



# **8-Bit Micro-Controller**

## **TM57PA40**

### **Electrical Characteristics**

## **Application Note**

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

**tenx technology inc.**

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**PRODUCT NAME**

**TM57PA40**

**TITLE**

TM57PA40 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. TM57PA40 State current

TM57PA40 IRC (4MHz) 25°C LVR disable										
Unit	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA
5V	∨		∨		∨		∨		∨	
3V		∨		∨		∨		∨		∨
CLKO			∨	∨						
WKT					∨	∨				
PWM							∨	∨		
Sleep									∨	∨
Operating Current	2.43	1.07	2.54	1.12	2.43	1.07	2.43	1.07	0	0

TM57PA40 ERC (6.7KΩ/33PF) 25°C LVR disable										
Unit	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA
5V	∨		∨		∨		∨		∨	
3V		∨		∨		∨		∨		∨
CLKO			∨	∨						
WKT					∨	∨				
PWM							∨	∨		
Sleep									∨	∨
Operating Current	2.13	0.92	2.18	0.95	2.13	0.92	2.13	0.92	0	0

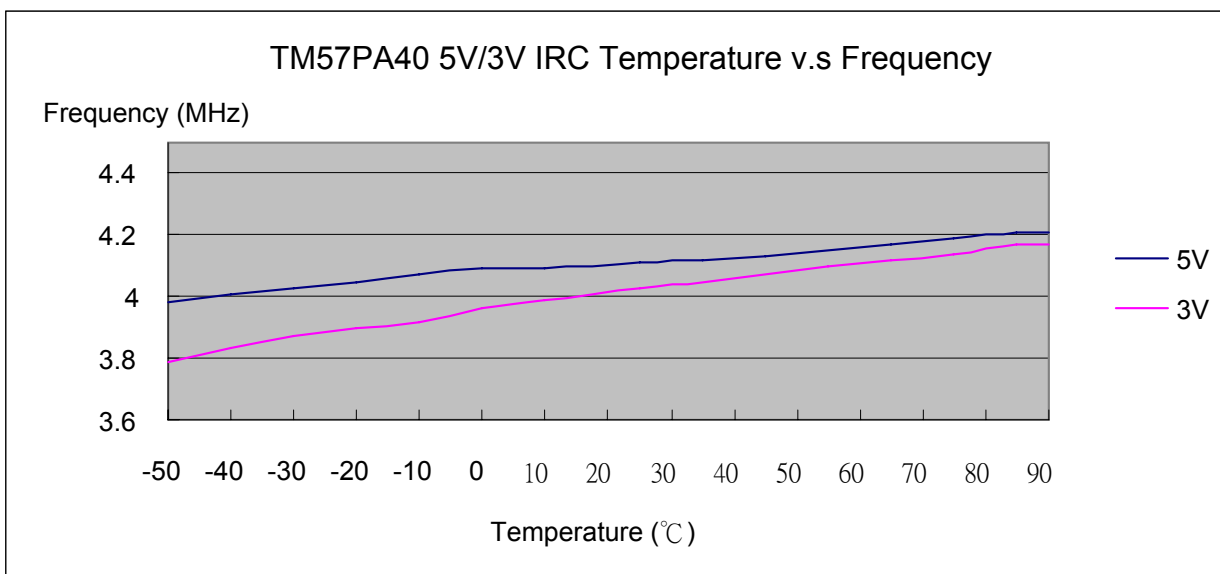
TM57PA40 X'TAL (4MHz) 25°C LVR disable										
Unit	mA	mA	mA	mA	mA	mA	mA	mA	mA	mA
5V	▼		▼		▼		▼		▼	
3V		▼		▼		▼		▼		▼
CLKO			▼	▼						
WKT					▼	▼				
PWM							▼	▼		
Sleep									▼	▼
Operating Current	3.52	1.05	3.6	1.09	3.52	1.05	3.52	1.05	0	0

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

1. -50°C ~ 90°C
2. 5V / 3V
3. IRC 4MHz
4. LVR disable

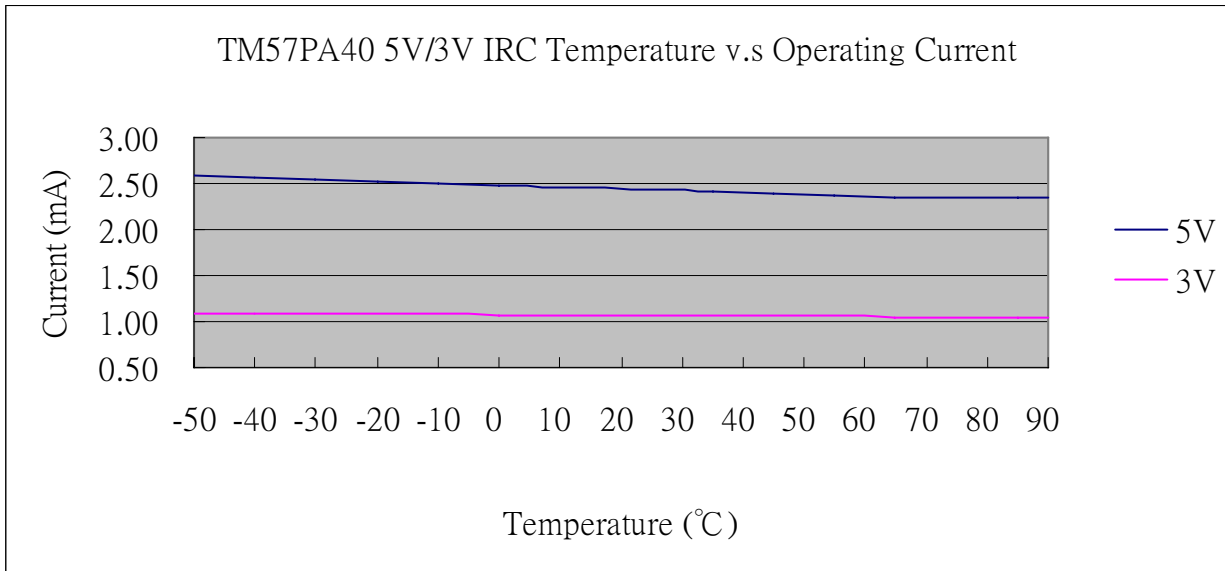
Test Description: When the IRC(4MHz) temperature is in the range of -50°C ~ 90°C, measure the frequency change of CLKO.

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	3.98	4.01	4.03	4.05	4.07	4.09	4.09	4.11	4.12	4.13	4.15	4.17	4.19	4.21	4.21
3V	3.79	3.83	3.87	3.9	3.92	3.96	3.99	4.03	4.05	4.07	4.1	4.12	4.14	4.17	4.17



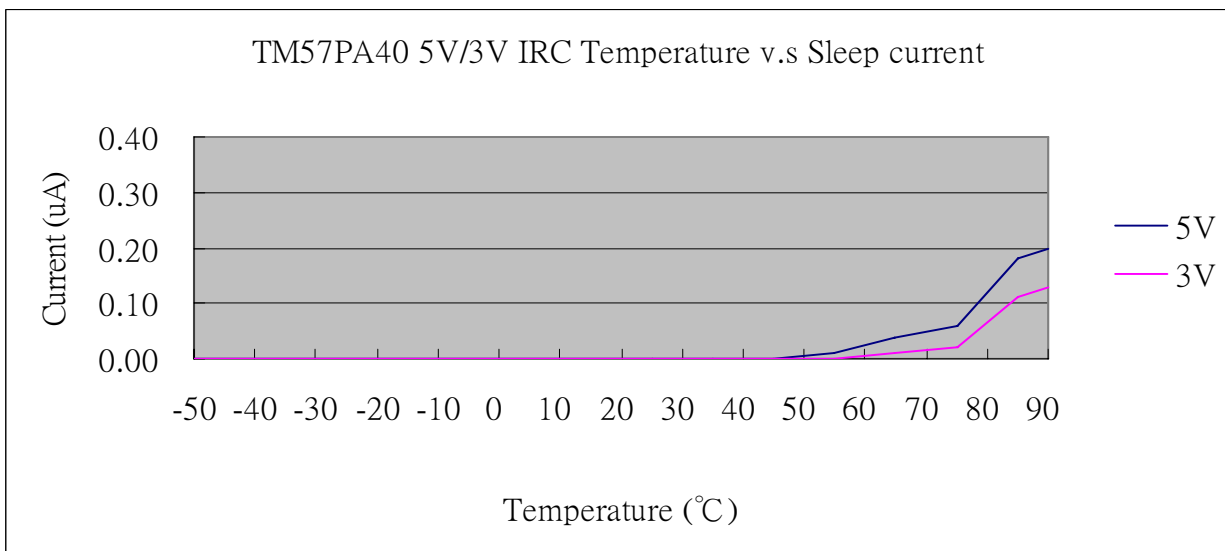
Test Description: When the IRC(4MHz) temperature is in the range of -50°C ~ 90°C, measure the operating current.

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	2.58	2.56	2.55	2.53	2.51	2.48	2.46	2.43	2.42	2.39	2.37	2.35	2.35	2.34	2.34
3V	1.09	1.08	1.08	1.08	1.08	1.07	1.07	1.07	1.06	1.06	1.06	1.05	1.05	1.04	1.04



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

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	0.04	0.06	0.18	0.20
3V	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.11	0.13

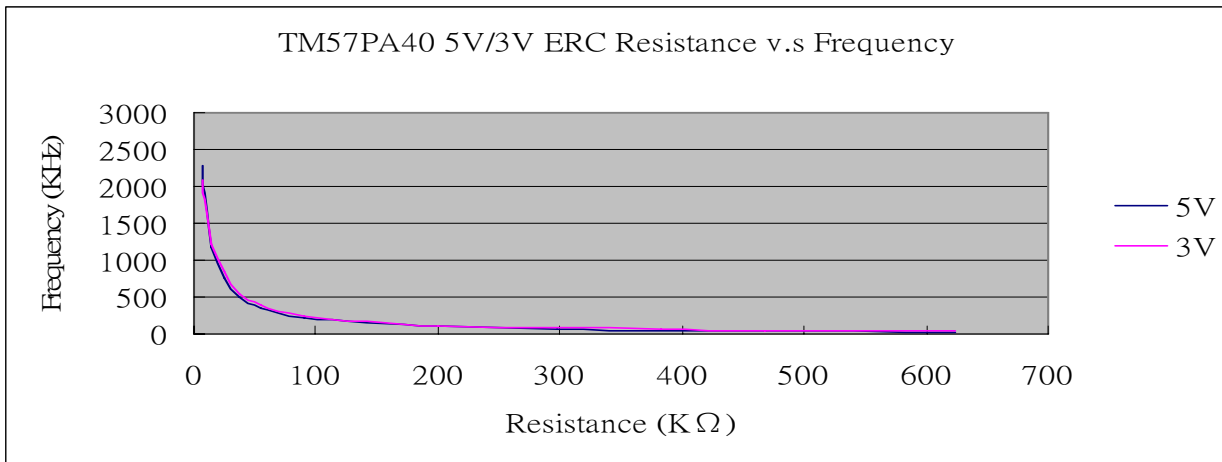


### 3. ERC vs. Frequency vs. Operating Current vs. Temperature

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

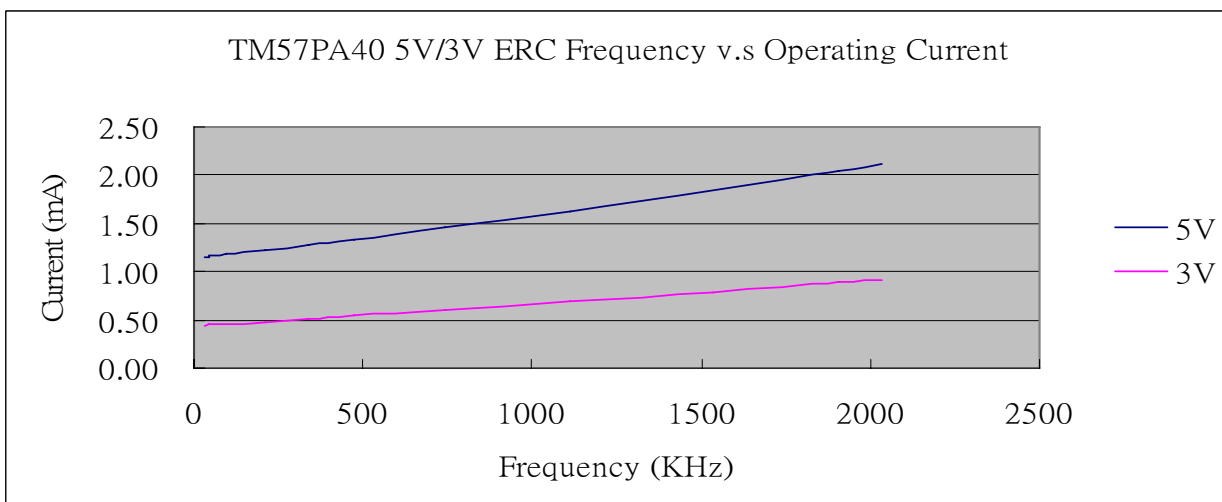
Test description: When the ERC (33PF) temperature is at 25°C, measure the frequency changes at different resistances.

KHz	6.7KΩ	7.5KΩ	10KΩ	15KΩ	24KΩ	38KΩ	55KΩ	91KΩ	201KΩ	297KΩ	383KΩ	468KΩ	624KΩ
5V	2280	2113	1670	1177	771	492	345	213	98	66	51	42	32
3V	2093	1983	1640	1227	841	550	395	248	117	79	61	50	38



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

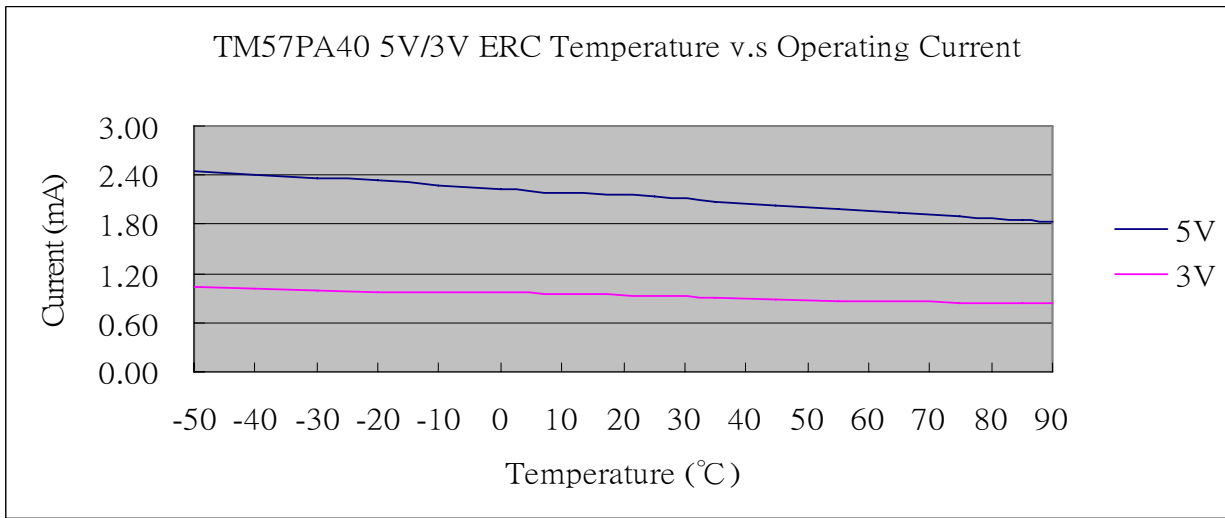
mA	2033KHz	1907KHz	1537KHz	1113KHz	740KHz	474KHz	336KHz	210KHz	97KHz	66KHz	51KHz	42KHz	31KHz
5V	2.12	2.04	1.84	1.63	1.46	1.34	1.28	1.22	1.18	1.17	1.16	1.15	1.15
3V	0.92	0.89	0.79	0.7	0.61	0.55	0.51	0.48	0.46	0.45	0.45	0.45	0.44



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

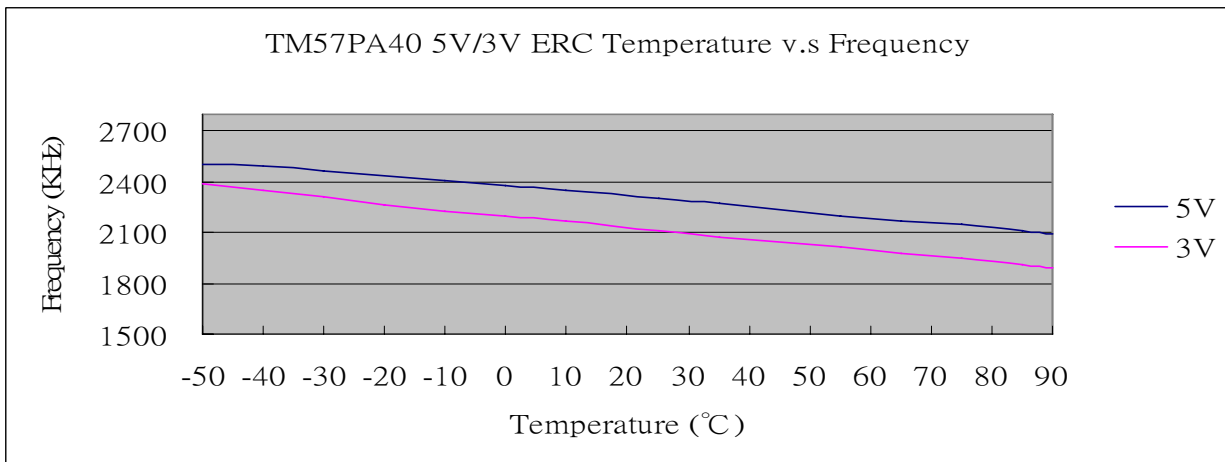
Test description: When the ERC (6.7KΩ/33PF) temperature is in the range of -50°C ~ 90°C, measure the operating current.

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	2.45	2.41	2.37	2.33	2.27	2.23	2.19	2.13	2.07	2.03	1.98	1.94	1.90	1.86	1.84
3V	1.03	1.01	1.00	0.98	0.97	0.96	0.94	0.92	0.90	0.89	0.87	0.85	0.84	0.83	0.83



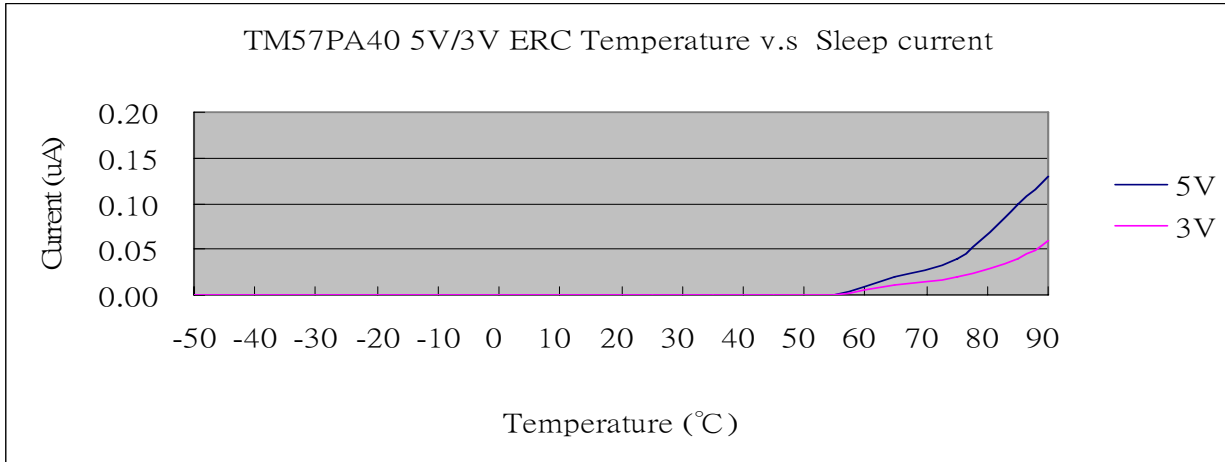
Test Description: When ERC (6.7KΩ/33PF) temperature is in the range of -50°C ~ 90°C, measure the frequency change of ERC.

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	2507	2493	2467	2440	2407	2380	2347	2300	2273	2233	2200	2173	2147	2113	2093
3V	2393	2347	2313	2267	2227	2200	2173	2113	2073	2047	2017	1980	1947	1912	1894



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

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	0.00	0.02	0.04	0.10	0.13
3V	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.04	0.06



#### 4. X'TAL vs. Operating Current

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

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	3.52	3.55	3.99	4.66	5.27	5.69
3V	1.05	1.34	1.65	1.96	2.25	2.45

