

General

The PE3001 can be used for temperature monitoring supplied by the UHF field (without battery) only for certain limited applications. No maintenance will be required and the temperature range is not limited by the battery environmental conditions. Although it is essential to have a permanent UHF field that supplies the circuitry. During a measurement cycles PE3001 is supplied from a capacitor – in non-measurement cycles the capacitor will be charged from the UHF field through the rectifier of the PE3001. In this application temperature monitoring up to 120 °C is possible.

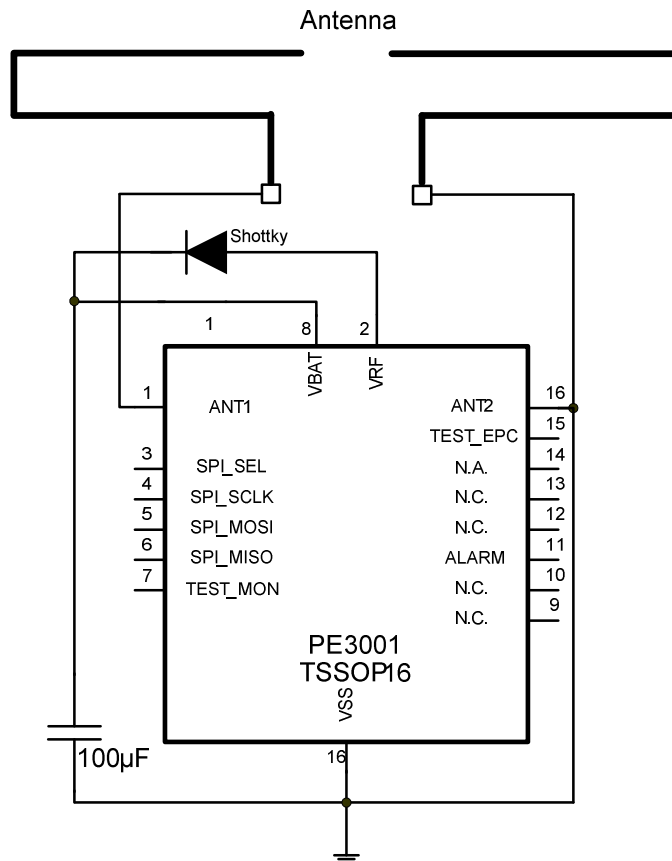


Figure 1: Application Schematic

An Eagle schematic and layout database is available for evaluation and customer developments.

Parameters

The distance between the reader and the tag (PE3001) and the number of measurements per minute is depending on the reader power and chosen capacity.

Table 1 shows results – all parameters taken at reader power $P_{\text{UHF}}=300\text{mW}$ and a capacitor of $100\mu\text{F}$. Figure 2 shows the configuration. All used devices need to meet the requirements for temperature stability when used at higher temperatures. It should be possible to reach higher reading distances with more power and on a non-ESD underground. Also the number of measurements can be increased with more reader power.

To get a lower voltage drop during measurement cycle it is possible to increase the capacity.

Note that only the EVA3001 V3 Evaluation kit generates enough antenna power for the chip to operate under these conditions. This layout is available for download.

Table 1: Parameters in PE lab

Parameter	Symbol	Min	Max	Unit	Comment
Reader Power	P_{UHF}		300	mW	FEIG MRU200
Number of measurements			20	1/min	
Temperature	T	20	120	°C	at PE3001 in package
Distance	d	0	3,5	cm	Reader to Tag on ESD table
Voltage drop on capacity	V_{DROP}		2	V	For capacity = 100uF (during measurement cycle)

Reader commands

Most readers do not naturally support a continuous UHF field. They frequently go in “quiet” mode after communication sequences. Follow the sequence below when running a general measurement cycle. It is necessary to have enough time between “start monitor” and “stop monitor” to conduct a measurement (time between start and stop command should be 150ms or more).

Table 2: General sequence for monitoring

Step	Order
1	Activate permanent field
2	Configure PE3001 (set TID-Address: 0Bh and 0Ch to “0”)
3	Start measurement and wait 150ms
4	Stop measurement
5	Read out results (USER-Address: 09h)
6	Wait 2,5sek (with activated field) [depending on reader power]
7	repeat measurement at step 3

In the following table is an example code to control a FEIG reader.

Table 3: Example for a FEIG Reader

Step	Reader command	Comment
1	02 00 08 FF 6A 01	Activate field (wait 5000ms)
2	02 00 12 FF B0 24 20 02 00 0B 02 02 00 00 00 00 A8 63	Configure PE3001
3	02 00 08 FF 6A 01	Activate field
4	02 00 08 FF B0 24 20 02 00 0E 01 02 10 00 A8 A6	Start monitor (wait 150ms)
5	02 00 08 FF B0 24 20 02 00 0E 01 02 20 00 39 33	Stop monitor
6	02 00 0D FF B0 23 20 00 00 09 01 B8 D8	Read measurement
7	02 00 08 FF 6A 01	Activate field (wait 2500ms)
8		repeat measurement from step 4

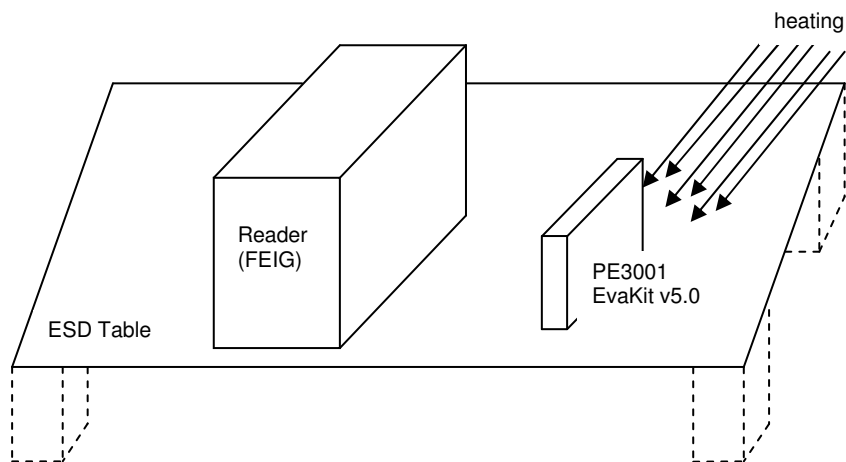


Figure 2: Measurement Setup Configuration

PE3001 UHF Logger

Application Note

Temperature monitoring without battery



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