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 °C to +300 °C
- Long-term stability
- Virtually linear characteristics
- Nickel plated leads

1.3 Quick reference data

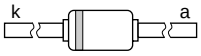
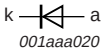
Table 1. Quick reference data

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

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

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
$I_{sen(cont)}$	continuous sensor current	in free air; T_{amb} = 25 °C	[1]	-	10	mA
		in free air; T_{amb} = 300 °C		-	2	mA
T_{amb}	ambient temperature			–40	+300	°C

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

6. Characteristics

Table 6. Characteristics

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
R_{100}	sensor resistance	$I_{sen(cont)}$ = 2 mA					
		KTY84/130		970	-	1030	Ω
		KTY84/150		950	-	1050	Ω
		KTY84/151		950	-	1000	Ω
TC	temperature coefficient			-	0.61	-	%/K
R_{250}/R_{100}	resistance ratio	T_{amb} = 250 °C and 100 °C		2.111	2.166	2.221	
R_{25}/R_{100}	resistance ratio	T_{amb} = 25 °C and 100 °C		0.595	0.603	0.611	
τ_{th}	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 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 mA.

Ambient temperature		Temperature coefficient (%/K)	KTY84/151			
(°C)	(°F)		Resistance (Ω)			Temperature error (K)
			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

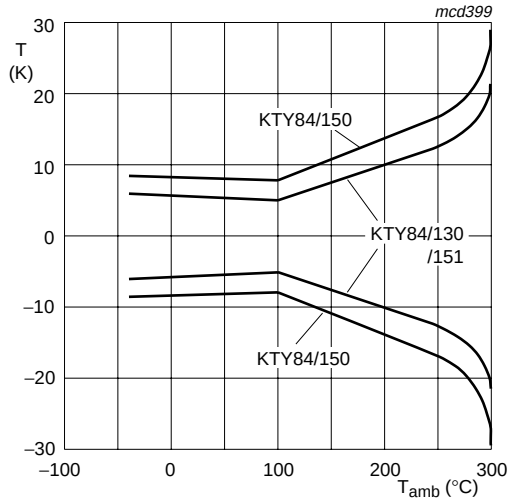


Fig 1. Maximum expected temperature error (ΔT)

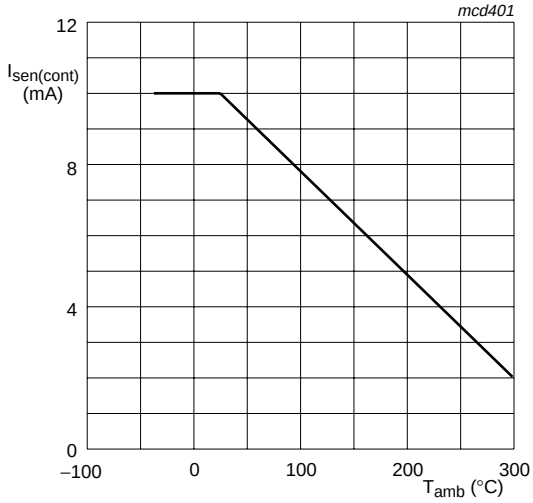


Fig 2. Maximum operating current for safe operation

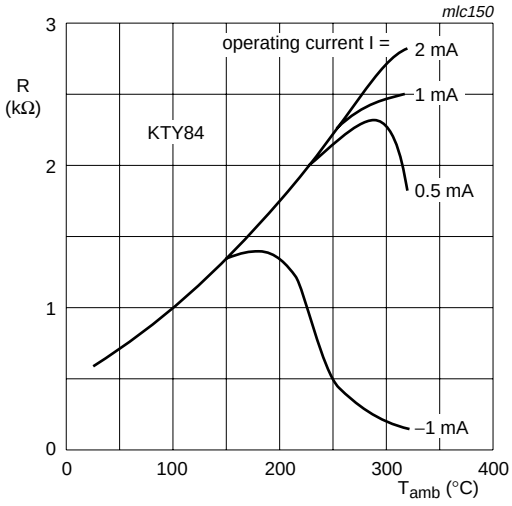
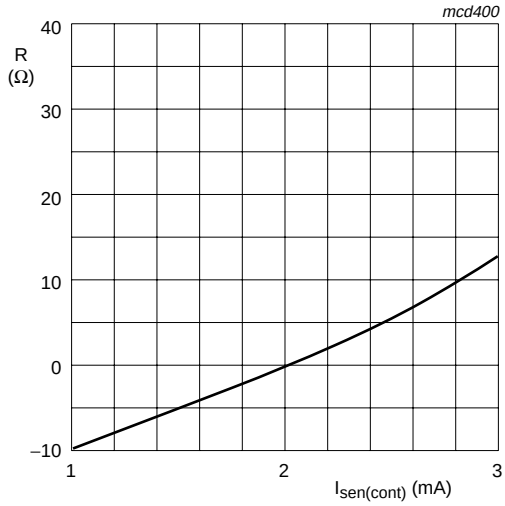


Fig 3. Sensor resistance as a function of ambient temperature and operating current



T_{amb} = 100 °C

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

7. Package outline

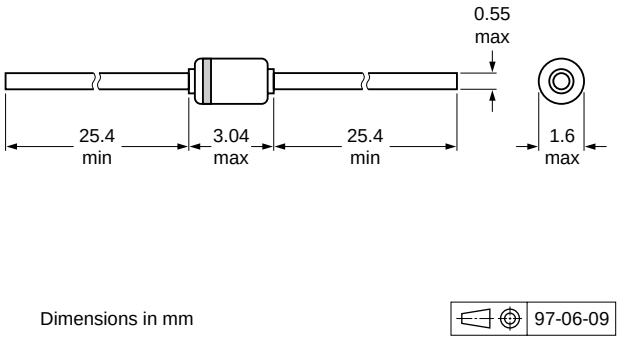


Fig 5. Minimized package outline SOD68

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:	• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate.			
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	-	-	-

9. Legal information

9.1 Data sheet status

Document status[1][2]	Product status[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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11. Contents

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