



# KTY84 series

## Silicon temperature sensors

Rev. 06 — 8 May 2008

Product data sheet

## 1. Product profile

### 1.1 General description

The temperature sensors in the KTY84 series have a positive temperature coefficient of resistance and are suitable for use in measurement and control systems. The sensors are encapsulated in the SOD68 (DO-34) package.

Other special selections are available on request.

#### CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

### 1.2 Features

- High accuracy and reliability
- Positive temperature coefficient; fail-safe behavior
- Temperature range  $-40\text{ }^{\circ}\text{C}$  to  $+300\text{ }^{\circ}\text{C}$
- Long-term stability
- Virtually linear characteristics
- Nickel plated leads

### 1.3 Quick reference data

Table 1. Quick reference data

$T_{amb} = 100\text{ }^{\circ}\text{C}$ ; in liquid; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{100}$	sensor resistance	$I_{sen(cont)} = 2\text{ mA}$				
		KTY84/130	970	-	1030	$\Omega$
		KTY84/150	950	-	1050	$\Omega$
		KTY84/151	950	-	1000	$\Omega$

## 2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	cathode (k)		
2	anode (a)		

### 3. Ordering information

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
KTY84/130	-	hermetically sealed glass package; axial leaded; 2 leads	SOD68
KTY84/150			
KTY84/151			

### 4. Marking

**Table 4. Marking codes**

Type number	Marking code
KTY84/130	KT84L
KTY84/150	KT84M
KTY84/151	KT84O

### 5. Limiting values

**Table 5. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134).*

Symbol	Parameter	Conditions	Min	Max	Unit	
$I_{\text{sen(cont)}}$	continuous sensor current	in free air; $T_{\text{amb}} = 25\text{ °C}$	[1]	-	10	mA
		in free air; $T_{\text{amb}} = 300\text{ °C}$		-	2	mA
$T_{\text{amb}}$	ambient temperature		-40	+300	°C	

[1] For temperatures greater than 200 °C, a sensor current of  $I_{\text{sen(cont)}} = 2\text{ mA}$  must be used.

## 6. Characteristics

**Table 6. Characteristics**

$T_{amb} = 100\text{ °C}$ ; in liquid; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
R <sub>100</sub>	sensor resistance	I <sub>sen(cont)</sub> = 2 mA				
		KTY84/130	970	-	1030	Ω
		KTY84/150	950	-	1050	Ω
		KTY84/151	950	-	1000	Ω
TC	temperature coefficient		-	0.61	-	%/K
R <sub>250</sub> /R <sub>100</sub>	resistance ratio	T <sub>amb</sub> = 250 °C and 100 °C	2.111	2.166	2.221	
R <sub>25</sub> /R <sub>100</sub>	resistance ratio	T <sub>amb</sub> = 25 °C and 100 °C	0.595	0.603	0.611	
τ <sub>th</sub>	thermal time constant	in still air	[1] -	20	-	s
		in still liquid	[1] -	1	-	s
		in flowing liquid	[1] -	0.5	-	s

- [1] The thermal time constant is the time taken for the sensor to reach 63.2 % of the total temperature difference. For example, if a sensor with a temperature of 25 °C is moved to an environment with an ambient temperature of 100 °C, the time for the sensor to reach a temperature of 72.4 °C is the thermal time constant.

**Table 7. Ambient temperature, corresponding resistance, temperature coefficient and maximum expected temperature error for KTY84/130 and KTY84/150**

$I_{sen(cont)} = 2\text{ mA}$ .

Ambient temperature		Temperature coefficient (%/K)	KTY84/130				KTY84/150			
(°C)	(°F)		Resistance (Ω)			Temperature error (K)	Resistance (Ω)			Temperature error (K)
			Min	Typ	Max		Min	Typ	Max	
-40	-40	0.84	340	359	379	±6.48	332	359	386	±8.85
-30	-22	0.83	370	391	411	±6.36	362	391	419	±8.76
-20	-4	0.82	403	424	446	±6.26	394	424	455	±8.7
-10	14	0.80	437	460	483	±6.16	428	460	492	±8.65
0	32	0.79	474	498	522	±6.07	464	498	532	±8.61
10	50	0.77	514	538	563	±5.98	503	538	574	±8.58
20	68	0.75	555	581	607	±5.89	544	581	618	±8.55
25	77	0.74	577	603	629	±5.84	565	603	641	±8.54
30	86	0.73	599	626	652	±5.79	587	626	665	±8.53
40	104	0.71	645	672	700	±5.69	632	672	713	±8.5
50	122	0.70	694	722	750	±5.59	679	722	764	±8.46
60	140	0.68	744	773	801	±5.47	729	773	817	±8.42
70	158	0.66	797	826	855	±5.34	781	826	872	±8.37
80	176	0.64	852	882	912	±5.21	835	882	929	±8.31
90	194	0.63	910	940	970	±5.06	891	940	989	±8.25
100	212	0.61	970	1000	1030	±4.9	950	1000	1050	±8.17
110	230	0.60	1029	1062	1096	±5.31	1007	1062	1117	±8.66
120	248	0.58	1089	1127	1164	±5.73	1067	1127	1187	±9.17
130	266	0.57	1152	1194	1235	±6.17	1128	1194	1259	±9.69
140	284	0.55	1216	1262	1309	±6.63	1191	1262	1334	±10.24
150	302	0.54	1282	1334	1385	±7.1	1256	1334	1412	±10.8
160	320	0.53	1350	1407	1463	±7.59	1322	1407	1492	±11.37
170	338	0.52	1420	1482	1544	±8.1	1391	1482	1574	±11.96
180	356	0.51	1492	1560	1628	±8.62	1461	1560	1659	±12.58
190	374	0.49	1566	1640	1714	±9.15	1533	1640	1747	±13.2
200	392	0.48	1641	1722	1803	±9.71	1607	1722	1837	±13.85
210	410	0.47	1719	1807	1894	±10.28	1683	1807	1931	±14.51
220	428	0.46	1798	1893	1988	±10.87	1760	1893	2026	±15.19
230	446	0.45	1879	1982	2085	±11.47	1839	1982	2125	±15.88
240	464	0.44	1962	2073	2184	±12.09	1920	2073	2226	±16.59
250	482	0.44	2046	2166	2286	±12.73	2003	2166	2329	±17.32
260	500	0.42	2132	2261	2390	±13.44	2087	2261	2436	±18.15
270	518	0.41	2219	2357	2496	±14.44	2172	2357	2543	±19.36
280	536	0.38	2304	2452	2600	±15.94	2255	2452	2650	±21.21
290	554	0.34	2384	2542	2700	±18.26	2333	2542	2751	±24.14
300	572	0.29	2456	2624	2791	±22.12	2404	2624	2844	±29.05

**Table 8. Ambient temperature, corresponding resistance, temperature coefficient and maximum expected temperature error for KTY84/151** $I_{sen(cont)} = 2\text{ mA}$ .

Ambient temperature		Temperature coefficient (%/K)	KTY84/151			Temperature error (K)
(°C)	(°F)		Resistance (Ω)			
			Min	Typ	Max	
-40	-40	0.84	332	350	368	±5.97
-30	-22	0.83	362	381	399	±5.84
-20	-4	0.82	394	414	433	±5.72
-10	14	0.80	428	449	469	±5.62
0	32	0.79	464	486	507	±5.51
10	50	0.77	503	525	547	±5.41
20	68	0.75	544	566	589	±5.31
25	77	0.74	565	588	611	±5.25
30	86	0.73	587	610	633	±5.2
40	104	0.71	632	656	679	±5.08
50	122	0.70	679	704	728	±4.96
60	140	0.68	729	754	778	±4.83
70	158	0.66	781	806	831	±4.68
80	176	0.64	835	860	885	±4.53
90	194	0.63	891	916	942	±4.37
100	212	0.61	950	975	1000	±4.19
110	230	0.60	1007	1036	1064	±4.58
120	248	0.58	1067	1099	1131	±4.99
130	266	0.57	1128	1164	1199	±5.41
140	284	0.55	1191	1231	1271	±5.84
150	302	0.54	1256	1300	1345	±6.3
160	320	0.53	1322	1372	1421	±6.77
170	338	0.52	1391	1445	1500	±7.25
180	356	0.51	1461	1521	1581	±7.75
190	374	0.49	1533	1599	1664	±8.27
200	392	0.48	1607	1679	1751	±8.81
210	410	0.47	1683	1761	1839	±9.36
220	428	0.46	1760	1846	1931	±9.93
230	446	0.45	1839	1932	2024	±10.51
240	464	0.44	1920	2021	2121	±11.11
250	482	0.44	2003	2112	2220	±11.73
260	500	0.42	2087	2205	2321	±12.42
270	518	0.41	2172	2298	2424	±13.37
280	536	0.38	2257	2391	2525	±14.79
290	554	0.34	2335	2479	2622	±16.98
300	572	0.29	2406	2558	2710	±20.61

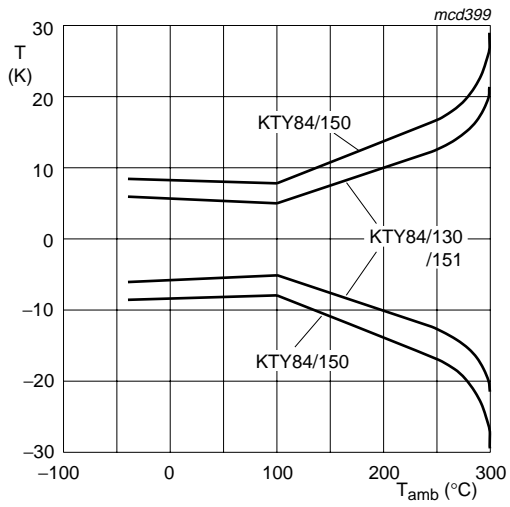


Fig 1. Maximum expected temperature error ( $\Delta T$ )

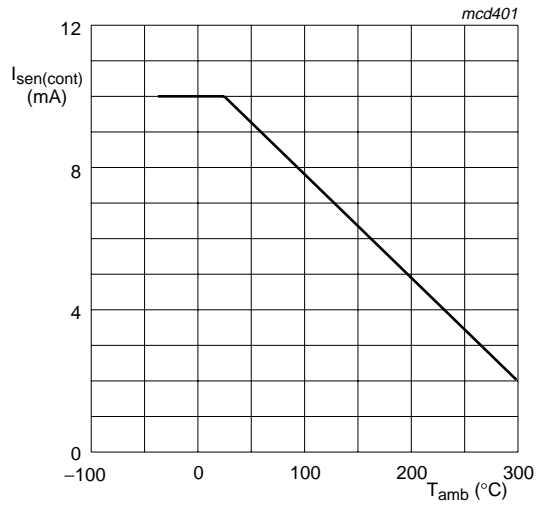


Fig 2. Maximum operating current for safe operation

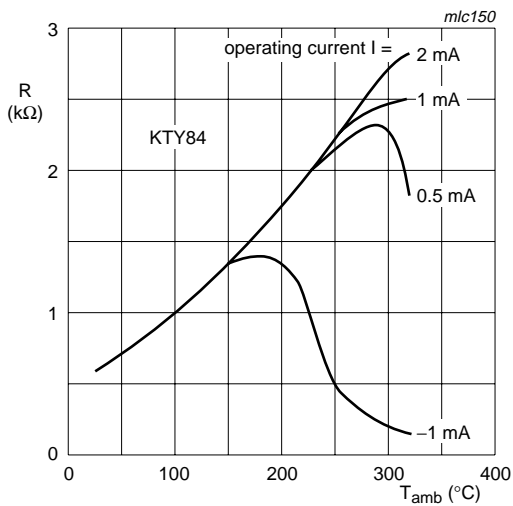


Fig 3. Sensor resistance as a function of ambient temperature and operating current

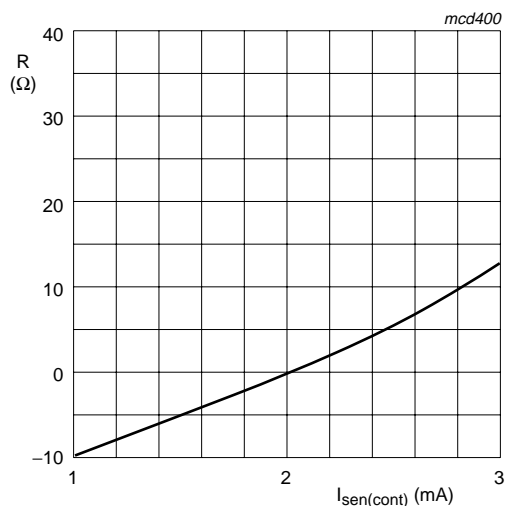


Fig 4. Deviation of sensor resistance as a function of operating current in still liquid

## 7. Package outline

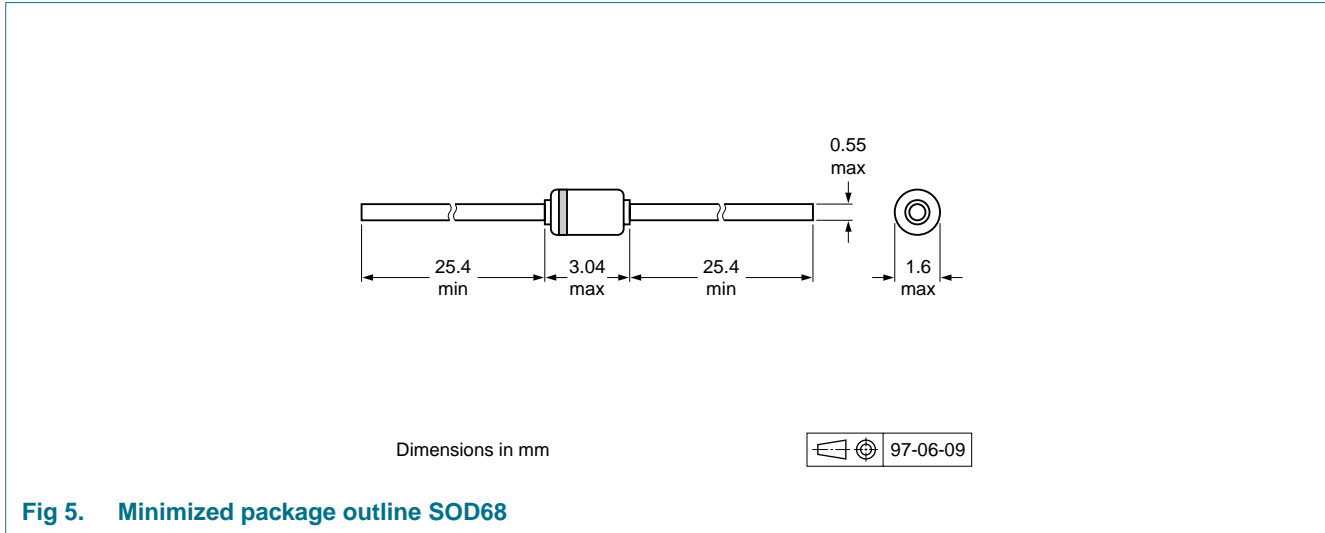


Fig 5. Minimized package outline SOD68

## 8. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
KTY84_SER_6	20080508	Product data sheet	-	KTY84_SERIES_5
Modifications:		<ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> </ul>		
KTY84_SERIES_5	20030915	Product specification	-	KTY84-1SERIES_4
KTY84-1SERIES_4	20000825	Product specification	-	KTY84-1SERIES_3
KTY84-1SERIES_3	19980409	Product specification	-	KTY84-1SERIES_2
KTY84-1SERIES_2	19961206	Product specification	-	KTY84-1 series
KTY84-1 series	May 1990	-	-	-

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Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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[2] The term 'short data sheet' is explained in section "Definitions".

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