PRODUCT / PROCESS CHANGE NOTIFICATION

1. PCN basic data	
1.1 Company	STMicroelectronics International N.V
1.2 PCN No.	ADG/21/12710
1.3 Title of PCN	New Assembly and Test location for ESDALC5-1BT2Y & ESDAVLC8-1BT2Y in China subcontractor
1.4 Product Category	ESDALC5-1BT2Y ESDAVLC8-1BT2Y
1.5 Issue date	2021-04-09

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 China

4. Description of change		
	Old	New
4.1 Description	Assembly and test line in ST plant in Philippines (Calamba)	STMicroelectronics is changing the assembly and test site to subcontractor located in China for protection device ESDALC5-1BT2Y & ESDAVLC8-1BT2Y. ST has decided to add passivation layer to improve product robustness.
4.2 Anticipated Impact on form,fit, function, quality, reliability or processability?	No	

5. Reason / motivation for change	
5.1 Motivation	STMicroelectronics has decided to rationalize into subcontractor in China for its assembly and test activity related to ESDALC5-1BT2Y & ESDAVLC8-1BT2Y. This additional assembly and test plant in China are a subcontractor already qualified and running in high volume for ST.
5.2 Customer Benefit	SERVICE CONTINUITY

6. Marking of parts / traceability of change	
6.1 Description	Internal codification and QA number

7. Timing / schedule	
7.1 Date of qualification results	2021-03-30
7.2 Intended start of delivery	2021-10-29
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)
12710 Public product.pdf 12710 New Assembly and Test location ESDALC5-1BT2Y ESDAVLC8-1BT2Y.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
	ESDALC5-1BT2Y	
	ESDAVLC8-1BT2Y	

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(1) ADG: Automotive and Discrete Group

PCN
Product/Process Change Notification

New Assembly and Test location for ESDALC5-1BT2Y & ESDAVLC8-1BT2Y in China subcontractor

Notification number:	ADG/21/12710	**Issue Date**	04-Apr-2021
Issued by	Sophie da Silva		
Product series affected by the change		ESDALC5-1BT2Y & ESDAVLC8-1BT2Y	
Type of change		Back End realization	

Description of the change

STMicroelectronics is changing the assembly and test site from the current ST plant in Philippines (Calamba) to subcontractor located in China for protection device ESDALC5-1BT2Y & ESDAVLC8-1BT2Y.

ST has decided to add passivation layer to improve product robustness.

Reason for change

STMicroelectronics has decided to rationalize into subcontractor in China for its assembly and test activity related to ESDALC5-1BT2Y & ESDAVLC8-1BT2Y. This additional assembly and test plant in China is a subcontractor already qualified and running in high volume for ST.

Former versus changed product:	The changed products do not present modified electrical, dimensional or thermal parameters, leaving unchanged the current information published in the product datasheet. 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 (so called “halogen-free”).

Disposition of former products

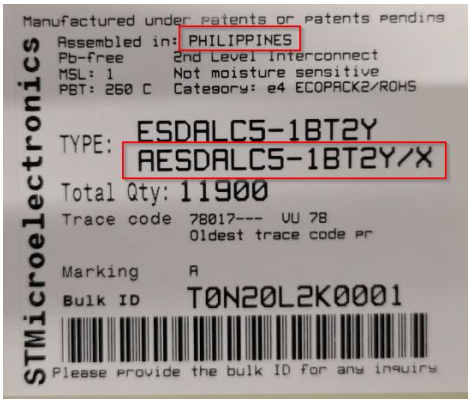
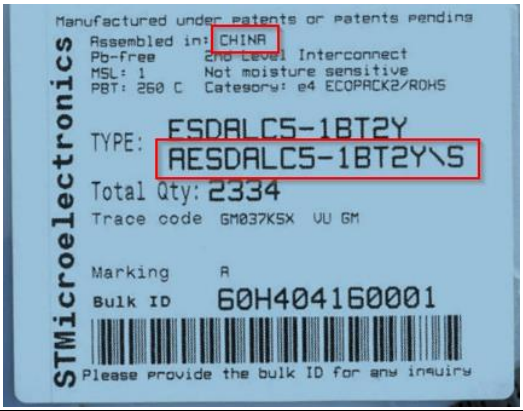
Delivery of current product will be done until ST Calamba stock depletion.

ST Restricted

Marking and traceability

Traceability of the change will be ensured by Finished Good/Type print on carton labels.

Commercial part number (Order code)	Current Finished Good/Type	New Finished Good/Type
ESDALC5-1BT2Y	AESDALC5-1BT2Y/X	AESDALC5-1BT2Y\S
ESDAVLC8-1BT2Y	AESDAVLC81BT2Y/X	AESDAVLC81BT2Y\S

Current Label (example)	New Label (example)
	

Qualification complete date	30-Mar-2021

Forecasted sample availability

Product family	Sub-family	Commercial part Number	Availability date
Protection device	SOD882T	ESDALC5-1BT2Y	Week 16-2021
Protection device	SOD882T	ESDAVLC8-1BT2Y	Week 16-2021

Change implementation schedule:

Sales types	Estimated production start	Estimated first shipments
ESDALC5-1BT2Y	Week 40-2021	Week 43-2021
ESDAVLC8-1BT2Y	Week 40-2021	Week 43-2021

Comments:	

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 180 days of receipt of this PCN will constitute acceptance of the change

Qualification program and results	21017QRP attached

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Reliability Evaluation Report

New Assembly and Test location for Automotive Grade ESDALC5-1BT2Y & ESDAVLC8-1BT2Y in existing China subcontractor

General Information	
Product Description	Automotive single-line low capacitance Transil™, transient surge voltage suppressor (TVS) for ESD protection
Part Numbers	ESDALC5-1BT2Y ESDAVLC8-1BT2Y
Product Group	*ADG*
Product division	*Discrete & Filter*
Package	*SOD882T*
Maturity level step	*QUALIFIED*

Locations	
Wafer fab	*ST TOURS FRANCE*
Assembly plant	*SUBCONTRACTOR IN CHINA 996H*
Reliability Lab	*ST TOURS FRANCE*

Reliability Assessment
PASS

DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comment
1	5-03-2021	9	Aude DROMEL	Julien MICHELON	Initial version

Note: This report is a summary of the reliability trials performed in good faith by STMicroelectronics in order to evaluate the potential reliability risks during the product life using a set of defined test methods.
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TABLE OF CONTENTS

1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
AEC-Q101	Stress test qualification for automotive grade discrete semiconductors
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

2 GLOSSARY

SS	Sample Size
PC	Pre-conditioning
HTRB	High Temperature Reverse Bias
TC	Temperature Cycling
UHAST	Unbiased Highly Accelerated Stress Test
DPA	Destructive Physical Analysis
SD	Solderability
WBI	Wire Bond Integrity
H3TRB/THB	Thermal Humidity Bias
MSL	Moisture Sensitive Level
GD	Generic Data

3 RELIABILITY EVALUATION OVERVIEW

3.1 Objectives

Qualification of a new Assembly and Test location for automotive grade products ESDALC5-1BT2Y & ESDAVLC8-1BT2Y in existing China subcontractor

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

ESDALC5-1BT2Y

life.augmented

Automotive single-line low capacitance Transil™, transient surge voltage suppressor (TVS) for ESD protection

Datasheet – production data

SOD882T
ESDALC5-1BT2Y

Features

- Single-line bidirectional protection
- Breakdown voltage = 5.8 V min.
- Low capacitance = 26 pF at 0 V
- Lead-free packages
- ECOPACK®2 compliant component
- AEC-Q101 qualified

Benefits

- Low capacitance for optimized data integrity
- Low leakage current < 60 nA
- Low PCB space consumption: 0.6 mm^2
- High reliability offered by monolithic integration

Complies with the following standards:

- IEC 61000-4-2 (exceeds level 4)
  - 30 kV (air discharge)
  - 30kV (contact discharge)
- ISO10605: C = 330 pF, R = 330 Ω
  - 30kV (air discharge)
  - 30kV (contact discharge)
- ISO 7637-3:
  - Pulse 3a: V_S = -150 V
  - Pulse 3b: V_S = +100 V

Applications

Where transient overvoltage protection in ESD sensitive equipment is required, such as:

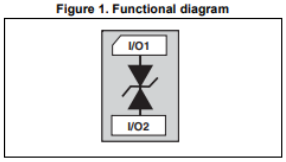
- Automotive applications
- Computers
- Printers
- Communication systems
- Cellular phone handsets and accessories
- Video equipment

Description

The ESDALC5-1BT2Y is bidirectional single-line TVS diode designed to protect data lines or other I/O ports against ESD transients.

This device is ideal for applications where both printed circuit board space and power absorption capability are required.

Figure 1. Functional diagram



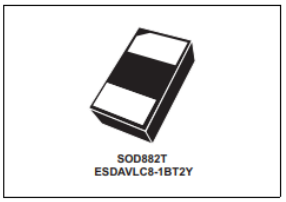
TM: Transil is a trademark of STMicroelectronics

ESDAVLC8-1BT2Y

life.augmented

Automotive single-line low capacitance Transil™, transient surge voltage suppressor (TVS) for ESD protection

Datasheet – production data



SOD882T
ESDAVLC8-1BT2Y

Features

- Single-line bidirectional protection
- Breakdown voltage = 8.5 V min.
- Very low capacitance = 4.5 pF at 0 V
- Lead-free packages
- ECOPACK®2 compliant component
- AEC-Q101 qualified

Benefits

- Very low capacitance for optimized data integrity
- Very low reverse current < 50 nA
- Low PCB space consumption: 0.6 mm^2
- High reliability offered by monolithic integration

Complies with the following standards:

- IEC 61000-4-2 (exceeds level 4)
  - 17 kV (air discharge)
  - 17 kV (contact discharge)
- ISO10605: C = 330 pF, R = 330 Ω
  - 15 kV (air discharge)
  - 8 kV (contact discharge)
- MIL STD 883G - Method 3015-7: class 3
  - HBM (human body model)

Applications

Where transient overvoltage protection in ESD sensitive equipment is required, such as:

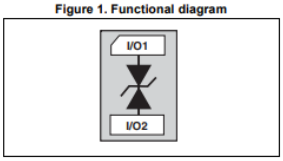
- Automotive applications
- Computers
- Printers
- Communication systems
- Cellular phone handsets and accessories
- Video equipment

Description

The ESDAVLC8-1BT2Y is a bidirectional single-line TVS diode designed to protect data lines or other I/O ports against ESD transients.

This device is ideal for applications where both printed circuit board space and power absorption capability are required.

Figure 1. Functional diagram



TM: Transil is a trademark of STMicroelectronics

4.2 Construction note

	ESDALC5-1BT2Y & ESDAVLC8-1BT2Y
Wafer/Die fab. information	
Wafer fab manufacturing location	ST TOURS GLOBAL 6" FRANCE
Technology / Process family	ASD-TRANSIL
Wafer Testing (EWS) information	
Electrical testing manufacturing location	ST TOURS FRANCE
Assembly information	
Assembly site	SUBCONTRACTOR - CHINA
Package description	SOD882T
Final testing information	
Testing location	SUBCONTRACTOR - CHINA

5 TESTS RESULTS SUMMARY

5.1 Test vehicles

Lot #	Part Number	Die manufacturing plant	Assembly plant	Package	Comments
Lot 1	ESDALC5-1BT2Y	ST TOURS	SUBCONTRACTOR CHINA	SOD882T	Qualification lots
Lot 2					
Lot 3					
Lot 4					
Lot 5					
GD1	ESDA17P100-1U2M			DFN.16.10.06-105-2L	Similar package for solderability tests (Same frame material , same finishing)
GD2	ECMF04-4HSM10Y		SUBCONTRACTOR MALAYSIA	FPN 2.6 x 1.35	Similar product for WBI test (same wire, same bond pad metal, same resin)
GD3					
GD4					

5.2 Test plan and results summary

Test	PC	Std ref.	Conditions	Total	Steps	Results/Lot Fail/S.S.				
						Lot 1	Lot 2	Lot 3	Lot 4	Lot 5
Die Oriented Tests										
HTRB	N	JESD22-A108/MIL-STD-750-1 M1038 Method A	Junction Temperature=150°C Temperature=150°C Tension=3V	231	168h			0/77	0/77	0/77
					504h			0/77	0/77	0/77
					1000h			0/77	0/77	0/77
Package Oriented Tests										
TC	Y	JESD22-A104	Frequency (cy/h)=2cy/h Temperature (high)=150°C Temperature (low)=-65°C	231	500cy	0/77	0/77	0/77		
					1000cy	0/77	0/77	0/77		
DPA	Y	ST 0060102 AEC Q101	DPA after TCT	2	Physical analysis	0/2				
H3TRB/THB	Y	JESD22-A101	Humidity (HR)=85% Temperature=85°C Tension=3V	308	168h	0/77		0/77	0/77	0/77
					504h	0/77		0/77	0/77	0/77
					1000h	0/77		0/77	0/77	0/77
DPA	Y	ST 0060102 AEC Q101	DPA after H3TRB	2	Physical analysis	0/2				
UHAST	Y	JESD22 A-118	Humidity (HR)=85% Pressure=2.3bar Temperature=130°C	231	96h	0/77	0/77	0/77		
MSL1 Evaluation	Y	JESD22-A113	Humidity (HR)=85% MSL=1 Reflow=3 Temperature=85°C	30	After MSL1	0/30	-	-		

Similarities for solderability

Test	PC	Std ref.	Conditions	Total	Steps	Results/Lot Fail/S.S.
						GD1
Package Oriented Tests						
Solderability	N	J-STD-002 / JESD22-B102	Dry Aging=16Hrs Metal (solder)=SnPb Temperature=220°C	15	VISUAL INSPECTION	0/15
Solderability	N	J-STD-002 / JESD22-B102	Wet Aging=8Hrs Metal (solder)=SnPb Temperature=220°C	15	VISUAL INSPECTION	0/15
Solderability	N	J-STD-002 / JESD22-B102	Dry Aging=16Hrs Metal (solder)=SnAgCu Temperature=245°C	15	VISUAL INSPECTION	0/15
Solderability	N	J-STD-002 / JESD22-B102	Wet Aging=8Hrs Metal (solder)=SnAgCu Temperature=245°C	15	VISUAL INSPECTION	0/15

Similarities for WBI

Test	PC	Std ref.	Conditions	Total	Steps	Results/Lot Fail/S.S.		
						GD4	GD5	GD6
Package Oriented Tests								
WBI	N	AEC-Q101	Wire pull after HTRB 1000h	15	Wire pull	0/5	0/5	0/5

6 ANNEXES

6.1 Tests Description

Test name	Standard Reference	Description	Purpose
Die Oriented			
HTRB High Temperature Reverse Bias	JESD22 A-108	HTRB : High Temperature Reverse Bias HTFB / HTGB : High Temperature Forward (Gate) 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	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.
Package Oriented			
TC Temperature Cycling	JESD22 A-104	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
H3TRB/THB Temperature Humidity Bias	JESD22 A-101	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.
uHAST	JESD22 A-118	The Unbiased HAST is performed for the purpose of evaluating the reliability of non-hermetic packaged solidstate devices in humid environments	Purpose: to investigate corrosion phenomena affecting die or package materials, related to chemical contamination and package hermeticity. To point out critical water entry paths with consequent electrochemical and galvanic corrosion.
MSL Moisture sensitive level	JESD22 A-113	The MSL is an electronic standard for the time period in which a moisture sensitive device can be exposed to ambient room conditions	MSL Moisture sensitive level

Test name	Standard Reference	Description	Purpose
Solderability	J-STD-002	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.
WBI Wire Bond Integrity	MIL-STD-750 Method 2037	Decap and wire pull After HTRB 1000H	Purpose: to evaluate the quality of the contact of the wire bonding (dissimilar metals) after high temperature storage. Migration of IMC is expected.
DPA Destructive Physical Analysis	Specific construction analysis on random parts that have successfully completed THB or TC.	To investigate on reliability stresses impact on delamination, corrosion and product construction integrity.	DPA Destructive Physical Analysis

Public Products List

Publict Products are off the shelf products. They are not dedicated to specific customers, they are available through ST Sales team, or Distributors, and visible on ST.com

PCN Title : New Assembly and Test location for ESDALC5-1BT2Y & ESDAVLC8-1BT2Y in China subcontractor

PCN Reference : ADG/21/12710

Subject : Public Products List

Dear Customer,

Please find below the Standard Public Products List impacted by the change.

ESDAVLC8-1BT2Y	ESDALC5-1BT2Y	

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