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## NTE7225 Integrated Circuit Precision Temperature Sensor

### **Description:**

The NTE7225 is a precision temperature sensor in a TO92 type package which can be easily calibrated. This device operates as a 2-Lead Zener and the breakdown voltage is directly proportional to the absolute temperature at 10mV/°K. The circuit has a dynamic impedance of less than 1Ω and operates within a range of current from 450μA to 5mA without alteration of its characteristics. Calibrated at +25°C, the NTE7225 has a typical error of less than 1°C over a 100°C temperature range. Unlike other sensors, the NTE7225 has a linear output.

### **Features:**

- Directly Calibrated in °K
- 1°C Initial Accuracy
- Operates From 450μA to 5mA
- Less Than 1Ω Dynamic Impedance

### **Absolute Maximum Ratings:**

Forward Current,  $I_F$  ..... 10mA  
 Reverse Current,  $I_R$  ..... 15mA  
 Operating Free-Air Temperature Range (Note 1),  $T_{opr}$   
     Continuous ..... -40° to +100°C  
     Intermittent ..... +100° to +125°C  
 Storage temperature Range,  $T_{stg}$  ..... -65° to +150°C

Note 1.  $T_J \leq +150^\circ\text{C}$ .

### **Temperature Accuracy:**

Parameter	Test Conditions	Min	Typ	Max	Unit
Operating Output Voltage	$T_C = +25^\circ\text{C}$ , $I_R = 1\text{mA}$	2.92	2.98	3.04	V
Uncalibrated Temperature Error	$I_R = 1\text{mA}$ $T_C = +25^\circ\text{C}$ $T_{min} \leq T_C \leq T_{max}$	-	2	6	°C
		-	4	9	°C
Temperature Error with +25°C Calibration	$I_R = 1\text{mA}$ , $T_{min} \leq T_C \leq T_{max}$	-	1	2	°C
Calibration Error at Extended Temperature	$T_C = T_{max}$ (intermittent)	-	2	-	°C
Non-Linearity	$I_R = 1\text{mA}$	-	0.3	1.5	°C

**Electrical Characteristics:** (Note 2)

Parameter	Test Conditions	Min	Typ	Max	Unit
Operating Output Voltage Change With Current	$450\mu\text{A} \leq I_R \leq 5\text{mA}$ at Constant Temperature	-	3	14	mV
Dynamic Impedance	$I_R = 1\text{mA}$	-	0.6	-	$\Omega$
Output Voltage Temperature Drift		-	+10	-	mV/ $^{\circ}\text{C}$
Time Constant	Still Air	-	80	-	s
	Air 0.5m/s	-	10	-	s
	Stirred Oil	-	1	-	s
Time Stability	$T_C = +25^{\circ}\text{C}$	-	0.2	-	$^{\circ}\text{C}/\text{kh}$

Note 2. Accuracy measurements are made in a well-stirred oil bath. For other conditions, self heating must be considered.

