PRODUCT/PROCESS CHANGE NOTIFICATION

PCN APM-PWR/07/2701
Notification Date 08/01/2007

BIPOLAR DEVICES IN SOT-32 PACKAGE: from Au to Cu wire

PWR - PWR BIP/ IGBT/ RF

Table 1. Change Identification

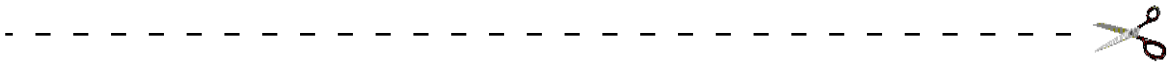
Product Identification (Product Family/Commercial Product)	See attached list
Type of change	Package assembly material change
Reason for change	Service improvement / Production optimization
Description of the change	Power Bipolar Division has been decided to set up a copper bonding for SOT-32 package in Subcontractor CDIL plant. Actually these devices are produced with a Gold wire on Spot Ag frame. This change is aimed both to assure higher efficiency and to improve our service to customers. The applied change doesn't impact on the guaranteed electrical characteristics reported in the data sheet.
Product Line(s) and/or Part Number(s)	See attached
Description of the Qualification Plan	See attached
Change Product Identification	See "N" in additional info on P/N
Manufacturing Location(s)	

Table 2. Change Implementation Schedule

Forecasted implementation date for change	26-Oct-2007
Forecasted availabillity date of samples for customer	25-Jul-2007
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	25-Jul-2007
Estimated date of changed product first shipment	31-Oct-2007

Table 3. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt	**PCN APM-PWR/07/2701**
Please sign and return to STMicroelectronics Sales Office	**Notification Date 08/01/2007**

☐ Qualification Plan Denied	Name:
☐ Qualification Plan Approved	Title:
	Company:
☐ Change Denied	Date:
☐ Change Approved	Signature:

Remark

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DOCUMENT APPROVAL

Name	Function
Lanzafame, Alfio Salvator	Division Marketing Manager
Porto, Michele Claudio	Division Product Manager
Falcone, Giuseppe	Division Q.A. Manager

RELIABILITY EVALUATION

ON

COPPER WIRES FOR

SOT-32 PACKAGE MADE IN CDIL

Table of Contents

Introduction

This report aims at the internal qualification of the copper wires in the SOT-32 package made in CDIL.

The Qualification Reliability test trials have been performed in ST Catania Site.

The evaluation results meet ST products qualification targets, therefore the copper wires in the SOT-32 package made in CDIL is qualified.

Test Vehicles :

Product Line	Sales Type	Package
B715	BD135	SOT-32
BV20	BULT118M	SOT-32

Failure Criteria :

A failed component is a device which becomes inoperative during the test or it fails on meeting the end limits foreseen in the device specification, for one or more than the parameters here below reported

Parameter Power BIPOLAR Main Parameter

Collector Leakage Current (Icbo or Iceo or Ices, etc...)
Emitter Leakage (Iebo)
$H_{FE,}$ Vcesat, Vbesat, Vf
Breakdown Voltage (BVcbo, BVceo,Vbces, Bvebo)

Reliability Evaluation Plan and results

D.U.T.: BD135 LINE: B715 PACKAGE: SOT-32

Test	Conditions	S.S.	Requirement	Results
H.T.S.	TA=150℃	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
T.H.B.	TA=85℃ - RH=85% Vbias= 24V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
H.T.R.B.	T.A.=150℃ Vdd=36V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
PRESSURE POT	TA=121℃ - PA=2Atm	77 x 1 Lot	Parameter deviation within spec. limits at 96 hours.	No parameter deviation out of spec. limits at 96 hours.
THERMAL CYCLES AIR TO AIR	TA=-65℃ TO 150℃ 1 HOUR / CYCLE	77 x 1 Lot	Parameter deviation within spec. limits at 500 cycles.	No parameter deviation out of spec. limits at 500 cy

Reliability Evaluation Plan and results

D.U.T.: BULT118M LINE: BV20 PACKAGE: SOT-32

Test	Conditions	S.S.	Requirement	Results
H.T.S.	TA=150℃	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
T.H.B.	TA=85℃ - RH=85% Vbias= 100V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
H.T.R.B.	T.A.=150℃ Vdd=560V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
PRESSURE POT	TA=121℃ - PA=2Atm	77 x 1 Lot	Parameter deviation within spec. limits at 96 hours.	No parameter deviation out of spec. limits at 96 hours.
THERMAL CYCLES AIR TO AIR	TA=-65℃ TO 150℃ 1 HOUR / CYCLE	77 x 1 Lot	Parameter deviation within spec. limits at 500 cycles.	No parameter deviation out of spec. limits at 500 cy

Technological Characteristics

D.U.T.: BD135 LINE: B715 PACKAGE: SOT-32

DIE	*Technology:* PLANAR NPN *Material:* Silicon *Metallization – Front :* Al/Si *- Back :* AuAs/Cr/Ni/Au		*Passivation :* P-Vapox *Dimensions :* 1070 x 1070 um	
DIE ATTACH	Soft Solder	**FRAME**	*Frame and lead material:* *Frame coating :* *Lead coating :*	Raw Cu - Ag spot Full Ni Sn 100%
WIRE BOND	Ultrasonic	**WIRE**	*Material :* *Diameter :*	Cu Base Cu Emitter 2 mils Base 2 mils Emitter
SEALING	Molding	**PACKAGING**	*Material :*	Epoxy Resin

PRODUCTION PLACES: WAFER PROCESSING: SINGAPORE
ASSEMBLY LOCATION: CDIL Mohali
QA LOCATION: CDIL Mohali

Technological Characteristics

D.U.T.: BULT118M LINE: BV20 PACKAGE: SOT-32

DIE	*Technology:* PLANAR NPN *Material:* Silicon *Metallization – Front :* Al/Si *- Back :* Ti/Ni/Au		*Passivation :* P-Vapox *Dimensions :* 2520 x 1690 um	
DIE ATTACH	Soft Solder	**FRAME**	*Frame and lead material:* *Frame coating :* *Lead coating :*	Raw Cu - Ag spot Full Ni Sn 100%
WIRE BOND	Ultrasonic	**WIRE**	*Material :* *Diameter :*	Cu Base Cu Emitter 2 mils Base 2 mils Emitter
SEALING	Molding	**PACKAGING**	*Material :*	Epoxy Resin

PRODUCTION PLACES: WAFER PROCESSING: SINGAPORE
ASSEMBLY LOCATION: CDIL Mohali
QA LOCATION: CDIL Mohali

Reliability Test Description

High Temperature Reverse Bias (HTRB)

This test is performed in order to demonstrate the quality and reliability of devices subjected to an elevated temperature and simultaneously reverse biased. The purpose of this test is to detect surface defects such as poor passivation, presence of contaminants, etc...

High Temperature Storage (HTS)

This stress test is performed to check the device life in a high temperature ambient. Specimens are put for a period of time inside a stove in free air. Detectable failure mechanisms are presence of contaminants and metal corrosion.

Temperature Humidity Bias (THB)

This test is performed to check the device life in a high humidity ambient. Specimens are subjected to a permanent bias in a climatic chamber in the presence of steam. Detectable failure mechanisms are metal corrosion and molding defects.

Pressure Pot

This test is performed in order to check device life in a high humidity ambient in an accelerated way. Specimens are subjected for a period of time inside an autoclave in the presence of steam and pressure. Detectable failure mechanism is metal corrosion.

Thermal Fatigue

This test is performed to demonstrate the quality and reliability of devices exposed to cyclic variation in electrical stress between "on" and "off" conditions and resultant cyclic variation in device and case temperatures (thermo-mechanical stress). The purpose of this test is to detect assembly defects: improper die-attach, bonding weakness and thermal mismatch among various components of the package.

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