



Reliability Report
Reliability Data for CPC10XXN/CPC12XXN
4 Pin SOP Product
(High Voltage 200v – 450v)

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Introduction

This report summarizes the Reliability data of Clare’s CPC10XXN/CPC12XXN 4-Pin SOP family products. The Reliability data presented here were collected during Clare’s product qualification and ongoing monthly Reliability Monitoring Program (RMP). The silicon die level data collected on multiple product types, but share the same process technology and design rules (DMOS P27) wafer fabrication facility and subcontract assembly location. The 4-Pin SOP package data were substituted from CPC101XN, CPC103XN, and CPC12XXN since the package construction materials, leadframe and subcontract assembly location are similar for all 4-pin SOP products.

Reliability Tests:

The stress tests data and associated results for the CPC10XXN/CPC12XXN and family products are summarized in Table 1. These results apply to certain CPC2XXXN products also.

Table 1: CPC10XXN/CPC12XXN Reliability Tests

| Product Package | Stress Test | Applicable Specs and Readpoints | Stress Conditions | # Lots | Sample Size | Total |
|--|---------------------|---------------------------------|--|--------|-------------|-------|
| CPC1008N/ CPC1017N/ CPC1035N/ 4-SOP | Thermal Shock (T/S) | Mil-Std-883, M1011 | 0 to 100°C, 10/10 dwells 15 cycles | 4 | 55 | 220 |
| CPC1008N/ CPC1017N/ CPC1035N/ 4-SOP | Temp Cycle (T/C) | Mil-Std-883 M1010, “B” | -55 to 125°C, 10/10 dwells, 300 cycles | 4 | 55 | 220 |
| CPC1025N/ 4-SOP | HTRB | JESD22-A108 | 125C, 80% WVDC, 1000 hrs | 1 | 129 | 129 |
| CPC1035N/ 4-SOP | HTRB | JESD22-A108 | 125C, 80% WVDC, 1000 hrs | 3 | 129 | 387 |
| CPC1030N/ 4-SOP | HTRB | JESD22-A108 | 125C, 80% WVDC, 1000 hrs | 2 | 129 | 258 |
| CPC1001N/ 4-SOP | Cold Storage Test | JESD22-A119 | -55C, 1000hrs | 1 | 55 | 55 |

Reliability Test Results:

Table 2 below provides the Reliability results from the stress tests that were performed on the CPC10XXN/CPC12XXN family products.

Table 2: CPC10XXN/CPC12XXN Reliability Test Results

| Product/ Package | Stress/ Kits | Readpoint 1 / Reject/ SS | Readpoint 2 / Reject/ SS | Readpoint 3 / Reject/ SS | Readpoint 4 / Reject/ SS | Comments |
|---------------------|---------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|----------------------|
| CPC1035/ 4-SOP | HTRB | 250 hrs. | 500 hrs. | 750 hrs. | 1000 hrs. | |
| | TE1898 | 0/129 | 0/129 | 0/129 | 0/129 | |
| CPC1035/ 4-SOP | HTRB | 250 hrs. | 500 hrs. | 750 hrs. | 1000 hrs. | |
| | TE1897 | 0/129 | 0/129 | 0/129 | 0/129 | |
| CPC1035/ 4-SOP | HTRB | 250 hrs. | 500 hrs. | 750 hrs. | 1000 hrs. | |
| | TE1876 | 0/129 | 0/129 | 0/129 | 0/129 | |
| CPC1030/ 4-SOP | HTRB/ T17836 | 250 hrs. 0/129 | 500 hrs. 0/129 | 750 hrs. 0/129 | 1000 hrs. 0/129 | |
| | HTRB/ T15324 | 250 hrs. 0/129 | 500 hrs. 0/129 | 750 hrs. 0/129 | 1000 hrs. 0/129 | |
| CPC1025N/ 4-SOP | HTRB/ T35631 | 168 hrs. 0/129 | 500 hrs. 0/129 | 750 hrs. 0/129 | 1000 hrs. 0/129 | |
| | T/S / T38953 | 15 Cycles 0/55 | | | | |
| CPC1017N/ 4-SOP | T/C / T38953 | 300 Cycles 0/55 | | | | |
| | T/S / T21031 | 15 Cycles 0/55 | | | | |
| CPC1035/ 4-SOP | T/C / T21031 | 300 Cycles 0/55 | | | | Same parts as T/S |
| | T/S / TE2190 TE2228 | 15 Cycles 0/110 | | | | |
| CPC1008N/ 4-SOP | T/C / TE2190 TE2228 | 300 Cycles 0/110 | | | | |
| | Cold Storage | -55C, 1000h 0/55 | | | | |

FIT (Failure in Time) Rate of CPC10XXN/CPC12XXN

Table 3 below summarizes the FIT rate from the HTRB data. Using the Reliability HTRB data, FIT rate was calculated based on the equivalent device hours at use condition of 40°C and stressed condition of 125°C at 0.7eV of activation energy. The FIT rate came out to be 4.62 FITs.

Table 3: CPC10XXN/CPC12XXN FIT Rate Summary

| Product/ Stress | Lot Number | # of Devices | # of Failed | Hours Tested | Test Temp (°C) | Eq. Device Hours | FITs @ 60% CL |
|--------------------|---------------|-----------------|----------------|-----------------|----------------------|---------------------|---------------------|
| CPC1025N/ HTRB | T35631 | 129 | 0 | 1000 | 125 | 199,265,692 | 4.62 |
| CPC1035N/ HTRB | TE1898 | 129 | 0 | 1000 | 125 | | |
| CPC1035N/ HTRB | TE1897 | 129 | 0 | 1000 | 125 | | |
| CPC1035N/ HTRB | TE1876 | 129 | 0 | 1000 | 125 | | |
| CPC1030N/ HTRB | T17836 | 129 | 0 | 1008 | 125 | | |
| CPC1030N/ HTRB | T15324 | 129 | 0 | 1008 | 125 | | |