M16C/65C
Standard Characteristics (2)

Related Part No. :
M16C/65C group
R5F3651ECDFC, R5F3651ECNFC, R5F3651KCDFC, R5F3650KCDFA,
R5F3650KCDFB, R5F3651KCNFC, R5F3650KCNFA, R5F3650KCNFB,
R5F3651MCDFC, R5F3650MCDFA, R5F3650MCDFB, R5F3651MCNFC,
R5F3650MCNFA, R5F3650MCNFB, R5F3651NCDFC, R5F3650NCDFA,
R5F3650NCDFB, R5F3651NCNFC, R5F3650NCNFA, R5F3650NCNFB
### Standard Characteristics

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1. Input voltage (1)

(1) “H” Input voltage

- **Related Pin**
  - P0_0-P0_7, P1_0-P1_7, P2_0-P2_7, P3_0
    (in single-chip mode)
  - P3_1-P3_7, P4_0-P4_7, P5_0-P5_7, P6_0-P6_7
  - P7_0-P7_7, P8_0-P8_7, P9_0-P9_7, P10_0-P10_7
  - When using 128-Pin Package
  - P11_0-P11_7, P12_0-P12_7, P13_0-P13_7, P14_0-P14_1

- **Operating Condition**
  - Topr= -40, 25, 85 (°C)
  - Vcc = 2.7V to 5.5V

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**Figure 1. VIH vs Vcc (in single-chip mode)**

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
1. Input voltage(2)

(2) "L" Input voltage

- Related Pin
  - P0_0-P0_7, P1_0-P1_7, P2_0-P2_7, P3_0 (in single-chip mode)
  - P3_1-P3_7, P4_0-P4_7, P5_0-P5_7, P6_0-P6_7
  - P7_0-P7_7, P8_0-P8_7, P9_0-P9_7, P10_0-P10_7

- Operating Condition
  - Topr=-40, 25, 85 (°C)
  - Vcc=2.7V to 5.5V

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

VIL vs Vcc

<table>
<thead>
<tr>
<th>Vcc [V]</th>
<th>VIL [V]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>3.0</td>
<td>2.0</td>
</tr>
<tr>
<td>4.0</td>
<td>2.0</td>
</tr>
<tr>
<td>5.0</td>
<td>2.0</td>
</tr>
<tr>
<td>6.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>

This area is recognized to be "L".

Related Pin
- P0_0-P0_7, P1_0-P1_7, P2_0-P2_7, P3_0 (data input in memory expansion and microprocessor mode)

Operating Condition
- Topr=-40, 25, 85 (°C)
- Vcc=2.7V to 5.5V
2. Hysteresis(1)

(1) Interrupt pin

- Related Pin
  HOLD, RDY, TA0IN-TA4IN, TB0IN-TB5IN, INT0-INT7, NMI, ADTRG, CTS0-CTS2, CTS5-CTS7, SCL0-SCL2
  SCL5-SCL7, SDA0-SDA2, SDA5-SDA7, CLK0-CLK7, TA0OUT-TA4OUT, KI0-KI3, RXD0-RXD2, RXD5-RXD7, SIN3, SIN4
  SD, PMC0, PMC1, SCLMM, SDAMM, CEC, ZP, IDU, IDV, IDW

- Operating Condition
  Topr = -40, 25, 85 (degrees C)
  Vcc = 2.7V to 5.5V

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
2. Hysteresis (2)

(2) RESET

- Related Pin: RESET
- Operating Condition:
  - Topr = -40, 25, 85 (°C)
  - Vcc = 2.7V to 5.5V

Figure 7. VT+ / VT- vs Vcc

Figure 8. Hysteresis (VT+ - VT-) vs Vcc

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
3. Output voltage (1)

(1) “H” Output voltage

- Related Pin
  P0_0-P0_7, P1_0-P1_7, P2_0-P2_7, P3_0-P3_7, P4_0-P4_7, P5_0-P5_7, P6_0-P6_7, P7_2-P7_7, P8_0-P8_4, P8_6-P8_7, P9_0-P9_7, P10_0-P10_7

When using 128-Pin Package
P11_0-P11_7, P12_0-P12_7, P13_0-P13_7, P14_0-P14_1

- Operating Condition
  Topr=-40, 25, 85 (degrees C)
  Vcc=3.0V

![IOH vs VOH (Vcc=3.0V)](image1)

Figure 9. IOH vs VOH (Vcc=3.0V)

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

- Related Pin
  P0_0-P0_7, P1_0-P1_7, P2_0-P2_7, P3_0-P3_7, P4_0-P4_7, P5_0-P5_7, P6_0-P6_7, P7_2-P7_7, P8_0-P8_4, P8_6-P8_7, P9_0-P9_7, P10_0-P10_7

When using 128-Pin Package
P11_0-P11_7, P12_0-P12_7, P13_0-P13_7, P14_0-P14_1

- Operating Condition
  Topr=-40, 25, 85 (degrees C)
  Vcc=5.0V

![IOH vs VOH (Vcc=5.0V)](image2)

Figure 10. IOH vs VOH (Vcc=5.0V)
3. Output voltage (2)

(2) “L” Output voltage

- Related Pin
  - P0_0-P0_7, P1_0-P1_7, P2_0-P2_7, P3_0-P3_7, P4_0-P4_7, P5_0-P5_7, P6_0-P6_7, P7_0-P7_7, P8_0-P8_7, P9_0-P9_7, P10_0-P10_7

When using 128-Pin Package
  - P11_0-P11_7, P12_0-P12_7, P13_0-P13_7, P14_0-P14_1

- Operating Condition
  - Topr = -40, 25, 85 degrees C
  - Vcc = 3.0V

- Related Pin
  - P0_0-P0_7, P1_0-P1_7, P2_0-P2_7, P3_0-P3_7, P4_0-P4_7, P5_0-P5_7, P6_0-P6_7, P7_0-P7_7, P8_0-P8_7, P9_0-P9_7, P10_0-P10_7

When using 128-Pin Package
  - P11_0-P11_7, P12_0-P12_7, P13_0-P13_7, P14_0-P14_1

- Operating Condition
  - Topr = -40, 25, 85 degrees C
  - Vcc = 5.0V

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

![Figure 11. IOL vs VOL (Vcc=3.0V)](image1)

![Figure 12. IOL vs VOL (Vcc=5.0V)](image2)
4. Pull-up resistance

(1) Pull-up MOS current (-Ip) vs Vcc

- Related Pin
  P0_0-P0_7, P1_0-P1_7, P2_0-P2_7, P3_0-P3_7, P4_0-P4_7, P5_0-P5_7, P6_0-P6_7, P7_2-P7_7, P8_0-P8_4, P8_6-P8_7, P9_0-P9_7, P10_0-P10_7
- Operating Condition
  Topr=-40, 25, 85 (degrees C)
  Vcc=2.7V to 5.5V

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

(2) Rpullup vs Vcc

- Related Pin
  P0_0-P0_7, P1_0-P1_7, P2_0-P2_7, P3_0-P3_7, P4_0-P4_7, P5_0-P5_7, P6_0-P6_7, P7_2-P7_7, P8_0-P8_4, P8_6-P8_7, P9_0-P9_7, P10_0-P10_7
- Operating Condition
  Topr=-40, 25, 85 (degrees C)
  Vcc=2.7V to 5.5V
5. A/D Accuracy (1)

- Operating Condition
  Topr = -40, 25, 85 (degrees C)
  Vcc = AVcc = VREF = 5.12V
  φAD = 24MHz

- Related Pin
  AN0-AN7, AN0_0-AN0_7, AN2_0-AN2_7, ANEX0, ANEX1

- Absolute Accuracy
  Topr = -40 degrees C
  Absolute accuracy
  MAX (LSB) 0.35
  MIN (LSB) -0.39
  Linearity error
  MAX (LSB) 0.29
  MIN (LSB) -0.28

- Absolute Accuracy
  Topr = 25 degrees C
  Absolute accuracy
  MAX (LSB) 0.35
  MIN (LSB) -0.27
  Linearity error
  MAX (LSB) 0.30
  MIN (LSB) -0.33
  Differential non-linearity error
  MAX (LSB) 0.22
  MIN (LSB) -0.22

- Absolute Accuracy
  Topr = 85 degrees C
  Absolute accuracy
  MAX (LSB) 0.35
  MIN (LSB) -0.39
  Linearity error
  MAX (LSB) 0.33
  MIN (LSB) -0.29
  Differential non-linearity error
  MAX (LSB) 0.25
  MIN (LSB) -0.25

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
5. A/D Accuracy(2)

- **Related Pin**
  - AN0-AN7, AN0_0-AN0_7, AN2_0-AN2_7, ANEX0, ANEX1

- **Operating Condition**
  - Topr=-40,25,85 (degrees C)
  - Vcc=AVcc=VREF=5.12V
  - fAD=20MHz

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### Absolute Accuracy

- **Topr=-40 degrees C**
  - Absolute accuracy (MAX): 0.39 (LSB)
  - Absolute accuracy (MIN): -0.21 (LSB)

- **Topr=25 degrees C**
  - Absolute accuracy (MAX): 0.43 (LSB)
  - Absolute accuracy (MIN): -0.29 (LSB)

- **Topr=85 degrees C**
  - Absolute accuracy (MAX): 0.43 (LSB)
  - Absolute accuracy (MIN): -0.27 (LSB)

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### Linearity Error

- **Topr=-40 degrees C**
  - Linearity error (MAX): 0.34 (LSB)
  - Linearity error (MIN): -0.33 (LSB)

- **Topr=25 degrees C**
  - Linearity error (MAX): 0.31 (LSB)
  - Linearity error (MIN): -0.35 (LSB)

- **Topr=85 degrees C**
  - Linearity error (MAX): 0.24 (LSB)
  - Linearity error (MIN): -0.16 (LSB)

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### Differential Non-Linearity Error

- **Topr=-40 degrees C**
  - Differential non-linearity error (MAX): 0.18 (LSB)
  - Differential non-linearity error (MIN): -0.34 (LSB)

- **Topr=25 degrees C**
  - Differential non-linearity error (MAX): 0.23 (LSB)
  - Differential non-linearity error (MIN): -0.19 (LSB)

- **Topr=85 degrees C**
  - Differential non-linearity error (MAX): 0.24 (LSB)
  - Differential non-linearity error (MIN): -0.18 (LSB)

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*The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.*
5. A/D Accuracy(3)

- Operating Condition
  - Topr=-40, 25, 85 (degrees C)
  - Vcc=AVcc=VREF=3.30V
  - φAD=16MHz

- Related Pin
  - AN0-AN7, AN0_0-AN0_7, AN2_0-AN2_7, ANEX0, ANEX1

- Absolute accuracy
  - Topr=-40degreesC
    - MAX(LSB): 0.608606
    - MIN(LSB): -0.57055
    - Linearity error:
      - MAX(LSB): 0.41
      - MIN(LSB): -0.50
    - Differential non-linearity error:
      - MAX(LSB): 0.248242
      - MIN(LSB): -0.21721

  - Topr=25degreesC
    - MAX(LSB): 0.794788
    - MIN(LSB): -0.38436
    - Linearity error:
      - MAX(LSB): 0.57
      - MIN(LSB): -0.43
    - Differential non-linearity error:
      - MAX(LSB): 0.341333
      - MIN(LSB): -0.27927

  - Topr=85degreesC
    - MAX(LSB): 0.608606
    - MIN(LSB): -0.22921
    - Linearity error:
      - MAX(LSB): 0.40
      - MIN(LSB): -0.42
    - Differential non-linearity error:
      - MAX(LSB): 0.310303
      - MIN(LSB): -0.21721

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The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
5. A/D Accuracy(4)

- **Related Pin**: AN0-AN7, AN0_0-AN0_7, AN2_0-AN2_7, ANEX0, ANEX1

- **Operating Condition**
  - Topr=-40, 25, 85 (degrees C)
  - Vcc=AVcc=VREF =3.072V
  - fAD=10MHz

**Absolute Accuracy**

- **Topr=-40 degrees C**
  - **MAX(LSB)**: 0.55
  - **MIN(LSB)**: -0.58333
  - **Linearity error**
    - **MAX(LSB)**: 0.41
    - **MIN(LSB)**: -0.53
  - **Differential non-linearity error**
    - **MAX(LSB)**: 0.266667
    - **MIN(LSB)**: -0.3

- **Topr=25 degrees C**
  - **MAX(LSB)**: 0.616667
  - **MIN(LSB)**: -0.25
  - **Linearity error**
    - **MAX(LSB)**: 0.44
    - **MIN(LSB)**: -0.34
  - **Differential non-linearity error**
    - **MAX(LSB)**: 0.3
    - **MIN(LSB)**: -0.2

- **Topr=85 degrees C**
  - **MAX(LSB)**: 0.616667
  - **MIN(LSB)**: -0.25
  - **Linearity error**
    - **MAX(LSB)**: 0.44
    - **MIN(LSB)**: -0.34
  - **Differential non-linearity error**
    - **MAX(LSB)**: 0.3
    - **MIN(LSB)**: -0.2

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product’s characteristics.
5. A/D Accuracy

- Related Pin: AN0-AN7, AN0_0-AN0_7, AN2_0-AN2_7, ANEX0, ANEX1

- Operating Condition
  - Topr= -40, 25, 85 (degrees C)
  - Vcc=AVcc=VREF = 5.12V
  - φAD= 20MHz (FOCO40M divided by 2)

Absolute Accuracy

- Topr= -40 degrees C
  - Absolute accuracy: MAX (LSB) 0.37, MIN (LSB) -0.25
  - Linearity error: MAX (LSB) 0.25, MIN (LSB) -0.38
  - Differential non-linearity error: MAX (LSB) 0.2, MIN (LSB) -0.24

- Topr= 25 degrees C
  - Absolute accuracy: MAX (LSB) 0.37, MIN (LSB) -0.27
  - Linearity error: MAX (LSB) 0.27, MIN (LSB) -0.35
  - Differential non-linearity error: MAX (LSB) 0.22, MIN (LSB) -0.18

- Topr= 85 degrees C
  - Absolute accuracy: MAX (LSB) 0.35, MIN (LSB) -0.19
  - Linearity error: MAX (LSB) 0.26, MIN (LSB) -0.30
  - Differential non-linearity error: MAX (LSB) 0.22, MIN (LSB) -0.18

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
5. A/D Accuracy

- Operating Condition
  Topr = -40, 25, 85 (degrees C)
  Vcc = AVcc = VREF = 3.3V
  φAD = 13.3MHz (FOCO40M divided by 3)

- Related Pin
  AN0-AN7, AN0_0-AN0_7, AN2_0-AN2_7, ANEX0, ANEX1

Topr = -40 degrees C

<table>
<thead>
<tr>
<th>Absolute accuracy (MAX)</th>
<th>Absolute accuracy (MIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.639636 LSB</td>
<td>-0.53952 LSB</td>
</tr>
<tr>
<td>Linearity error (MAX)</td>
<td>Linearity error (MIN)</td>
</tr>
<tr>
<td>0.52 LSB</td>
<td>-0.44642 LSB</td>
</tr>
<tr>
<td>Differential non-linearity error (MAX)</td>
<td>Differential non-linearity error (MIN)</td>
</tr>
<tr>
<td>0.341333 LSB</td>
<td>-0.27927 LSB</td>
</tr>
</tbody>
</table>

Topr = 25 degrees C

<table>
<thead>
<tr>
<th>Absolute accuracy (MAX)</th>
<th>Absolute accuracy (MIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.701697 LSB</td>
<td>-0.44642 LSB</td>
</tr>
<tr>
<td>Linearity error (MAX)</td>
<td>Linearity error (MIN)</td>
</tr>
<tr>
<td>0.57 LSB</td>
<td>-0.44642 LSB</td>
</tr>
<tr>
<td>Differential non-linearity error (MAX)</td>
<td>Differential non-linearity error (MIN)</td>
</tr>
<tr>
<td>0.310303 LSB</td>
<td>-0.21721 LSB</td>
</tr>
</tbody>
</table>

Topr = 85 degrees C

<table>
<thead>
<tr>
<th>Absolute accuracy (MAX)</th>
<th>Absolute accuracy (MIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.577576 LSB</td>
<td>-0.47745 LSB</td>
</tr>
<tr>
<td>Linearity error (MAX)</td>
<td>Linearity error (MIN)</td>
</tr>
<tr>
<td>0.42 LSB</td>
<td>-0.58 LSB</td>
</tr>
<tr>
<td>Differential non-linearity error (MAX)</td>
<td>Differential non-linearity error (MIN)</td>
</tr>
<tr>
<td>0.279273 LSB</td>
<td>-0.21721 LSB</td>
</tr>
</tbody>
</table>

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
5. A/D Accuracy(7)

- Operating Condition
  Topr=-40, 25, 85 (degrees C)
  Vcc=AVcc=VREF =3.072V
  φAD=10MHz (FOCO40M divided by 4)

- Related Pin
  AN0-AN7、AN0_0-AN0_7、AN2_0-AN2_7、ANEX0、ANEX1

Table: Absolute accuracy, Linearity error, Differential non-linearity error

- Topr=25(degrees C)
  Absolute accuracy: MAX(LSB) 0.316667, MIN(LSB) -0.31667
  Linearity error: MAX(LSB) 0.35, MIN(LSB) -0.26
  Differential non-linearity error: MAX(LSB) 0.233333, MIN(LSB) -0.23333

- Topr=85(degrees C)
  Absolute accuracy: MAX(LSB) 0.316667, MIN(LSB) -0.31667
  Linearity error: MAX(LSB) 0.35, MIN(LSB) -0.26
  Differential non-linearity error: MAX(LSB) 0.233333, MIN(LSB) -0.23333

Figure33. Topr=-40(degrees C)
Figure34. Topr=25(degrees C)
Figure35. Topr=85(degrees C)

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
6. D/A Accuracy (1)

- Related Pin
  DA0, DA1

- Operating Condition
  Topr=−40, 25, 85 (degrees C)
  PLL CLOCK: 24MHz
  Vcc=5.12V

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

Figure 36. Topr=−40 (degrees C)
Figure 37. Topr=25 (degrees C)
Figure 38. Topr=85 (degrees C)
6. D/A Accuracy(2)

- Related Pin
  DA0, DA1

- Operating Condition
  Topr=-40,25,85 (degrees C)
  XIN CLOCK : 10MHz
  Vcc=3.072V

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

Figure39. Topr=-40(degrees C)  
Figure40. Topr=25(degrees C)  
Figure41. Topr=85(degrees C)
7. Power supply current (1)

(1) High-speed mode f(Xin)

1. Icc vs f(Xin)

- Operating Condition
  XIN = 4 to 20 MHz (square wave)
  125 kHz on-chip oscillator stop
  Toper = 25(degrees C)

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

Figure 42. Icc vs f(Xin) (Vcc=3.0V)

Figure 43. Icc vs f(Xin) (Vcc=5.0V)
7. Power supply current (2)

(1) High-speed mode \( f(\text{Xin}) \)

2. \( I_{cc} \) vs \( V_{cc} \)

- Operating Condition
  - \( \text{XIN} = 10 \text{ MHz (square wave)} \)
  - 125 kHz on-chip oscillator stop
  - \( T_{opr} = -40,25,85(\text{degrees C}) \)
  - No division

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

![Figure 44. \( I_{cc} \) vs \( V_{cc} \) (f(\text{Xin})=10MHz)](image1)

![Figure 45. \( I_{cc} \) vs \( V_{cc} \) (f(\text{Xin})=20MHz)](image2)
7. Power supply current(3)

(1) High-speed mode f(Xin)

3. Icc vs Topr

- Operating Condition
  - XIN = 10, 16, 20 MHz (square wave)
  - 125 kHz on-chip oscillator stop
  - Topr = -40 to 85 (degrees C)
  - No division

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
7. Power supply current (4)
   (2) High-speed mode f(PLL)

   1. ICC vs f(PLL)

   ■ Operating Condition
   f(PLL) = 10 to 32 MHz (square wave)
   125 kHz on-chip oscillator stop
   T_{op} = 25(degrees C)
   No division

   The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
7. Power supply current (5)

(2) High-speed mode f(PLL)

- Operating Condition
  - f(PLL) = 20MHz
  - XIN = 5 MHz (square wave)
  - PLL multiplied by 4
  - 125 kHz on-chip oscillator stop
  - Topr = -40, 25, 85 (degrees C)
  - No division

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
7. Power supply current (6)

(2) High-speed mode f(PLL)

3. Icc vs Topr

- Operating Condition
  - f(PLL) = 20, 24, 32 MHz (square wave)
  - 125 kHz on-chip oscillator stop
  - Topr = -40 to 85 (degrees C)
  - No division

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
7. Power supply current (7)

(3) 40 MHz on-chip Oscillator mode

1. Icc vs Vcc
   - Operating Condition
     40 MHz on-chip oscillator on
     F(BCLK) = 5.10 MHz
     Main clock stop
     125 kHz on-chip oscillator stop
     Topr = 25 (degrees C)

2. Icc vs Topr
   - Operating Condition
     40 MHz on-chip oscillator on
     Divide-by-2, f(BCLK) = 10 MHz
     Main clock stop
     125 kHz on-chip oscillator stop
     Topr = -40 to 85 (degrees C)

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
7. Power supply current (8)

(4) 125kHz on-chip Oscillator mode

1. ICC vs Vcc

- Operating Condition
  Main clock stop
  125kHz on-chip oscillator on
  T0pr = 25 (degrees C)

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
7. Power supply current (9)

(4) 125kHz on-chip Oscillator mode

2. Icc vs Topr

- Operating Condition
  - Main clock stop
  - 125kHz on-chip oscillator on, no division
  - Topr = -40 to 85 (degrees C)

![Icc vs Topr Graph](image1)

![Icc vs Topr Graph](image2)

Figure 58. Icc vs Topr

Figure 59. Icc vs Topr

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
7. Power supply current (10)

(5) Low-power mode $f(X_{cin})$

1. $I_{cc}$ vs $Vcc$
   - Operating Condition
     $f(X_{cin}) = 32kHz$
     In low-power mode
     $FMR22 = FMR23 = 1$
     on flash memory
     $T_{opr} = -40, 25, 85$(degrees C)

![Icc vs Vcc Graph]

Figure 60. Icc vs Vcc

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
7. Power supply current (11)

(5) Low-Power mode f(Xcin)

2. Icc vs Topr

- Operating Condition f(Xcin) = 32kHz
  In low-power mode FMR22 = FMR23 = 1
  on flash memory Topr = -40 to 85 (degrees C)

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

Figure 62. Icc vs Topr

Figure 63. Icc vs Topr
7. Power supply current (12)

(6) Wait mode f(Xcin)

1. Icc vs Vcc

- Operating Condition
  f(Xcin) = 32kHz (oscillation capacity High)
  40MHz on-chip oscillator stop
  125kHz on-chip oscillator stop
  Peripheral clock operation
  Topr = -40, 25, 85 (degrees C)

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
7. Power supply current (13)

6. Wait mode f(Xcin)

2. Icc vs Topr

- Operating Condition
  f(Xcin) = 32kHz (oscillation capacity High)
  40MHz on-chip oscillator stop
  125kHz on-chip oscillator stop
  Peripheral clock operation
  Topr = -40 to 85(degrees C)

- Operating Condition
  f(Xcin) = 32kHz (oscillation capacity Low)
  40MHz on-chip oscillator stop
  125kHz on-chip oscillator stop
  Peripheral clock operation
  Topr = -40 to 85(degrees C)

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

Figure 66. Icc vs Topr

Figure 67. Icc vs Topr
7. Power supply current (14)

(7) Wait mode f (OCO-S)

1. Icc vs Vcc

- Operating Condition
  Main clock stop
  40MHz on-chip oscillator stop
  125kHz on-chip oscillator on
  Peripheral clock operation
  Topr = -40, 25, 85 (degrees C)

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The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
7. Power supply current (15)

(7) Wait mode (OCO-S)

2. Icc vs Topr

- Operating Condition
  - Main clock stop
  - 40MHz on-chip oscillator stop
  - 125kHz on-chip oscillator stop
  - Peripheral clock operation
  - Topr = -40 to 85 (degrees C)

- Operating Condition
  - Main clock stop
  - 40MHz on-chip oscillator stop
  - 125kHz on-chip oscillator on
  - Peripheral clock stop
  - Topr = -40 to 85 (degrees C)

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

Figure 70. Icc vs Topr

Figure 71. Icc vs Topr
7. Power supply current (16)

(8) Timer Xin Direct mode f(Xin)

1. Icc vs f(Xin)

- Operating Condition
  - Xin = 4 to 10 MHz (square wave)
  - 125kHz on-chip oscillator stop
  - Peripheral clock stop (Timer only)
  - Topr = -40 to 85(degrees C)

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
7. Power supply current (17)

(8) Timer Xin Direct mode f(Xin)

2. Icc vs Vcc

- Operating Condition
  XIN = 4MHz (square wave)
  125kHz on-chip oscillator stop
  Peripheral clock stop (Timer only)
  Topr = -40 to 85(degrees C)

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

Figure 74. Icc vs Vcc (f(Xin)=4MHz)

Figure 75. Icc vs Vcc (f(Xin)=6MHz)
7. Power supply current (18)

(8) Timer Xin Direct mode f(Xin)

2. Icc vs Vcc

- Operating Condition
  - XIN = 8 MHz (square wave)
  - 125 kHz on-chip oscillator stop
  - Peripheral clock stop (Timer only)
  - Topr = -40 to 85 (degrees C)

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

![Icc vs Vcc (f(Xin)=8MHz)](image1)

![Icc vs Vcc (f(Xin)=10MHz)](image2)

- Operating Condition
  - XIN = 10 MHz (square wave)
  - 125 kHz on-chip oscillator stop
  - Peripheral clock stop (Timer only)
  - Topr = -40 to 85 (degrees C)
7. Power supply current (19)

(8) Timer Xin Direct mode f(Xin)

3. Icc vs Topr

- Operating Condition
  XIN = 4 to 10 MHz (square wave)
  125kHz on-chip oscillator stop
  Peripheral clock stop (Timer only)
  Topr = -40 to 85(degrees C)

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
7. Power supply current (20)

(9) Stop mode

1. Icc vs Vcc

- Operating Condition
  - Main clock stop
  - 40MHz on-chip oscillator stop
  - 125kHz on-chip oscillator stop
  - Peripheral clock stop
  - Topr = -40, 25, 85 (degrees C)

![Icc vs Vcc graph](image)

Figure 80. Icc vs Vcc

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
7. Power supply current(21)

(9) Stop mode

2. Icc vs Topr

- Operating Condition
  - Main clock stop
  - 40MHz on-chip oscillator stop
  - 125kHz on-chip oscillator stop
  - Peripheral clock stop
  - Topr = -40 to 85(°C)

![Icc vs Topr Graph](image)

Figure 81. Icc vs Topr

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
7. Power supply current (22)

(10) During A/D conversion

- Operating Condition
  \( f(\text{BCLK}) = \phi\text{AD} = 10\text{MHz} \)
  \( \text{Vcc1} = \text{Vcc2} = \text{VREF} \)
  \( \text{Topr} = 25(\text{degrees C}) \)
  No division

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The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.
7. Power supply current (23)

(11) During flash memory erase / program

- Operating Condition
  - $f(BCLK) = 4$ to $10$ MHz
  - PM17 = 1 (one wait)
  - Vcc=3.0V
  - Topr = 25(degrees C)
  - No division

- Operating Condition
  - $f(BCLK) = 4$ to $10$ MHz
  - PM17 = 1 (one wait)
  - Vcc=5.0V
  - Topr = 25(degrees C)
  - No division

The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

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Figure 84. $I_{cc}$ vs $f(BCLK)$ (Vcc=3.0V)

Figure 85. $I_{cc}$ vs $f(BCLK)$ (Vcc=5.0V)