



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

Apr 13st, 2021

PCN # Alternate Assembly Location for Thyristor SOT23_SOT89_SOT223 package

To our valued customers,

Littelfuse would like to notify you that we qualified alternate assembly location of Thyristor SOT23, SOT89, SOT223 package products with BCP consideration. Detail affected product list please refer to attached file.

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: Slight dimension difference but all in JEDEC spec
Part number changes: None
Effective date: July 13th, 2021
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



800 E. Northwest Highway Des Plaines, IL 60016

Product/Process Change Notice (PCN)

PCN#: ESW490-37 **Date:** Apr 13th, 2021

Product Identification:

All SOT23 & SOT89 & SOT223 package products of Thyristor.

Implementation Date for Change:

July 13th, 2021

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 qualified alternate assembly location of Thyristor SOT23, SOT89, SOT223 package products with BCP consideration. Detail affected product list please refer to attached file.

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.

Important Dates:

Qualification Samples Available: Apr 13th, 2021

Last Time Buy:

Final Qualification Data Available: Apr 13th, 2021

Date of Final Product Shipment:

Method of Distinguishing Changed Product

- Product Mark,
- Date Code, Traceability data available upon request
- Other,

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

Slight dimension difference but all in JEDEC spec

LF Qualification Plan/Results:

Attached..... full detail available upon request

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

Prepared By : Light Zhang, Thyristor Product Engineer
Date : Mar 23rd, 2021
Products : 2nd Source Subcon Qualification
Revision : A

1.0 Objective:

This report covers dual manufacturing site qualification activities of Thyristor products include SOT89 SOT223 SOT23. Site qualify includes backend assembly, final test and packaging operations.

2.0 Applicable Products:

Thyristor products in package of SOT23, SOT223, SOT89
Please see the attached Appendix I for a full list of affected part numbers.

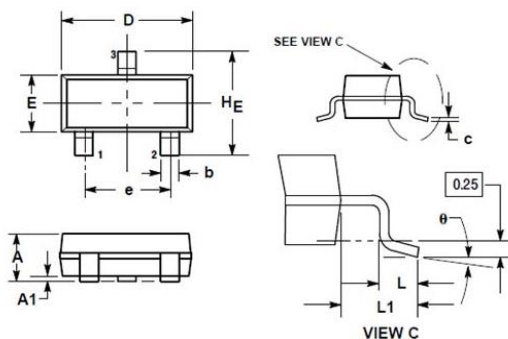
3.0 Physical Differences/Changes of Product:

There are no physical changes for 2nd source subcon made.

4.0 Comparison of Package Outline Dimensions Specifications:

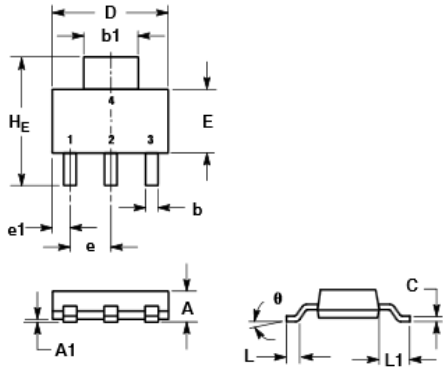
There are slight differences in package outline dimensions but all of new specifications are still within applicable JEDEC specifications.

- 4.1 SOT23 Outline
---Dimensions A1, D, L, H_E are different



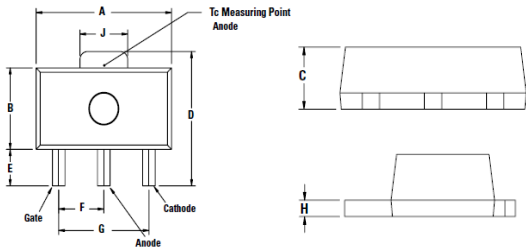
| DIM | Present Sepcification | | | New Sepcification | | |
|----------------|-----------------------|------|------|-------------------|------|------|
| | Millimeters | | | Millimeters | | |
| | Min | Nom | Max | Min | Nom | Max |
| A | 0.89 | 1.03 | 1.17 | 0.89 | 1.03 | 1.17 |
| A1 | 0.05 | 0.10 | 0.15 | 0.01 | 0.10 | 0.15 |
| b | 0.30 | 0.40 | 0.50 | 0.30 | 0.40 | 0.50 |
| c | 0.08 | 0.14 | 0.20 | 0.08 | 0.14 | 0.20 |
| D | 2.80 | 2.90 | 3.00 | 2.80 | 2.90 | 3.04 |
| E | 1.20 | 1.30 | 1.40 | 1.20 | 1.30 | 1.40 |
| e | --- | 1.90 | --- | --- | 1.90 | --- |
| L | 0.40 | 0.49 | 0.58 | 0.40 | 0.49 | 0.60 |
| L1 | 0.46 | 0.55 | 0.64 | 0.46 | 0.55 | 0.64 |
| H _E | 2.10 | 2.30 | 2.49 | 2.10 | 2.30 | 2.64 |
| θ | 0° | - | 10° | 0° | - | 10° |

4.2 SOT223 Outline
 ---Dimension H_E is different.



| DIM | Present Sepcification | | | New Sepcification | | |
|----------------|-----------------------|------|------|-------------------|------|------|
| | Millimeters | | | Millimeters | | |
| | Min | Nom | Max | Min | Nom | Max |
| A | - | - | 1.80 | - | - | 1.80 |
| A1 | 0.02 | 0.07 | 0.13 | 0.02 | 0.07 | 0.13 |
| b | 0.66 | 0.75 | 0.84 | 0.66 | 0.75 | 0.84 |
| b1 | 2.90 | 3.00 | 3.10 | 2.90 | 3.00 | 3.10 |
| c | 0.23 | 0.29 | 0.35 | 0.23 | 0.29 | 0.35 |
| D | 6.60 | 6.60 | 6.71 | 6.30 | 6.60 | 6.71 |
| E | 3.30 | 3.50 | 3.70 | 3.30 | 3.50 | 3.70 |
| e | --- | 2.30 | --- | --- | 2.30 | --- |
| e1 | 0.75 | 0.95 | 1.15 | 0.75 | 0.95 | 1.15 |
| L1 | 1.50 | 1.75 | 2.00 | 1.50 | 1.75 | 2.00 |
| H _E | 6.80 | 7.00 | 7.20 | 6.70 | 7.00 | 7.30 |
| θ | 0° | - | 10° | 0° | - | 10° |

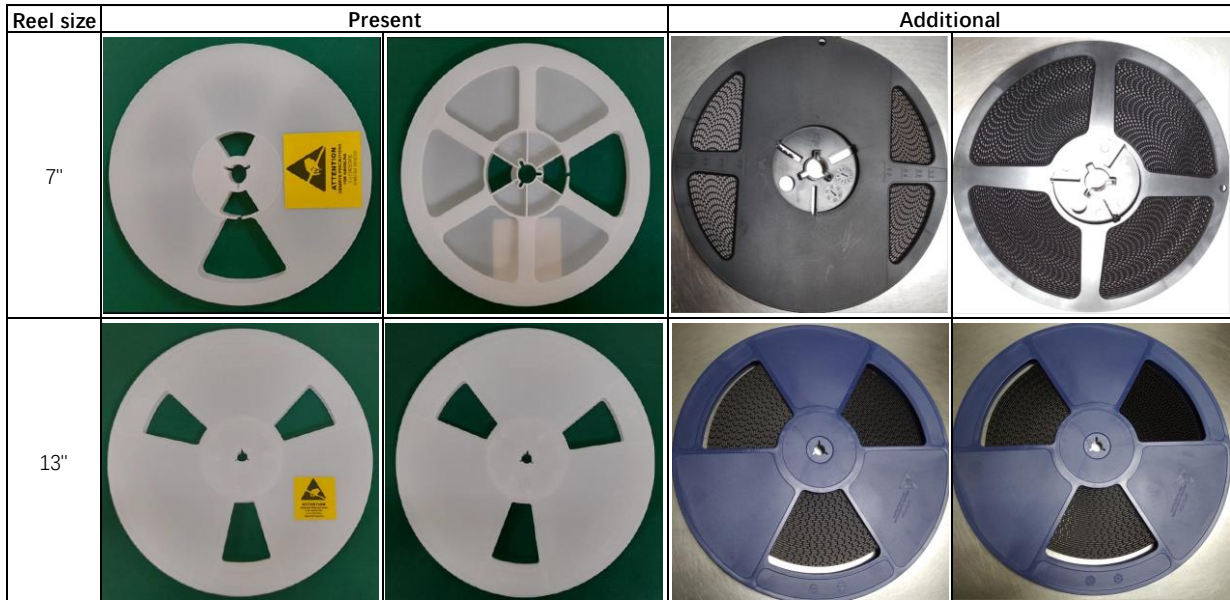
4.3 SOT 89 Outline
 ---Dimensions E F G J are different.



| DIM | Present Sepcification | | | New Sepcification | | |
|-----|-----------------------|-----|------|-------------------|------|------|
| | Millimeters | | | Millimeters | | |
| | Min | Nom | Max | Min | Nom | Max |
| A | 4.40 | - | 4.60 | 4.40 | - | 4.60 |
| B | 2.29 | - | 2.60 | 2.29 | - | 2.60 |
| C | 1.40 | - | 1.60 | 1.40 | - | 1.60 |
| D | 3.94 | - | 4.25 | 3.94 | - | 4.25 |
| E | 0.89 | - | 1.20 | 0.81 | - | 1.20 |
| F | 1.42 | - | 1.57 | - | 1.50 | - |
| G | 2.92 | - | 3.07 | - | 3.00 | - |
| H | 0.35 | - | 0.44 | 0.35 | - | 0.44 |
| J | 1.62 | - | 1.83 | - | 1.65 | - |

5.0 Physical Differences/Changes of Reel & Tape:

- 5.1 There are no physical differences on tape
- 5.2 There are physical differences about the reel used in 2nd subcon.

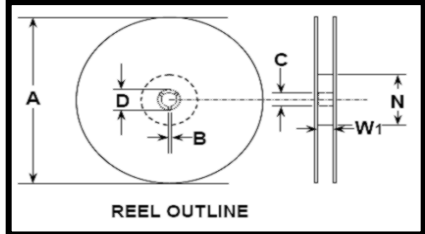


6.0 Comparison of Reel & Tape Outline Dimensions Specifications:

- 6.1 There is no change of the tape outline dimensions specification.
- 6.2 There are slight differences in Reel outline dimensions but all of new specifications are still within applicable EIA-481 standard.

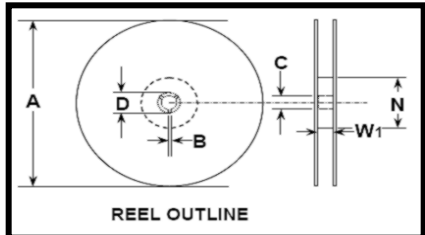
6.2.1 7" Reel outline dimensions specifications.

---7" reel for SOT89 & SOT223 outline, Dimension A, B, D, N are different.



| ITEM | SYMBOL | Present | | New | |
|----------------------|--------|---------------|-------------------|---------------|-------------------|
| | | VALUE (MM) | TOLERANCE (MM) | VALUE (MM) | TOLERANCE (MM) |
| Reel Diameter | A | 180.0 | ±1.5 | 178.0 | ±1.0 |
| Drive Spoke Width | B | 2.3 | ±0.2 | 2.1 | ±0.2 |
| Arbor Hole Diameter | C | 13.0 | +0.5/-0.2 | 13.0 | +0.5/-0.2 |
| Drive Spoke Diameter | D | 21.0 | +0.3 / - 0 | 21.2 | ±0.3 |
| Hub Diameter | N | 60.0 | ±1.0 | 60.0 | ±0.5 |
| Reel Inner ar Hub | W1 | 12.4 | +2.0/-0.0 | 12.4 | +2.0/-0.0 |

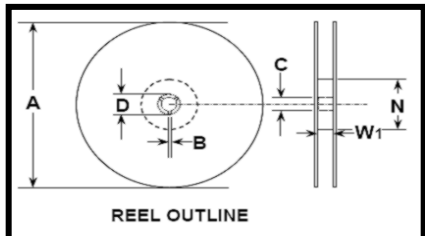
---7" reel for SOT23 outline, Dimension A, B, D, N are different.



| ITEM | SYMBOL | Present | | New | |
|----------------------|--------|---------------|-------------------|---------------|-------------------|
| | | VALUE (MM) | TOLERANCE (MM) | VALUE (MM) | TOLERANCE (MM) |
| Reel Diameter | A | 180.0 | ±1.5 | 178.0 | ±1.0 |
| Drive Spoke Width | B | 2.3 | ±0.2 | 2.1 | ±0.2 |
| Arbor Hole Diameter | C | 13.0 | +0.5/-0.2 | 13.0 | +0.5/-0.2 |
| Drive Spoke Diameter | D | 21.0 | +0.3 / - 0 | 21.2 | ±0.3 |
| Hub Diameter | N | 60.0 | ±1.0 | 60.0 | ±0.5 |
| Reel Inner ar Hub | W1 | 8.4 | +1.5/-0.0 | 8.4 | +1.5/-0.0 |

6.2.2 13" Reel outline dimensions specifications.

---13" reel for SOT89 & SOT223 outline, Dimension A, B, D, N are different.



| ITEM | SYMBOL | Present | | New | |
|----------------------|--------|---------------|-------------------|---------------|-------------------|
| | | VALUE (MM) | TOLERANCE (MM) | VALUE (MM) | TOLERANCE (MM) |
| Reel Diameter | A | 330.0 | ±1.5 | 330.0 | ±2.0 |
| Drive Spoke Width | B | 2.2 | ±0.2 | 2.0 | ±0.5 |
| Arbor Hole Diameter | C | 13.0 | +0.5/-0.2 | 13.0 | +0.5/-0.2 |
| Drive Spoke Diameter | D | 21.0 | +0.3 / - 0 | 22.0 | ±0.5 |
| Hub Diameter | N | 100.0 | ±1.5 | 100.0 | ±1.0 |
| Reel Inner ar Hub | W1 | 12.4 | +2.0/-0.0 | 12.4 | +2.0/-0.0 |



7.0 Qualification Test Result

All samples passed parametric and reliability test standard by Littelfuse.

7.1 Package SOT23 Reliability test result summary

| Test Item | Sample P/N | Sample QTY | Littelfuse test Ref# | Contents/Conditions | Duration | Result Summary |
|------------------|--------------|------------|----------------------|--|---------------|----------------|
| ACBV (HTRB) | NYC0102BLT1G | 77 x 2 | 143336 | At T _J max, Reverse biased at 100%V _{DRM} | 1,008hrs | 0 failure |
| | S6X8BBSRP | 77 x 2 | 149946 | | | |
| Pre-conditioning | NYC0102BLT1G | 77 x 8 | 143336 | 24hrs 125°C bake, 168hrs 85°C/85% humidity storage, 3 x IR reflow | | 0 failure |
| | S6X8BBSRP | 77 x 8 | 149946 | | | |
| H3TRB | NYC0102BLT1G | 77 x 2 | 143336 | T _A =85°C, RH=85%, Reverse biased (NYC0102BLT1G at 100V; S6X8BBSRP at 160V) | 1,008hrs | 0 failure |
| | S6X8BBSRP | 77 x 2 | 149946 | | | |
| TC | NYC0102BLT1G | 77 x 2 | 143336 | -55°C&150°C (air to air), Dwell time 15mins | 1,000 cycles | 0 failure |
| | S6X8BBSRP | 77 x 2 | 149946 | | | |
| UHASt | NYC0102BLT1G | 77 x 2 | 143336 | T _A =130°C, RH=85% | 96hrs | 0 failure |
| | S6X8BBSRP | 77 x 2 | 149946 | | | |
| IOL | NYC0102BLT1G | 77 x 2 | 143336 | T _A =25°C, T _J (ΔT _J)>=100°C) | 15,000 cycles | 0 failure |
| | S6X8BBSRP | 77 x 2 | 149946 | | | |
| RSH | NYC0102BLT1G | 30 x 2 | 143336 | 260°C | 10 secs | 0 failure |
| | S6X8BBSRP | 30 x 2 | 149946 | | | |
| Solderability | NYC0102BLT1G | 10 x 2 | 143336 | 245°C | 10 secs | 0 failure |
| | S6X8BBSRP | 10 x 2 | 149946 | | | |
| ESD | MCR08MT1G | 30 x 2 | 143336 | HBM 30KV, MM 8KV | | 0 failure |
| | NYC228STT1G | 30 x 2 | 149946 | | | |

7.2 Package SOT223 Reliability test result summary

| Test Item | Sample P/N | Sample QTY | Littelfuse test Ref# | Contents/Conditions | Duration | Result Summary |
|------------------|------------|------------|----------------------|--|---------------|----------------|
| ACBV (HTRB) | S6002TSRP | 77 x 1 | 144606 | At T _J max, Reverse biased at 100%V _{DRM} | 1,008hrs | 0 failure |
| Pre-conditioning | S6002TSRP | 77 x 4 | 144606 | 24hrs 125°C bake, 168hrs 85°C/85% humidity storage, 3 x IR reflow | | 0 failure |
| H3TRB | S6002TSRP | 77 x 1 | 144606 | T _A =85°C, RH=85%, Reverse biased at 160V _{DC} | 1,008hrs | 0 failure |
| TC | S6002TSRP | 77 x 1 | 144606 | -55°C&150°C (air to air), Dwell time 15mins | 1,000 cycles | 0 failure |
| UHASt | S6002TSRP | 77 x 1 | 144606 | T _A =130°C, RH=85% | 96hrs | 0 failure |
| IOL | S6002TSRP | 77 x 1 | 144606 | T _A =25°C, T _J (ΔT _J)>=100°C) | 15,000 cycles | 0 failure |
| RSH | S6002TSRP | 30 | 144606 | 260°C | 10 secs | 0 failure |
| Solderability | S6002TSRP | 10 | 144606 | 245°C | 10 secs | 0 failure |
| ESD | S6002TSRP | 30 | 144606 | HBM 30KV, MM 8KV | | 0 failure |



7.3 Package SOT89 Reliability test result summary

| Test Item | Sample P/N | Sample QTY | Littelfuse test Ref# | Contents/Conditions | Duration | Result Summary |
|------------------|------------|------------|----------------------|--|---------------|----------------|
| ACBV (HTRB) | S602BSRP | 77 x 2 | 144614 | At T _J max, Reverse biased at 100%V _{DRM} | 1,008hrs | 0 failure |
| | LX807MBRP | 77 x 1 | 147397 | | | |
| Pre-conditioning | S602BSRP | 77 x 8 | 144614 | 24hrs 125°C bake, 168hrs 85°C/85% humidity storage, 3 x IR reflow | | 0 failure |
| | LX807MBRP | 77 x 4 | 147397 | | | |
| H3TRB | S602BSRP | 77 x 2 | 144614 | T _A =85°C, RH=85%, Reverse biased (S602BSRP at 160V; LX807MBRP at 320V) | 1,008hrs | 0 failure |
| | LX807MBRP | 77 x 1 | 147397 | | | |
| TC | S602BSRP | 77 x 2 | 144614 | -55°C&150°C (air to air), Dwell time 15mins | 1,000 cycles | 0 failure |
| | LX807MBRP | 77 x 1 | 147397 | | | |
| UHASt | S602BSRP | 77 x 2 | 144614 | T _A =130°C, RH=85% | 96hrs | 0 failure |
| | LX807MBRP | 77 x 1 | 147397 | | | |
| IOL | S602BSRP | 77 x 2 | 144614 | T _A =25°C, T _J (ΔT _J)>=100°C | 15,000 cycles | 0 failure |
| | LX807MBRP | 77 x 1 | 147397 | | | |
| RSH | S602BSRP | 30 x 2 | 144614 | 260°C | 10 secs | 0 failure |
| | LX807MBRP | 30 x 1 | 147397 | | | |
| Solderability | S602BSRP | 10 x 2 | 144614 | 245°C | 10 secs | 0 failure |
| | LX807MBRP | 10 x 1 | 147397 | | | |
| ESD | S602BSRP | 30 x 2 | 144614 | HBM 30KV, MM 8KV | | 0 failure |
| | LX807MBRP | 30 x 1 | 147397 | | | |

7.4 Parametric Test

There is no change in absolute ratings and parametric specifications

| Test Item | Sample P/N | Sample Qty | Littelfuse test Ref# | Contents/Conditions | Result Summary |
|-----------------------|--------------|------------|----------------------|---|---------------------|
| Electrical Parameters | NYC0102BLT1G | 10 x 2 | 143357 | IGT/VGT/IH/VT/IDRM/IRRM | Meet datasheet spec |
| | S6X8BBSRP | 10 x 2 | 149948 | | |
| | S6002TSRP | 10 x 1 | 144612 | | |
| | S602BSRP | 10 x 2 | 144617 | | |
| | LX807MBRP | 10 x 1 | 147398 | | |
| ITSM | NYC0102BLT1G | 5 x 2 | 143357 | f = 50Hz; T _J (initial) = 25°C | |
| | S6X8BBSRP | 5 x 2 | 149948 | | |
| | S6002TSRP | 5 x 1 | 144612 | | |
| | S602BSRP | 5 x 2 | 144617 | | |
| | LX807MBRP | 5 x 1 | 147398 | | |
| Thermal Resistance | NYC0102BLT1G | 5 x 2 | 143357 | Junction-to-Case R _{θJC} | |
| | S6X8BBSRP | 5 x 2 | 149948 | | |
| | S6002TSRP | 5 x 1 | 144612 | | |
| | S602BSRP | 5 x 2 | 144617 | | |
| | LX807MBRP | 5 x 1 | 147398 | | |



8.0 Recommendations & Conclusions:

Base on the above qualification test results, Littelfuse judged that the 2nd source qualification have been successfully completed and results were verified by qualification tests.

Littelfuse released the 2nd source subcon manufacturing to production.

9.0 Approvals:

Light Zhang
Outsourced Product Engineer
Littelfuse, Inc.

Peter Liu
Aisa OSAT Product Engineering Manager
Littelfuse, Inc.

10.0

Appendix I – Affected part number list

| | | | | |
|--------------|---------------|-----------|--------------|----------------|
| NYC0102BLT1G | S4X8BSRP | LX807MBRP | S6X8TSRP | S940S6X8TSRP |
| SYC0102BLT1G | S6X8BSRP | LX803DTRP | S8X8TSRP | S958S6X8TS2RP |
| NYC0102BLT1P | S4X8BS1RP | LX803MTRP | S966S8X8TSRP | S971S6X8TSRP |
| S6X8BBSRP | S6X8BS1RP | LX807DTRP | S4X8TS1RP | S988S6X8TSRP |
| MCR08BT1G | S4X8BS2RP | LX807MTRP | S6X8TS1RP | Q1421L0103NTRP |
| MCR08MT1G | S6X8BS2RP | L0103DTRP | S8X8TS1RP | Q1427L0103MTRP |
| NYC222STT1G | S402BSRP | L0103MTRP | S4X8TS2RP | Q1428L0107MTRP |
| NYC226STT1G | S602BSRP | L0103NTRP | S6X8TS2RP | Q1429L0103NTRP |
| NYC228STT1G | S402BS1RP | L0107DTRP | S8X8TS2RP | Q1430L0107NTRP |
| MAC08BT1G | S602BS1RP | L0107MTRP | S402TSRP | |
| MAC08MT1G | S602BS2RP | L0107NTRP | S602TSRP | |
| Z0103MNT1G | S4X8BSRP1 | L0109DTRP | S802TSRP | |
| Z0107MNT1G | S6X8BSRP1 | L0109MTRP | S402TS1RP | |
| Z0109MNT1G | S885S6X8BSRP | L0109NTRP | S602TS1RP | |
| MCR08MT1G-L | S1002S6X8BSRP | S4X8TSRP | S6002TSRP | |