MPC8360 COM Express SOM Thermal Dissipation

Application Note 368

Logic Product Development
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Abstract

This document provides the results of thermal dissipation tests conducted on the MPC8360 COM Express System on Module (SOM).

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REVISION HISTORY

REV	EDITOR	DESCRIPTION	APPROVAL	DATE
A	Michael Erickson	Initial draft	ME	01/03/08

1 Introduction

This Application Note discusses thermal dissipation tests conducted on the MPC8360 COM Express System on Module (SOM). Because each end-product application using the MPC8360 COM Express SOM is unique, the scope of this document is limited to only reporting results of generic testing and offering suggestions for thermal solutions. The final solution for proper heat dissipation is the responsibility of the designer of the end-product application.

2 Thermal Dissipation Test

2.1 Hardware Configuration

To conduct the test, Logic Product Development engineers used a standard MPC8360E-RDK Development Kit with the standard MPC8360 COM Express SOM configuration (COMMPC8360E-2752FCR). The COMMPC8360E-2752FCR SOM features a Freescale™ MPC8360E processor running at 667 MHz.

2.2 Software Configuration

The development kit was programmed with a Linux operating system image that initialized the Ethernet and graphics controllers. The Linux image did not include any special power management features.

2.3 Test Setup

Logic engineers affixed thermocouples to the surface of the MPC8360E processor and some of the other high-wattage components. No heatsink was affixed to the processor.

The development kit was powered on and then placed inside an 18”x18”x18" oven. The oven temperature was incrementally increased by 5°C per hour over the course of several hours and temperature measurements were taken of the processor's package surface.

2.4 Test Results

The maximum junction temperature of the processor is 105°C. The actual junction temperature cannot be measured, so the temperature of the surface of the processor’s package is used instead. The package thermal resistance is approximately 1°C per watt. Based on the above data, Logic estimates that maintaining a package-surface temperature of 85°C or lower should ensure a junction temperature within specification. Logic estimates that the entire COM Express SOM consumes approximately 8 watts.

With the development kit placed in a vertical position, the processor reached a surface temperature of 85°C when the oven was heated to 50°C. Thus, if the SOM is to be installed in a vertical position, the end-product design should employ a heatsink capable of dispersing a temperature differential of 35°C if the ambient temperature will reach 50°C.

With the development kit placed in a horizontal position, the processor reached a surface temperature of 85°C when the oven was heated to 40°C. Thus, if the SOM is to be installed in a horizontal position, the end-product design should employ a heatsink capable of dispersing a temperature differential of 45°C if the ambient temperature will reach 40°C.

If necessary, Logic's engineering staff can help find suitable heatsink solutions. Please contact platformsupport@logicpd.com for more information.

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3 Summary

These test results and data are provided for customer information only. No warranty is implied by the recommendations set forth in this document. Customers are fully responsible for testing their design and ensuring that proper thermal dissipation is available for their end-product application.

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