PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCN No.	ADG/20/12436
1.3 Title of PCN	Qualification of Triac in TO-3PF package at additional Assembly/Test location in China
1.4 Product Category	T4050-6PF
1.5 Issue date	2020-12-22

2. PCN Team	
2.1 Contact supplier	
2.1.1 Name	ROBERTSON HEATHER
2.1.2 Phone	+1 8475853058
2.1.3 Email	heather.robertson@st.com
2.2 Change responsibility	
2.2.1 Product Manager	Stephane CHAMARD
2.1.2 Marketing Manager	Philippe LEGER
2.1.3 Quality Manager	Jean-Paul REBRASSE

3. Change		
3.1 Category	3.2 Type of change	3.3 Manufacturing Location
Machines	(Not Defined)	subcontractor in Korea (location A) and subcontractor in China (Location B)

4. Description of change		
	Old	New
4.1 Description	subcontractor in Korea (location A)	subcontractor in China (Location B)
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	No	

5. Reason / motivation for change	
5.1 Motivation	Triac production capacity increase
5.2 Customer Benefit	CAPACITY INCREASE

6. Marking of parts / traceability of change	
6.1 Description	finish good and marking

7. Timing / schedule	
7.1 Date of qualification results	2020-11-06
7.2 Intended start of delivery	2020-12-07
7.3 Qualification sample available?	Upon Request

8. Qualification / Validation			
8.1 Description			
8.2 Qualification report and qualification results	In progress	Issue Date	

9. Attachments (additional documentations)
12436 Public product.pdf 12436 Qualification of Triac in TO-3PF package at additional Assembly Test location in China.pdf

10. Affected parts		
10. 1 Current		10.2 New (if applicable)
10.1.1 Customer Part No	10.1.2 Supplier Part No	10.1.2 Supplier Part No
	T4050-6PF	

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PCN
Product/Process Change Notification

Qualification of Triac in TO-3PF package at additional Assembly/Test location in China

Notification number:	ADG/20/12436	**Issue Date**	21-Dec-2020
Issued by	Isabelle Ballon		
Product series affected by the change		T4050-6PF	
Type of change		Back-end realization	

Description of the change

Qualification of an additional back-end production subcontractor located in China (location B) for the assembly, the test and the finishing of Triacs products in TO-3PF package as a double sourcing of subcontractor in Korea (location A).
This Chinese subcontractor plant (Location B) is already a major production site for ST products.

Reason for change

STMicroelectronics investment on Triac production capacity increase.

Former versus changed product:	The changed products will remain fully compliant with product datasheet in term of electrical, dimensional or thermal parameters. The Moisture Sensitivity Level of the part (according to the IPC/JEDEC JSTD-020D standard) remains unchanged. The footprint recommended by ST remains the same. There is no change in the packing modes and the standard delivery quantities either. The products remain in full compliance with the ST ECOPACK®2 grade (“halogen-free”).

Disposition of former products

As the purpose is a manufacturing multi-sourcing approach, the current production will still run and shipments will be supported using the both former and new assembly locations

Marking and traceability

Parts produced in China are differentiated by their **finish good** and **marking** as indicated below

CP	Finish Good Location A	Finish Good Location B
T4050-6PF	**T4050-6PF/P**	**T4050-6PF/E**

Assembly location	Plant and date code		
	Assy plant code	Assy year	Assy week
Korea (subco)	HB (on label) HB (on unit)	**Y** (1 digit indicating the year)	**WW** (2 digits indicating the week number)
China (subco)	**GE (on label)** **GE (on unit)**		

Traceability for the implemented change will be ensured by an **internal codification (finished good)** and by the **Q.A. number**.

Qualification complete date	2020 week 49

Forecasted sample availability

All qualification samples are available on request.

Change implementation schedule

Sales types	Estimated production start	Estimated first shipments
T4050-6PF	**Week 52-2020**	**Week 10-2021**

Comments:	With early PCN acceptance, shipment possible starting week 02-2021 on selected part numbers.

Customer's feedback

Please contact your local ST sales representative or quality contact for requests concerning this change notification.
Absence of acknowledgement of this PCN within 30 days of receipt will constitute acceptance of the change
Absence of additional response within 90 days of receipt of this PCN will constitute acceptance of the change

Qualification program and results	20070QRP

Qualification Report
Qualification of Triac in TO-3PF package at additional Assembly/Test location in China

General Information	
Product Line	*Triac*
Product Description	*40 A Snubberless™ TRIAC*
Product Perimeter	*T4050-6PF*
Product Group	*ADG*
Product Division	*Discrete & Filter*
Packages	*TO-3PF*
Maturity level step	*QUALIFIED*

Locations	
Wafer Fab	*ST TOURS - FRANCE*
Assembly Plant	*SUBCONTRATOR – CHINA – 994X*
Reliability Lab	*ST TOURS – FRANCE*
Reliability Assessment	*PASS*

DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comments
1.0	19-nov-2020	12	Erika LAURET	Julien MICHELON	Initial release: Qualification of Triac in TO-3PF package at additional Assembly/Test location in China

TABLE OF CONTENTS

1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
AEC-Q005	Pb-Free Test Requirements
AEC-Q006	Qualification Requirements for Components Using Copper (Cu) Wire Interconnections
JESD 47	Stress-Test-Driven Qualification of Integrated Circuits
JESD 94	Application specific qualification using knowledge-based test methodology
JESD 22	Reliability test methods for packaged devices
MIL-STD-750C	Test method for semiconductor devices

2 GLOSSARY

ACBV	Alternative Current Blocking Voltage
DBT	Dead Bug Test
GD	Generic Data
H3TRB	High Humidity High Temperature Reverse Bias
HTRB	High Temperature Reverse Bias
IOLT	Intermittent Operating Life Test
PD	Physical Dimensions
RSH	Resistance to Soldering Heat
SD	Solderability test
SS	Sample Size
TC	Temperature Cycling
TS	Terminal Strength
TW/WG	Tin Whiskers / Whiskers Growth
UHAST	Unbiased Highly Accelerated Stress Test

3 RELIABILITY EVALUATION OVERVIEW

3.1 Objectives

The objective of this report is to qualify an additional back-end subcontractor located in China (location B) for the assembly and test and finishing of Triacs products in TO-3PF package as a double sourcing of subcontractor in Korea (location A).
This subcontractor in China (Location B) is already a major production site for ST products.

Table of involved products

Commercial Product	Package	Comment
T4050-6PF	TO-3PF	Standard product

Before	After
subcontractor in Korea	subcontractor in Korea subcontractor in China

The reliability test methodology used follows the JESD47: « Stress Test driven Qualification Methodology »

The reliability tests ensuing are:
.

- TC and IOLT to ensure the mechanical robustness of the products.
- HTRB, ACBV to evaluate the risk of contamination from the resin and the assembly process versus the die layout sensitivity.
- H3TRB, UHAST to check the robustness to corrosion and the good package hermeticity.
- Solderability, RSH, DBT, TS and screwing to check compatibility of package with customer assembly.
- TW/WG to check lead-finishing quality.

For some tests, similarity methodology is used. See 5.1 “comments” for more details about similarities.

3.2 Conclusion

Qualification Plan requirements have been fulfilled without exception. Reliability tests have shown that the devices behave correctly against environmental tests (no failure). Moreover, the stability of electrical parameters during the accelerated tests demonstrates the robustness of the products and safe operation, which is consequently expected during their lifetime.

4 DEVICE CHARACTERISTICS

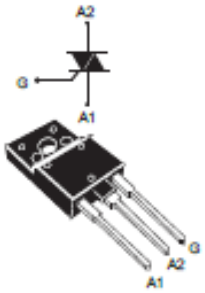
4.1 Device description

life.augmented

T4050-6PF

Datasheet

40 A Snubberless™ Triac



TO-3PF

Features

- High current Triac
- High surge current = 400 A
- Max. blocking voltage = V_{DRM}, V_{RRM} = 600 V
- Max. surge voltage = V_{DSM}, V_{RSM} = 700 V
- I_{GT} maximum = 50 mA
- High static and dynamic commutation:
  - (dI/dt)c = 25.1 A/ms
  - dV/dt = 1000 V/µs
- UL1557 certified (file ref. 81734) = 2.5 kV
- Snubberless™ device
- ECOPACK®2 compliant (RoHS and HF compliance)

Applications

- Heater, ventilation and air conditioning (HVAC)
- Solid state relay (SSR)
- Motor soft starter
- SMPS inrush current limiter

Product status link
T4050-6PF

Product summary	
$I_{T(RMS)}$	40 A
V_{DRM}, V_{RRM}	600 V
V_{DSM}, V_{RSM}	700 V
I_{GT}	50 mA

Description

The device is packaged in a through-hole TO-3PF full plastic insulated.

The T4050-6PF is optimized for the ON/OFF function or phase angle control in applications such as static relays, heating regulation, induction motor starting circuits, light dimmers, motor speed controllers and in many other industrial applications where high immunity and high surge current are required.

4.2 Construction Note

	T4050-6PF
Wafer/Die fab. information	
Wafer fab manufacturing location	*ST TOURS - FRANCE*
Technology / Process family	*40 A Snubberless™ TRIAC*
Wafer Testing (EWS) information	
Electrical testing manufacturing location	*ST TOURS - FRANCE*
Assembly information	
Assembly site	*SUBCONTRACTOR – CHINA- 994X*
Package description	TO-3PF
Molding compound	ECOPACK®2 (“Halogen-free”) molding compound
Lead finishing material	Lead free (pure Tin)
Final testing information	
Testing location	*SUBCONTRACTOR – CHINA- 994X*

5 TESTS PLAN AND RESULTS SUMMARY

5.1 Test vehicles

Lot #	Part Number	Package	Comments
L1	T4050-6PF	TO-3PF	Triacs product
L2	STTH31AC06SPF	TO-3PF	Rectifier product
L3	STTH60AC06CPF	TO-3PF	Rectifier product
GD2	DUMMIES	TO-3PF	Generic data for SD, TS, WG and screwing Same BOM, same assy plant.

Detailed results in below chapter will refer to these references.

5.2 Test plan

Stress	Abrv	Reference	Lot	SS	Comments	To do?
Pre and Post-Stress Electrical Test	TEST	User specification or supplier's standard Specification	All qualification parts tested per the requirements of the appropriate device specification.			Y
External Visual	EV	JESD22B-101	All qualification parts tested per the requirements of the appropriate device specification.		Done during Assembly → Test & Finish inspection	Y
Parametric Verification	PV	User specification	L1 L2 L3	30 30 30		Y
AC blocking voltage	ACBV	MIL-STD-750-1 M1040 Test condition A	L1	77	Required for Thyristor only.	Y
Temperature Cycling	TC	JESD22A-104	L1 L2 L3	77 77 77		Y
Unbiased Highly Accelerated Stress Test	UHAST	JESD22A-118	L1 L2 L3	23 25 25	Can be covered by H3TRB	Y
High Humidity High Temperature Reverse Bias	H3TRB	JESD22A-101	L1 L2 L3	76 77 76		Y
Intermittent Operational Life / Thermal Fatigue	IOL / TF	MIL-STD-750 Method 1037	L1 L2 L3	77 77 77	For power devices. Not required for Transient Voltage Suppressor (TVS)	Y
Whisker Growth Evaluation	WG	AEC-Q005	L1	See test method		Y
Physical Dimension	PD	JESD22B-100	L1	30		Y
Solderability	SD	J-STD-002 JESD22B102	L1	30		Y
Dead Bug Test	DBT	DM00112629	L1	30	Mandatory for SMD package Has to be done for PTH package	Y

5.3 Results summary

Test	Std ref.	Conditions	Steps / Duration	SS	Failure/SS			
					L1	L2	L3	GD1
Pre- and Post-Electrical Test	ST datasheet	Static parameters following product datasheet	-		PASS			
External Visual	JESD22 B-101	All qualification parts submitted for testing passed External & Visual inspection during manufacturing process						
Parametric Verification	ST datasheet	Over part temperature range		30	Refer to paragraph 6.1 in Annexes			
ACBV	MIL-STD-750-1 M1040 Method A	Tj=125°C Vbias= 600V AC blocking voltage	1Khrs	77	0/77			
HTRB	JESD22A-108	Tj=175°C Vbias= 480V	1Khrs	154		0/77	0/77	
TC	JESD22 A-104	-65/+150°C 2cy/h	500cy	231	0/77	0/77	0/77	
UHAST	JESD22 A-118	130°C; 85% RH 2.3bar	96hrs	73	0/23	0/25	0/25	
H3TRB	JESD22 A-101	85°C; 85% RH VR=100V	1Khrs	229	0/76	0/77	0/76	
IOLT	MIL-STD 750 Method 1037	ΔTj=100°C Ton=Toff=210s	1Khrs	76	0/76			
IOLT	MIL-STD 750 Method 1037	ΔTj=100°C Ton=Toff=300s	1Khrs	154		0/77	0/77	
RSH	JESD22 B-106 (PTH)	Temperature=270°C Time (on)=7s		30		0/30		
TS	MIL-STD-750 Method 2036	Condition E – Lead fatigue	-	15	0/15			
screwing	ST 0063378	Torque=1N.m	-	15	0/15			
SD	J-STD-002 JESD22 B-102	Wet ageing SnPb bath 245°C	-	15		0/15		
		Wet ageing SnAgCu bath 245°C		15		0/15		
WG	AEC-Q005 JESD201	No reflow THS 30°C/60%RH	4Khrs	3				0/3
		No reflow THS 55°C/85%RH	4Khrs	3				0/3
		No reflow TC -40°C/125°C	1.5Kcy	3				0/3
		Reflow SnPb 215°C THS 30°C/60%RH	4Khrs	3				0/3
		Reflow SnPb 215°C THS 55°C/85%RH	4Khrs	3				0/3
		Reflow SnPb 215°C TC -40°C/125°C	1.5Kcy	3				0/3
		Reflow Pb Free 245°C THS 30°C/60%RH	4Khrs	3				0/3
		Reflow Pb Free 245°C THS 55°C/85%RH	4Khrs	3				0/3
		Reflow Pb Free 245°C	1.5Kcy	3				0/3

Test	Std ref.	Conditions	Steps / Duration	SS	Failure/SS			
					L1	L2	L3	GD1
		TC -40°C/125°C						

6 ANNEXES

6.1 Parametric Verification

- Lot 1 : T4050-6PF : No major change and all parameters are compliant to ST datasheet limits

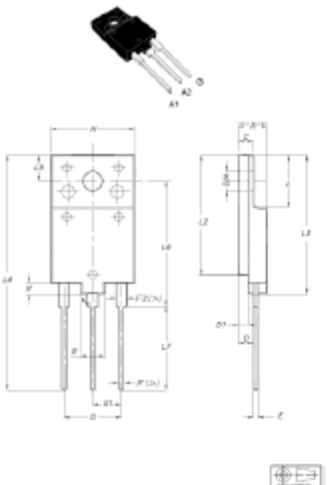
Parameters	Datasheet			Lot 1
	Min	Max		30units
ID (µA)		5	Med	0.419
			Min	392
			Max	475
IR (µA)		5	Med	0.695
			Min	623
			Max	760
Vd (V)	600		Med	865
			Min	856
			Max	931
Vr (V)	600		Med	999
			Min	964
			Max	1040
ITSM (A)	400		Med	618
RTH (° C/W)		1,45		1.39

Parameters	Datasheet			Lot 1
	Min	Max		30units
IGTQ1 (mA)		50	Med	17.74
			Min	17.1
			Max	19.5
IGTQ2 (mA)		50	Med	31.2
			Min	29.3
			Max	33.6
IGTQ3 (mA)		50	Med	30.19
			Min	27.2
			Max	33.7
IHQ1 (mA)		85	Med	38.53
			Min	35
			Max	55
IHQ3 (mA)		85	Med	36.99
			Min	25
			Max	60

Parameters	Datasheet			Lot 1
	Min	Max		30units
ILQ1 (mA)		70	Med	44.32
			Min	40
			Max	49
ILQ2 (mA)		160	Med	61
			Min	58
			Max	65
ILQ3 (mA)		70	Med	28.44
			Min	25
			Max	31
VTM+ (V)		1.4	Med	1.19
			Min	1.18
			Max	1.19
VTM- (V)		1.4	Med	1.19
			Min	1.19
			Max	1.20

6.2 Physical Dimensions

Dimensional report for TO-3PF package at Subcontrator plant (China)



Ref.	Dimensions					
	Millimeters			Inches[1]		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	5.30		5.70	0.2087		0.2244
C	2.80		3.20	0.1102		0.1260
D	3.10		3.50	0.1220		0.1378
D1	1.80		2.20	0.0709		0.0866
E	0.80		1.10	0.0315		0.0433
F	0.65		0.95	0.0256		0.0374
F2	1.80		2.20	0.0709		0.0866
G	10.30		11.50	0.4055		0.4528
G1		5.45			0.2146	
H	15.30		15.70	0.6024		0.6181
L	9.80	10.00	10.20	0.3858	0.3937	0.4016
L2	22.80		23.20	0.8976		0.9134
L3	26.30		26.70	1.0354		1.0512
L4	43.20		44.40	1.7008		1.7480
L5	4.30		4.70	0.1693		0.1850
L6	24.30		24.70	0.9567		0.9724
L7	14.60		15.00	0.5748		0.5906
N	1.80		2.20	0.0709		0.0866
R	3.80		4.20	0.1496		0.1654
Dia	3.40		3.80	0.1339		0.1496

	A	C	D	D1	E	F	F2	G	G1	H	L	L2	L3	L4	L5	L6	L7	N	R	Dia
1	5,50	3,01	3,29	1,98	0,89	0,85	2,08	10,95	5,49	15,48	9,97	22,96	26,49	43,89	4,35	24,55	14,73	1,97	3,98	3,58
2	5,50	3,00	3,24	1,99	0,89	0,85	2,06	10,93	5,44	15,48	10,00	22,97	26,42	43,80	4,34	24,53	14,73	1,98	3,99	3,59
3	5,50	3,00	3,28	2,00	0,88	0,83	2,08	10,93	5,44	15,49	9,98	23,00	26,50	43,84	4,33	24,54	14,72	1,97	3,97	3,59
4	5,51	3,02	3,25	1,99	0,89	0,86	2,08	10,94	5,47	15,50	10,00	22,96	26,46	43,72	4,34	24,52	14,75	1,99	3,98	3,57
5	5,51	3,02	3,25	2,00	0,89	0,87	2,09	10,96	5,46	15,49	10,00	22,97	26,50	43,86	4,34	24,54	14,75	1,99	3,99	3,57
6	5,52	3,03	3,21	1,98	0,89	0,87	2,08	10,93	5,46	15,51	9,95	23,00	26,49	43,84	4,35	24,47	14,78	1,98	3,98	3,59
7	5,51	3,02	3,27	2,00	0,89	0,86	2,00	10,95	5,46	15,48	9,96	22,99	26,53	43,86	4,34	24,52	14,75	1,99	3,96	3,58
8	5,52	3,03	3,25	1,99	0,89	0,87	2,04	10,95	5,47	15,50	10,00	23,02	26,50	43,89	4,35	24,47	14,80	1,99	4,00	3,60
9	5,49	3,00	3,25	2,00	0,86	0,84	2,05	10,95	5,44	15,49	9,97	23,09	26,55	43,93	4,33	24,51	14,77	1,98	3,98	3,59
10	5,49	3,00	3,26	1,99	0,87	0,81	2,04	10,94	5,48	15,49	9,96	22,98	26,54	43,73	4,35	24,50	14,75	2,00	3,99	3,59
11	5,52	3,02	3,25	1,99	0,88	0,86	2,09	10,96	5,45	15,52	9,98	23,02	26,53	43,89	4,35	24,54	14,79	2,00	3,99	3,59
12	5,52	3,02	3,27	2,00	0,89	0,87	1,99	10,95	5,47	15,49	9,98	22,96	26,52	43,89	4,33	24,51	14,80	1,99	3,97	3,59
13	5,51	3,01	3,21	1,97	0,88	0,85	2,08	10,94	5,45	15,50	10,00	22,96	26,55	43,90	4,35	24,53	14,75	2,00	4,01	3,59
14	5,51	3,01	3,24	1,99	0,87	0,87	2,08	10,98	5,47	15,49	9,98	22,97	26,53	43,93	4,33	24,51	14,80	2,00	4,01	3,59
15	5,52	3,02	3,24	2,00	0,88	0,85	2,08	10,94	5,44	15,52	9,99	23,02	26,45	43,94	4,34	24,54	14,75	1,99	4,00	3,60
16	5,52	3,01	3,26	1,99	0,89	0,88	2,05	10,96	5,47	15,51	9,96	23,03	26,46	43,93	4,34	24,48	14,80	2,00	4,00	3,61
17	5,53	3,02	3,30	2,00	0,89	0,84	2,00	10,95	5,44	15,50	9,95	22,97	26,45	43,83	4,36	24,50	14,78	2,00	3,99	3,59
18	5,53	3,03	3,29	2,00	0,89	0,87	2,07	10,96	5,46	15,50	9,97	23,02	26,53	43,89	4,34	24,51	14,77	2,00	4,01	3,59
19	5,55	3,02	3,28	2,00	0,89	0,86	2,03	10,97	5,46	15,53	9,99	22,98	26,45	43,82	4,35	24,46	14,81	2,00	3,99	3,57
20	5,55	3,04	3,28	1,99	0,89	0,87	2,03	10,96	5,49	15,52	9,95	23,05	26,55	43,92	4,35	24,56	14,72	2,00	4,02	3,58
21	5,52	3,02	3,28	2,00	0,89	0,86	2,05	10,95	5,43	15,50	9,94	23,03	26,48	43,87	4,34	24,51	14,77	2,00	4,01	3,59
22	5,53	3,03	3,29	2,00	0,89	0,86	2,07	10,96	5,44	15,50	9,96	23,06	26,52	43,87	4,33	24,54	14,74	2,00	3,97	3,58
23	5,52	3,03	3,23	1,98	0,89	0,87	2,05	10,95	5,47	15,50	9,96	23,04	26,54	43,93	4,33	24,49	14,83	2,00	3,94	3,59
24	5,52	3,03	3,26	1,99	0,89	0,86	2,06	10,91	5,43	15,50	9,95	22,96	26,53	43,88	4,33	24,50	14,78	1,98	3,99	3,61
25	5,52	3,03	3,23	1,98	0,88	0,87	2,04	10,95	5,46	15,50	9,94	23,01	26,53	43,90	4,33	24,48	14,81	1,98	3,96	3,58
26	5,51	3,03	3,24	1,98	0,90	0,84	2,03	10,92	5,44	15,50	9,95	23,01	26,51	43,86	4,33	24,51	14,76	1,99	3,99	3,58
27	5,51	3,02	3,24	1,99	0,88	0,87	2,03	10,94	5,44	15,50	9,97	22,95	26,52	43,90	4,34	24,52	14,74	1,98	3,98	3,58
28	5,52	3,02	3,28	2,00	0,90	0,86	2,07	10,97	5,44	15,51	9,96	22,97	26,53	43,88	4,34	24,52	14,72	1,98	3,92	3,61
29	5,52	3,02	3,25	1,98	0,89	0,87	2,04	10,96	5,48	15,53	9,94	22,98	26,52	43,91	4,34	24,50	14,75	1,98	4,01	3,59
30	5,51	3,02	3,27	1,99	0,89	0,87	2,04	10,99	5,50	15,49	9,94	22,92	26,54	43,86	4,34	24,52	14,75	1,97	3,98	3,60
AVE	5,52	3,02	3,26	1,99	0,89	0,86	2,05	10,95	5,46	15,50	9,97	23,00	26,51	43,87	4,34	24,51	14,77	1,99	3,99	3,59
MIN	5,49	3,00	3,21	1,97	0,86	0,81	1,99	10,91	5,43	15,48	9,94	22,92	26,42	43,72	4,33	24,46	14,72	1,97	3,92	3,57
MAX	5,55	3,04	3,30	2,00	0,90	0,88	2,09	10,99	5,50	15,53	10,00	23,09	26,55	43,94	4,36	24,56	14,83	2,00	4,02	3,61
LSL	5,3	2,8	3,1	1,8	0,8	0,65	1,8	10,3		15,3	9,8	22,8	26,3	43,2	4,3	24,3	14,6	1,8	3,8	3,4
USL	5,7	3,2	3,5	2,2	1,1	0,95	2,2	11,5		15,7	10,2	23,2	26,7	44,4	4,7	24,7	15	2,2	4,2	3,8
Cpk	4,52	5,84	2,29	7,54	3,44	2,06	1,84	11,09		5,05	2,83	1,75	1,84	3,38	1,63	2,55	1,86	6,12	2,91	5,95

6.3 Tests description

Test name	Description	Purpose
HTRB High Temperature Reverse Bias / **HTFB** High Temperature Forward Bias	The device is stressed in static configuration, trying to satisfy as much as possible the following conditions: - Low power dissipation - Max. supply voltage compatible with diffusion process and internal circuitry limitations. Forward: device is forward biased with a current fixed and adjusted to reach the targeted junction temperature	To determine the effects of bias conditions and temperature on solid state devices over time. It simulates the devices' operating condition in an accelerated way. To maximize the electrical field across either reverse-biased junctions or dielectric layers, in order to investigate the failure modes linked to mobile contamination, oxide ageing, layout sensitivity to surface effects. To assess active area and contacts integrity
ACBV Alternative Current Blocking Voltage	The device is stressed here in AC mode, trying to satisfy as much as possible the following conditions: - Low power dissipation. - Peak supply voltage compatible with diffusion process and internal circuitry limitations.	To determine the effects of bias conditions and temperature on solid state devices over time. It simulates the devices operating condition in an accelerated way. To apply electrical field across either reverse-biased junctions or dielectric layers, in order to investigate the failure modes linked to mobile contamination, oxide ageing, layout sensitivity to surface effects.
H3TRB High Humidity High Temperature Reverse Bias	The device is biased in static configuration minimizing its internal power dissipation, and stored at controlled conditions of ambient temperature and relative humidity.	To evaluate the package moisture resistance with electrical field applied, both electrolytic and galvanic corrosion are put in evidence.
TC Temperature Cycling	The device is submitted to cycled temperature excursions, between a hot and a cold chamber in air atmosphere.	To investigate failure modes related to the thermo-mechanical stress induced by the different thermal expansion of the materials interacting in the die-package system. Typical failure modes are linked to metal displacement, dielectric cracking, molding compound delamination, wire-bonds failure, die-attach layer degradation.
UHAST Unbiased Highly Accelerated Stress Test	The device is stored in saturated steam, at fixed and controlled conditions of pressure and temperature.	To investigate corrosion phenomena affecting die or package materials, related to chemical contamination and package hermeticity.
IOLT Intermittent Operating Life Test	All test samples shall be subjected to the specified number of cycles. When stabilized after initial warm-up cycles, a cycle shall consist of an "on" period, when power is applied suddenly, not gradually, to the device for the time necessary to achieve a delta case temperature followed by an “off” period, when the power is suddenly removed, for cooling the case through a similar delta temperature.	The purpose of this test is to determine compliance with the specified numbers of cycles for devices subjected to the specified conditions. It accelerates the stresses on all bonds and interfaces between the chip and mounting face of devices subjected to repeated turn on and off of equipment and is therefore most appropriate for case mount style (e.g., stud, flange, and disc) devices.
TS Terminal Strength	Terminals submitted to lead fatigue	To check the resistance of the device leads to metal fatigue
RSH Resistance to Solder Heat	Package is dipped by the leads in a solder bath after initial wet ageing (for SMDs only). Assessment by electrical test + no external crack	To simulate wave soldering process and verify that package will not be thermally damaged during this step.
SD Solderability	The purpose of this test method is to provide a referee condition for the evaluation of the solderability of terminations (including leads up to 0.125 inch in diameter) that will be assembled using tin lead eutectic solder.	This evaluation is made on the basis of the ability of these terminations to be wetted and to produce a suitable fillet when coated by tin lead eutectic solder. These procedures will test whether the packaging materials and processes used during the manufacturing operations process produce a component that can be successfully soldered to the next level assembly using tin lead eutectic solder. A preconditioning test is included in this test method, which degrades the termination finish to provide a guard band against marginal finish.

Test name	Description	Purpose
DBT Dead Bug Test	To evaluate the wettability of the package leads. Good indicator to determine the bad solderability behavior	Components are glued up-side down on a substrate. Pins are wetted with a moderately activated flux. Then run once through the reflow oven with leadfree temperature profile. Visual inspection is performed with suitable tool.
TW/WG Whiskers Growth	Forced growing of Tin Whiskers by various kind of environmental stress: temperature, moisture and temperature cycling.	To ensure no risk of electrical short due to Tin Whisker growth.

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PCN Title : Qualification of Triac in TO-3PF package at additional Assembly/Test location in China

PCN Reference : ADG/20/12436

Subject : Public Products List

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T4050-6PF		

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