EMC2113

RPM-Based Fan Controller with Multiple Temperature Zones & Hardware Thermal Shutdown

PRODUCT FEATURES

Data Brief

General Description

The EMC2113 is an SMBus compliant fan controller. The fan driver can be operated using two methods, each with two modes. The methods include an RPM-based Fan Speed Control Algorithm and a direct PWM drive setting. The modes include manually programming the desired settings or using the internal programmable temperature look-up table to select the desired setting based on measured temperature.

The EMC2113 includes a temperature monitor that measures up to three (3) external diodes and the internal diode. The temperature monitors offer 1°C accuracy (for external diodes) with sophisticated features to reduce errors introduced by series resistance and beta variation of substrate thermal diode transistors commonly found in processors.

The device includes high and low limits for all temperature channels as well as a hardware set critical temperature limit. This hardware set limit drives a dedicated system shutdown pin.

Finally, the device includes an open-drain, active low interrupt pin to flag temperature or fan control errors.

Applications

- Notebook Computers
- Projectors
- Graphics Cards
- Industrial and Networking Equipment

Features

- Programmable Fan Control circuit
  - 4-wire fan compatible
  - Both Low and High frequency PWM
- RPM-based fan control algorithm
  - 2% accurate from 500 RPM to 16k RPM
  - Automatic Tachometer feedback
- Temperature Look-Up Table
  - Controls fan speed or PWM drive setting
  - Eight steps that incorporate up to four temperature zones simultaneously (user selectable)
  - Supports forced DTS or standard temperature data
  - Allows external PWM input (150Hz to 40kHz)
- Up to Three External Temperature Channels
  - Supports transistor model for 90nm - 45nm Intel CPUs
  - Resistance Error Correction and Beta Compensation
  - 1°C accurate (60°C to 125°C)
  - 0.125°C resolution
  - Programmable High and Low limits
- Hardware Programmable Thermal Shutdown Temperature
  - Cannot be altered by software
  - 65°C to 127°C Range
  - Dedicated system shutdown interrupt pin
- Internal Temperature Monitor
  - ±1°C accuracy
  - 0.125°C resolution
- 3.3V Supply Voltage
- Open drain interrupt pin
- SMBus 2.0 Interface
  - SMBus Alert compatible
  - Selectable SMBus Address via pull-up resistor and ADDR_SEL pin
  - Block Read and Write
- Available in 16-pin 4mm x 4mm QFN Lead-free RoHS Compliant package

ORDER NUMBER(S):

ORDERING NUMBER	PACKAGE	FEATURES
EMC2113-1-AP-TR	16-pin 4mm x4mm QFN (Lead-free ROHS Compliant)	RPM-based Fan Speed Control Algorithm, High Frequency PWM driver, HW Thermal / Critical shutdown

This product meets the halogen maximum concentration values per IEC61249-2-21

For RoHS compliance and environmental information, please visit www.smsc.com/rohs

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Block Diagram

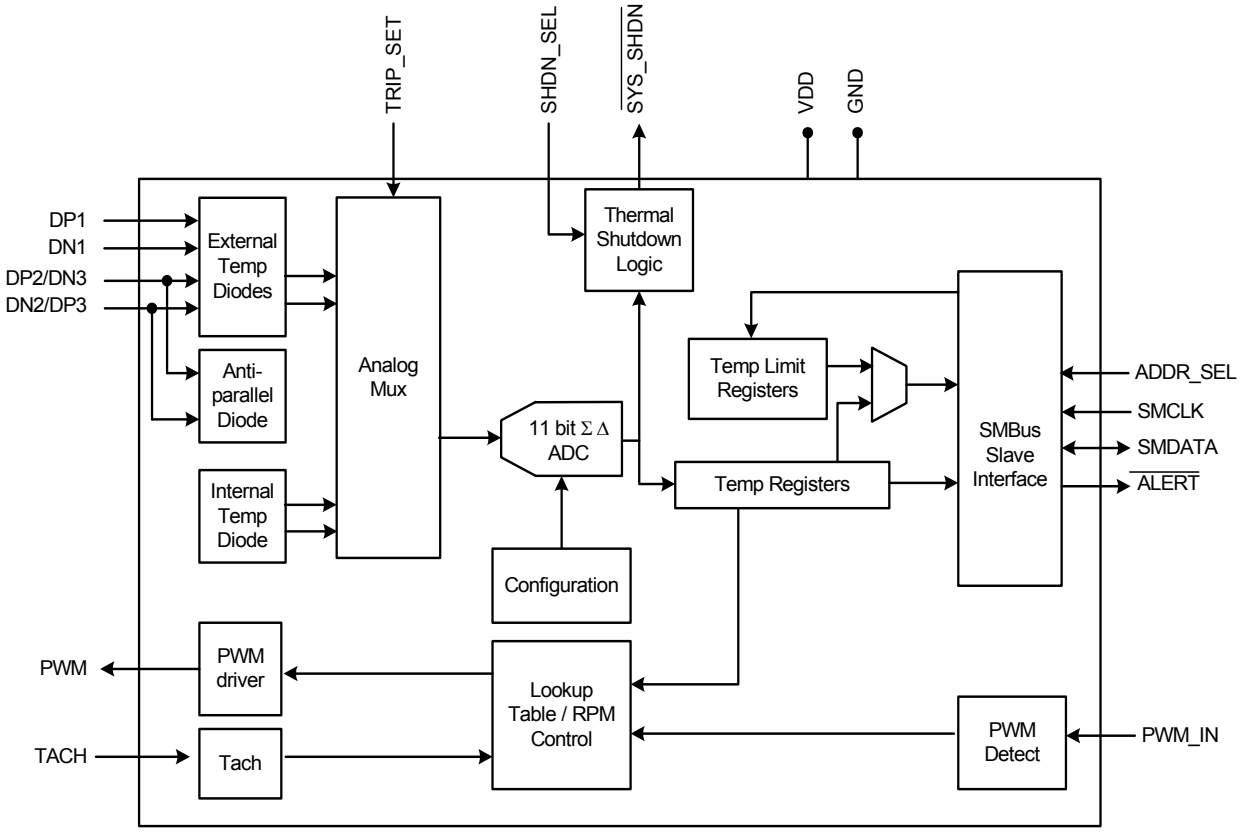


Figure 1 EMC2113 Block Diagram

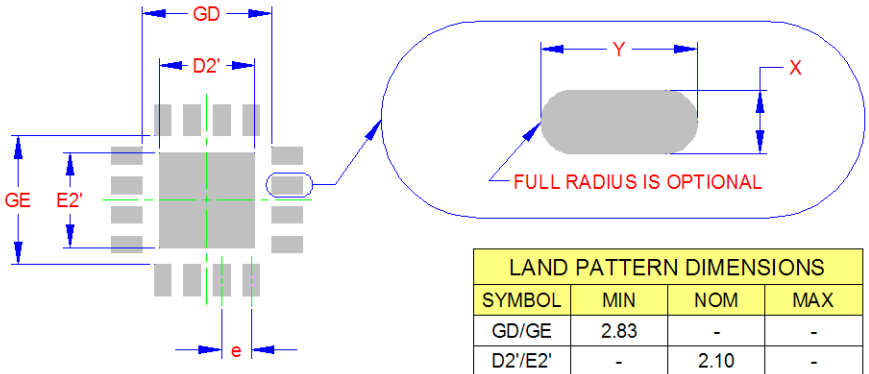
Package Outline

EMC2113 Package Information

COMMON DIMENSIONS					
SYMBOL	MIN	NOM	MAX	NOTE	REMARK
A	0.80	0.85	0.90	-	OVERALL PACKAGE HEIGHT
A1	0	0.02	0.05	-	STANDOFF
A3		0.20 REF		-	LEAD-FRAME THICKNESS
D/E	3.90	4.00	4.10	-	X/Y BODY SIZE
D2/E2	2.00	2.10	2.20	2	X/Y EXPOSED PAD SIZE
L	0.45	0.50	0.55	-	TERMINAL LENGTH
b	0.25	0.30	0.35	2	TERMINAL WIDTH
K	0.20	-	-	-	TERMINAL TO PAD DISTANCE
e		0.65 BSC		-	TERMINAL PITCH

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. POSITION TOLERANCE OF EACH TERMINAL AND EXPOSED PAD IS ± 0.05mm AT MAXIMUM MATERIAL CONDITION. DIMENSIONS "b" APPLIES TO PLATED TERMINALS AND IT IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM THE TERMINAL TIP.
3. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL BUT MUST BE LOCATED WITHIN THE AREA INDICATED.

Figure 2 16-Pin QFN 4mm x 4mm Package Dimensions



LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD/GE	2.83	-	-
D2'/E2'	-	2.10	-
X	-	-	0.37
Y	-	-	0.69
e		0.65	

RECOMMENDED PCB LAND PATTERN

Figure 3 16-Pin QFN 4mm x 4mm PCB Footprint

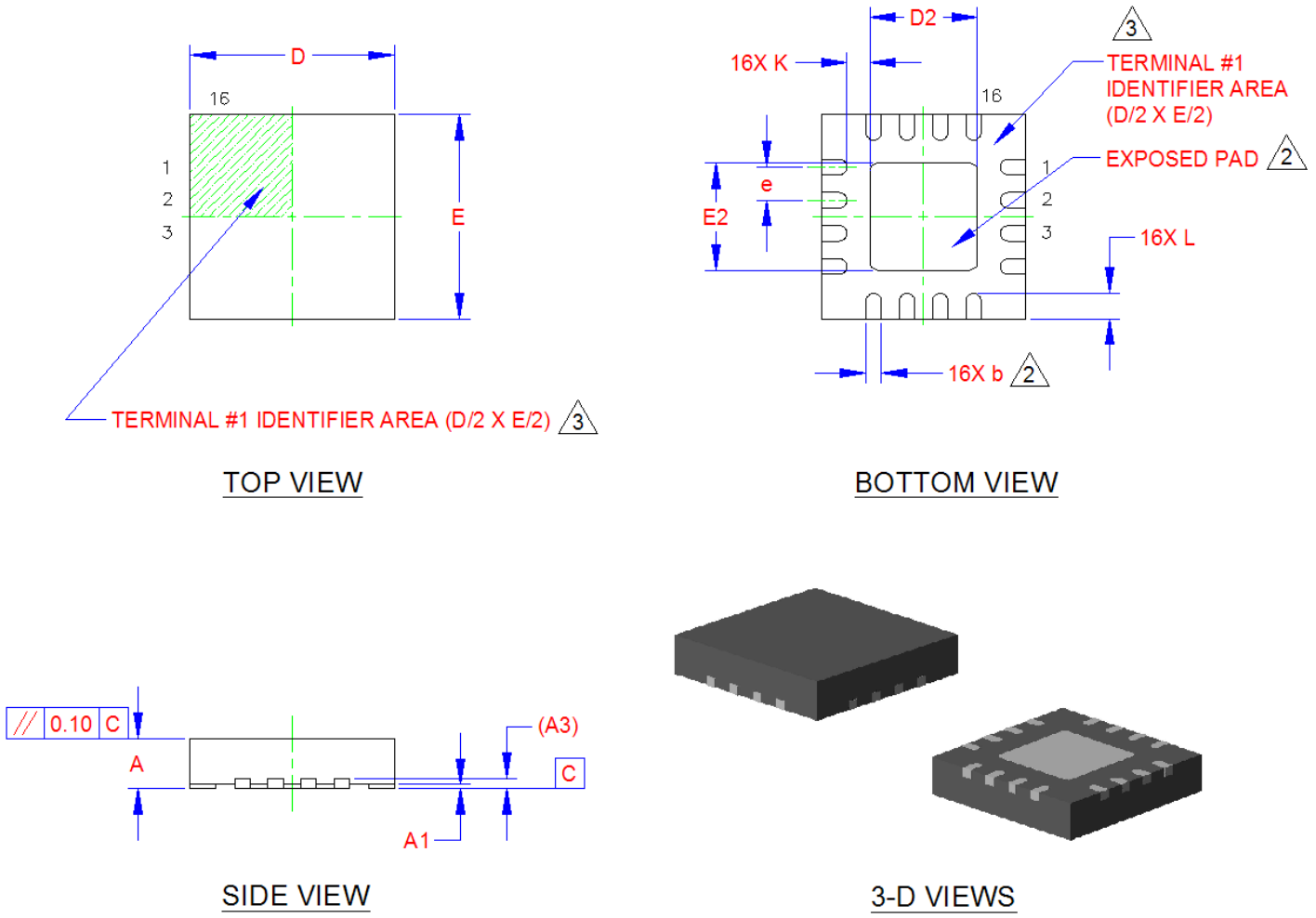


Figure 4 16-Pin QFN 4mm x 4mm Package Drawing