

# High-Side Current-Sense and Dual 1°C Temperature Monitor

## PRODUCT FEATURES

Data Brief

### General Description

The EMC1702 is a combination high-side current sensing device with precision temperature measurement. It measures the voltage developed across an external sense resistor to represent the high-side current of a battery or voltage regulator. It also measures the bus voltage and uses these measured values to present a proportional power calculation. The EMC1702 contains additional bi-directional peak detection circuitry to flag instantaneous current spikes with programmable time duration and magnitude threshold. Finally, the EMC1702 includes an external diode channel for temperature measurement as well as an internal diode for ambient temperature measurements.

The temperature measurement includes advanced features such as Resistance Error Correction (REC), Beta Compensation (to support CPU diodes requiring the BJT/transistor model including 45nm and 65nm processors), and automatic diode type detection.

Both current sensing and temperature monitoring include two tiers of protection: one that can be masked and causes the ALERT pin to be asserted, and the other that cannot be masked and causes the THERM pin to be asserted.

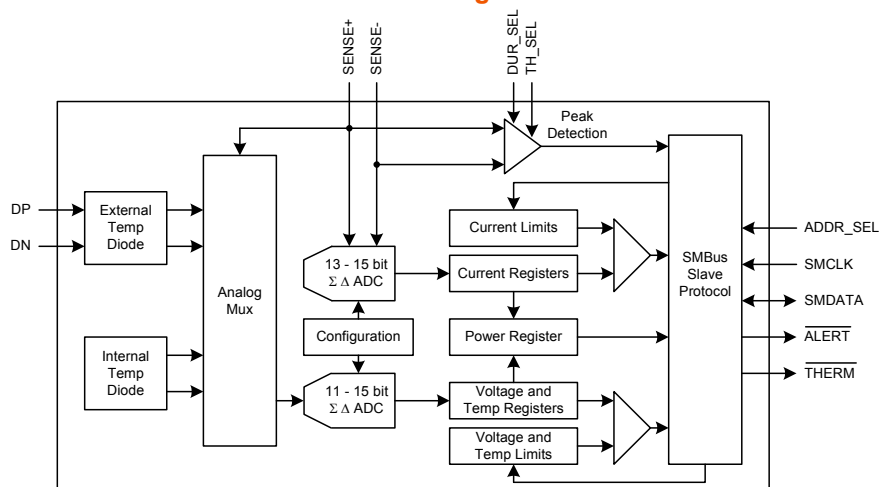
### Applications

- Notebook and Desktop Computers
- Industrial
- Power Management Systems
- Embedded Applications

### Features

- High-side current sensor
  - Bi-directional current measurement
  - Measures bus voltage and indicates power ratio
  - 1% current measurement accuracy
  - Integrated over 82ms to 2.6sec with 11-bit resolution
  - 3V to 24V voltage bus voltage range
- Independent hardware set instantaneous current peak detector
  - Software controls to program time duration and magnitude threshold
- Power supply options
  - Bus or separately powered for low voltage operation
- Wide temperature operating range: -40°C to +85°C
- One external temperature monitor
  - 1°C accuracy ( $20^{\circ}\text{C} < T_{\text{DIODE}} < 110^{\circ}\text{C}$ ) with 0.125°C resolution
  - Ideality factor setting
  - Support for 45nm and 65nm CPU diodes requiring the BJT/transistor model w/ beta compensation
  - Determines external diode type and optimal settings
  - Resistance Error Correction
- Internal temperature monitor
  - $\pm 1^{\circ}\text{C}$  accuracy ( $-5^{\circ}\text{C} < T_{\text{A}} < 85^{\circ}\text{C}$ )
- ALERT and THERM outputs for temperature, voltage, and out-of-current limit reporting
- SMBus 2.0 interface
  - Pin-selectable SMBus Address
  - Block Read and Write
- Available in a 12-pin 4mm x 4mm QFN RoHS Compliant Package

### Block Diagram



**Order Number(s):**

<b>ORDERING NUMBER</b>	<b>PACKAGE</b>	<b>FEATURES</b>
EMC1702-1-KP-TR	12-pin 4mm x 4mm QFN (Lead-free ROHS compliant)	External Diode, current sensor, hardware set peak detector

**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](http://www.smsc.com/rohs)**



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## Package Outline

### EMC1702 Package Drawing (12-Pin QFN 4mm x 4mm)

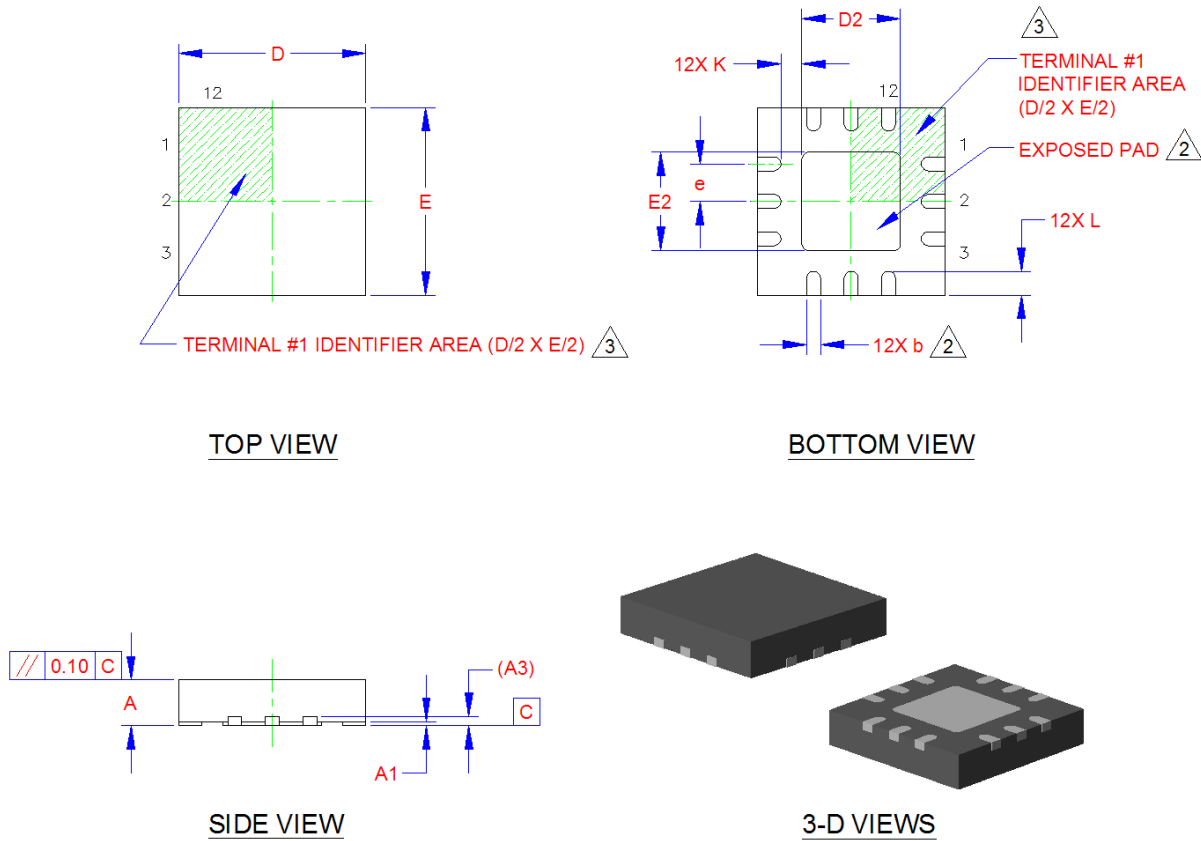
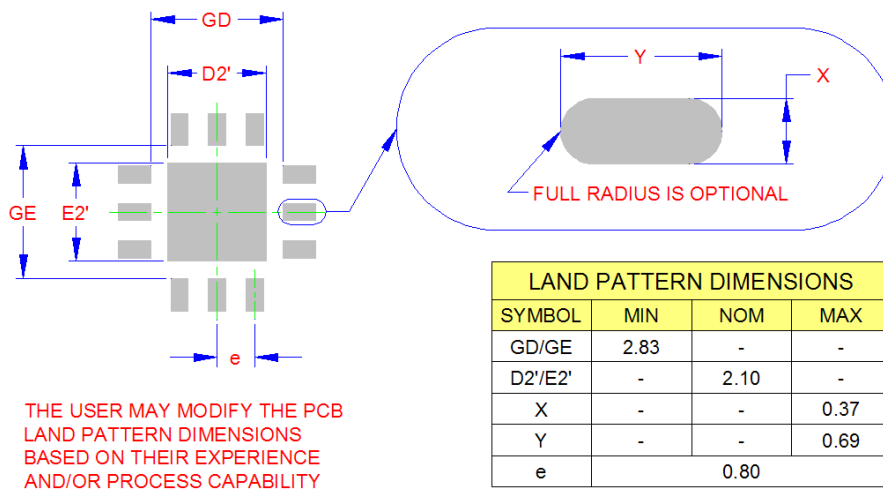


Figure 1 12-Pin QFN 4mm x 4mm Package Drawings

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	0.80 BSC			-	TERMINAL PITCH

**NOTES:**

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. POSITION TOLERANCE OF EACH TERMINAL AND EXPOSED PAD IS  $\pm 0.05\text{mm}$  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 12-Pin QFN 4mm x 4mm Package Dimensions and Notes**

RECOMMENDED PCB LAND PATTERN
**Figure 3 12-Pin QFN 4mm x 4mm PCB Footprint**