PRODUCT/PROCESS CHANGE NOTIFICATION

PCN APG-CRM/07/2896
Notification Date 09/19/2007

TDA7563B FAMILY: DESIGN CHANGE

CRM - CAR RADIO & MULTIMEDIA DIV

Table 1. Change Identification

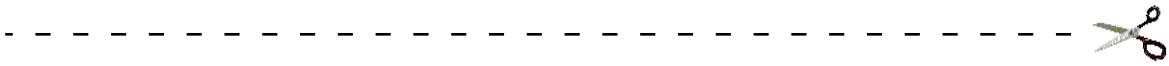
Product Identification (Product Family/Commercial Product)	TDA7563B, TDA7563BH, TDA7563BPD, TDA7563BPDTR
Type of change	Product design change
Reason for change	Diagnostic improvement
Description of the change	Metal change from DB to DC version for diagnostic improvement in case of multiple output misconnection (simultaneous open load and output short to ground occurrence).
Product Line(s) and/or Part Number(s)	See attached
Description of the Qualification Plan	See attached
Change Product Identification	"DC" marked on the part
Manufacturing Location(s)	1]Carrollton 6"

Table 2. Change Implementation Schedule

Forecasted implementation date for change	15-Dec-2007
Forecasted availabillity date of samples for customer	19-Sep-2007
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	19-Sep-2007
Estimated date of changed product first shipment	31-Dec-2007

Table 3. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt	**PCN APG-CRM/07/2896**
Please sign and return to STMicroelectronics Sales Office	**Notification Date 09/19/2007**

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

Remark

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DOCUMENT APPROVAL

Name	Function
Pengo, Tullio	Division Marketing Manager
Cassani, Fabrizio	Division Product Manager
Mercandelli, Laura	Division Q.A. Manager

TDA7563B FAMILY: DESIGN CHANGE

WHAT*:*

We are going to put in production a revision of TDA7563B family aimed at improving diagnostic in case of multiple output misconnection (simultaneous open load and output short to ground occurrence).

The above is done through a metal fix (from the actual DB version to DC version). The change will be fully visible through the reference “DC” marked on the part next to the marking area.

The change does not imply a datasheet revision that remains unchanged.

WHY:

Product improvement.

HOW:

Here enclosed you find the qualification report RR 0060.07.CS2039 that qualifies the new product revision (rev. DC).

WHEN:

We are ready to deliver the new version from mid December 07.

RELIABILITY REPORT

TDA7563B

Quad Power Amplifier

Author: Daniele Bini

Approved: Giacomo Burrone

Date: Castelletto, May 10, 2007

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1 RELIABILITY EVALUATION OVERVIEW

1.1 Objectives

The purpose of this document is to describe the reliability qualification trials and the results carried out on TDA7563B product assembled in package FW27 package.

1.2 Conclusion

TDA7563B has improved the robustness against double fault as open load plus short to ground conditions.
The design improvements have been done by metal rerouting, therefore all reliability tests performed on TDA7563B-UD23DB (RR 0028A.06.2039) also cover the UD23DC version. In agreement with Q100 spec. ESD, LU and electrical characterization has been performed with positive results.

- HBM ±2kV and MM ±200V models were applied without failures.
- Injection current and over-voltage models were applied and no failures have been detected.
- electrical characterization on TDA7563B device fulfills the product specification

Based on the overall results, from the reliability point of view, the evaluation of TDA7563B device has been positively completed.

2 DEVICE CHARACTERISTICS

2.1 Device description

Features

- Multipower BCD technology
- MOSFET output power stage
- DMOS power output
- New Hi-efficiency (class SB)
- High output power capability 4x28W/4Ω @ 14.4V, 1KHZ, 10% THD, 4x50W max, power
- Max. output power 4x72W/2Ω
- Full I^2C bus driving:
  - St-by
  - Independent front/rear soft play/mute
  - Selectable gain 30dB /16dB (for low noise line output function)
  - High efficiency enable/disable
  - I^2C bus digital diagnostics (including DC bus AC load detection)
- Full fault protection
- DC offset detection
- Four independent short circuit protection
- Clipping detector pin with selectable threshold (2%/10%)
- St-by/mute pin
- Linear thermal shutdown with multiple thermal warning
- ESD protection

Flexiwatt27 (Horizontal)

PowerSO36

Flexiwatt27 (Vertical)

Description

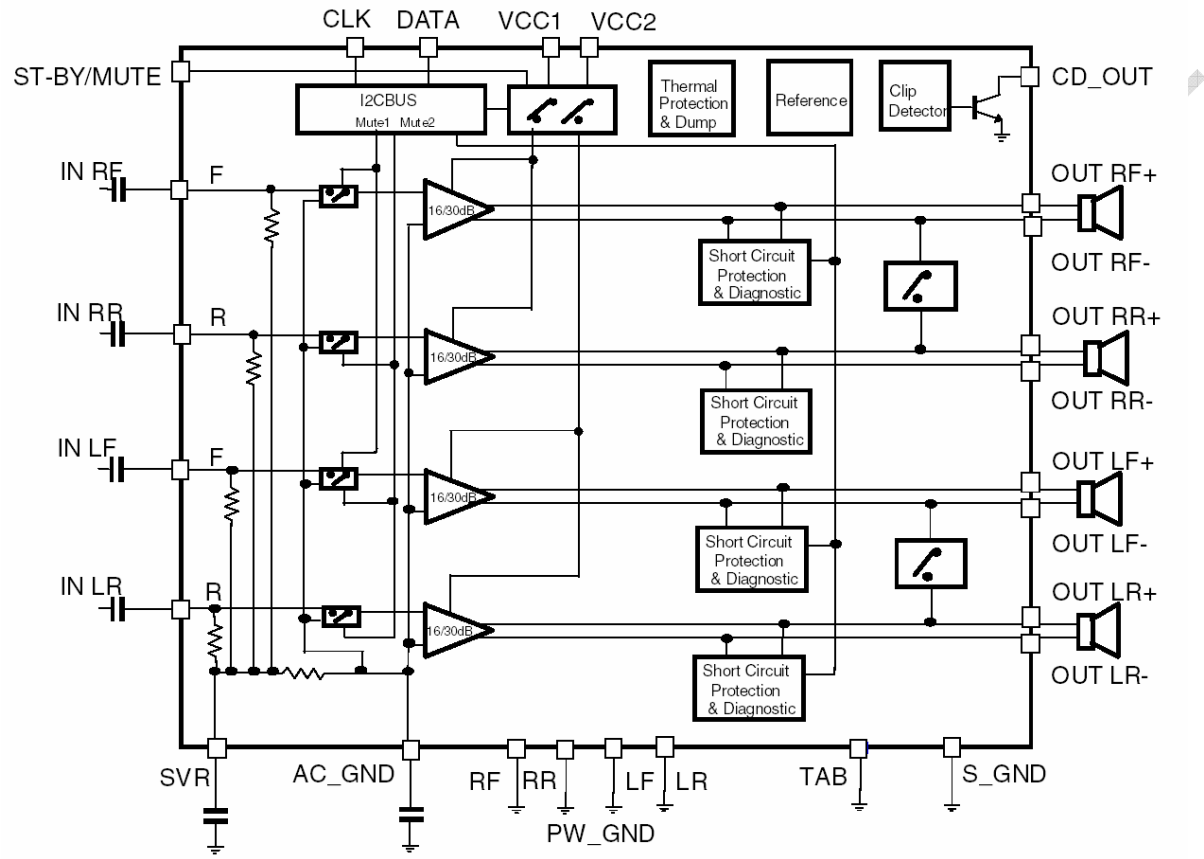
The TDA7563B is a new BCD technology Quad Bridge type of car radio amplifier in Flexiwatt27 package specially intended for car radio applications.

Thanks to the DMOS output stage the TDA7563B has a very low distortion allowing a clear powerful sound. Among the features, its superior efficiency performance coming from the internal exclusive structure, makes it the most suitable device to simplify the thermal management in high power sets.

The dissipated output power under average listening condition is in fact reduced up to 50% when compared to the level provided by conventional class AB solutions.

This device is equipped with a full diagnostics array that communicates the status of each speaker through the I^2C bus.

2.2 Block Diagram



2.3 Construction note

2.3.1 Wafer fabrication information

Internal name:	A848*UD23DCH (A848*UK23DCH)
Diffusion process:	BCD5S
Diffusion plant:	CRN
Wafer size [inches]:	6"
Wafer thickness [µm]:	375
Die sizes [mm^2]:	6.00 x 4.79
Passivation:	Teos + PTeos + SiOn + PIX
Back finishing:	Cr/Ni/Au
Pad Metallization[µm]:	AlSiCu: 0.4um+0.8um+3um

2.3.2 Assembly information

Package line:	FW27
Assembly plant:	Malta
Wires [mils]:	2 mils, Cu
Resin:	SUMITOMO 6300HW
Die Attach:	Pb/Ag/Sn 97.5/1.5/1
Frame Material	Cu
Lead Finishing:	Pure tin

3 RELIABILITY TESTS RESULTS

Test Name	Description	Purpose
HTOL	The device is stressed in dynamic configuration, approaching the operative max. ratings in terms of junction temperature, load current, internal power dissipation.	To simulate the worst-case application stress conditions. The typical failure modes are related to electromigration, wire-bonds degradation, oxide faults.
HTRB	The device is stressed in static configuration, approaching the absolute max. ratings in terms of junction temperature and voltage ratings and minimizing the internal power dissipation.	to investigate the failure modes linked to mobile contamination, oxide ageing, and layout sensitivity to surface effects
PTC	The device is stressed in dynamic configuration approaching the operative conditions with an alternate exposure at high and low temperature extremes.	To simulate the actual combination of environmental stresses interacting in the field application. The typical failure modes are those reported for HTOL and TC
ESD	The device is submitted to a high voltage peak on all his pins simulating ESD stress according to different simulation models.	To classify the device according to his susceptibility to damage or degradation by exposure to electrostatic discharge.
LU	The device is submitted to a direct current forced/sinked into the input/output pins. Removing the direct current no change in the supply current must be observed.	To verify the presence of bulk parasitic effect inducing latch-up.

Test Name	Description	Purpose
PC	The device is submitted to a typical temperature profile used for surface mounting devices , after a controlled moisture absorption	As stand-alone test: to investigate the moisture sensitivity level. As preconditioning before other reliability tests: to verify that the surface mounting stress does not impact on the subsequent reliability performance. The typical failure modes are "pop corn" effect and delamination.
TC	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.
AC	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.
THB	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
HTS	The device is stored in unbiased condition at the max. temperature allowed by the package materials, sometimes higher than the max. operative temperature	To investigate the failure mechanisms activated by high temperature, typically wire-bonds solder joint ageing, data retention faults, metal stress-voiding
WBP	The wire is submitted to a pulling force (approximately normal to the surface of the die) able to achieve wire break or interface separation between ball/pad or stitch/lead.	To investigate and measure the integrity and robustness of the interface between wire and die or lead metallization
WBS	The ball bond is submitted to a shear force (parallel to the pad area) able to cause the separation of the bonding surface between ball bond and pad area.	To investigate and measure the integrity and robustness of the bonding surface between ball bond and pad area.

3.1 Reliability test plan and results summary

Here the tests plan and the results summary.

ESD & LU Characterization on UD23DC (UK23DC)

Test	TDA7563B				
	Conditions	Sample Size	Duration	Failure	Note
ESD	HBM ±2kV [R=1.5kΩ, C=100pF]	6	-	0	
	MM ±200V [R=0Ω, C=200pF]	6	-	0	
LU	Injection current (Inom±100mA)	6	-	0	
	Overvoltage (Vs≥24V)	4	-	0	

Die & Package oriented test

Test	TDA7563B				
	Conditions	Sample Size	Duration	Failure	Note
HTOL	Vs=16V, Tj=150°C, Load=2Ω/4Ω + 300µH	45 x 2	1000h	0	2
HTRB	Vs=18V, Tj=150°C, standby	45 x 2	1000h	0	2
ESD	HBM ±2kV [R=1.5kΩ, C=100pF]	5	-	0	2
	MM ±200V [R=0Ω, C=200pF]	5	-	0	2
	CDM ±500V	3	-	0	1
	CDM ±250V	3	-	0	1
LU	Injection current (Inom±100mA)	6	-	0	2
	Overvoltage (Vs≥24V)	3	-	0	2
TC	Ta=-50°C/+150°C	45 x 2	1000c	0	4
AC	Ta=121°C, P=2atm	45 x 2	168h	0	2
HTS	Ta=150°C, unbiased	45 x 2	1000h	0	2
THB	Vs=18V, standby, Ta=85°C, RH=85%	45 x 2	1000h	0	2
WBS	AEC Q100-001	30 bonds from a minimum of 5 devices	-	0	3
WBP	MIL STD883 Method 2011		-	0	3
PC	BAKE: 24h @ 125°C SOAK: 192h @ T=30°C, RH=60% REFLOW: 3 @ Tpeak=245°C	90	-	0	1
TC	Ta=-50°C/+150°C	45	1000c	0	1
AC	Ta=121°C, P=2atm	45	168h	0	1

NOTES

1. Test performed on UD23DA assembled in PSO36 slug-up.
2. Test performed on UD23DB
3. WBP and WBS stresses have been performed with positive results:

	Mean	Sigma	CPK
PULL TEST:	53.80	5.29	1.75
BALL SHEAR:	170	5.75	5.45

4. The test has been prolonged till 2000c for knowledge purpose without failures.

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