

Listing of PCNs

Introduction

This file contains PCN information for the product(s) referenced by the file name.

Note that the file may contain multiple PCNs. If this is the case, they are arranged in chronological order, so to see the most recent PCN scroll to the end.

TT Electronics
Fixed Resistor Business unit
4222 South Staples Street
Corpus Christi, Texas 787411



Telephone: (361)992-7900
Facsimile: (361) 992-3377

PRODUCT/ PROCESS CHANGE NOTICE

PCN Number	PCN – 20110824-1a
Date	8/24/11
Product(s) Affected	PFC-W1505, PFC-W2010, PFC-W2512
Date Effective	November 1, 2011
Mfg. Location	Corpus Christi

Type of Change	<input checked="" type="checkbox"/> End of Life	<input type="checkbox"/> Material	<input type="checkbox"/> Process	<input type="checkbox"/> Other
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Description of Change	End of life notice. The revision of the PCN extends the last time buy to February 29, 2012.
Reason for Change	IRC is discontinuing the manufacturing.
Implementation Plan	IRC will accept last-time-buys to support current business only until February 29, 2012. After February 29, only orders to deplete stock WIP will be accepted.
Recommendations	IRC recommends the PFC precision needs. IRC makes no recommendation where Tan material is required.
Availability of Previously Manufactured Products	N/A
Sales Contact	
Title	
Phone	
Fax	
Email	

Approvals		
Operations Manager/Date	Global Product Line Director/Date	VP & FRBU/ Date
Chuck Stout Approved on 11/23/11 @ 7:42AM	Philip Fullmer Approved on 11/22/11 @ 9:42 AM	Gareth Mycock Approved on 11/23/11 @ 6:50AM

FRBU C PCN; Revision Date: October 6, 2011



Resistors Product Change Notification

PCN Number and Title	2013-RBU04: Notice of Additional Ceramic Source Qualification for Commercial PFC Resistors		
Notification Launch Date	November 7, 2013		
Type of Change	<input type="checkbox"/> End of Life Notification <input type="checkbox"/> Material Change <input type="checkbox"/> Manufacturing Facility Change or Addition <input type="checkbox"/> Process Change <input type="checkbox"/> Datasheet Specification Change <input type="checkbox"/> Design Change <input checked="" type="checkbox"/> Other: <u>Qualification of Additional Ceramic Source</u>		
Manufacturing Location(s) Affected	Corpus Christi, TX USA	Date of Change Implementation	January 2, 2014

Products Affected		
Product Family	Datasheet Link(s)	Comment
1206 Case Size Commercial PFC	http://www.irctt.com/file.aspx?product_id=161&file_type=datsheet http://www.welwyn-tt.com/pdf/datasheet/PFC.pdf	ONLY 1206 Case Size Commercial Grade

Description of Change	<p>TT electronics has qualified an additional ceramic source for high-volume manufacturing of commercial-grade 1206 case size PFC precision resistors. This notice affects all tolerances and TCR values of commercial-grade 1206 case size PFC resistors.</p> <p>Commercial-grade PFC resistors are identified by the TCR code in the part number as listed on the datasheet. TCR codes 01, 02, 03, 11, and 12 designate a commercial-grade PFC resistor. Any PFC manufactured with a TT electronics internal part number with a commercial PFC tolerance code is affected by this change.</p> <p><i>There is no change to form, fit, or function of the finished product as described in the datasheet. This notice is for informational purposes only.</i></p>
Reason for Change	In order to support long-term continuity to our valued customers in the unlikely event of a sudden ceramic raw material shortage from existing sources, TT electronics has qualified an additional source of ceramic for commercial PFC product in the popular 1206 case size.
Implementation Plan	Effective January 2, 2014 customers may receive product manufactured with ceramic from all qualified sources.



	MIL-Screened resistors (ordered by 04, 05, 06, 07, 14, 15, and 16 TCR codes) and resistors ordered by MIL-PRF-55342 part number are <u>NOT</u> impacted by this change.
Customer Impact	Customers will experience no impact from the qualification of the additional ceramic source.
Recommendations	As this notice is provided for information purposes only, no recommendations are required.
Availability of Previously Manufactured Product	N/A
Sales Contacts	EMEA: Armando Marnati Armando.Marnati@ttelectronics.com Americas: Mike Graham Mike.Graham@ttelectronics.com Asia/Pacific: Janson Chuen Janson.Chuen@ttelectronics.com

Title	Name	Signature / Date
Director of Product Management	Philip Fulmer	<i>Philip Fulmer</i> October 10, 2013
Operations Director	Chuck Stout	<i>Chuck Stout</i> October 10, 2013
Global Sales Director	Klaus Zwerschina	<i>Klaus Zwerschina</i> October 10, 2013
SVP/ General Manager	Gareth Mycock	<i>Gareth Mycock</i> October 11, 2013

Additional Information:

Please see the following page of this change notice for a reference table providing further information on part numbers impacted by this change.



PFC Type	IRC PFC Part Number	Welwyn PFC Part Number	Is this part number impacted by PCN?
Commercial	<p>PFC-W0402R-XX-YYYY-Z PFC-W0402LF-XX-YYYY-Z PFC-W0603R-XX-YYYY-Z PFC-W0603LF-XX-YYYY-Z PFC-W0805R-XX-YYYY-Z PFC-W0805LF-XX-YYYY-Z</p> <p>Where XX = All Commercial TCR Codes: 01 = $\pm 100\text{ppm}/^{\circ}\text{C}$ 02 = $\pm 50\text{ppm}/^{\circ}\text{C}$ 03 = $\pm 25\text{ppm}/^{\circ}\text{C}$ 11 = $\pm 15\text{ppm}/^{\circ}\text{C}$ 12 = $\pm 10\text{ppm}/^{\circ}\text{C}$</p> <p>Where YYY = Resistance Value Where Z = Tolerance Code</p>	<p>W0402XXX-YYYYZI W0603XXX-YYYYZI W0805XXX-YYYYZI</p> <p>Where XXX = TCR Code Where YYYY = Resistance Value Where Z = Tolerance Code</p>	Not Impacted
Commercial	<p>PFC-W1206R-XX-YYYY-Z PFC-W1206LF-XX-YYYY-Z</p> <p>Where XX = All Commercial TCR Codes: 01 = $\pm 100\text{ppm}/^{\circ}\text{C}$ 02 = $\pm 50\text{ppm}/^{\circ}\text{C}$ 03 = $\pm 25\text{ppm}/^{\circ}\text{C}$ 11 = $\pm 15\text{ppm}/^{\circ}\text{C}$ 12 = $\pm 10\text{ppm}/^{\circ}\text{C}$</p> <p>Where YYY = Resistance Value Where Z = Tolerance Code</p>	W1206XXX-YYYYZI	Additional ceramic source used for volume production per this PCN notice
MIL-Screened	<p>PFC-W0402R-XX-YYYY-Z PFC-W0603R-XX-YYYY-Z PFC-W0805R-XX-YYYY-Z PFC-W1206R-XX-YYY-Z</p> <p>Where XX = All MIL-Screened TCR Codes: 04 = $\pm 300\text{ppm}/^{\circ}\text{C}$ 05 = $\pm 100\text{ppm}/^{\circ}\text{C}$ 06 = $\pm 50\text{ppm}/^{\circ}\text{C}$ 07 = $\pm 25\text{ppm}/^{\circ}\text{C}$ 14 = $\pm 20\text{ppm}/^{\circ}\text{C}$ 15 = $\pm 15\text{ppm}/^{\circ}\text{C}$ 16 = $\pm 10\text{ppm}/^{\circ}\text{C}$</p>	N/A	Not Impacted
MIL-PRF-55342	D55342XXXXXXXXXX	N/A	Not Impacted
MIL-PRF-55342	M55342XXXXXXXXXX	N/A	Not Impacted

Resistors Product Change Notification

PCN Number	PCN-2018-RBU12
PCN Title	PFC 0402 & 0805 PFC Process Upgrade
PCN Date	05 October 2018
Type of Change	<input type="checkbox"/> End of Life Notification <input checked="" type="checkbox"/> Manufacturing Facility Change or Addition <input checked="" type="checkbox"/> Datasheet Specification Change <input type="checkbox"/> Other: <input checked="" type="checkbox"/> Material Change <input checked="" type="checkbox"/> Process Change <input checked="" type="checkbox"/> Design Change
Manufacturing Location(s) Affected	Corpus Christi (USA)
Date of Change Implementation	<p>Phased Implementation by case size:</p> <p>(1) 0805 (Orders placed beginning week commencing 05 November 2018)</p> <p>(2) 0402 (Orders placed beginning week commencing 19 November 2018)</p> <p>Case sizes 0603, 1206, planned Q1 2019, to be addressed by separate PCN.</p> <p>Existing orders at the time of implementation will be supported by either the current or new design product.</p> <p>Product with new and old construction will be supplied until inventories are consumed</p>

Products Affected		
Product Series	Product Type(s)	Datasheet Link
PFC	PFC-W0402LF PFC-W0805LF	<p>Commercial products covered by this PCN: http://www.ttelectronics.com/sites/default/files/resistors-datasheets/PFC.pdf</p> <p>Special products (tight tolerance / TCR / Sn-Pb, etc) outside scope of this PCN but previously included in the PFC datasheet, are addressed in a separate datasheet: http://www.ttelectronics.com/sites/default/files/resistors-datasheets/PFC-S.pdf</p>

Change Detail	
Description of Change	<p>(1) No change to part number or form/fit/function. Updated product will fit the same solder pads but minor tolerance changes have been made (summarized in "Additional Information").</p> <p>(2) Termination modified to align with modern design rules and process techniques, see details below:</p> <ol style="list-style-type: none"> Simplified termination stack incorporating thick film conductor inks (Ag / Au) that replace sputtered precious metals in the current design

	<ul style="list-style-type: none"> b. NiCr sputtered wraparound edges c. Outer plated layers are unchanged <p>(3) Introduce state of the art trimming methods as a replacement to photolithography to achieve resistor pattern</p> <p>(4) Switch from diced to scribed ceramics</p> <p>(5) Employ electrical overload screening to 100% of product to remove non typical components from shipped product</p> <p>(6) Introduce digital marking on product size 0805</p> <p>(7) Package product on paper tape for improved pocket definition.</p> <p>(8) New Product is easily distinguished from legacy product by packaging tape (white punched paper tape instead of embossed black plastic) and top coat protection color – black instead of blue, and presence of digital marking on updated product for 0805.</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p>(9) MOQ is 5000 pieces on all sizes. Standard packaging will be 5K per reel. 1K reel sizes will be available for quotation.</p>
Reason for Change	<p>Changes implemented will provide stable cost basis to support market expectations. Establish capacity increase for PFC using modern manufacturing techniques, materials, and equipment.</p>
Implementation Plan	<p>(1) Included product</p> <ul style="list-style-type: none"> a. Case size 0402, 0805 b. TCR Codes: <ul style="list-style-type: none"> i. -01: 100 ppm ii. -02: 50 ppm iii. -03: 25 ppm iv. -11: 15 ppm v. -12: 10 ppm c. Tolerance: <ul style="list-style-type: none"> i. -B ($\pm 0.1\%$) ii. -C ($\pm 0.25\%$) iii. -D ($\pm 0.5\%$) iv. -F ($\pm 1\%$) v. -G ($\pm 2\%$) vi. -J ($\pm 5\%$) d. R values: <ul style="list-style-type: none"> i. 0402: 15R – 30K ii. 0805: 5R0 – 267K <p>(2) Notify all potentially affected customer, notification to include 2 yr usage, PNs</p>
Customer Impact	<p>(1) No change to form / fit / function.</p> <p>(2) Product encapsulation color will change from blue to black; potential impact on PCB automated inspection processes.</p> <p>(3) Reel size change to 5K SPQ will reduce frequency of reel changes in PCB assembly processes.</p>

Recommendations	Change MRP Systems: <ul style="list-style-type: none"> • MOQ: 5000 pieces • Country of Origin: Taiwan
Availability of Previously Manufactured Product	Previously manufactured product will ship until inventory is exhausted.
Availability of Approval Samples	Product functions identically in for purposes of Form / Fit / Function. Sample requests will be considered individually, will be subject to product lead time.
Sales Contacts	Americas: Kevin Marzano kevin.marzano@ttelectronics.com Asia: Janson Chuen janson.chuen@ttelectronics.com Europe (EMEA): Peter Bauer peter.bauer@ttelectronics.com Distribution (Global): David Burns david.burns@ttelectronics.com http://www.ttelectronics.com/resistors

Approval			
	Name	Title	Date
Issued by	David Winkler	Product Line Manager, Thin Film Products	25 Sept 2018
Approved by	Barry Peters	VP, Product Management & Engineering	25 Sept 2018
Approved by	David Kertes	VP, Global Sales and Marketing	26 Sept 2018
Approved by	Guy Millard	Vice President & General Manager, Resistors Business Unit	1 Oct 2018

Additional Information

Minor Modifications to dimensional tolerances: dimensional nominal values are unchanged, but some minor changes will be implemented. Dimensional tolerances are summarized below, with changed values **highlighted yellow**.

Style		L	W	H	A	B
W0402	Inches	±0.003	±0.005	±0.003	-0.004 / +0.008	±0.006
	(mm)	(±0.07)	(±0.12)	(±0.08)	(-0.1 / +0.2)	(±0.15)
W0805	Inches	±0.006	±0.007	±0.006	±0.009	±0.008
	(mm)	(±0.16)	(±0.18)	(±0.14)	(±0.23)	(±0.21)



Price sheet attached for reference

Resistors Product Change Notification

PCN Number	PCN-2018-RBU14
PCN Title	PFC 0603 & 1206 PFC Process Upgrade
PCN Date	21 December 2018
Type of Change	<input type="checkbox"/> End of Life Notification <input checked="" type="checkbox"/> Manufacturing Facility Change or Addition <input checked="" type="checkbox"/> Datasheet Specification Change <input type="checkbox"/> Other: <input checked="" type="checkbox"/> Material Change <input checked="" type="checkbox"/> Process Change <input checked="" type="checkbox"/> Design Change
Manufacturing Location(s) Affected	Corpus Christi (USA)
Date of Change Implementation	<p>Phased Implementation by case size:</p> <p>(1) 0603 (Orders placed beginning week commencing 01 April 2019)</p> <p>(2) 1206 (Orders placed beginning week commencing 01 April 2019)</p> <p>Existing orders at the time of implementation will be supported by either the current or new design product.</p> <p>Product with new and old construction will be supplied until inventories are consumed</p>

Products Affected		
Product Series	Product Type(s)	Datasheet Link
PFC	PFC-W0603LF PFC-W1206LF	<p>Commercial products covered by this PCN are described at https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PFC.pdf. The datasheet is also attached to the end of this announcement for convenience.</p> <p>Special products (tight tolerance / TCR / Sn-Pb, etc) outside scope of this PCN but previously included in the PFC datasheet, are addressed in a separate datasheet, available at https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PFC-S.pdf.</p> <p>If these hyperlinks to datasheets do not function directly, please copy and paste the address into your browser.</p>

Change Detail	
Description of Change	<p>(1) No change to part number or form/fit/function. Updated product will solder reliably to industry standard solder pads but minor tolerance changes have been made (summarized in "Additional Information") to account for pre- and post-PCN product shipments during inventory consumption.</p> <p>(2) Termination modified to align with modern design rules and process techniques,</p>

	<p>see details below:</p> <ul style="list-style-type: none"> a. Simplified termination stack incorporating thick film conductor inks (Ag / Au) that replace sputtered precious metals in the current design b. NiCr sputtered wraparound edges c. Outer plated layers are unchanged <p>(3) Introduce state of the art trimming methods as a replacement to photolithography to achieve resistor pattern</p> <p>(4) Switch from diced to scribed ceramics</p> <p>(5) Employ electrical overload screening to 100% of product to remove non typical components from shipped product</p> <p>(6) Introduce digital marking</p> <p>(7) Package product on paper tape for improved pocket definition.</p> <p>(8) New Product is easily distinguished from legacy product by packaging tape (white punched paper tape instead of embossed black plastic) and top coat protection color – black instead of blue, and presence of digital marking on updated product.</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p>(9) MOQ is 5000 pieces on all sizes. Standard packaging will be 5K per reel. 1K reel sizes will be available for quotation.</p>
Reason for Change	<p>Changes implemented will provide stable cost basis to support market expectations. Establish capacity increase for PFC using modern manufacturing techniques, materials, and equipment.</p>
Implementation Plan	<p>(1) Included product</p> <ul style="list-style-type: none"> a. Case size 0603, 1206 b. TCR Codes: <ul style="list-style-type: none"> i. -01: 100 ppm ii. -02: 50 ppm iii. -03: 25 ppm iv. -11: 15 ppm v. -12: 10 ppm c. Tolerance: <ul style="list-style-type: none"> i. -B ($\pm 0.1\%$) ii. -C ($\pm 0.25\%$) iii. -D ($\pm 0.5\%$) iv. -F ($\pm 1\%$) v. -G ($\pm 2\%$) vi. -J ($\pm 5\%$) d. R values: <ul style="list-style-type: none"> i. 0603: 5R0 – 100K ii. 1206: 5R0 – 1M <p>(2) Notify all potentially affected customer, notification to include 2 yr usage, PNs</p>
Customer Impact	<p>(1) No change to form / fit / function.</p> <p>(2) Product encapsulation color will change from blue to black; potential impact on PCB automated inspection processes.</p> <p>(3) Reel size change to 5K SPQ will reduce frequency of reel changes in PCB assembly processes.</p>

Recommendations	Change MRP Systems: <ul style="list-style-type: none"> • MOQ: 5000 pieces • Country of Origin: Taiwan
Availability of Previously Manufactured Product	Previously manufactured product will ship until inventory is exhausted.
Availability of Approval Samples	Product functions identically in for purposes of Form / Fit / Function. Sample requests will be considered individually, will be subject to product lead time.
Sales Contacts	Americas: Kevin Marzano kevin.marzano@ttelectronics.com Asia: Janson Chuen janson.chuen@ttelectronics.com Europe (EMEA): Peter Bauer peter.bauer@ttelectronics.com Distribution (Global): David Burns david.burns@ttelectronics.com http://www.ttelectronics.com/resistors

Approval			
	Name	Title	Date
Issued by	David Winkler	Product Line Manager, Thin Film Products	21 Dec 2018
Approved by	Barry Peters	VP, Product Management & Engineering	21 st Dec 2018
Approved by	David Kertes	VP, Global Sales and Marketing	21 Dec 2018
Approved by	Guy Millard	Vice President & General Manager, Resistors Business Unit	7th Jan 2019

Additional Information

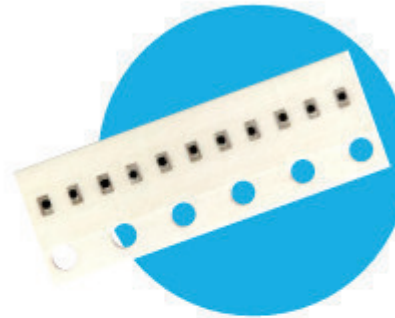
Minor Modifications to dimensional tolerances: dimensional nominal values are unchanged, but some insignificant changes to the dimensional tolerances are in place. The PCN-affected part will solder reliably to existing EIA-standard landing pads with no need for design changes.


Resistors

Precision Thin Film Chip Resistors

PFC Commercial Series

- High stability tantalum nitride film
- Available in 0402, 0603, 0805 and 1206
- AEC-Q200 qualified
- Absolute TCR to $\pm 10 \text{ ppm}/^\circ\text{C}$
- Sulfur resistant to ASTM B809-95



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

PFC chip resistor series provides the high precision and ultra stable performance of tantalum nitride resistive film system in 0402, 0603, 0805 and 1206 sizes. The unique characteristics of the passivated tantalum nitride film ensure long term life stability and reliability in most environments.

Qualified for resistance to sulfur bearing gases, the PFC series is an excellent solution for automotive and heavy equipment applications where precision, exceptional reliability with anti-sulfuration characteristics is imperative.

Electrical Data

Model	Power Rating (70°C)	Max Voltage Rating ($\leq \sqrt{P \times R}$)	Temperature Range	ESD Sensitivity	Noise	Termination	Substrate
W0402	50mW	75V	-65°C to +150°C	2KV to 4KV (HBM)	<-25dB	100% matte tin (RoHS compliant) plated over nickel barrier	96.5% Alumina
W0603	100mW	75V					
W0805	250mW	100V					
W1206	333mW	200V					

Environmental Data

Environmental Test	Test Method	Performance	
		Typical	Maximum
Sulfuration Test	ASTM B809-95 humid vapor	$\pm 0.02\%$	$\pm 0.05\%$
Thermal Shock	MIL-PRF-55342	$\pm 0.02\%$	$\pm 0.10\%$
Low Temperature Operation	MIL-PRF-55342	$\pm 0.01\%$	$\pm 0.05\%$
Short Time Overload	MIL-PRF-55342	$\pm 0.01\%$	$\pm 0.05\%$
High Temperature Exposure	MIL-PRF-55342	$\pm 0.03\%$	$\pm 0.10\%$
Effects of Solder	MIL-PRF-55342	$\pm 0.01\%$	$\pm 0.10\%$
Moisture Resistance	MIL-PRF-55342	$\pm 0.03\%$	$\pm 0.10\%$
Life	MIL-PRF-55342	$\pm 0.03\%$	$\pm 0.10\%$

General Note

TT Electronics reserves the right to make changes in product specification without notice or liability.
All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

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Precision Thin Film Chip Resistors

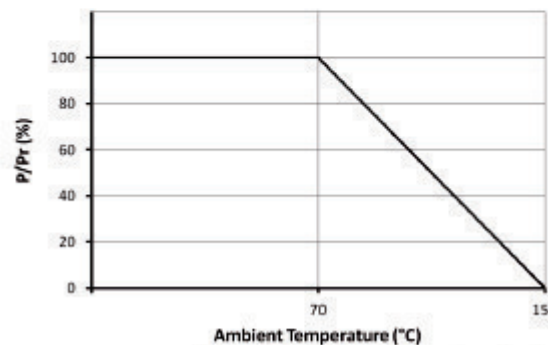
PFC Commercial Series



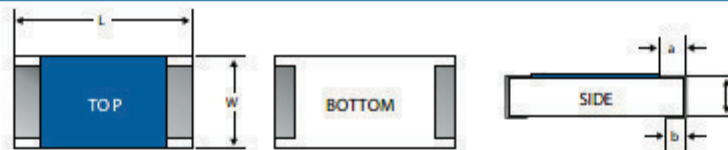
Manufacturing Capabilities Data

TCR ppm/°C	Tolerance 0.1% to 5%			
	W0402	W0603	W0805	W1206
10	100Ω-16kΩ	100Ω-50kΩ	100Ω-100kΩ	100Ω-400kΩ
15	50Ω-16kΩ	50Ω-50kΩ	50Ω-100kΩ	50Ω-400kΩ
25	15Ω-30kΩ	10Ω-100kΩ	10Ω-267kΩ	10Ω-1MΩ
50, 100	15Ω-30kΩ	5Ω-100kΩ	5Ω-267kΩ	5Ω-1MΩ

Power Derating Curve



Physical Data



Model	L	W	H	a	b
W0402	0.04 ±0.003 (1.02 ±0.07)	0.021 ±0.005 (0.53 ±0.12)	0.012 ±0.003 (0.3 ±0.08)	0.008 -0.004, +0.008 (0.2 -0.1/+0.2)	0.01 ±0.006 (0.25 ±0.15)
W0603	0.063 ±0.004 (1.6 ±0.1)	0.031 ±0.004 (0.79 ±0.11)	0.02 ±0.004 (0.51 ±0.11)	0.012 ±0.008 (0.3 ±0.2)	0.015 ±0.009 (0.38 ±0.23)
W0805	0.081 ±0.006 (2.06 ±0.16)	0.05 ±0.007 (1.27 ±0.18)	0.02 ±0.006 (0.51 ±0.14)	0.015 ±0.009 (0.38 ±0.23)	0.016 ±0.008 (0.41 ±0.21)
W1206	0.126 ±0.008 (3.2 ±0.2)	0.063 ±0.004 (1.6 ±0.1)	0.024 ±0.006 (0.61 ±0.16)	0.025 ±0.017 (0.64 ±0.44)	0.025 ±0.017 (0.64 ±0.44)

For PCB mounting pad recommendations see

<http://www.ttelectronics.com/sites/default/files/resistors/TN006%20-%20Recommended%20Layouts%20for%20SMD%20Resistors.pdf>

Construction

Conductors and tantalum nitride resistive element are applied to an alumina substrate. The product is laser trimmed to value, and a protective black epoxy coat is applied. The product is then metallized and plated to provide a wrap-around solderable termination with a 100% matte tin finish on a nickel barrier layer. It is 100% tested and provided on standard paper carrier tape.

Marking

The 0402 chips are not marked. 3 digit marking is used on the 0603 size and 4 digit marking on larger sizes and E96 values.

Special Variants

For PFC resistors with tighter tolerances, SnPb terminations or MIL screening, refer to the separate PFC Special Series datasheet.

General Note

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Precision Thin Film Chip Resistors

PFC Commercial Series



Ordering Procedure

This product has two valid part numbers:

European (Welwyn) Part Number: W1206R-01-1K0BI (1206, 100ppm/°C, 1 kilohm $\pm 0.1\%$, Pb-free)

W	1	2	0	6	R	-	0	1	-	1	K	0	B	I
1	2	3	4	5	6									

1 Type	2 Size	3 TCR	4 Value	5 Tolerance	6 Termination & Packing
W=PFC	0402	R-12 = $\pm 10\text{ppm}/^\circ\text{C}$	E24 = 3/4 characters	B = $\pm 0.1\%$	I = Pb-free, Standard pack
	0603	R-11 = $\pm 15\text{ppm}/^\circ\text{C}$	E96 = 3/4 characters	D = $\pm 0.5\%$	All sizes 5000/reel*
	0805	R = $\pm 25\text{ppm}/^\circ\text{C}$	R = ohms	F = $\pm 1\%$	
	1206	R-02 = $\pm 50\text{ppm}/^\circ\text{C}$	K = kilohms	G = $\pm 2\%$	
		R-01 = $\pm 100\text{ppm}/^\circ\text{C}$	M = megohms	J = $\pm 5\%$	

USA (IRC) Commercial Part Number: PFC-W1206LF-01-1001-B (1206, 100ppm/°C, 1 kilohm $\pm 0.1\%$, Pb-free)

P	F	C	-	W	1	2	0	6	L	F	-	0	1	-	1	0	0	1	-	B
1	2	3	4	5	6															

1 Family	2 Model	3 Termination	4 TCR	5 Value	6 Tolerance	Packing
PFC	W0402	LF = Pb-free (100%Sn)	12 = $\pm 10\text{ppm}/^\circ\text{C}$	3 digits + multiplier	B = $\pm 0.1\%$	All sizes 5000/reel
	W060		11 = $\pm 15\text{ppm}/^\circ\text{C}$	R = ohms for	D = $\pm 0.5\%$	
	W0805		03 = $\pm 25\text{ppm}/^\circ\text{C}$	values < 100 ohms	F = $\pm 1\%$	
	W1206		02 = $\pm 50\text{ppm}/^\circ\text{C}$		G = $\pm 2\%$	
			01 = $\pm 100\text{ppm}/^\circ\text{C}$		J = $\pm 5\%$	

* Non-standard pack quantity 1000/reel may be available by special request – contact factory.

General Note

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Resistors Product Change Notification

PCN Number	PCN-2020-RBU09
PCN Title	Manufacturing Facility Change: Corpus Christi Manufactured Resistors
PCN Date	15 th July 2020
Type of Change	<input type="checkbox"/> End of Life Notification <input type="checkbox"/> Material Change <input checked="" type="checkbox"/> Manufacturing Facility Change or Addition <input type="checkbox"/> Process Change <input type="checkbox"/> Datasheet Specification Change <input type="checkbox"/> Design Change <input type="checkbox"/> Other:
Manufacturing Location(s) Affected	TT Electronics Corpus Christi
Date of Change Implementation	August 2021

Products Affected	
TTE Product Series	Datasheet Link
PFC & All Custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PFC.pdf
PFC Special & All Custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PFC-S.pdf
PFC Divider & All Custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PFC-D.pdf
PFC High Temperature & All Custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PFC-HT.pdf
M55342 & D55342	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/MIL-CHIP.pdf
WIN & All Custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WIN.pdf
Automotive Sensors (ASR/PSR)	No Datasheet available
GUS – TS005	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/TS005.pdf
GUS – QS001	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/QS001.pdf
GUS - QSOP	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/QSOP.pdf
GUS - SOIC	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/SOIC.pdf
GUS - TSSOP	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/TSSOP.pdf
GUS – AC Line Terminator	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/AC-Line-Terminator.pdf
GUS – R2R	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/R-2R.pdf
GUS – Tapped Filter	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/Tapped-Filter.pdf
GUS – T Filter	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/T-Filter.pdf
CCN & All Custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/CCN.pdf

SIP & All Custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/4700.pdf
CHC & All Custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/CHC.pdf
CHC Precision & All Custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/CHC-Precision.pdf
SOT23/DIV23 & All custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/DIV23.pdf
SOT143 & All custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/SOT143.pdf
SPD & All custom Variants	No Datasheet available
SON & All Custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/SON.pdf
GUB & All Custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/GUB.pdf
Ultra Precision Networks – All Styles	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/TaN-U.pdf
DIP & All Custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/1900.pdf
M900 & All Custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/M900.pdf
FP & All Custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/8900.pdf
SOIC (GL & GS) & All Custom Variants	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/SOIC-C.pdf
TFA & All Custom Variants	No Datasheet Available
PLC & All Custom Variants	No Datasheet Available

Change Detail	
Description of Change TT Electronics is declaring that production of the products listed above is being transferred from TT Electronics Corpus Christi to TT Electronics Dallas	
Reason for Change	TT Electronics are creating a Thin Film Resistor Centre Of Excellence in Dallas, USA
Implementation Plan	There will be no disruption to the supply chain. Any customers who do wish to place a Last Time Buy order of Corpus Christi manufactured product must do so by 31 st January 2021 with a final ship date of 31 st August 2021 All products will be qualified in line with their respective datasheets and qualification test reports will be available upon request.
Customer Impact	There is no impact on product fit, form or function & there will be no disruption to the supply chain. All product qualifications will remain unchanged
Recommendations	Customers are advised to order in line with their qualification requirements.
Availability of Previously Manufactured Product	N/A

Availability of Approval Samples	Samples manufacture in the Dallas facility will be available from Q1 2022
Sales Contacts	Americas OEM: Mike Graham Mike.graham@ttelectronics.com Europe OEM: Klaus Zwerschina Klaus.zwerschina@ttelectronics.com Asia OEM: Janson Chuen janson.chuen@ttelectronics.com Americas Distribution: Corey Harrelson Corey.harrelson@ttelectronics.com Europe Distribution: Claudia Patzak-Kruger Claudia.patzak@ttelectronics.com Asia Distribution: Kuek Joo Wee joowee.kuek@ttelectronics.com

Approvals			
	Name	Title	Date
Issued by	David Peters	Product Line Manager	15 th July 2020
Approved by	Barry Peters	VP Product Management & Engineering	15 th July 2020
Approved by	Klaus Zwerschina	Global Sales Director	15 th July 2020

Resistors Product Change Notification

PCN Number	PCN-2021-RBU09
PCN Title	Datasheet Update – PFC Special Series
PCN Date	16/06/2021
Type of Change	<input type="checkbox"/> End of Life Notification <input type="checkbox"/> Manufacturing Facility Change or Addition <input checked="" type="checkbox"/> Datasheet Specification Change <input type="checkbox"/> Other: <input type="checkbox"/> Material Change <input type="checkbox"/> Process Change <input type="checkbox"/> Design Change
Manufacturing Location(s) Affected	TT Electronics, Corpus Christi, Texas
Date of Change Implementation	16 th June 2021

Products Affected	
TTE Series	Datasheet Link
PFC-S	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheets/PFC-S.pdf

Change Detail	
Description of Change	Update to the PFC-S Datasheet to align it to our manufacturing capability, as it is not possible to manufacture Anti-Sulphur resistors below 100 Ohms. There will be no change to the product form, fit or function of the device and this PCN is for notification only.
Reason for Change	Copper is required in the termination stack for Anti-Sulphur and regular resistors below 100 Ohms. This Results in parts failing some of the Sulphur Tests.
Implementation Plan	Immediate implementation – June 2021
Customer Impact	Product form, fit or function is unchanged, however values below 100 ohms are no longer available with the anti-sulphur option.

Recommendations	N/A
Availability of Previously Manufactured Product	N/A
Availability of Approval Samples	N/A
Sales Contacts	Americas: Kevin Marzano Kevin.Marzano@ttelelectronics.com Asia: Janson Chuen Janson.Chuen@ttelelectronics.com Europe (EMEA): Claudia Patzak-Kruger Claudia.Patzak@ttelelectronics.com


Approval			
	Name	Title	Date
Issued by	Mark Beeston	Product Line Manager	16/06/2021
Approved by	Barry Peters	VP Product Management and Engineering	16/06/2021
Approved by	Klaus Zwerschina	Global Sales Director	16/06/2021

Resistors Product Change Notification

PCN Number	PCN-2022-RBU01
PCN Title	Lead (Pb) bearing Commercial PFC Process Upgrade.
PCN Date	11th April 2022
Type of Change	<input type="checkbox"/> End of Life Notification <input checked="" type="checkbox"/> Manufacturing Facility Change or Addition <input checked="" type="checkbox"/> Datasheet Specification Change <input type="checkbox"/> Other: <input checked="" type="checkbox"/> Material Change <input checked="" type="checkbox"/> Process Change <input checked="" type="checkbox"/> Design Change
Manufacturing Location(s) Affected	Dallas (USA)
Date of Change Implementation	<p>Implementation by case size:</p> <p>(1) 0402 (Orders shipped commencing 1st July 2022)</p> <p>(2) 0603 (Orders shipped commencing 1st July 2022)</p> <p>(3) 0805 (Orders shipped commencing 1st July 2022)</p> <p>(4) 1206 (Orders shipped commencing 1st July 2022)</p> <p>Existing orders at the time of implementation and any new orders, will be supported by either the current or new design product.</p> <p>Product with new and old construction will be supplied until inventories are consumed</p>

Products Affected	
TT Series	Affected Variants
	Commercial products covered by this PCN: Included product. (Note: This relates to Commercial Pb bearing Terminations parts only) a. Case size 0402, 0603, 0805, 1206 b. TCR Codes: (USA) (EMEA) i. -01: 100 ppm R-01: 100 ppm ii. -02: 50 ppm R-02: 50 ppm iii. -03: 25 ppm R: 25 ppm iv. -11: 15 ppm R-11: 15 ppm v. -12: 10 ppm R-12: 10 ppm c. Tolerance: i. -B (±0.1%) ii. -D (±0.5%) iii. -F (±1%) iv. -G (±2%) v. -J (±5%)
PFC	PFC-W0402R PFC-W0603R PFC-W0805R PFC-W1206R W0402xxPB W0603xxPB W0805xxPB W1206xxPB

		<p>d. R values:</p> <ul style="list-style-type: none"> i. 0402: 15R – 30K ii. 0603: 5R – 100K iii. 0805: 50R0 – 100K (For Low TCR values : 10 – 15ppm) iv. 0805: 5R0 – 267K (For Higher TCR Values : 25 – 100ppm) v. 1206: 5R0 – 1M <p>The Leaded commercial PFC products identified above will move from the PFC Special Series to the PFC Commercial Series as defined by the relevant datasheet which can be accessed via the following links:</p> <p>https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheets/PFC.pdf https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheets/PFC-S.pdf</p>
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Change Detail	
Description of Change	<p>(1) No change to part number or form/fit/function. Updated product will fit the same solder pads but minor tolerance changes have been made to account for pre- and post-PCN product shipments during inventory consumption.</p> <p>(2) Termination modified to align with modern design rules and process techniques, see details below:</p> <ul style="list-style-type: none"> a. Simplified termination stack incorporating thick film conductor inks (Ag / Au) that replace sputtered precious metals in the current design b. NiCr sputtered wraparound edges c. Outer plated layers are unchanged <p>(3) Introduce state of the art trimming methods as a replacement to photolithography to achieve resistor pattern</p> <p>(4) Switch from diced to scribed ceramics</p> <p>(5) Employ electrical overload screening to 100% of product to remove non typical components from shipped product</p> <p>(6) Introduce digital marking on product size 0603, 0805, 1206 only. (0402 not marked).</p> <p>(7) New Product is easily distinguished from legacy product by topcoat protection color – black instead of blue, and presence of digital marking on updated product.</p>  <p>MOQ is 5000 pieces on all sizes. Standard packaging will be 5K per reel. 1K reel sizes will be available for quotation.</p>
Reason for Change	<p>Establish capacity increase for PFC using modern manufacturing techniques, materials, and equipment.</p>

Implementation Plan	(1) Notify all potentially affected customer, notification to include 2year usage, PNs
Customer Impact	(1) No change to form / fit / function. (2) Product encapsulation color will change from blue to black; potential impact on PCB automated inspection processes. (3) Reel size change to 5K SPQ will reduce frequency of reel changes in PCB assembly processes.
Recommendations	Change MRP Systems: <ul style="list-style-type: none"> • MOQ: 5000 pieces • Country of Origin: Taiwan
Availability of Previously Manufactured Product	Previously manufactured product will ship until inventory is exhausted.
Availability of Approval Samples	Product functions identically for purposes of Form / Fit / Function. Sample requests will be considered individually and will be subject to product lead time.
Sales Contacts	Americas: Kevin Marzano kevin.marzano@ttelelectronics.com Europe: Claudia Patzak-Kruger Claudia.patzak@ttelelectronics.com Asia: Janson Chuen janson.chuen@ttelelectronics.com

Approvals			
	Name	Title	Date
Issued by	Mark Beeston	Product Line Manager	11/04/2022
Approved by	Barry Peters	VP Product Management and Engineering	11/04/2022
Approved by	Klaus Zwerschina	Global Sales Director	11/04/2022