



# PRODUCT/PROCESS CHANGE NOTIFICATION

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PCN MPA-PWR/06/2192  
Notification Date 12/13/2006

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**New Assembly/Testing Location SOT32 package for Power  
Bipolar in CDIL Subcontractor**

**PWR - PWR BIP/ IGBT/ RF**

**Table 1. Change Identification**

Product Identification (Product Family/Commercial Product)	Power Bipolar
Type of change	Package assembly location change
Reason for change	Service improvement / capability extension
Description of the change	Power Bipolar Division has decided to use Cdil subcontractor for the devices reported in the enclosed list (in addition to the part numbers already in production since year 2002). This change will assure an additional assembly/testing location that will be translate in a better service for our Customers.The SOT32 package coming from CDIL subcontractor is perfectly compatible with SOT32 package currently in use for the same products (flat lead shape version).This will not change the guaranteed electrical characteristics. Samples are available for lines used for Subcontractor qualification.
Product Line(s) and/or Part Number(s)	See attached
Description of the Qualification Plan	See attached
Change Product Identification	"JB" as Production area code on package
Manufacturing Location(s)	

**Table 2. Change Implementation Schedule**

Forecasted implementation date for change	13-Mar-2007
Forecasted availability date of samples for customer	05-Dec-2006
Forecasted date for <b>STMicroelectronics</b> change Qualification Plan results availability	05-Dec-2006
Estimated date of changed product first shipment	13-Mar-2007

**Table 3. Change Responsibility**

	<b>Name</b>	<b>Signature</b>	<b>Date</b>
Division Product Manager	Claudio Porto		Dec.05 ,06
Division Q.A. Manager	Giuseppe Falcone		Dec.05 ,06
Division Marketing Manager	Alfio Lanzafame		Dec.05 ,06

**Table 4. List of Attachments**

Customer Part numbers list	
Qualification Plan results	

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Customer Acknowledgement of Receipt		<b>PCN MPA-PWR/06/2192</b>
Please sign and return to STMicroelectronics Sales Office		<b>Notification Date 12/13/2006</b>
<input type="checkbox"/> Qualification Plan Denied <input type="checkbox"/> Qualification Plan Approved  <input type="checkbox"/> Change Denied <input type="checkbox"/> Change Approved	Name:	
	Title:	
	Company:	
	Date:	
	Signature:	
Remark ..... ..... ..... ..... .....		

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**Reliability evaluation on  
SOT-32 Package  
for Power Bipolar in CDIL Subcontractor**

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### **Introduction**

This report aims at the internal qualification of the SOT-32 Package for Power Bipolar in CDIL Subcontractor.

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

The evaluation results meet ST products qualification targets, therefore the SOT-32 Package for Power Bipolar in CDIL Subcontractor is qualified.

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**Test Vehicles:**

<b>Product Line</b>	<b>Sales Type</b>	<b>Package</b>
B641	BD238	SOT-32
BG01	BD681	SOT-32
BK01	BD678	SOT-32
F641	BD438	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

**Power BIPOLAR Parameter**

Collector Leakage Current (Icbo or Iceo or Ices, etc...)  
 Emitter Leakage (Iebo)  
 HFE, Vcesat, Vbesat, Vf  
 Breakdown Voltage ( BVcbo, BVceo,Vbces, Bvebo )

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### Reliability Evaluation Plan and results

**D.U.T.: BD238**

**Line: B641**

**Package: SOT-32**

<b>Test</b>	<b>Conditions</b>	<b>S.S.</b>	<b>Requirement</b>	<b>Results</b>
<b>H.T.S.</b>	TA=150°C	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
<b>T.H.B.</b>	TA=85°C - RH=85% Vbias= 50V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
<b>H.T.R.B.</b>	T.A.= 150°C Vces = 80 V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
<b>PRESSURE POT</b>	TA=121°C - PA=2Atm	77 x 1 Lot	Parameter deviation within spec. limits at 96 hours.	No parameter deviation out of spec. limits at 96 hours.
<b>THERMAL FATIGUE</b>	ΔTC=105 °C - Pd= 3W	77x1 Lot	Parameter deviation within spec. limits at 10k cycles.	No failure up to 10Kcy.
<b>THERMAL CYCLES AIR TO AIR</b>	TA=-65°C TO 150°C 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

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## Reliability Evaluation Plan and results

**D.U.T.: BD681**

**Line: BG01**

**Package: SOT-32**

<b>Test</b>	<b>Conditions</b>	<b>S.S.</b>	<b>Requirement</b>	<b>Results</b>
<b>H.T.S.</b>	TA=150°C	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
<b>T.H.B.</b>	TA=85°C - RH=85% Vbias= 50V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
<b>H.T.R.B.</b>	T.A.= 150°C Vces = 80 V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
<b>PRESSURE POT</b>	TA=121°C - PA=2Atm	77 x 1 Lot	Parameter deviation within spec. limits at 96 hours.	No parameter deviation out of spec. limits at 96 hours.
<b>THERMAL FATIGUE</b>	ΔTC=105 °C - Pd= 3W	77x1 Lot	Parameter deviation within spec. limits at 10k cycles.	No failure up to 10Kcy.
<b>THERMAL CYCLES AIR TO AIR</b>	TA=-65°C TO 150°C 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

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### Reliability Evaluation Plan and results

**D.U.T. : BD678    LINE: BK01    PACKAGE: SOT-32**

<b>Test</b>	<b>Conditions</b>	<b>S.S.</b>	<b>Requirement</b>	<b>Results</b>
<b>H.T.S.</b>	TA=150°C	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
<b>T.H.B.</b>	TA=85°C - RH=85% Vbias= 50V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
<b>H.T.R.B.</b>	T.A.= 150°C Vces = 48 V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
<b>PRESSURE POT</b>	Ta=121°C;Pa=2Atm	77 x 1 Lot	Parameter deviation within spec. limits at 96 hours.	No parameter deviation out of spec. limits at 96 hours.
<b>THERMAL FATIGUE</b>	ΔTC=105 °C - Pd= 3W	77x1 Lot	Parameter deviation within spec. limits at 10k cycles.	No failure up to 10Kcy.
<b>THERMAL CYCLES AIR TO AIR</b>	Ta=-65 °C to +150°C; 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

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### Reliability Evaluation Plan and results

**D.U.T. : BD438    LINE: F641    PACKAGE: SOT-32**

<b>Test</b>	<b>Conditions</b>	<b>S.S.</b>	<b>Requirement</b>	<b>Results</b>
<b>H.T.S.</b>	TA=150°C	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
<b>T.H.B.</b>	TA=85°C - RH=85% Vbias= 50V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
<b>H.T.R.B.</b>	T.A.= 150°C Vces = 48 V	77 x 1 Lot	Parameter deviation within spec. limits at 1000 hours.	No parameter deviation out of spec. limits at 1000 hours.
<b>PRESSURE POT</b>	Ta=121°C;Pa=2Atm	77 x 1 Lot	Parameter deviation within spec. limits at 96 hours.	No parameter deviation out of spec. limits at 96 hours.
<b>THERMAL FATIGUE</b>	ΔTC=105 °C - Pd= 3W	77x1 Lot	Parameter deviation within spec. limits at 10k cycles.	No failure up to 10Kcy.
<b>THERMAL CYCLES AIR TO AIR</b>	Ta=-65 °C to +150°C; 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

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### Technological Characteristics

**D.U.T.: BD238**

**Line: B641**

**Package: SOT-32**

<b>DIE</b>	<i>Technology:</i> Epitaxial Base PNP <i>Material:</i> Silicon <i>Passivation</i> : P-Vapox <i>Metallization – Front :</i> Al <i>Dimensions</i> : 74 x 55 mils - Back : Ti/Ni/Au			
<b>DIE ATTACH</b>	Soft Solder Pb/Sn/Ag	<b>FRAME</b>	<i>Frame and lead material:</i> <i>Frame coating :</i> <i>Lead coating :</i>	Row copper  Nickel Plated  Sn 100%
<b>WIRE BOND</b>	Ultrasonic	<b>WIRE</b>	<i>Material :</i> <i>Diameter :</i>	Al      Base Al      Emitter  5 mils Base 5 mils Emitter
<b>SEALING</b>	Molding	<b>PACKAGING</b>	<i>Material :</i>	Epoxy Resin

**PRODUCTION PLACES:** WAFER PROCESSING : SINGAPORE  
ASSEMBLY LOCATION : INDIA  
Q.A. LOCATION : INDIA

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### Technological Characteristics

**D.U.T.: BD681**

**Line: BG01**

**Package: SOT-32**

<b>DIE</b>	<i>Technology:</i> Epitaxial Base NPN <i>Material:</i> Silicon <i>Passivation</i> : P-Vapox <i>Metallization – Front :</i> Al <i>Dimensions</i> : 90 x 70 mils <i>- Back :</i> Ti/Ni/Au			
<b>DIE ATTACH</b>	Soft Solder Pb/Sn/Ag	<b>FRAME</b>	<i>Frame and lead material:</i> <i>Frame coating :</i> <i>Lead coating :</i>	Row copper Nickel Plated Sn 100%
<b>WIRE BOND</b>	Ultrasonic	<b>WIRE</b>	<i>Material :</i> <i>Diameter :</i>	Al Base Al Emitter 5 mils Base 5 mils Emitter
<b>SEALING</b>	Molding	<b>PACKAGING</b>	<i>Material :</i>	Epoxy Resin

**PRODUCTION PLACES:** WAFER PROCESSING : SINGAPORE  
ASSEMBLY LOCATION : INDIA  
Q.A. LOCATION : INDIA

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### Technological Characteristics

**D.U.T. : BD678    LINE: BK01    PACKAGE: SOT-32**

<b>DIE</b>	<i>Technology:</i> Epitaxial Base PNP <i>Material:</i> Silicon <i>Passivation :</i> P-Vapox <i>Metallization – Front :</i> Al/Si <i>Dimensions :</i> 90 x 70 mils <i>- Back :</i> Ti-Ni-Au			
<b>DIE ATTACH</b>	Soft Solder Pb/Sn/Ag	<b>FRAME</b>	<i>Frame and lead material:</i>  <i>Frame coating :</i>	Row copper,  Nickel Plated
<b>WIRE BOND</b>	Ultrasonic	<b>WIRE</b>	<i>Material :</i>  <i>Diameter :</i>	Al         Base Al         Emitter  5 mils Base 5 mils Emitter
<b>SEALING</b>	Molding	<b>PACKAGING</b>	<i>Material :</i>	Epoxy Resin

**PRODUCTION PLACES:**    WAFER PROCESSING     : SINGAPORE  
   ASSEMBLY LOCATION     : INDIA  
   Q.A. LOCATION             : INDIA

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### Technological Characteristics

**D.U.T. : BD438    LINE: F641    PACKAGE: SOT-32**

<b>DIE</b>	<i>Technology:</i> Epitaxial Base PNP <i>Material:</i> Silicon <i>Passivation :</i> P-Vapox <i>Metallization – Front :</i> Al/Si <i>Dimensions :</i> 60 x 79 mils <i>- Back :</i> Ti/Ni/Au			
<b>DIE ATTACH</b>	Soft Solder Pb/Sn/Ag	<b>FRAME</b>	<i>Frame and lead material:</i>  <i>Frame coating :</i>  <i>Lead coating :</i>	Row copper  Nickel Plated  Sn 100%
<b>WIRE BOND</b>	Ultrasonic	<b>WIRE</b>	<i>Material :</i>  <i>Diameter :</i>	Al      Base Al      Emitter  5 mils Base 5 mils Emitter
<b>SEALING</b>	Molding	<b>PACKAGING</b>	<i>Material :</i>	Epoxy Resin

**PRODUCTION PLACES:** WAFER PROCESSING : SINGAPORE  
 ASSEMBLY LOCATION : INDIA  
 Q.A. LOCATION : INDIA

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### 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.

#### Thermal Cycles/Shocks

The purpose of this test is to determine the resistance of devices to exposure to extreme changes in temperature. Specimens are first placed in a suitable environment at a low temperature and then transferred to one at high temperature. Effects of thermal cycles/shocks include cracking of die, breaking of wire bonding, mechanical damage to the device case.

#### 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 moulding defects.

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**Reliability Test Description** (continued)

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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