APPLICATION NOTE

REPLACEMENT PART REFERENCE GUIDE, NCR2-183+

AN-20-009

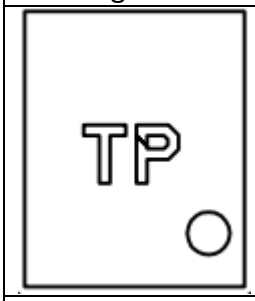
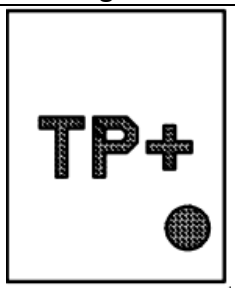
Background:

Mini-Circuits NCR2-183+ is LTCC based ultra-wideband balun transformer. Dielectric ceramic material has been discontinued by the supplier. Per EU RoHS directive 2011/65/EU, Exemption Note 7(c)-I for Pb in ceramic is subject to expiration. This exemption however is under appeal and has been extended.

Mini-Circuits is using alternate Pb-free material for NCR2-183+ which complies with EU RoHS expiration of exemption 7(c)I to replace the existing part. There is no change to case-style (NF1846-1) or part # for this product. The Material Declaration will be available on the website. Please contact rohs@minicircuits.com for all other inquiries.

Replacement model with a new material has been judged by Mini-Circuits Engineering as a suitable replacement to original model.

Mechanical Aspect:

Parts with Original LTCC	**Parts with Replacement LTCC**
Case Style – NF1846-1	Case Style – NF1846-1
Part # - NCR2-183+	Part # - NCR2-183+
Marking on Unit – "TP"	Marking on Unit – "TP+"
	
No Change to Mechanical Dimension and terminal finish.	

Conclusion: The replacement LTCC material system is Form-Fit-Function Compatible

Notes:
a. Suitability for model replacement within a particular system must be determined by and is solely the responsibility of the customer based on, among other things, electrical performance criteria, stimulus conditions, application, compatibility with other components and environmental conditions and stresses.

APPLICATION NOTE

1) TYPICAL PERFORMANCE COMPARISON AT ROOM TEMPERATURE:

	Original Part- LTCC Containing Pb			Replacement Part- Pb Free LTCC			Data Sheet Specification (Rev B)			Unit
Run #	**H77490**			**H88950**						
Date Code	**1442**			**2149**						
Date	**10/3/2014**			**12/7/2021**						
Qty.	**40**			**8995**						
Tested By	**Prod Test**			**Robot # 07**						
Specification	20-3228+-50, Rev. X1			20-3228+TP-50, Rev. OR						
Parameter	**Min**	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Typ**	**Max**	
Insertion Loss, dB (12000 – 18000 MHz)	-	0.89	1.25	-	1.38	2.40	-	0.6	2.5	dB
Amp. Unb , dB (12000 – 18000 MHz)	-	0.94	3.06	-	1.22	3.30	-	2	3.8	dB
Pha. Unb , degree (12000 – 18000 MHz)	-	4.09	11.06	-	6.11	17.92	-	10	25	deg
Return Loss, dB (12000 – 18000 MHz)	-	14.88	-	-	14.99	-	-	-	-	dB

For typical performance and Graphs: See paragraphs below.

2) TYPICAL PERFORMANCE GRAPHS AT ROOM TEMPERATURE:

Code	Description	Code	Description
	New Material (Pb Free LTCC)		Typical
	Old Material (LTCC Containing Pb)		Specification

Note: Red is new material Blue are old lots. Green is spec

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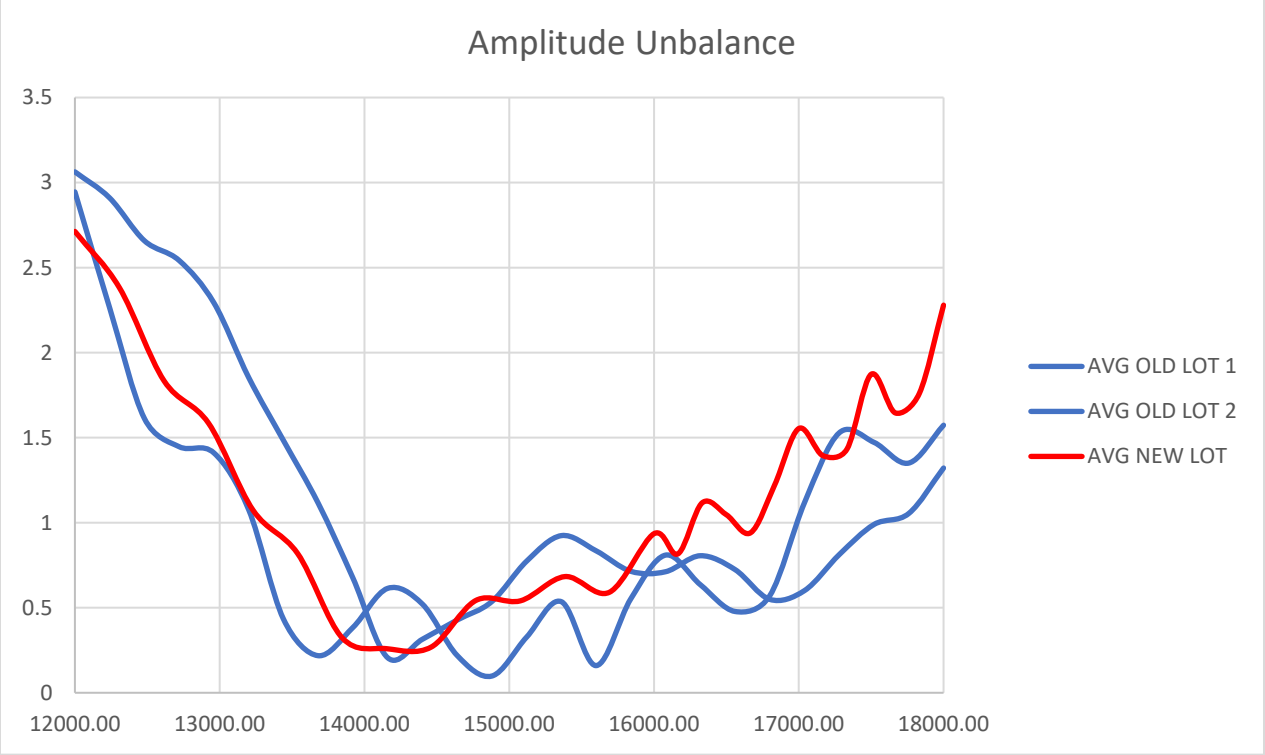

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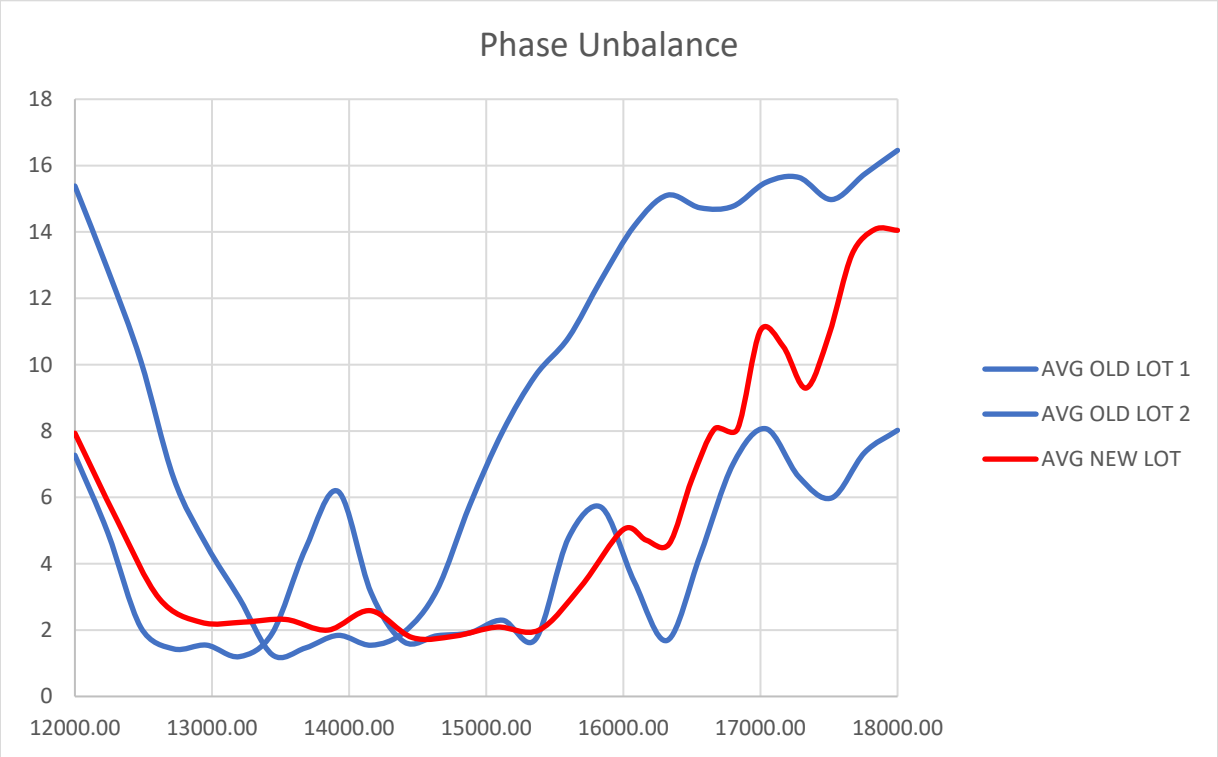

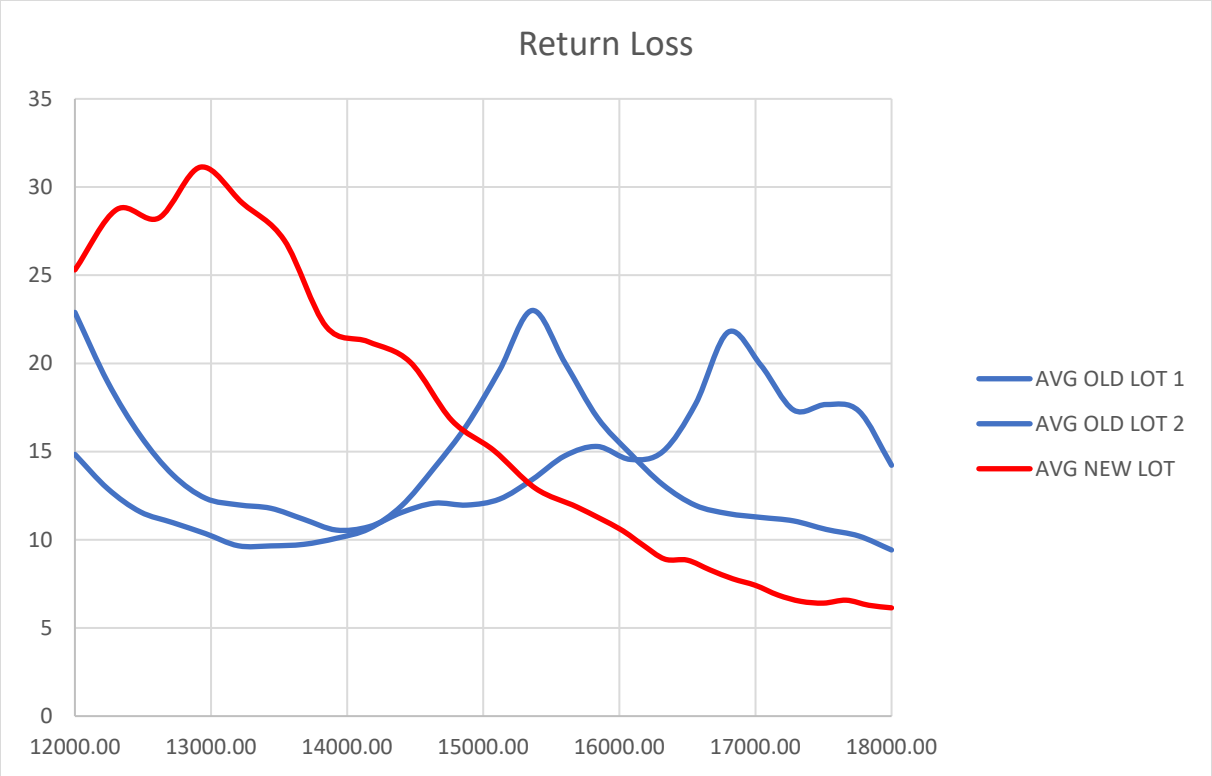

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