TEXAS INSTRUMENTS

Qualification Notification for the TSS721A Meter-Bus Transceiver Device

May 10, 1999

Abstract

Texas Instruments has qualified the TSS721A device, to replace the TSS721 device. This device was redesigned in order to apply to the EN1434-3 requirements, to reflect the 8 points wishes of the Meter-Bus Users Group Meeting inputs from September 23rd, 1996 in Frankfurt and additional, general parameter improvement as like higher input impedance and lower output impedance of the voltage regulator. Revision to the "A" device is necessary because of the changes to some electrical parameter conditions or limits.

Data sheet changes are attached and in underlined bold italics. The device nomenclature has changed due to the data sheet adjustments. For details on function, functional schematic, electrical characteristics and applications see also the TSS721A data sheet.

Analysis

Changes included an all-level change in design to incorporate device performance improvement.

Device nomenclature has changed due to data sheet adjustments as shown in Table 1.

Table 2 summarizes the construction details for the test devices.

Table 3 shows the reliability results.

Tables 4 to 8 show the electrical characteristic data sheet changes with bold italics.

Conversion Schedule

Texas Instruments started manufacturing of the affected devices. Customers may begin receiving TSS721A products after the issue of this notification.

Sample Devices

Sample devices are available on request. Please contact your local Field Sales Office.

Contact

If you should have questions or wish additional information, please contact your local Field Sales Office or the contacts listed below.

Contact	Location	Title	Telephone	E-Mail
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Table 1: Nomenclature Change for the TSS721A

Old	New
Device Name	Device Name
TSS721	TSS721A

Table 2: TSS721A, Tested Device Information

Reason for Qualification: Product Redesign

Product Affected: TSS721A 'E'

ATTRIBUTES

Device Specific Info	
Device Name	TSS721AD
Die Revision	E
Die Dimension	080 x 140 mils
Wafer Fab Info	
Fab Site	SFab
Fab Technology	Bipolar
Wafer Thickness	11 mils
Metal 1	AlCu 0.25%
Metal 2	AlCu 0.25%
Passivation	10KA CN
Assy/Test Info	
Assy Site	Taiwan
Mold	PF9AS
Mount Comp	Hit EN-4088Z
Bond Type/Matl	1.0 Au
Package Info	
Package Type	D (SOIC)
Pin Count	16
Leadframe Finish	Pd Plate
Leadframe Comp	Cu

Table 3: TSS721A, Reliability Test Results

	TSS721AD
Qualification Results	**Act. SS/ #Fails**
Operating Life Dyn. Test (150°C, 300 hrs.)	120/0
Temperature Cycle Test (-65°C to 150°C, 1000 Cycles)	120/0
Latch Up	5/0
Electrical Characterization	Pass
Machine Model (EIAJ-ESD 200 pF,0 Ohm , 150V)	3/0
Human Body Model (MIL-STD ESD 100 pF, 1500 Ohm, 2000V) CLASS 2 (1,2,3)	3/0
Charged Device Model ESD - (1000V)	3/0

Table 4: Comparison of TSS721 and TSS721A

Absolute maximum ratings

		TSS721	TSS721A	
Parameter				**unit**
Input voltage at pin UBAT			***- 0.3 to 5.5***	V

Table 5: Comparison of TSS721 and TSS721A

Recommended operating conditions

		TSS721		TSS721A		
Parameter		**min**	**max**	**min**	**max**	**unit**
Bus voltage |BUSL2-BUSL1|	Receiver	11.3	40	***10.8***	***42.0***	V
	Transmitter	12	40	12	***42.0***	V
V_B voltage (receive mode)				***9.3***		V
V_{BAT}, ***(see Note 1)***		2.5	3.8	2.5	3.8	V

NOTE 1: $V_{BATmax} \leq V_{STC} - 1V$

Table 6: Comparison of TSS721 and TSS721A

Electrical characteristics at recommended ranges (unless otherwise noted)

		TSS721 max		TSS721A max		
Parameter	**Test conditions**	**min**	**max**	**min**	**max**	**unit**
V drop Rectifier BR	I_{BUS}=3mA				***1.5***	V
V drop current source CS1	R_{IDD}=13kΩ				***1.8***	V
ΔI_{BUS}	ΔV_{BUS}=10V; R_{IDD}=13kΩ; I_{MC}=0mA		20			µA
ΔI_{BUS}	ΔV_{BUS}=10V; I_{MC}=0mA; ***R_{IDD}=13 – 30 kΩ***				***2***	***%***
I_{CC}	V_{STC}=6.5V; I_{MC}=0mA; V_{BAT}=3.8V; R_{IDD}=13kΩ; (See Note 2)				***650***	µA
I_{CI1}	V_{STC}=6.5V; I_{MC}=0mA; V_{BAT}=3.8V; R_{IDD}=13kΩ; V_{BUS}=6.5V; RX/RXI=off (See Note 2)				***350***	µA

NOTE 2:Inputs RX/RXI and outputs TX/TXI are open; $I_{CC}=I_{CI1}+I_{CI2}$

Table 6: Comparison of TSS721 and TSS721A (continue)
Electrical characteristics at recommended ranges (unless otherwise noted)

				TSS721 max		TSS721A max		
Parameter		**Test conditions**		**min**	**max**	**min**	**max**	**unit**
I_{BAT}				-2	2	***-0.5***	***0.5***	µA
I_{BAT} + I_{VDD}		V_{BUS}=0V; V_{STC}=0V		-2	2	***-0.5***	***0.5***	µA
V_{VDD}		-I_{VDD}=1mA; V_{STC}=6.5V		3.2	3.4	***3.1***	3.4	V
R_{VDD}		-I_{VDD}=2 to 8mA; V_{STC}=4.5V					***5.0***	Ω
V_{RIDD}		R_{IDD}=30kΩ		1.23	1.32	1.23	***1.33***	V
R_{VS}		V_{DD}=off		400	800	***300***	***1000***	kΩ
V_{PF}		V_{STC}=6V; I_{PF}=-100µA		V_{BAT}-0.6	V_{BAT}			V
		V_{VB}=V_{STC}+0.3V; I_{PF}=1µA		0	0.6			V
		V_{VB}=V_{STC}+0.3V; I_{PF}=5µA		0	0.6			V
V_{PF}	***V_{STC}=6.5V***	***V_{VB}=V_{STC}+0.8V***	I_{PF}=-100µA			V_{BAT}-0.6	V_{BAT}	V
		V_{VB}=V_{STC}+0.3V	I_{PF}=1µA			0	0.6	V
			I_{PF}=5µA			0	0.6	V
ton		C_{STC}=50µF, (See Note 4)					***3***	s

NOTE 4:Bus voltage slew rate: 1V/µs

Table 7: Comparison of TSS721 and TSS721A

Electrical characteristics at recommended ranges (unless otherwise noted)

RECEIVER SECTION

		TSS721 max		TSS721A max		
Parameter	**Test conditions**	**min**	**max**	**min**	**max**	**unit**
V_T		MARK -7.9	MARK -5.7	***MARK -8.2***	MARK -5.7	V
I_{TX}; ***I_{TXI}***	V_{TX}=7.5V; ***V_{VB}=12V; V_{STC}=6.0V; V_{BAT}=3.8V***		10		10	µA

Table 8: Comparison of TSS721 and TSS721A

Electrical characteristics at recommended ranges (unless otherwise noted)

TRANSMITTER SECTION

		TSS721 max		TSS721A max		
Parameter	**Test conditions**	**min**	**max**	**min**	**max**	**unit**
I_{RX}	V_{RX}=V_{BAT}=3V; V_{VB}=V_{STC}=0V	-1	1	***-0.5***	***0.5***	µA
	V_{RX}=0V; V_{BAT}=3V; V_{STC}=6.5V	-10	-30	-10	***-40***	µA
I_{RXI}	V_{RX}=V_{BAT}=3V; V_{VB}=V_{STC}=0V	10	30	10	***40***	µA
	V_{RX}=0V; V_{BAT}=3V; V_{STC}=6.5V	10	30	10	***40***	µA