



RELIABILITY REPORT
FOR
MAX30034CUA+T
PLASTIC ENCAPSULATED DEVICES

May 18, 2017

MAXIM INTEGRATED

160 RIO ROBLES
SAN JOSE, CA 95134

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Conclusion

The MAX30034CUA+T successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated's quality and reliability standards.

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I. Device Description

A. General

The MAX30031-MAX30034 are patent-pending protection devices intended to (with the help of external, energy-rated resistors) absorb repetitive defibrillation and other high-energy pulses to protect sensitive electronic circuitry in ECG and other medical/industrial equipment. The devices can withstand over 100,000 defibrillation pulses without failure. The devices are intended to replace the gas-discharge tubes and transient absorbers in applications where its significant reduction in size is beneficial and its lower, well defined on-voltage can offer higher degrees of protection to sensitive electronics. The devices use a combination of a rugged integrated circuit process and high-speed circuitry to ensure very fast turn-on times with trigger voltages low enough to not require secondary clamping circuitry. A low hold current of approximately 175mA ensures protection is maintained for the entire length of the high-energy transient event. The MAX30031-MAX30034 are available in a small, 3mm x 5mm μ MAX-8 package and are specified over the 0°C to +70°C temperature range.

II. Manufacturing Information

| | |
|--------------------------------|------------------------------------|
| A. Description/Function: | Defibrillation/Surge/ESD Protector |
| B. Process: | S18 |
| C. Fabrication Location: | USA |
| D. Assembly Location: | Thailand |
| E. Date of Initial Production: | April 14, 2016 |

III. Packaging Information

| | |
|---|--------------------------|
| A. Package Type: | 8-pin umax |
| B. Lead Frame: | Copper |
| C. Lead Finish: | 100% matte Tin |
| D. Bondwire: | Au (1.3 mil dia.) |
| E. Mold Material: | Epoxy with silica filler |
| F. Assembly Diagram: | #05-100283 |
| G. Flammability Rating: | Class UL94-V0 |
| H. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C | Level 1 |
| I. Single Layer Theta Ja: | N/A°C/W |
| J. Single Layer Theta Jc: | N/A°C/W |
| K. Multi Layer Theta Ja: | 206°C/W |
| L. Multi Layer Theta Jc: | 42°C/W |

IV. Die Information

| | |
|----------------------------|---|
| A. Dimensions: | 34.6457X62.9921 mils |
| B. Passivation: | Si ₃ N ₄ /SiO ₂ (Silicon nitride/ Silicon dioxide) |
| C. Interconnect: | Al/0.5%Cu with Ti/TiN Barrier |
| D. Backside Metallization: | None |
| E. Minimum Metal Width: | 0.23 microns (as drawn) |
| F. Minimum Metal Spacing: | 0.23 microns (as drawn) |
| G. Isolation Dielectric: | SiO ₂ |
| H. Die Separation Method: | Wafer Saw |

V. Quality Assurance Information

- A. Quality Assurance Contacts: Eric Wright (Reliability Engineering)
Brian Standley (Manager, Reliability)
Bryan Preeshl (Vice President of QA)
- B. Outgoing Inspection Level: 0.1% for all electrical parameters guaranteed by the Datasheet.
0.1% for all Visual Defects.
- C. Observed Outgoing Defect Rate: < 50 ppm
- D. Sampling Plan: Mil-Std-105D

VI. Reliability Evaluation

A. Accelerated Life Test

The results of the 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{\text{MTTF}} = \frac{1.83}{192 \times 4340 \times 80 \times 2} \quad (\text{Chi square value for MTTF upper limit})$$

(where 4340 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$$\lambda = 13.7 \times 10^{-9}$$

$$\lambda = 13.7 \text{ F.I.T. (60\% confidence level @ 25°C)}$$

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at <http://www.maximintegrated.com/qa/reliability/monitor>. Cumulative monitor data for the S18 Process results in a FIT Rate of 0.40 @ 25C and 6.96 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing

The OT06-0 die type has been found to have all pins able to withstand an HBM transient pulse of +/-2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device passes overvoltage testing per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX30034CUA+T

| TEST ITEM | TEST CONDITION | FAILURE IDENTIFICATION | SAMPLE SIZE | NUMBER OF FAILURES | COMMENTS |
|----------------------------------|--|----------------------------------|-------------|--------------------|----------|
| Static Life Test (Note 1) | Ta = 135C Biased Time = 192 hrs. | DC Parameters & functionality | 80 | 0 | |

Note 1: Life Test Data may represent plastic DIP qualification lots.