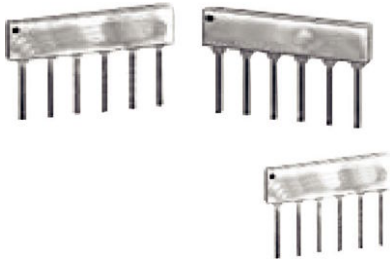


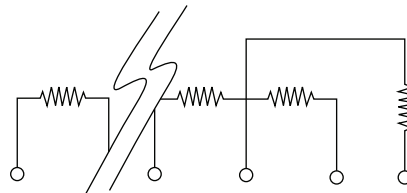
Ceramic Sandwich, Single-In-Line Thin Film Resistor, Through Hole Network (Low Profile 0.20 Custom)



Actual Size

Vishay Dale Thin Film presents a design concept in precision thin film resistor networks. The essence of this new concept is the marriage of two principle design elements . . . a unique resistive film, having electrical properties comparable to those of wire-wound resistors, and a rugged, low cost, ceramic package and an almost limitless variety of sizes and configurations.

SCHEMATIC



Custom schematics available.
Please consult factory.

FEATURES

- Gold-to-gold terminations. External leads are attached directly to gold pads on the ceramic substrate by thermo-compression bonding (no internal solder)
- Low profile (0.200 min.)
- Custom pin-outs available
- 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
TOL.	ABSOLUTE	RATIO
	0.05	0.01

STANDARD ELECTRICAL SPECIFICATIONS			
TEST	SPECIFICATIONS		CONDITIONS
Material	Passivated nichrome	Tantalum nitride	-
Pin/Lead Number	3 to 10		-
Resistance Range	20 Ω to 2000 kΩ (total)	20 Ω to 500 kΩ (total)	-
TCR: Absolute	± 10 ppm/°C to ± 25 ppm/°C	± 50 ppm/°C to ± 100 ppm/°C	- 55 °C to + 125 °C
TCR: Tracking	± 2 ppm/°C	± 5 ppm/°C	- 55 °C to + 125 °C
Tolerance: Absolute	± 0.05 % to ± 1.0 %		+ 25 °C
Tolerance: Ratio	± 0.01 % to ± 0.5 %	± 0.02 % to ± 0.5 %	+ 25 °C
Power Rating: Resistor	100 mW (per element)		Typical at + 25 °C
Power Rating: Package	-		-
Stability: Absolute	ΔR ± 0.05 %	ΔR ± 0.1 %	2000 h at + 70 °C
Stability: Ratio	ΔR ± 0.015 %	ΔR ± 0.02 %	2000 h at + 70 °C
Voltage Coefficient	< 0.1 ppm/V	< 0.1 ppm/V	-
Working Voltage	100 V		-
Operating Temperature Range	- 55 °C to + 125 °C		-
Storage Temperature Range	- 55 °C to + 150 °C		-
Noise	< - 30 dB		-
Thermal EMF	< 0.08 μV/°C		-
Shelf Life Stability: Absolute	ΔR ± 0.01 %		1 year at + 25 °C
Shelf Life Stability: Ratio	ΔR ± 0.002 %		1 year at + 25 °C

DIMENSIONS AND IMPRINTING in inches and millimeters			
	DIMENSION	INCHES	MILLIMETERS
	A	0.100 typ. ⁽¹⁾	2.54 typ.
	B	0.020 ± 0.002 typ.	0.51 ± 0.05 typ.
	C	0.125 min.	3.17 min.
	D	0.100 max.	2.54 max.
	E	0.010	0.25
	L (3 Pins)	0.320	8.13
	L (4 Pins)	0.420	10.67
	L (5 Pins)	0.520	13.21
	L (6 Pins)	0.620	15.75
	L (7 Pins)	0.720	18.25
L (8 Pins)	0.820	20.83	
L (9 Pins)	0.920	23.37	
L (10 Pins)	1.020	25.91	
H (3 Pins)	0.200 ⁽²⁾	7.11 ⁽²⁾	
H (4 Pins)			
H (5 Pins)			
H (6 Pins)			
H (7 Pins)			
H (8 Pins)			
H (9 Pins)			
H (10 Pins)			

Notes
⁽¹⁾ Non-accum.

⁽²⁾ Resistance value and schematic dependent. By occupying more than one 0.100 inch square, higher values are available.

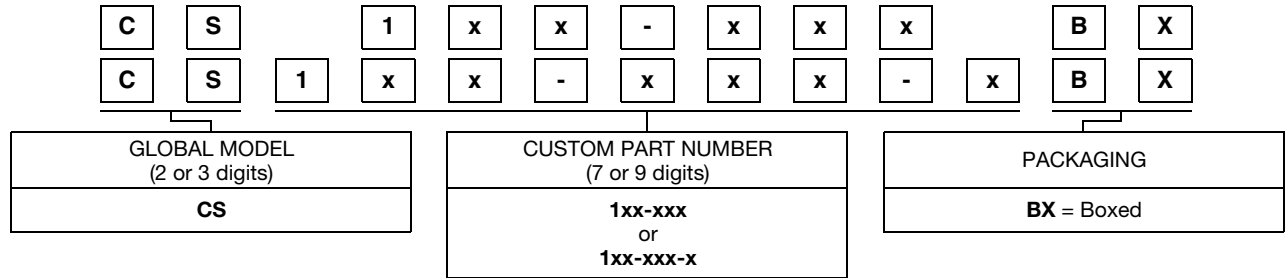
MECHANICAL SPECIFICATIONS	
Resistive Element	Passivated nichrome or tantalum nitride
Substrate Material	Alumina
Body	Ceramic
Terminals	Copper alloy
Plating	Gold
Tin/Lead Option	Sn63
Lead (Pb)-free Option	Sn96.5, Ag3.0, Cu0.5
Tin/Lead and Lead (Pb)-free Finish	Hot solder dip

ORDERING INFORMATION CHECK LIST	
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. Resistance 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 4. Specify if lead (Pb)-free
For additional assistance refer to Vishay Dale Thin Film's guide to understanding Thin Film precision. Resistor networks or application engineering. All standard products may be ordered directly from Vishay Dale Thin Film.	

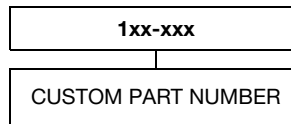


GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: CS1xx-xxxBX



Historical Part Number example: 1xx-xxx (for reference purposes only)





Vishay Dale Thin Film Land Patterns

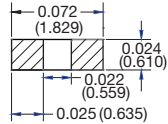
1. Scope

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.

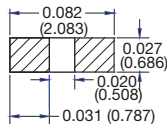
2. Product Series

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

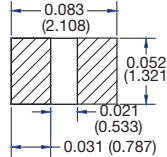
0402 Land Pattern



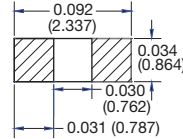
0502 Land Pattern



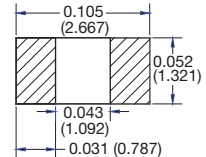
0505 Land Pattern



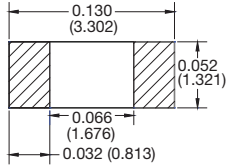
0603 Land Pattern



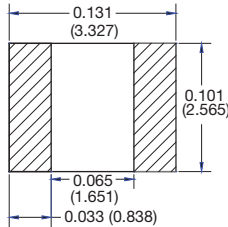
0705 Land Pattern



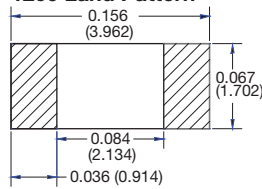
1005 Land Pattern



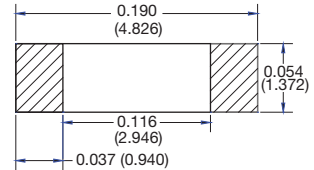
1010 Land Pattern



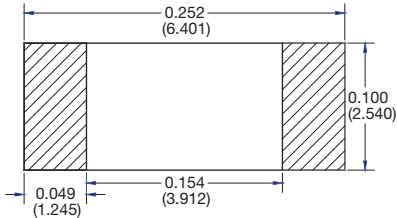
1206 Land Pattern



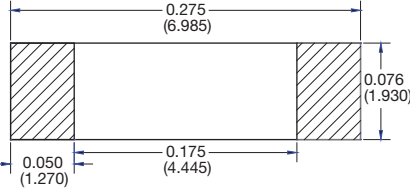
1505 Land Pattern



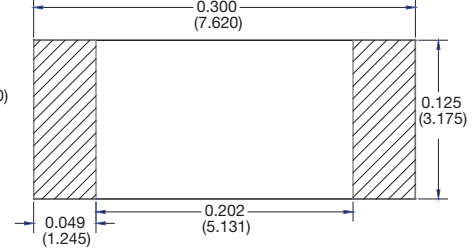
2010 Land Pattern



2208 Land Pattern

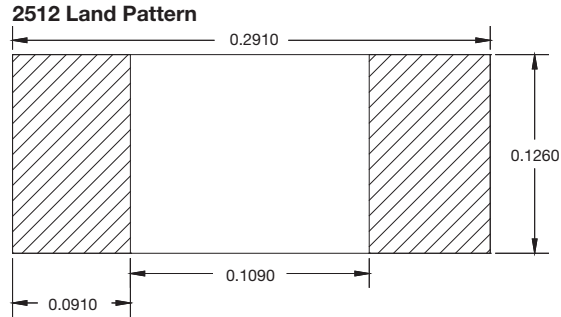
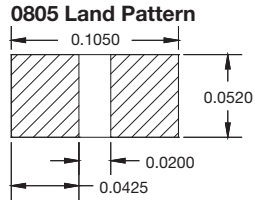
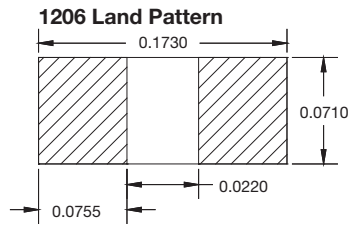
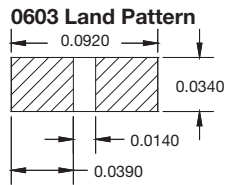


2512 Land Pattern

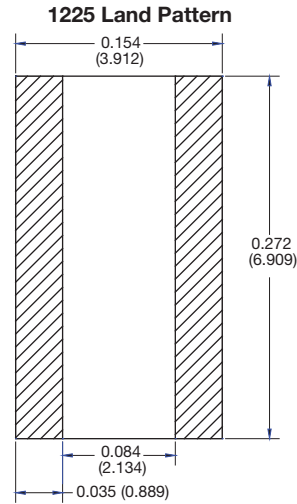
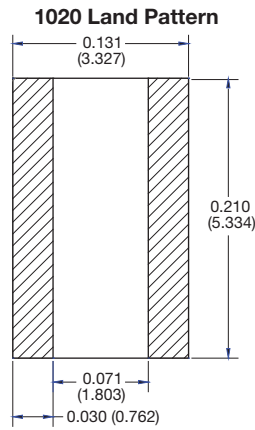
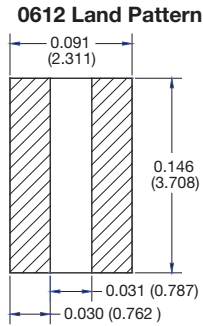
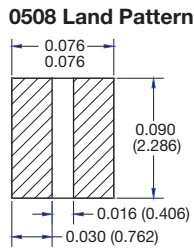




Thin Film Surface Mount Chip Resistors (PHP, PCAN Series)

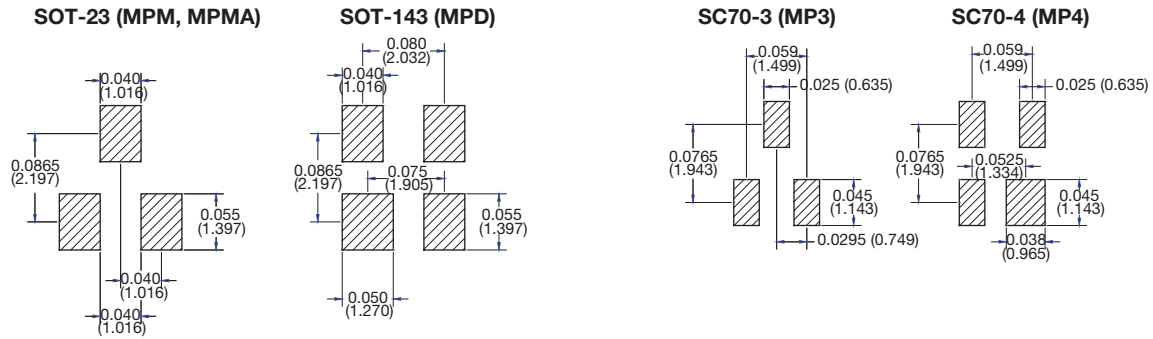


Thin Film Surface Mount Chip Resistors Long Axis Termination (L Series)

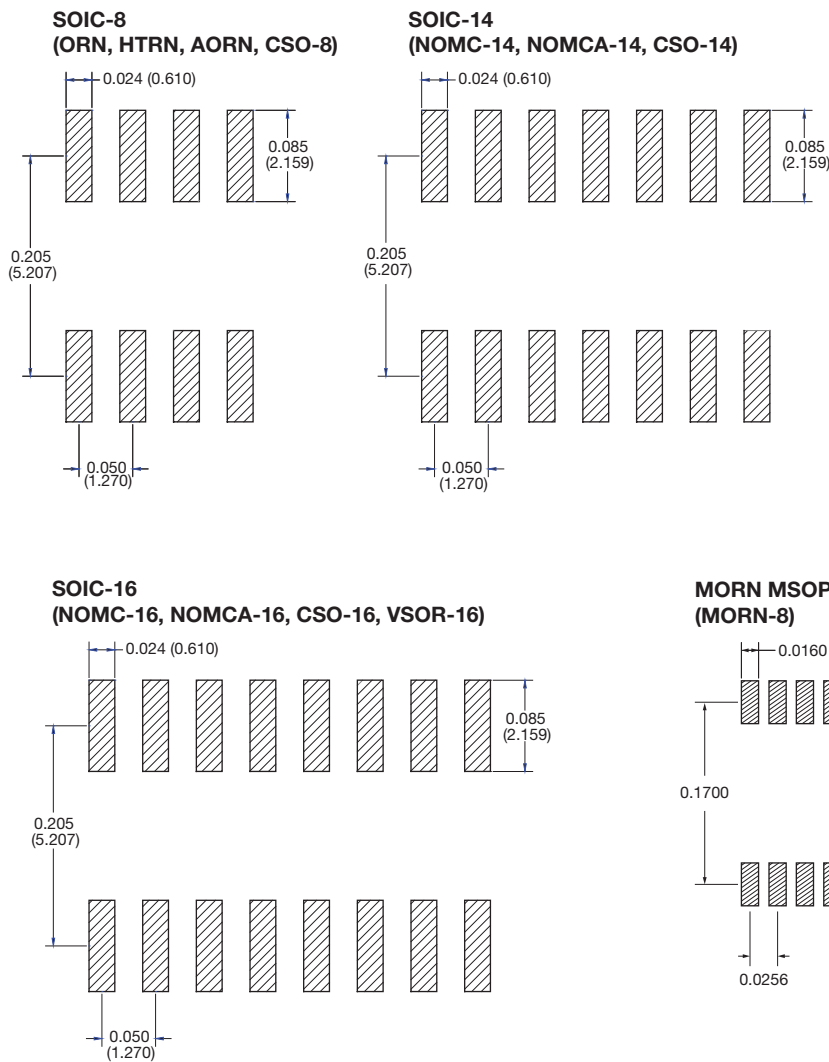




Surface Mount Networks (MPM, MPD, MP3, MP4 Series)

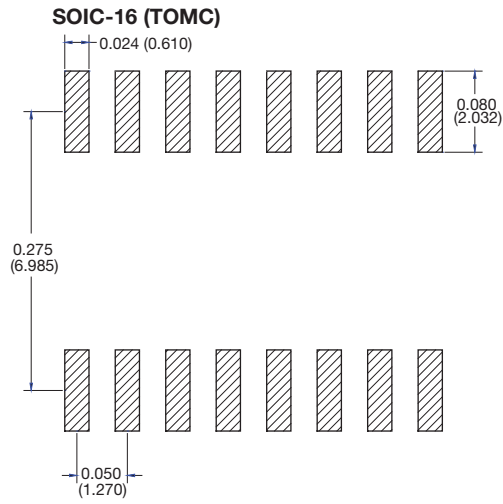


Surface Mount Networks SOIC Narrow Body 150 mils (ORN, CSO, MOMC, HTRN, AORN, MORN Series)

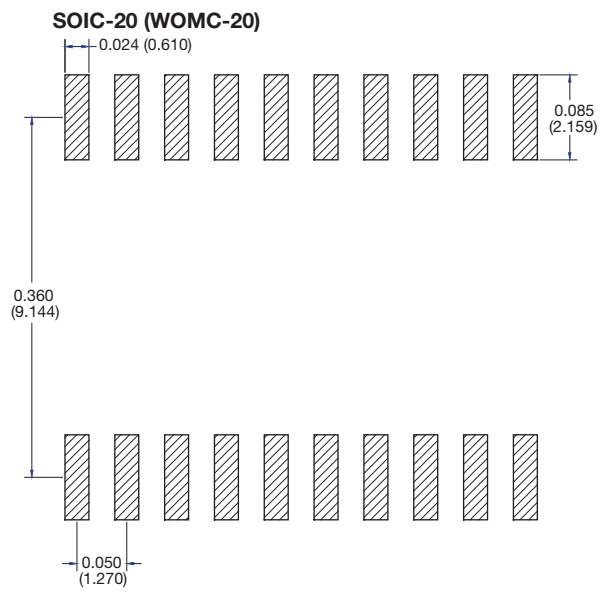
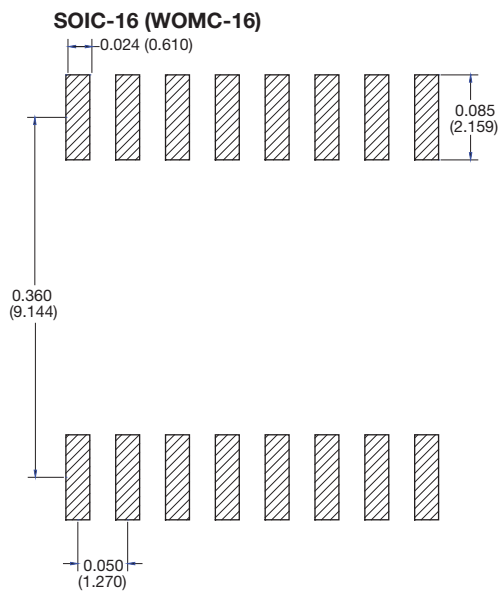




Surface Mount Networks SOIC Medium Body 220 mils (TOMC Series)



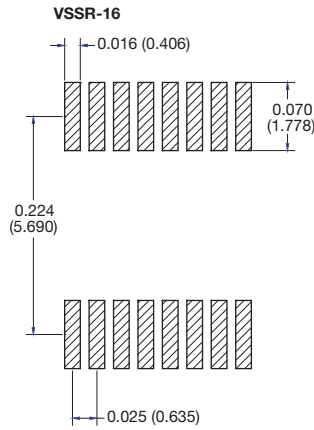
Surface Mount Networks SOIC Wide Body 300 mils (WOMC Series)



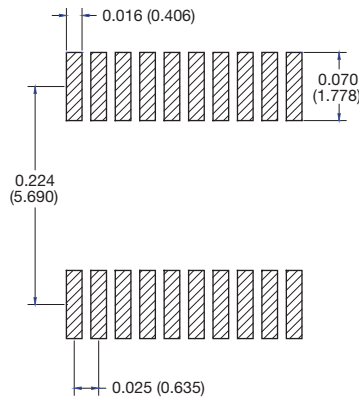


Surface Mount Networks High Density SSOP, TSOP (VSSR, VTSR Series)

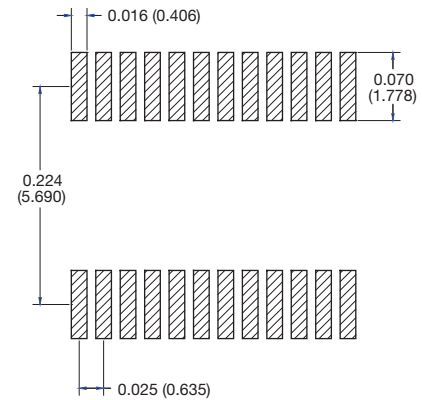
SSOP MO-137



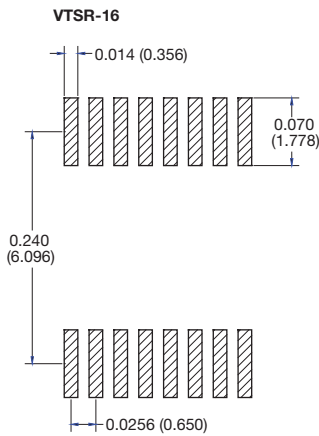
OSOP-20, VSSR-20



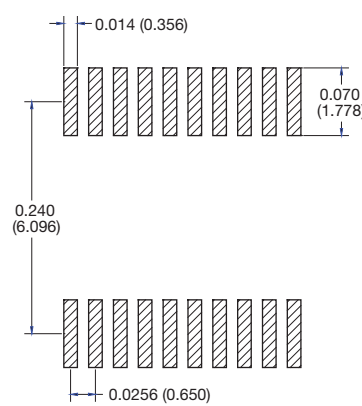
VSSR-24, HD-CSO-24



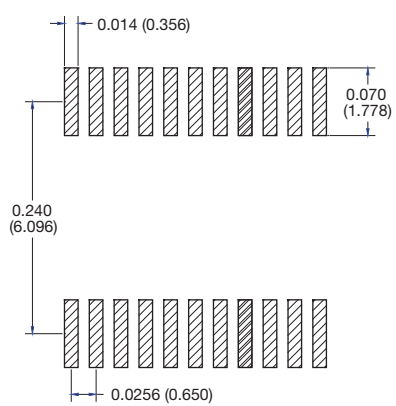
TSSOP MO-153



VTSR-20

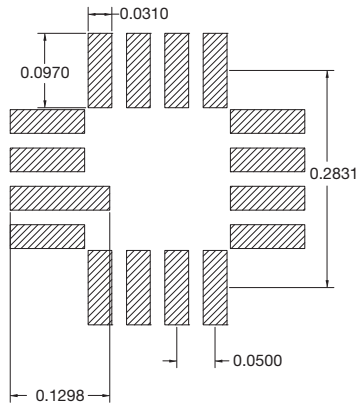


VTSR-24

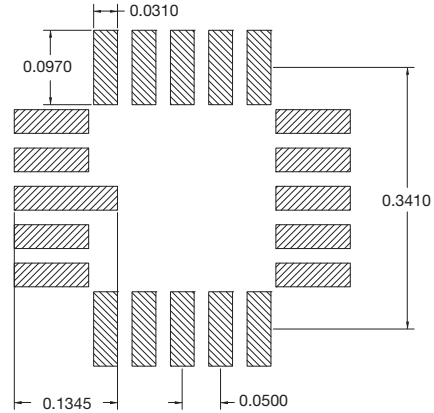


Surface Mount Leadless Networks (LCC Series)

16 Pin LCC

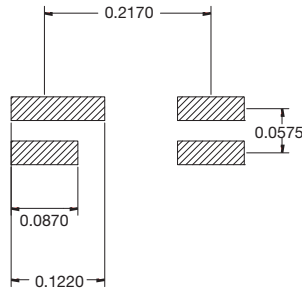


20 Pin LCC



Surface Mount Leadless Networks (MPH Series)

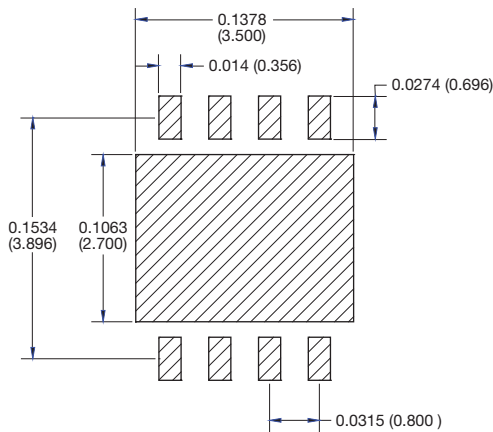
4 Pin LCC



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

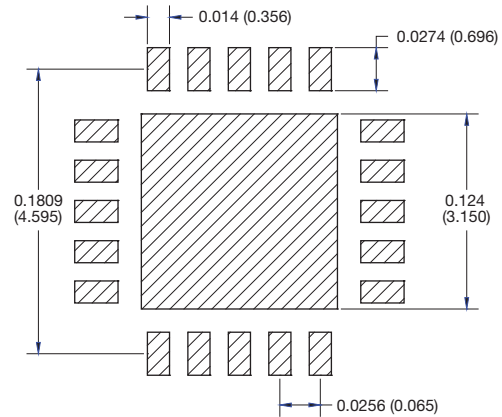
DFN MLP

DFN-8 4 x 5 mm Sq



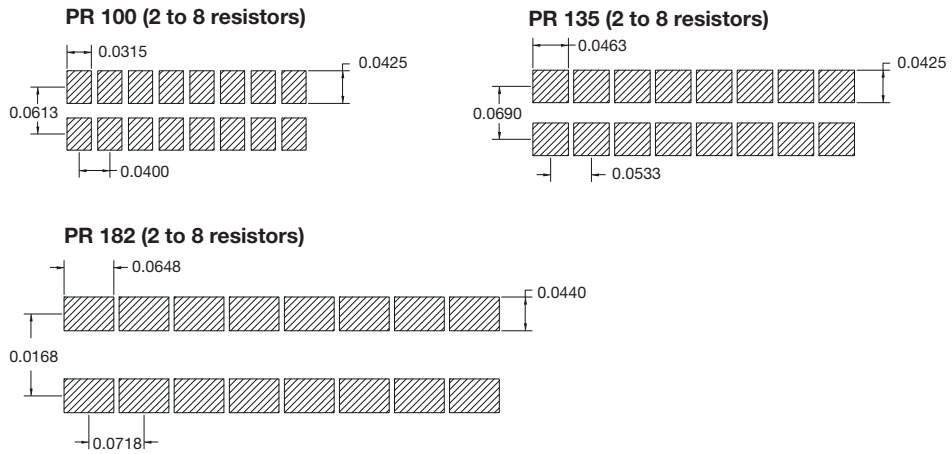
QFN MLP

QFN-20 5 x 5 mm Sq





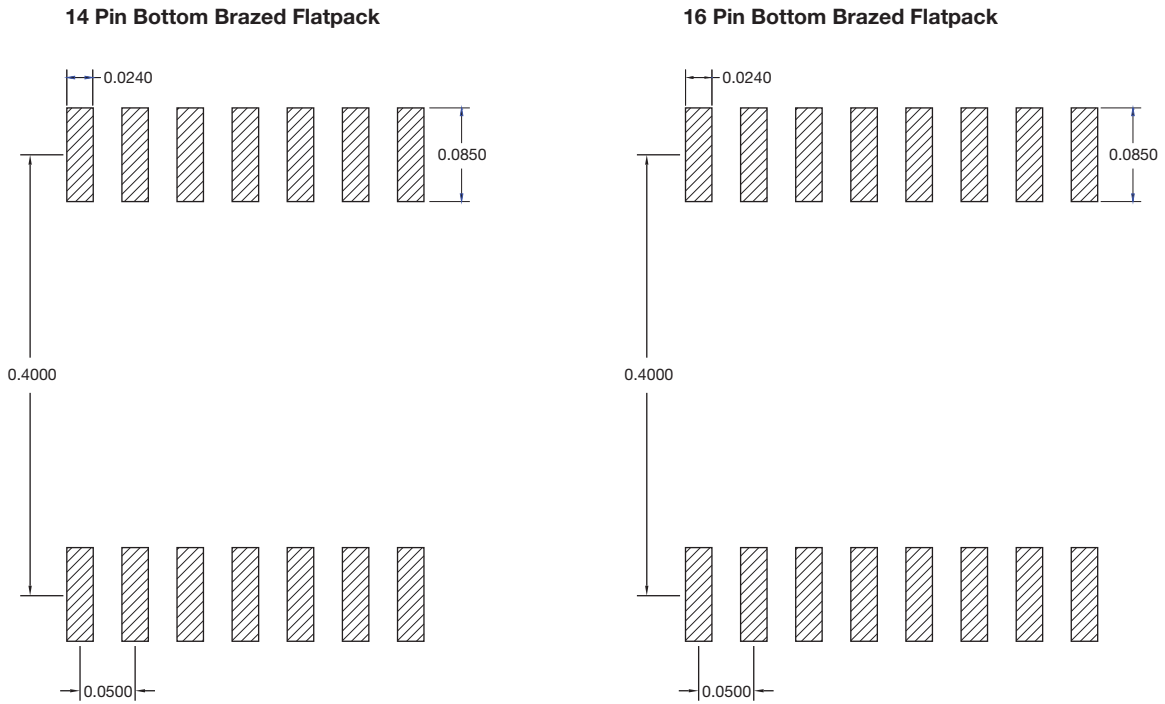
Surface Mount Leadless Resistor Arrays (PR Series)



Note

- All dimensions in inches (mm)

Flatpack





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