



8755 W. Higgins Road  
Suite 500  
Chicago, Illinois USA 60631

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March 4<sup>th</sup>, 2016

RE: PCN # ESU270-37 – SP402x series new wafer foundry and alternative backend manufacturing location approval

To our valued customers,

Littelfuse would like to notify you of a newly approved wafer foundry location and two alternative backend locations for the SP402x series TVS Diode Array (SPA® Diodes) products. The new wafer foundry is located in China, and the two new alternative backend factories both in China are all fully approved. There are no changes to form or function of the finished product.

Qualification efforts are complete and the new factories are online for immediate shipments. Please see the attached documentation for change detail and affected part numbers.

All affected products have been fully qualified in accordance with established performance and reliability criteria. The attached pages summarize the qualification results. Full qualification data and/or samples will be available upon request.

**Form, fit, function changes:** None  
**Part number changes:** None  
**Effective date:** June 4<sup>th</sup>, 2016 or sooner  
**Replacement products:** N/A  
**Last time buy:** N/A

This notification is for your information and acknowledgement. If you have any other questions or concerns, please contact Tim Micun, Product Manager.

We value your business and look forward to assisting you whenever possible.

Best Regards,

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800 E. Northwest Highway Des Plaines, IL 60016

## Product/Process Change Notice (PCN)

**PCN#:** ESU270-37    **Date:** March 4, 2016

**Product Identification:**

SP402x series of TVS Diode Array Products

**Implementation Date for Change:**

June 4, 2016 or sooner

### Contact Information

**Name:** Tim Micun

**Title:** Product Marketing Manager

**Phone #:** +1 408 409 3657

**Fax#:** N/A

**E-mail:** tmicun@littelfuse.com

### Category of Change:

- Assembly Process
- Data Sheet
- Technology
- Discontinuance/Obsolescence
- Equipment
- Manufacturing Site
- Raw Material
- Testing
- Fabrication Process
- Other: \_\_\_\_\_

### Description of Change:

Approve a new wafer foundry location and two alternate backend assembly, test, and packing locations for SP402x series products.

There are no changes to fit, form & function of the finished product. The affected products have been fully qualified in accordance with all established criteria for performance and reliability

All relevant detail is included in the supplemental pages..

### Important Dates:

- Qualification Samples Available: March 2, 2016
- Final Qualification Data Available: March 2, 2016
- Date of Final Product Shipment:

Last Time Buy:

### Method of Distinguishing Changed Product

- Product Mark,
- Date Code,
- Other, See (8.0) in the succeeding PCN report for details

### Demonstrated or Anticipated Impact on Form, Fit, Function or Reliability:

N/A

### LF Qualification Plan/Results:

N/A

**Customer Acknowledgement of Receipt:** Littelfuse requests you acknowledge receipt of this PCN. In your acknowledgement, you can grant approval or request additional information. Littelfuse will assume the change is acceptable if no acknowledgement is received within 30 days of this notice. Lack of any additional response within 90 days of PCN issuance further constitutes acceptance of the change.



# PCN Report

## ETR # 76816, 80610

**Prepared By** : Jordan Hsieh-SPA Product Engineering Manager,  
 : Ming-Huan Ko-SPA Product Engineer  
**Date** : Mar/02/2016  
**Device** : SP402x Series Product  
**Revision** : A

### 1.0 Objective:

The purpose of this project is to change to a new wafer foundry and qualify two alternative assembly locations for SP402x series product. Succeeding pages summarize the physical, electrical and reliability test performed in qualification lot.

### 2.0 Applicable Devices:

Part Numbers	Part Numbers
SP4020-01FTG	SP4020-01FTG-C
SP4021-01FTG	SP4021-01FTG-C

### 3.0 Assembly, Process & Material Differences/Changes:

#### 3.1 Assembly and Process Changes

Change wafer supplier of steering die as below table.

P/N	SP4021-01FTG, SP4021-01FTG-C, SP4020-01FTG and SP4020-01FTG-C		
Material	Original	New	Changed?
Steering Die	Taiwan	China	Yes

#### 3.2 Material Changes

Add two alternative backend locations for SP4020-01FTG, SP4020-01FTG-C, SP4021-01FTG and SP4021-01FTG-C as below table.

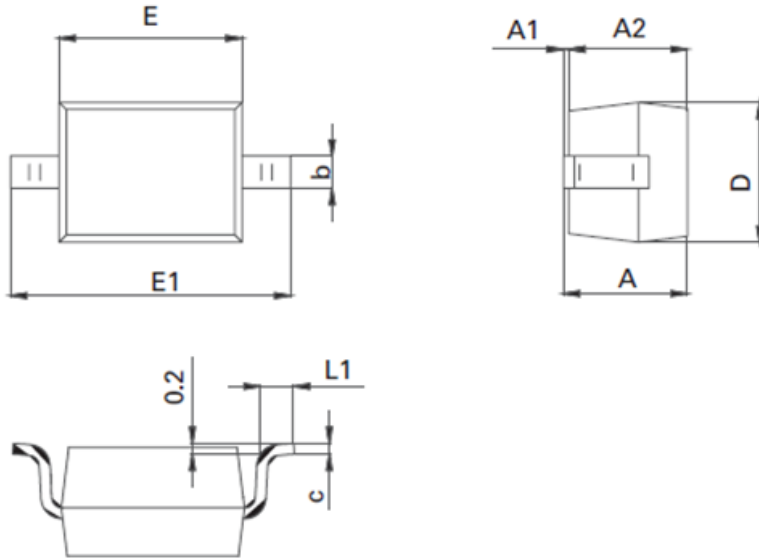
Material	Original Backend Location		New Backend Location 1		New Backend Location 2		Changed ?
	Located in China		Located in China		Located in China		
	Material Name	Supplier	Material Name	Supplier	Material Name	Supplier	
Leadframe	N42	Shuen Der Industry	N42	Shuen Der Industry	A42	ASM	Yes
Die Attach Material	84-1LMISR4	Henkel	Eutetic	--	Eutetic	--	Yes
Au Wire	Gold Wire	Heraeus	Gold Wire	MK Electron	Gold Wire	MK Electron	Yes
Molding Compound	ELER-8-100HFE	E'Dale	ELER-8-100HFE	E'Dale	EME-G600	HHCK	Yes
Lead Finish	Tin	Yunnan	Tin	ShangHai SinYang	Tin	Suzhou Nuonengda	Yes

#### 4.0 Packing Method

There will be no changes in the packing method.

#### 5.0 Physical Differences/Changes:

Lead dimension of new backend locations differ from the original backend location.



	Original Supplier		Alternative Supplier-1		Alternative Supplier-2	
	Min	Max	Min	Max	Min	Max
A	0.80	1.00	--	1.00	--	1.00
A1	0.00	0.10	0.02	0.10	0.00	0.10
A2	0.80	0.90	--	0.90	0.80	0.90
b	0.25	0.35	--	0.30	0.25	0.35
c	0.08	0.15	0.10 Typical		0.08	0.15
D	1.15	1.45	1.20	1.40	1.20	1.40
E	1.60	1.80	1.60	1.80	1.60	1.80
E1	2.50	2.70	2.55	2.75	2.50	2.70
L1	0.25	0.40	0.22	0.42	2.50	4.00

Unit: mm



**6.0 Reliability Test Results Summary:**

Test Items	Condition	S/S	Results	ETR #
Precondition	Bake 24hr @ 150°C/ 168hrs 85%rh, 85°C sock/3 times 260°C peak temperature reflow	308	0/308	ETR 76816 Qualification for new wafer supplier and alternative assembly supplier-1
DC Blocking(HTRB)	Bias = 3.3V Ta = 150°C Duration = 1008 Hours	77	0/77	
Temperature Cycle	Ta = -55°C to +150°C Duration = 1000 Cycles	77	0/77	
Temperature/Humidity (H <sup>3</sup> TRB)	Bias=3.3V Ta = 85°C, 85% RH Duration = 1008 Hours	77	0/77	
Autoclave	Ta = 121°C, 100%RH, 2atm Duration = 96 Hours	77	0/77	
Moisture Sensitivity Level(MSL)	Refer to Precondition Test	308	0/308	
ESD Test	HBM>8kV, MM>400V	30	0/30	

Test Items	Condition	S/S	Results	ETR #
Precondition	Bake 24hr @ 150°C/ 168hrs 85%rh, 85°C sock/3 times 260°C peak temperature reflow	308	0/308	ETR 80610 Qualification for new wafer supplier and alternative assembly supplier-2
DC Blocking(HTRB)	Bias = 3.3V Ta = 150°C Duration = 504 Hours	77	0/77	
Temperature Cycle	Ta = -55°C to +150°C Duration = 1000 Cycles	77	0/77	
Temperature/Humidity (H <sup>3</sup> TRB)	Bias=3.3V Ta = 85°C, 85% RH Duration = 504 Hours	77	0/77	
Autoclave	Ta = 121°C, 100%RH, 2atm Duration = 96 Hours	77	0/77	
Moisture Sensitivity Level(MSL)	Refer to Precondition Test	308	0/308	

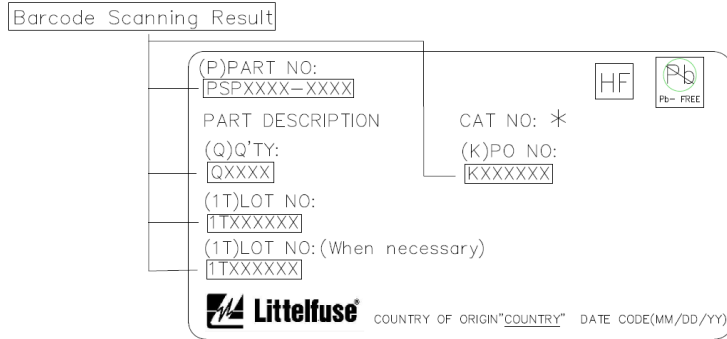


**7.0 Electrical Characteristic Summary:**

There is no change in electrical characteristics. Characterization data is available upon request.

**8.0 Changed Part Identification:**

To distinguish different manufacturing locations please refer to labeling information as CAT NO:



Original Backend Location	New Backend Location 1	New Backend Location 2
CAT No : S	CAT No : Y	CAT No : F

**9.0 Recommendations & Conclusions:**

Based on the test results, it is determined that the new wafer foundry and alternative assembly locations are qualified and certified for production of Littelfuse® SP402x series products.

**10.0 Approvals:**

**Jordan Hsieh**  
**SPA Product Engineering Manager**  
**Littelfuse, Hsinchu**