



8-Bit Micro-Controller

TM57FLA80

Electrical Characteristics

Application Note

**Tenx reserves the right to change or
discontinue this product without notice.**

tenx technology inc.

CONTENTS

PRODUCT NAME 2

TM57FLA80 2

APPLICATION NOTE 2

1. TM57FLA80 State current 2

2. IRC vs. Frequency vs. Operating Current vs. Temperature..... 4

3. ERC vs. Frequency vs. Operating Current vs. Temperature 6

4. X'TAL vs. Operating Current 9

PRODUCT NAME**TM57FLA80****TITLE**

TM57FLA80 Electrical Characteristics

APPLICATION NOTE

The electrical characteristics described in the document are for reference only. The operating current is measured with no loading at room temperature (25°C). All the characteristics will be different subject to the process variation, temperature, Option, loading and operating voltage etc. IC from different lots will be slightly different due to the drift of the manufacturing processes.

1. TM57FLA80 State current

TM57FLA80 IRC (4MHz) 25°C LVR disable																		
Unit	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA	uA	uA	uA	uA	uA	uA
5V	✓		✓		✓		✓		✓		✓		✓		✓		✓	
3V		✓		✓		✓		✓		✓		✓		✓		✓		✓
CLKO			✓	✓														
WKT					✓	✓												
PWM							✓	✓										
Touch key enable									✓	✓								
Key is touched											✓	✓						
Sleep IVC OFF													✓	✓				
Sleep IVC ON															✓	✓		
LCD all light																	✓	✓
Operating Current	1.79	1.4	1.91	1.48	1.79	1.4	1.79	1.4	1.88	1.4	1.85	1.4	0	0	181	72.4	23.8	12.3

TM57FLA80 ERC (6.7K Ω /33PF) 25°C LVR disable																	
Unit	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA	uA	uA	uA	uA	uA
5V	✓		✓		✓		✓		✓		✓		✓		✓		✓
3V		✓		✓		✓		✓		✓		✓		✓		✓	
CLKO			✓	✓													
WKT					✓	✓											
PWM							✓	✓									
Touch key enable									✓	✓							
Key is touched											✓	✓					
Sleep IVC OFF													✓	✓			
Sleep IVC ON															✓	✓	
LCD all light																✓	✓
Operating Current	1.35	0.82	1.42	0.86	1.35	0.82	1.35	0.82	1.46	0.83	1.44	0.83	0	0	181	72.2	23.6

TM57FLA80 X'TAL (4MHz) 25°C LVR disable																	
Unit	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA	uA	uA	uA	uA	uA
5V	✓		✓		✓		✓		✓		✓		✓		✓		✓
3V		✓		✓		✓		✓		✓		✓		✓		✓	
WKT			✓	✓													
PWM					✓	✓											
Touch key enable							✓	✓									
Key is touched									✓	✓							
Sleep IVC OFF											✓	✓					
Sleep IVC ON													✓	✓			
LCD all light															✓	✓	
Operating Current	2.07	1.32	2.07	1.32	2.07	1.32	2.17	1.32	2.15	1.3	0	0	180	71.9	24.5	12.6	

Touch key option states: Enable TK1, disable the other options.

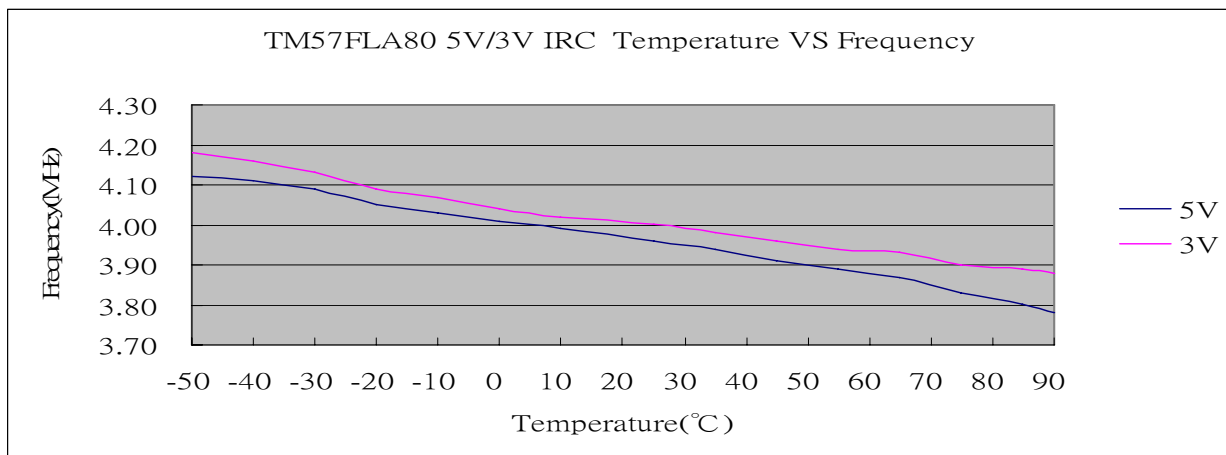
Lcd option: Enable IDLE mode, LCDCTRL=11H, LCDCLK (div=16) with no load.

2. IRC vs. Frequency vs. Operating Current vs. Temperature

1. -50°C ~ 90°C
2. 5V / 3V
3. IRC 4MHz
4. LVR disable
5. IVC OFF(ON)

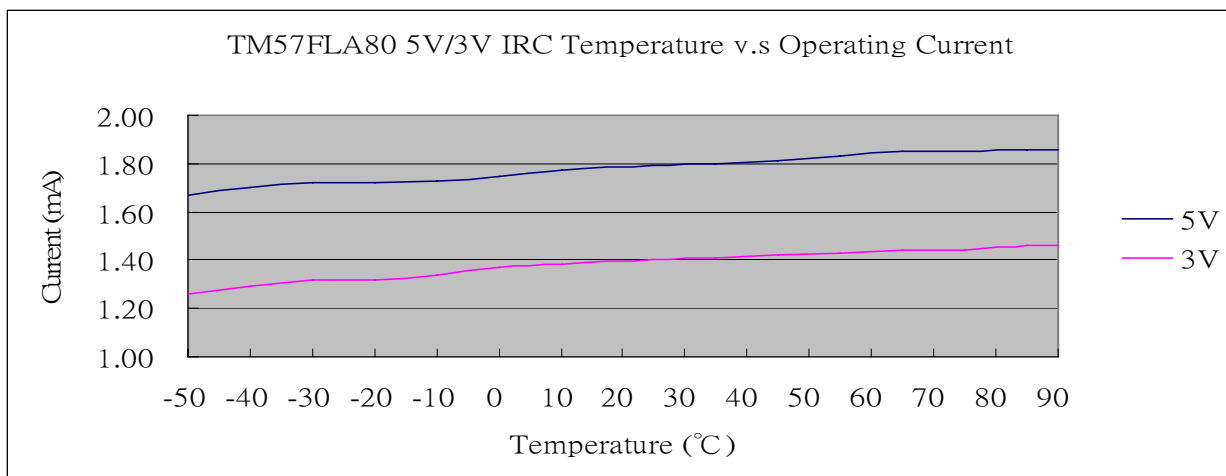
Test Description: When the IRC(4MHz) temperature is in the range of -50°C ~ 90°C, measure the frequency change of CLKO.

MHz	-50°C	-40°C	-30°C	-20°C	-10°C	0°C	10°C	25°C	35°C	45°C	55°C	65°C	75°C	85°C	90°C
5V	4.12	4.11	4.09	4.05	4.03	4.01	3.99	3.96	3.94	3.91	3.89	3.87	3.83	3.80	3.78
3V	4.18	4.16	4.13	4.09	4.07	4.04	4.02	4.00	3.98	3.96	3.94	3.93	3.90	3.89	3.88



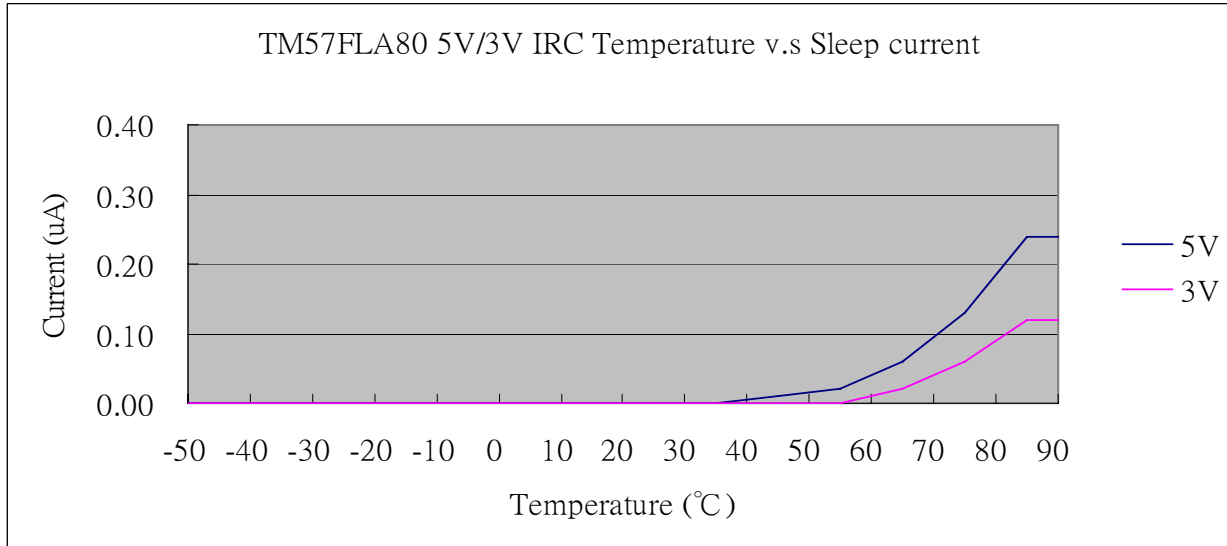
Test Description: When the IRC(4MHz) temperature is in the range of -50°C ~ 90°C, measure the operating current.

mA	-50°C	-40°C	-30°C	-20°C	-10°C	0°C	10°C	25°C	35°C	45°C	55°C	65°C	75°C	85°C	90°C
5V	1.67	1.70	1.72	1.72	1.73	1.75	1.77	1.79	1.80	1.81	1.83	1.85	1.85	1.86	1.86
3V	1.26	1.29	1.32	1.32	1.34	1.37	1.38	1.40	1.41	1.42	1.43	1.44	1.44	1.46	1.46



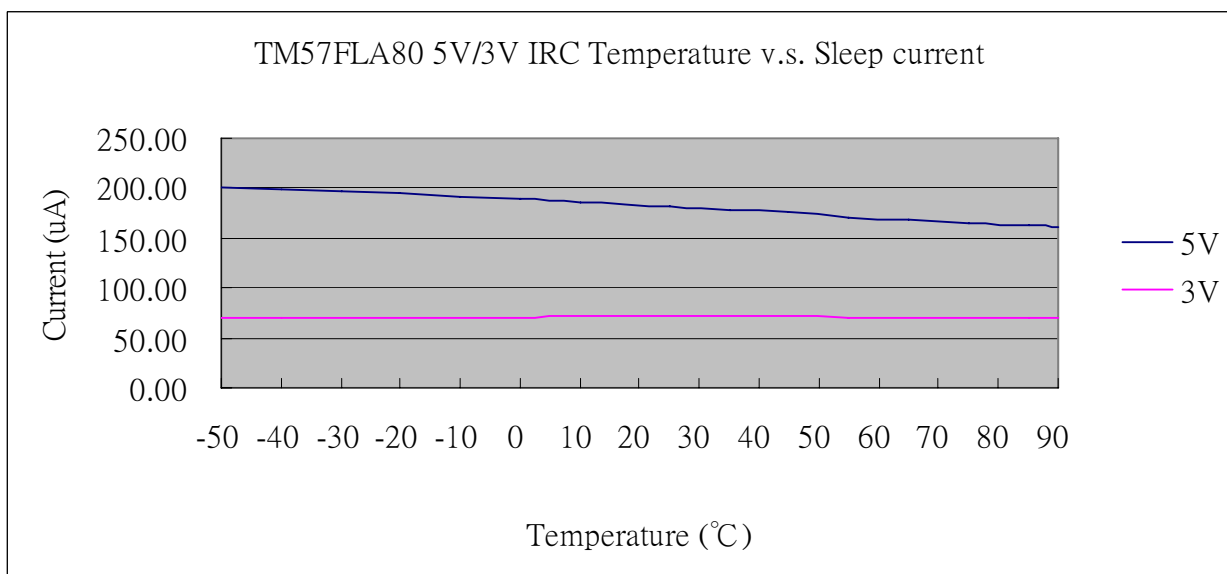
Test Description: When the IRC(4MHz) temperature is in the range of $-50^{\circ}\text{C} \sim 90^{\circ}\text{C}$, measure the Sleep current for IVC OFF.

μA	-50°C	-40°C	-30°C	-20°C	-10°C	0°C	10°C	25°C	35°C	45°C	55°C	65°C	75°C	85°C	90°C
5V	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.06	0.13	0.24	0.24
3V	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.06	0.12	0.12



Test Description: When the IRC(4MHz) temperature is in the range of $-50^{\circ}\text{C} \sim 90^{\circ}\text{C}$, measure the Sleep current for IVC ON.

μA	-50°C	-40°C	-30°C	-20°C	-10°C	0°C	10°C	25°C	35°C	45°C	55°C	65°C	75°C	85°C	90°C
5V	201.3	199.3	197.1	194.3	191.7	188.7	185.5	180.9	178.7	175.4	171.2	168.1	164.7	162.0	161.2
3V	69.2	69.8	70.2	70.6	70.8	71.0	71.1	71.2	71.4	71.2	70.9	70.7	70.5	70.1	70.0

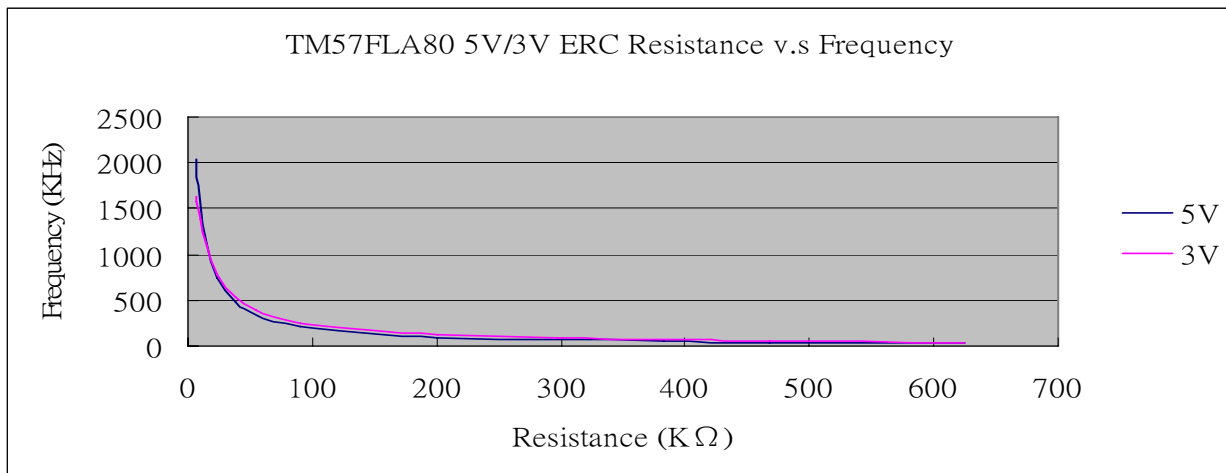


3. ERC vs. Frequency vs. Operating Current vs. Temperature

1. 25°C
2. 5V / 3V
3. ERC (33PF)
4. LVR disable
5. IVC OFF

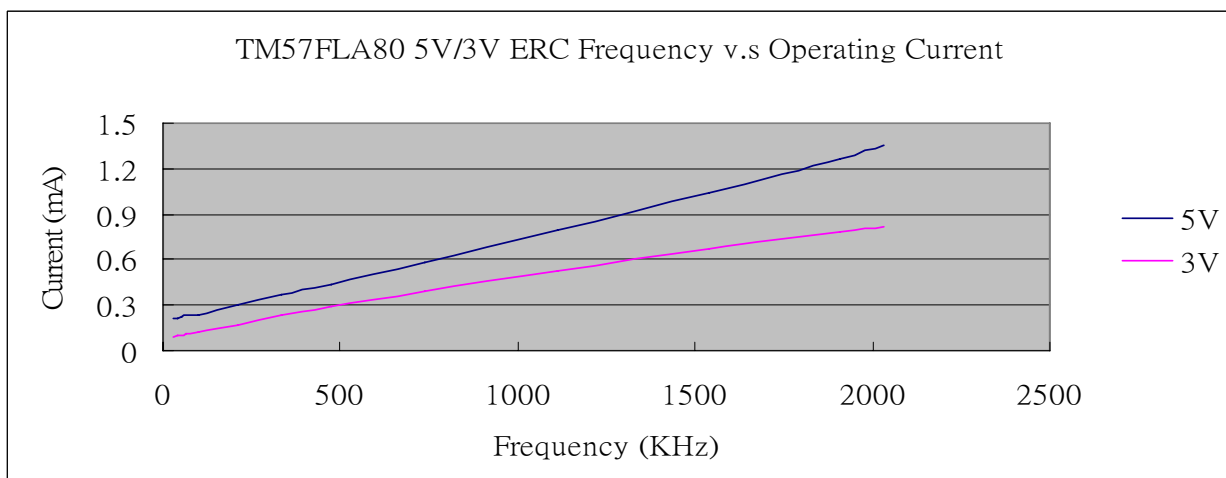
Test description: When the ERC (33PF) temperature is at 25°C, measure the frequency changes at different resistances.

KHz	6.7K Ω	7.5K Ω	10K Ω	15K Ω	24K Ω	38K Ω	55K Ω	91K Ω	201K Ω	297K Ω	383K Ω	468K Ω	624K Ω
5V	2033	1907	1537	1113	740	474	336	210	97	66	51	42	31
3V	1627	1573	1387	1093	785	530	391	248	118	81	63	52	39



Test description: When the ERC (33PF) temperature is at 25°C, measure the operating currents at different frequencies.

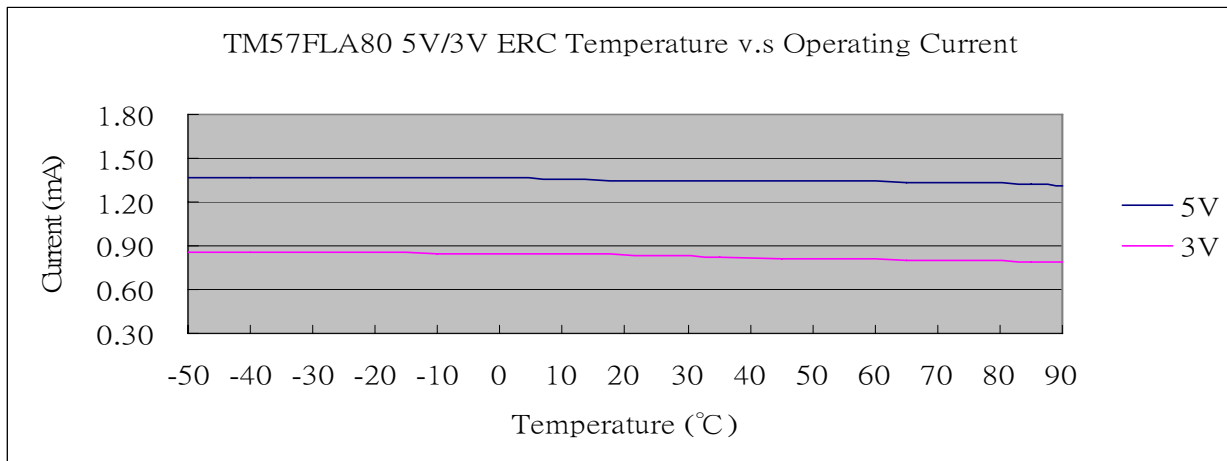
mA	2033KHz	1907KHz	1537KHz	1113KHz	740KHz	474KHz	336KHz	210KHz	97KHz	66KHz	51KHz	42KHz	31KHz
5V	1.36	1.27	1.04	0.79	0.58	0.44	0.37	0.3	0.24	0.23	0.22	0.21	0.21
3V	0.82	0.78	0.67	0.53	0.39	0.29	0.23	0.17	0.12	0.11	0.1	0.1	0.09



1. -50°C ~ 90°C
2. 5V / 3V
3. ERC (6.7KΩ/33PF)
4. LVR disable
5. IVC OFF(ON)

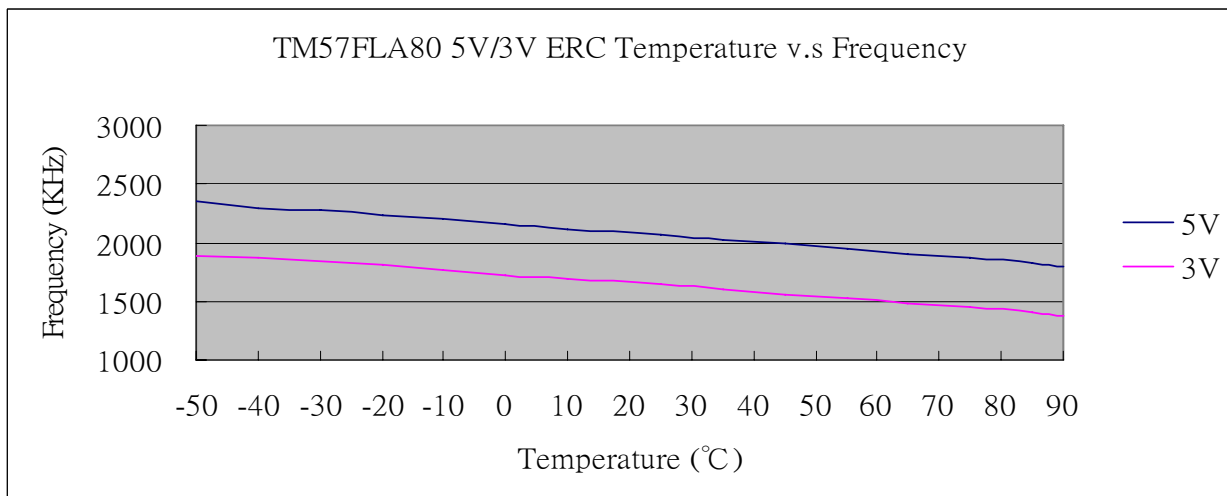
Test description: When the ERC (6.7KΩ/33PF) temperature is in the range of -50°C ~ 90°C, measure the operating current.

mA	-50°C	-40°C	-30°C	-20°C	-10°C	0°C	10°C	25°C	35°C	45°C	55°C	65°C	75°C	85°C	90°C
5V	1.37	1.37	1.37	1.37	1.37	1.37	1.36	1.35	1.35	1.34	1.34	1.33	1.33	1.32	1.31
3V	0.85	0.85	0.85	0.85	0.84	0.84	0.84	0.83	0.82	0.81	0.81	0.80	0.80	0.79	0.79



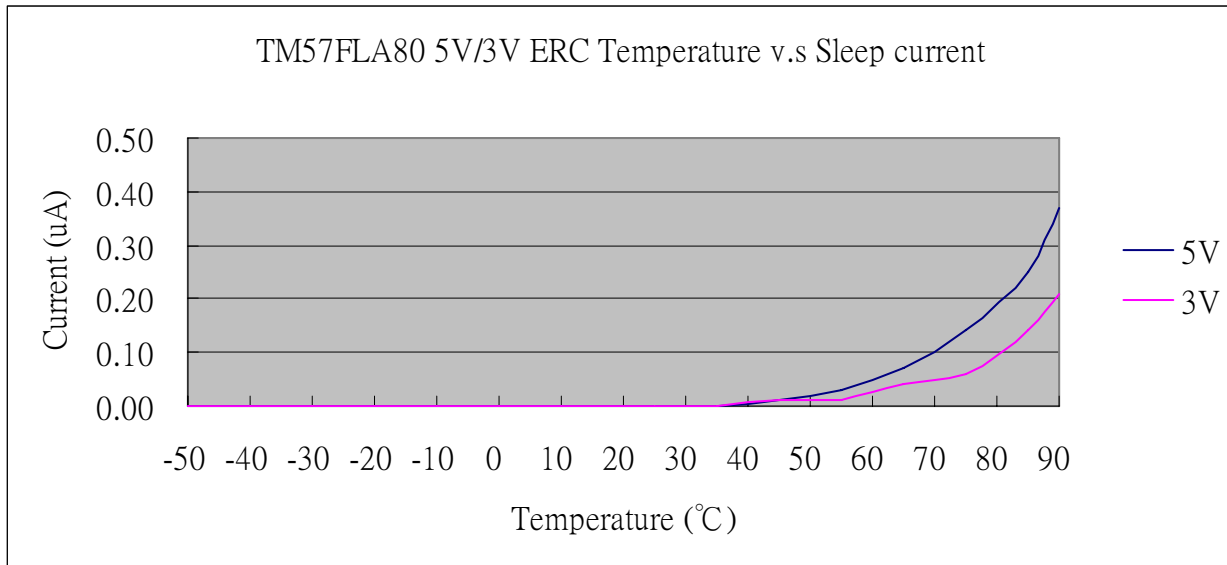
Test Description: When ERC (6.7KΩ/33PF) temperature is in the range of -50°C ~ 90°C, measure the frequency change of ERC.

KHz	-50°C	-40°C	-30°C	-20°C	-10°C	0°C	10°C	25°C	35°C	45°C	55°C	65°C	75°C	85°C	90°C
5V	2347	2300	2273	2233	2200	2153	2120	2073	2027	1989	1950	1905	1868	1826	1803
3V	1888	1875	1837	1810	1768	1721	1697	1640	1603	1557	1525	1484	1444	1407	1379



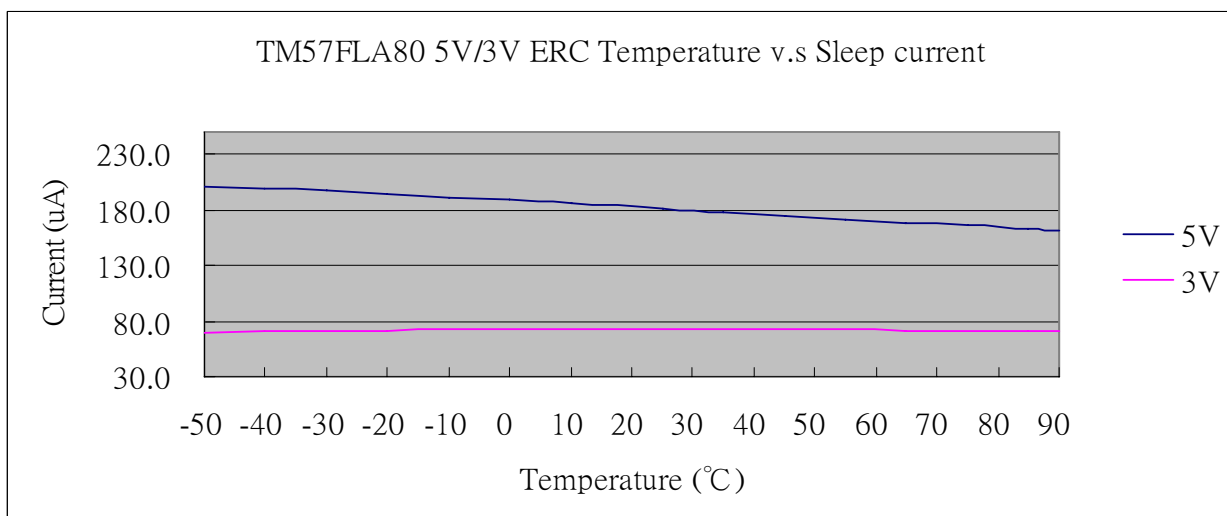
Test Description: When the ERC (6.7K Ω /33PF) temperature is in the range of -50°C ~ 90°C, measure the Sleep current for IVC OFF.

μ A	-50°C	-40°C	-30°C	-20°C	-10°C	0°C	10°C	25°C	35°C	45°C	55°C	65°C	75°C	85°C	90°C
5V	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.07	0.14	0.25	0.37
3V	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.04	0.06	0.14	0.21



Test Description: When the ERC (6.7K Ω /33PF) temperature is in the range of -50°C ~ 90°C, measure the Sleep current for IVC ON.

μ A	-50°C	-40°C	-30°C	-20°C	-10°C	0°C	10°C	25°C	35°C	45°C	55°C	65°C	75°C	85°C	90°C
5V	200.7	199.1	197.2	194.4	191.7	189.3	186.2	181.2	178.1	174.3	171.2	168.4	166.1	163.2	161.3
3V	69.1	70.4	71.3	71.8	72.0	72.2	72.2	72.2	72.1	72.1	72.0	71.7	71.7	71.2	71.1



4. X'TAL vs. Operating Current

1. 25°C
2. 5V / 3V
3. X'TAL
4. LVR disable
5. IVC OFF

Test description: When the X'TAL temperature is at 25°C, measure the operating currents at different frequencies.

mA	4MHz	6MHz	8MHz	10MHz	12MHz
5V	2.05	2.69	3.4	4.09	4.78
3V	1.32	1.91	2.46	3.01	-

