

Multiple Channel 1°C Temperature Sensors with Beta Compensation

PRODUCT FEATURES

Data Brief

General Description

The EMC1413 / EMC1414 are high accuracy, low cost, System Management Bus (SMBus) temperature sensors. Advanced features such as Resistance Error Correction (REC), Beta Compensation (to support CPU diodes requiring the BJT/transistor model including 45nm, 65nm and 90nm processors) and automatic diode type detection combine to provide a robust solution for complex environmental monitoring applications.

The EMC1413 monitors three temperature channels and the EMC1414 monitors four temperature channels. It provides $\pm 1^\circ\text{C}$ accuracy for both external and internal diode temperatures.

Resistance Error Correction automatically eliminates the temperature error caused by series resistance allowing greater flexibility in routing thermal diodes. Beta Compensation eliminates temperature errors caused by low, variable beta transistors common in today's fine geometry processors. The automatic beta detection feature monitors each external diode/transistor and determines the optimum sensor settings for accurate temperature measurements regardless of processor technology. This frees the user from providing unique sensor configurations for each temperature monitoring application. These advanced features plus $\pm 1^\circ\text{C}$ measurement accuracy provide a low-cost, highly flexible and accurate solution for critical temperature monitoring applications.

Applications

- Notebook Computers
- Desktop Computers
- Industrial
- Embedded applications

Features

- Programmable SMBus address
- Support for diodes requiring the BJT/transistor model
 - supports 45nm, 65nm, and 90nm CPU thermal diodes
- Automatically determines external diode type and optimal settings
- Resistance Error Correction
- Up to 3 External Temperature Monitors
 - $\pm 1^\circ\text{C}$ max accuracy ($20^\circ\text{C} < T_{\text{DIODE}} < 110^\circ\text{C}$)
 - 0.125°C resolution
 - Supports up to 2.2nF diode filter capacitor
 - Anti-parallel diodes for extra diode support
- Internal Temperature Monitor
 - $\pm 1^\circ\text{C}$ accuracy
 - 0.125°C resolution
- 3.3V Supply Voltage
- Programmable temperature limits for ALERT
- Available in these lead-free RoHS compliant packages
 - 10-pin 3mm x 3mm DFN
 - 10-pin MSOP

Ordering Information:

ORDERING NUMBER	PACKAGE	FEATURES	SMBUS ADDRESS
EMC1413-1-AIZL-TR	10-pin MSOP (lead-free RoHS compliant)	Up to four temperature sensors, ALERT and THERM pins, fixed SMBus address	1001_100(r/w)
EMC1413-A-AIZL-TR	10-pin MSOP (lead-free RoHS compliant)	Up to four temperature sensors, ALERT and THERM pins, programmable SMBus address	Selectable via THERM pull-up
EMC1413-A-AIA-TR	10-pin DFN 3mm x 3mm (lead-free RoHS compliant)	Up to four temperature sensors, ALERT and THERM pins, programmable SMBus address	Selectable via THERM pull-up
EMC1413-3-AIZL-TR	10-pin MSOP (lead-free RoHS compliant)	Up to four temperature sensors, ALERT and THERM pins, programmable SMBus address	0011_000(r/w)
EMC1414-1-AIZL-TR	10-pin MSOP (lead-free RoHS compliant)	Up to four temperature sensors, ALERT and THERM pins, fixed SMBus address	1001_100(r/w)
EMC1414-A-AIZL-TR	10-pin MSOP (lead-free RoHS compliant)	Up to four temperature sensors, ALERT and THERM pins, programmable SMBus address	Selectable via THERM pull-up
EMC1414-A-AIA-TR	10-pin DFN 3mm x 3mm (lead-free RoHS compliant)	Up to four temperature sensors, ALERT and THERM pins, programmable SMBus address	Selectable via THERM pull-up

REEL SIZE IS 4,000 PIECES

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

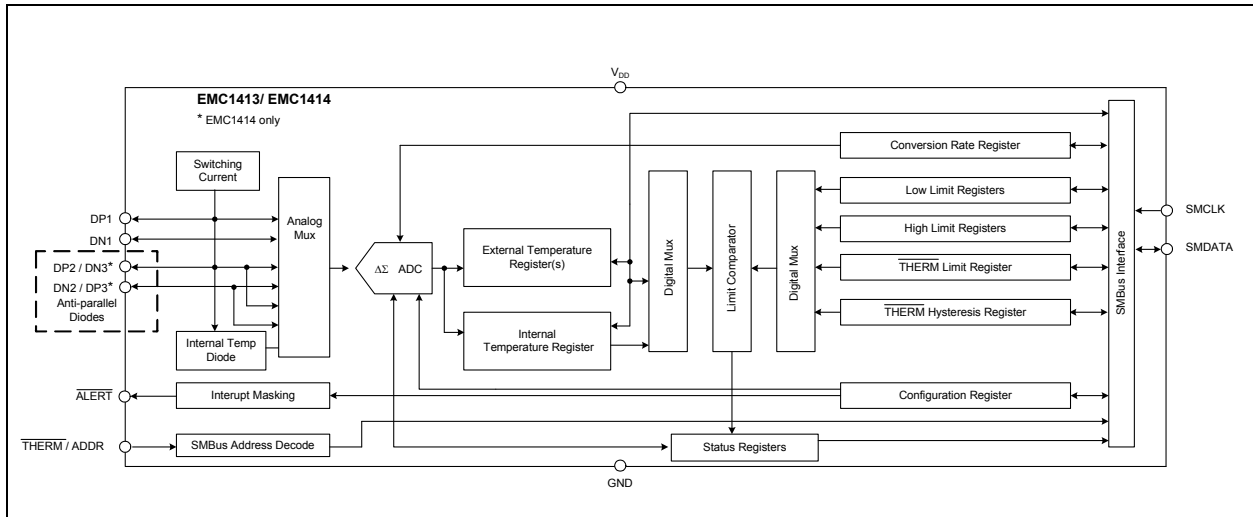


Figure 1 EMC1414 Block Diagram

Package Outlines

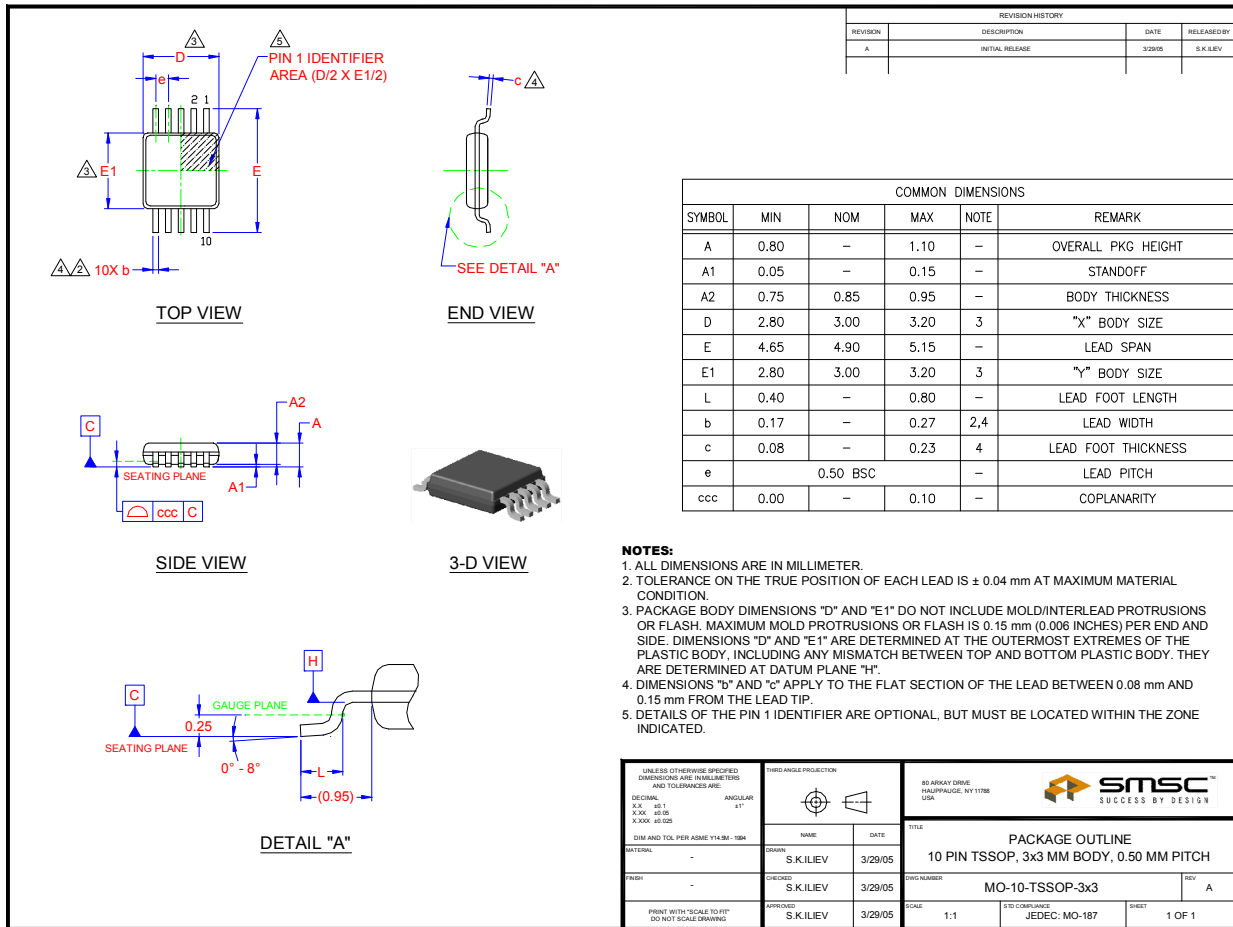


Figure 2 10-Pin MSOP / TSSOP Package

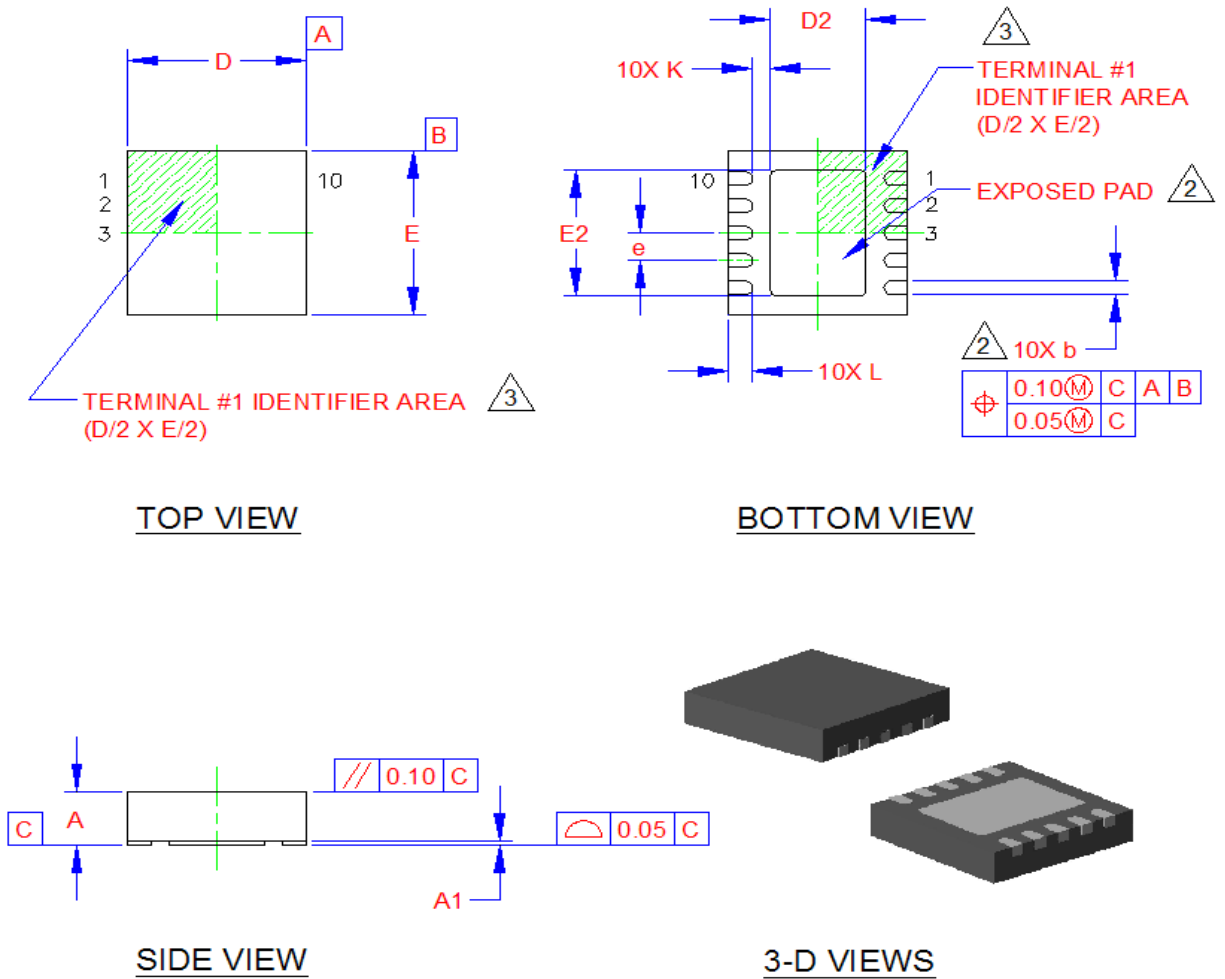
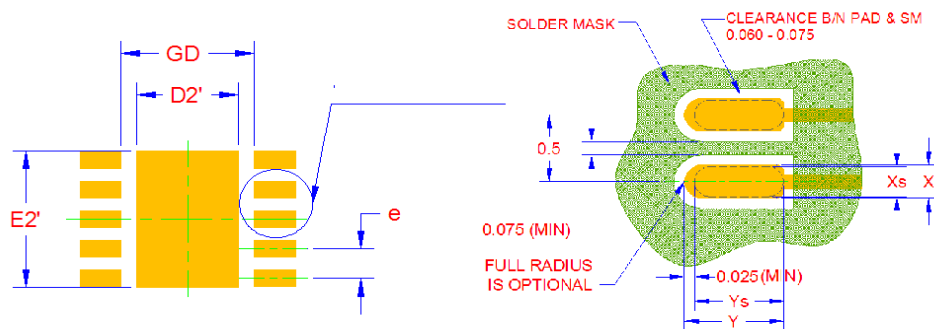


Figure 3 10-Pin DFN Package Drawing

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
D/E	2.90	3.00	3.10	-	X/Y BODY SIZE
D2	1.50	1.60	1.70	2	X EXPOSED PAD SIZE
E2	2.20	2.30	2.40	2	Y EXPOSED PAD SIZE
L	0.35	0.40	0.45	-	TERMINAL LENGTH
b	0.18	0.25	0.30	2	TERMINAL WIDTH
K	0.25	0.30	-	-	TERMINAL TO PAD DISTANCE
e	0.50 BSC			-	TERMINAL PITCH

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. UNILATERAL COPLANARITY ZONE APPLIES TO THE EXPOSED PAD, AS WELL AS THE TERMINALS. 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 4 10-Pin DFN Package Dimensions

PCB LAND PATTERN

LAND PATTERN DIMENSIONS			
SYMBOL	MIN	NOM	MAX
GD	2.10	-	2.20
D2'	-	1.60	1.60
E2'	-	2.30	-
Pad: X	-	0.28	0.28
Pad: Y	-	0.69	0.69
e	0.50		

Figure 5 10 Pin DFN PCB Footprint

Mouser Electronics

Authorized Distributor

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[EMC1413-1-AIZL-TR](#) [EMC1413-A-AIA-TR](#) [EMC1413-A-AIZL-TR](#) [EMC1414-1-AIZL-TR](#) [EMC1414-A-AIZL-TR](#)