2020 Susumu QA communication 045
Nov, 11th, 2020

To: Future Electronics Inc
From: Isao Yasusaka, Senior Manager, Quality Assurance, Susumu, Co.Ltd.
On: New fabrication facility (Minamiterajima, Niigata) product evaluation data

Thanks for being a loyal customer. As we informed you before, in order to guarantee stable supply and improve product quality of KRL series, we were building a new Itoigawa Minamiterajima factory to which the KRL series fabrication line would be transferred from current Itoigawa Suzawa factory (2020 Susumu Engineering communication 006.) The new factory building was completed, and new production equipment were in place by the end of September 2020. The quality evaluation of the products from the new factory has been also done and we have confirmed that the quality level of the products from the new factory was at least the same as that of the products from the old factory or even better. We are now confident that we can supply the same quality (or better) products from the new factory to our customers.
We have attached data that compare the quality of the products from the new factory to the products from old factory. Will you please review these data and approve the transfer of the fabrication processes from old factory to the new factory.
If you require more data than these attached data, please contact our sales representative. Thank you.

Details

1. Applicable products

Metal foil low resistance chip resistor, the KRL series
Your part number:

2. 2. Change: Process flow before and after the transfer.

Essential process flow will change as follows:
Current flow: Metal foil lamination → Resist application → Exposure → Developing → Etching → Stripping → Protective coating application → Oxygen bombarding → Substrate Plating
New flow: Metal foil lamination → Resist application → Exposure → Developing → Etching → Stripping (note 1) → Protective coating application → Oxygen bombarding (note 2) → Substrate Plating (note 3)

Note 1: All fabrication equipment has been newly purchased and installed. Currently, the processes from developing to stripping are batch processes but in new factory, these processes are continuous in-line process.
Note 2: Oxygen bombarding is currently a part of protective coating process and not in the control plan as separate process. In new fabrication line, this will be an independent process and it will be added as an independent process in the control plan.
Note 3: The substrate plating process will not be transferred. As before, we continue to plate at two locations, 1) in house (Itoigawa Suzawa factory) 2) Outsourcing to Tateyama Denka Kogyo

3. Process change points and their effect and evaluation

Based on FMEA of the fabrication processes, we have identified processes that might influence product characteristics and we did evaluation on them. The table below shows that each change point, evaluation items and the result of the evaluation (comparison.)

	Change point	Product characteristics that need evaluation	Evaluation items	Evaluation results
Material	No change	—	—	—
People	No change	—	—	—
Procedure	Change from liquid (positive) resist to film (negative) resist	・Product dimension ・Pre-trimming resistance distribution	1） Product dimension ①Pattern position ②Pattern dimension	1)Product dimension ①Smaller variation, accuracy improved

Equipment	Developing/etching/striping: change batch process to in line process	・Pattern defects (visually identifiable)	2）Pre-trimming resistance distribution 3)Visual check ①Etching residue ②Pattern defects (pin hole, missing pattern) ③Contamination (foreign material, resist residue)	②Smaller variation, accuracy improved 2) No change before and after the change 3)Visual check ①Improvement observed by decrease of etching residue ②No defect found in both pre and post change ③No defect found in both pre and post change ＊ Evaluation data 1-10 are attached

4. Details of pre and post change evaluation (comparison) data

The table below shows the designation of data and products type/size

Metal foil type	Size: 0816	Size: 2012	Size: 3216	Size: 6432	Size: 50110
Constantan	Data-1	Data-3	Data-5	Data-7	Data-9
Manganin	Data-2	Dat-4	Dat-6	Data-8	Data-10

5. Parallel production at Suzawa (old) and Minamiterajima (new) factories (both are in Itoigawa city)

The substrates produced in the old factory and new factory are controlled under unique designation and "first in, first out". Until the in process substrate inventory from the old factory is depleted, we will continue parallel production.

Please return the following information to Susumu:

Will you approve this change? Yes No (circle one)

If no, what is the condition for approval?

Any other Communication to Susumu regarding this change.

Your name: _____

Company names and your title: _____

Signature: _____ Date: _____

AFFECTED MPNS
KRL2012D-M-R003-F-T5
KRL2012E-M-R020-F-T5
KRL6432E-M-R100-F-T5
KRL1632E-M-R100-F-T5
KRL3264-C-R068-F-T1
KRL2012E-M-R220-F-T5
KRL1632E-M-R008-G-T5
KRL11050D-C-R004-F-T1
KRL6432E-M-R004-F-T1
KRL2012E-M-R005-F-T5
KRL3264-C-R015-F-T1
KRL2012E-M-R010-F-T5
KRL1220E-M-R180-F-T5
KRL1220E-M-R180-F-T5
KRL6432E-M-R005-F-T1
KRL1632E-M-R009-G-T5
KRL1632E-M-R470-F-T5
KRL3216T4A-M-R010-F-T1
KRL3264D-C-R100-F-T1
KRL2012E-C-R003-F-T5
KRL2012E-C-R300-F-T5
KRL6432E-M-R005-F-T1
KRL1220E-M-R005-F-T5
KRL1632E-M-R150-F-T5
KRL1632E-M-R470-F-T5
KRL1632E-M-R470-F-T5
KRL1632E-M-R470-F-T5
KRL1220D-M-R010-F-T1
KRL1220E-M-R010-F-T5
KRL1220E-M-R022-F-T1
KRL1220E-M-R033-F-T5
KRL3264-C-R022-F-T1
KRL1632E-M-R005-G-T5
KRL1632E-M-R022-F-T5
KRL3264D-C-R043-F-T1
KRL3264D-C-R043-F-T1
KRL1632E-M-R022-F-T5
KRL1632E-M-R022-F-T5
KRL3264-C-R010-F-T1
KRL2012E-M-R005-F-T5
KRL2012E-M-R010-F-T5
KRL11050D-C-R004-F-T1
KRL6432E-M-R007-F-T1
KRL2012E-M-R100-F-T5
KRL1632E-M-R180-F-T5
KRL6432E-M-R005-F-T1

KRL1632E-M-R082-F-T5
KRL3216E-C-R008-F-T5
KRL3216E-C-R012-F-T5
KRL1632E-M-R010-F-T5
KRL1632E-M-R027-F-T5
KRL2012E-M-R006-F-T5
KRL3216-M-R003-F-T1
KRL1220E-M-R039-F-T5
KRL3264E-C-R500-F-T1
KRL7638D-C-R008-F-T1
KRL0816D-C-R047-F-T5
KRL0816D-C-R047-F-T5
KRL1632E-M-R100-F-T5
KRL3216E-C-R020-F-T5
KRL2012E-M-R003-F-T5
KRL2012E-M-R470-F-T5
KRL1220-C-R030-F-T1
KRL3264-C-R008-G-T1