



MAX20446BATG/V+T
MAX20446BATGA/V+T

Summary:

This report summarizes the results of the reliability tests performed by Maxim to qualify the MAX20446BATG/V+T & MAX20446BATGA/V+T for automotive applications.

Conclusion:

The MAX20446BATG/V+T & MAX20446BATGA/V+T successfully meets the reliability requirements performed by Maxim in accordance with the automotive qualification standard, AEC-Q100.

Test Results/Lot information (Device Specific):

Table 1:

Lot Number:		JCGP4Q001TQ	
Part Number:		MAX20446BATG/V+	
Temperature Grade:		1	
Fab Site:		MFN	
Fab Process Core:		S18	
Metallization/# Layers:		AlCu / 4	
Passivation:		SiN / SiO2	
Die Type:		DE03A-0B	
Package Assembly Site:		UTL	
Die Substrate:		Si	
Package Type:		24L TQFN 4x4	
Wire Bond Material/Dia.:		CuPd 1.0 mil	
Mold Compound:		G700HCD	
Die Attach:		AB8200T	
Leadframe Material:		COPPER	
Lead Finish:		100% MATTE TIN	
Flammability Rating:		UL-94 (V-0 Rating)	
Moisture Rating:		MSL 1	
Date Code:		2029	
Rel Lot Number:		R41935A	
Test		Results	
		SS	Temp
ESD (HBM)	2500V	0/5	RH
ESD (CDM)	All Pins: 500V	0/5	RH
	Corner Pins: 750V	0/5	RH
Latch-Up	CI: 100mA	0/6	RH
	OV: 1.5 x MOV	0/6	RH
HTOL	192 hrs	0/77	RHC

Core Process Cumulative FIT Rate:

$\lambda = 0.02$ FITs (60% confidence level @25°C)

$\lambda = 0.24$ FITs (60% confidence level @55°C)

The following tables include the process and package level qualification data to support the product level qualification. Multiple tables may be included if multiple wafer fabrication or assembly subcontractors are used (multiple package variations may be included).

Test Results/Lot information (Package Technology): TQFN/ / ASECL

Table 2:

Lot Number:	TBJG5Q001HQ	EAQR7Q001H	EARB3Q001C	EAZR0A013BA
Part Number:	MAX20066ATPA/V+	MAX20003ATPA/V+	MAX20080ATM/V+CFT	MAX20003ATPB/V+
Temperature Grade:	1	1	1	1
Fab Site:	TOWER JAZZ	EPSON	EPSON	EPSON
Fab Process:	S18	S18	S18	S18
Metallization/# Layers:	AlCu / 4	AlCu / 4	AlCu / 4	AlCu / 4
Passivation:	SiN / SiO2	SiN / SiO2	SiN / SiO2	SiN / SiO2
Die Type:	SP35A-0B	AP47A-0B	AP80B-0B	AP47A-0E
Package Assembly Site:	ASECL	ASECL	ASECL	ASECL
Die Size:	84.25 x 88.98	100 x 103.94	142.91 x 155.91	100 x 103.94
Package Type:	20L TQFN 4x4	20L TQFN 5x5	48L TQFN 7x7	20L TQFN 5X5
Wire Bond Material/Dia.:	CuPd 1.3 mil	CuPd 1.3 mil	CuPd 1.0 mil	CuPd 1.3 mil
Mold Compound:	G700LA	G700LA	G700LA	G700LA
Die Attach:	EN4900G	EN4900G	EN4900G	EN4900G
Leadframe Material:	COPPER	COPPER	COPPER	COPPER
Lead Finish:	100% MATTE TIN	100% MATTE TIN	100% MATTE TIN	100% MATTE TIN
Date Code:	1611	1413	1410	1631
Rel Lot Number:	R28336A	R27054A	R26792A	R27520D

AEC #	Test	Results		Results		Results		Results	
		SS	Temp	SS	Temp	SS	Temp	SS	Temp
A1	Preconditioning	0/231	R	0/231	R	0/231	R	0/45	R
A2	HAST	0/77	RH	0/77	RH	0/77	RH	-	N/A
A3	Unbiased HAST	0/77	R	0/77	R	0/77	R	-	N/A
A4	Temperature Cycle	500x – 0/77	RH	500x – 0/77	RH	500x – 0/77	RH	-	N/A
A5	Power Temperature Cycle	-	N/A	-	N/A	-	N/A	1000x – 0/45	RH
C2	Wire Bond Pull	0/200	N/A	0/150	N/A	-	N/A	-	N/A
A6	High Temp Storage	1000hr – 0/45	RH	1000hr – 0/45	RH	1000hr – 0/45	RH	-	N/A
C3	Solderability	0/15	N/A	-	N/A	-	N/A	-	N/A
B1	High Temp Op/Life	1000hr – 0/77	RHC	1000hr – 0/77	RHC	-	N/A	-	N/A

Test Results/Lot information (Package Technology): TQFN / UTL

Table 3:

Lot Number:	EAQR7Q001B	EAT03Q001D	EATO3Q002AA	EAZR0A030EB					
Part Number:	MAX20003ATPA/V+	MAX20003ATPA/V+	MAX20003ATPA/V+	MAX20003ATPB/V+					
Temperature Grade:	1	1	1	1					
Fab Site:	EPSON	EPSON	EPSON	EPSON					
Fab Process:	S18	S18	S18	S18					
Metallization/# Layers:	AlCu / 4	AlCu / 4	AlCu / 4	AlCu / 4					
Passivation:	SiN / SiO2	SiN / SiO2	SiN / SiO2	SiN / SiO2					
Die Type:	AP47A-0B	AP47A-0B	AP47A-0B	AP47A-0E					
Package Assembly Site:	UTL	UTL	UTL	UTL					
Die Size:	100 x 103.94	100 x 103.94	100 x 103.94	100 x 103.94					
Package Type:	20L TQFN 5x5	20L TQFN 5x5	20L TQFN 5x5	20L TQFN 5x5					
Wire Bond Material/Dia.:	CuPd 1.3 mil	CuPd 1.3 mil	CuPd 1.3 mil	CuPd 1.3 mil					
Mold Compound:	G770HCD	G770HCD	G770HCD	G770HCD					
Die Attach:	AB8200T	AB8200T	AB8200T	AB8200T					
Leadframe Material:	COPPER	COPPER	COPPER	COPPER					
Lead Finish:	100% MATTE TIN	100% MATTE TIN	100% MATTE TIN	100% MATTE TIN					
Date Code:	1412	1424	1435	1715					
Rel Lot Number:	R27054B	R27054D	R27054E	R29180A					
AEC #	Test	Results		Results		Results		Results	
		SS	Temp	SS	Temp	SS	Temp	SS	Temp
A1	Preconditioning	0/231	R	0/231	R	0/231	R	0/45	R
A2	HAST	0/77	RH	0/77	RH	0/77	RH	-	N/A
A3	Unbiased HAST	0/77	R	0/77	R	0/77	R	-	N/A
A4	Temperature Cycle	500x – 0/77	RH	500x – 0/77	RH	500x – 0/77	RH	-	N/A
A5	Power Temperature Cycle	-	RH	-	RH	-	RH	1000x – 0/45	RH
C2	Wire Bond Pull	0/150	N/A	0/150	N/A	0/150	N/A	-	N/A
A6	High Temp Storage	1000hr – 0/45	RH	-	RH	-	RH	-	N/A
C3	Solderability	0/15	N/A	-	N/A	-	N/A	-	N/A
B1	High Temp Op/Life	1000hr – 0/77	RHC	1000hr – 0/77	RHC	1000hr – 0/77	RHC	-	N/A

Test Results/Lot information (Wafer Process Technology): S18 / MFN

Table 4:

Lot Number:	JBPH4Q002CC	JBPH4Q002CA	JBPH43005AC	JBPH43004A
Part Number:	MAX20094ATIA/VY+	MAX20094ATIA/VY+	MAX20094ATIA/VY+	MAX20094ATIA/VY+
Temperature Grade:	1	1	1	1
Fab Site:	MFN	MFN	MFN	MFN
Fab Process:	S18	S18	S18	S18
Metallization/# Layers:	AlCu / 4	AlCu / 4	AlCu / 4	AlCu / 4
Passivation:	SiN / SiO2	SiN / SiO2	SiN / SiO2	SiN / SiO2
Die Type:	AP77A-0B	AP77A-0B	AP77A-0B	AP77A-0B
Package Assembly Site:	UTL	UTL	UTL	ASECL
Die Size:	92.52 x 92.52	92.52 x 92.52	92.52 x 92.52	92.52 x 92.52
Package Type:	28L SWTQFN 5x5	28L SWTQFN 5x5	28L SWTQFN 5x5	28L SWTQFN 5x5
Wire Bond Material/Dia.:	CuPd 1.3 mil	CuPd 1.3 mil	CuPd 1.3 mil	CuPd 1.3 mil
Mold Compound:	G770HCD	G770HCD	G770HCD	G700LA
Die Attach:	AB8200T	AB8200T	AB8200T	EN4900G
Leadframe Material:	COPPER	COPPER	COPPER	COPPER
Lead Finish:	100% MATTE TIN	100% MATTE TIN	100% MATTE TIN	100% MATTE TIN
Date Code:	1718	1718	1726	1725
Rel Lot Number:	R28961A	R28961B	R28961C	R28961G

AEC #	Test	Results		Results		Results		Results	
		SS	Temp	SS	Temp	SS	Temp	SS	Temp
A1	Preconditioning	0/231	R	0/231	R	0/231	R	-	N/A
A2	HAST	0/77	RH	0/77	RH	0/77	RH	-	N/A
A3	Unbiased HAST	0/77	R	0/77	R	0/77	R	-	N/A
A4	Temperature Cycle	500x – 0/77	RH	500x – 0/77	RH	500x – 0/77	RH	-	N/A
A6	High Temp Storage	1000hr – 0/77	RH	1000hr – 0/77	RH	1000hr – 0/77	RH	-	N/A
B1	High Temp Operating Life	1000hr – 0/77	RHC	1000hr – 0/77	RHC	1000hr – 0/77	RHC	-	N/A
B2	Early Life Failure Rate	48hr – 0/800	RH	-	N/A	48hr – 0/800	RH	48hr – 0/800	RH

Revision	Description of Revision and Author	Approved By	Effective By (Date)
A	Initial release.	J. Aquino	21 Oct 2020