

PCN Number:		20150831002		PCN Date:		09/23/2015							
Title:		TLC2272/4 150 to 200 mm											
Customer Contact:		PCN_ww_admin_team@list.ti.com		PCN Type:		180 day PCN							
Proposed 1st Ship Date:		03/23/2016		Estimated Sample Availability:		Date provided at sample request							
Change Type:													
<input type="checkbox"/>	Assembly Site	<input type="checkbox"/>	Design	<input type="checkbox"/>	Wafer Bump Site	<input type="checkbox"/>							
<input type="checkbox"/>	Assembly Process	<input type="checkbox"/>	Data Sheet	<input type="checkbox"/>	Wafer Bump Material	<input type="checkbox"/>							
<input type="checkbox"/>	Assembly Materials	<input type="checkbox"/>	Part number change	<input type="checkbox"/>	Wafer Bump Process	<input type="checkbox"/>							
<input type="checkbox"/>	Mechanical Specification	<input type="checkbox"/>	Test Site	<input type="checkbox"/>	Wafer Fab Site	<input type="checkbox"/>							
<input type="checkbox"/>	Packing/Shipping/Labeling	<input type="checkbox"/>	Test Process	<input type="checkbox"/>	Wafer Fab Materials	<input type="checkbox"/>							
				<input checked="" type="checkbox"/>	Wafer Fab Process								
PCN Details													
Description of Change:													
<p>Texas Instruments is pleased to announce the qualification to convert TLC2272 and TLC2274 devices from 150mm to 200mm wafer diameter. Devices will remain in current wafer fab facility DFAB</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;">From</th> <th style="width: 50%;">To</th> </tr> </thead> <tbody> <tr> <td>Site, Wafer diameter</td> <td>Site, Wafer diameter</td> </tr> <tr> <td>DFAB, 150mm</td> <td>DFAB, 200mm</td> </tr> </tbody> </table>								From	To	Site, Wafer diameter	Site, Wafer diameter	DFAB, 150mm	DFAB, 200mm
From	To												
Site, Wafer diameter	Site, Wafer diameter												
DFAB, 150mm	DFAB, 200mm												
Reason for Change:													
Increased capacity.													
Anticipated impact on Fit, Form, Function, Quality or Reliability (positive / negative):													
None.													
Changes to product identification resulting from this PCN:													
None.													
Product Affected:													
TLC2272AMD	TLC2272MD	TLC2274AMDG4	TLC2274MDG4										
TLC2272AMDG4	TLC2272MDG4	TLC2274AMDRG4	TLC2274MDR										
TLC2272AMDR	TLC2272MDR	TLC2274AQD	TLC2274MDRG4										
TLC2272AMDRG4	TLC2272MDRG4	TLC2274AQDG4	TLC2274MN										
TLC2272AQD	TLC2272QDR	TLC2274AQDR	TLC2274QD										
TLC2272AQDG4	TLC2272QDRG4Q1	TLC2274AQDRG4	TLC2274QDG4										
TLC2272AQDR	TLC2272QDRQ1	TLC2274AQDRG4Q1	TLC2274QDRG4										
TLC2272AQDRG4	TLC2272QPWR	TLC2274AQDRQ1	TLC2274QDRG4Q1										
TLC2272AQDRG4Q1	TLC2272QPWRG4	TLC2274AQPWRG4Q1	TLC2274QDRQ1										
TLC2272AQDRQ1	TLC2272QPWRG4Q1	TLC2274AQPWRQ1	TLC2274QPWRG4Q1										
TLC2272AQPWRG4Q1	TLC2272QPWRQ1	TLC2274AMD	TLC2274QPWRQ1										
TLC2272AQPWRQ1	TLC2274AMD												

Qualification Data:

This qualification has been specifically developed for the validation of this change. The qualification data validates that the proposed change meets the applicable released technical specifications.

Automotive New Product Qualification Plan/Summary (As per AEC-Q100 and JEDEC Guidelines)

Supplier Name:	Texas Instruments Inc.	Wafer Fabrication Site / Process:	Dallas, Texas (DFAB) / LBC3S-200mm
Supplier Code:		Supplier Die Rev:	A
Supplier Part Number:	TLC2272QPWRSV	Supplier Assembly/Test Site:	Malaysia (MLA)
Customer Name:	Catalog	Supplier Package/Pin:	PW (TSSOP) / 8
Customer Part Number:		Pb Free Lead Frame (Y/N):	Y
Device Description:		“Green” Mold Compound (Y/N):	Y
MSL Rating:	1	Operating Temp Range:	-40°C to +125°C
Peak Solder Reflow Temp:	260°C	Automotive Grade Level (1):	Level 1
Prepared by Signature:	Thao Nguyen	Date:	4/15/15

est	#	Reference	Test Conditions	Min Lots (2)	SS / lot (2)	Min Total (2)	Results Lot/pass/fail	Comments: (N/A =Not Applicable)	Exceptions to AEC - Q100
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TEST GROUP A – ACCELERATED ENVIRONMENT STRESS TESTS (3)

PC	A1	JESD22 A113 J-STD-020	Preconditioning: SMD only; Moisture Preconditioning for THB/HAST, AC/UHST, TC, HTSL	Performed on <u>ALL</u> SMD devices, Prior to THB, AC, TC, PTC, HTSL					
THB or HAST	A2	JESD22 A101 JESD22 A110	Temperature Humidity Bias: 85°C/85% 1000 hours Highly Accelerated Stress Test: 130°C/85% 96 hours	3	77	231	3/231/0	QBS to package and A/T data. MAX3243IPW G4DL	
AC or UHST	A3	JESD22 A102 or JESD22 A118	Autoclave: 121C / 15 PSIG, 96 hours Unbiased Highly Accelerated Stress Test:	3	77	231	3/231/0	QBS to package and A/T data. MAX3243IPW G4DL	
TC	A4	JESD22 A104	Temperature Cycle: -65°C/+150°C/ 1000 cycles Post Temp Cycle Bond Pull 3 grams minimum (30 bonds Total)	3	77	231	3/231/0	QBS to package and A/T data. MAX3243IPW G4DL	
PTC	A5	JESD22-A105	Power Temperature Cycle: -40°C to +125°C for 1000 cycles	1	45	45	NA	Only applies to devices over 1 W	
HTSL	A6	JESD22 A103	High Temperature Storage Life: 175°C/500 hours	1	45	45	1/50/0	QBS to package and A/T data. MAX3243IPW G4DL	

TEST GROUP B – ACCELERATED LIFETIME SIMULATION TESTS (3)

HTOL	B1	JESD22 A108	High Temp Operating Life: 150°C/408 hours	3	77	231	3/231/0	QBS to Fab process MAX3243IPW G4DL	
ELFR	B2	AEC-Q100-008	Early Life Failure Rate: 150°C/ 24hours or 125°C/ 48hours	3	800	2400	3/2400/0	QBS to Fab process MAX3243IPW G4DL	
NVM Endurance, Data Retention, and Operational Life	B3	AEC Q100-005	NVM Endurance, Data Retention, and Operational Life	3	77	231		N/A	

TEST GROUP C – PACKAGE ASSEMBLY INTEGRITY TESTS (3)									
WBS	C1	AEC-Q100-001	Wire Bond Shear Test: (Ppk > 1.67 and Cpk > 1.33)	30 bonds	5 parts Min.	30 bonds	1/30/0	QBS to package and A/T data.	
WBP	C2	Mil-Std-883 Method 2011	Wire Bond Pull: Each bonder used (Ppk > 1.67 and Cpk > 1.33)	30 bonds	5 parts Min.	30 bonds	1/30/0	QBS to package and A/T data.	
SD	C3	JESD22 B102	Solderability: (>95% coverage) 8 hr steam age	1	15	15	1/22/0	QBS to package and A/T data. Pb free solderability	
PD	C4	JESD22 B100, JESD22 B108	Physical Dimensions: (Ppk > 1.67 and Cpk > 1.33)	3	10	30	3/30/0	QBS to package and A/T data.	
SBS	C5	AEC-Q100-010	Solder Ball Shear: (Ppk > 1.67 and Cpk > 1.33)	50 balls	3	50		N/A to non-solder ball surface mount devices	
LI	C6	JESD22 B105 Not Required for SMT parts	Lead Integrity: (No lead cracking or breaking)	50 leads	1	50		N/A to non-solder ball surface mount devices	

TEST GROUP D – DIE FABRICATION RELIABILITY TESTS

Test	#	Reference	Test Conditions	Min Lots (2)	SS / lot (2)	Min Total (2)	Results Lot/pass/fail	Comments: (N/A =Not Applicable)	Exceptions to AEC - Q100
EM	D1	JESD61	Electromigration: (Only if de-rating required beyond design rules)	-	-	-	Passed		
TDDB	D2	JESD35	Time Dependant Dielectric Breakdown:	-	-	-		N/A	
HCI	D3	JESD60 & 28	Hot Injection Carrier	-	-	-		N/A	

TEST GROUP E- ELECTRICAL VERIFICATION

TEST	E1	User/Supplier Specification	Pre and Post Stress Electrical Test.	All	All	All		100% of qualification devices	
HBM	E2	JESD22-A114	Electrostatic Discharge, Human Body Model	1	3	3	2000V- 3/0	QBS to TLC2272AID R Classification 2	
CDM	E3	JESD22-C101	Electrostatic Discharge, Charged Device Model; (750V corner leads, 500V for all other leads)	1	3	3	750V -3/0	QBS to TLC2272AID R Classification C4B	
LU	E4	AEC-Q100-004	Latch-Up:	1	6	6	1/6/0	QBS to TLC2272AID R	
ED	E5	AEC-Q100-009	Electrical Distributions: (Test across recommended operating temperature range) (Cpk > 1.67 , Ppk > 1.67)	1	30	30	1/30/0 25°C, 125°C, -40°C	QBS to TLC2272AID R	

Supplier Name:	Texas Instruments Inc.	Supplier Wafer Fabrication Site:	DFAB, Dallas, TX
Supplier Code:		Supplier Die Rev:	A
Supplier Part Number:	TLC2272AQPWRSV	Supplier Assembly/Test Site:	TI Malaysia
Customer Name:		Supplier Package/Pin:	PW/8 pin

Customer Part Number:		Pb Free Lead Frame (Y/N):	Y
Device Description:	Dual Operational Amplifier	"Green" Mold Compound (Y/N):	Y
MSL Rating:	Level-1	Operating Temp Range:	-40°C to +125°C
Peak Solder Reflow Temp:	L1/260C	Automotive Grade Level (1):	Level 1

Test	#	Reference	Test Conditions	Min Lots (2)	SS / lot (2)	Min Total (2)	Results Lot/pass/fail	Comments: (N/A =Not Applicable)	Exceptions to AEC -Q100
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TEST GROUP A – ACCELERATED ENVIRONMENT STRESS TESTS (3)

PC	A1	JESD22 A113 J-STD-020	Preconditioning: SMD only; Moisture Preconditioning for THB/HAST, AC/UHST, TC, HTSL, & HTOL	Performed on <u>ALL</u> SMD devices, Prior to THB, AC, TC & PTC			All/0	All reldb jobs documented below	None
HAST	A2	JESD22 A110	Highly Accelerated Stress Test: (Test @ Rm) 130°C/85% 96 hours	3	77	231	3/78/0 1/77/0 3/78/0	SHEREL.04.L VT.03001 MPDREL.05. AUTO.12063 MPDREL.04. AHC.03004	Test before and after @ Room Temp
AC	A3	JESD22 A102	Autoclave: 121C / 96 hours	3	77	231	1/77/0 1/77/0 1/77/0	HIJREL.05.B Q.03002 HIJREL.05.L V.08010 HIJREL.05.76 .10033 Test is performed up to 240 hours	None
TC	A4	JESD22 A104	Temperature Cycle: -65°C/+150°C/ 1000 cycles Post Temp Cycle Bond Pull 3 grams minimum	3	77	231	1/77/0 1/77/0 1/77/0 Post Bond wasn't performed	HIJREL.05.B Q.03002 HIJREL.05.L V.08010 MPDREL.05. AUTO.12063	Test before and after @ Room Temp
PTC	A5	JESD22-A105	Power Temperature Cycle: -40°C to +125°C for 1000 cycles	0	0	0		Power consumption < 1Watt	None
HTSL	A6	JESD22 A103	High Temperature Storage Life: 170°C/420 hours (3)	1	45	45	3/231/0	TIDREL.05.C DC.11011 Test is performed up to 1000 hours	Test before and after @ Room Temp

TEST GROUP B – ACCELERATED LIFETIME SIMULATION TESTS (3)

HTOL	B1	JESD22 A108	High Temp Operating Life: 150°C/500 hours	3	77	231	60/1856/0	155°C/240 hr	Test @ Room Temp
ELFR	B2	AEC-Q100-008	Early Life Failure Rate: 125°C/48 hours 150°C/24hours	3	800	2400	60/1856/0	HTOL data	Per lot SS may be reduced. Test @ Room Temp

TEST GROUP C – PACKAGE ASSEMBLY INTEGRITY TESTS (3)

WBS	C1	AEC-Q100-001	Wire Bond Shear Test: (Ppk > 1.67 and Cpk > 1.33)	30 bonds	5 parts Min.	30 bonds	1/38/0	Green mold compound Qual MQ from SWR 20041105041	
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WBP	C2	Mil-Std-883 Method 2011	Wire Bond Pull: Each bonder used (Ppk > 1.67 and Cpk > 1.33)	30 bonds	5 parts Min.	30 bonds	1/38/0	Same as above	
SD	C3	JESD22 B102	Solderability: (>95% coverage) 8 hr steam age	1	22	22	1/22/0	Package family data	
PD	C4	JESD22 B100, JESD22 B108	Physical Dimensions: (Ppk > 1.67 and Cpk > 1.33)	1	5	5	1/5/0	Same as above	
SBS	C5	AEC-Q100-010	Solder Ball Shear: (Ppk > 1.67 and Cpk > 1.33)	50 balls	3	50		N/A to non-solder ball surface mount devices	
LI	C6	JESD22 B105 Not Required for SMT parts	Lead Integrity: (No lead cracking or breaking)	50 leads	1	50		N/A to non-solder ball surface mount devices	

TEST GROUP D – DIE FABRICATION RELIABILITY TESTS

Test	#	Reference	Test Conditions	Min Lots (2)	S.S. Per Lot (2)	Min Total (2)	Results Lot/pass/fail	Comments: (N/A =Not Applicable)	Exceptions to AEC -Q100
EM	D1	JESD61	Electromigration: (Only if de-rating required beyond design rules)	-	-	-		Assume QBS to available	
Tddb	D2	JESD35	Time Dependant Dielectric Breakdown:	-	-	-		N/A	
HCI	D3	JESD60 & 28	Hot Injection Carrier	-	-	-		N/A	

TEST GROUP E- ELECTRICAL VERIFICATION

TEST	E1	User/Supplier Specification	Pre and Post Stress Electrical Test.	All	All	All		100% of qualification devices	
HBM	E2	JESD22-A114	Electrostatic Discharge, Human Body Model	1	3	3	500V 3/0 1000V 3/0 1500V 3/0 2000V 3/0	MSPREL.98 .TLC2272.1 2002	Performed per JEDEC Test before and after @ Room Temp
MM	E2	JESD22-A115	Machine Model:	1	3	3	50V 3/0 100V 3/0	MSPREL.98 .TLC2272.1 2002 MSPREL.98 .TLC2272.1 2003	Performed per JEDEC Test before and after @ Room Temp
CDM	E3	JESD22-C101	Electrostatic Discharge, Charged Device Model; (750V corner leads, 500V for all other leads)	1	3	3	500V 3/0 750V 3/0 1000V 3/0 1500V 3/0	MSPREL.98 .TLC2272.1 2002	Performed per JEDEC
LU	E4	AEC-Q100-004	Latch-Up:	1	6	6	6/0	MPDREL.0 3.TLC.1002 5	Test before and after @ Room Temp
ED	E5	AEC-Q100-009	Electrical Distributions: (Test across recommended operating temperature range) (Cpk > 1.67 , Ppk > 1.67)	1	30	30	3/ 90/0	Data available	ED data may be limited to min 30 units from one diffusion lot
GL	E8	AEC-Q100-006	Electro-Thermally induced Gate Leakage:	0	0	0	NA	NA	GL will not be performed

ADDITIONAL INFORMATION

MTBF FIT			Mean Time Between Failures Failures-in-Time. The number of failures per 10E9 device-hours. Estimated usage temperature = 55°C Statistical confidence level = 60% Activation Energy = 0.7 eV Summarized by technology	-	-	-	1.87*10 ⁹ 0.5	MTBF FIT	
DPPM			Defective Parts per Million Based on APG customer returns resulting in Corrective	-	-	-			

			Action (N/A for New Products)						
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- (1) Grade 0 (or A): -40°C to +150°C ambient operating temperature range
 Grade 1 (or Q): -40°C to +125°C ambient operating temperature range
 Grade 2 (or T): -40°C to +105°C ambient operating temperature range
 Grade 3 (or I): -40°C to +85°C ambient operating temperature range
 Grade 4 (or C): -0°C to +150°C ambient operating temperature range
- (2) These are recommended minimum lot/sample sizes. Lot/sample size may be reduced depending on available data.
- (3) Generic data may be used.

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Reliability data shows characteristic failure mechanisms of the specific environmental stress as documented in the industry standards for each stress condition.

For questions regarding this notice, e-mails can be sent to the regional contacts shown below or your local Field Sales Representative.

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