



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

Jan 13<sup>th</sup>, 2021

RE: PCN # ESU270-56 – Alternative lead frame vendors Approval for DFN0402 & DFN2510 & SOT23-3L & SOD323 & SOD523 & SC70

To our valued customers,

Littelfuse would like to notify you of approved alternative lead frame vendors for DFN0402 & DFN2510 & SOT23-3L & SOD323 & SOD523 & SC70 SPA™ TVS Diode Arrays products for BCP and productivity improvement. There are no changes to fit, form, function of the finished product.

Qualification efforts are complete. Please see the attached documentation for change details and affected part numbers.

**Products Affected:**

| DFN0402-2L and DFN2510-10L Part Numbers |                   |                   |
|---|-------------------|-------------------|
| SP1004U-ULC-04UTG                       | SP1212-01ETG      | SPHV12-01ETG      |
| SP3420-04UTG                            | SP1220-01ETG      | SPHV15-01ETG      |
| SP1064-04UTG                            | SP3530-01ETG      | SPHV24-01ETG      |
| SP3012-04UTG                            | SP1233-01ETG      | SPHV36-01ETG      |
| SP3012-04UTG-1                          | SP3522-01ETG      | SPHV12-01ETG-C    |
| SP1003-01ETG                            | SP3030-01ETG      | SPHV15-01ETG-C    |
| SP1005-01ETG                            | SP3031-01ETG      | SPHV24-01ETG-C    |
| SP1007-01ETG                            | SP1250-01ETG      | SPHV36-01ETG-C    |
| SP3022-01ETG                            | SP0402B-ELC-01ETG | SP0402B-ULC-01ETG |
|   | SP0402U-ELC-01ETG | SP0402U-ULC-01ETG |

| SOT23-3L, SOD323, SOD523 and SC70 Part Numbers |                  |                 |
|--|------------------|-----------------|
| SD05-01FTG                                     | SP4020-01FTG     | SM05-02HTG      |
| SD05C-01FTG                                    | SP4020-01FTG-C   | SM12-02HTG      |
| SD12-01FTG                                     | SP4021-01FTG     | SM15-02HTG      |
| SD12C-01FTG                                    | SP4021-01FTG-C   | SM24-02HTG      |
| SD15-01FTG                                     | SP4022-01FTG     | SM36-02HTG      |
| SD15C-01FTG                                    | SP4022-01FTG-C   | SP0502BAHTG     |
| SD22-01FTG                                     | SP4022-01FTG-C-L | SP1305-02HTG    |
| SD24-01FTG                                     | SP4023-01FTG     | SP6150-01HTG    |
| SD24C-01FTG                                    | SP4023-01FTG-C   | SP712-02HTG     |
| SD36-01FTG                                     | SP4024-01FTG     | SP1326-01LTG    |
| SD36C-01FTG                                    | SP4024-01FTG-C   | SP1326-01LTG-ER |
| SP4208-01FTG-C                                 | SP4203-01FTG-C   | SP0502BAJTG     |
|  | SP1002-02JTG     | SP1001-02JTG    |



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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: April 13<sup>th</sup>, 2021 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 Sophia Hu, Assistant Product Manager.

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

Best Regards,

Sophia Hu

TVS Diode Array Assistant Product Manager  
Semiconductor Business Unit, Wuxi, China

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800 E. Northwest Highway Des Plaines, IL 60016

Product/Process Change Notice (PCN)

PCN# : ESU270-56 Date : Jan 13<sup>th</sup>, 2021

Product Identification:

DFN0402 & DFN2510 & SOT23-3L & SOD323 & SOD523 & SC70 add approved alternative lead frame vendors

Implementation Date for Change:

April 13<sup>th</sup>, 2021 or sooner

Contact Information

Name : Sophia Hu

Title : Assistant Product Marketing Manager

Phone # : +86 13771377277

Fax# : N/A

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Category of Change:

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

Description of Change:

Littelfuse approved alternative lead frame vendors for DFN0402 & DFN2510 & SOT23-3L & SOD323 & SOD523 & SC70 for BCP and productivity improvement. There are no changes to fit, form, function of the finished product.

Important Dates:

- Qualification Samples Available: Upon request
- Final Qualification Data Available: Upon request
- Date of Final Product Shipment:
- Last Time Buy:

Method of Distinguishing Changed Product

- Product Mark,
- Date Code,
- Other, Littelfuse internal work order documentation

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

N/A

LF Qualification Plan/Results:

Yes

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 da of PCN issuance further constitutes acceptance of the change.



## PCN Report

### ETR # Various

**Prepared By** : Jia Zhu-Product Manager, Jordan Hsieh-Product Engineering Manager,  
Raider Chen-Product Engineer, Sophia Hu-Associate Product Manager  
**Date** : 2021/1/11  
**Device** : SPA products  
**Revision** : A

### 1.0 Objective:

The purpose of this project is to qualify alternative lead frame suppliers for SPA products. Succeeding pages summarize the physical, electrical and reliability test performed in qualification lots.

### 2.0 Applicable Devices:

#### 2.1 DFN0402-2L and DFN2510-10L Part Numbers

| DFN0402-2L and DFN2510-10L Part Numbers |                   |                   |
|---|-------------------|-------------------|
| SP1004U-ULC-04UTG                       | SP1212-01ETG      | SPHV12-01ETG      |
| SP3420-04UTG                            | SP1220-01ETG      | SPHV15-01ETG      |
| SP1064-04UTG                            | SP3530-01ETG      | SPHV24-01ETG      |
| SP3012-04UTG                            | SP1233-01ETG      | SPHV36-01ETG      |
| SP3012-04UTG-1                          | SP3522-01ETG      | SPHV12-01ETG-C    |
| SP1003-01ETG                            | SP3030-01ETG      | SPHV15-01ETG-C    |
| SP1005-01ETG                            | SP3031-01ETG      | SPHV24-01ETG-C    |
| SP1007-01ETG                            | SP1250-01ETG      | SPHV36-01ETG-C    |
| SP3022-01ETG                            | SP0402B-ELC-01ETG | SP0402B-ULC-01ETG |
|   | SP0402U-ELC-01ETG | SP0402U-ULC-01ETG |

#### 2.2 SOT23, SOD323, SOD523 and SC70-3L Part Numbers

| SOT23-3L, SOD323, SOD523 and SC70 Part Numbers |                  |                 |
|--|------------------|-----------------|
| SD05-01FTG                                     | SP4020-01FTG     | SM05-02HTG      |
| SD05C-01FTG                                    | SP4020-01FTG-C   | SM12-02HTG      |
| SD12-01FTG                                     | SP4021-01FTG     | SM15-02HTG      |
| SD12C-01FTG                                    | SP4021-01FTG-C   | SM24-02HTG      |
| SD15-01FTG                                     | SP4022-01FTG     | SM36-02HTG      |
| SD15C-01FTG                                    | SP4022-01FTG-C   | SP0502BAHTG     |
| SD22-01FTG                                     | SP4022-01FTG-C-L | SP1305-02HTG    |
| SD24-01FTG                                     | SP4023-01FTG     | SP6150-01HTG    |
| SD24C-01FTG                                    | SP4023-01FTG-C   | SP712-02HTG     |
| SD36-01FTG                                     | SP4024-01FTG     | SP1326-01LTG    |
| SD36C-01FTG                                    | SP4024-01FTG-C   | SP1326-01LTG-ER |
| SP4208-01FTG-C                                 | SP4203-01FTG-C   | SP0502BAJTG     |
|  | SP1002-02JTG     | SP1001-02JTG    |



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

- 3.1 Assembly Changes  
No change of assemble process.
- 3.2 Process Changes  
No change of process method.
- 3.3 Material Change  
No change of material.

**4.0 Packing Method**

No change of packing method.

**5.0 Physical Differences/Changes:**

No change of this item.

**6.0 Reliability Test Results Summary:**

**6.1 DFN0402-2L and DFN2510-10L summary report:**

| Test Items                       | Condition  | S/S          | Results      | ETR #  |
|----------------------------------|--|--------------|--------------|--|
| Pre-conditioning (PC)            | JESD22-A113  | 308 each lot | Upon request | 139830<br>139834<br>149781<br>148212<br>152497<br>152629<br>152635<br>152659 |
| DC Blocking (HTRB)               | Bias = VRWM, Ta = 150°C,<br>Duration = 1008 Hours        | 77 each lot  | Upon request |  |
| Temperature Cycle (TC)           | Ta = -55°C to +150°C, Duration =<br>1000 Cycles          | 77 each lot  | Upon request |  |
| Temperature/Humidity (H3TRB)     | Ta = 85°C, 85% RH, Bias =<br>VRWM, Duration = 1008 Hours | 77 each lot  | Upon request |  |
| Autoclave (AC)                   | Ta = 121°C, 100%RH, 2ATM,<br>Duration = 96 Hours         | 77 each lot  | Upon request |  |
| Resistance to Solder Heat (RSH)  | 260°C, 10 sec, M-2031                                    | 10 each lot  | Upon request |  |
| Moisture Sensitivity Level (MSL) | Per Jedec J-STD-020D Level 1                             | 308 each lot | Upon request |  |
| Solderability (SD)               | ANSI-J-STD-002   | 10 each lot  | Upon request |  |



**6.2 SOT23, SOD323, SOD523 and SC70-3L summary report:**

| Test Items                       | Condition  | S/S          | Results      | ETR #                                |
|----------------------------------|--|--------------|--------------|--------------------------------------|
| Pre-conditioning (PC)            | JESD22-A113  | 308 each lot | Upon request | 152663<br>152664<br>152665<br>152666 |
| DC Blocking (HTRB)               | Bias = VRWM, Ta = 150°C,<br>Duration = 1008 Hours        | 77 each lot  | Upon request |                                      |
| Temperature Cycle (TC)           | Ta = -55°C to +150°C, Duration =<br>1000 Cycles          | 77 each lot  | Upon request |                                      |
| Temperature/Humidity (H3TRB)     | Ta = 85°C, 85% RH, Bias =<br>VRWM, Duration = 1008 Hours | 77 each lot  | Upon request |                                      |
| Autoclave (AC)                   | Ta = 121°C, 100%RH, 2ATM,<br>Duration = 96 Hours         | 77 each lot  | Upon request |                                      |
| Resistance to Solder Heat (RSH)  | 260°C, 10 sec, M-2031                                    | 10 each lot  | Upon request |                                      |
| Moisture Sensitivity Level (MSL) | Per Jedec J-STD-020D Level 1                             | 308 each lot | Upon request |                                      |
| Solderability (SD)               | ANSI-J-STD-002   | 10 each lot  | Upon request |                                      |

**7.0 Electrical Characteristic Summary:**

No change in electrical characteristics. Characterization data is available upon request.

**8.0 Changed Part Identification:**

Internal control can identify lead frame difference.

**9.0 Approvals:**

**Sophia Hu**  
SPA Assistant Product Manager  
Littelfuse, Wuxi

**Jordan Hsieh**  
SPA Product Manager  
Littelfuse, HsinChu

**Raider Chen**  
SPA Product Engineer  
Littelfuse, HsinChu