Littelfuse
Expertise Applied | Answers Delivered

Littelfuse, Inc.
8755 West Higgins Road, Suite 500
Chicago, IL 60631 USA
(773) 628-1000

Feb 1st, 2021

RE: LFPCN 41360 - TVS STD Axial Leaded series P4KE P6KE SA die size standardization

To: Our Valued Customers

Littelfuse would like to notify you of standardizing die sizes for axial leaded series P4KE, P6KE and SA to improve the manufacturability and assembly processes.

The form, fit, function, quality and reliability of the affected products will remain the same. The electrical performance and datasheet specifications of the affected products will remain unchanged. Package dimensions of the affected products will remain the same.

All affected products have been fully qualified in accordance with established performance and reliability criteria. Please see the attached documentation for qualification results, change details and affected part numbers.

Form, fit, function changes: None
Part number changes: None
Effective date: May 1st, 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 product team below for further assistance.

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

Sincerely,

Jenny Chen
Assistant Product Marketing Manager
Commercial TVS Products
Tel: +86 510 85277701 Ext – 7965
Jchen7@littelfuse.com

800 E. Northwest Highway Des Plaines, IL 60016

Product/Process Change Notice (PCN)

PCN#: LFPCN #41360 Date: Feb 1st, 2021

Product Identification:

Axial Leaded series P4KE, P6KE and SA

Implementation Date for Change:

May 1st, 2021 or rolling change

Contact Information

Name: Jenny Chen

Title: Assistant Product Manager

Phone #: +86 510 85277710 Ext. 7965

Fax#: N/A

E-mail: jchen7@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 of standardizing die sizes of axial leaded series P4KE, P6KE and SA to improve the manufacturability and assembly processes.

The form, fit, function, quality and reliability of the affected product will remain the same. The electrical performance and datasheet specifications of the affected products will remain unchanged. Package dimensions of the affected product will remain the same.

Important Dates:

☒ Qualification Samples Available: Available upon the request ☐ Last Time Buy:

☒ Final Qualification Data Available: Feb 1st 2021, included on the following pages

☐ Date of Final Product Shipment:

Method of Distinguishing Changed Product

☐ Product Mark,

☒ Date Code, 1Exxx, May 1st 2021

☐ Other,

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

N/A

LF Qualification Plan/Results:

Littelfuse Qualification Report is included on the following pages.

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 : Wilson Wu-Product Engineer
Date : 1/26/2021
Device : P6KE SA P4KE Series Product
Revision : 1

1.0 Objective:

The purpose of this project is to qualify shrink die size to improve the manufacturability and assembly processes. Succeeding pages summarize the electrical and reliability test performed in qualification lots.

2.0 Applicable Devices:

Package	Product Series	Part Numbers	Die Size		Structure	PCN affected
			From	To		
DO-15	P6KE	P6KE6.8A~P6KE9.1A	80mil[1]	70mil	Single	Yes
		P6KE10A~P6KE20A	70mil[2]		Single	No
		P6KE22A~ P6KE91A	80mil	70mil	Single	Yes
		P6KE100A~P6KE200A	80mil		Single	No
		P6KE220A~ P6KE300A	84mil	80mil	Single	Yes
		P6KE350A~ P6KE600A	80mil		Stacked	No
		P6KE6.8CA~P6KE9.1CA	80mil	70mil	Single	Yes
		P6KE10CA~P6KE20CA	70mil		Single	No
		P6KE22CA~ P6KE47CA	80mil	70mil	Single	Yes
		P6KE51CA~ P6KE91CA	84mil	70mil	Single	Yes
		P6KE100CA~P6KE220CA	84mil	80mil	Single	Yes
		P6KE250CA~ P6KE600CA	80mil		Stacked	No
	SA	SA5.0A~SA17A	70mil		Single	No
		SA18A~SA85A	80mil	70mil	Single	Yes
		SA90A~SA180A	80mil		Single	No
		SA5.0CA~SA17CA	70mil		Single	No
		SA18CA~SA85CA	80mil	70mil	Single	Yes
		SA90CA~SA180CA	84mil	80mil	Single	Yes
DO-41	P4KE	P4KE6.8A~ P4KE56A	60mil	55mil	Single	Yes
		P4KE62A~ P4KE300A	60mil		Single	No
		P4KE350A~ P4KE550A	60mil	55mil	Stacked	Yes
		P4KE6.8CA~ P4KE56CA	60mil	55mil	Single	Yes
		P4KE62CA~ P4KE100CA	60mil		Single	No
		P4KE110CA~ P4KE550CA	60mil	55mil	Stacked	Yes

Note:

1. *Die is square, Die Size 80mil means 80milx80mil;*
2. *Die size is same of From and To which means die size is not changed for these Part Numbers.*

3.0 Reliability Test Results Summary:

Test Items	Condition	S/S	Results	ETR #
High Temperature, DC Blocking(HTRB)	Bias = VR,Ta = 150°C Duration = 1008 Hours	616	0/616	ETR149170 ETR149172 ETR149503
Temperature Cycle(TC)	Ta = -55°C to +150°C Duration = 1000 Cycles 15 minutes dwell	320	0/320	
High Temperature & Humidity with Bias(H3TRB)	Ta = 85°C, 85% RH Bias=VR Duration = 1008 Hours	320	0/320	
UHAST	Ta = 130°C, 85%RH, 2ATM Duration = 96 Hours	320	0/320	
Resistance to Solder Heat(RSH)	260°C,10 seconds	240	0/240	
Solderability	ANSI-J-STD-002	44	0/44	

Remark:

1. Tests are conducted without a bias condition unless otherwise stated.
2. Reliability data from product tests that is representative of similar products having structural similarity, commonality of production processes and product technology will be generically applied to those products.
3. Tests are conducted on **P6KE6.8A, P6KE6.8CA, P6KE27A, P6KE200CA, P4KE6.8A, P4KE6.8CA, P4KE27CA, P4KE550A** to cover different package and chip size products.

Estimate of Failure Rate, MTBF, FITS for a Given Operation Temperature

Temp ℃	% FR/khrs	MTBF (K)	FITS
30	0.00000570	17550748.71	0.06
60	0.00017892	558900.14	1.79
80	0.00128632	77741.34	12.86
100	0.00748514	13359.80	74.85
125	0.05274861	1895.78	527.49
150	0.29513590	338.83	2951.36

4. The **M**ean-**T**ime-**B**etween-**F**ailure (MTBF) in hours and the percent failure rate per 1000 hours (%FR/khr) are computed at a 60% confidence level using the chi square method and the Arrhenius derating model for various junction operating temperatures. For the calculations, a value of 1 eV was used for the activation energy.

4.0 Electrical Characteristic Summary:

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

Test Items	Condition	S/S	Results	ETR #
Parametric	V_{BR}, I_R, VF	80	0/80	ETR147129 ETR147859 ETR149161 ETR149163 ETR149505 ETR150448 ETR150449 ETR150451
Surge Out test	+/- 1 hit, at 25°C from rated IPP, 0.1 IPP step	130	0/130	
Surge Life test	+/- 1 hit,30 hits, 1.0IPP	130	0/130	

Detail Surge Test Summary:

Part No.	Package	ETR#	Surge out 10X1000us	Surge Life 10X1000us
P6KE6.8A	DO-15	149161	1.5IPP	0/10
P6KE6.8CA	DO-15	149505	1.6IPP	0/10
P6KE27A	DO-15	149161	1.4IPP	0/10
P6KE27CA	DO-15	150448	1.5IPP	0/10
P6KE91A	DO-15	150448	1.4IPP	0/10
P6KE91CA	DO-15	150449	1.4IPP	0/10
P6KE200CA	DO-15	147859	1.6IPP	0/10
P6KE300A	DO-15	150449	1.3IPP	0/10
P4KE6.8A	DO-41	149163	1.5IPP	0/10
P4KE6.8CA	DO-41	149505	1.5IPP	0/10
P4KE27CA	DO-41	149163	1.2IPP	0/10
P4KE180CA	DO-41	150451	1.3IPP	0/10
P4KE550A	DO-41	149163	1.3IPP	0/10

5.0 Changed Part Identification:

There is no Part used in affected products.

6.0 Recommendations & Conclusions:

Based on above results, it is determined that the shrink die is qualified for production of above listed Littelfuse products.

7.0 Approvals:

Peter Liu
Asia OSAT Product Engineering Manager
Littelfuse, Wuxi

8.0 Appendix I –Affected part number list

LFPCN 41360 Affected Part Numbers

P6KE Series		SA Series		P4KE Series	
PN	PN	PN	PN	PN	PN
P6KE6.8A	P6KE6.8CA	SA18A	SA18CA	P4KE6.8A	P4KE6.8CA
P6KE7.5A	P6KE7.5CA	SA20A	SA20CA	P4KE7.5A	P4KE7.5CA
P6KE8.2A	P6KE8.2CA	SA22A	SA22CA	P4KE8.2A	P4KE8.2CA
P6KE9.1A	P6KE9.1CA	SA24A	SA24CA	P4KE9.1A	P4KE9.1CA
P6KE22A	P6KE22CA	SA26A	SA26CA	P4KE10A	P4KE10CA
P6KE24A	P6KE24CA	SA28A	SA28CA	P4KE11A	P4KE11CA
P6KE27A	P6KE27CA	SA30A	SA30CA	P4KE12A	P4KE12CA
P6KE30A	P6KE30CA	SA33A	SA33CA	P4KE13A	P4KE13CA
P6KE33A	P6KE33CA	SA36A	SA36CA	P4KE15A	P4KE15CA
P6KE36A	P6KE36CA	SA40A	SA40CA	P4KE16A	P4KE16CA
P6KE39A	P6KE39CA	SA43A	SA43CA	P4KE18A	P4KE18CA
P6KE43A	P6KE43CA	SA45A	SA45CA	P4KE20A	P4KE20CA
P6KE47A	P6KE47CA	SA48A	SA48CA	P4KE22A	P4KE22CA
P6KE51A	P6KE51CA	SA51A	SA51CA	P4KE24A	P4KE24CA
P6KE56A	P6KE56CA	SA54A	SA54CA	P4KE27A	P4KE27CA
P6KE62A	P6KE62CA	SA58A	SA58CA	P4KE30A	P4KE30CA
P6KE68A	P6KE68CA	SA60A	SA60CA	P4KE33A	P4KE33CA
P6KE75A	P6KE75CA	SA64A	SA64CA	P4KE36A	P4KE36CA
P6KE82A	P6KE82CA	SA70A	SA70CA	P4KE39A	P4KE39CA
P6KE91A	P6KE91CA	SA75A	SA75CA	P4KE43A	P4KE43CA
P6KE220A	P6KE100CA	SA78A	SA78CA	P4KE47A	P4KE47CA
P6KE250A	P6KE110CA	SA85A	SA85CA	P4KE51A	P4KE51CA
P6KE300A	P6KE120CA		SA90CA	P4KE56A	P4KE56CA
	P6KE130CA		SA100CA	P4KE350A	P4KE110CA
	P6KE150CA		SA110CA	P4KE400A	P4KE120CA
	P6KE160CA		SA120CA	P4KE440A	P4KE130CA
	P6KE170CA		SA130CA	P4KE446A	P4KE150CA
	P6KE180CA		SA150CA	P4KE480A	P4KE160CA
	P6KE200CA		SA160CA	P4KE510A	P4KE170CA
	P6KE220CA		SA170CA	P4KE530A	P4KE180CA
			SA180CA	P4KE540A	P4KE200CA
				P4KE550A	P4KE220CA
					P4KE250CA
					P4KE300CA
					P4KE350CA
					P4KE400CA
					P4KE440CA
					P4KE480CA
					P4KE510CA
					P4KE530CA
					P4KE540CA
					P4KE550CA