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

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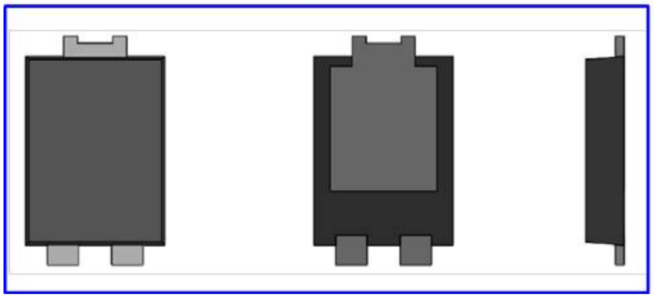
**May 31st, 2022**

**PCN # ESW490-43 – TO-277 Package Outline Change**

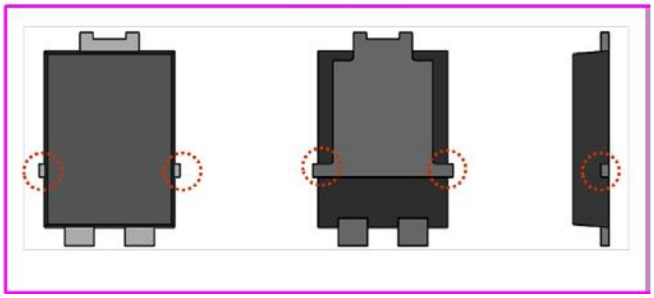
To our valued customers,

Littelfuse would like to notify you that we will slightly change the outline of TO-277 package, which will optimize the backend assembly efficiency and output which in the end increase the total capacity of Littelfuse TO-277 package to support customer increased demand in future.

**Current TO-277 outline**



**New TO-277 outline**



**Form, fit, function changes:** small outline change but no footprint update needed (refer to qual report)
**Part number changes:** None
**Effective date:** Aug 31st, 2022
**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 your local sales team or Zhiwei Wang, Power Thyristor/Diode Discrete, Product Marketing Manager.

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

Thank you very much!

Best Regards,

Zhiwei Wang
Product Marketing Manager of Power Thyristor/Diode Discrete
Semiconductor Business Unit, Wuxi, China
+86 510 85277701 - 7927
zwang@littelfuse.com

Littelfuse®

800 E. Northwest Highway Des Plaines, IL 60016

# Product/Process Change Notice (PCN)

**PCN#:** ESW490-43 Date: May 31st, 2022

Product Identification:

TO-277 Package Outline Change

Implementation Date for Change:

Aug 31st, 2022

**Contact Information**

Name: Zhiwei Wang

Title: Product Marketing Manager

Phone #: +86 510 85277701 - 7927

Fax#: N/A

E-mail: zwang@littelfuse.com

**Category of Change:**

☒ Assembly Process
☒ Data Sheet
☐ Technology
☐ Discontinuance/Obsolescence
☐ Equipment
☐ Manufacturing Site
☐ Raw Material
☐ Testing
☐ Fabrication Process
☐ Other: ____________________

**Description of Change:**

Littelfuse would like to notify you that we will slightly change the outline of TO-277 package, which will optimize the backend assembly efficiency and output which in the end increase the total capacity of Littelfuse TO-277 package to support customer increased demand in future.

Form, fit, function changes: small outline change but no footprint update needed (refer to qual report)

Part number changes: None

Effective date: Aug 31st, 2022

Replacement products: N/A

Last time buy: N/A

**Important Dates:**

☒ Qualification Samples Available:

☒ Final Qualification Data Available:

☐ Date of Final Product Shipment:

☐ Last Time Buy:

**Method of Distinguishing Changed Product**

☐ Product Mark,

☒ Date Code, WW36, 2022

☐ Other,

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

Small outline change but no footprint update needed (refer to qual report)

**LF Qualification Plan/Results**:

Available

**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.

Littelfuse, Wuxi
East 3# Zhen Fa 6 Road
Shuo Fang Industrial Park
Wuxi, Jiangsu 214142

# Product Qualification Report

| | |
|---|---|
| To: | Those who may concern |
| From: | Glisten Xu, Product Engineer, Littelfuse, Wuxi<br>Yali Wang, Product Engineer, Littelfuse, Wuxi |
| Date: | May 31st, 2022 – Rev. B |
| Subject: | **Qualification test result of TO-277 series product outline change** |

## Purpose:

This report is to inform the successful qualification test results of TO-277 series product outline change.

## Conclusion:

According to the qualification result, Littelfuse concluded that TO-277 series product outline change had been successfully completed and will be released to mass production.

Best Regards,

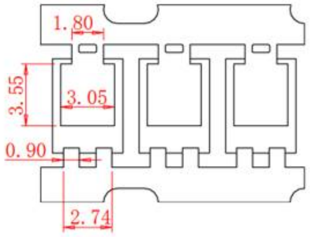
Glisten Xu

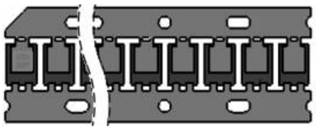
Product Engineer
Littelfuse Semiconductor

# 1. Change Description

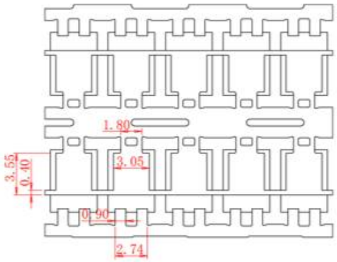
1.1 Re-design TO-277 series lead frame outline to increase lead Frame qty/piece from 40 pcs/piece to 226 pcs/piece.

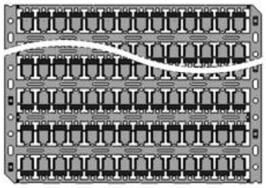
**Current Lead Frame**





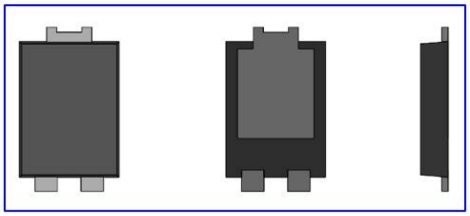
**New Lead Frame**



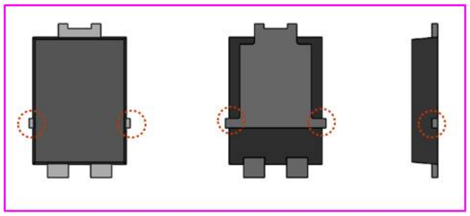


1.2 Re-design TO-277 series lead frame outline to solve the overflow issue through add new parts on both sides, it can make mold easy to flatten the surface of a material at molding process.

**Current TO-277 outline**



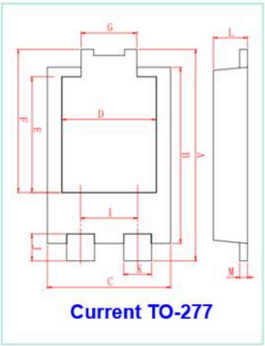
**New TO-277 outline**



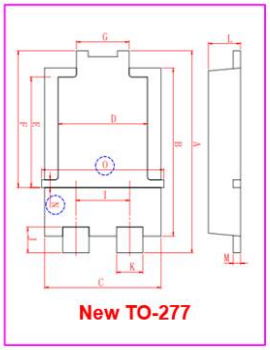
1.3 Dimension change description:

The “A” ~ “M” dimensions of the new TO-277 are the same as current TO-277, with new TO-277 add dimensions of "N" and "O".

| Dim | Spec. (mm) | Old TO-277 Actual (mm) | | | Judge | New TO-277 Actual (mm) | | | Judge |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | | 1 | 2 | 3 | |
| A | 6.50 ± 0.20 | 6.496 | 6.503 | 6.498 | Pass | 6.501 | 6.503 | 6.502 | Pass |
| B | 5.38 ± 0.10 | 5.381 | 5.382 | 5.380 | Pass | 5.381 | 5.385 | 5.382 | Pass |
| C | 3.98 ± 0.10 | 3.975 | 3.980 | 3.978 | Pass | 3.981 | 3.980 | 3.979 | Pass |
| D | 3.05 ± 0.15 | 3.093 | 3.082 | 3.084 | Pass | 3.054 | 3.051 | 3.052 | Pass |
| E | 3.55 ± 0.15 | 3.537 | 3.531 | 3.541 | Pass | 3.559 | 3.561 | 3.555 | Pass |
| F | 4.40 ± 0.20 | 4.367 | 4.443 | 4.449 | Pass | 4.449 | 4.451 | 4.448 | Pass |
| G | 1.80 ± 0.10 | 1.808 | 1.798 | 1.801 | Pass | 1.794 | 1.801 | 1.798 | Pass |
| I | 1.84 ± 0.10 | 1.845 | 1.851 | 1.858 | Pass | 1.841 | 1.842 | 1.845 | Pass |
| J | 0.85 ± 0.20 | 0.853 | 0.855 | 0.861 | Pass | 0.843 | 0.842 | 0.845 | Pass |
| K | 0.90 ± 0.05 | 0.901 | 0.902 | 0.899 | Pass | 0.902 | 0.902 | 0.900 | Pass |
| L | 1.10 ± 0.15 | 1.099 | 1.098 | 1.099 | Pass | 1.098 | 1.102 | 1.108 | Pass |
| M | 0.25 ± 0.05 | 0.251 | 0.249 | 0.248 | Pass | 0.249 | 0.251 | 0.250 | Pass |
| N | 0.40 ± 0.15 | - | - | - | - | 0.408 | 0.412 | 0.415 | Pass |
| O | < 4.25 | - | - | - | - | 4.035 | 4.058 | 4.081 | Pass |



**Current TO-277**



**New TO-277**

1.4 Molding Process Change:

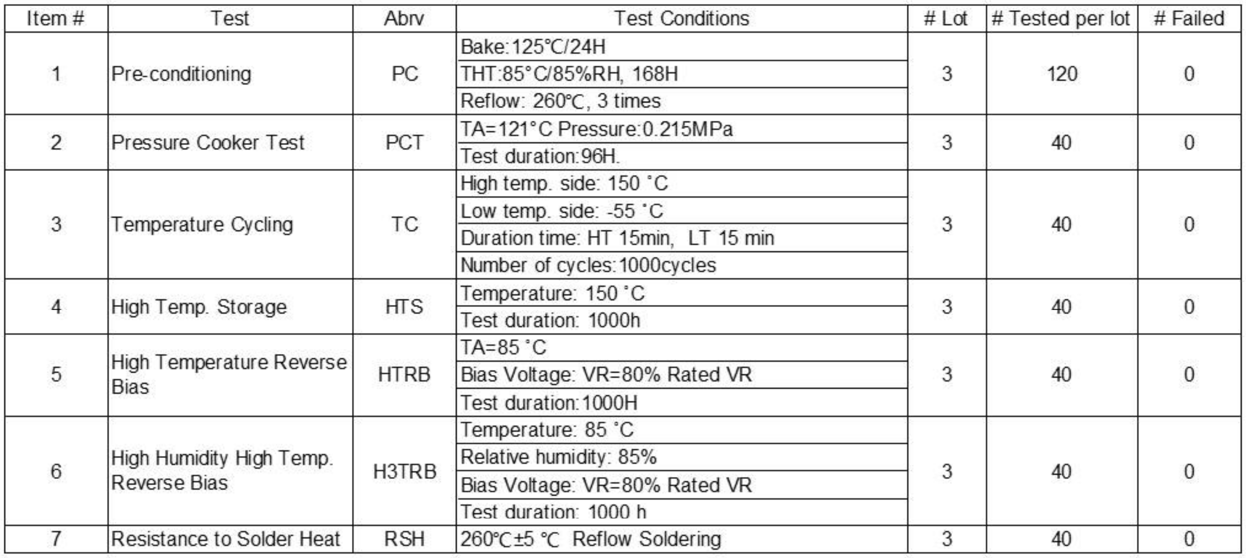
Due to the new matrix frame is used, the molding mold is larger, so the process parameters need to adjust as below.

| Parameter Item | Current TO-277 Molding Parameter | | New TO-277 Molding Parameter | |
|---|---|---|---|---|
| | Spec | Actual | Spec | Actual |
| On Mold temperature | 170 ± 10°C | 172°C | 170 ± 10°C | 173°C |
| Off Mold temperature | 170 ± 10°C | 173°C | 170 ± 10°C | 171°C |
| Turn-in Pressure | 30 ± 10kg/cm$^2$ | 32kg/cm$^2$ | 40 ± 10kg/cm$^2$ | 43kg/cm$^2$ |
| Turn-in Time | 30 ± 5sec | 30sec | 30 ± 5sec | 30sec |
| Heating Time | 30 ± 5sec | 30sec | 30 ± 5sec | 30sec |
| Clamping Pressure | 100 ± 20kg/cm$^2$ | 101kg/cm$^2$ | 140 ± 20kg/cm$^2$ | 142kg/cm$^2$ |

## 2. Qualification Test Vehicle

| Part Number | Package Type | Lot Size | Internal Reference # |
|---|---|---|---|
| DST560S | TO-277 | 1 | 168115 |
| DST2080S | TO-277 | 1 | 168116 |
| DST12100S | TO-277 | 1 | 168117 |

## 3. Qualification Test Items and Result Summary



| Item # | Test | Abrv | Test Conditions | # Lot | # Tested per lot | # Failed |
|---|---|---|---|---|---|---|
| 1 | Pre-conditioning | PC | Bake:125℃/24H<br>THT:85°C/85%RH, 168H<br>Reflow: 260℃, 3 times | 3 | 120 | 0 |
| 2 | Pressure Cooker Test | PCT | TA=121°C Pressure:0.215MPa<br>Test duration:96H. | 3 | 40 | 0 |
| 3 | Temperature Cycling | TC | High temp. side: 150 °C<br>Low temp. side: -55 °C<br>Duration time: HT 15min, LT 15 min<br>Number of cycles:1000cycles | 3 | 40 | 0 |
| 4 | High Temp. Storage | HTS | Temperature: 150 °C<br>Test duration: 1000h | 3 | 40 | 0 |
| 5 | High Temperature Reverse Bias | HTRB | TA=85 °C<br>Bias Voltage: VR=80% Rated VR<br>Test duration:1000H | 3 | 40 | 0 |
| 6 | High Humidity High Temp. Reverse Bias | H3TRB | Temperature: 85 °C<br>Relative humidity: 85%<br>Bias Voltage: VR=80% Rated VR<br>Test duration: 1000 h | 3 | 40 | 0 |
| 7 | Resistance to Solder Heat | RSH | 260℃±5 ℃ Reflow Soldering | 3 | 40 | 0 |

**Conclusion: All qual vehicles pass reliability test.**

## Appendix: Affected PN list

DST10100S
DST10100S-A
DST1040S
DST1040S-A
DST1045S
DST1045S-A
DST1050S
DST1050S-A
DST12100S
DST1545S
DST1550S
DST2050S
DST2080S
DST5100S
DST5100S-A
DST560S
DST560S-A
DST580S
DST580S-A
DST8100S
DST8100S-A
DST860S
DST860S-A