

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

Oct 11<sup>th</sup>, 2016

RE: PCN # ESW490\_28 TO-220(Isolated & non-isolated) TO-263(D2Pak) & TO218(Isolated & non-isolated) Package Solder Paste Property Change

To our valued customers,

Littelfuse would like to notify you of a newly approved solder paste type Pb92.5Sn5Ag2.5 for all TO-220 Isolated/non-Isolated , TO-263(D2PAK), and TO218(Isolated & non-isolated) Thyristor products. The new solder paste type is fully approved internally. It will enable further improvement in quality enhancement, and process control.

Qualification efforts have been completed. 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: Jan 11<sup>th</sup>, 2017 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, Assistant Product Manager.

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

Best Regards,

Zhiwei Wang 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#: ESW490-28 Date: Oct 11, 2016 **Contact Information** Product Identification: Name: Zhiwei Wang All TO-220(Isolated & non-isolated) TO-263(D2Pa Title: Assistant Product Manager & TO218(Isolated & non-isolated) Phone #: +86 510 85277701 - 7927 Implementation Date for Change: Fax#: N/A Jan 11, 2017 E-mail: zwang@littelfuse.com **Description of Change: Category of Change:** Assembly Process Approve a new solder paste type Pb92.5Sn5Ag2.5 for all TO-220 Isolated/non-Isolated, TO-263(D2PAK), and TO218(Isolated & non-isolated) Thyristor Data Sheet products Technology The affected products have been fully qualified in accordance with all Discontinuance/Obsolescence established criteria for performance and reliability Equipment Manufacturing Site All relevant detail is included in the supplemental pages... Raw Material Testing ☐ Fabrication Process Other: **Important Dates:** Qualification Samples Available: Oct 11, 2016, sample available upon request Last Time Buy: Final Qualification Data Available: Oct 11,2016 Date of Final Product Shipment: Method of Distinguishing Changed Product Product Mark, Date Code, Start from 7BXXX Other, Demonstrated or Anticipated Impact on Form, Fit, Function or Reliability: None 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

# ETR # 84716, 84718,84596,84490,84717,84719,84622,84491,84748,84750,84752,84754,84720, 86002,86007,85999,86000

Prepared By	: Maggie Xu, Senior Product Engineer
Date	: Oct/11/2016
Device	: TO220/TO263/TO218 Series Package Product
Revision	: A

#### 1.0 Objective:

The purpose of this project is to qualify the use of Pb92.5Ag2.5Sn5 as a new solder paste material for Thyristor TO220 (Isolated and Non-Isolated), TO263 (D2Pak) and TO218 (Isolated and Non-Isolated) Products.

Package	Original Solder paste	New Solder Paste
TO220	Pb90Sn10	Pb92.5Ag2.5Sn5
TO263	Pb90Sn10	Pb92.5Ag2.5Sn5
TO218	Pb90Sn10	Pb92.5Ag2.5Sn5

#### 2.0 Applicable Devices:

Thyristor TO220 (Isolated and Non-Isolated), TO263 (D2Pak) and TO218 (Isolated and Non-Isolated) Product Series

#### 3.0 Packing Method:

There will be no changes in the packing method.

#### 4.0 Physical Differences/Changes:

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

#### 5.0 <u>Reliability Test Results Summary:</u>

Test Category	Description	Sample P/N	Sample Qty	Littelfuse test Ref#	Contents/Conditions	Result Summary
	Electrical Parameters	S4008LS2TP	271	84716	IGT/VGT/IH/IDRM/IRRM	Meet datasheet spec
Parametric Test		Q4010N5RP	271	84718		
		Q6016NH6RP	261	84596		
		Q8025LH5TP	271	84490		
		Q6040K7TP	271	86002		



G6025K6TP     271     86007       High Temperature leakage test     S4008LS2TP     5     84717     AC600Vpeak, 110°C       Q4010NSRP     5     84491     AC600Vpeak, 125°C       G6016NH6RP     5     84091     AC600Vpeak, 125°C       S8065KTP     5     84732     AC600Vpeak, 125°C       G6016NH6RP     5     84752     Single half cycle; f = 50H2; T,(initial) = 25°C       G6016NH6RP     5     84752     Single half cycle; f = 50H2; T,(initial) = 25°C       G6016NH6RP     5     84622     Single half cycle; f = 50H2; T,(initial) = 25°C       G6016NH6RP     3     84719     G6040KTP     5       Q6025H5TP     3     84719     G6040KTP     5       Q6025K6TP     3     84622     G4025K6TP     3       Q6016NH6RP     3     84491     G6040KTP     3       Q6025K6TP     3     84622     G4025K6TP     3       Q6016NH6RP     77     84718     Ta:10°C, 1.008hr, Reverse biased at 400Vpeak AC       Q6016NH6RP     77     84718     Reverse biased at 400Vpeak AC			S8065KTP	271	86007		
High Temperature leakage test     Q4010NSRP     5     84719 84622 Q8025LH5TP     Accouvpeak, 125°C       WC600Vpeak, 125°C     Q6040KTP     5     86000 S8065KTP     5     86000 S8065KTP     Accouvpeak, 125°C       ITSM     Q6025K6TP     5     84750 Q6040KTP     Single half cycle; f = 50Hz; T,(initial) = 25°C       ITSM     Q6025LH5TP     5     84743 Q6040KTP     Single half cycle; f = 50Hz; T,(initial) = 25°C       Thermal Resistance     Q8025LH5TP     3     84717 Q4010NSRP     Single half cycle; f = 50Hz; T,(initial) = 25°C       Thermal Resistance     Q8025LH5TP     3     84717 Q4010NSRP     Single half cycle; f = 50Hz; T,(initial) = 25°C       AC Blocking     Q8025LH5TP     3     84717 Q4010NSRP     Single half cycle; f = 50Hz; T,(initial) = 25°C       AC Blocking     Q8025LH5TP     3     84717 Q4010NSRP     Single half cycle; f = 50Hz; T,(initial) = 25°C       AC Blocking     Q8025LH5TP     3     84719 Q8025K6TP     Single half cycle; f = 50Hz; T,(initial) = 25°C       AC Blocking     Q4010NSRP     7     84718 Reverse biased at 400Vpeak AC     Ta: 10°C, 1,008hr, Reverse biased at 400Vpeak AC       Test     Q6016NH6RP     77			Q6025K6TP	271	86007		
High Temperature leakage test     Colo 16NH6RP     5     84622       Q6004K7TP     5     84000       Q6025LH5TP     5     86000       S8065K7P     5     86000       Q6025K6TP     5     86000       Q6025K6TP     5     84748       Q6016NH6RP     5     84756       Q6004K7TP     5     84763       Q6004K7TP     5     84763       Q6004K7TP     5     84763       Q6004K7TP     5     86000       S8065K7P     5     86000       Q6016NH6RP     3     84717       Q6016NH6RP     3     84717       Q6016NH6RP     3     84719       Q6016NH6RP     3     84622       Q8025LH5TP     3     84999       Q6025K6TP     3     85999       Q6016NH6RP     77     84716       Reverse biased at     400Vpeak AC       Q4010NSRP     77     84718       Q6026K6TP     77     8490       Pair Librit     Q6026			S4008LS2TP	5	84717	AC600Vpeak, 110°C	
High Temperature leakage test     G6016NH6RP     5     84622 84025LH5TP     Ac600Vpeak, 125°C       Backge test     G6026K0TP     5     86000 S8065KTP     Ac600Vpeak, 125°C       S4000LS2TP     5     84760 G6016NH6RP     S4780 G6016NH6RP     S4782 S4000LS2TP     Single half cycle; f = 50Hz; T,(initial) = 25°C       ITSM     G6025K6TP     5     84750 G6025K6TP     Single half cycle; f = 50Hz; T,(initial) = 25°C       Thermal Resistance     G6026K6TP     5     84717 G4010NSRP     S4072 G4010NSRP     Single half cycle; f = 50Hz; T,(initial) = 25°C       Thermal Resistance     G6016NH6RP     3     84717 G4010NSRP     S44718 G4010NSRP     S4491       AC Blocking     G6016NH6RP     3     84719 G6025K6TP     Ta:110°C, 1,008hr, Reverse biased at 400Vpeak AC     Ta:25°C, 1,008hr, Reverse biased at 400Vpeak AC       AC Blocking     G6016NH6RP     77     84718 G6025K6TP     Ta:125°C, 1,008hr, Reverse biased at 400Vpeak AC     Ta:125°C, 1,008hr, Reverse biased at 600Vpeak AC       Test     High Humidity High Temp, Reverse Bias     S4008LS2TP     77     84708 G6016NH6RP     Ta:35°C, RH: 85%, 1008hr, Reverse biased at 1,008 hr read point       High Humidity High Temp, Reverse Bias     G601	Hiah	Q4010N5RP	5	84719			
Temperature leakage test     Q8025LH5TP     5     84491 (G6040K7TP     AC600Vpeak, 125°C       AC600Vpeak, 125°C     S80600     S8065KTP     5     86000       G6025K6TP     5     86000     Single half cycle; f = 50H2; T,(initial) = 25°C       ITSM     G6040K7TP     5     84754 G4010NSRP     Single half cycle; f = 50H2; T,(initial) = 25°C       Thermal     G6016NH6RP     5     84752 S4008LS2TP     Single half cycle; f = 50H2; T,(initial) = 25°C       Thermal     G6016NH6RP     3     84622       Thermal     G6016NH6RP     3     84622       G6025K6TP     3     84491       G6040K7TP     3     85999       G6025K6TP     3     85999       G6025K6TP     77     84716       Q4010N5RP     77     84716       Q4010N5RP     77     84716       Q4010N5RP     77     84716       Q6016NH6RP     77     84596       Q6025K6TP     77     84718       Q6016NH6RP     77     84596       Q6025K6TP     77     84596 <td>Q6016NH6RP</td> <td></td> <td>84622</td> <td></td> <td></td>		Q6016NH6RP		84622			
Reliability Test     AC Blocking     Subolicity Bakage test     Geoduk/TP     5     86000 86025K6TP     Coord plan, 120 0       AC Blocking     Geoduk/TP     5     84748 04010N5RP     5     84748 04010N5RP     Single half cycle; f = 50Hz; T,(Initial) = 25°C       ITSM     Geoduk/TP     5     84762 06040K/TP     Single half cycle; f = 50Hz; T,(Initial) = 25°C       Thermal     Geoduk/TP     5     86000     Single half cycle; f = 50Hz; T,(Initial) = 25°C       Thermal     Geoduk/TP     5     86000     Single half cycle; f = 50Hz; T,(Initial) = 25°C       Reverse biased thermal     Geoduk/TP     3     84719     Single half cycle; f = 50Hz; T,(Initial) = 25°C       Reverse biased thermal     Geoduk/TP     3     84719     Single half cycle; f = 50Hz; T,(Initial) = 25°C       Geoduk/TP     3     84491     Single half cycle; f = 50Hz; T,(Initial) = 25°C     T,(Initial) = 25°C       Reverse biased thermal     Geoduk/TP     3     84491     Ta:110°C, 1,008hr, Reverse biased at 400Vpeak AC     Ta:10°C, 1,008hr, Reverse biased at 600Vpeak AC       Reliability Test     Geoduk/TP     77     86007     Ta:15°C, RH: 85%, 1,008hr, Reverse biased at 10008hr		Temperature	Q8025LH5TP		84491	$\Delta C600$ /peak 125°C	
Reliability Test     AC Blocking High Humidity High Humidity High Temp. Reverse Bias (H3TRB)     S4008LS2TP (A010N5RP)     5     84748 84752 84752 86000     Single half cycle; f = 50Hz; T,(initial) = 25°C       Thermal Reliability Test     S4008LS2TP     5     84702       AC Blocking High Humidity High Temp. Reverse Bias (H3TRB)     S4008LS2TP     3     84717       AC Blocking     G0016NH6RP     3     84622 04025K6TP     3     85999       AC Blocking     G0016NH6RP     77     84716     Reverse biased at 400Vpeak AC     no failure at 1,008hr, Reverse biased at 400Vpeak AC       Reliability Test     S4008LS2TP     77     84716     Ta:125°C, 1,008hr, Reverse biased at 400Vpeak AC     no failure at 1,008hr, Reverse biased at 400Vpeak AC		leakage test	Q6040K7TP		86000	AC000 vpeak, 125 C	
S4008LS2TP     5     84748 84750       QA010NSRP     5     84750       QA02SLH5TP     5     84754       QA02SLH5TP     5     84754       QA02SLH5TP     5     86000       SA008LS2TP     5     86000       QA02SLH5TP     3     84717       QA00LS2TP     3     84717       QA00SLS2TP     3     84717       QA00SLS2TP     3     84717       QA01NSRP     3     84622       QA02SLH5TP     3     84799       QA02SLH5TP     3     84716       QA02SLH5TP     3     8491       QA01NSRP     3     84599       QA02SLH5TP     3     85999       QA01NSRP     77     84716       Reverse biased at 400Vpeak AC     77       QA010NSRP     77     84718       QA016NH6RP     77     84596       QA02SLH5TP     77     84716       QA040K7TP     77     84000       QA040K7TP     77     84007			S8065KTP	5	86000		
$ \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$			Q6025K6TP	5	86000		
ITSM     Q6016NH6RP     5     84752 84754     Single half cycle; f = 50Hz; T,(initial) = 25°C       G040K7TP     5     86000     S0665KTP     5     86000       G025K6TP     5     86000     Q025K6TP     3     84711       Q4010NSRP     3     84717     Q4010NSRP     3     84491       Q6040K7TP     3     84491     Resistance     Q6025K6TP     3     85999       Q6025K6TP     3     85999     Q6025K6TP     3     85999       Q6025K6TP     3     85999     Q6025K6TP     85099     Ta:110°C, 1,008hr, Reverse biased at 400Vpeak AC     no failure at 1,008hr, Reverse biased at 400Vpeak AC     Ta:125°C, 1,008hr, Reverse biased at 400Vpeak AC     Ta:125°C, 1,008hr, Reverse biased at 400Vpeak AC     no failure at 1,008hr read point       Reliability Test     Q6016NH6RP     77     84596     Ta:125°C, 1,008hr, Reverse biased at 60Vpeak AC     no failure at 1,008hr read point       Reliability Test     Migh Humidity High Temp, Reverse Bias (H3TRB)     S4008LS2TP     84716     Ta: 85°C, RH: 85%, 1,008hr, Reverse biased at 100Vpc     no failure at 1,008hr       Q6040K7TP     77     84716			S4008LS2TP	5	84748		
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$			Q4010N5RP	5	84750		
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$			Q6016NH6RP	5	84752	Single holf avala, f 50Hz	
C6040K7TP     5     86000       S8065KTP     5     86000       C6025K6TP     5     86000       C6025K6TP     3     84717       Q4010N5RP     3     84717       Q4010N5RP     3     84479       Q6016NH6RP     3     84622       Q8025LH5TP     3     84599       Q6040K7TP     3     85999       Q6025K6TP     3     85999       Q4010N5RP     Ta:110°C, 1,008hr, Reverse biased at 400Vpeak AC     no failure at 1,008hr, Reverse biased at 400Vpeak AC       Q6016NH6RP     77     84718     Reverse biased at 600Vpeak AC       Q6025LH5TP     77     844718     Reverse biased at 100Vpeak AC       Q4010N5RP     77     844718     Ta: 85°C, RH: 85%, 1,008hr, Reverse biased at 160Vpc       Q4010N5RP     77     844718     Ta: 85°C, RH:		ITSM	Q8025LH5TP	5	84754		
Q6025K6TP     5     86000       S4008LS2TP     3     84717       Q4010N5RP     3     84719       Q6025K6TP     3     84491       Q6016NH6RP     3     84491       Q6025K6TP     3     85999       Q6025K6TP     3     85999       Q6025K6TP     3     84716       Q60040K7TP     73     84716       Q6005K6TP     3     84718       Q40010N5RP     77     84718       Q40010N5RP     77     84596       Q6025K6TP     77     86007       Q6016NH6RP     77     84596       Q6025K6TP     77     86007       Q6040K7TP     77     86007       Q6040K7TP     77     86007       Q6040K7TP     77     8490       Based at d00Vpeak AC     600Vpeak AC       Q6040K7TP     77     84490       Yearse biased at d00Vpeak AC     600Vpeak AC       Q4010N5RP     77     84490       Yearse biased at d0Vpeak AC     600Vpeak AC <			Q6040K7TP	5	86000	. 3(	
S4008LS2TP     3     84717       Q4010N5RP     3     84717       Q4010N5RP     3     84719       Q6016NH6RP     3     84622       Q8025LH5TP     3     84491       Q6040K7TP     3     85999       Q6025K6TP     3     85999       Q6025K6TP     3     85999       Q6010N5RP     84716     Reverse biased at 400Vpeak AC       Q4010N5RP     77     84716       Q4010N5RP     77     7       Q4010N5RP     77     7       Q6025K6TP     77     84596       Q6025K6TP     77     86007       Q6025K6TP     77     86007       Q6025LH5TP     77     86007       Q8025LH5TP     77     84490       Q6016NH6RP     77				5			
Thermal Resistance     Q4010N5RP     3     84719       Q6016NH6RP     3     84622       Q8025LH5TP     3     84491       Q6040K7TP     3     85999       Q6025K6TP     3     85999       Q6025K6TP     3     85999       Q6025K6TP     3     85999       Q6016NH6RP     77     84716       Ta:110°C, 1,008hr, Reverse biased at 400Vpeak AC     Ta:125°C, 1,008hr, Reverse biased at 400Vpeak AC       Q4010N5RP     77     84596       Q6016NH6RP     77     86007       Q6025K6TP     77     86007       Q6040K7TP     77     86007       Q6025K6TP     77     86007       Q6025LH5TP     77     86007       Q8025LH5TP     77     84490       Vpeak AC     26016NH6RP     77       Q4010N5RP     77     84716       Q6016NH6RP     77     84716       Q6016NH6RP     77     84716       Q6016NH6RP     77     84716       Q6016NH6RP     77     84							
Thermal Resistance     Q6016NH6RP     3     84622 Q8025LH5TP     3     84491       Q6040K7TP     3     85999     Q6025K6TP     3     85999     P     <							
Resistance     Q8025LH5TP     3     84491       Q6040K7TP     3     85999     4000       Q6025K6TP     3     85999     77     10000       Q6025K6TP     3     85999     77     10000     10000       Reliability Test     S4008LS2TP     84716     Ta:110°C, 1,008hr, Reverse biased at 400Vpeak AC     no failure at 1,008hr, Reverse biased at 400Vpeak AC       Q6016NH6RP     77     84596     77     125°C, 1,008hr, Reverse biased at 400Vpeak AC     no failure at 1,008hr       Q6016NH6RP     77     86007     73     86007     73     125°C, 1,008hr, Reverse biased at 600Vpeak AC     no failure at 1,008hr       Reliability Test     Q6040K7TP     77     86007     73     125°C, 1,008hr, Reverse biased at 600Vpeak AC     no failure at 1,008hr       High Humidity High Temp, Reverse Bias (H3TRB)     S4008LS2TP     77     84490     73     74     74       Q6016NH6RP     77     84490     74     74     74     74     74     74     74     74     74     74     74     74     74     74							
Reliability Test     S4008LS2TP     77     84716 400Vpeak AC     Ta:110°C, 1,008hr, Reverse biased at 400Vpeak AC     no failure at 1,008hr       AC Blocking     Q6016NH6RP     77     84596     Ta:125°C, 1,008hr, Reverse biased at 400Vpeak AC     no failure at 1,008hr       Q6016NH6RP     77     86002     Ta:125°C, 1,008hr, Reverse biased at 400Vpeak AC     no failure at 1,008hr       Q6016NH6RP     77     86002     Ta:125°C, 1,008hr, Reverse biased at 600Vpeak AC     no failure at 1,008hr       Q6040K7TP     77     86002     Ta:125°C, 1,008hr, Reverse biased at 600Vpeak AC     no failure at 1,008hr       High Humidity High Temp. Reverse Bias (H3TRB)     S4008LS2TP     77     84490     Ta: 85°C, RH: 85%, 1,008hr, Reverse biased at 160Vpc     no failure at 1,008 hr       Q6040K7TP     77     84490     Ta: 85°C, RH: 85%, 1,008hr, Reverse biased at 100Vpc     no failure at 1,008 hr							
Q6025K6TP     3     85999       Reliability Test     S4008LS2TP     77     84716     Ta:110°C, 1,008hr, Reverse biased at 400Vpeak AC     no failure at 1,008hr, Reverse biased at 400Vpeak AC       AC Blocking     Q6016NH6RP     77     84596     Ta:125°C, 1,008hr, Reverse biased at 400Vpeak AC     no failure at 1,008hr read point       Q6016NH6RP     77     86007     Ta:125°C, 1,008hr, Reverse biased at 400Vpeak AC     no failure at 1,008hr       Q6040K7TP     77     86007     Ta:125°C, 1,008hr, Reverse biased at 600Vpeak AC     no failure at 1,008hr       No 8025LH5TP     77     86007     Ta: 85°C, RH: 85%, 1,008hr, Reverse biased at 1,008 hr       Q4010N5RP     77     84490     Ta: 85°C, RH: 85%, 1,008hr, Reverse biased at 1,008 hr       Q6040K7TP     77     84490     Ta: 85°C, RH: 85%, 1,008hr, Reverse biased at 1,008 hr       Q6040K7TP     77     84490     Ta: 85°C, RH: 85%, 1,008 hr, Reverse biased at 1,008 hr       Q6025K6TP     77     84490     Ta: 85°C, RH: 85%, 1,008 hr       Q6025K6TP     77     86007     Ta: 85°C, RH: 85%, 1,008 hr		Resistance					
Reliability Test     AC Blocking     S4008LS2TP     Reverse biased at 77     84716     Ta:110°C, 1,008hr, Reverse biased at 400Vpeak AC     no failure at 1,008hr, Reverse biased at 400Vpeak AC       AC Blocking     Q6016NH6RP     77     84596     Ta:125°C, 1,008hr, Reverse biased at 400Vpeak AC     no failure at 1,008hr, Reverse biased at 600Vpeak AC       Reliability Test     Q6025K6TP     77     86007     Ta:125°C, 1,008hr, Reverse biased at 600Vpeak AC     no failure at 1,008hr, Reverse biased at 600Vpeak AC       High Humidity High Temp. Reverse Bias (H3TRB)     S4008LS2TP     77     84716     Ta: 85°C, RH: 85%, 1,008hr, Reverse biased at 100Vpc     no failure at 1,008 hr read point       Q6016NH6RP     77     84490     Ta: 85°C, RH: 85%, 100Vpc     no failure at 1,008 hr read point							
Reliability Test     S4008LS2TP     84716 77     Reverse biased at 400Vpeak AC     no failure at 1,008hr, Reverse biased at 400Vpeak AC       AC Blocking     Q6016NH6RP     77     84596     Ta:125°C, 1,008hr, Reverse biased at 400Vpeak AC     no failure at 1,008hr, Reverse biased at 600Vpeak AC       Q6016NH6RP     77     86007     Ta:125°C, 1,008hr, Reverse biased at 600Vpeak AC     no failure at 1,008hr, Reverse biased at 600Vpeak AC       Q8025LH5TP     77     86007     Ta:125°C, 1,008hr, Reverse biased at 600Vpeak AC     no failure at 1,008hr, Reverse biased at 600Vpeak AC       High Humidity High Temp. Reverse Bias (H3TRB)     S4008LS2TP     77     84716     Ta: 85°C, RH: 85%, 1,008hr, Reverse biased at 160V <sub>DC</sub> no failure at 1,008 hr read point       Q6040K7TP     77     84490     Ta: 85°C, RH: 85%, 1,008 hr, Reverse biased at 1,008 hr     no failure at 1,008 hr       Q6025K6TP     77     86002     Ta: 85°C, RH: 85%, 1,008 hr     no failure at 1,008 hr			Q6025K6TP	3	85999	To:110%C 1 000hr	
AC Blocking     Q4010N5RP     77     84718     Reverse biased at 400Vpeak AC     no failure at 1,008hr read point       Reliability Test     AC Blocking     Q6016NH6RP     77     86007     77     786007     77     786007     78     77     78     78     78     78     78     78     78     78     78     78     78     78     78     78     78     78     78     77     78     78     77     78 <td></td> <td rowspan="2"></td> <td>S4008LS2TP</td> <td>77</td> <td>84716</td> <td>Reverse biased at 400Vpeak AC</td> <td rowspan="2"></td>			S4008LS2TP	77	84716	Reverse biased at 400Vpeak AC	
AC Blocking     Coordination P     77     34398     77     34398     77     34398     77     34398     77     34398     77     34398     77     34398     77     34398     77     34398     77     34398     77     34398     77     34398     77     34398     77     34398     77     34398     77     34398     77     36007     77     78     77     86007     77     86007     77     86007     77     86007     78     78     77     86007     77     86007     77     84490     77     84490     77     844716     77     84718     77     84718     70     70     84716     77     84718     70     70     84716     70     70     84716     70 <td></td> <td>Q4010N5RP</td> <td>77</td> <td>84718</td> <td>Reverse biased at</td>			Q4010N5RP	77	84718	Reverse biased at	
Reliability Test     Q6025K6TP     77     86007     Ta:125°C, 1,008hr, Reverse biased at 600Vpeak AC     read point       Reliability Test     Q6040K7TP     77     86007     Ta:125°C, 1,008hr, Reverse biased at 600Vpeak AC     read point       High Humidity High Temp. Reverse Bias (H3TRB)     S4008LS2TP     77     84490     Ta: 85°C, RH: 85%, 1,008hr, Reverse biased at 160Vpc     no failure at 1,008 hr read point       Q6040K7TP     77     84490     Ta: 85°C, RH: 85%, 1,008hr, Reverse biased at 160Vpc     no failure at 1,008 hr read point		AC Blocking	Q6016NH6RP	77	84596		
Reliability Test     Q6040K7TP     77     86002     Reverse biased at 600Vpeak AC       Reliability Test     Q8025LH5TP     77     86007     1		5	Q6025K6TP	77	86007	- Ta:125°C, 1,008hr, Reverse biased at	
Reliability Test     S8065KTP     77     86007       Q8025LH5TP     77     84490       High Humidity High Temp. Reverse Bias (H3TRB)     S4008LS2TP     77     84716       Q6016NH6RP     77     84596     1,008hr, Reverse biased at 160V <sub>DC</sub> no failure at 1,008 hr read point       Q6025K6TP     77     86002     1     1002hr Borese biased at 100V <sub>DC</sub> No failure at 1,008 hr			Q6040K7TP	77	86002		
Test   Q8025LH5TP   77   84490     High Humidity   S4008LS2TP   84716   77   84718     High Humidity   Q4010N5RP   77   84718   Ta: 85°C, RH: 85%, 1,008hr, Reverse biased at 160V <sub>DC</sub> no failure at 1,008 hr read point     Q6016NH6RP   77   84490   Ta: 85°C, RH: 85%, 1,008hr, Reverse biased at 160V <sub>DC</sub> no failure at 1,008 hr read point     Q6025K6TP   77   86002   Ta: 85°C, RH: 85%, 1,008 hr read point	5		S8065KTP	77	86007		
High Humidity High Temp. Reverse Bias (H3TRB)   Q4010N5RP   77   84718   Ta: 85°C, RH: 85%, 1,008hr, Reverse biased at 160V <sub>DC</sub> no failure at 1,008 hr read point     Q6040K7TP   77   84490   Ta: 85°C, RH: 85%, 1,008hr, Reverse biased at 160V <sub>DC</sub> no failure at 1,008 hr read point			Q8025LH5TP	77	84490		
High Humidity High Temp. Reverse Bias (H3TRB)   Q6016NH6RP   77   84596   1,008hr, Reverse biased at 160V <sub>DC</sub> no failure at 1,008 hr read point     Q6040K7TP   77   84490   1,008hr, Reverse biased at 160V <sub>DC</sub> no failure at 1,008 hr read point     Q6025K6TP   77   86002   Ta: 85°C, RH: 85%,     Q8025LH5TP   77   86007   Ta: 85°C, RH: 85%,	High Temp. Reverse Bias	High Temp. Reverse Bias	S4008LS2TP	77	84716	1,008hr, Reverse biased at 160V <sub>DC</sub> 1,008 hr read point	1,008 hr
High Temp. Reverse Bias (H3TRB)   Q6016NH6RP   77   84596   1,000 m, 100 m and 16			Q4010N5RP	77	84718		
Reverse Blas (H3TRB)     Q6040K7TP     77     84490     read point       Q6025K6TP     77     86002     read point       Q8025LH5TP     77     86007     Ta: 85°C, RH: 85%,			Q6016NH6RP	77	84596		
Q8025LH5TP 77 86007 Ta: 85°C, RH: 85%,			Q6040K7TP	77	84490		
Q8025LH5TP 77 86007 Ta: 85°C, RH: 85%,			Q6025K6TP		86002		
			Q8025LH5TP		86007		
			S8065KTP	77	86007		



					320V <sub>DC</sub>	
		S4008LS2TP	77	84716		
	Q4010N5RP	77	84718			
	<b>T</b>	Q6016NH6RP	77	84596		0 failure at
	Temperature Cycling (TC)	Q8025LH5TP	77	84490		100cycle
		Q6040K7TP	77	86002	$40^{\circ}$ 2150°C (air to air)	read point
		S8065KTP	77	86007	-40℃&150℃ (air to air), Dwell time 15mins,100	
		Q6025K6TP	77	86007	cycles	
		S4008LS2TP	10	84716		
		Q4010N5RP	10	84718	ANSI/J-STD-002, category	no failure after
	Solderability	Q8025LH5TP	10	84490		
	Conderability	Q6040K7TP	10	86002	3, Test A	solderability
		S8065KTP	10	86007		,
		Q6025K6TP	10	86007		
		S4008LS2TP	30	84716		
		Q4010N5RP	30	84718		
	Resistance to Solder Heat (RSH)	Q6016NH6RP	30	84596		
		Q8025LH5TP	30	84490	260°C, 10 seconds	0% failure after RSH
		Q6040K7TP	30	86002		
		S8065KTP	30	86007		
		Q6025K6TP	30	86007		

# 6.0 <u>Electrical Characteristic Summary:</u>

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

#### 7.0 Changed Part Identification:

NA

### 8.0 <u>Recommendations & Conclusions:</u>

Based on the test results, it is determined that Pb92.5Ag2.5Sn5 is qualified and certified for Thyristor TO220 (Isolated and Non-Isolated), TO263 (D2Pak) and TO218 (Isolated and Non-Isolated) Product Series.

# 9.0 Approvals:

<u>Maggie Xu</u> Thyristor Product Engineer Littelfuse, WUXI <u>Zhiwei Wang</u> Product Engineer Manager Littelfuse, WUXI