Resistors Product Change Notification

PCN Number	PCN-2023-RBU02
PCN Title	**Datasheet Update – 4500, 4530, HVD & HVP Series**
PCN Date	7th February 2023
Type of Change	☐ End of Life Notification ☐ Manufacturing Facility Change or Addition ☒ Datasheet Specification Change ☐ Other: ☐ Material Change ☐ Process Change ☐ Design Change
Manufacturing Location(s) Affected	TT Electronics Bedlington
Date of Change Implementation	**7th February 2023**

Products Affected	
TT Series	**Datasheet Link**
4500 Series	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheet/4500.pdf
4530 Series	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheet/4530.pdf
HVD Series	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheet/HVD.pdf
HVP Series	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheet/HVP.pdf

Change Detail	
Description of Change	Update to the 4500, 4530, HVD & HVP Series Datasheets to reflect changes to the upper resistance value & tolerance limits. There will be no change to the product form, fit or function and this PCN is for notification only. See Appendix 1 for details.
Reason for Change	To ensure datasheets are in line with current manufacturing process capability.
Implementation Plan	With immediate effect
Customer Impact	Product form, fit or function is unchanged. Upper Resistance value limit is 1Gohm.
Recommendations	Please contact your local Sales / FAE team for assistance if required.
Availability of Previously Manufactured Product	N/A
Availability of Approval Samples	N/A
Sales Contacts	Americas: Kevin Marzano kevin.marzano@ttelectronics.com Europe: Claudia Patzak-Kruger Claudia.patzak@ttelectronics.com Asia: Janson Chuen janson.chuen@ttelectronics.com

Approvals			
	Name	**Title**	**Date**
Issued by	Mark Beeston	Product Line Manager	7th February 2023
Approved by	Heather Baird	VP Product Management	7th February 2023
Approved by	Klaus Zwerschina	VP Sales	7th February 2023

Appendix 1

Before Version

All parts are Pb-free and comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

Electrical Data

		4501	4502	4503	4504	4505	4506	4507
Power rating at 70°C	watts	1	1.7	2	3	2.8	3.6	4.5
Resistance range	ohms	20k to 500M	36k to 750M	36k to 750M	62k to 1G	51k to 1G	82k to 1G	180k to 1.5G
Limiting element voltage	volts	10k	10k	15k	15k	20k	20k	20k
TCR (20°C to 70°C)	ppm/°C	100, 150 (see table below for 50ppm)						
Resistance tolerance	%	1, 2, 5						
Values		Any value to order						
Ambient temperature range	°C	-55 to 125						
Value ranges for TCR of 100 ppm/°C		≤150M	≤270M	≤270M	≤470M	≤390M	≤680M	≤1.5G
Value ranges for TCR of 150 ppm/°C		>150M	>270M	>270M	>470M	>390M	>680M	
Value ranges available for TCR of 50ppm/°C		<100M	<150M	<200M	<250M	<250M	<300M	<600M

All parts are Pb-free and comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

Electrical Data

		4531*	4532*	4533*	4534*	4535*	4536*	4537*
Power rating at 70°C	watts	1.0	1.7	2.0	3.0	2.8	3.6	4.5
Resistance range	ohms	20K to 130M	36K to 250M	36K to 250M	62K to 450M	51K to 370M	82K to 660M	180K to 1.4G
Limiting element voltage	volts	6.5K	6.5K	10K	10K	15K	15K	15K
TCR (20°C to 70°C)	ppm/°C	100						
Resistance tolerance	%	1, 2, 5						
Resistance ratio tolerances	%	1, 2, 5						
Standard values		Any value to order						
Ambient temperature range	°C	-55 to 125						

*5th or 6th digit determines protection and lead type (see marking)

All parts are Pb-free and comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

Electrical Data

		HVD08	HVD12	HVD15	HVD20	HVD30
Power rating at 70°C	watts	0.75	1.5	2.5	3.5	4.5
Limiting element voltage in air dc or ac pk	kV	7.5	10	15	20	30
Resistance value	ohms	10K – 1G	50K – 2G	100K – 2G	100K – 5G	
Resistance tolerance	%	1, 5				
Ratio tolerance	%	0.25, 0.5, 1				
TCR (20°C to 70°C)	ppm/°C	50, 100				
Tracking TCR (20°C to 70°C)	ppm/°C	25, 50				
Standard values		E24 preferred for (R1 + R2) and R2				
Ambient temperature range	°C	-55 to +155				
Insulation resistance at 500V	ohms	>10G				
Dielectric strength of insulation	volts	Screen printed protection: >1000 Powder coated: >2000				

Electrical Data

		HVP04	HVP06	HVP08	HVP10	HVP15	HVP20
Power rating at 70°C in air	watts	0.4	0.6	0.8	1	1.5	2
Power rating at 25°C in oil	watts	0.6	0.9	1.2	1.5	2.25	3
Resistance range	ohms	1K0 to 250M	1K5 to 1G0	2K0 to 1G0	3K0 to 2G0	4K0 to 5G0	5K0 to 10G
Limiting element voltage in air (dc or ac peak)	kV	2	5	7.5	10	15	20
Limiting element voltage in oil (dc or ac peak)	kV	4	10	15	20	30	40
TCR (20°C to 70°C)	ppm/°C	100	100, 50, 25				
Resistance tolerance	%	0.5, 1, 5	0.25, 0.5, 1, 5				
Values		E24 preferred					
Ambient temperature range	°C	-55 to 155					
Insulation resistance at 500V	ohms	>10G					
Dielectric strength of insulation	volts	Screen printed protection: >1000 Powder coated: >2000					

Other resistance, tolerance and TCR values are available on request.

After Version

Electrical Data

		4501	4502	4503	4504	4505	4506	4507
Power rating at 70°C	watts	1	1.7	2	3	2.8	3.6	4.5
Resistance range	ohms	20k to 500M	36k to 750M	36k to 750M	62k to 1G	51k to 1G	82k to 1G	180k to 1G
Limiting element voltage	volts	10k	10k	15k	15k	20k	20k	20k
TCR (20°C to 70°C)	ppm/°C	100, 150 (see table below for 50ppm)						
Resistance tolerance	%	1, 2, 5						
Values		Any value to order						
Ambient temperature range	°C	-55 to 125						
Value ranges for TCR of 100 ppm/°C		≤150M	≤270M	≤270M	≤470M	≤390M	≤680M	≤1.5G
Value ranges for TCR of 150 ppm/°C		>150M	>270M	>270M	>470M	>390M	>680M	
Value ranges available for								
TCR of 50ppm/°C		<100M	<150M	<200M	<250M	<250M	<300M	<600M

Electrical Data

		4531*	4532*	4533*	4534*	4535*	4536*	4537*
Power rating at 70°C	watts	1.0	1.7	2.0	3.0	2.8	3.6	4.5
Resistance range	ohms	20K to 130M	36K to 250M	36K to 250M	62K to 450M	51K to 370M	82K to 660M	180K to 1G
Limiting element voltage	volts	6.5K	6.5K	10K	10K	15K	15K	15K
TCR (20°C to 70°C)	ppm/°C	100						
Resistance tolerance	%	1, 2, 5						
Resistance ratio tolerances	%	1, 2, 5						
Standard values		Any value to order						
Ambient temperature range	°C	-55 to 125						

*5th or 6th digit determines protection and lead type (see marking)

Electrical Data

		HVD08	HVD12	HVD15	HVD20	HVD30
Power rating at 70°C	watts	0.75	1.5	2.5	3.5	4.5
Limiting element voltage in air dc or ac pk	kV	7.5	10	15	20	30
Resistance value	ohms	10K – 1G	50K to 1G0	100K to 1G0		
Resistance tolerance	%	1, 5				
Ratio tolerance	%	0.25, 0.5, 1				
TCR (20°C to 70°C)	ppm/°C	50, 100				
Tracking TCR (20°C to 70°C)	ppm/°C	25, 50				
Standard values		E24 preferred for (R1 + R2) and R2				
Ambient temperature range	°C	-55 to +155				
Insulation resistance at 500V	ohms	>10G				
Dielectric strength of insulation	volts	Screen printed protection: >1000 Powder coated: >2000				

Other resistance, tolerance and TCR values are available on request.

Electrical Data

		HVP04	HVP06	HVP08	HVP10	HVP15	HVP20
Power rating at 70°C in air	watts	0.4	0.6	0.8	1	1.5	2
Power rating at 25°C in oil	watts	0.6	0.9	1.2	1.5	2.25	3
Resistance range	ohms	1K0 to 250M	1K5 to 1G0	2K0 to 1G0	3K0 to 1G0	4K0 to 1G0	5K0 to 1G0
Limiting element voltage in air (dc or ac peak)	kV	2	5	7.5	10	15	20
Limiting element voltage in oil (dc or ac peak)	kV	4	10	15	20	30	40
TCR (20°C to 70°C)	ppm/°C	100	≤500M: 25, 50, 100 >500M: 50, 100		25, 50, 100		
Resistance tolerance	%	0.5, 1, 5	<500M: 0.25, 0.5, 1, 5 ≥500M: 1, 5				
Values		E24 preferred					
Ambient temperature range	°C	-55 to 155					
Insulation resistance at 500V	ohms	>10G					
Dielectric strength of insulation	volts	Screen printed protection: >1000 Powder coated: >2000					

Other resistance, tolerance and TCR values are available on request.