High Frequency (up to 40 GHz) Resistor, Thin Film Surface Mount Chip

FC series chip resistors are designed with low internal reactance. They function as almost pure resistors on a very high range of frequencies. The specialized laser edge trimming allows for precision tolerances to 0.1 %.

FEATURES

- Small standard size 0402 case size
- Edge trimmed block resistors
- High purity alumina substrate
- Ohmic range (10 Ω to 1000 Ω)
- Small internal reactance (< 10 mΩ)
- Low TCR (down to ± 25 ppm/°C)
- Epoxy bondable termination available
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free Available

RoHS* Available

HALOGEN FREE Available

GREEN (5-2008) Available

Note

* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

APPLICATIONS

- Low noise amplifiers
- Attenuation
- Line termination

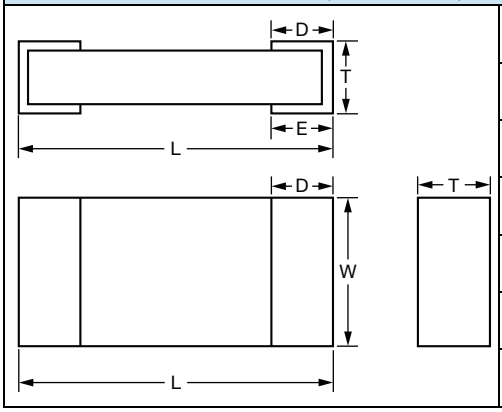
STANDARD ELECTRICAL SPECIFICATIONS

TEST	SPECIFICATIONS	CONDITIONS
Material	Passivated nichrome	-
Resistance Range	10 Ω to 1000 Ω	Case size dependent
TCR: Absolute	± 25 ppm/°C to ± 100 ppm/°C	-55 °C to +125 °C
Tolerance: Absolute	± 0.1 % to ± 5.0 %	+25 °C
Stability: Absolute	Δ*R* ± 0.02 %	2000 h at 70 °C
Stability: Ratio	-	-
Voltage Coefficient	0.1 ppm/V	-
Working Voltage	30 V to 75 V	-
Operating Temperature Range	-55 °C to +155 °C	-
Storage Temperature Range	-55 °C to +155 °C	-
Noise	< -35 dB	-
Shelf Life Stability: Absolute	Δ*R* ± 0.01 %	1 year at +25 °C

COMPONENT RATINGS

CASE SIZE	POWER RATING (mW)	WORKING VOLTAGE (V)	RESISTANCE RANGE (Ω)
0402	50	30	10 to 1000
0505	125	37	20 to 1000
0603	125	50	10 to 1000
0805	200	50	10 to 1000
1005	250	75	10 to 1000
1206	330	75	10 to 1000

DIMENSIONS in inches (millimeters)



CASE SIZE	LENGTH	WIDTH W (± 0.005)	THICKNESS	TOP PAD D (± 0.005)	BOTTOM PAD E (± 0.005)
0402	0.042 ± 0.008 (1.067 ± 0.203)	0.022 (0.559)	0.015 to 0.0015 (0.381 to 0.0381)	0.010 (0.254)	0.010 (0.254)
0505	0.055 ± 0.006 (1.397 ± 0.152)	0.050 (1.270)	0.015 to 0.0015 (0.381 to 0.0381)	0.010 (0.254)	0.015 (0.381)
0603	0.064 ± 0.006 (1.626 ± 0.152)	0.032 (0.813)	0.015 to 0.0015 (0.381 to 0.0381)	0.012 (0.305)	0.015 (0.381)
0805	0.080 ± 0.006 (2.032 ± 0.152)	0.050 (1.270)	0.015 to 0.0015 (0.381 to 0.0381)	0.016 ± 0.008 (0.406 ± 0.203)	0.015 (0.381)
1005	0.105 ± 0.008 (2.667 ± 0.203)	0.050 (1.270)	0.015 to 0.0015 (0.381 to 0.0381)	0.015 (0.381)	0.015 (0.381)
1206	0.126 ± 0.008 (3.200 ± 0.203)	0.063 (1.600)	0.015 to 0.0015 (0.381 to 0.0381)	0.020 + 0.005/- 0.010 (0.508 + 0.127/- 0.254)	

MECHANICAL SPECIFICATIONS

Resistive Element	Passivated nichrome
Substrate Material	Alumina
Terminations	Pre-soldered or gold
Lead (Pb)-free Option	96.5 % Sn, 3.0 % Ag, 0.5 % Cu
Tin/Lead Option	Sn63
Lead (Pb)-free Finish and Tin / Lead	Hot solder dip

GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: FC1206E1001BBTS

F	C	1	2	0	6	E	1	0	0	1	B		B		T	S
F	C	1	2	0	6	K	1	0	0	0	B	T	B	S	T	S

GLOBAL MODEL	CASE SIZE	TCR CHARACTERISTIC	RESISTANCE	TOLERANCE	TERMINATION (1, 2 or 3 digits)	PACKAGING
FC	**0402** **0505** **0603** **0805** **1005** **1206**	**E** = 25 ppm/°C **H** = 50 ppm/°C **K** = 100 ppm/°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 1001 = 1 kΩ	**B** = 0.1 % **D** = 0.5 % **F** = 1 % **G** = 2 % **J** = 5 %	**T** = Top sided Au (gold) term Au over Ni epoxy bondable RoHS-compliant - e4 **B** = Wraparound Sn/Pb solder 63 % Sn/37 % Pb with nickel barrier **G** = Wraparound Au over Ni (gold) termination epoxy bondable RoHS-compliant - e4 **TB** = Top sided Sn/Pb solder 63 % Sn/37 % Pb with nickel barrier **TBS** = Top sided lead (Pb)-free solder with nickel barrier RoHS-compliant - e1 **S** = Wraparound lead (Pb)-free solder 96.5 % Sn/3.0 % Ag/0.5 %Cu RoHS-compliant - e1	**BS** = BULK 100 min., 1 mult **WS** = WAFFLE 100 min., 1 mult TAPE AND REEL **T0** = 100 min., 100 mult **T1** = 1000 min., 1000 mult (1) **T3** = 300 min., 300 mult **T5** = 500 min., 500 mult **TF** = Full reel **TS** = 100 min., 1 mult

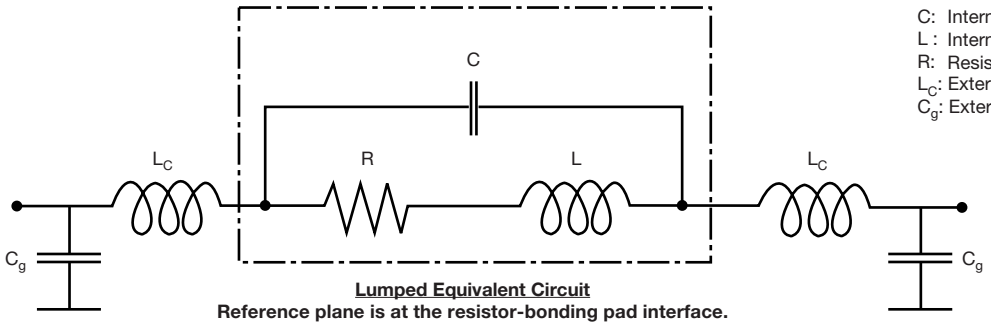
Historical Part Number example: FC1206E1001BBT (for reference purposes only)

FC	1206	E	1001	B	B	T
SERIES	CASE SIZE	TCR CHARACTERISTIC	RESISTANCE	TOLERANCE	TERMINATION	PACKAGING

Note

(1) Preferred packaging code

TYPICAL HIGH FREQUENCY PERFORMANCE ELECTRICAL MODEL AND TESTING



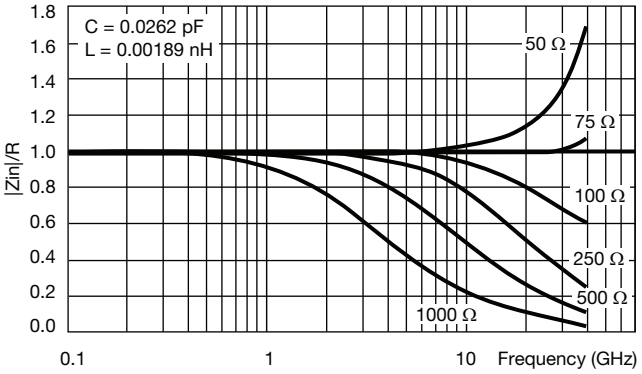
C: Internal shunt capacitance
L : Internal inductance
R: Resistance
L_C: External connection inductance
C_g: External capacitance to ground

Lumped Equivalent Circuit
Reference plane is at the resistor-bonding pad interface.

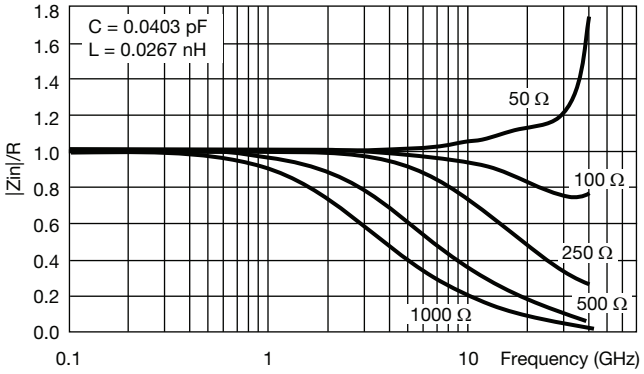
The lumped circuit above was used to model the data at the bonding pad-resistor reference plane. High frequency testing was performed by Modelithics, Inc. on parts mounted to quartz test boards. Quartz test boards were chosen to minimize the contribution of the board effects at high frequencies.

INTERNAL IMPEDANCE

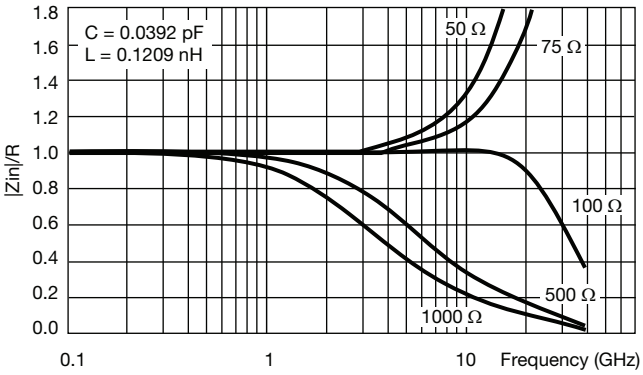
0402 Flip chip



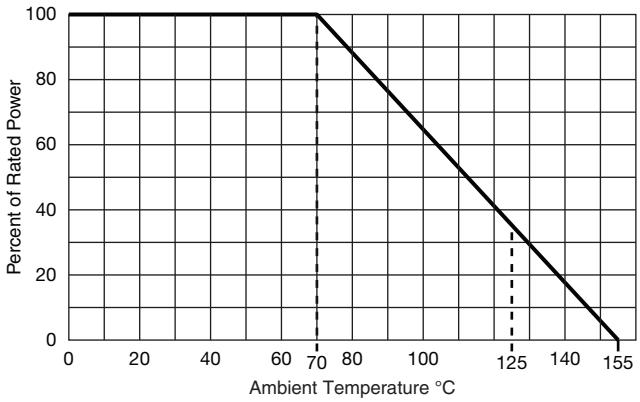
0603 Flip chip



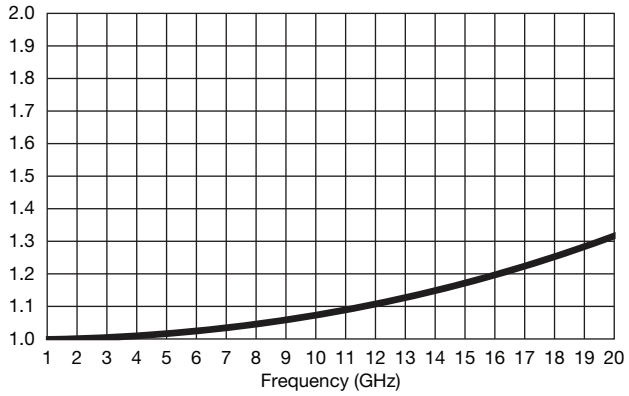
0402 Wraparound



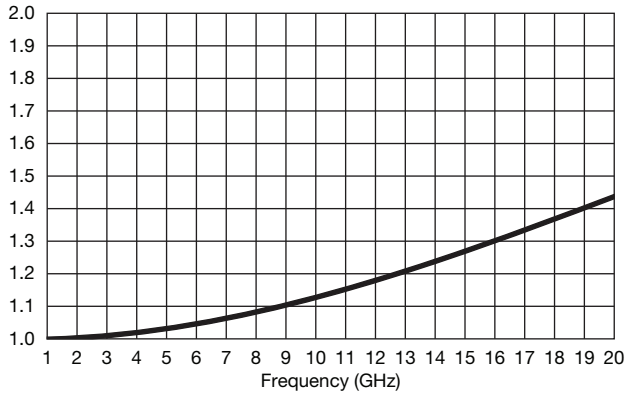
DERATING CURVE



VSWR FC Series 0402 size 50 Ω



VSWR FC Series 0402 size 100 Ω



Vishay Dale Thin Film Land Patterns

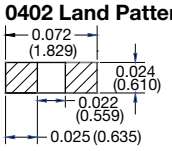
1. Scope

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.

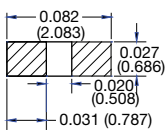
2. Product Series

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

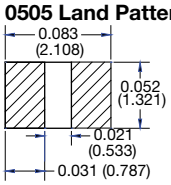
0402 Land Pattern



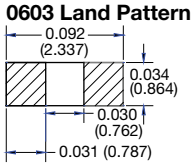
0502 Land Pattern



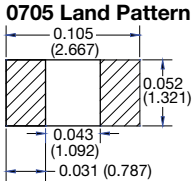
0505 Land Pattern



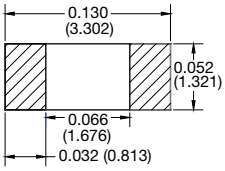
0603 Land Pattern



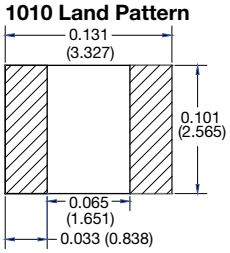
0705 Land Pattern



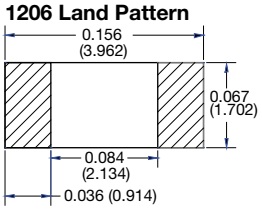
1005 Land Pattern



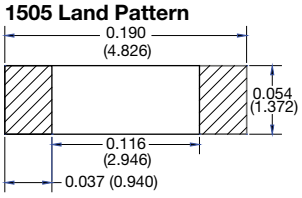
1010 Land Pattern



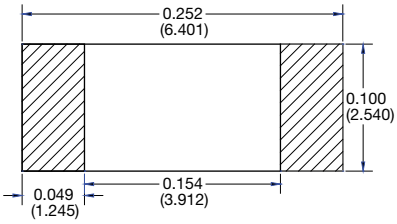
1206 Land Pattern



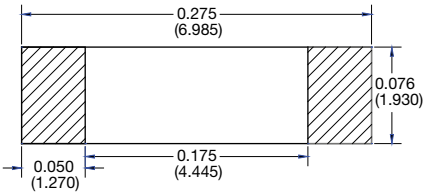
1505 Land Pattern



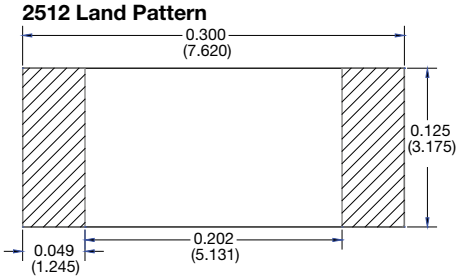
2010 Land Pattern



2208 Land Pattern

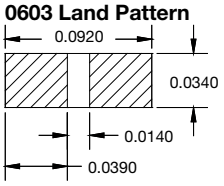


2512 Land Pattern

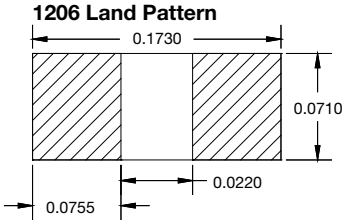


Thin Film Surface Mount Chip Resistors (PHP, PCAN Series)

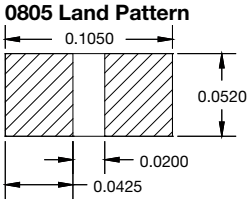
0603 Land Pattern



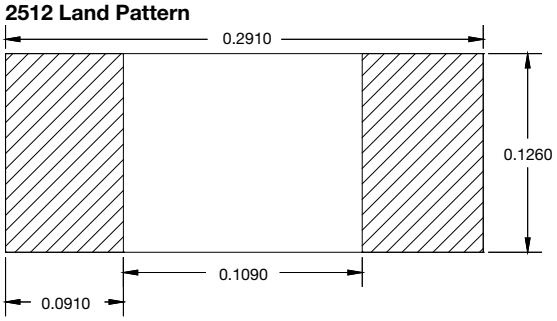
1206 Land Pattern



0805 Land Pattern

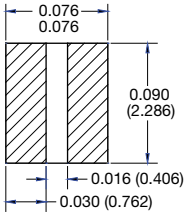


2512 Land Pattern

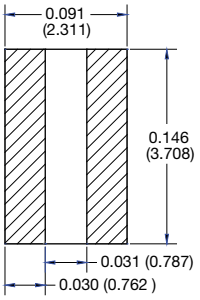


Thin Film Surface Mount Chip Resistors Long Axis Termination (L Series)

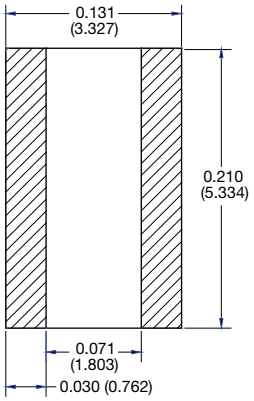
0508 Land Pattern



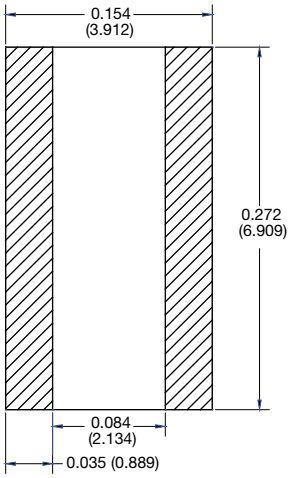
0612 Land Pattern



1020 Land Pattern

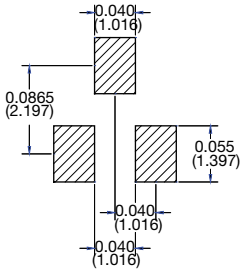


1225 Land Pattern

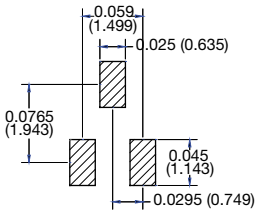


Surface Mount Networks (MPM, MP3, MP4 Series)

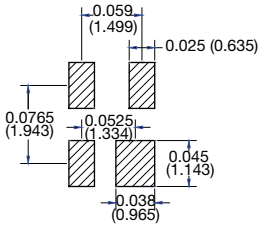
SOT-23 (MPM, MPMA)



SC70-3 (MP3)

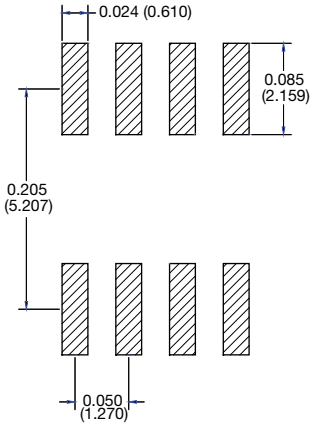


SC70-4 (MP4)

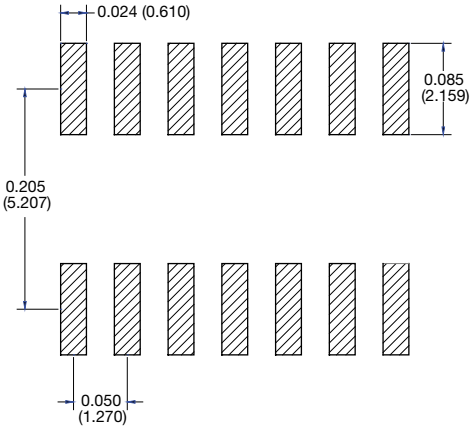


Surface Mount Networks SOIC Narrow Body 150 mils (ORN, CSO, MOMC, HTRN, AORN, MORN Series)

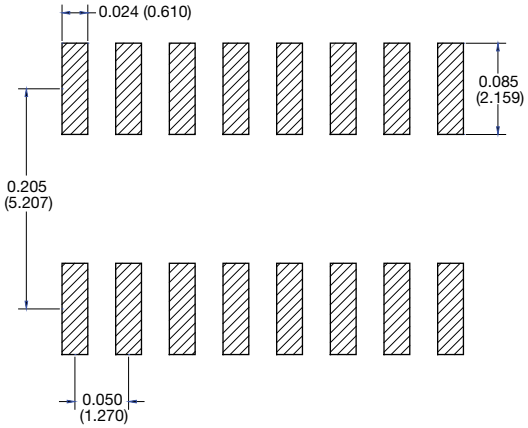
SOIC-8
(ORN, HTRN, AORN, CSO-8)



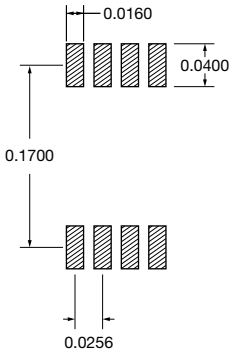
SOIC-14
(NOMC-14, NOMCA-14, CSO-14)



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

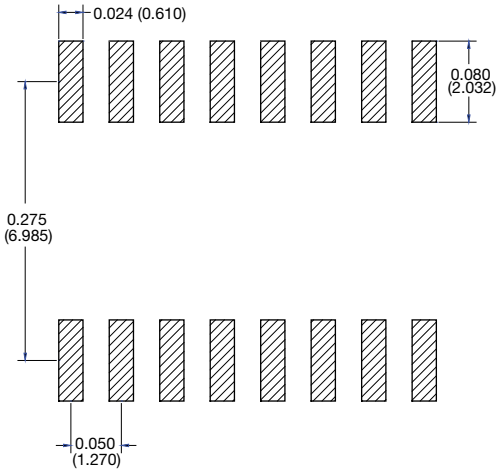


MORN MSOP MO-187AA
(MORN-8)



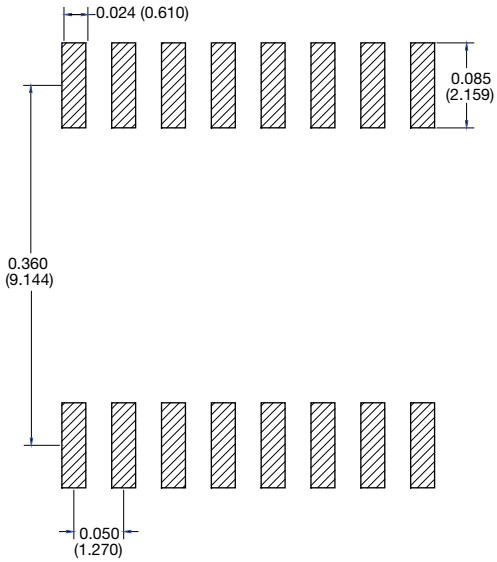
Surface Mount Networks SOIC Medium Body 220 mils (TOMC Series)

SOIC-16 (TOMC)

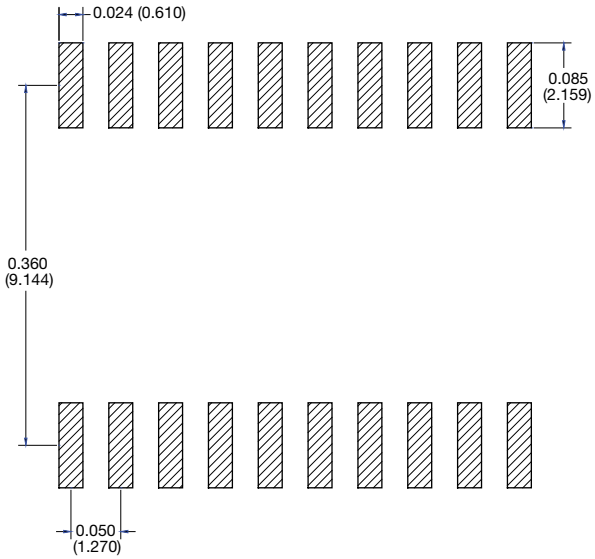


Surface Mount Networks SOIC Wide Body 300 mils (WOMC Series)

SOIC-16 (WOMC-16)



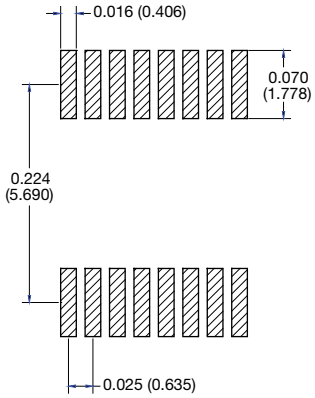
SOIC-20 (WOMC-20)



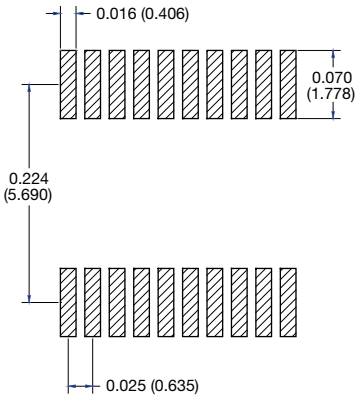
Surface Mount Networks High Density SSOP, TSOP (VSSR, VTSR Series)

SSOP MO-137

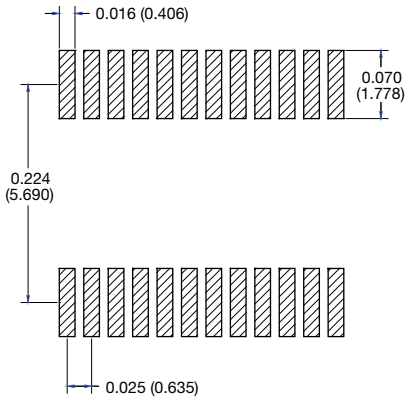
OSOP-16, VSSR-16



OSOP-20, VSSR-20

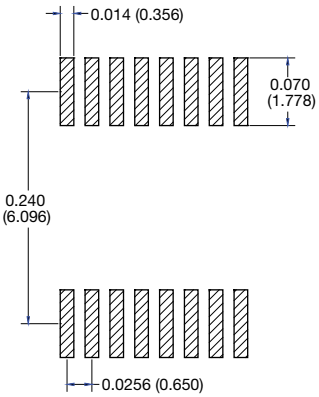


OSOP-24, VSSR-24, HD-CSO-24

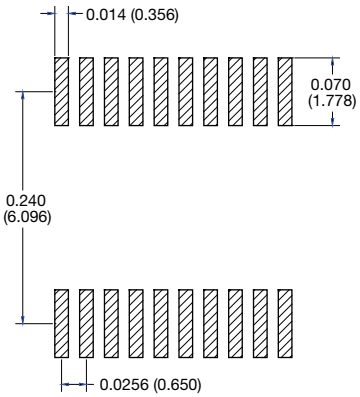


TSSOP MO-153

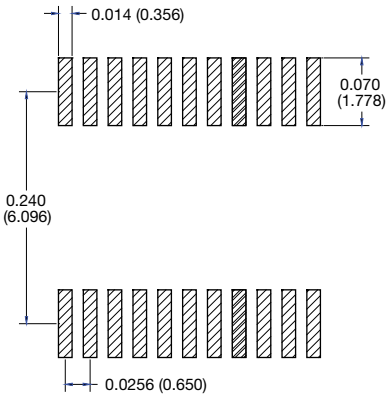
VTSR-16



VTSR-20

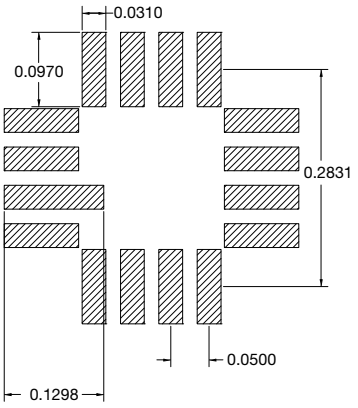


VTSR-24

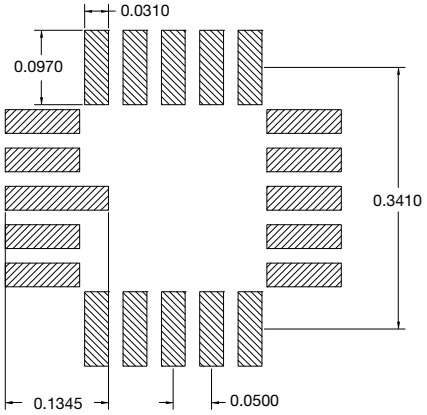


Surface Mount Leadless Networks (LCC Series)

16 Pin LCC

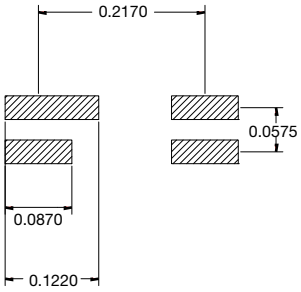


20 Pin LCC



Surface Mount Leadless Networks (MPH Series)

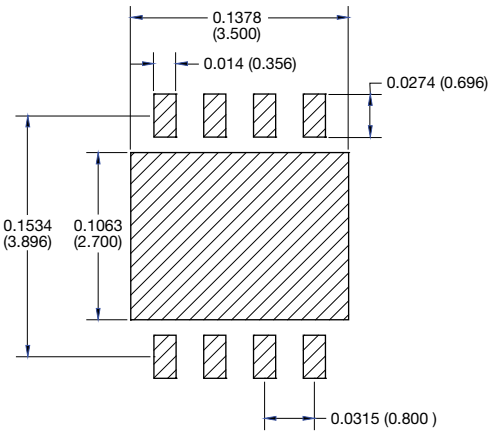
4 Pin LCC



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

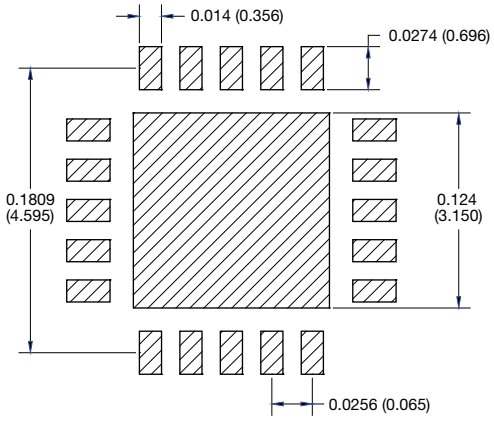
DFN MLP

DFN-8 4 x 5 mm Sq



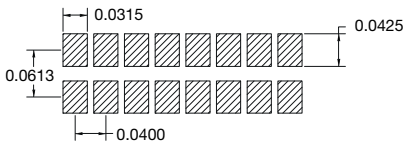
QFN MLP

QFN-20 5 x 5 mm Sq

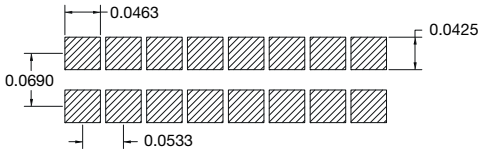


Surface Mount Leadless Resistor Arrays (PR Series)

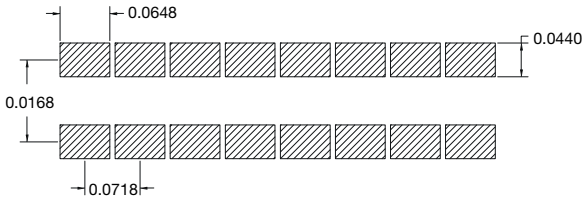
PR 100 (2 to 8 resistors)



PR 135 (2 to 8 resistors)



PR 182 (2 to 8 resistors)

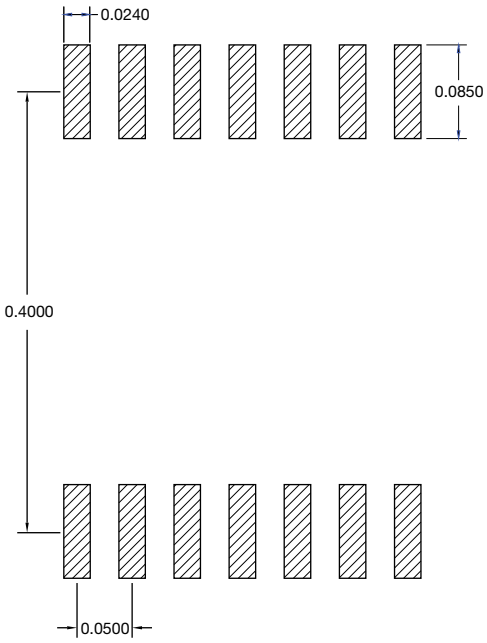


Note

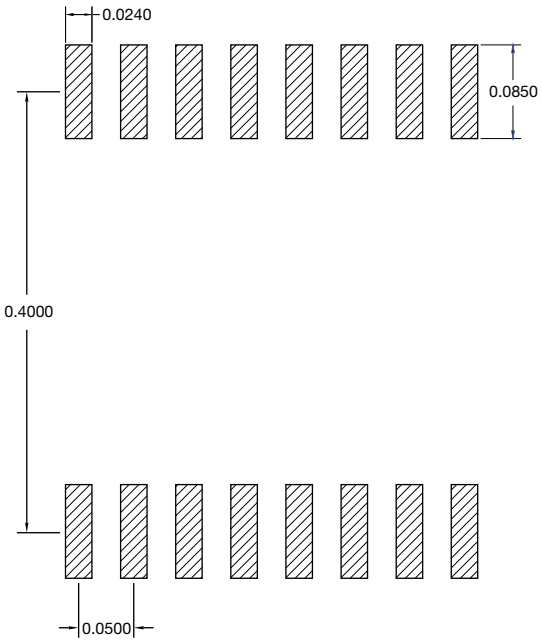
- All dimensions in inches (mm)

Flatpack

14 Pin Bottom Brazed Flatpack



16 Pin Bottom Brazed Flatpack



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