

# 5.0 A H-Bridge

## THERMAL ADDENDUM

### Introduction

This thermal addendum is provided as a supplement to the MC33886 technical data sheet. 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 MC33886 is offered in a 20 terminal HSOP exposed pad, 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>	20
R <sub>θJB</sub> <sup>(2)(3)</sup>	6.0
R <sub>θJA</sub> <sup>(1)(4)</sup>	52
R <sub>θJC</sub> <sup>(5)</sup>	1.0

**NOTES:**

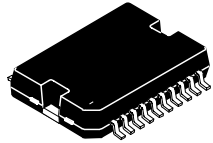
1. Per JEDEC JESD51-2 at natural convection, still air condition.
2. 2s2p thermal test board per JEDEC JESD51-5 and JESD51-7.
3. Per JEDEC JESD51-8, with the board temperature on the center trace near the center lead.
4. Single layer thermal test board per JEDEC JESD51-3 and JESD51-5.
5. Thermal resistance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

**33886DH**

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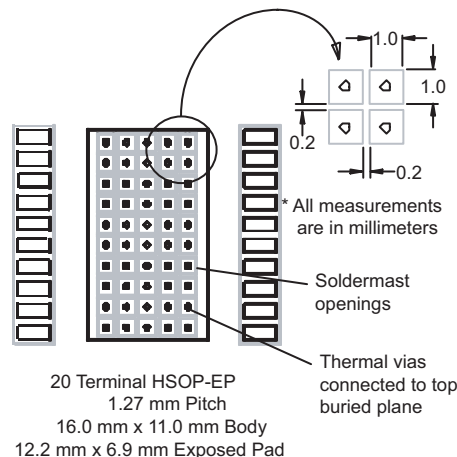
**20-TERMINAL  
HSOP-EP**

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**DH SUFFIX  
VW (Pb-FREE) SUFFIX  
98ASH70702A  
20-TERMINAL HSOP-EP**

**Note** For package dimensions, refer to the 33886 device datasheet.



**Figure 1. Thermal Land Pattern for Direct Thermal Attachment According to JESD51-5**

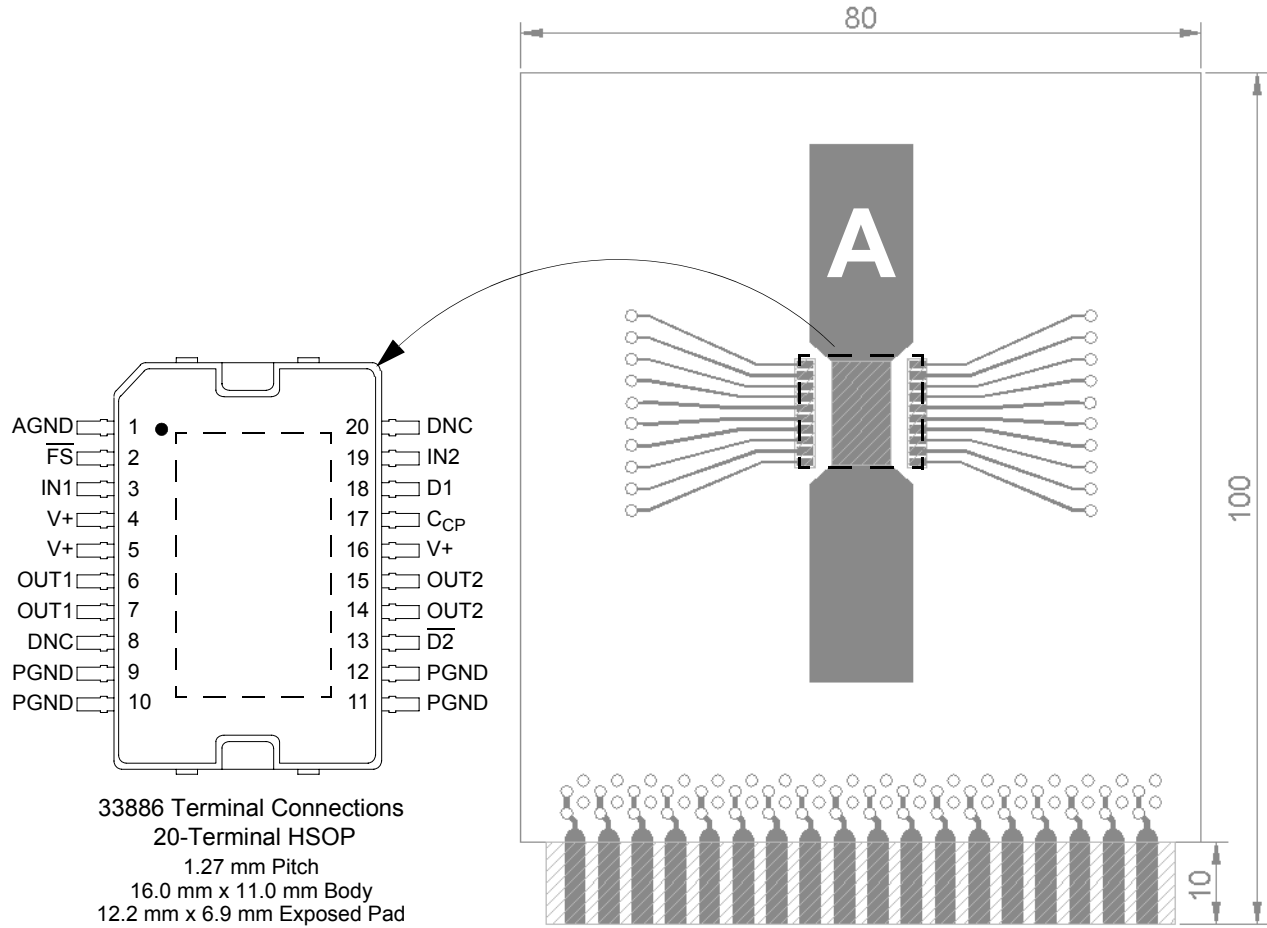


Figure 2. Thermal Test Board

**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 <sub>θJA</sub>	0.0	52
	300	36
	600	32
R <sub>θJS</sub>	0.0	10
	300	7.0
	600	6.0

R<sub>θJA</sub> is the thermal resistance between die junction and ambient air.

R<sub>θJS</sub> is the thermal resistance between die junction and the reference location on the board surface near a center lead of the package (see [Figure 2](#)).

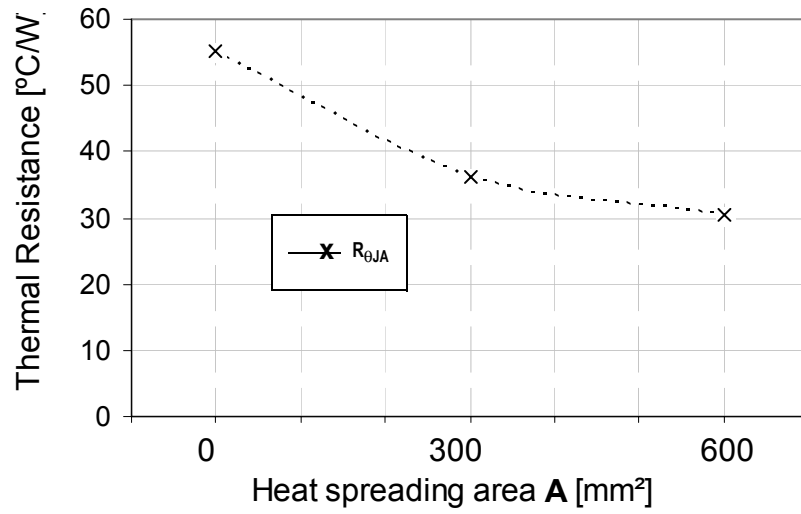


Figure 3. Device on Thermal Test Board  $R_{\theta JA}$

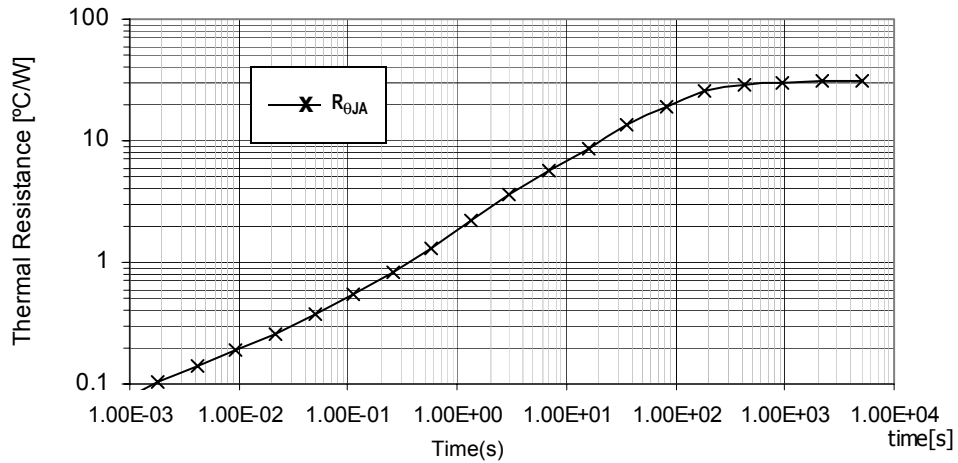


Figure 4. Transient Thermal Resistance  $R_{\theta JA}$   
Device on Thermal Test Board Area A = 600 (mm<sup>2</sup>)

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