



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

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Dec 4<sup>th</sup>, 2015

RE: PCN # ESU270-34 -- SP3030-01ETG, SP3031-01ETG SP3021-01ETG and SP3022-01ETG Alternative Manufacturing Location Approval for Wafer Foundry & Backend Assembly, Test and Packing

To our valued customers,

Littelfuse would like to notify you of a newly approved wafer foundry location and alternative backend locations for the SP3030-01ETG, SP3031-01ETG SP3021-01ETG and SP3022-01ETG TVS Diode Array (SPA® Diodes) products. The new wafer foundry is based in Taiwan, and the new backend factories located in geographically separate locations throughout Asia. There are no changes to fit, form, and function of the finished product.

Internal 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:** March 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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## Product/Process Change Notice (PCN)

**PCN#:** ESU270-34    **Date:** Dec 4, 2015

**Product Identification:**

SP3030-01ETG, SP3031-01ETG, SP3021-01ETG  
and SP3022-01ETG of TVS Diode Array Product

**Implementation Date for Change:**

March 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 alternative backend, assembly, test, and packing locations for SP3030-01ETG, SP3031-01ETG, SP3021-01ETG and SP3022-01ETG 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: Dec 4, 2015                       Last Time Buy:
- Final Qualification Data Available: Dec 4, 2015
- Date of Final Product Shipment:

### Method of Distinguishing Changed Product

- Product Mark,
- Date Code,
- Other, Refer to PCN report section 8

### 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 # Various

**Prepared By** : Jordan Hsieh-SPA Product Engineering Manager,  
 : Light Hsieh-SPA Product Engineer  
**Date** : Dec/05/2015  
**Device** : SP3031-01ETG, SP3030-01ETG, SP3022-01ETG, SP3021-01ETG  
**Revision** : A

### 1.0 Objective:

The purpose of this project is to qualify an additional wafer site and alternative assembly sites for the products listed below. Succeeding pages summarize the physical, electrical and reliability test performed in qualification lots.

### 2.0 Applicable Devices:

Part Numbers
SP3031-01ETG
SP3030-01ETG
SP3022-01ETG
SP3021-01ETG

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

#### 3.1 Assembly Process Changes

There are no changes in the assembly and process method

#### 3.2 Material Changes and Update

1. Wafer (die) material → The base wafer is of similar material and construction, yielding similar performance to the legacy material. The new wafer site has been qualified by Littelfuse.

2. Finished (Assembled) Product → Conforms to the established performance and datasheet specification of the legacy material, and can and should be used interchangeably.

Assembled Material Summary of qualify source for SOD882 package

Assy Source	S	G	T	X	H
<b>Leadframe</b>	DFN-2 0.6x1.0 Cu Alloy	DFN-2 0.6x1.0 Cu Alloy	DFN-2 0.6x1.0 Cu Alloy	DFN-2 0.6x1.0 Cu Alloy	DFN-2 0.6x1.0 Cu Alloy
<b>DA adhesive</b>	8006NS	8006NS	8006NS	8006NS	8006NS
<b>Bound wire</b>	Au	Au	Au	Au	Au
<b>Compound</b>	G770	G770	9220	9220	9220
<b>Finish plating</b>	NiPbAu-PPF	NiPbAu-PPF	NiPbAu-PPF	NiPbAu-PPF	NiPbAu-PPF

Each assembly site uses industry-standard SOD882 package, all of which have been qualified by Littelfuse.



**4.0 Packing Method**

There will be no changes in the packing method.

**5.0 Physical Differences/Changes:**

There is no change in mechanical specification or package outline dimension (POD).

**6.0 Reliability Test Results Summary:**

Test Items	Condition	S/S	Results	ETR #
Precondition	(1) Bake 24hr @ 150°C (2) 168hrs @ 85% RH and 85°C (3) IR Reflow, 3 reflows, Peak Temperature of 260°C	308	0/240	ETR 71737 ETR 75128 ETR 76954 ETR 78136 ETR 78492 ETR 79057
DC Blocking(HTRB)	Bias = Rated Voltage Ta = 150°C Duration = 1008 Hours	77	0/80	
Temperature Cycle	Ta = -55°C to +150°C Duration = 1000 Cycles	77	0/80	
Temperature/Humidity (H <sup>3</sup> TRB)	Ta = 85°C, 85% RH Duration = 1008 Hours	77	0/80	
Autoclave	Ta = 121°C, 100%RH, 15psi Duration = 1008 Hours	77	0/80	
Parametric & Capacitance Test	VRWM=1μA, Ir=5V ; Cd at Vr=0V1Mhz Duration = 168 Hours	30	0/30	
Moisture Sensitivity Level(MSL)	Refer to Precondition Test	80	0/80	
Solderability	Refer to Precondition Test	10	0/10	
ESD Test	IEC61000-4-2 (Contact) IEC61000-4-2 (Air)	30	0/30	

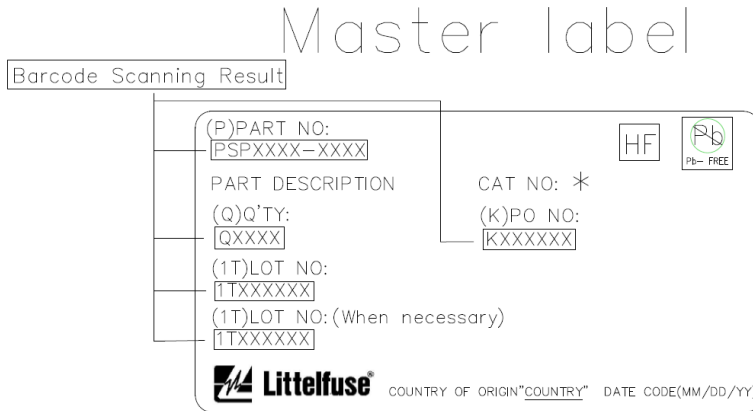
**7.0 Electrical Characteristic Summary:**

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



**8.0 Part Identification:**

- 8.1 Wafer site can be identified by coding LOT NO on the label.
- 8.2 Assembly site can be identified by coding of CAT NO on the label.



Seq	P/N	Assy Catalog
Original	SP3031-01ETG	S
	SP3030-01ETG	S,H,X
	SP3022-01ETG	H,G
	SP3021-01ETG	G
New	<b>SP3031-01ETG</b> <b>SP3030-01ETG</b> <b>SP3022-01ETG</b> <b>SP3021-01ETG</b>	<b>T,G,H,S,X</b>

**9.0 Recommendations & Conclusions:**

Based on the reliability test results, it is determined that the additional wafer foundry and alternative assembly sites are qualified and certified for production of Littelfuse products.

**10.0 Approvals:**

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