

# System Basis Chip (SBC) with High-Speed CAN Transceiver

## THERMAL ADDENDUM

### Introduction

This thermal addendum is provided as a supplement to the MC33989 technical datasheet. The addendum provides thermal performance information that may be critical in the design and development of system applications. All electrical, application, and packaging information is provided in the data sheet.

### Packaging and Thermal Considerations

The MC33989 is offered in a 28 terminal SOICW, single die package. There is a single heat source (P), a single junction temperature (T<sub>J</sub>), and thermal resistance (R<sub>θJA</sub>).

$$\{ T_J \} = [ R_{\theta JA} ] \cdot \{ P \}$$

The stated values are solely for a thermal performance comparison of one package to another in a standardized environment. This methodology is not meant to and will not predict the performance of a package in an application-specific environment. Stated values were obtained by measurement and simulation according to the standards listed below.

### Standards

Table 1. Thermal Performance Comparison

Thermal Resistance	[°C/W]
R <sub>θJA</sub> <sup>(1) (2)</sup>	41
R <sub>θJB</sub> <sup>(2) (3)</sup>	10
R <sub>θJA</sub> <sup>(1) (4)</sup>	68
R <sub>θJC</sub> <sup>(5)</sup>	220

Notes:

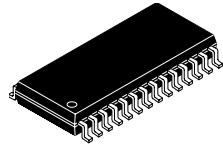
1. Per JEDEC JESD51-2 at natural convection, still air condition.
2. 2s2p thermal test board per JEDEC JESD51-7.
3. Per JEDEC JESD51-8, with the board temperature on the center trace near the center lead.
4. Single layer thermal test board per JEDEC JESD51-3.
5. Thermal resistance between the die junction and the package top surface; cold plate attached to the package top surface and remaining surfaces insulated.

33989

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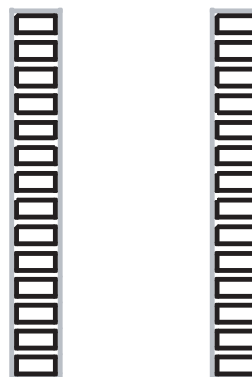
28-PIN  
SOICW

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DWB SUFFIX  
EG SUFFIX (PB-FREE)  
98ASB42345B  
28-PIN SOICW

**Note** For package dimensions, refer to the 33989 device datasheet.



28 Terminal SOICW  
1.27 mm Pitch  
18.0 mm x 7.5 mm Body

**Figure 1. Surface Mount for SOIC Wide Body non-Exposed Pad**

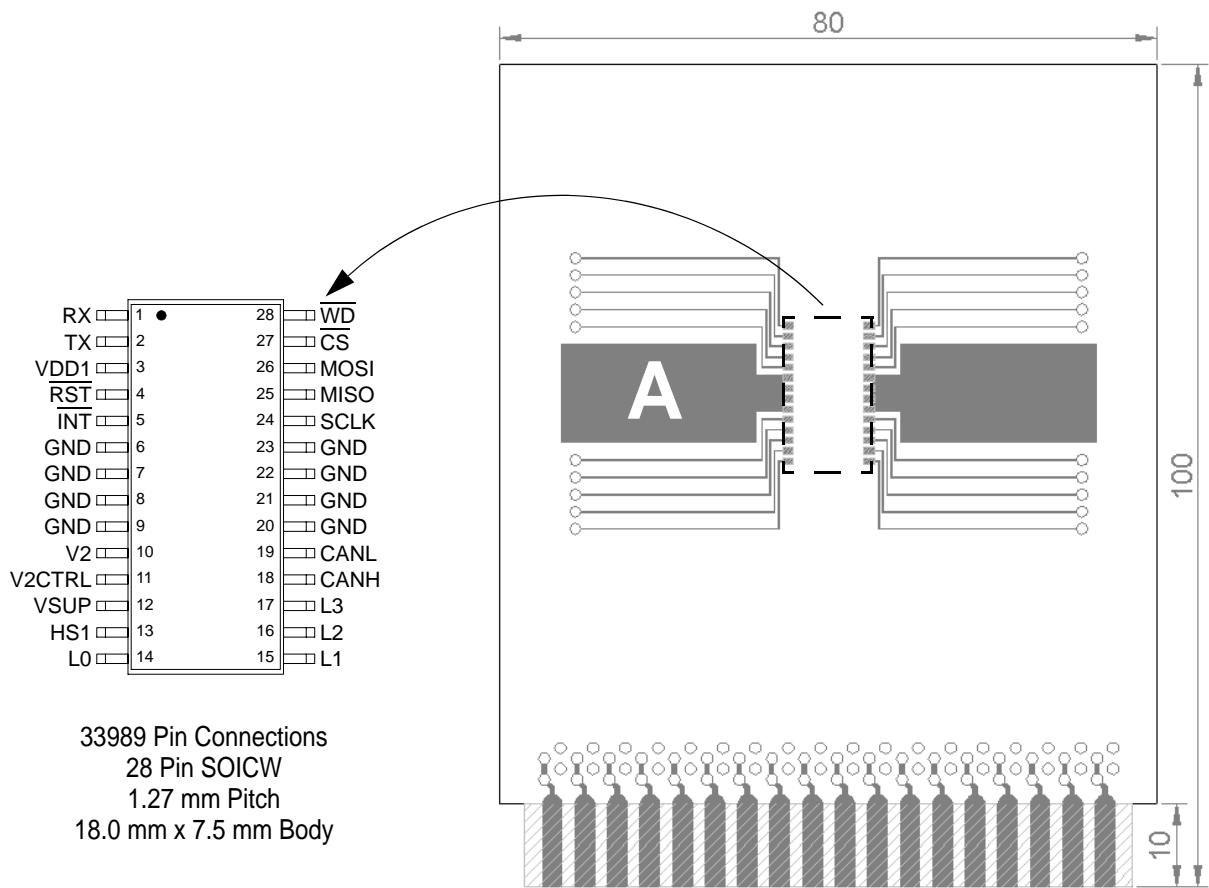


Figure 2. Thermal Test Board

**Device on Thermal Test Board**

- Material: Single layer printed circuit board  
FR4, 1.6 mm thickness  
Cu traces, 0.07 mm thickness
- Outline: 80 mm x 100 mm board area,  
including edge connector for thermal testing
- Area A: Cu heat-spreading areas on board surface
- Ambient Conditions: Natural convection, still air

**Table 2. Thermal Resistance Performance**

Thermal Resistance	Area A (mm <sup>2</sup> )	°C/W
$R_{\theta JA}$	0	68
	300	52
	600	47

$R_{\theta JA}$  is the thermal resistance between die junction and ambient air.

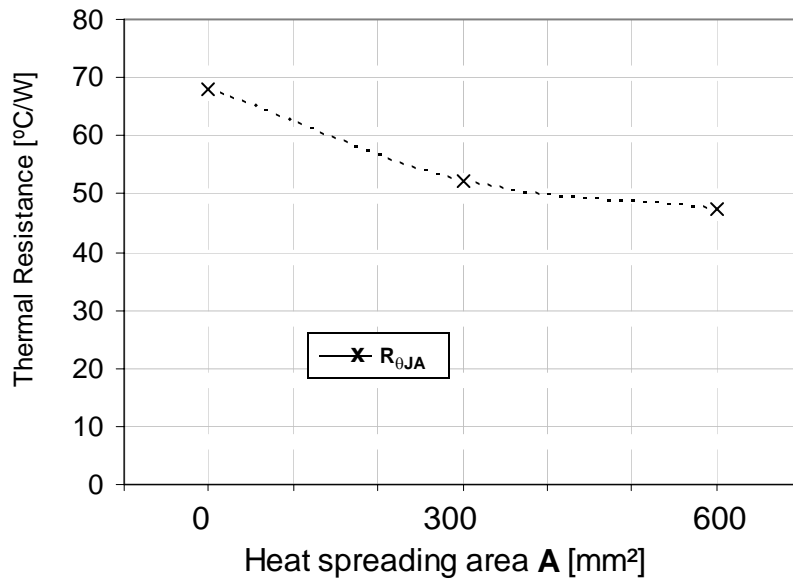


Figure 3. Device on Thermal Test Board  $R_{\theta JA}$

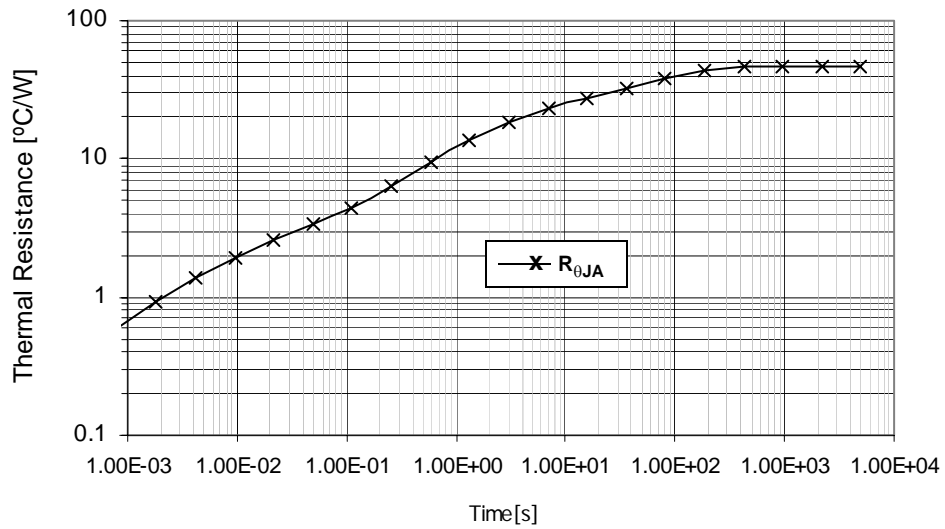


Figure 4. Transient Thermal Resistance  $R_{\theta JA}$   
1 W Step response, Device on Thermal Test Board Area A = 600 (mm<sup>2</sup>)

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