



8-Bit Micro-Controller

TM57FA40

Electrical Characteristics

Application Note

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

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PRODUCT NAME

TM57FA40

TITLE

TM57FA40 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. TM57FA40 State current

TM57FA40 IRC (4MHz) 25°C LVR disable												
Unit	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA	uA	uA
5V	∇		∇		∇		∇		∇		∇	
3V		∇		∇		∇		∇		∇		∇
CLKO			∇	∇								
WKT					∇	∇						
PWM							∇	∇				
Sleep IVC OFF									∇	∇		
Sleep IVC ON											∇	∇
Operating Current	1.39	1.05	1.49	1.12	1.39	1.05	1.39	1.05	0	0	202.2	80.6

TM57FA40 ERC(6.7KΩ/33PF) 25°C LVR disable												
Unit	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA	uA	uA
5V	∇		∇		∇		∇		∇		∇	
3V		∇		∇		∇		∇		∇		∇
CLKO			∇	∇								
WKT					∇	∇						
PWM							∇	∇				
Sleep IVC OFF									∇	∇		
Sleep IVC ON											∇	∇
Operating Current	1.17	0.68	1.22	0.7	1.17	0.68	1.17	0.68	0	0	195.8	79.8

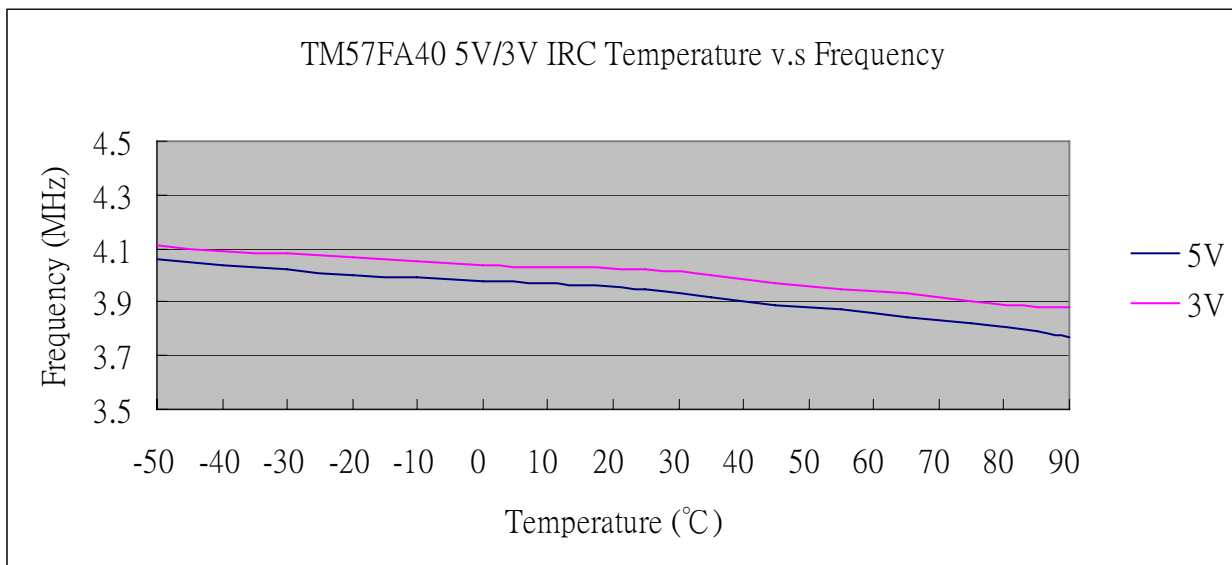
TM57FA40 XTAL (4MHz) 25°C LVR disable												
Unit	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA	uA	uA
5V	▼		▼		▼		▼		▼		▼	
3V		▼		▼		▼		▼		▼		▼
CLKO			▼	▼								
WKT					▼	▼						
PWM							▼	▼				
Sleep IVC OFF									▼	▼		
Sleep IVC ON											▼	▼
Operating Current	1.73	1	1.82	1.06	1.73	1	1.73	1	0	0	197.9	80.5

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)

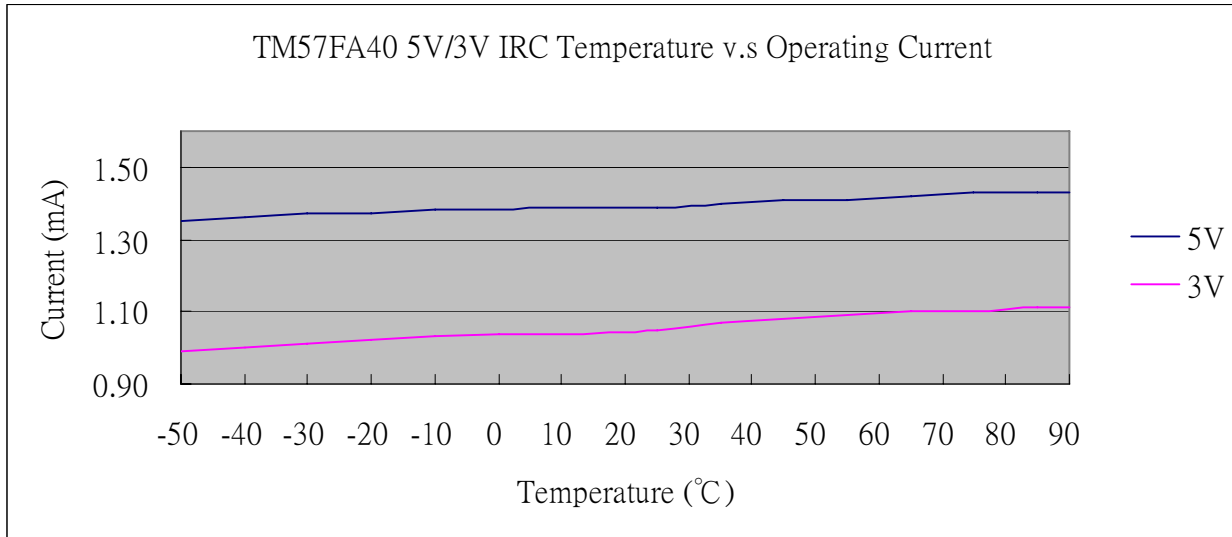
Test Description: When the IRC(4MHz) temperature is in the range of -50°C ~ 90°C, measure the frequency change of CLKO.

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	4.06	4.04	4.02	4.00	3.99	3.98	3.97	3.95	3.92	3.89	3.87	3.84	3.82	3.79	3.77
3V	4.11	4.09	4.08	4.07	4.05	4.04	4.03	4.02	4.00	3.97	3.95	3.93	3.90	3.88	3.88



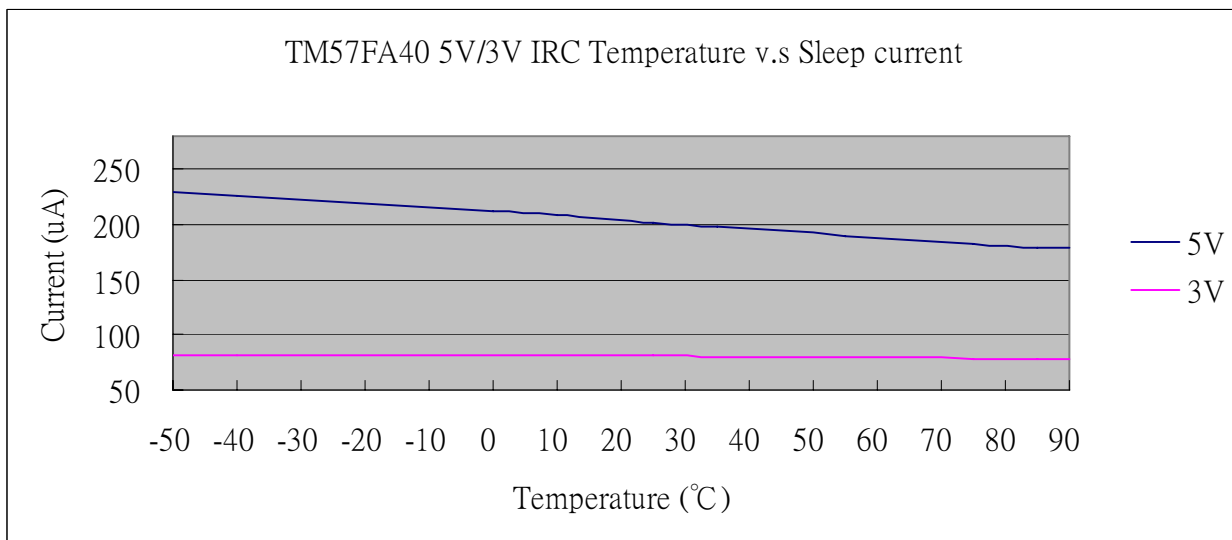
Test Description: When the IRC(4MHz) temperature is in the range of -50°C ~ 90°C, measure the operating current.

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	1.35	1.36	1.37	1.37	1.38	1.38	1.39	1.39	1.40	1.41	1.41	1.42	1.43	1.43	1.43
3V	0.99	1.00	1.01	1.02	1.03	1.04	1.04	1.05	1.07	1.08	1.09	1.10	1.10	1.11	1.11



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

uA	-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	230.3	226.7	223.1	219.6	215.7	212.3	208.2	202.2	197.8	194.0	189.9	185.6	182.0	178.7	178.2
3V	80.6	80.7	80.9	81.0	81.0	81.0	80.9	80.6	80.3	79.9	79.4	79.0	78.6	77.8	77.4

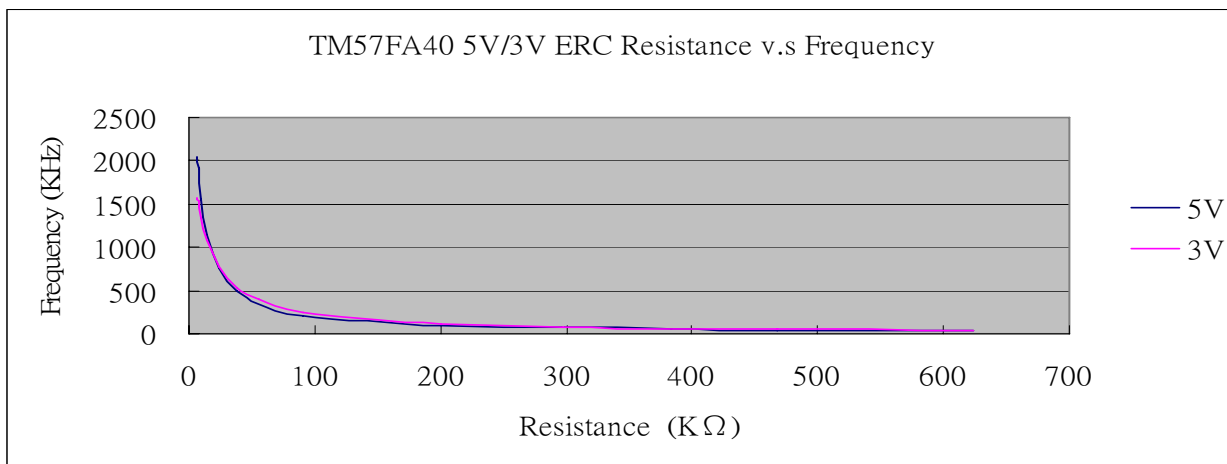


3. ERC vs. Frequency vs. Operating Current vs. Temperature

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

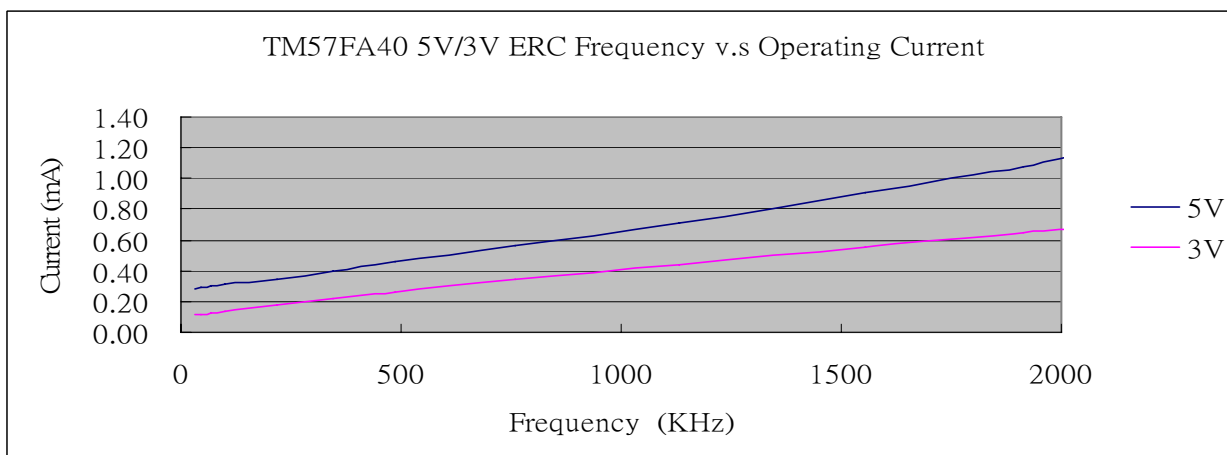
Test description: When the ERC (33PF) temperature is at 25°C, measure the frequency changes at different resistances.

KHz	6.7KΩ	7.5KΩ	10KΩ	15KΩ	24KΩ	38KΩ	55KΩ	91KΩ	201KΩ	297KΩ	383KΩ	468KΩ	624KΩ
5V	2053	1913	1553	1130	759	486	347	216	101	68	53	44	33
3V	1577	1527	1350	1077	782	532	390	251	120	83	64	53	40



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

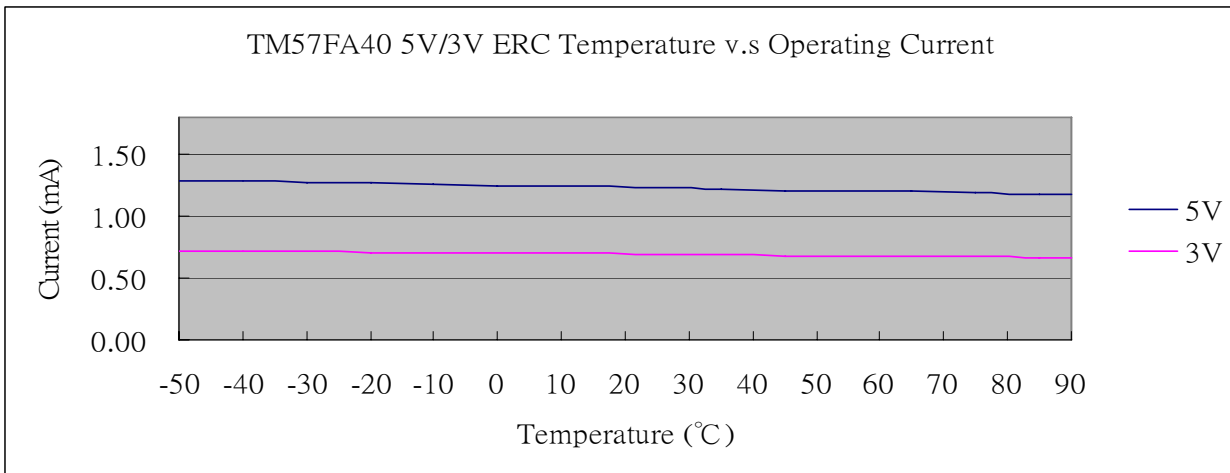
mA	2053KHz	1913KHz	1553KHz	1130KHz	759KHz	486KHz	347KHz	216KHz	101KHz	68KHz	53KHz	44KHz	33KHz
5V	1.17	1.08	0.91	0.71	0.56	0.46	0.40	0.35	0.31	0.30	0.29	0.29	0.28
3V	0.68	0.65	0.55	0.44	0.34	0.26	0.22	0.18	0.14	0.13	0.12	0.12	0.12



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

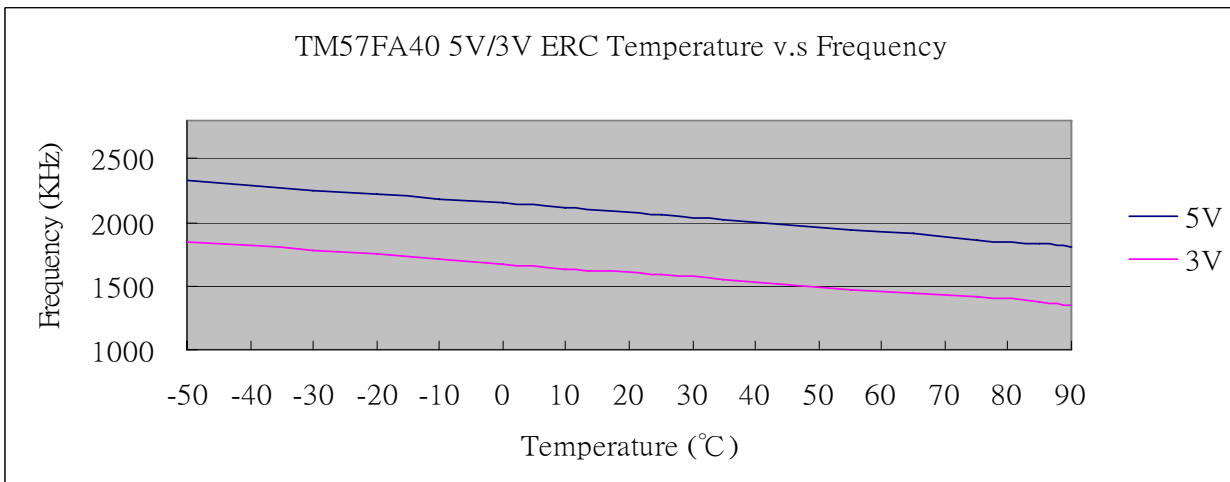
Test description: When the ERC (6.7KΩ/33PF) temperature is in the range of -50°C ~ 90°C, measure the operating current.

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	1.28	1.28	1.27	1.27	1.26	1.25	1.24	1.23	1.22	1.21	1.20	1.20	1.19	1.18	1.18
3V	0.72	0.72	0.72	0.71	0.71	0.71	0.70	0.69	0.69	0.68	0.67	0.67	0.67	0.66	0.66



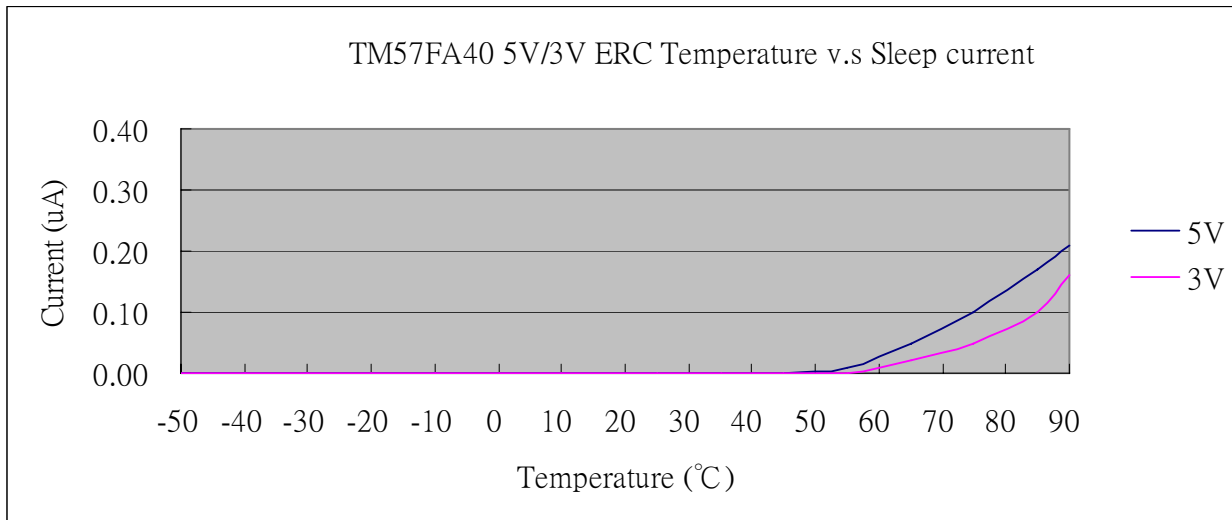
Test Description: When ERC (6.7KΩ/33PF) temperature is in the range of -50°C ~ 90°C, measure the frequency change of ERC.

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	2327	2287	2253	2220	2187	2153	2120	2060	2020	1982	1945	1907	1865	1829	1810
3V	1851	1814	1783	1749	1706	1668	1633	1586	1550	1513	1473	1446	1412	1373	1353



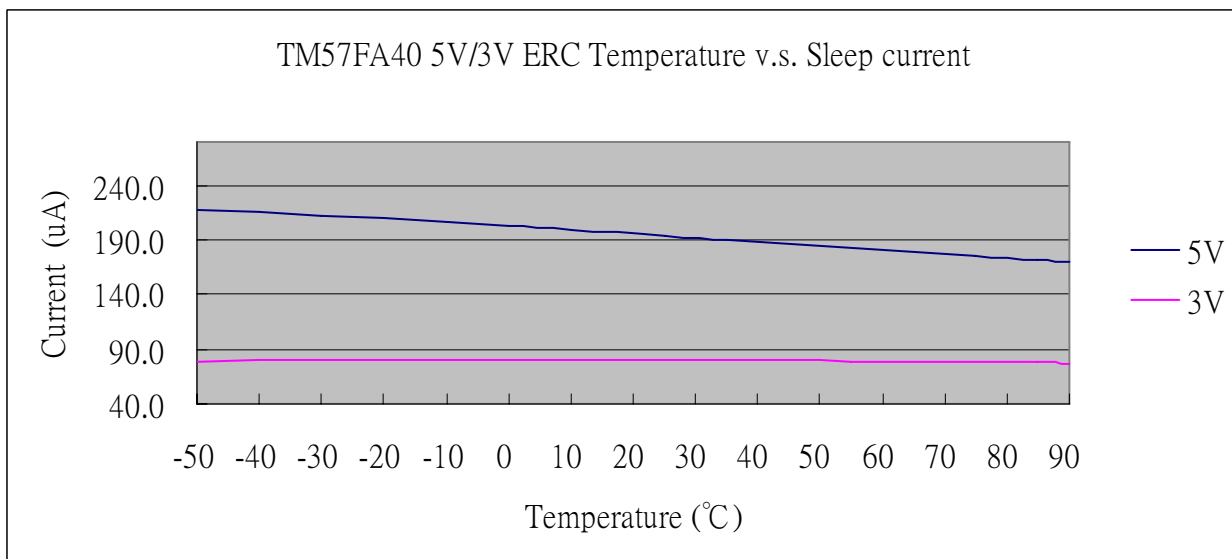
Test Description: When the ERC (6.7KΩ/33PF) temperature is in the range of -50°C ~ 90°C, measure the Sleep current for IVC OFF.

uA	-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	0.00	0.01	0.05	0.10	0.17	0.21
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	0.05	0.10	0.16



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

uA	-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	217.8	215.0	213.0	209.9	206.6	203.0	199.3	193.7	189.4	186.4	182.5	179.3	176.1	172.5	170.1
3V	78.8	79.4	79.8	80.1	80.3	80.3	80.2	80.1	79.6	79.4	79.1	78.7	78.4	77.7	77.3



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	13MHz
5V	1.73	2.16	2.69	3.2	3.72	4.08
3V	1	1.43	1.84	2.26	2.66	-

