



Expertise Applied | Answers Delivered

Littelfuse, Wuxi
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Shuo Fang Industrial Park
Wuxi, Jiangsu 214142

Product Qualification Plan

To: Those who may concern

From: Jane Xu, Product Engineer, Littelfuse, Wuxi

Date: May 11th, 2022 – Rev.A

Subject: **Qualification plan of EMC replacement for -HR&-HRA series Product**

Purpose:

This report is to inform the qualification plan of EMC replacement for -HR&-HRA series product.

Best Regards,

Jane Xu

Product Engineer
Littelfuse Semiconductor

1. Change Description

Package Type	Affected PN	Change Description	Before	After
DO214AC(SMAJ)	SMAJxx-HR&-HRA series	EMC	EME-E110G Vendor: Sumikon	1:Test 1 2:Test 2
P600	P600 -HR&-HRA Series			

2. Qualification Test Vehicle

Package Type	Part Number	Lot Size
DO214AC(SMAJ)	SMAJ6.0A-HR	Test1: 1 LOT Test2: 1 LOT (For each part number)
	SMAJ45CA-HR	
P600	15KPA17A-HR	
	5KP85CA-HR	
	30KPA345CA-HR	

3. Qualification Test Plan

Reliability Test	Package Type	Part Number	S.S	Test Condition	Ref. Spec
Pre-conditioning	DO214AC(SMAJ)	SMAJ6.0A-HR	Test1:231pcs/LOT Test2:231pcs/LOT	24hr 125°C bake, 168hrs 85°C/85% humidity storage, 3 times reflow, for TC,H3TRB,UHAST	JESD22A-113
		SMAJ45CA-HR			
	P600	15KPA17A-HR	Not requirement		
		5KP85CA-HR 30KPA345CA-HR			
High temperature Reverse Bias (HTRB)	DO214AC(SMAJ)	SMAJ6.0A-HR	Test1:77pcs/LOT Test2:77pcs/LOT	Tj specified in datasheet, 1008hrs, biased at VR	MIL-STD-750- 1 M1038 Method A
		SMAJ45CA-HR			
	P600	15KPA17A-HR			
		5KP85CA-HR 30KPA345CA-HR			
High Humidity High Temp. Reverse Bias (H3TRB)	DO214AC(SMAJ)	SMAJ6.0A-HR	Test1:77pcs/LOT Test2:77pcs/LOT	TA: 85°C, RH: 85%, 1000hrs, Reverse biased at VR or max 100V	JESD22-A101
		SMAJ45CA-HR			
	P600	15KPA17A-HR			
		5KP85CA-HR 30KPA345CA-HR			
Unbiased Highly Accelerated Stress Test(UHAST)	DO214AC(SMAJ)	SMAJ6.0A-HR	Test1:77pcs/LOT Test2:77pcs/LOT	96 hours at TA=130°C/85%RH.	JESD22-A118
		SMAJ45CA-HR			
	P600	15KPA17A-HR			
		5KP85CA-HR 30KPA345CA-HR			
Temperature Cycling(TC)	DO214AC(SMAJ)	SMAJ6.0A-HR	Test1:77pcs/LOT Test2:77pcs/LOT	TA: -55°C to +150°C , dwell time >15mins, 1000 cycle)	JESD22-A104
		SMAJ45CA-HR			
	P600	15KPA17A-HR			
		5KP85CA-HR 30KPA345CA-HR			
MSL	DO214AC(SMAJ)	SMAJ6.0A-HR	Test1:22pcs/LOT Test2:22pcs/LOT	JEDEC-J-STD- 020C	Level 1
		SMAJ45CA-HR			

MSL	P600	15KPA17A-HR	Test1:22pcs/LOT Test2:22pcs/LOT	JEDEC-J-STD- 020C	Level 1
		5KP85CA-HR			
		30KPA345CA-HR			
Resistance to Solder Heat (RSH)	DO214AC(SMAJ)	SMAJ6.0A-HR	Test1:30pcs/LOT Test2:30pcs/LOT	260°C, 10secs	JESD22-A111
	P600	SMAJ45CA-HR			
		15KPA17A-HR			
		5KP85CA-HR			
DPA	DO214AC(SMAJ)	SMAJ6.0A-HR	Test1:4pcs Test2:4pcs	Complete H3TRB or UHAST, and TC.	AEC Q101-004
		SMAJ45CA-HR	NA		
	P600	15KPA17A-HR	NA		
		5KP85CA-HR	NA		
		30KPA345CA-HR	Test1:4pcs Test2:4pcs		
Solderability	DO214AC(SMAJ)	SMAJ6.0A-HR	Test1:10pcs Test2:10pcs	245°C ± 5°C, 5 ± 0.5s	J-STD-002
		SMAJ45CA-HR	NA		
	P600	15KPA17A-HR	NA		
		5KP85CA-HR	NA		
		30KPA345CA-HR	Test1:10pcs; Test2:10pcs		

Appendix 1: Affected PN list

SMAJ			
Bi-direction		Uni-direction	
SMAJ6.0CA-HR	SMAJ6.0CA-HRA	SMAJ6.0A-HR	SMAJ6.0A-HRA
SMAJ9.0CA-HR	SMAJ9.0CA-HRA	SMAJ9.0A-HR	SMAJ9.0A-HRA
SMAJ10CA-HR	SMAJ10CA-HRA	SMAJ10A-HR	SMAJ10A-HRA
SMAJ11CA-HR	SMAJ11CA-HRA	SMAJ11A-HR	SMAJ11A-HRA
SMAJ12CA-HR	SMAJ12CA-HRA	SMAJ12A-HR	SMAJ12A-HRA
SMAJ13CA-HR	SMAJ13CA-HRA	SMAJ13A-HR	SMAJ13A-HRA
SMAJ14CA-HR	SMAJ14CA-HRA	SMAJ14A-HR	SMAJ14A-HRA
SMAJ15CA-HR	SMAJ15CA-HRA	SMAJ15A-HR	SMAJ15A-HRA
SMAJ16CA-HR	SMAJ16CA-HRA	SMAJ16A-HR	SMAJ16A-HRA
SMAJ17CA-HR	SMAJ17CA-HRA	SMAJ17A-HR	SMAJ17A-HRA
SMAJ18CA-HR	SMAJ18CA-HRA	SMAJ18A-HR	SMAJ18A-HRA
SMAJ20CA-HR	SMAJ20CA-HRA	SMAJ20A-HR	SMAJ20A-HRA
SMAJ26CA-HR	SMAJ26CA-HRA	SMAJ26A-HR	SMAJ26A-HRA
SMAJ33CA-HR	SMAJ33CA-HRA	SMAJ33A-HR	SMAJ33A-HRA
SMAJ36CA-HR	SMAJ36CA-HRA	SMAJ36A-HR	SMAJ36A-HRA
SMAJ45CA-HR	SMAJ45CA-HRA	SMAJ45A-HR	SMAJ45A-HRA

5KP			
Bi-direction		Uni-direction	
5KP5.0CA-HR	5KP5.0CA-HRA	5KP5.0A-HR	5KP5.0A-HRA
5KP6.0CA-HR	5KP6.0CA-HRA	5KP6.0A-HR	5KP6.0A-HRA
5KP6.5CA-HR	5KP6.5CA-HRA	5KP6.5A-HR	5KP6.5A-HRA
5KP7.0CA-HR	5KP7.0CA-HRA	5KP7.0A-HR	5KP7.0A-HRA
5KP7.5CA-HR	5KP7.5CA-HRA	5KP7.5A-HR	5KP7.5A-HRA
5KP8.0CA-HR	5KP8.0CA-HRA	5KP8.0A-HR	5KP8.0A-HRA
5KP8.5CA-HR	5KP8.5CA-HRA	5KP8.5A-HR	5KP8.5A-HRA
5KP9.0CA-HR	5KP9.0CA-HRA	5KP9.0A-HR	5KP9.0A-HRA
5KP10CA-HR	5KP10CA-HRA	5KP10A-HR	5KP10A-HRA
5KP11CA-HR	5KP11CA-HRA	5KP11A-HR	5KP11A-HRA
5KP12CA-HR	5KP12CA-HRA	5KP12A-HR	5KP12A-HRA
5KP13CA-HR	5KP13CA-HRA	5KP13A-HR	5KP13A-HRA
5KP14CA-HR	5KP14CA-HRA	5KP14A-HR	5KP14A-HRA
5KP15CA-HR	5KP15CA-HRA	5KP15A-HR	5KP15A-HRA
5KP16CA-HR	5KP16CA-HRA	5KP16A-HR	5KP16A-HRA
5KP17CA-HR	5KP17CA-HRA	5KP17A-HR	5KP17A-HRA
5KP18CA-HR	5KP18CA-HRA	5KP18A-HR	5KP18A-HRA
5KP20CA-HR	5KP20CA-HRA	5KP20A-HR	5KP20A-HRA
5KP22CA-HR	5KP22CA-HRA	5KP22A-HR	5KP22A-HRA
5KP24CA-HR	5KP24CA-HRA	5KP24A-HR	5KP24A-HRA
5KP26CA-HR	5KP26CA-HRA	5KP26A-HR	5KP26A-HRA
5KP28CA-HR	5KP28CA-HRA	5KP28A-HR	5KP28A-HRA
5KP30CA-HR	5KP28CA-HRA-B	5KP30A-HR	5KP28A-HRA-B
5KP33CA-HR	5KP30CA-HRA	5KP33A-HR	5KP30A-HRA
5KP36CA-HR	5KP33CA-HRA	5KP36A-HR	5KP33A-HRA
5KP40CA-HR	5KP33CA-HRA-B	5KP40A-HR	5KP33A-HRA-B
5KP43CA-HR	5KP36CA-HRA	5KP43A-HR	5KP36A-HRA
5KP45CA-HR	5KP40CA-HRA	5KP45A-HR	5KP40A-HRA
5KP48CA-HR	5KP43CA-HRA	5KP48A-HR	5KP43A-HRA
5KP51CA-HR	5KP45CA-HRA	5KP51A-HR	5KP45A-HRA
5KP54CA-HR	5KP48CA-HRA	5KP54A-HR	5KP48A-HRA
5KP58CA-HR	5KP51CA-HRA	5KP58A-HR	5KP51A-HRA
5KP60CA-HR	5KP54CA-HRA	5KP60A-HR	5KP54A-HRA
5KP64CA-HR	5KP58CA-HRA	5KP64A-HR	5KP58A-HRA
5KP70CA-HR	5KP60CA-HRA	5KP70A-HR	5KP60A-HRA
5KP75CA-HR	5KP64CA-HRA	5KP75A-HR	5KP64A-HRA
5KP78CA-HR	5KP70CA-HRA	5KP78A-HR	5KP70A-HRA
5KP85CA-HR	5KP75CA-HRA	5KP85A-HR	5KP75A-HRA
5KP90CA-HR	5KP78CA-HRA	5KP90A-HR	5KP78A-HRA
5KP100CA-HR	5KP85CA-HRA	5KP100A-HR	5KP85A-HRA
5KP110CA-HR	5KP90CA-HRA	5KP110A-HR	5KP90A-HRA

5KP120CA-HR	5KP100CA-HRA	5KP120A-HR	5KP100A-HRA
5KP130CA-HR	5KP110CA-HRA	5KP130A-HR	5KP110A-HRA
5KP150CA-HR	5KP120CA-HRA	5KP150A-HR	5KP120A-HRA
5KP160CA-HR	5KP130CA-HRA	5KP160A-HR	5KP130A-HRA
5KP170CA-HR	5KP150CA-HRA	5KP170A-HR	5KP150A-HRA
5KP180CA-HR	5KP160CA-HRA	5KP180A-HR	5KP160A-HRA
5KP190CA-HR	5KP170CA-HRA	5KP190A-HR	5KP170A-HRA
5KP200CA-HR	5KP180CA-HRA	5KP200A-HR	5KP180A-HRA
5KP210CA-HR	5KP190CA-HRA	5KP210A-HR	5KP190A-HRA
5KP220CA-HR	5KP200CA-HRA	5KP220A-HR	5KP200A-HRA
	5KP210CA-HRA		5KP210A-HRA
	5KP220CA-HRA		5KP220A-HRA

15KP			
Bi-direction		Uni-direction	
15KPA17CA-HR	15KPA17CA-HRA	15KPA17A-HR	15KPA17A-HRA
15KPA18CA-HR	15KPA18CA-HRA	15KPA18A-HR	15KPA18A-HRA
15KPA20CA-HR	15KPA20CA-HRA	15KPA20A-HR	15KPA20A-HRA
15KPA22CA-HR	15KPA22CA-HRA	15KPA22A-HR	15KPA22A-HRA
15KPA24CA-HR	15KPA24CA-HRA	15KPA24A-HR	15KPA24A-HRA
15KPA26CA-HR	15KPA26CA-HRA	15KPA26A-HR	15KPA26A-HRA
15KPA28CA-HR	15KPA28CA-HRA	15KPA28A-HR	15KPA28A-HRA
15KPA30CA-HR	15KPA30CA-HRA	15KPA30A-HR	15KPA30A-HRA
15KPA33CA-HR	15KPA33CA-HRA	15KPA33A-HR	15KPA33A-HRA
15KPA36CA-HR	15KPA36CA-HRA	15KPA36A-HR	15KPA36A-HRA
15KPA40CA-HR	15KPA40CA-HRA	15KPA40A-HR	15KPA40A-HRA
15KPA43CA-HR	15KPA43CA-HRA	15KPA43A-HR	15KPA43A-HRA
15KPA45CA-HR	15KPA45CA-HRA	15KPA45A-HR	15KPA45A-HRA
15KPA48CA-HR	15KPA48CA-HRA	15KPA48A-HR	15KPA48A-HRA
15KPA51CA-HR	15KPA51CA-HRA	15KPA51A-HR	15KPA51A-HRA
15KPA54CA-HR	15KPA54CA-HRA	15KPA54A-HR	15KPA54A-HRA
15KPA58CA-HR	15KPA58CA-HRA	15KPA58A-HR	15KPA58A-HRA
15KPA60CA-HR	15KPA60CA-HRA	15KPA60A-HR	15KPA60A-HRA
15KPA64CA-HR	15KPA64CA-HRA	15KPA64A-HR	15KPA64A-HRA
15KPA70CA-HR	15KPA70CA-HRA	15KPA70A-HR	15KPA70A-HRA
15KPA75CA-HR	15KPA75CA-HRA	15KPA75A-HR	15KPA75A-HRA
15KPA78CA-HR	15KPA78CA-HRA	15KPA78A-HR	15KPA78A-HRA
15KPA85CA-HR	15KPA85CA-HRA	15KPA85A-HR	15KPA85A-HRA
15KPA90CA-HR	15KPA90CA-HRA	15KPA90A-HR	15KPA90A-HRA
15KPA100CA-HR	15KPA100CA-HRA	15KPA100A-HR	15KPA100A-HRA
15KPA110CA-HR	15KPA110CA-HRA	15KPA110A-HR	15KPA110A-HRA
15KPA120CA-HR	15KPA120CA-HRA	15KPA120A-HR	15KPA120A-HRA



Expertise Applied | Answers Delivered

15KPA130CA-HR	15KPA130CA-HRA	15KPA130A-HR	15KPA130A-HRA
15KPA150CA-HR	15KPA150CA-HRA	15KPA150A-HR	15KPA150A-HRA
15KPA160CA-HR	15KPA160CA-HRA	15KPA160A-HR	15KPA160A-HRA
15KPA170CA-HR	15KPA170CA-HRA	15KPA170A-HR	15KPA170A-HRA
15KPA180CA-HR	15KPA180CA-HRA	15KPA180A-HR	15KPA180A-HRA
15KPA200CA-HR	15KPA200CA-HRA	15KPA200A-HR	15KPA200A-HRA
15KPA220CA-HR	15KPA220CA-HRA	15KPA220A-HR	15KPA220A-HRA
15KPA240CA-HR	15KPA240CA-HRA	15KPA240A-HR	15KPA240A-HRA
15KPA260CA-HR	15KPA260CA-HRA	15KPA260A-HR	15KPA260A-HRA
15KPA280CA-HR	15KPA280CA-HRA	15KPA280A-HR	15KPA280A-HRA
		15KPA70A-HR-B	
		15KPA130A-HR-B	

20KP
20KPA28CA-HR
20KPA28CA-HRA
20KPA400CA-HRA
20KPA410CA-HRA

30KP			
Bi-direction		Uni-direction	
30KPA28CA-HR	30KPA28CA-HRA	30KPA28A-HR	30KPA28A-HRA
30KPA30CA-HR	30KPA30CA-HRA	30KPA30A-HR	30KPA30A-HRA
30KPA33CA-HR	30KPA33CA-HRA	30KPA33A-HR	30KPA33A-HRA
30KPA36CA-HR	30KPA36CA-HRA	30KPA36A-HR	30KPA33A-HRA-B
30KPA39CA-HR	30KPA39CA-HRA	30KPA39A-HR	30KPA36A-HRA
30KPA42CA-HR	30KPA42CA-HRA	30KPA42A-HR	30KPA39A-HRA
30KPA43CA-HR	30KPA43CA-HRA	30KPA43A-HR	30KPA42A-HRA
30KPA45CA-HR	30KPA45CA-HRA	30KPA45A-HR	30KPA43A-HRA
30KPA48CA-HR	30KPA48CA-HRA	30KPA48A-HR	30KPA45A-HRA
30KPA51CA-HR	30KPA51CA-HRA	30KPA51A-HR	30KPA48A-HRA
30KPA54CA-HR	30KPA54CA-HRA	30KPA54A-HR	30KPA51A-HRA
30KPA58CA-HR	30KPA58CA-HRA	30KPA58A-HR	30KPA54A-HRA
30KPA60CA-HR	30KPA60CA-HRA	30KPA60A-HR	30KPA58A-HRA
30KPA64CA-HR	30KPA64CA-HRA	30KPA64A-HR	30KPA60A-HRA
30KPA66CA-HR	30KPA66CA-HRA	30KPA66A-HR	30KPA64A-HRA
30KPA70CA-HR	30KPA70CA-HRA	30KPA70A-HR	30KPA66A-HRA
30KPA71CA-HR	30KPA71CA-HRA	30KPA71A-HR	30KPA70A-HRA
30KPA72CA-HR	30KPA72CA-HRA	30KPA72A-HR	30KPA71A-HRA
30KPA75CA-HR	30KPA75CA-HRA	30KPA75A-HR	30KPA72A-HRA
30KPA78CA-HR	30KPA78CA-HRA	30KPA78A-HR	30KPA75A-HRA



Expertise Applied | Answers Delivered

30KPA84CA-HR	30KPA84CA-HRA	30KPA84A-HR	30KPA78A-HRA
30KPA90CA-HR	30KPA90CA-HRA	30KPA90A-HR	30KPA84A-HRA
30KPA96CA-HR	30KPA96CA-HRA	30KPA96A-HR	30KPA90A-HRA
30KPA102CA-HR	30KPA102CA-HRA	30KPA102A-HR	30KPA96A-HRA
30KPA108CA-HR	30KPA108CA-HRA	30KPA108A-HR	30KPA102A-HRA
30KPA120CA-HR	30KPA120CA-HRA	30KPA120A-HR	30KPA108A-HRA
30KPA132CA-HR	30KPA132CA-HRA	30KPA132A-HR	30KPA120A-HRA
30KPA144CA-HR	30KPA144CA-HRA	30KPA144A-HR	30KPA132A-HRA
30KPA150CA-HR	30KPA150CA-HRA	30KPA150A-HR	30KPA144A-HRA
30KPA156CA-HR	30KPA156CA-HRA	30KPA156A-HR	30KPA150A-HRA
30KPA160CA-HR	30KPA160CA-HRA	30KPA160A-HR	30KPA156A-HRA
30KPA168CA-HR	30KPA168CA-HRA	30KPA168A-HR	30KPA160A-HRA
30KPA170CA-HR	30KPA170CA-HRA	30KPA170A-HR	30KPA168A-HRA
30KPA180CA-HR	30KPA180CA-HRA	30KPA180A-HR	30KPA170A-HRA
30KPA198CA-HR	30KPA198CA-HRA	30KPA198A-HR	30KPA180A-HRA
30KPA216CA-HR	30KPA216CA-HRA	30KPA216A-HR	30KPA198A-HRA
30KPA240CA-HR	30KPA240CA-HRA	30KPA240A-HR	30KPA216A-HRA
30KPA258CA-HR	30KPA258CA-HRA	30KPA258A-HR	30KPA240A-HRA
30KPA260CA-HR	30KPA260CA-HRA	30KPA260A-HR	30KPA258A-HRA
30KPA270CA-HR	30KPA270CA-HRA	30KPA270A-HR	30KPA260A-HRA
30KPA280CA-HR	30KPA280CA-HRA	30KPA280A-HR	30KPA270A-HRA
30KPA288CA-HR	30KPA288CA-HRA	30KPA288A-HR	30KPA280A-HRA
30KPA300CA-HR	30KPA300CA-HRA	30KPA300A-HR	30KPA288A-HRA
30KPA345CA-HR	30KPA345CA-HRA	30KPA345A-HR	30KPA300A-HRA
			30KPA345A-HRA