\circ}\text{C}$
Shelf Life Stability: Ratio	$\Delta R \pm 0.002\%$	1 year at + 25 $^{\circ}\text{C}$

DIMENSIONS AND IMPRINTING in millimeters			
	<b>DIMENSION</b>	<b>MIN.</b>	<b>MAX.</b>
	A	0.800	1.100
	A1	0.000	0.100
	A2	0.800	1.000
	B	0.100	0.018
	b1	0.400	0.500
	b2	0.200	0.250
	D	1.800	2.200
	E	1.800	2.400
	E1	1.150	1.350
	e	1.300	-
	e2	0.650	-
L	0.100	0.030	

MECHANICAL SPECIFICATIONS	
Resistive Element	Passivated nichrome
Substrate Material	Silicon
Body	Molded epoxy
Terminals	Copper alloy
Lead (Pb)-free Option	100 % matte tin
Tin Lead Option	Sn85
Tin Lead and Lead (Pb)-free Finish	Plated



GLOBAL PART NUMBER INFORMATION											
New Global Part Numbering: <b>MP32001AWS</b>											
	M	P	3	2	0	0	1	A	W	S	
	M	P	T	4	2	0	0	1	B	T	1
GLOBAL MODEL (2 or 3 digits)	LEADS		RESISTANCE				TOLERANCE AND RATIO TOLERANCE		PACKAGING		
<b>MP</b> (Tin Lead)	3 4		The 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.  Example: 2001 = 2K (1K/1K) 2002 = 20K (10K/10K)				Abs. Tol.    Ratio <b>A</b> = 0.1 %    0.05 % <b>B</b> = 0.1 %    0.1 % <b>C</b> = 0.25 %    0.1 % <b>D</b> = 0.5 %    0.1 % <b>F</b> = 1.0 %    0.5 %		<b>BS</b> = BULK 100 min., 1 mult <b>WS</b> = WAFFLE 100 min., 1 mult  TAPE AND REEL <b>T1</b> = 1000 min., 1000 mult <sup>(1)</sup>		
<b>MPT</b> (Lead (Pb)-free) (e3)									<b>Note</b> <sup>(1)</sup> Preferred packaging code		
Historical Part Number example: <b>MP32002BW</b> (for reference purposes only)											
<b>MP</b>	<b>3</b>	<b>2002</b>	<b>B</b>	<b>W</b>							
SERIES	LEADS	RESISTANCE	TOLERANCE AND RATIO TOLERANCE	PACKAGING							



### Vishay Dale Thin Film Land Patterns

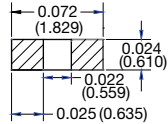
#### 1. Scope

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.

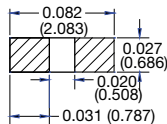
#### 2. Product Series

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

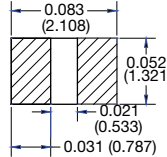
**0402 Land Pattern**



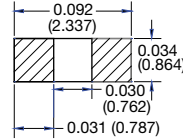
**0502 Land Pattern**



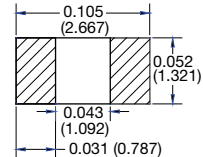
**0505 Land Pattern**



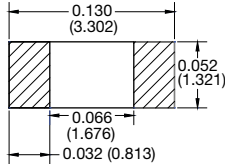
**0603 Land Pattern**



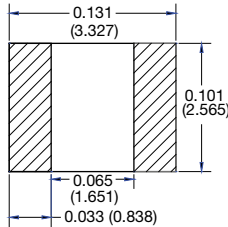
**0705 Land Pattern**



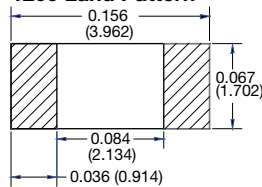
**1005 Land Pattern**



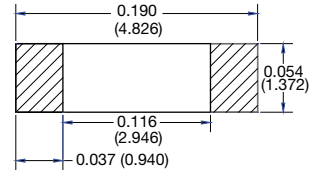
**1010 Land Pattern**



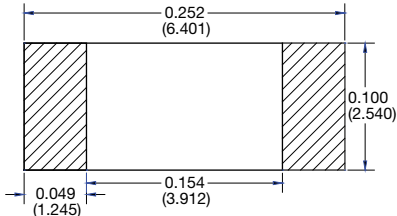
**1206 Land Pattern**



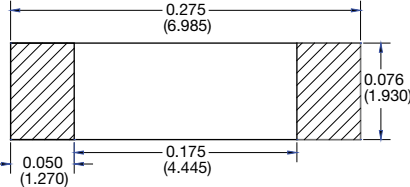
**1505 Land Pattern**



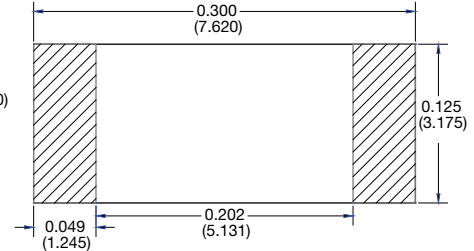
**2010 Land Pattern**



**2208 Land Pattern**

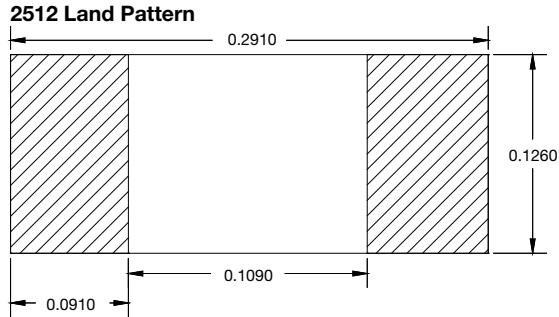
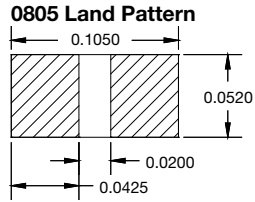
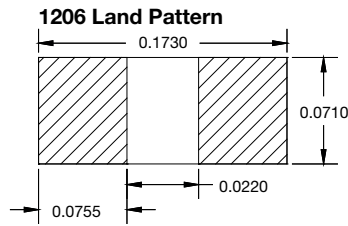
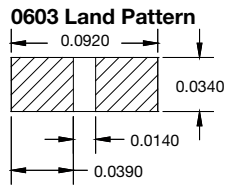


**2512 Land Pattern**

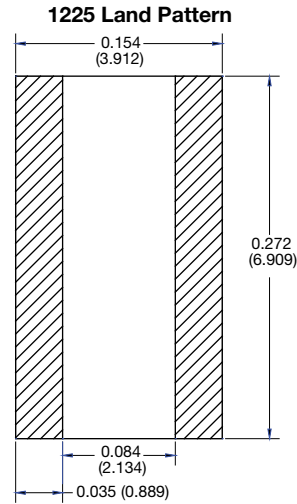
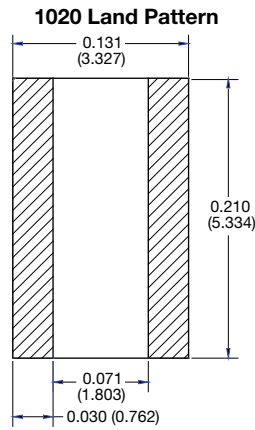
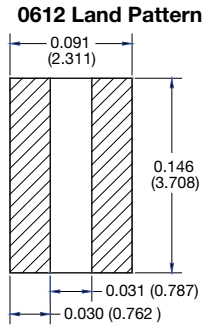
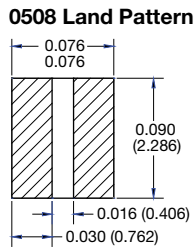




### Thin Film Surface Mount Chip Resistors (PHP, PCAN Series)

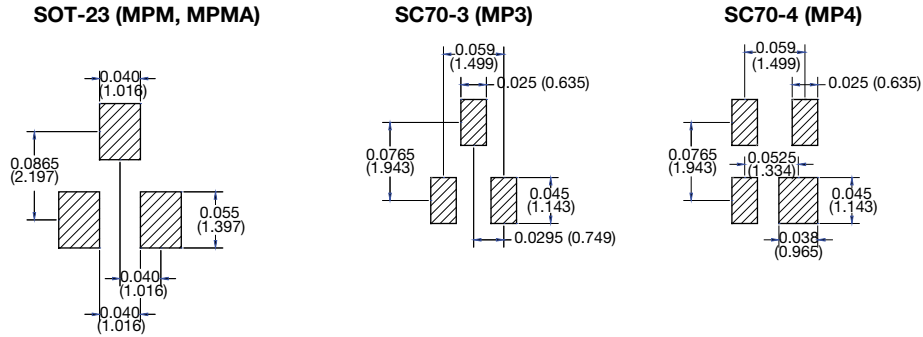


### Thin Film Surface Mount Chip Resistors Long Axis Termination (L Series)

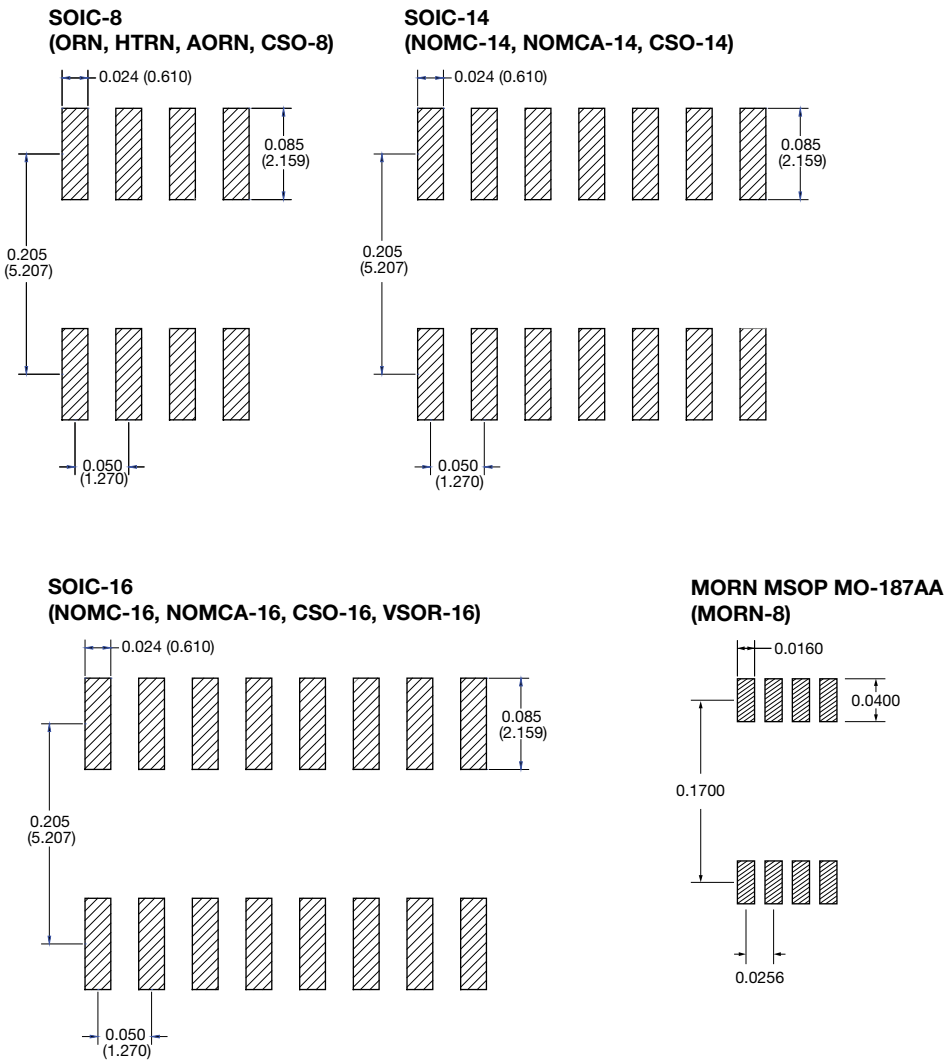




### Surface Mount Networks (MPM, MP3, MP4 Series)

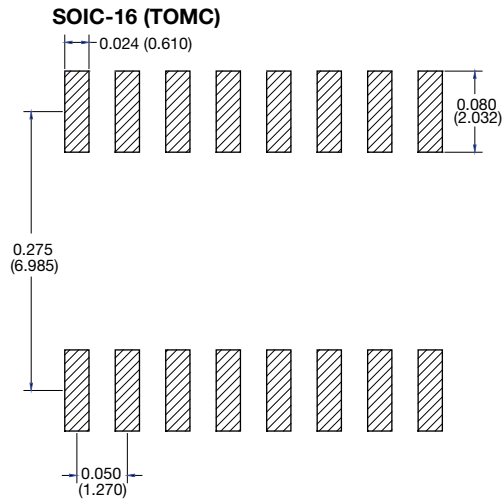


### Surface Mount Networks SOIC Narrow Body 150 mils (ORN, CSO, MOMC, HTRN, AORN, MORN Series)

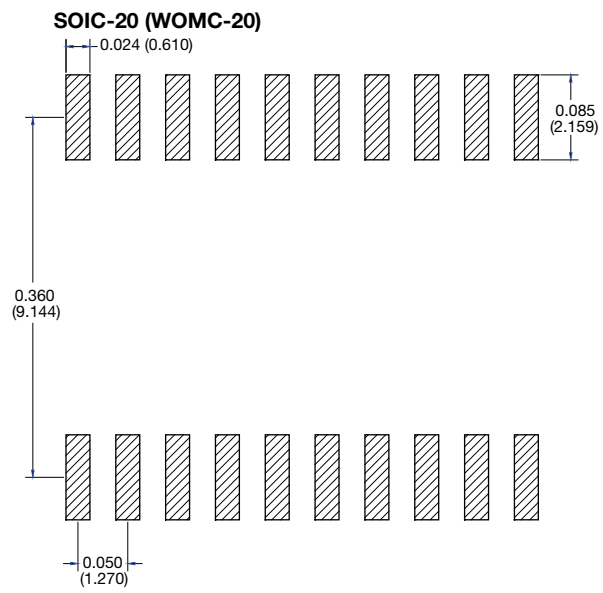
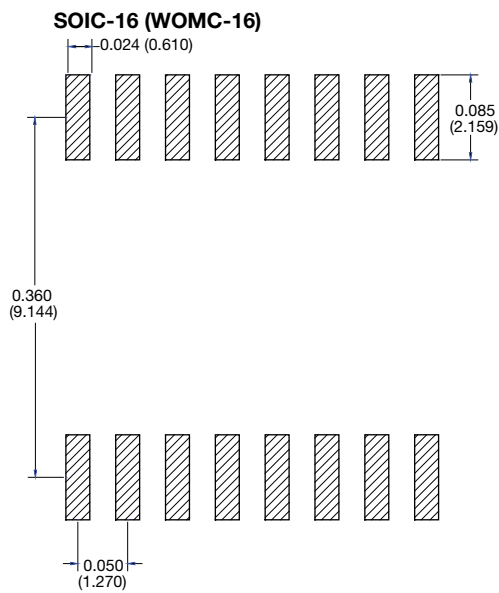




### Surface Mount Networks SOIC Medium Body 220 mils (TOMC Series)



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

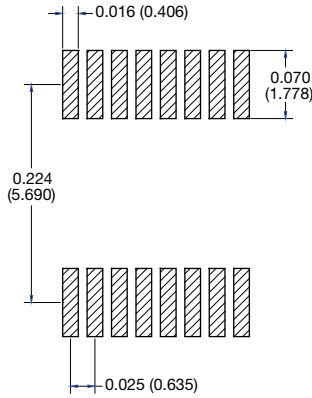




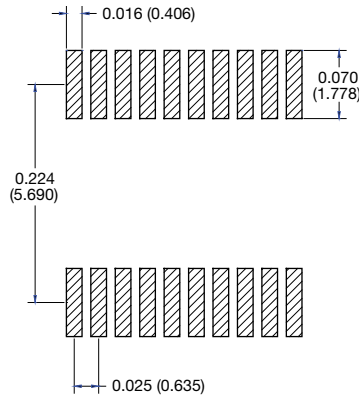
### Surface Mount Networks High Density SSOP, TSOP (VSSR, VTSR Series)

#### SSOP MO-137

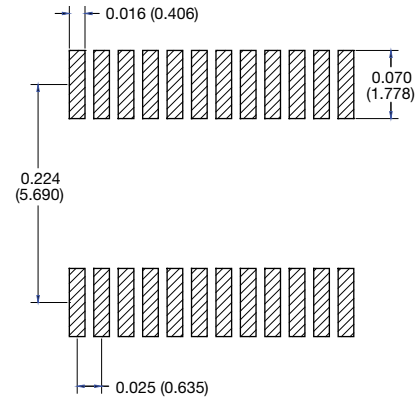
##### OSOP-16, VSSR-16



##### OSOP-20, VSSR-20

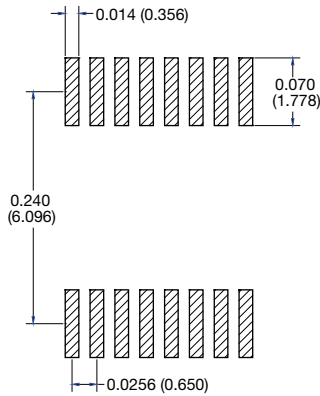


##### OSOP-24, VSSR-24, HD-CSO-24

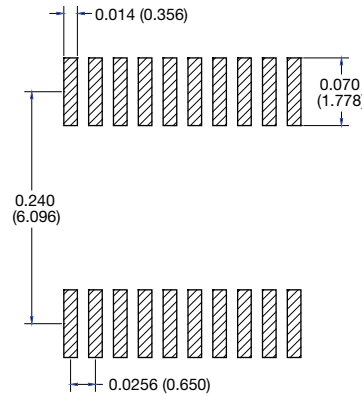


#### TSSOP MO-153

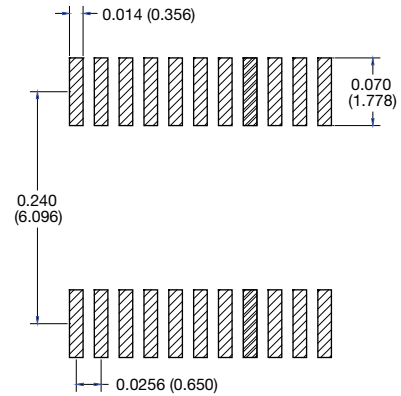
##### VTSR-16



##### VTSR-20

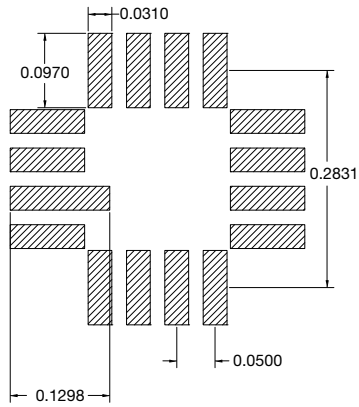


##### VTSR-24

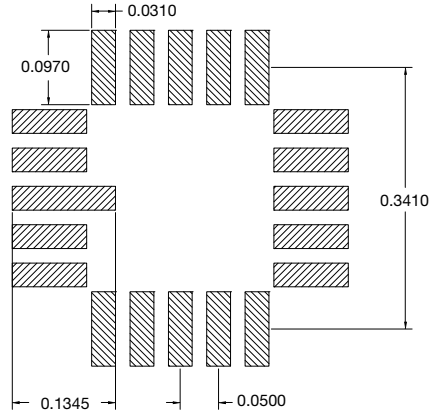


Surface Mount Leadless Networks (LCC Series)

**16 Pin LCC**

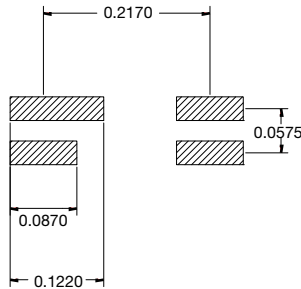


**20 Pin LCC**



Surface Mount Leadless Networks (MPH Series)

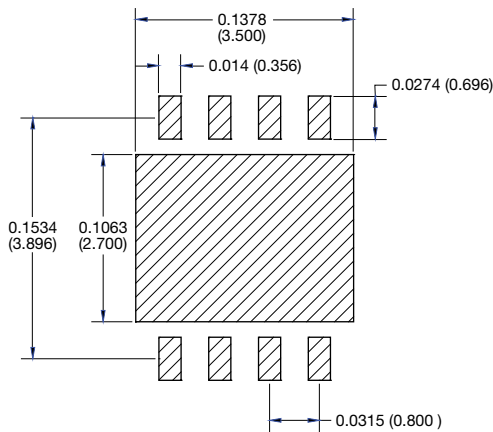
**4 Pin LCC**



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

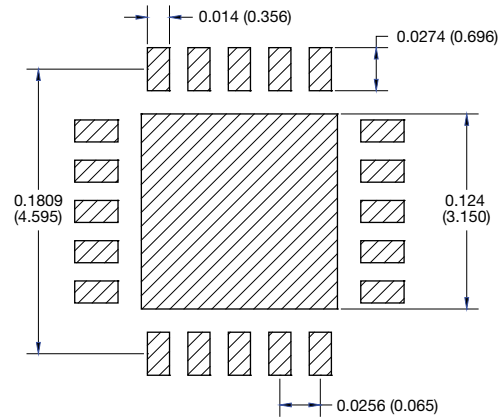
**DFN MLP**

**DFN-8 4 x 5 mm Sq**



**QFN MLP**

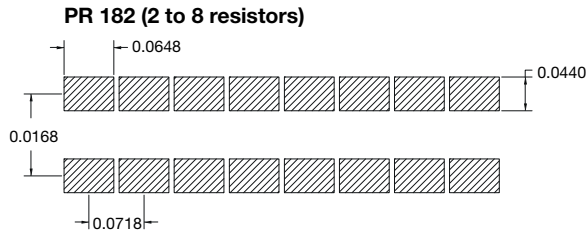
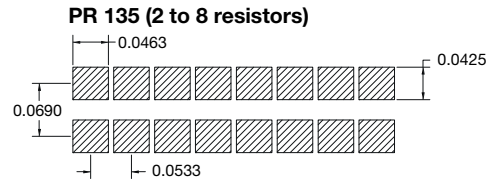
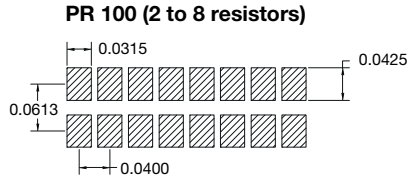
**QFN-20 5 x 5 mm Sq**







### Surface Mount Leadless Resistor Arrays (PR Series)

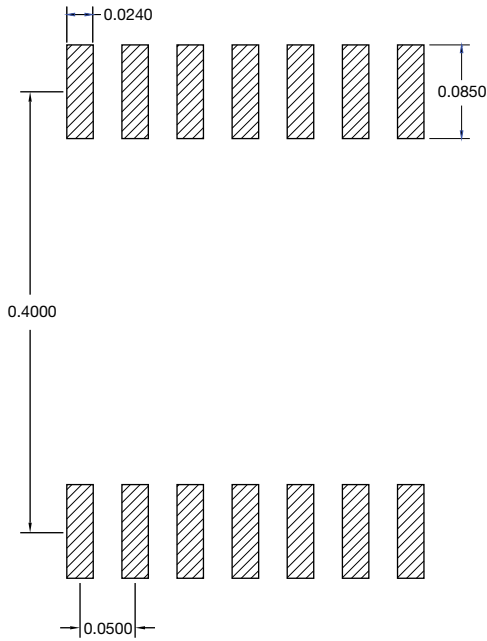


#### Note

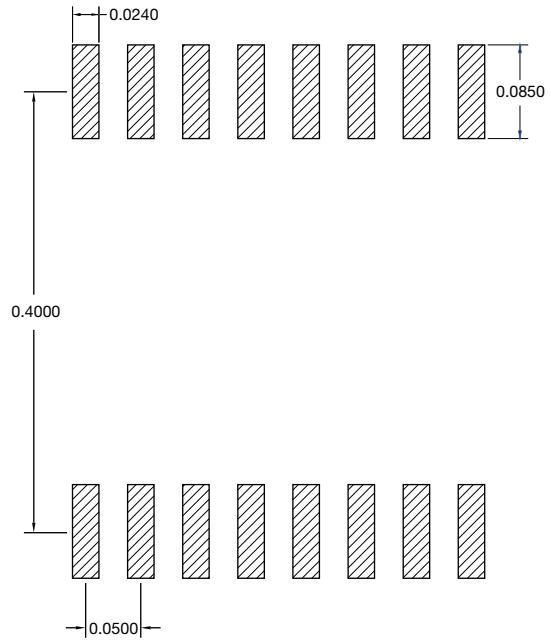
- All dimensions in inches (mm)

### Flatpack

#### 14 Pin Bottom Brazed Flatpack



#### 16 Pin Bottom Brazed Flatpack





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