



## Product Change Notification - LIAL-19WSIK731

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**Date:**

06 Jan 2020

**Product Category:**

Memory

**Affected CPNs:****Notification subject:**

Memo # ML032019005L: Final Notice: Qualification of 36.3K process technology for selected Microchip products of the 24xx01, 24xx02, and 24xx04 extended grade device families.

**Notification text:****PCN Status:**

Final notification

**PCN Type:**

Manufacturing Change

**Microchip Parts Affected:**

Please open one of the icons found in the Affected CPNs section above.

**NOTE:** For your convenience Microchip includes identical files in two formats (.pdf and .xls)

**Description of Change:**

Qualification of 36.3K process technology for selected Microchip products of the 24xx01, 24xx02, and 24xx04 extended grade device families.

**Pre Change:**

Available in 160K wafer technology fabricated at Microchip fabrication sites FAB2 and FAB4 (Tempe, AZ and Gresham, OR, USA) using 8 inch wafers.

**Post Change:**

Available in 160K wafer technology fabricated at Microchip fabrication sites FAB2 and FAB4 (Tempe, AZ and Gresham, OR, USA) using 8 inch wafers or available in 36.3K wafer technology fabricated at FAB 5 (Colorado Springs, CO, USA) using 6 inch wafers.

**Pre and Post Change Summary:**

	Pre Change	Post Change	
<b>Wafer Technology</b>	160K wafer technology	160K wafer technology	36.3K wafer technology
<b>Fabrication Location</b>	Microchip Fabrication Sites FAB 2 and FAB4 (Tempe, AZ and Gresham, OR, USA)	Microchip Fabrication Sites FAB 2 and FAB4 (Tempe, AZ and Gresham, OR, USA)	FAB 5 (Colorado Springs, CO USA)
<b>Wafer Diameter</b>	8 inches (200 mm)	8 inches (200 mm)	6 inches (150 mm)
<b>Quality certification</b>	ISO/TS16949	ISO/TS16949	ISO9001/TS16949



**Impacts to Data Sheet:**

None

**Change Impact:**

None

**Reason for Change:**

To improve manufacturability by qualifying an additional fabrication site.

**Change Implementation Status:**

In Progress

**Estimated First Ship Date:**

March 2, 2019 (date code: 2010)

NOTE: Please be advised that after the estimated first ship date customers may receive pre and post change parts.

**Time Table Summary:**

Workweek	January 2020					->	March 2020				
	01	02	03	04	05		18	19	20	21	22
Final PCN Issue Date		X									
Qual Report Availability		X									
Estimated Implementation Date							X				

**Method to Identify Change:**

Traceability code

**Qualification Report:**

Please open the attachments included with this PCN labeled as PCN\_#\_Qual Report.

**Revision History:**

**January 06, 2020:** Issued final notification. Attached the qualification report. Provided estimated first ship date to be on March 2, 2020

The change described in this PCN does not alter Microchip's current regulatory compliance regarding the material content of the applicable products.

**Attachment(s):**

[PCN\\_LIAL-19WSIK731\\_QUAL\\_REPORT.pdf](#)

Please contact your local [Microchip sales office](#) with questions or concerns regarding this notification.

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**QUALIFICATION REPORT SUMMARY**  
RELIABILITY LABORATORY

**PCN#: LIAL-19WSIK731**

**Date**  
**April 30, 2019**

**Qualification of 36.3K process technology for selected  
Microchip products of the 24xx01, 24xx02, and 24xx04  
extended grade device families**



**MICROCHIP**

## **SUMMARY QUALIFICATION REPORT**

**Purpose:** Qualification of 36.3K process technology for selected Microchip products of the 24xx01, 24xx02, and 24xx04 extended grade device families.

**Document Control #:** ML112018006E

**Document Revision:** E

**Device(s):** 24xx01x, 24xx02x, 24xx04x

**Product:** 4K, 512 X 8 1.8V SERIAL EE

**Mask Identification #:** 363V2

**Process** 36.3K

**MSL:** 3301



### Test Conditions:

TEST	METHOD	CONDITION	SAMPLE SIZE RUN	CRITERIA
Early Life Failure Test	AEC Q100	150 °C, 24 Hrs Electrical Test at +25 °C and 125 °C	820	0/800
High Temperature Operating Life / Dynamic Life Test	MIL-STD 883 Method 1005	150°C, 408 Hrs Electrical Test at -40°C, +25°C, +85°C and/or +125°C.	620	0/600 1 Lot
Endurance Cycling and Bakes (END)	MIL-STD 883 Method 1033	100K data memory, E/W cycles, 85°C Bake 1: 150°C, 48 Hrs Bake 2: 150°C, 48 Hrs	242	0/231
High Temperature Retention Bake (RET)	MIL-STD 883 Method 1033	175°C, 504 Hrs	242	0/231
EDR HTOL(DLT)	MIL-STD 883 Method 1033	100K data memory, E/W cycles, 85 °C, 408 hours HTOL at 150 °C Electrical pre and post test at +25 °C and 125 °C.	92	0/77
ESD Human Body Model	JS-001	1.5K Ohm, 100 pF Electrical Test at +25°C, +85°C and/or +125°C.	27	2000 V 1 Lot
ESD Charged Device Model	JS-002	1 Ohm pogo pin to ground with a 50-ohm impedance matched cable, device is placed onto a charge plate separated by a dielectric material. Electrical test at +25°C, +85°C and/or +125°C.	18	500V on all pins, 750V on corner pins 1 Lot
ESD Machine Model	JESD22A115	0 Ohm, 200 pF Electrical Test at +25°C, +85°C and/or +125°C.	12	200 V 1 Lot
Latch-up Testing	JESD78	Trigger Voltage Limit = $1.5 \cdot V_{max}$ Pulse Width = 10 ms Rise/Fall Time = 500 us Test at +25°C and +125°C	6  24	1 Lot 200 mA (0/6) 105 mA (0/12)



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## SUMMARY QUALIFICATION REPORT

### Qualification Material:

LOT	LOT 1	LOT 2	LOT 3	LOT 4	LOT 5
DEVICE	24LC04B	24LC04B	24LC04B	24LC04B	24LC04B
MASK, REV	363V2, C1	363V2, C1	363V2, C1	363V2, C1	363V2, C1
WAFER FAB	Colorado Springs 6-inch fabrication	Colorado Springs 6 inch fabrication	Colorado Springs 6 inch fabrication	Colorado Springs 6 inch fabrication	Colorado Springs 6 inch fabrication
WAFER PROCESS	36.3K 6"	36.3K 6"	36.3K 6"	36.3K 6"	36.3K 6"
WAFER LOT	CSO519113359.000	E8U3576	MCSO519228073.000	MCSO519238695.000	MCSO519368133.100
ASSEMBLY LOT	MMT-191401703.000	Chandler	MMT-192801215.000	MMT-192501097.000	MMT-193801538.000
PACKAGE	PDIP	8L GSB	8L TSSOP	8L PDIP	8L PDIP
ASSEMBLY SITE	MMT	Chandler	MMT	MMT	MMT
FINAL TEST	MTAI	Chandler	MCSO	MTAI	MTAI
QUAL #	R18097-0x	ML092018001L ML092018006A	ML122018002C ML1220180048	R18126-01 to R18126-07	R19039-01 to R19039-07
CN #	ES212662	ES212662	ES212662	ES235118	ES273919

### Conclusion:

Pass  Fail

Based on the results, the 24LC04B complies with the reliability guidelines specified in QCI-39000. Therefore, the 24xx04x, 24xx02x, and the 24xx01x are released to production

**Die Level Results:**

DYNAMIC LIFE TESTING AT 150°C		
	24 Hours	408 Hours
Lot 1	0/820	0/620
Lot 4	0/815	0/615
Lot 5	0/811	0/615

Activation Energy	0.7 eV
Derated Temperature	55°C

	Infant Mortality	Total Life	MTBF (Hours)
Device Hours	58,704	813,504	N/A
Fit Rate - 50% Confidence	45	3	305,562,999
Fit Rate - 60% Confidence	60	4	231,149,485
Fit Rate - 90% Confidence	151	11	91,983,628

Note: One FIT is one fail in 109 device hours

	Best Estimated Failure Rate (%\KHR)
Infant Mortality	0.0045
Total Life	0.0003



**ENDURANCE CYCLING AT 85°C AND BAKES AT 150°C**

	100,000 cycles Data Flash Memory Erase/Write Cycling	Bake 1	Bake 2
Lot 1	0/242	0/242	0/242
Lot 4	0/246	0/246	0/238
Lot 5	0/246	0/186	0/244

**HIGH TEMPERATURE RETENTION BAKE AT 175°C**

	96 Hours	504 Hours
Lot 1	0/242	0/242
Lot 4	0/236	0/236
Lot 5	0/244	0/244

Activation Energy	0.7 eV
Derated Temperature	55°C

	Total Life
Device Hours	433,200
FIT Rate - 50% Confidence	2
FIT Rate - 60% Confidence	3
FIT Rate - 90% Confidence	7

Note: One FIT is one fail in 10<sup>9</sup> device hours.

**ENDURANCE CYCLIING AT 85°C AND DYNAMIC LIFE TEST AT 150°C (HTOL)**

	100,000 cycles Data Flash Memory Erase/Write Cycling	96 Hours (HTOL)	408 Hours (HTOL)
Lot 1	0/92	0/92	3/89 <sup>a</sup>
Lot 4	0/92	0/92	0/92
Lot 5	0/91	0/91	0/91

<sup>a</sup>Three devices were discounted due to test handler damage to the leads

**ELECTROSTATIC DISCHARGE TESTS**

	Human Body Model	Machine Model
Lot 2	Pass up to 5500V	Pass up to 400V

	Charge Device model
Lot 3	Pass up to 2000V

**LATCH-UP TEST**

	200mA @ 25°C	105mA @ 85°C
Lot 2	Passed	Passed

	105mA @ 125C
Lot 3	Passed

Note: All pins meet and exceed QCI-39000 guidelines.

Affected Catalog Part Numbers (CPN)

24LC04B-E/MS  
24LC04B-E/MC  
24LC04B-E/SN  
24LC04B-E/P  
24LC04B-E/ST  
24LC04BT-E/MNY  
24LC04BT-E/MS  
24LC04BT-E/MC  
24LC04BT-E/SN  
24LC04BT-E/ST  
24LC04BT-E/OT  
24LC04BH-E/MS  
24LC04BH-E/SN  
24LC04BH-E/P  
24LC04BH-E/ST  
24LC04BHT-E/MNY  
24LC04BHT-E/MS  
24LC04BHT-E/SN  
24LC04BHT-E/ST  
24LC04BHT-E/OT  
24LC01B-E/MS  
24LC01B-E/MC  
24LC01B-E/SN  
24LC01B-E/P  
24LC01B-E/ST  
24LC01BT-E/MNY  
24LC01BT-E/MS  
24LC01BT-E/MC  
24LC01BT-E/LT  
24LC01BT-E/SN  
24LC01BT-E/ST  
24LC01BT-E/OT  
24LC02B-E/MS  
24LC02B-E/SN  
24LC02B-E/P  
24LC02B-E/ST  
24LC02BT-E/MNY  
24LC02BT-E/MS  
24LC02BT-E/MC  
24LC02BT-E/LT  
24LC02BT-E/SN  
24LC02BT-E/ST  
24LC02BT-E/OT  
24LC01BH-E/MS  
24LC01BH-E/SN  
24LC01BH-E/P

24LC01BH-E/ST  
24LC01BHT-E/MNY  
24LC01BHT-E/MS  
24LC01BHT-E/LT  
24LC01BHT-E/SN  
24LC01BHT-E/ST  
24LC01BHT-E/OT  
24LC02BH-E/MS  
24LC02BH-E/SN  
24LC02BH-E/P  
24LC02BH-E/ST  
24LC02BHT-E/MNY  
24LC02BHT-E/MS  
24LC02BHT-E/LT  
24LC02BHT-E/SN  
24LC02BHT-E/ST  
24LC02BHT-E/OT