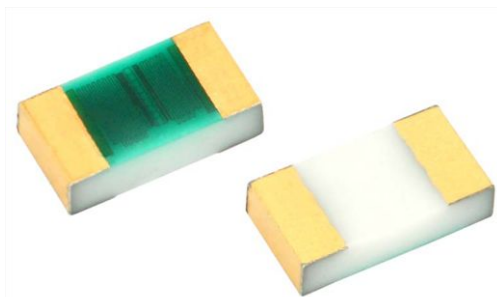
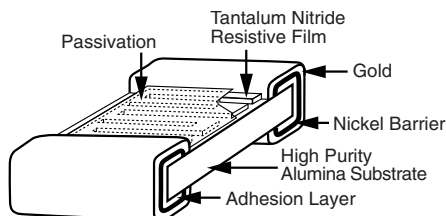


Precision Automotive High Temperature (155 °C at full rated power) Thin Film Chip Resistor, AEC-Q200 Qualified



The terminations consist of an adhesion layer, a leach resistant nickel barrier and gold plating compatible with high temperature solder systems.

CONSTRUCTION



FEATURES

- Resistance range: 1.0 Ω to 1 M Ω
- AEC-Q200 qualified, table 7F
- AEC-Q200 qualified, ESD rated class 1C (< 1 k Ω : 1 kV; > 1 k Ω : 2 kV)
- Laser trimmed to any value
- Intrinsic moisture protected resistor element
- Moisture resistant to MIL-STD-202, method 106
- Tantalum nitride resistor film on alumina substrate
- 100 % visual inspected per MIL-PRF-55342
- Laser-trimmed tolerances to ± 0.1 %
- Load life stability 0.2 % at 1000 h at 155 °C and 100 % rated power
- Very low noise and voltage coefficient (< - 30 dB, < 0.1 ppm/V)
- Sulfur resistant (per ASTM B809-95 humid vapor test)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

TYPICAL PERFORMANCE

	ABSOLUTE
TCR	25
TOL.	0.1

STANDARD ELECTRICAL SPECIFICATIONS

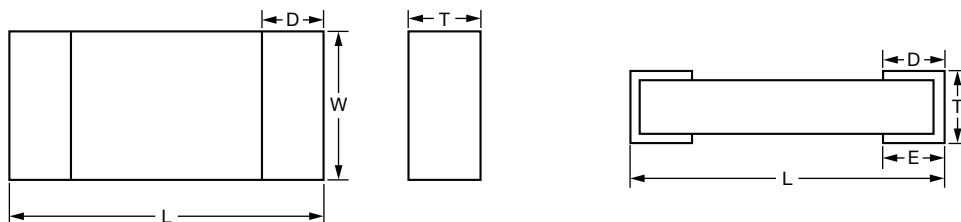
TEST	SPECIFICATIONS	CONDITIONS
Material	Tantalum nitride	-
Resistance Range	1.0 Ω to 1 M Ω	-
TCR: Absolute	± 25 ppm/ $^{\circ}$ C to ± 100 ppm/ $^{\circ}$ C	- 55 $^{\circ}$ C to + 175 $^{\circ}$ C
Tolerance: Absolute	± 0.1 % to ± 1.0 %	+ 25 $^{\circ}$ C
Stability: Absolute	± 0.2 %	1000 h at 155 $^{\circ}$ C and 100 % rated power
Stability: Ratio	Not applicable	-
Voltage Coefficient	Less than 0.1 ppm/V	-
Working Voltage	75 V	-
Operating Temperature Range	- 55 $^{\circ}$ C to + 250 $^{\circ}$ C	-
Storage Temperature Range ⁽¹⁾	- 55 $^{\circ}$ C to + 250 $^{\circ}$ C	-
Noise	< - 30 dB	-
Shelf Life Stability: Absolute	100 ppm	1 year at 25 $^{\circ}$ C

Note

⁽¹⁾ Storage temperature rating is for device only.

COMPONENT RATINGS

CASE SIZE	POWER RATING (mW)	WORKING VOLTAGE (V)	RESISTANCE RANGE (Ω)
0402	50	75	1.5 to 51K
0603	150	75	2.75 to 120K
0805	200	100	2.75 to 301K
1206	400	200	1.0 to 1M

DIMENSIONS in inches


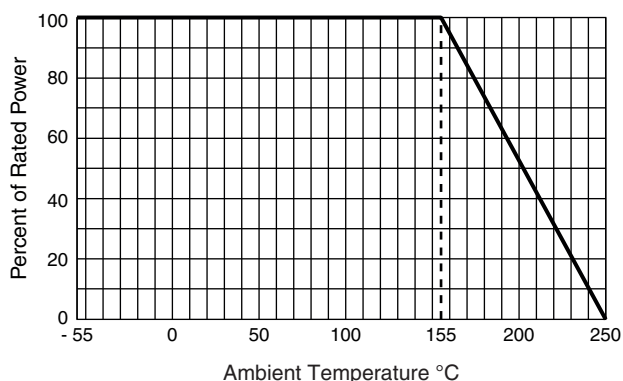
CASE SIZE	L	W	T	D	E
0402	0.042 ± 0.008	0.022 ± 0.005	0.015 ± 0.003	0.010 ± 0.005	0.010 ± 0.005
0603	0.064 ± 0.006	0.032 ± 0.005	0.015 ± 0.003	0.012 ± 0.005	0.015 ± 0.005
0805	0.080 ± 0.006	0.050 ± 0.005	0.015 ± 0.003	0.016 ± 0.008	0.015 ± 0.005
1206	0.126 ± 0.008	0.063 ± 0.005	0.015 ± 0.003	0.020 ± 0.005 / - 0.01	0.020 ± 0.005 / - 0.01

ENVIRONMENTAL TESTS

ENVIRONMENTAL TEST	CONDITIONS	TYPICAL VISHAY PERFORMANCE
High temperature storage	MIL-STD-202 method 108, 1000 h at 125 °C	± 0.05 %
Temperature cycling	JESD22 method JA-104, 1000 cycles, - 55 °C to + 155 °C	± 0.115 %
Moisture resistance	MIL-STD-202 method 106	± 0.017 %
Biased humidity	MIL-STD-202 method 103, 1000 h at 85 °C, 85 % RH, 10 % rated power	± 0.133 %
Life	MIL-STD-202 method 108, 1000 h at 155 °C	± 0.20 % at 100 % rated power and 155 °C. Effective film temperature is 200 °C.
Mechanical shock	MIL-STD-202 method 213, condition C	± 0.008 %
Vibration	MIL-STD-202 method 204, 10 Hz to 2 kHz	± 0.008 %
Resistance to soldering heat	MIL-STD-202 method 210, condition B	± 0.09 %
Electrostatic discharge	AEC-Q200-002, human body (< 1 kΩ: 1 kV; > 1 kΩ: 2 kV)	± 0.10 % at 2 kV
Solderability	MIL-STD-883 method 2003 para 2.3.1 and J-STD-002	Pass
Die shear	MIL-PRF-55342	Pass
Flame retardance	AEC-Q200-001 para 4.0	Pass

MECHANICAL SPECIFICATIONS

Resistive element	Tantalum nitride
Substrate material	Alumina
Terminations	Gold (10 μin. min.) over nickel (50 μin. min.)

DERATING CURVE




GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: PATT0603E1002BST1

P	A	T	T	0	6	0	3	E	1	0	0	2	B	G	T	1
GLOBAL MODEL	CASE SIZE	TCR CHARACTERISTIC	RESISTANCE					TOLERANCE	TERMINATION			PACKAGING				
PATT	0402 0603 0805 1206	E = ± 25 ppm/ $^{\circ}$ C H = ± 50 ppm/ $^{\circ}$ C K = ± 100 ppm/ $^{\circ}$ C ⁽¹⁾ L = ± 200 ppm/ $^{\circ}$ C	The first 3 digits are significant figures and the last digit specifies the number of zeros to follow. "R" designates the decimal point. Example: 10R0 = 10 Ω 1000 = 100 Ω 1002 = 10 k Ω					B = ± 0.1 % D = ± 0.5 % F = ± 1.0 % G = ± 2.0 % J = ± 5.0 %	G = Wraparound gold over nickel barrier			BULK BS = 100 min., 1 mult WAFFLE WS = 100 min., 1 mult W0 = 100 min., 100 mult W1 = 100 min., 1 mult (item single lot date code) WP = 100 min., 1 mult (package unit single lot date code) TAPE AND REEL T0 = 100 min., 100 mult T1 = 1000 min., 1000 mult T3 = 300 min., 300 mult T5 = 500 min., 500 mult TF = Full reel TS = 100 min., 1 mult TI = 100 min., 1 mult (item single lot date code) TP = 100 min., 1 mult (package unit single lot date code)				

Note

⁽¹⁾ Characteristic TCR - ($R < 10 \Omega$)

RESISTANCE	TCR (ppm/ $^{\circ}$ C)	TOLERANCE (%)
10 Ω to 1 M Ω	25, 50, 100, 200	0.1, 0.5, 1, 2, 5
5 Ω to 10 Ω ⁽²⁾	100, 200	1, 2, 5
1.0 Ω to 5 Ω ⁽²⁾	200	1, 2, 5

Note

⁽²⁾ Resistance values from 1.0 Ω to 10 Ω are undergoing PPAP qualification; results are expected to be similar to PPAP qualified 10 Ω to 120 k Ω .



Vishay Dale Thin Film Land Patterns

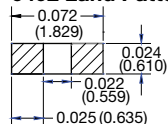
1. Scope

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.

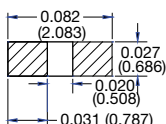
2. Product Series

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

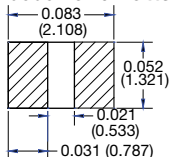
0402 Land Pattern



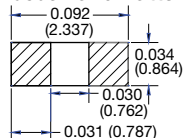
0502 Land Pattern



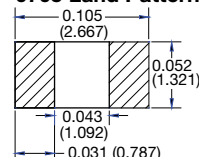
0505 Land Pattern



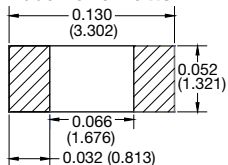
0603 Land Pattern



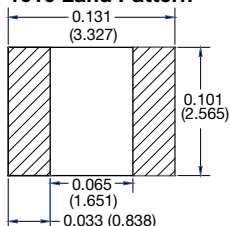
0705 Land Pattern



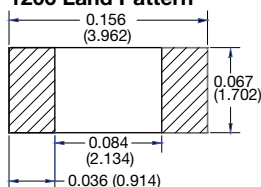
1005 Land Pattern



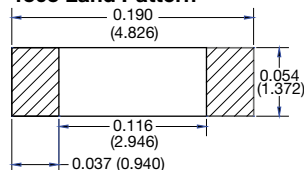
1010 Land Pattern



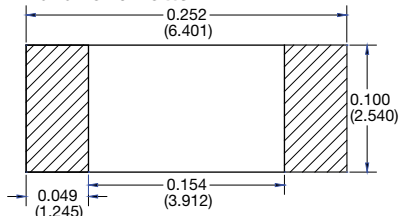
1206 Land Pattern



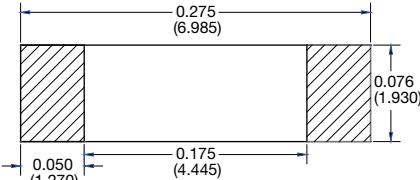
1505 Land Pattern



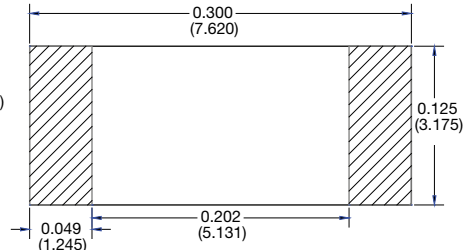
2010 Land Pattern



2208 Land Pattern



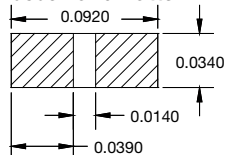
2512 Land Pattern



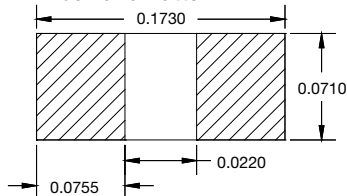


Thin Film Surface Mount Chip Resistors (PHP, PCAN Series)

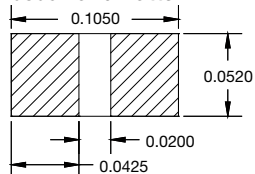
0603 Land Pattern



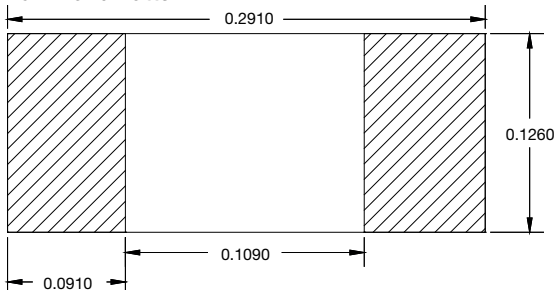
1206 Land Pattern



0805 Land Pattern

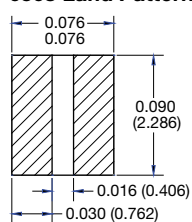


2512 Land Pattern

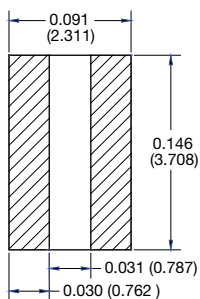


Thin Film Surface Mount Chip Resistors Long Axis Termination (L Series)

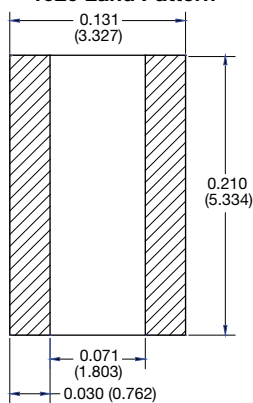
0508 Land Pattern



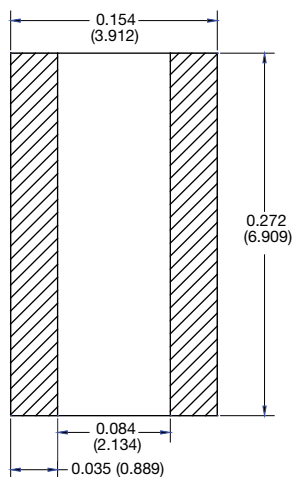
0612 Land Pattern



1020 Land Pattern



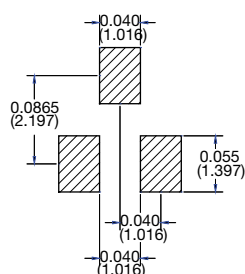
1225 Land Pattern



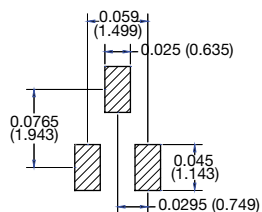


Surface Mount Networks (MPM, MP3, MP4 Series)

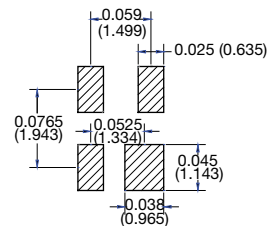
SOT-23 (MPM, MPMA)



SC70-3 (MP3)

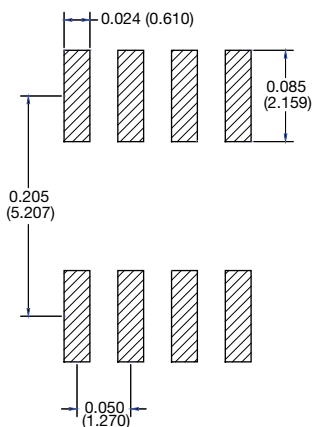


SC70-4 (MP4)

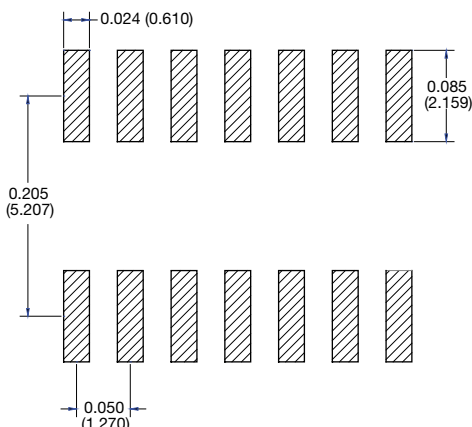


Surface Mount Networks SOIC Narrow Body 150 mils (ORN, CSO, MOMC, HTRN, AORN, MORN Series)

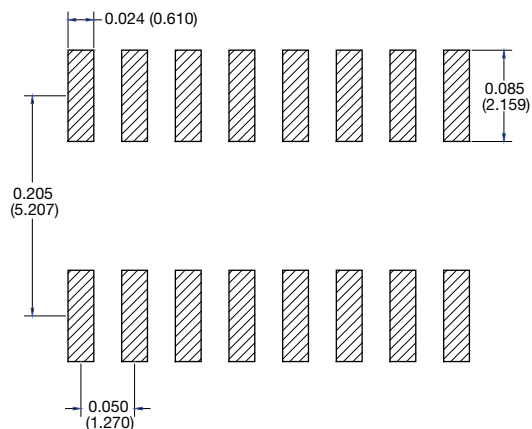
SOIC-8 (ORN, HTRN, AORN, CSO-8)



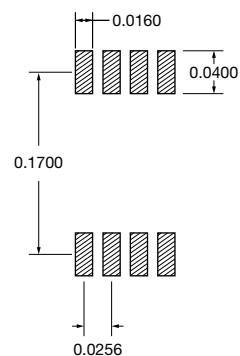
SOIC-14 (NOMC-14, NOMCA-14, CSO-14)



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

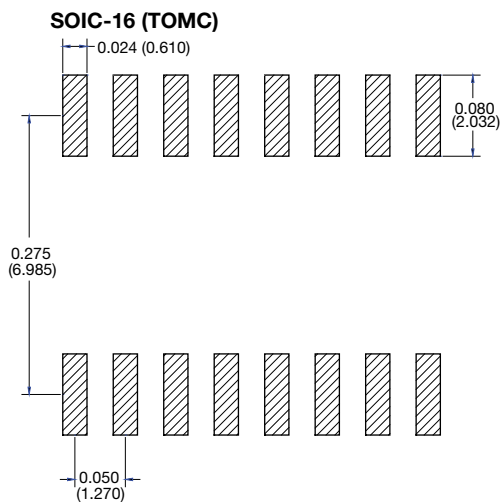


MORN MSOP MO-187AA (MORN-8)

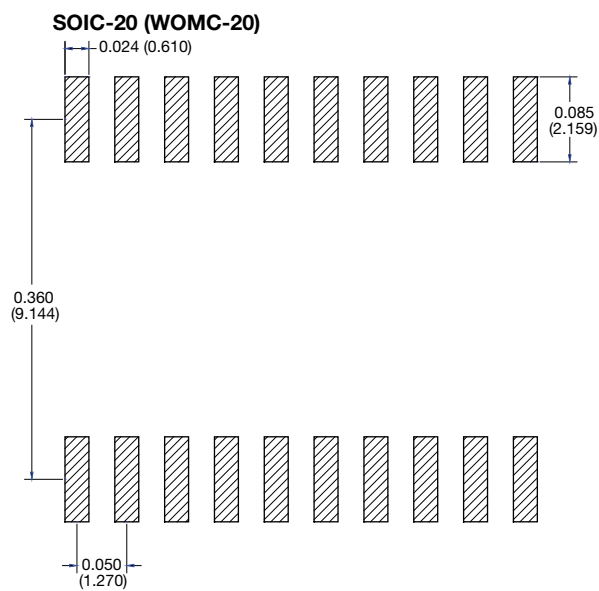
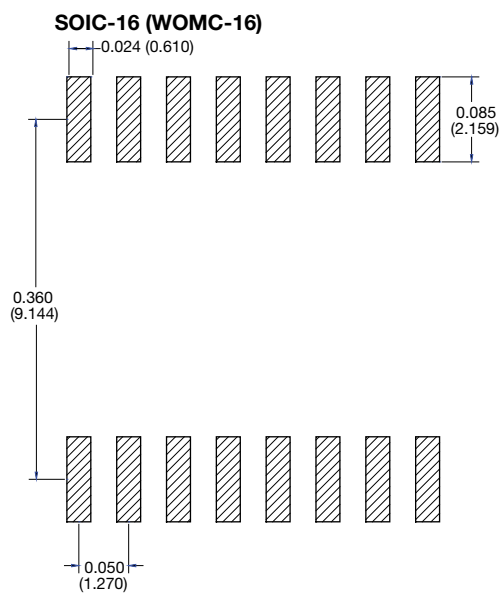




Surface Mount Networks SOIC Medium Body 220 mils (TOMC Series)



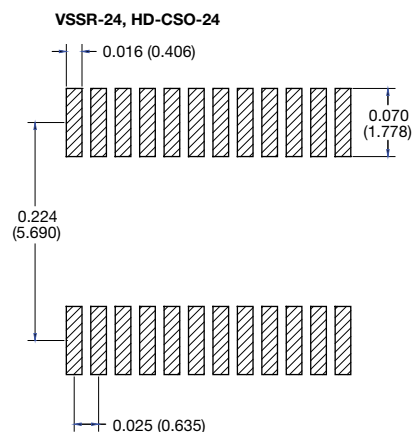
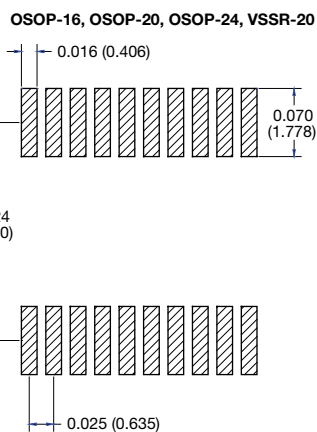
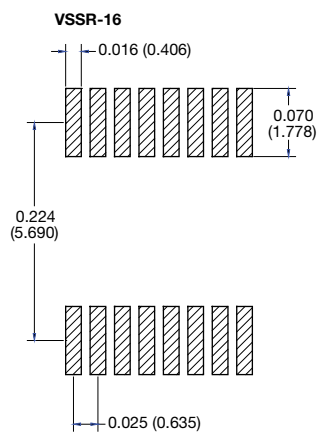
Surface Mount Networks SOIC Wide Body 300 mils (WOMC Series)



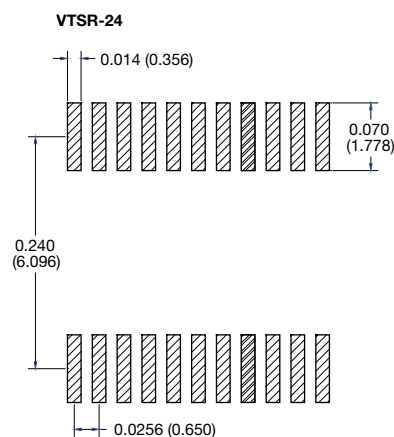
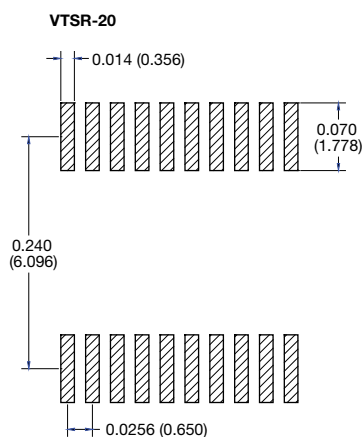
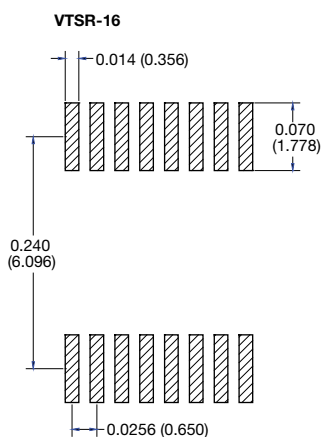


Surface Mount Networks High Density SSOP, TSOP (VSSR, VTSR Series)

SSOP MO-137

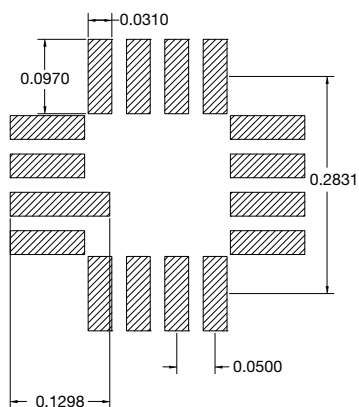


TSSOP MO-153

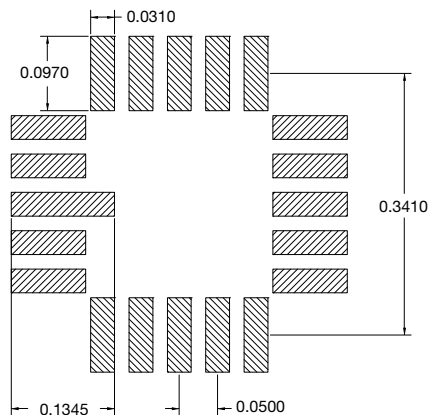


Surface Mount Leadless Networks (LCC Series)

16 Pin LCC

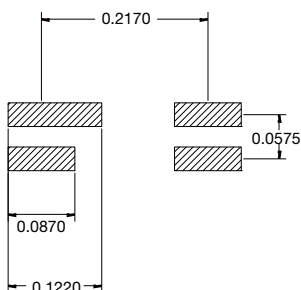


20 Pin LCC



Surface Mount Leadless Networks (MPH Series)

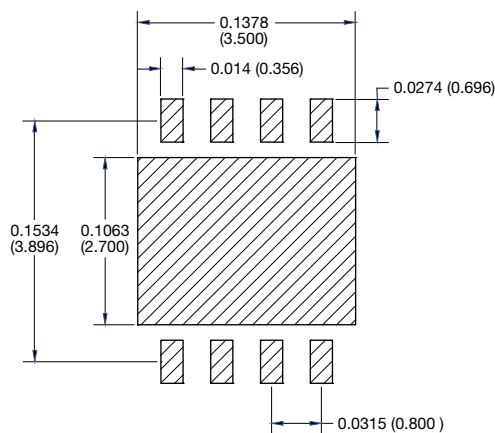
4 Pin LCC



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

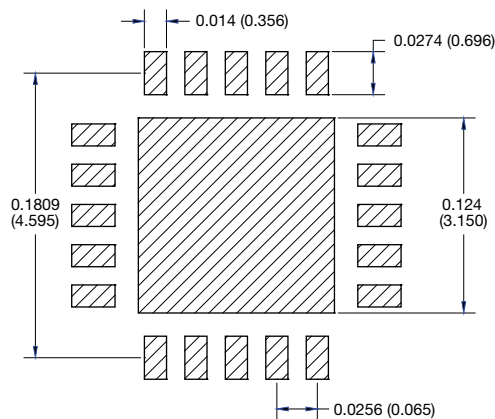
DFN MLP

DFN-8 4 x 5 mm Sq



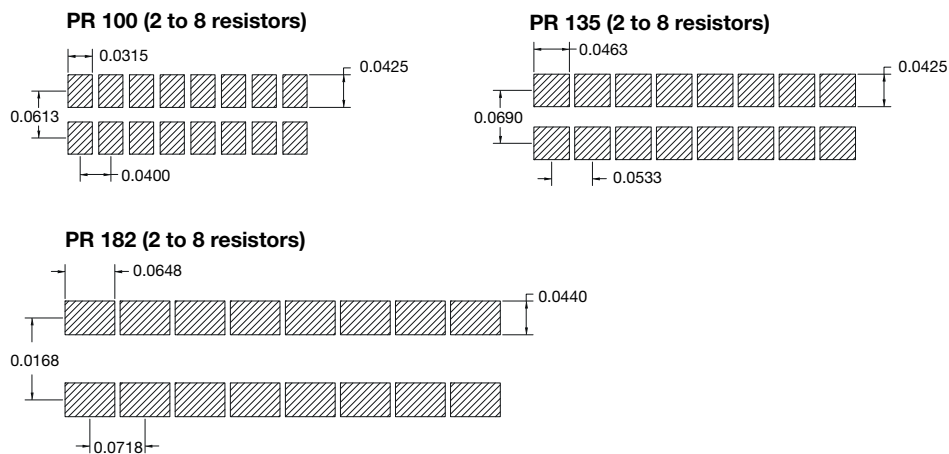
QFN MLP

QFN-20 5 x 5 mm Sq





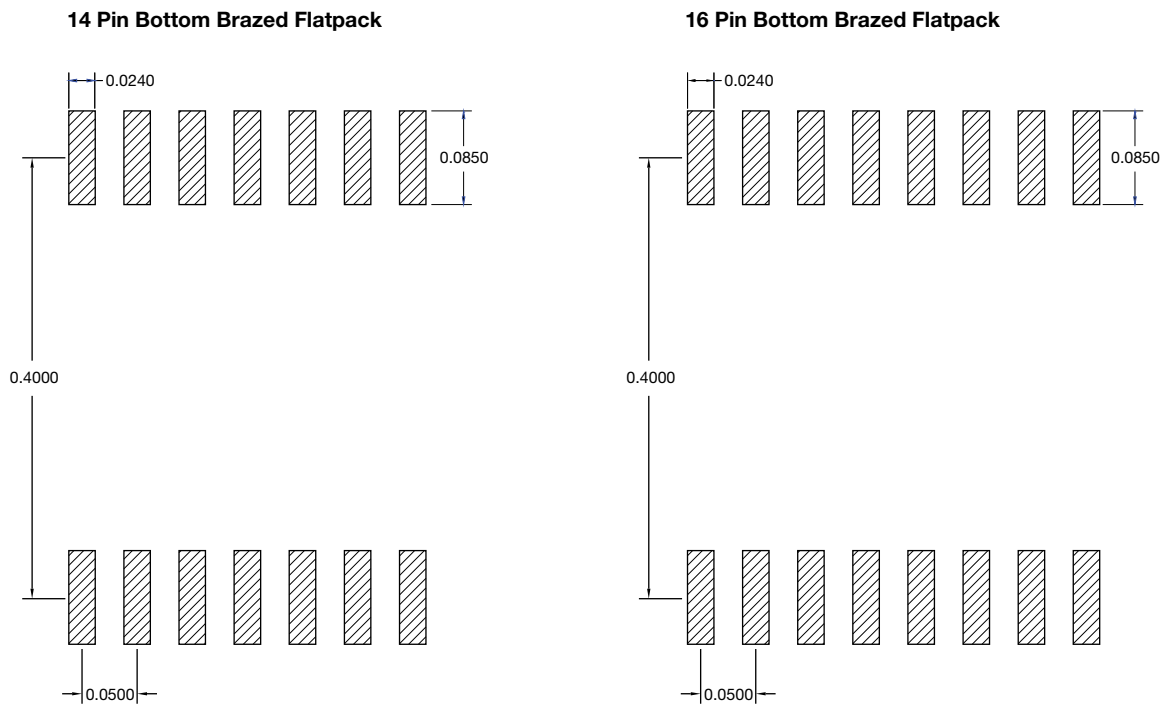
Surface Mount Leadless Resistor Arrays (PR Series)



Note

- All dimensions in inches (mm)

Flatpack





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<u>PATT0603E1003BGT1</u>	<u>PATT0603E8982BGT1</u>	<u>PATT0603E2001BGT1</u>	<u>PATT0603K8R45FGT1</u>
<u>PATT0603E4991BGT1</u>	<u>PATT0603E1000BGT1</u>	<u>PATT0603E10R0BGT1</u>	<u>PATT0603E20R0BGT1</u>
<u>PATT0603E2942BGT1</u>	<u>PATT0603E49R9BGT1</u>	<u>PATT0603K5R62FGT1</u>	<u>PATT0603L4R99FGT1</u>
<u>PATT0603E1002BGT1</u>	<u>PATT0603E2002BGT1</u>	<u>PATT0603E24R9BGT1</u>	<u>PATT0603E30R1BGT1</u>
<u>PATT0603E4992BGT1</u>	<u>PATT0603E2492BGT1</u>	<u>PATT0603E1502BGT1</u>	<u>PATT0603E1001BGT1</u>
<u>PATT0603L2R87FGT1</u>	<u>PATT0603E4990BGT1</u>	<u>PATT0603E5111BGT1</u>	<u>PATT0603K6R49FGT1</u>
<u>PATT0603L3R09FGT1</u>	<u>PATT0805L2R80FGT1</u>	<u>PATT0805L3R01FGT1</u>	<u>PATT0805E1000BGT1</u>
<u>PATT0805E4992BGT1</u>	<u>PATT0805E1002BGT1</u>	<u>PATT0805E4991BGT1</u>	<u>PATT0805E2493BGT1</u>
<u>PATT0805E1001BGT1</u>	<u>PATT0805E1003BGT1</u>	<u>PATT0805E10R0BGT1</u>	<u>PATT0805E49R9BGT1</u>
<u>PATT0805E7502BGT1</u>	<u>PATT0805E2002BGT1</u>	<u>PATT0805E1502BGT1</u>	<u>PATT0805L4R87FGT1</u>
<u>PATT0805E2492BGT1</u>	<u>PATT0805E2490BGT1</u>	<u>PATT0805E35R7BGT1</u>	<u>PATT0805K5R49FGT1</u>
<u>PATT0805E15R4BGT1</u>	<u>PATT0805E3013BGT1</u>	<u>PATT0805E1503BGT1</u>	<u>PATT0805E2003BGT1</u>
<u>PATT0805K7R68FGT1</u>	<u>PATT0805K6R81FGT1</u>	<u>PATT0805E2001BGT1</u>	