



**PRODUCT NAME**

TM87 series

**TITLE**

Load capacitance and frequency tolerance of 32,768Hz Crystal Oscillator

**APPLICATION NOTE**

Generally, Crystal oscillator is used in timepiece products. Therefore, it has certain requirements for time accuracy. Some details have to be taken care of when a Crystal oscillator is used:

1. On PCB layout, the position of Crystal device and load capacitors should as close to IC as possible.
2. On PCB layout, all of the signal lines should better detour the position of Crystal device, no matter on the component side or solder side of the PCB.
3. The capacitance of load capacitor will be different by brands and lots. Please fine tune the output frequency from your real product with trimmer.

The following table includes the results collected from TM8702 samples using 32.768KHz Crystal of KDS6L model as the experiment element.

In 3V application, the Crystal oscillator operated under 1.5V when BCF flag is cleared to 0.

1. 3V , Load Capacitance and Daily Error Value of Crystal Oscillator

Item	Xin	Xout	Sec/day(max)
1.	10pF	18 pF	-0.02
2.	15pF	8pF	0.08
3.	20pF	5pF	0.02
4.	22pF	4pF	0.03

2. 1.5V , Load Capacitance and Daily Error Value of Crystal Oscillator

Item	Xin	Xout	Sec/day(max)	Sec/day(min)
1.	10pF	15 pF	0.06	0.04
2.	15 pF	5 pF	0.04	0.02