

# Product Information

International  
Manufacturing  
Services, Inc.



Resistors

Thermal Transfer Devices

RF Terminations

Attenuators

Power Splitters & Couplers

RF & Microwave Dividers

Low Pass Filters

[www.ims-resistors.com](http://www.ims-resistors.com)

International Manufacturing Services, Inc. (IMS) is the primary source for innovative passive components. We meet and exceed customer expectations with our quality, value, service and industry leading delivery.

## HISTORY

Since 1974, IMS has been a global leader offering thick and thin film electronic components including:  
Resistors • Thermal Management Devices • Attenuators • RF Terminations • Splitters & Couplers • Dividers & Filters

## QUALITY

IMS, an ISO-9001:2008 registered company, maintains superior and comprehensive quality control assuring that our products conform to the highest standards. We offer additional testing services, including 100% Value/Visual and Thermal Shock.

## INNOVATION

Our most innovative products are created as a result of close partnering and professional consultation with our customers, culminating in high quality custom solutions with short lead times.

## SERVICE

Our dedicated and knowledgeable staff is always here to assist with creating the optimal solution for your application. In addition, IMS maintains a global network of representatives who can meet with you face to face to help with problem solving.

## DELIVERY

IMS has the shortest lead times in the industry. We maintain a substantial inventory of standard components for same day shipment.

## FLEXIBILITY

With design, development, manufacturing, sales and management personnel under one roof, IMS is positioned to respond quickly and effectively.



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*the impossible made simple<sup>sm</sup>*



# WHAT WE OFFER

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Look for these buttons to help quickly identify key product attributes!

<b>ULR</b> Ultra Leach Resistant	<b>HI-OHM</b> High Value Available	<b>HI PWR</b> High Power Device	<b>RoHS</b> RoHS Available	<b>Sn62</b> Lead Content Available	<b>NON-MAG</b> Non-Magnetic	<b>LOW TCR</b> Precision Product	<b>BONDABLE</b> Wirebondable	<b>KIT</b> Standard Kit Available	
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# High Power A/N Resistors N-Series

**N-Series** resistors on A/N suit applications which require high power dissipation in a small size. The N-Series allows users to tailor the device to their specific power requirements with the choice of four thicknesses.

- Characterized to 40GHz<sup>†</sup>
- High Power Dissipation<sup>‡</sup>
- Sn62 Solder Available
- Non-Magnetic

- Applications Include:**
- Amplifier Circuits
  - Power Converters
  - Test & Measurement
  - Handheld Devices



## How to build an N-Series part number:

**SAMPLE PN:** N D C - 1206 DE - 1300 J (1206 size, 0.015" Thickness 130Ω, 5%, PtAg w/ Sn62 Solder Dual Extended Terminals)

PN Prefix	Thickness	Term Metals	Sizes*	Terminal Styles	Value Range <sup>◇</sup>	Tolerances		
N	<b>C</b> = 0.010" <sup>1</sup> <b>D</b> = 0.015" <b>G</b> = 0.025" <b>T</b> = 0.040" <sup>2</sup> <sup>1</sup> Available with size 0805 and smaller <sup>2</sup> Available with size 2010 and larger	<b>3-</b> PtAg ✓	0402	<b>WA</b> Wraparound 	<b>DE**</b> Dual Extended 	10Ω to 2KΩ	G = 2% J = 5%	
		<b>8-</b> ULR PtAg ✓	0603					
		<b>C-</b> PtAg with Sn62 Solder	0505	<b>CS**</b> Center Stripe 	<b>SS</b> Single Sided 			<b>PW</b> Partial Wrap 
		<b>H-</b> ULR PtAg with Sn62 Solder	0805					
		<b>R-</b> ULR PtAg with Sn96 Solder ✓	1005	<b>EW/CZW**</b> Extended Wrap 	<b>SB</b> SS w/ Backplane 			<b>SG/SZG***</b> Single wrap to ground 
		<b>7-</b> Au over PtAu ✓	1206					
			2010					
			2512					
			2525					
			3725					

\*Reverse aspect ratios available for most sizes  
 \*\*0805 size and larger only  
 \*\*\*ZG the same as SG with tapered high frequency resistor style and edge trim for large case size

† Performance based on mounting in matched continuous 50Ω system with proper application of RF principles  
 ◇ First 3 digits of value code are significant value. The 4th is the number of zeros following. An 'R' indicates a decimal when resistance is under 100Ω  
 ‡ Proper thermal management required  
 † For value under 10Ω contact IMS



ULR

HI PWR

RoHS

Sn62

NON-MAG

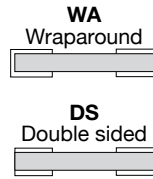
BONDABLE

## Power Ratings by Size and Thickness<sup>‡</sup>

Thickness	0.010"			0.015"			0.025"			0.040"			
	Baseplate Temp	50°C	70°C	100°C	50°C	70°C	100°C	50°C	70°C	100°C	50°C	70°C	100°C
Size	0402	13W	11W	7.1W	8.8W	7.3W	4.7W	N/A	N/A	N/A	N/A	N/A	N/A
	0505	45W	37W	24W	30W	25W	16W	20W	16W	10W	N/A	N/A	N/A
	0603	24W	20W	13W	16W	13W	8.7W	9.5W	7.7W	5.2W	N/A	N/A	N/A
	0805	75W	55W	37W	50W	37W	25W	30W	25W	16W	N/A	N/A	N/A
	1005	N/A	N/A	N/A	60W	48W	30W	40W	30W	20W	N/A	N/A	N/A
	1206	N/A	N/A	N/A	105W	85W	55W	70W	55W	35W	N/A	N/A	N/A
	2010	N/A	N/A	N/A	150W	120W	75W	90W	75W	48W	60W	48W	30W
	2512	N/A	N/A	N/A	200W	150W	100W	120W	100W	60W	70W	60W	38W
	2525	N/A	N/A	N/A	400W	300W	200W	240W	190W	120W	150W	120W	75W
3725	N/A	N/A	N/A	640W	500W	340W	380W	310W	200W	250W	200W	125W	

Thermal Management is crucial for the operation of these devices. Please visit our website for more information.

# A/N Ceramic Thermal Transfer Devices ThermaBridge™



**ThermaBridge™** provides the user with a simple, cost effective way to manage thermal issues at the board level. ThermaBridge™ moves heat from one area to another through an electrically isolated, thermally conductive ceramic chip device with metallized terminals.

- Electrically Isolated Thermal Conductor
- Thermal Design Tool
- Passive Thermal Control
- Extends Component Life
- Dramatic Temperature Reduction
- Epoxy or Solder Mountable



**Applications include:**

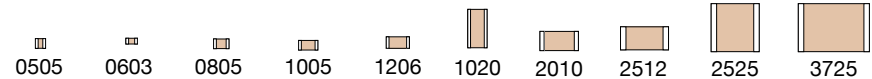
- **RF Amplifiers**
- **Conduction Cooled Computers**
- **Power Supplies & Converters**
- **JTRS, MIDS-J, GMR**
- **Temperature Controlled Oscillators**
- **Extracting Heat from Power FETS, LEDs, Pin & Laser Diodes**
- **Lighting Ballasts**
- **Protecting Neighboring Components**
- **Conduction Cooled Handheld Devices**
- **P25 Radios, Basestations & Repeaters**
- **Electrically Isolated Thermal Coupling**
- **Transformers**

How to build a ThermaBridge™ part number:

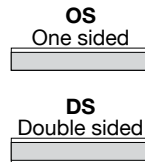
**SAMPLE PN: B G 3 - 0805WA** (0805 size, 0.025" Thickness ThermaBridge™, PtAg Terminals)

PN Prefix	Thickness	Term Metals	Sizes			Configuration
B	C = 0.010" D = 0.015" G = 0.025" T = 0.040" <sup>1</sup> <small><sup>1</sup> Available with size 2010 and larger</small>	3- PtAg ✓ 8- ULR PtAg ✓ C- PtAg with Sn62 Solder H- ULR PtAg with Sn62 Solder R- ULR PtAg with Sn96 RoHS Solder ✓	0505	1005	2525	WA= Wraparound  DS= Double sided
			0508	1020	3725	
			0510	1206		
			0603	1225		
			0612	2010		
			0805	2512		

Standard Sizes (Custom Sizes Available)



# A/N Ceramic Thermal Transfer Devices ThermaPlane™



The **ThermaPlane™** uses the same concept as the ThermaBridge™ and consists of a high thermal conductivity ceramic with metallization on the top and bottom of the device.

- Electrically Isolated Thermal Conductor
- Thermal Design Tool
- Passive Thermal Control
- Extends Component Life
- Dramatic Temperature Reduction
- Epoxy or Solder Mountable

**Applications include:**

- **RF Amplifiers**
- **Transceivers**
- **Extracting Heat From Processors & Pin Diodes**
- **Transformers**
- **Power Supplies & Converters**

**SAMPLE PN: P D 3 - 2010 OS** (2010 size, 0.025" Thickness ThermaPlane™, PtAg One Side)

Prefix	Thickness	Metals	Sizes		Configuration
P	C = 0.010" <sup>1</sup> D = 0.015" <sup>1</sup> G = 0.025" T = 0.040" <small><sup>1</sup> Available with size 2512 and smaller</small>	3- PtAg ✓ C- PtAg with Sn62 Solder 7- Au over PtAu ✓	0505	2010	OS= One Sided  DS= Metal on Both Sides
			0603	2512	
			0805	2525	
			1005	3725	
			1206	*	

\* Custom Sizes Available



## Full Wrap & Single Wrap to Ground Resistors RCX Series

- Values from 1Ω to 1TΩ
- Not Limited to EIA Standard Values
- Sn62 Solder Available
- Non-Magnetic



SAMPLE PN: **RCC** - **0805** - **2003** **J** (0805 Size, 200KΩ, 5%, PtAg w/ Sn62 Solder Terminals)

Attachment/ Term Metal	Size**	Rated Power†	Max RCW Voltage	Value Range <sup>◇</sup>	Tolerance Ranges***
✓ <b>RC1-</b> Au Wraparound	0302	63mW	50VDC	1Ω to 25MΩ	F = 1% 1Ω to 25MΩ G = 2% 1Ω to 25MΩ J = 5% 1Ω to 200MΩ K = 10% 1Ω to 1GΩ L = 15% 1Ω to 1GΩ M = 20% 1Ω to 100GΩ N = 30% 1Ω to 100GΩ O = 35% 1Ω to 1TΩ P = 40% 1Ω to 1TΩ
✓ <b>RC3-</b> PtAg Wraparound	0402	80mW	50VDC	1Ω to 1TΩ	
✓ <b>RC8-</b> ULR PtAg Wraparound	0502	100mW	50VDC	1Ω to 50MΩ	
<b>RC-</b> PtAg Wraparound with Sn62 Solder	0504	125mW	50VDC	1Ω to 200MΩ	
<b>RCH-</b> ULR PtAg Wraparound with Sn62 Solder	0603	100mW	50VDC	1Ω to 1TΩ	
<b>RC-</b> PtAg Wraparound with Sn96 Solder	0805	175mW	150VDC	1Ω to 1GΩ	
✓ <b>RCP-</b> PtAg Wraparound with Sn96 Solder	1005	250mW	160VDC	1Ω to 1GΩ	
✓ <b>RCR-</b> ULR PtAg Wraparound with Sn96 Solder	1206	250mW	200VDC	1Ω to 1GΩ	
✓ <b>RC4-*</b> PtAu Single Wrap	1505	250mW	200VDC	1Ω to 1GΩ	
✓ <b>RCD-*</b> PtAu Single Wrap with Sn62 Solder	2010	500mW	200VDC	1Ω to 1GΩ	
	2512	1W	200VDC	1Ω to 1GΩ	

† Free air rated at 70°C

◇ First 3 digits of value code are significant value. The 4th is the number of zeros following.  
An 'R' indicates a decimal when resistance is under 100Ω.

For 1Teraohm use code 1.0T. (if available).

\*Available on 0302 & 0302SG only.

\*\*Substitute **SG** in place of dash after size to indicate Single Wrap to Ground terminal style.  
\*\*\*Not all values and tolerances available in all sizes.



ULR

HI-OHM

RoHS

Sn62

NON-MAG

BONDABLE

## High Value Wraparound Resistors HCX Series

- Ultra High Resistance
- Not Limited to EIA Standard Values
- Sn62 Solder Available
- Non-Magnetic

### Applications Include:

- Sensors
- Current Flow Management
- Test & Measurement
- Piezoelectrics



SAMPLE PN: **HCC** - **2010** - **3009** **N** (2010 Size, 300GΩ, 30%, PtAg w/ Sn62 Solder Terminals)

Attachment/ Term Metal	Size <sup>1</sup>	Rated Power†	Max RCW Voltage	Value Range <sup>◇</sup>	Tolerance Ranges
✓ <b>HC3-</b> PtAg Wraparound	0805	175mW	150VDC	1.2GΩ to 1TΩ	L = 15% 1.2G to 100GΩ M = 20% 1.2G to 100GΩ N = 30% 1.2G to 1TΩ P = 40% 1.2G to 1TΩ R = 50% 1.2G to 1TΩ
<b>HCC-</b> PtAg Wraparound with Sn62 Solder	1206	250mW	200VDC	1.2GΩ to 1TΩ	
	2010	500mW	200VDC	1.2GΩ to 1TΩ	
✓ <b>HCP-</b> PtAg Wraparound with Sn96 Solder					

<sup>1</sup> Smaller sizes available. Please contact factory.

† Free air rated at 70°C

◇ First 3 digits of value code are significant value. The 4th is the number of zeros following.

An 'R' indicates a decimal when resistance is under 100Ω. For 1Teraohm use code 1.0T. (if available).



HI-OHM

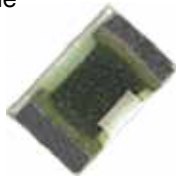
RoHS

Sn62

NON-MAG

## Extended Power Wraparound Resistors **Super RCX Series**

- Extra Power Density in the Same Footprint
- Not Limited to EIA Standard Values
- Sn62 Solder Available
- Non-Magnetic



SAMPLE PN: **RC3** - **0805S** - **11R4** **J** (Extended Power 0805 Size, 11.4Ω, 5%, PtAg terminals)

Attachment/ Term Metal	Size	Rated Power <sup>†</sup>	Max RCW Voltage	Value Range <sup>◇</sup>	Tolerance Ranges
✓ <b>RC3-</b> PtAg Wraparound	0402S	160mW	50VDC	10Ω to 1MΩ	F = 1% 10Ω to 1MΩ G = 2% 10Ω to 1MΩ J = 5% 10Ω to 1MΩ
✓ <b>RC8-</b> ULR PtAg Wraparound	0603S	200mW	100VDC	10Ω to 1MΩ	
	0805S	350mW	150VDC	10Ω to 1MΩ	
	1206S	500mW	200VDC	10Ω to 1MΩ	
<b>RC-</b> PtAg Wraparound with Sn62 Solder	2010S	1W	200VDC	10Ω to 1MΩ	
<b>RCH-</b> ULR PtAg Wraparound with Sn62 Solder	2512S	2W	350VDC	10Ω to 1MΩ	
✓ <b>RCR-</b> ULR PtAg Wraparound with Sn96 Solder					

† Free air rated at 70°C  
◇ First 3 digits of value code are significant value. The 4th is the number of zeros following.  
An 'R' indicates a decimal when resistance is under 100Ω. For 1Teraohm use code 1.0T. (if available).



## High Voltage Surface Mount Chip Resistors **HVI Series**

- High Rated Continuous Working Voltage
- High Stability Thick Film Resistor Element
- 96% Al<sub>2</sub>O<sub>3</sub> Substrate Material Provide Excellent Solder Leach Resistance
- Trimmed to EIA Standard Values
- Tolerances to ± 1%
- Passivated Resistor Element
- Available in Cut Tape or on Tape and Reel Packaging

### Applications Include:

- Power Supplies
- Power Converters
- Defibrillators
- Pacemakers
- Power Metering Devices



SAMPLE PN: **HVI** - **2010** - **4005** **J** (2010 Size, 40 MegΩ, 5%)

Attachment/ Term Metal	Size	Rated Power <sup>†</sup>	Max RWC Voltage <sup>1</sup>	Max Overload Voltage <sup>1</sup>	Value Range F = 1% Tolerance	Value Range J = 5% Tolerance	Value Range K = 10% Tolerance
✓ <b>HVI</b>	0402	62.5mW	100V	200V	39K to 10MΩ	39K to 100MΩ	N/A
	0603	100mW	200V	400V	56K to 10MΩ	56K to 100MΩ	N/A
	0805	125mW	400V	800V	100K to 10MΩ	100K to 100MΩ	N/A
	1206	250mW	500V	1kV	100K to 10MΩ	100K to 100MΩ	N/A
	2010	500mW	2kV	3kV	51K to 20MΩ	51K to 470MΩ	510K to 1GΩ
	2512	1W	3kV	4kV	30K to 20MΩ	30K to 470MΩ	510K to 1GΩ

<sup>1</sup> Operating Voltage = √(P·R) or Max Overload Voltage, whichever is lower

† Free air rated at 70°C

◇ First 3 digits of value code are significant value. The 4th is the number of zeros following.

An 'R' indicates a decimal when resistance is under 100Ω. For 1Teraohm use code 1.0T. (if available).

\* Not all values are available in all tolerances. See datasheet on the website.



## Single-Sided Resistors

# IMS Miniature Series

- Gold Terminals Provide Excellent Wire Bondability
- Ultra High Resistance Available
- Pt/Ag or Pt/Ag with Sn62 Solder Available
- Non-Magnetic Pt/Ag Great for Epoxy Attachment

Larger bond pads and optional metallized backplane are available.

This series is ideal for hybrids and microstrip circuits.



SAMPLE PN: IMS017 - 1 - 1201 F (0.025" x 0.030" Size, 1.2KΩ, 1%, Au Terminals)

PN Prefix	Size (inches)	Rated Power†	Max RCW Voltage	Term Metal	Value Range◇	Tolerance Ranges*
IMS017-1	0.025 x 0.030	30mW	40VDC	-1 Au Single-sided	1Ω to 25MΩ	F = 1% 1Ω to 25MΩ G = 2% 1Ω to 25MΩ J = 5% 1Ω to 200MΩ K = 10% 1Ω to 1GΩ L = 15% 1Ω to 1GΩ M = 20% 1Ω to 100GΩ N = 30% 1.2GΩ to 1TΩ P = 40% 1.2GΩ to 1TΩ R = 50% 1.2GΩ to 1TΩ
IMS000-	0.045 x 0.030	125mW	60VDC		1Ω to 1TΩ	
IMS001-	0.050 x 0.050	125mW	60VDC		0.1Ω to 25MΩ	
IMS014-1	0.035 x 0.035	125mW	50VDC	-3 PtAg Single-sided	1Ω to 25MΩ	
IMS002-	0.075 x 0.050	175mW	100VDC		1Ω to 25MΩ	
IMS009-	0.080 x 0.050	175mW	150VDC	-C PtAg Single-sided with Sn62 Solder	10Ω to 1GΩ	
IMSH09-	0.080 x 0.050	175mW	150VDC		1.2GΩ to 1TΩ	
IMS003-	0.100 x 0.050	250mW	160VDC		1Ω to 25MΩ	
IMS010-	0.125 x 0.050	250mW	230VDC		1Ω to 25MΩ	
IMS004-	0.150 x 0.050	350mW	350VDC		1Ω to 25MΩ	
IMS005-	0.100 x 0.100	500mW	160VDC		0.1Ω to 25MΩ	
IMS013-1	0.045 x 0.030	125mW	60VDC		1Ω to 25MΩ	

† Free air rated at 70°C

◇ First 3 digits of value code are significant value. The 4th is the number of zeros following.

An 'R' indicates a decimal when resistance is under 100Ω. For 1Teraohm use code 1.0T. (if available).

HI-OHM

RoHS

Sn62

NON-MAG

BONDABLE



## High Power Single-Sided Alumina Resistors

# IMS Power Series

- High Power Dissipation
- Sn62 Solder Available
- Non-Magnetic

Optional metallized backplane is available on all sizes.

For Higher Power Options See Page 4



SAMPLE PN: IMS204 - C - 12R0 J (0.440" x 0.180" Size, 12Ω, 5%, PtAg w/ Sn62 Solder Terminals)

PN Prefix	Size (inches)	Rated Power†	Max RCW Voltage	Term Metal	Value Range◇	Tolerance Ranges
IMS024-	0.240 x 0.120	1W	350VDC	-1 Au Single-sided	1Ω to 20MΩ	F = 1% 1Ω to 20MΩ G = 2% 1Ω to 20MΩ J = 5% 1Ω to 20MΩ K = 10% 0.05Ω to 20MΩ
IMS026-	0.120 x 0.240	1W	1VDC		0.05Ω to 1Ω	
IMS202-	0.360 x 0.140	2W	800VDC	-3 PtAg Single-sided	1Ω to 20MΩ	
IMS204-	0.440 x 0.180	4W	1100VDC	-C PtAg Single-sided with Sn62 Solder	1Ω to 20MΩ	
IMS206-	0.520 x 0.215	6W	1400VDC		1Ω to 20MΩ	
IMS208-	0.560 x 0.240	8W	1500VDC	-P PtAg Single-sided with Sn96 Solder	1Ω to 20MΩ	
IMS210-	0.620 x 0.270	10W	1800VDC		1Ω to 20MΩ	

† Free air rated at 70°C.

◇ First 3 digits of value code are significant value. The 4th is the number of zeros following.

An 'R' indicates a decimal when resistance is under 100Ω. For 1Teraohm use code 1.0T (if available).



HI PWR

RoHS

Sn62

NON-MAG

BONDABLE



# Thick Film Nickel Barrier Solderable Resistors RXI Series

- Large Inventory Available for Same-day Shipping
- Partial Reel Quantities Available
- Low Minimum Order Quantities
- 100% Matte Tin Finish over Nickel Barrier Terminals



SAMPLE PN: **RCI** - **0402** - **49R9 F** (0402 Size, 49.9Ω, 1%, Nickel Barrier Terminals)

PN Prefix	Size	Rated Power†	Max RCW Voltage	Value Range∅	Tolerances
✓ <b>RCI-</b> Nickel Barrier Layer with 100% Matte Tin Finish	0201	50mW	25VDC	E96 Values - 10Ω to 1MΩ	F = 1%
				E24 Values - 1Ω to 10MΩ	J = 5%
	0402	63mW	50VDC	E96 Values - 1Ω to 10MΩ	F = 1%
				E24 Values - 1Ω to 10MΩ	J = 5%
	0603	100mW	50VDC	E96 Values - 1Ω to 10MΩ	F = 1%
				E24 Values - 1Ω to 22MΩ	J = 5%
	0805*	125mW	150VDC	E96 Values - 1Ω to 10MΩ	F = 1%
				E24 Values - 1Ω to 22MΩ	J = 5%
	1206*	250mW	200VDC	E96 Values - 1Ω to 10MΩ	F = 1%
				E24 Values - 1Ω to 22MΩ	J = 5%
2010*	500mW	200VDC	E96 Values - 1Ω to 1MΩ	F = 1%	
			E24 Values - 1Ω to 1MΩ	J = 5%	
2512*	1W	200VDC	E96 Values - 1Ω to 1MΩ	F = 1%	
			E24 Values - 1Ω to 1MΩ	J = 5%	
✓ <b>RLI-</b> <b>Low Value</b> Nickel Barrier Layer with 100% Matte Tin Finish	0805	125mW	150VDC	E24 Values - 0.1Ω to 1Ω	G = 2%
				E24 Values - 0.1Ω to 1Ω	J = 5%
	1206	250mW	200VDC	E24 Values - 0.1Ω to 1Ω	G = 2%
	1210	500mW	200VDC	E24 Values - .068Ω to 1Ω	J = 5%

† Free air rated at 70°C

∅ First 3 digits of value code are significant value. The 4th is the number of zeros following  
An 'R' indicates a decimal when resistance is under 100Ω.

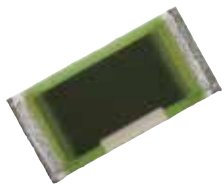
\* User trimmable versions, non-EIA values and tolerances available, contact factory



## Extended Power Thick Film Nickel Barrier Resistors

# Super RCI Version

- Extra Power Density in Same Footprint
- 100% Matte Tin Finish over Nickel Barrier Terminals



SAMPLE PN: RCI - 0805S - 1200 G (Extended Power 0805 Size, 120Ω, 2%, Nickel Barrier Terminals)



PN Prefix	Size	Rated Power†	Max RCW Voltage	Value Range◊	Tolerances
RCI- Nickel Barrier Layer with 100% Matte Tin Finish	0805S	350mW	150VDC	1Ω to 1MΩ	F = 1% G = 2% J = 5% K = 10%
	1206S	500mW	200VDC	1Ω to 1MΩ	
	2010S	1W	200VDC	1Ω to 1MΩ	
	2512S	2W	350VDC	1Ω to 1MΩ	

† Free air rated at 70°C.

◊ First 3 digits of value code are significant value. The 4th is the number of zeros following. An 'R' indicates a decimal when resistance is under 100Ω.



RoHS

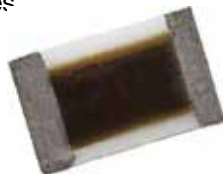
KIT

## Precision Thin Film Nickel Barrier Resistors

# TPI Series

- Low TCRs and Tight Tolerances
- Large Inventory for Same Day Shipping
- Partial Reel Quantities Available
- 100% Matte Tin Finish over Nickel Barrier Terminals
- Low Minimum Order Quantities

Tighter Tolerances to 0.01% Available. Please contact factory.



SAMPLE PN: TPI - 0402 - 49R9 B (0402 Size, 49.9Ω, 0.1% with Nickel Barrier)



PN Prefix	Size	Rated Power†	Max RCW Voltage	Value Range◊	Tolerances	TCR
TPI- Nickel Barrier Layer with 100% Matte Tin Finish	0402	63mW	25VDC	E96 Values - 10Ω to 205KΩ	B = 0.1% D = 0.5%	25PPM = All 10PPM* 5PPM* 2PPM**
	0603	63mW	50VDC	E96 Values - 4.7Ω to 1MΩ E96 Values - 2Ω to 1MΩ	B = 0.1% D = 0.5%	
	0805	100mW	100VDC	E96 Values - 4.7Ω to 2MΩ	B = 0.1%	* Available as special order only Add "N" after size for 10PPM Add "V" after size for 5PPM (i.e. TPI-0805V-49R9B for 5PPM)
				E96 Values - 1Ω to 2MΩ	D = 0.5%	
1206	125mW	150VDC	E96 Values - 4.7Ω to 2.5MΩ	B = 0.1%		
			E96 Values - 1Ω to 2.5MΩ	D = 0.5%		
2010	250mW	150VDC	E96 Values - 4.7Ω to 3MΩ	B = 0.1%		
			E96 Values - 1Ω to 3MΩ	D = 0.5%		
2512	500mW	150VDC	E96 Values - 4.7Ω to 3MΩ	B = 0.1%		
			E96 Values - 1Ω to 3MΩ	D = 0.5%		

† Free air rated at 70°C.

◊ First 3 digits of value code are significant value. The 4th is the number of zeros following. An 'R' indicates a decimal when resistance is under 100Ω.



RoHS

LOW TCR

KIT

## Current Sensing Thin Film Nickel Barrier Resistors LCI Series

- Ultra Low Resistance
- 100% Matte Tin Finish over Nickel Barrier Terminals
- Values from 0.003Ω



- Applications Include:**
- Stepping Motors
  - Switching Power Supplies
  - Voltage Regulation
  - DC-DC Converters
  - Battery Monitors

SAMPLE PN: LCI - 1225 - R047 J (1225 size, 0.047Ω, 5% with Nickel Barrier)

PN Prefix	Size	Rated Power†	Value Range‡	Max RCW Voltage	Tolerances
✓ LCI- Nickel Barrier Layer with 100% Matte Tin Finish	0402	63mW	0.05Ω to 1Ω	= √PR	F = 1% G = 2% J = 5%
	0603	100mW	0.02Ω to 1Ω		
	0805	125mW	0.02Ω to 1Ω		
	1206	250mW	0.01Ω to 1Ω		
	2010	750mW	0.01Ω to 1Ω		
	2512	1W	0.01Ω to 1Ω		
	1225	3W	0.003Ω to .2Ω		

† Free air rated at 70°C

‡ First 3 digits of value code are significant value. The 4th is the number of zeros following. An 'R' indicates a decimal when resistance is under 100Ω.



## Metal Foil Current Sensing Surface Mount Chip Resistors MLI Series

- High Stability Metal Foil Technology
- Single Sided or Full Wraparound Terminals
- 100% Tin over Nickel Barrier for Solder Attachment
- Resistance Values from 0.001Ω to 0.500Ω
- Tolerances to ± 1%
- TCR to ± 50 PPM/°C
- Available in Cut Tape or on Tape and Reel Packaging



SAMPLE PN: MLI - 1835WA - R005 F (1835 Size, wraparound, 5 milliohms, 1%)

PN Prefix	Size	Value Range‡	Rated Power†	Tolerance
✓ MLI Nickel Barrier Layer with 100% Matte Tin Finish	1835SS	1 mΩ - 9 mΩ (1 mΩ steps) 10 mΩ - 500 mΩ (E-6 values)	5W	F = 1% .003Ω and up G = 2% .002Ω J = 5% .001Ω
	1835WA	1 mΩ - 9 mΩ (1 mΩ steps) 10 mΩ - 500 mΩ (E-6 values)	5W	
	2043SS	1 mΩ - 9 mΩ (1 mΩ steps) 10 mΩ - 500 mΩ (E-6 values)	6W	
	2043WA	1 mΩ - 9 mΩ (1 mΩ steps) 10 mΩ - 500 mΩ (E-6 values)	5W	

† Free air rated at 70°C

Highest resistor value is 500 mΩ (R500).

‡ First 3 digits of value code are significant value. The 4th is the number of zeros following. An 'R' indicates a decimal when resistance is under 100Ω.

For example: 0.005Ω is noted as R005, 0.05Ω is noted as R050.



## Resistors Optimized for RF & Microwave RCX Partial Wrap Series

- Improved Frequency Response
- Characterized to 40GHz †
- Sn62 Solder Available
- Non-Magnetic
- Improved Performance to 40GHz (0302 Size)

This design allows visual inspection of the terminal joint connection when mounted face down.



SAMPLE PN: RCC - 0402PW - 50R0 J (0402 Size, 50Ω, 5%, PtAg w/ Solder Partial Wrap Terminals)

PN Prefix	Size	Frequency†	Rated Power**	Value Range‡	Tolerances
✓ <b>RC3-</b> PtAg Partial Wrap	0302PW	To 40GHz	63mW	10Ω to 2KΩ	F = 1% G = 2% J = 5%
✓ <b>RC8-</b> <b>ULR</b> PtAg Partial Wrap Wraparound	0402PW	To 36GHz	80mW		
<b>RC-</b> PtAg Partial Wrap with Sn62 Solder	0502PW	To 26.5GHz	100mW		
✓ <b>RCP</b> PtAg Partial Wrap with Sn96 Solder	0603PW	To 15GHz	100mW		
✓ <b>RC4-*</b> PtAu Partial Wrap	0805PW	To 8GHz	175mW		
<b>RCD-*</b> PtAu Partial Wrap with Sn62 Solder					
<b>RCH-</b> <b>ULR</b> PtAg Partial Wrap with Sn62 Solder					
✓ <b>RCR-</b> <b>ULR</b> PtAg Partial Wrap with Sn96 Solder					

\* Available on 0302PW Only.

‡ Other Values Available. Contact factory.

† Based on smallest size & mounting in matched continuous 50Ω system with proper application of RF principles

\*\* Rated at 70°C free air temperature



ULR

RoHS

Sn62

NON-MAG

KIT

## Thin Film Nickel Barrier Attenuators A-Series

- Characterized to 40GHz †
- 100% Matte Tin Finish over Nickel Barrier Terminals
- 50 Ohm Nominal Impedance
- Low Minimum Order Quantities
- Available in Cut Tape or on Tape and Reel Packaging



SAMPLE PN: A - 0805 - C - 03DB (0805 Size, 50Ω, 3dB, Nickel Barrier Terminals)

PN Prefix/Size	Value Range‡	Rated Power**	Max RCWVoltage*
A-0402WA-C	00 to 10dB	32mW	1.3VDC
IMS2652 (0402 face down)		32mW	1.3VDC
A-0603-C		63mW	1.8VDC
IMS2533 (0603 face down)		63mW	1.8VDC
A-0805-C		100mW	2.3VDC
IMS1141 (0805 face down)		100mW	2.3VDC
A-1206-C	00 to 10dB, 16dB	125mW	2.5VDC

‡ Other Values Available. Contact factory.

† Based on smallest size & mounting in matched continuous 50Ω system with proper application of RF principles

\* Max RCW Voltage Based on  $J/P^*R$

\*\* Rated at 70°C free air temperature



RoHS

KIT

# Temperature Variable Attenuators

## AV-0805

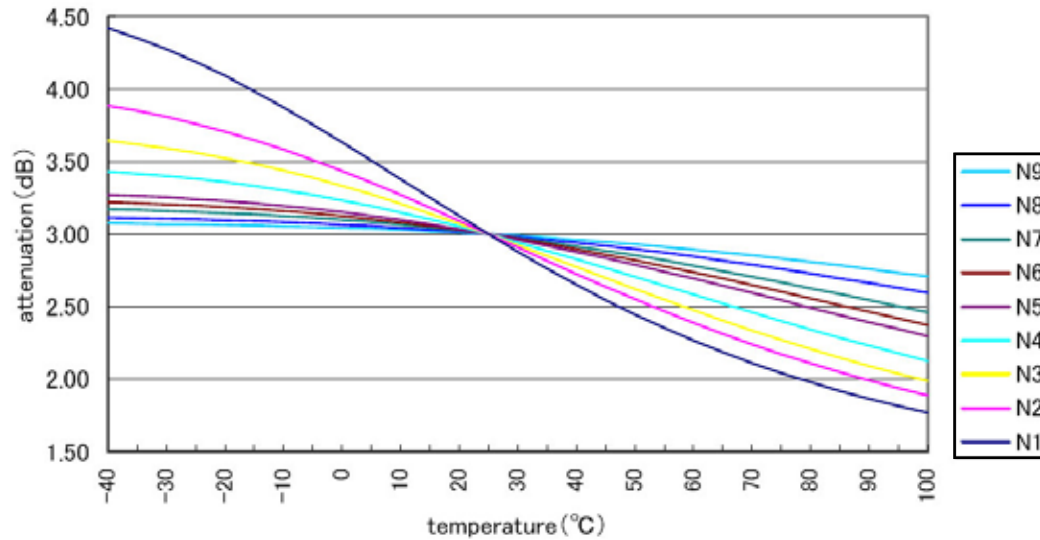
SAMPLE PN: AV - 0805 C - 03 N6 (0805 Size, nickel barrier, tin, wraparound, 3 dB N6)

PN Prefix	Size	Impedance	Attenuation	Temperature Curve
✓ AV	0805	C = 50Ω	1 to 10 dB	N1 to N9

- NiCr Thin Film
- DC to 5GHz
- Impedance - 50Ω
- Power Rating - 63 mW
- Temperature Curves from N1 to N9
- Operating Temperature: -40°C to +100°C
- Available in Cut Tape or on Tape and Reel Packaging



Typical temperature curves for an AV-0805-C-03NX.  
Consult datasheet for other attenuation levels and temperature curves.”



## Thick Film Attenuators IAX Series

- Characterized to 40GHz<sup>†</sup>
- Sn62 Solder
- Attenuation to 70dB
- Half dB Increments
- 50 Ohm Nominal Impedance



SAMPLE PN: IAC - 2512 WA - 06D5 (2512 Size, 6.5dB, PtAg w/ Sn 62 Terminals)

PN Prefix/Term Metal	Size	Rated Power <sup>‡</sup>	Term Style	Value Range		Attenuation Accuracy	
✓ <b>IA1</b> -* Au	0706	300mW	WA Wraparound	00dB to 70dB	'0' indicates whole dB increments.  '5' indicates 0.5dB increments up to 16.5dB.	0 - 3.5dB	±0.2dB
✓ <b>IA3</b> - PtAg	0805	400mW				4 - 13dB	±0.3dB
✓ <b>IA8</b> - ULR PtAg	1206	1W	SG Single Wrap to Ground			13.5 - 70dB	±0.5dB
<b>IAC</b> - PtAg with Sn62 Solder	2010	3W					
<b>IAH</b> - ULR PtAg with SN62 Solder	2512	5W	SS* Single Sided				
✓ <b>IAR</b> - ULR PtAg with SN96 Solder	3725	15W	PW Partial Wrap				

\*Single Sided & Au Terminals Available in 0706 Size Only.

† Based on mounting in matched continuous 50 ohm system with proper RF principles.



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## High Power A<sub>N</sub> Thick Film Attenuators V-Series

- High Power Dissipation<sup>‡</sup>
- Aluminum Nitride Substrate
- Characterized to 6GHz<sup>†</sup>
- Sn62 Solder
- Attenuation to 30dB
- Half dB Increments
- 50 Ohm Nominal Impedance



SAMPLE PN: VG3 - 3725 SG - 22D0 (3725 Size, 22dB, PtAg Terminals)

PN Prefix/Term Metal	Size	Rated Power <sup>‡</sup>	Term Style	Value Range		Attenuation Accuracy	
✓ <b>VG3</b> - PtAg	2010	20W	WA Wraparound	00dB to 30dB	'0' indicates whole dB increments.  '5' indicates 0.5dB increments up to 16.5dB.	0 - 3.5dB	±0.2dB
	3725	90W				3.5 - 13dB	±0.3dB
	Other sizes, power ratings and values can be supplied.		SG Single Wrap to Ground			13.5 - 30dB	±0.5dB
✓ <b>VG7</b> - Au over PtAu (input) PtAu (ground)							
✓ <b>VG8</b> - ULR PtAg							
<b>VG3</b> - PtAg with Sn62 Solder							
<b>VGH</b> - ULR PtAg with Sn62 Solder							
✓ <b>VGR</b> - ULR PtAg with Sn96 Solder							

† Based on smallest size & mounting in matched continuous 50Ω system with proper application of RF principles.

‡ Rated at 100°C baseplate temperature. Proper thermal management required.

For pulsed power applications, a scan trim should be specified. Please contact factory for more information.



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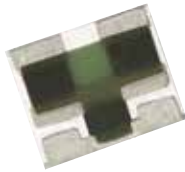
Sn62

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BONDABLE

## Standard Size T-Pad Attenuators IMA Series

- 0.122" x 0.145" Size
- Characterized to 12.4GHz†
- Sn62 Solder Available
- Attenuation to 40dB
- Half dB Increments



SAMPLE PN: IMA2373 - 12 D0 (0.122" x 0.145" Size, 12dB, PtAg Terminals)

PN Prefix	Term Style	Term Metal	Rated Power†	Attenuation	Accuracy	Value Range
IMA2314	Wraparound	PtAg w/ Sn62	2W	0 - 3.5dB	±0.2dB	00dB to 40dB
IMA2370	Single-Sided w/ Backplane	PtAg w/ Sn62	2W	30 - 40dB	±1.0dB	'0' indicates whole dB increments. '5' indicates 0.5dB increments up to 16.5dB.
IMA2371	Single Wrap to Ground	PtAg w/ Sn62	2W			
IMA2373	Wraparound	PtAg	2W	4 - 19dB	±0.3dB	
IMA2381	Single-Sided	PtAg	2W	20 - 30dB	±0.5dB	

† Based on smallest size & mounting in matched continuous 50Ω system with proper application of RF principles.  
‡ Rated at 70°C free air temperature.‡ Rated at 100°C baseplate temperature. Proper thermal management required.



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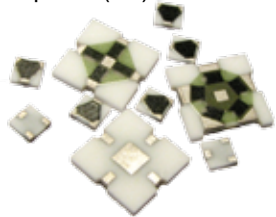
RoHS

Sn62

NON-MAG

## Wideband Resistive Splitters IPS Series

- Characterized to 20GHz†
- Two, Three or Four Way Split
- Alternative to Softboard Solutions
- Many Term Material and Presence of Backplane (BP) Available



SAMPLE PN: IPS2345 - C (2 Way, 1W, 50Ω Impedance, PtAg Terminals)

PN Prefix	Split	Size	Term Style	Term Material	Frequency†	Rated Power†	Impedance
IPS2290	2 Way	0.098" x 0.098"	Single-Sided	PtAg/PtAg BP	To 20GHz	1W	C = 50Ω
IPS2331	2 Way	0.098" x 0.098"	Single-Sided	Au/Au BP	To 20GHz	1W	D = 75Ω
IPS2346	2 Way	0.098" x 0.098"	Wraparound	PtAg	To 20GHz	1W	
IPS2480	3 Way	0.240" x 0.240"	Single-Sided	Au/Au BP	To 7GHz	3W	
IPS2481	3 Way	0.240" x 0.240"	Single-Sided	PtAg/PtAg BP	To 7GHz	3W	
IPS2521	3 Way	0.270" x 0.2470"	Wraparound	PtAg/PtAg BP	To 7GHz	3W	
IPS2522	4 Way	0.295" x 0.287"	Wraparound	PtAg/PtAg BP	To 7GHz	3W	
IPS2528	2 Way	0.098" x 0.098"	Wraparound	PtAg w/Sn62	To 20GHz	1W	
IPS2541	2 Way	0.098" x 0.098"	Single-Sided	PtAg	To 20GHz	1W	
IPS2542	3 Way	0.098" x 0.098"	Single-Sided	Au	To 7GHz	3W	
IPS2640	2 Way	0.098" x 0.098"	Wraparound	PtAg w/Sn96	To 20GHz	1W	
IPS2668	2 Way	0.098" x 0.098"	Single-Sided	PtAg/marked BP	To 20GHz	1W	
IPS2669	2 Way	0.098" x 0.098"	Partial Wrap	ULR PtAg	To 20GHz	1W	

† Based on mounting in a matched continuous 50Ω system with proper RF techniques  
‡ Rated at 70°C free air temperature.‡ Rated at 100°C baseplate temperature. Proper thermal management required.



RoHS

Sn62

NON-MAG

BONDABLE

## Thin Film Splitters IPT Series

- 96% Alumina Substrate
- NiCr Resistive Element
- Broadband to 30 GHz (face down mounting)
- 100% Matte Tin Terminals
- Sizes from 0402 to 1206
- Three Resistor "Y" Configuration
- Wraparound Terminals
- Available in Cut Tape or on Tape and Reel Packaging



SAMPLE PN: IPT - 0402WA C - U (0402 Size, 50Ω impedance, taped face down)

PN Prefix	Size	Impedance	Packaging
✓ IPT	0402WA	C - 50Ω	U - T/R face down
	0603WA	C - 50Ω	Blank - T/R U - T/R face down
	0805WA	C - 50Ω	Blank - T/R U - T/R face down
	1206WA	C - 50Ω	Blank - T/R U - T/R face down



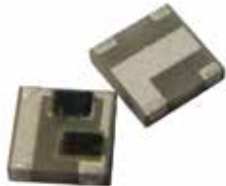
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## Wideband Resistive Couplers IMK Series

- 0.120" x 0.120" Size
- Characterized to 20GHz<sup>†</sup>

### Applications Include:

- RF Amplifiers
- Signal Analyzers
- Transmitters



SAMPLE PN: IMK2549 - 18dB (0.12" x 0.12" Size, 18dB coupler, PtAg Terminals)

PN Prefix	Direction	Term Style	Term Material	Impedance	Frequency <sup>†</sup>	Rated Power <sup>‡</sup>	Value Range
✓ IMK2549	Right	Wraparound	PtAg	C = 50Ω	To 15GHz	1W Dissipated	06 to 30dB
✓ IMK2550	Left	Wraparound	PtAg	C = 50Ω	To 15GHz	1W Dissipated	06 to 30dB
✓ IMK2574	Right	Wraparound	Au (Inputs) PtAu (GND)	C = 50Ω	To 15GHz	1W Dissipated	06 to 30dB
✓ IMK2575	Left	Wraparound	Au (Inputs) PtAu (GND)	C = 50Ω	To 15GHz	1W Dissipated	06 to 30dB
IMK2637	Right	Wraparound	PtAg w/Sn62	C = 50Ω	To 15GHz	1W Dissipated	06 to 30dB
IMK2638	Left	Wraparound	PtAg w/Sn62	C = 50Ω	To 15GHz	1W Dissipated	06 to 30dB
✓ IMK2650	Left	Wraparound	PtAg w/Sn96	C = 50Ω	To 15GHz	1W Dissipated	06 to 30dB
✓ IMK2658	Left	Wraparound	ULR PtAg	C = 50Ω	To 15GHz	1W Dissipated	06 to 30dB
✓ IMK2659	Left	Wraparound	ULR PtAg w/Sn96	C = 50Ω	To 15GHz	1W Dissipated	06 to 30dB

<sup>†</sup> Based on smallest size & mounting in matched continuous 50Ω system with proper application of RF principles.

<sup>‡</sup> Rated at 100°C Baseplate temperature.



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BONDABLE



# Power Dividers IMD Series

The **IMD Series** power dividers represent an advancement in board level signal processing technology. With alumina construction and highly conductive proprietary film, these devices exhibit low insertion loss, precision performance and repeatability not found in commodity type or LTCC devices.

- 2 to 20GHz Precise Devices Available
- Simple Thick Film Construction
- High Performance Repeatability
- Custom Designs Available

## IMD Series Design Capabilities

**ACN Versions Also Available**

<b>Term Style</b>	Microstrip or Wraparound		
<b>Construction</b>	Quadrature - 90° Outputs	Wilkinson - 0° Outputs	Rat Race - 180° Outputs
<b>Center Freq. Range</b>	2 - 16GHz/ 10% Bandwidth	3 - 13GHz/ 20% Bandwidth	6 - 20GHz/ 10% Bandwidth
<b>Typ. Ins. Loss</b>	0.5dB	0.5dB	0.7dB
<b>Design</b>	1/4 Wave	1/4 Wave	3/4 Wave

## Examples of off-the-shelf IMD Series Dividers

**SAMPLE PN: IMD2417** (10GHz Center Frequency SMT Rat Race Divider)

PN	Construction	Center Freq.	Bandwidth	VSWR	Typ. Insertion Loss	Input Power†	Size (inches)	Term Style
✓ IMD2435	Wilkinson	6GHz	20%	1.3:1	<0.5dB	20W	0.355 x 0.184	SMT
✓ IMD2365	Wilkinson	6GHz	20%	1.3:1	<0.5dB	20W	0.274 x 0.184	Microstrip
✓ IMD2417	Rat Race	10GHz	10%	1.3:1	<0.5dB	20W	0.322 x 0.356	SMT
✓ IMD2403	Quadrature	4.5GHz	10%	1.25:1	<0.4dB	20W	0.481 x 0.441	SMT



WILKINSON



RAT RACE



QUADRATURE



HI PWR

RoHS

NON-MAG

# Custom Solutions

Since 1974, IMS has been building unique products based on customer supplied drawings to solve design challenges. Here are examples of custom designs and product variations.

- Design Assistance Available
- Rapid & Low Cost Prototyping
- Minimal NRE Cost
- Low Minimum Order Quantities
- Quick Turn Around

**Heater Chips**  
**Custom Resistors**  
**Resistor Networks**  
**Custom Attenuators**  
**Jumpers**

**Dual-Sided Devices**  
**Oversized Terminations**  
**Ultra High Ohmic Values**  
**Ultra Low Ohmic Values**  
**Multi-Function Devices**

**Stand Alone Bonding Pads**  
**Special Laser Trims**  
**Custom Pad Sizes**  
**High Isolation Splitters**  
**Low Pass Filters**

# Engineering Kits

IMS offers engineering kits for many popular thick and thin film surface mount products at a reasonable cost. At right are standard engineering kits. Also available are custom kits of nearly any IMS product.

- Convenient Source of Components When You Need Them
- Available in 25, 50 or 100 pieces per Value

### RCI Series Resistor Kits

- RCI-0402 5%
- RCI-0603 1% & 5%
- RCI-0805 1% & 5%
- RCI-1206 1% & 5%
- RCI-2010 1% & 5%
- RCI-2512 1% & 5%

### RCX Series PW Resistor Kits

- RCX-0302PW 5%
- RCX-0402PW 5%
- RCX-0502PW 5%
- RCX-0603PW 5%
- RCX-0805PW 5%

### TPI Series Kits

- TPI-0603 0.5%
- TPI-0805 0.5%

### A-Series Attenuator Kits

- A-0402WA-C
- A-0603-C
- A-0805-C
- A-1206-C

# Quick Selection Guide

## Attachment Guide (Additional Terminal Materials Available)

Attachment Method	Option	Terminal Material
Solder	C, H*	Platinum Silver (PtAg) with 62% Tin, 36% Lead, 2% Silver Solder Coat
	3, 8*	RoHS Compliant Platinum Silver (PtAg)
	P, R*	RoHS Compliant Platinum Silver (PtAg) with 96% Tin, 4% Silver Solder Coat
		RCI, TPI, LCI & A Series Nickel Barrier Components with 100% Matte Tin Finish also Suitable for Solder
Epoxy	3	RoHS Compliant Platinum Silver (PtAg)
Gold Wirebond	1	RoHS Compliant Gold (Au)
	7	RoHS Compliant Gold (Au) over Platinum Gold (PtAu) for ALN Devices

\*ULR metalizations

	1W	2W	5W	10W	100W	350W	Page		
<b>Best Options for High Power Applications</b>	N Series	[Bar chart showing 1W to 350W]					4		
	IMS Power (SS)	[Bar chart showing 1W to 10W]					8		
	Super RCX (WA)	[Bar chart showing 1W to 10W]					7		
	Super RCI (WA)	[Bar chart showing 1W to 10W]					9		
<b>Best Options for High Voltage Applications</b>		1kV	1.5kV	2kV	2.5kV				
	HVX Series (WA)	[Bar chart showing 1kV to 2.5kV]				7			
	IMS Power (SS)	[Bar chart showing 1kV to 1.5kV]				8			
<b>Best Options for Applications Needing High Ohmic Value</b>		20MΩ	100MΩ	500MΩ	1GΩ	50GΩ	1TΩ		
	HCX Series (WA)	[Bar chart showing 20MΩ to 1TΩ]						6	
	RCX Series (WA)	[Bar chart showing 20MΩ to 1TΩ]						6	
	IMS Series (SS)	[Bar chart showing 20MΩ to 1TΩ]						8	
	RCI Series (WA)	[Bar chart showing 20MΩ to 1TΩ]						9	
	IMS Power (SS)	[Bar chart showing 20MΩ to 1TΩ]						8	
<b>Best Options for Applications Needing Low Value</b>		.9Ω	.5Ω	.1Ω	.07Ω	.05Ω	.01Ω	.003Ω	
	LCI Series (WA)	[Bar chart showing .9Ω to .003Ω]							10
	TPI Series (WA)	[Bar chart showing .9Ω to .003Ω]							10
	IMS Power (SS)	[Bar chart showing .9Ω to .003Ω]							8
	RCI Series (WA)	[Bar chart showing .9Ω to .003Ω]							9
	IMS Series (SS)	[Bar chart showing .9Ω to .003Ω]							8

# CERTIFICATE

TUV Rheinland of North America, Inc.  
1300 Massachusetts Avenue, Boxborough, MA 01719



Hereby certifies that



**International Manufacturing Services, Inc. (IMS)**  
**50 Schoolhouse Lane**  
**Portsmouth, RI 02871-2435**

has established and maintains a quality management system for the

## **Design and Manufacture of Resistors and Passive Components**

An audit was performed and documented in Report No 3995.  
Proof has been furnished that the requirements according to

**ISO 9001:2008**

are fulfilled.

Further clarification regarding the scope of this certificate and the applicability of  
ISO 9001:2008 requirements may be obtained by contacting TRNA.

Certificate Registration No.

**74 300 3995**

Certificate Effective Date  
**August 4, 2015**



Certificate Expiration Date  
**August 3, 2018**

Revised 9/10/2015  
Certification Decision Date: 08/04/2015

  
Certification of Management Systems

International  
Manufacturing  
Services, Inc.



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