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

R01ZZ0050EJ0100_M16C65C

Standard Characteristics

Table of Contents

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 (degreesC)
Vcc=2.7V to 5.5V

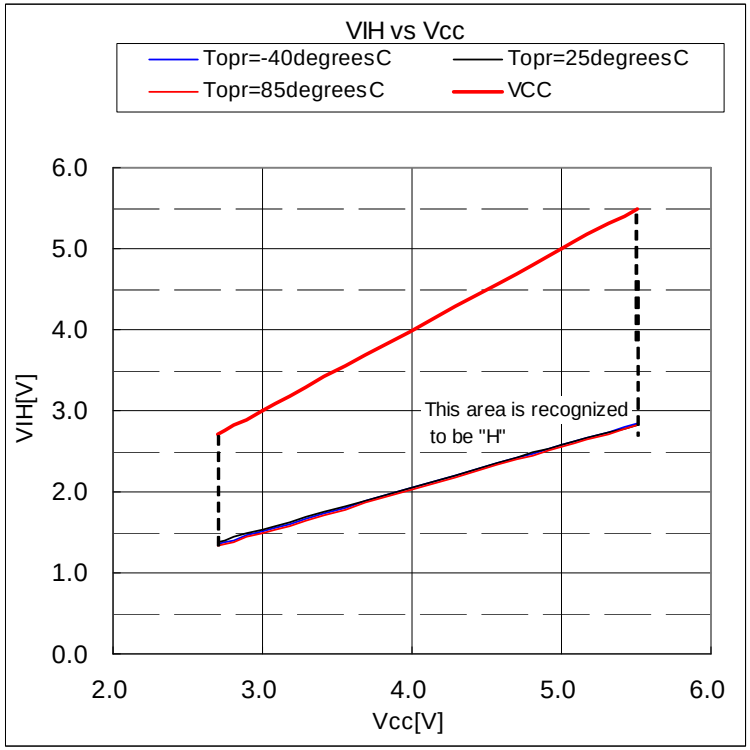


Figure1. VIH vs Vcc(in single-chip mode)

■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 (degreesC)
Vcc=2.7V to 5.5V

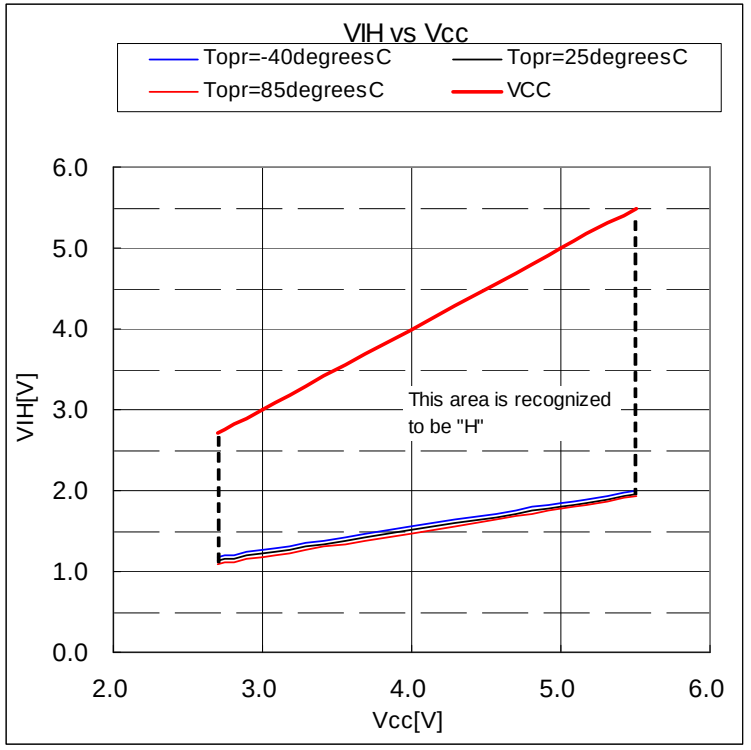


Figure2. VIH vs Vcc(data input in memory expansion and microprocessor mode)

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
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 (degreesC)
Vcc=2.7V to 5.5V

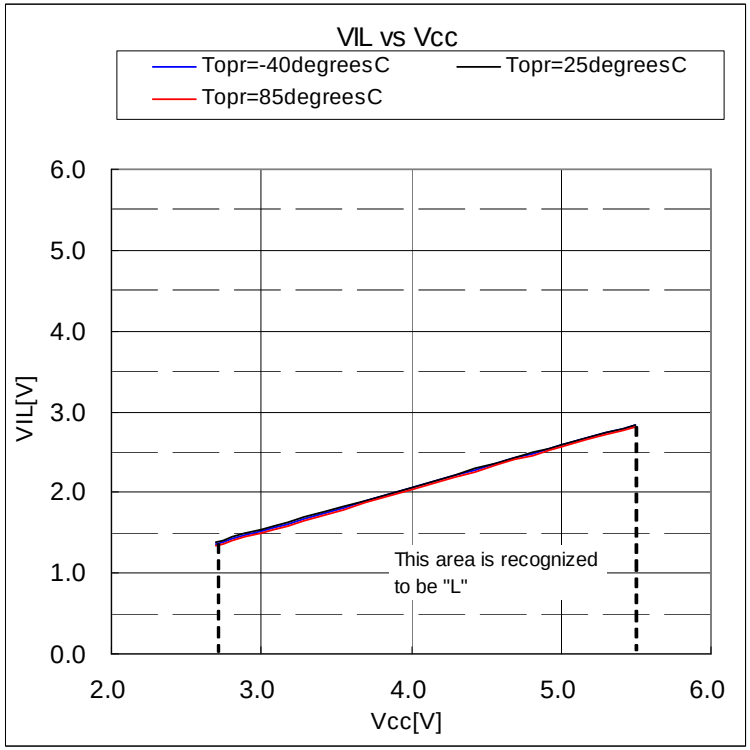


Figure3. VIL vs Vcc(in single-chip mode)

■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 (degreesC)
Vcc=2.7V to 5.5V

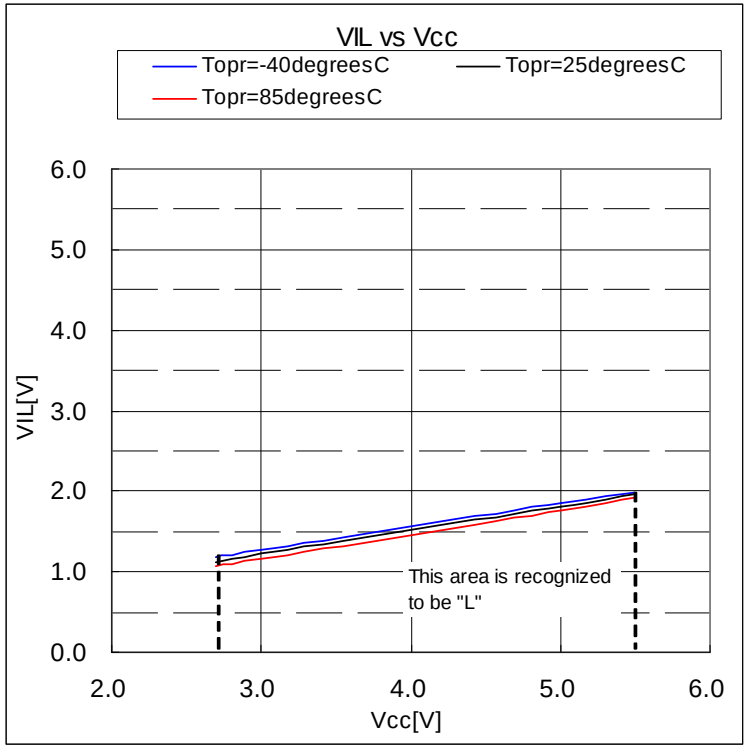


Figure4. VIL vs Vcc(data input in memory expansion and microprocessor mode)

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(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

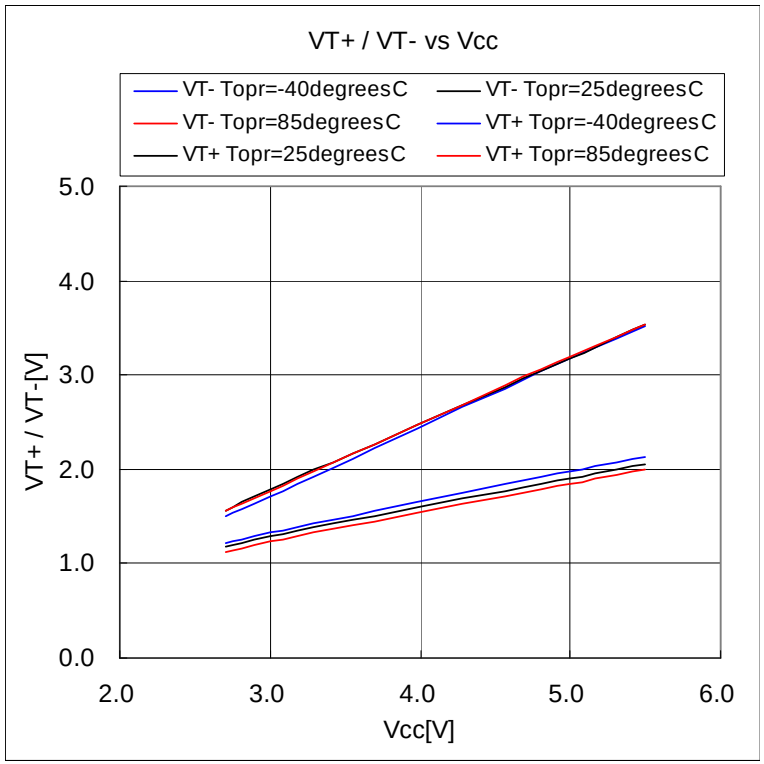


Figure5. VT+/VT- vs Vcc

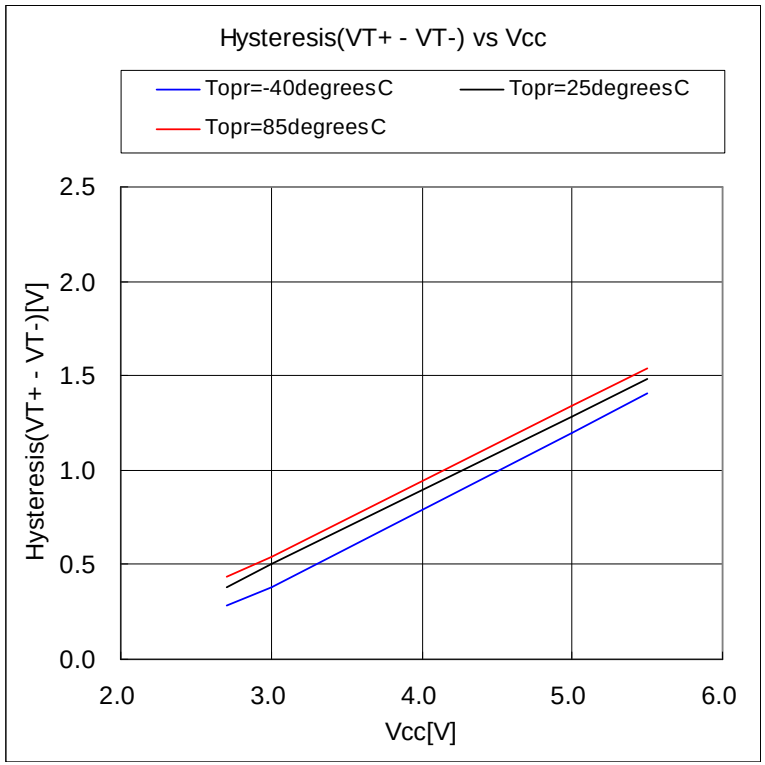


Figure6. Hysteresis (VT+-VT-) vs Vcc

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

2.Hysteresis(2)

(2)RESET

■Related Pin

RESET

■Operating Condition

Topr=-40,25,85 (degrees C)

Vcc=2.7V to 5.5V

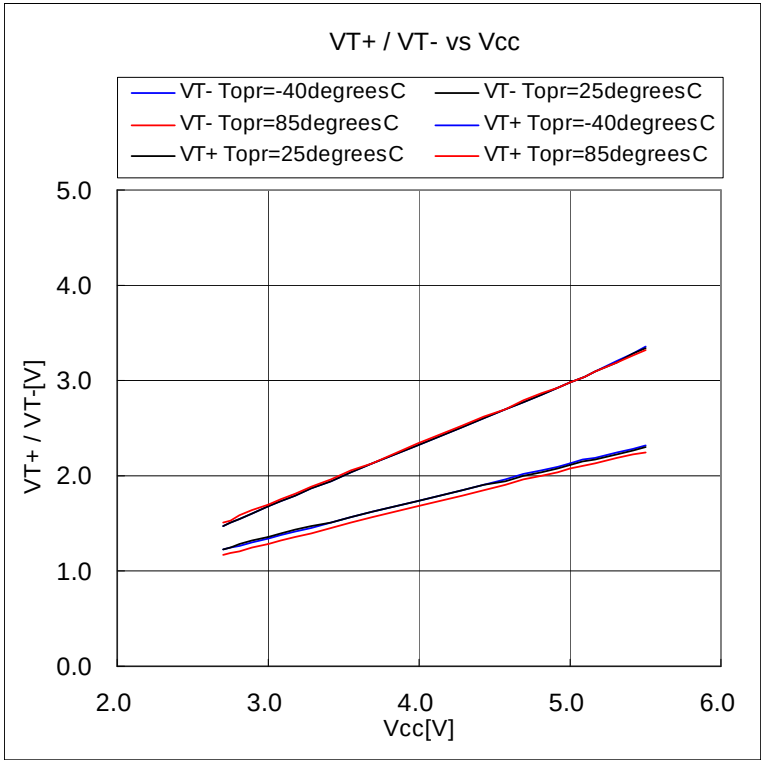


Figure7. VT+/VT- vs Vcc

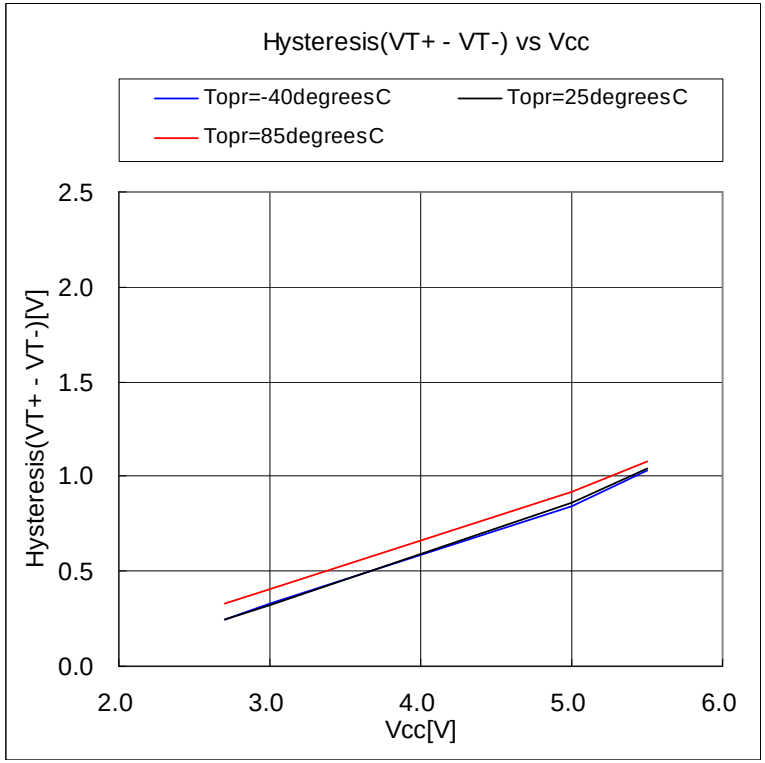


Figure8. Hysteresis (VT+-VT-) vs Vcc

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

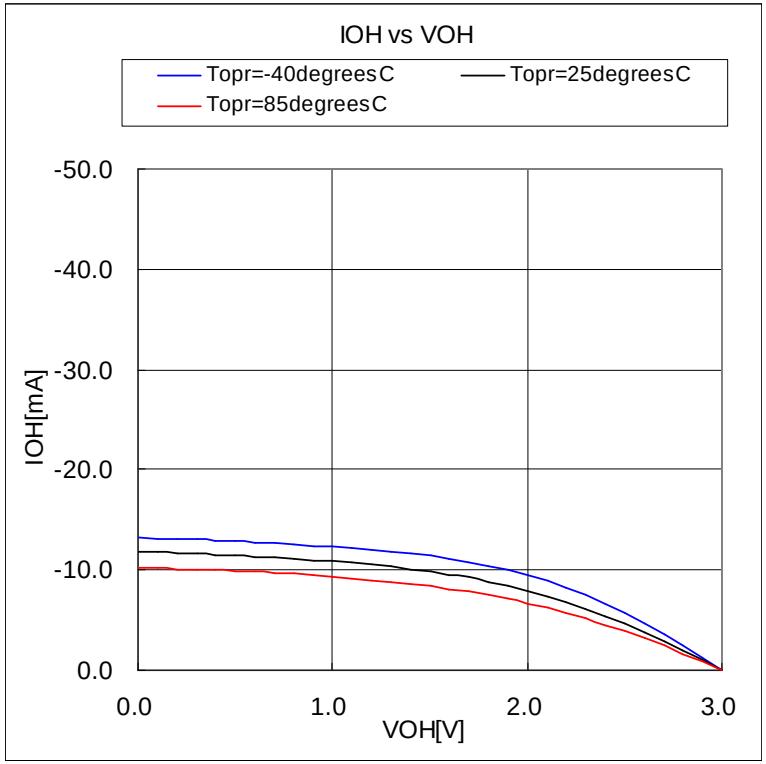


Figure9. IOH vs VOH (Vcc=3.0V)

■ 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_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

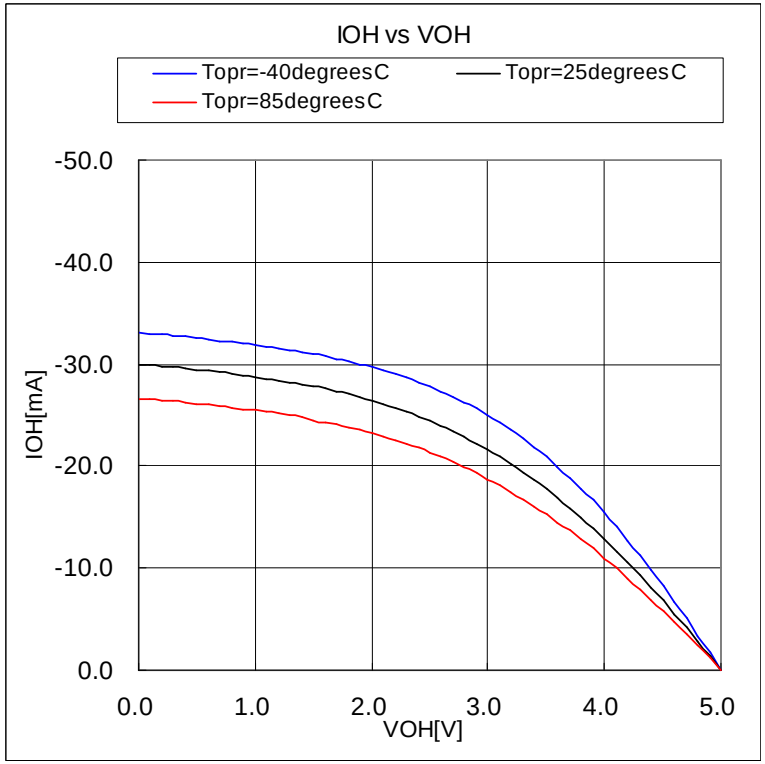


Figure10. IOH vs VOH (Vcc=5.0V)

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

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

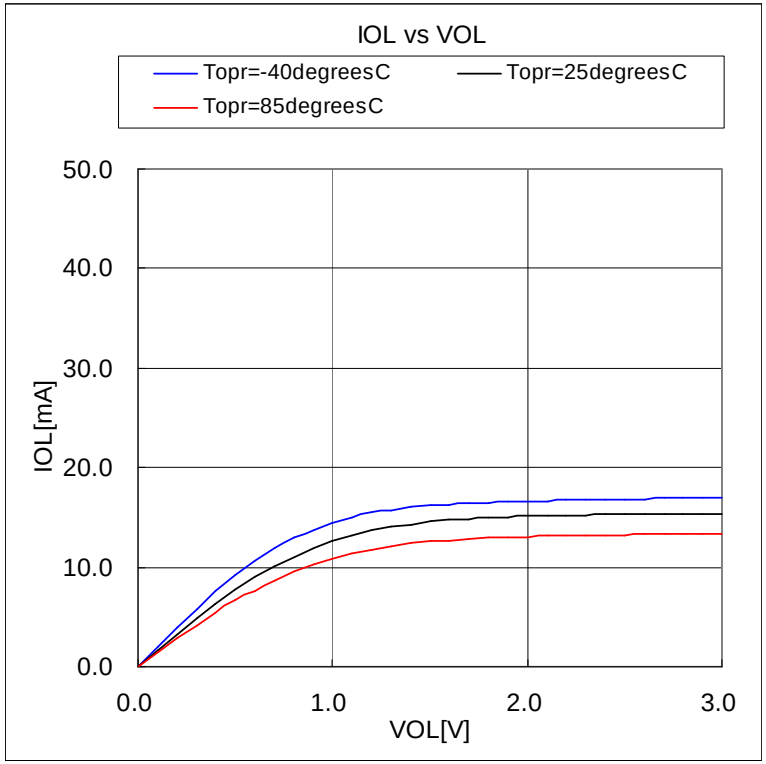


Figure11. IOL vs VOL (Vcc=3.0V)

■ 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

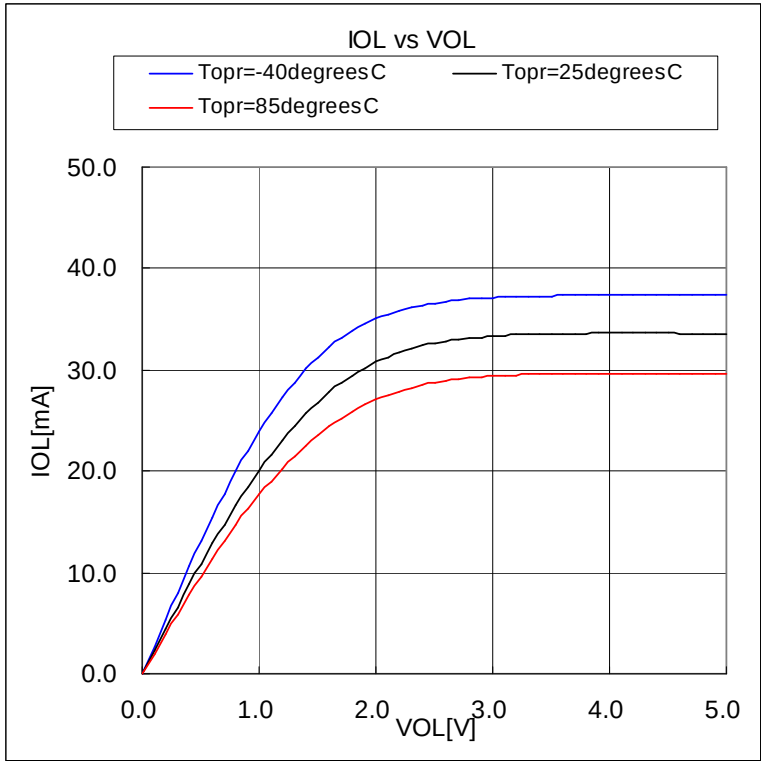


Figure12. IOL vs VOL (Vcc=5.0V)

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

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

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=2.7V to 5.5V

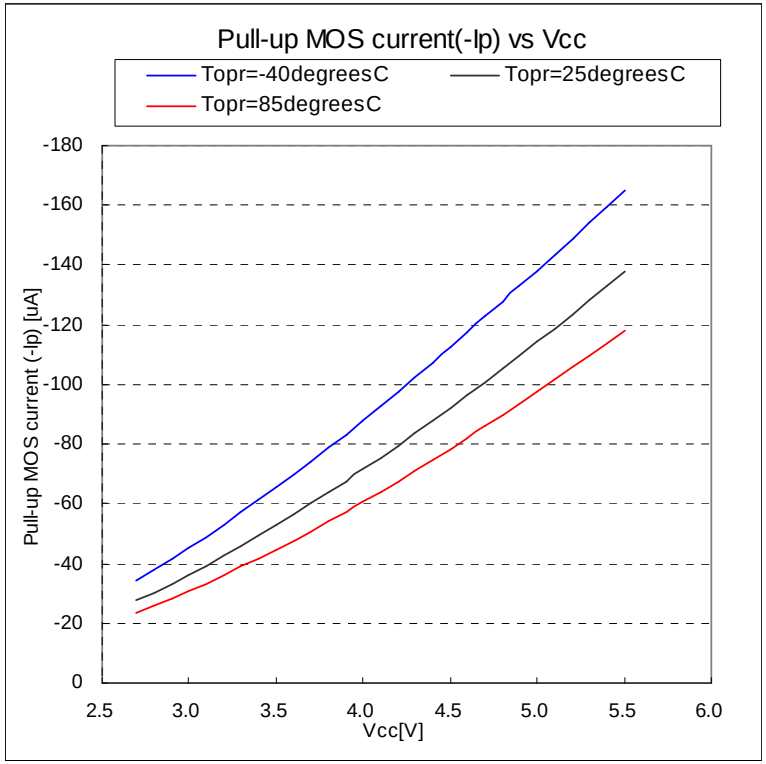


Figure13. Pull-up MOS current(-Ip) vs Vcc

(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

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=2.7V to 5.5V

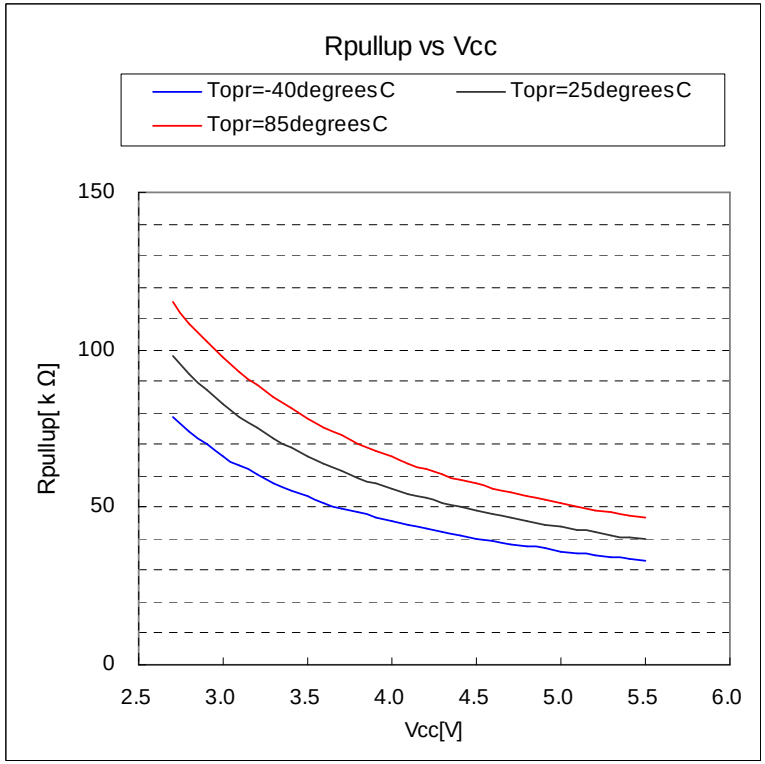


Figure14. Rpullup vs Vcc

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

5.A/D Accuracy(1)

■ Related Pin

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

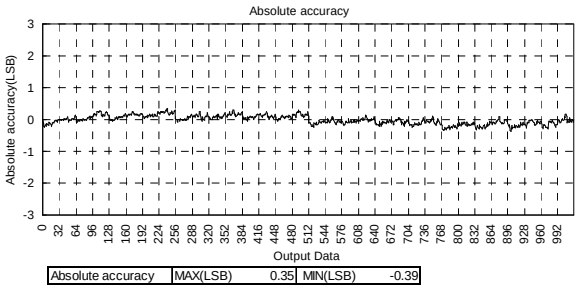
■Operating Condition

Topr=-40,25,85 (degrees C)

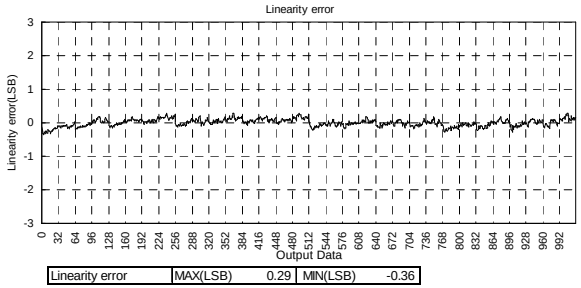
Vcc=AVcc=VREF =5.12V

φAD=24MHz

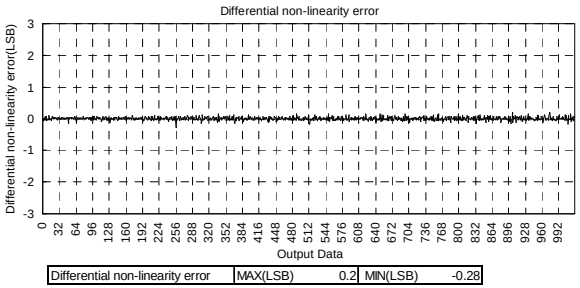
Topr=-40degreesC



Absolute accuracy	MAX(LSB)	0.35	MIN(LSB)	-0.39



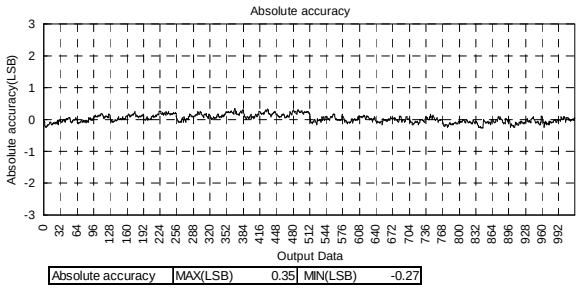
Linearity error	MAX(LSB)	0.29	MIN(LSB)	-0.36



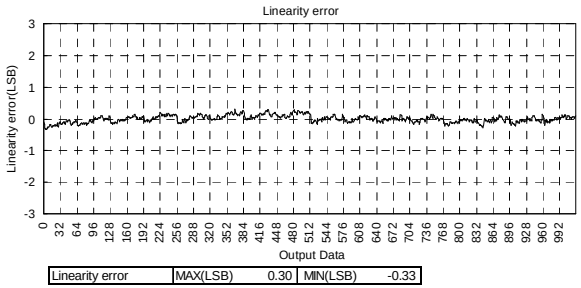
Differential non-linearity error	MAX(LSB)	0.2	MIN(LSB)	-0.28

Figure15. Topr=-40(degrees C)

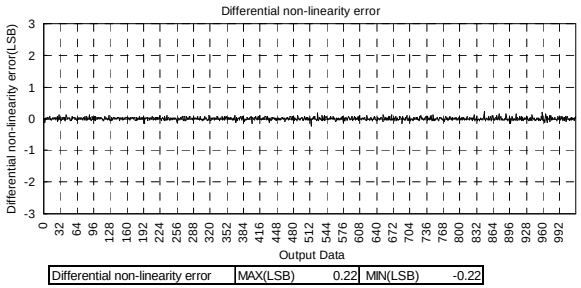
Topr=25degreesC



Absolute accuracy	MAX(LSB)	0.35	MIN(LSB)	-0.27



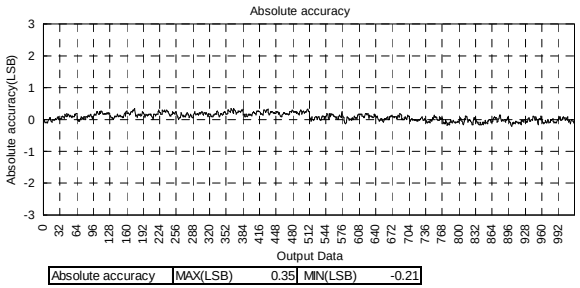
Linearity error	MAX(LSB)	0.30	MIN(LSB)	-0.33



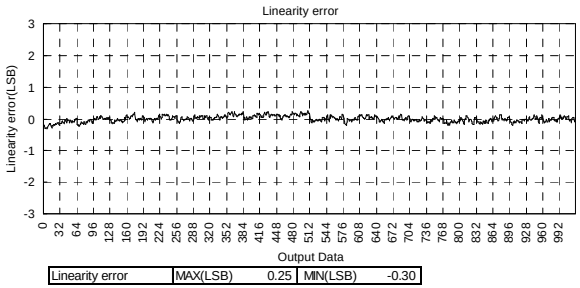
Differential non-linearity error	MAX(LSB)	0.22	MIN(LSB)	-0.22

Figure16. Topr=25(degrees C)

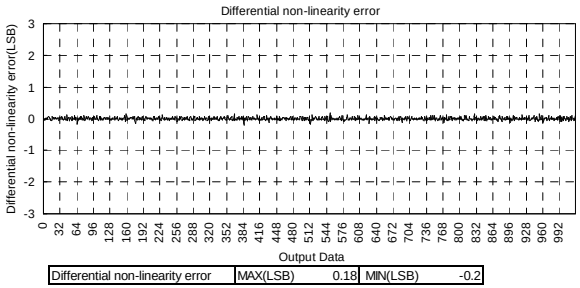
Topr=85degreesC



Absolute accuracy	MAX(LSB)	0.35	MIN(LSB)	-0.21



Linearity error	MAX(LSB)	0.25	MIN(LSB)	-0.30



Differential non-linearity error	MAX(LSB)	0.18	MIN(LSB)	-0.2

Figure17. 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.

5.A/D Accuracy(2)

■ Related Pin

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

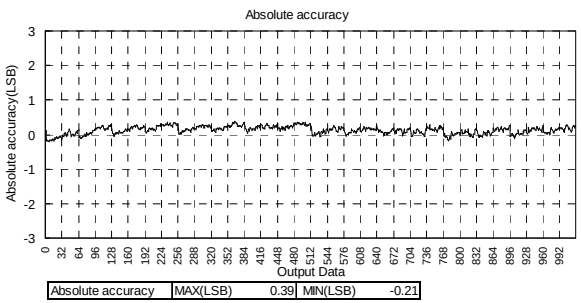
■Operating Condition

Topr=-40,25,85 (degrees C)

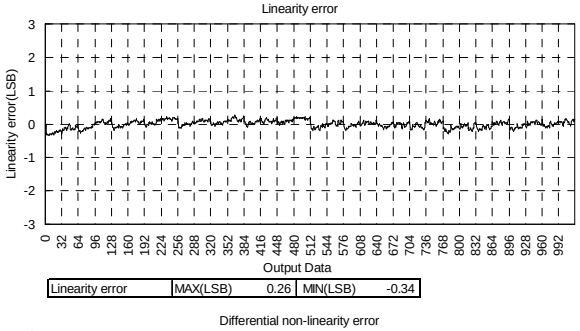
Vcc=AVcc=VREF =5.12V

φAD=20MHz

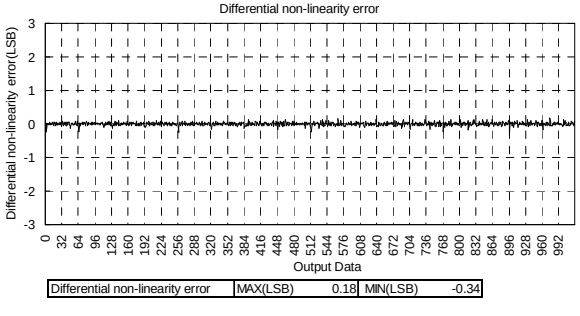
Topr=-40degreesC



Absolute accuracy	MAX(LSB)	0.39	MIN(LSB)	-0.21



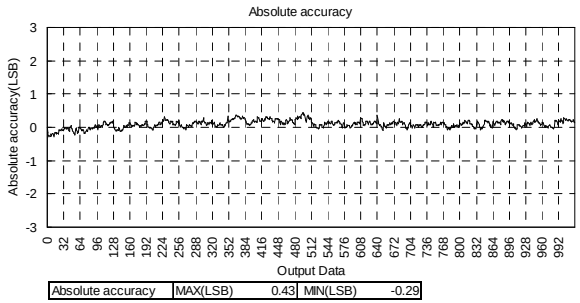
Linearity error	MAX(LSB)	0.26	MIN(LSB)	-0.34



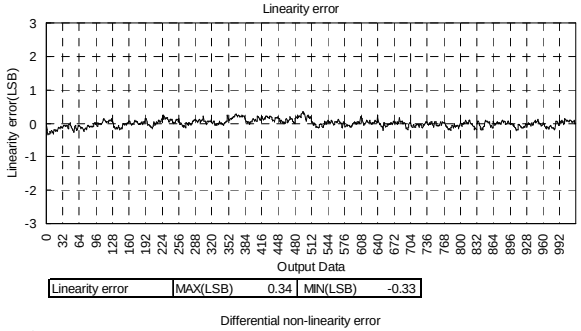
Differential non-linearity error	MAX(LSB)	0.18	MIN(LSB)	-0.34

Figure18. Topr=-40(degrees C)

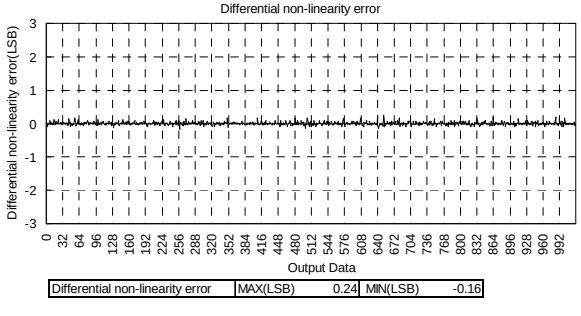
Topr=25degreesC



Absolute accuracy	MAX(LSB)	0.43	MIN(LSB)	-0.29



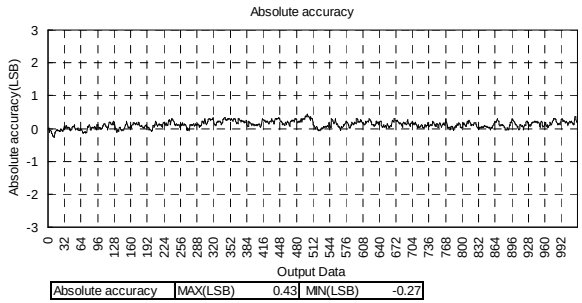
Linearity error	MAX(LSB)	0.34	MIN(LSB)	-0.33



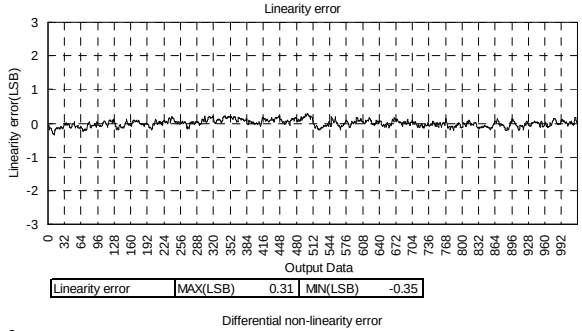
Differential non-linearity error	MAX(LSB)	0.24	MIN(LSB)	-0.16

Figure19. Topr=25(degrees C)

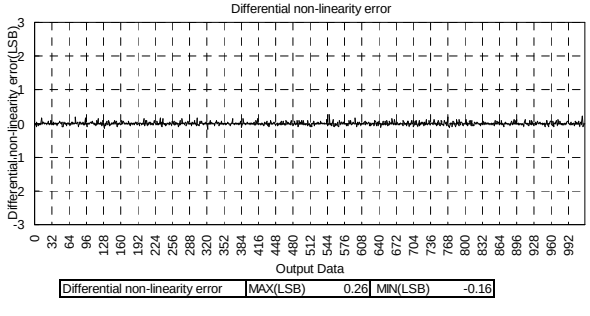
Topr=85degreesC



Absolute accuracy	MAX(LSB)	0.43	MIN(LSB)	-0.27



Linearity error	MAX(LSB)	0.31	MIN(LSB)	-0.35



Differential non-linearity error	MAX(LSB)	0.26	MIN(LSB)	-0.16

Figure20. 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.

5.A/D Accuracy(3)

■ 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 =3.30V

φAD=16MHz

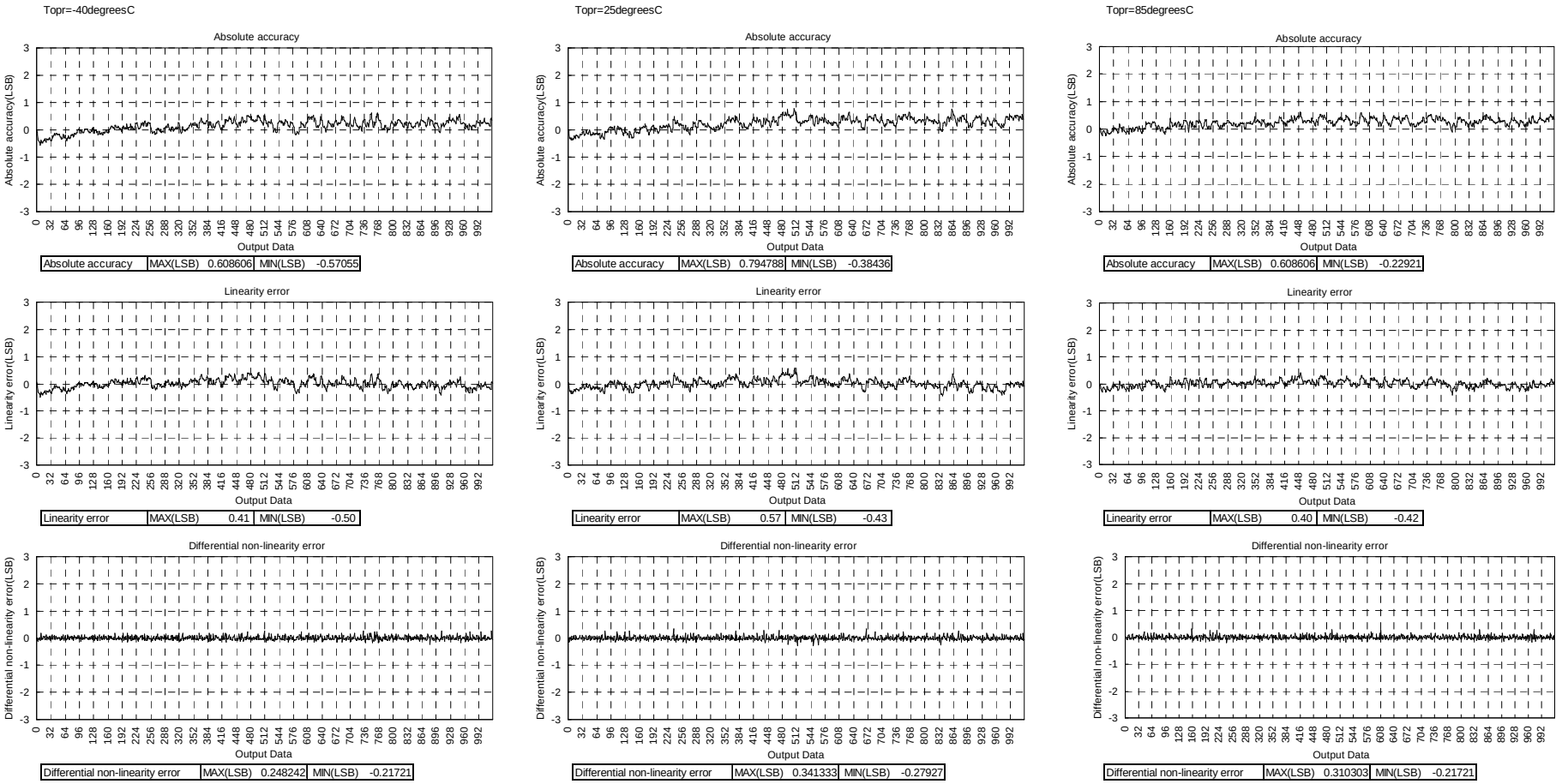


Figure21. Topr=-40(degrees C)

Figure22. Topr=25(degrees C)

Figure23. 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.

5.A/D Accuracy(4)

■ Related Pin

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

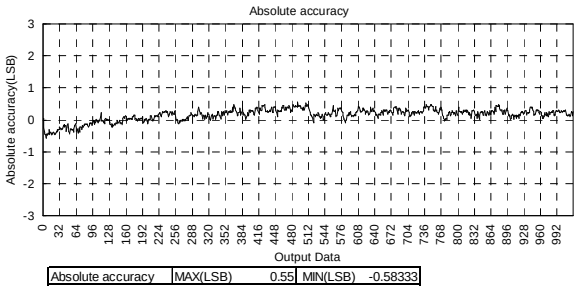
■Operating Condition

Topr=-40,25,85 (degrees C)

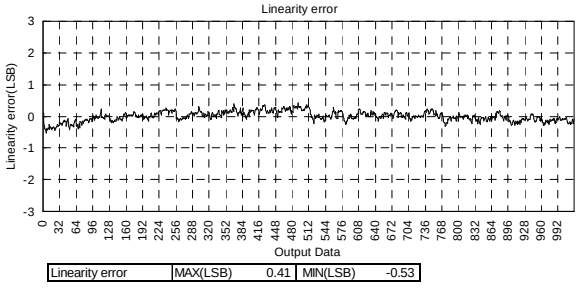
Vcc=AVcc=VREF =3.072V

φAD=10MHz

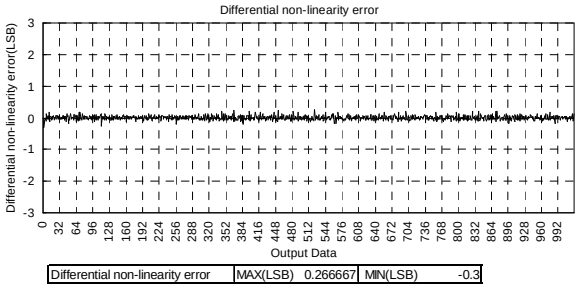
Topr=-40degreesC



Absolute accuracy	MAX(LSB)	0.55	MIN(LSB)	-0.58333



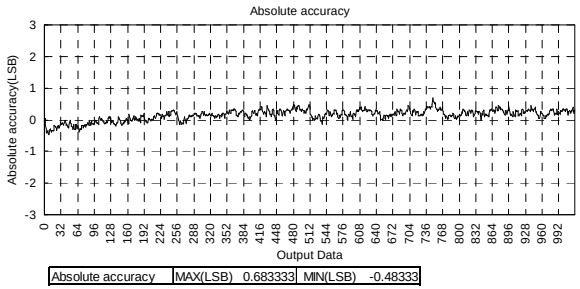
Linearity error	MAX(LSB)	0.41	MIN(LSB)	-0.53



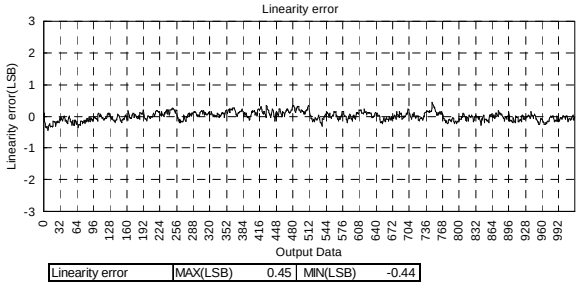
Differential non-linearity error	MAX(LSB)	0.266667	MIN(LSB)	-0.3

Figure24. Topr=-40(degrees C)

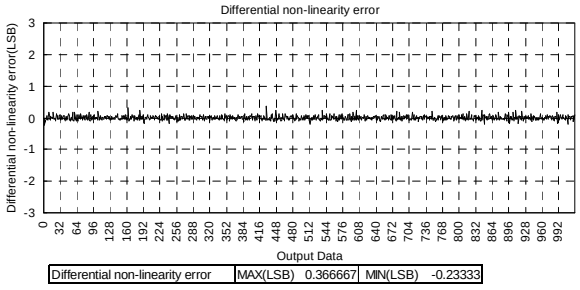
Topr=25degreesC



Absolute accuracy	MAX(LSB)	0.683333	MIN(LSB)	-0.48333



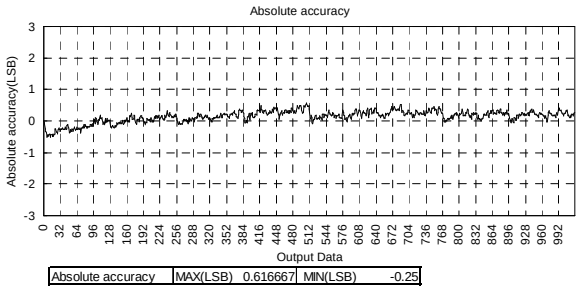
Linearity error	MAX(LSB)	0.45	MIN(LSB)	-0.44



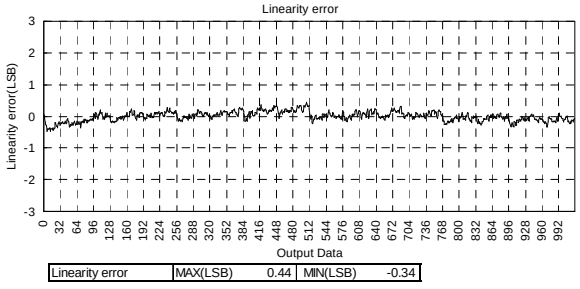
Differential non-linearity error	MAX(LSB)	0.366667	MIN(LSB)	-0.23333

Figure25. Topr=25(degrees C)

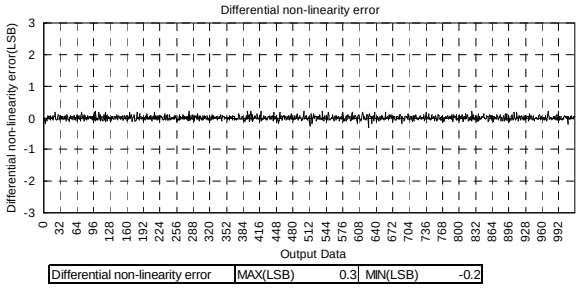
Topr=85degreesC



Absolute accuracy	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

Figure26. 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.

5.A/D Accuracy(5)

■ Related Pin

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

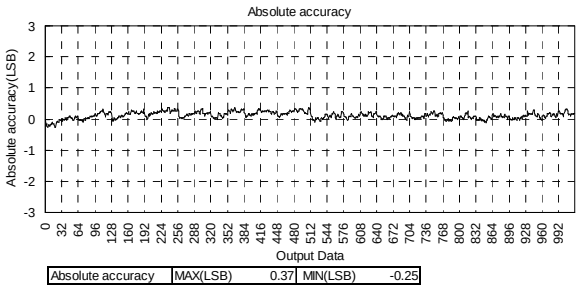
■Operating Condition

Topr=-40,25,85 (degrees C)

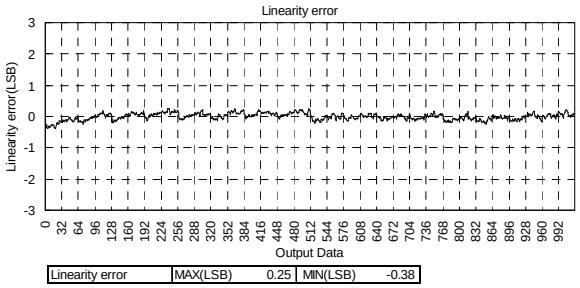
Vcc=AVcc=VREF =5.12V

φAD=20MHz (FOCO40M divided by 2)

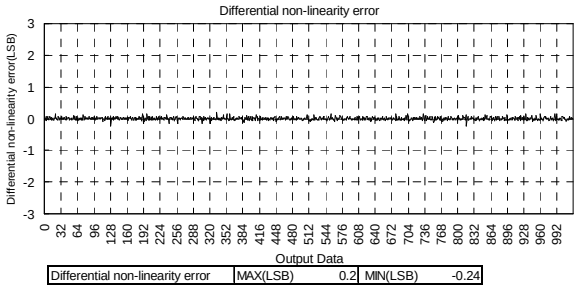
Topr=-40degreesC



Absolute accuracy	MAX(LSB)	0.37	MIN(LSB)	-0.25



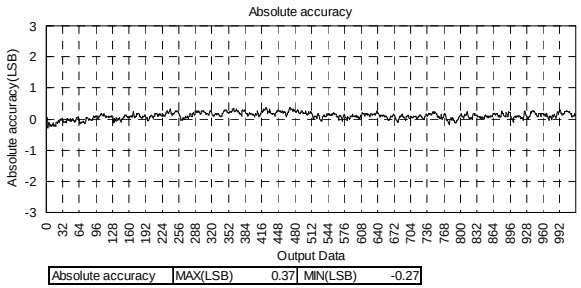
Linearity error	MAX(LSB)	0.25	MIN(LSB)	-0.38



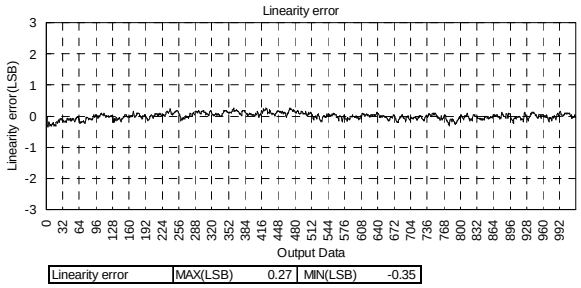
Differential non-linearity error	MAX(LSB)	0.2	MIN(LSB)	-0.24

Figure27. Topr=-40(degrees C)

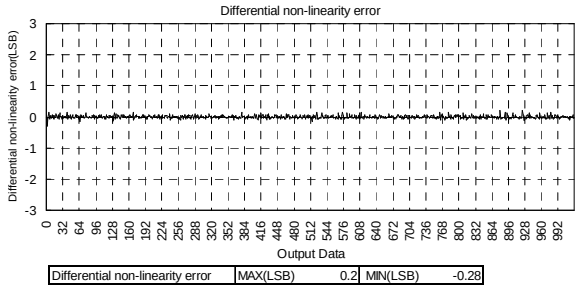
Topr=25degreesC



Absolute accuracy	MAX(LSB)	0.37	MIN(LSB)	-0.27



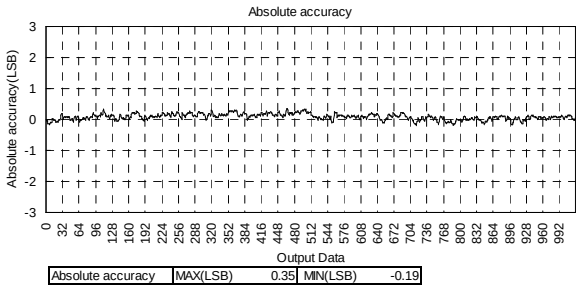
Linearity error	MAX(LSB)	0.27	MIN(LSB)	-0.35



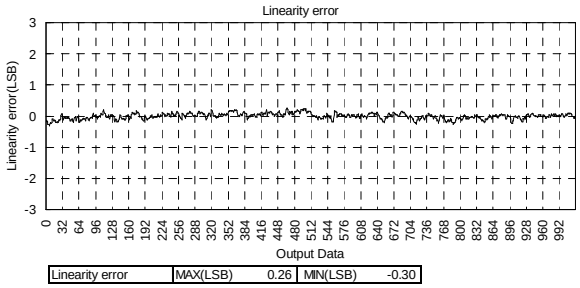
Differential non-linearity error	MAX(LSB)	0.2	MIN(LSB)	-0.28

Figure28. Topr=25(degrees C)

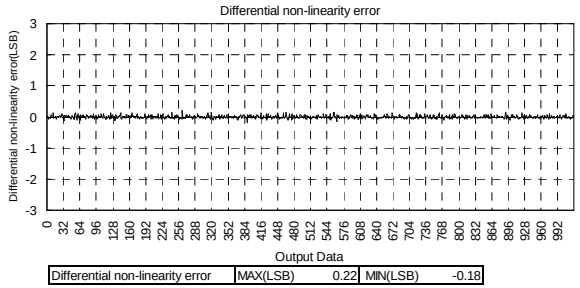
Topr=85degreesC



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

Figure28. 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.

5.A/D Accuracy(6)

■ Related Pin

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

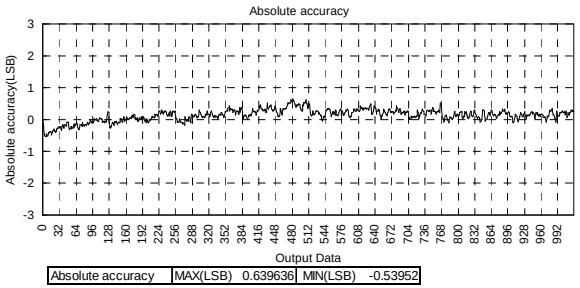
■Operating Condition

Topr=-40,25,85 (degrees C)

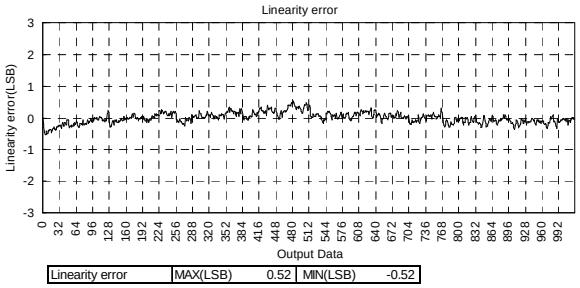
Vcc=AVcc=VREF =3.3V

φAD=13.3MHz (FOCO40M divided by 3)

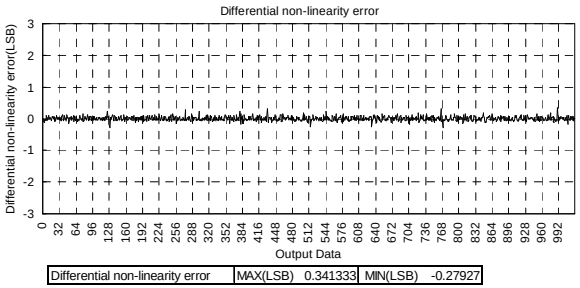
Topr=-40degreesC



Absolute accuracy	MAX(LSB) 0.639636	MIN(LSB) -0.53952



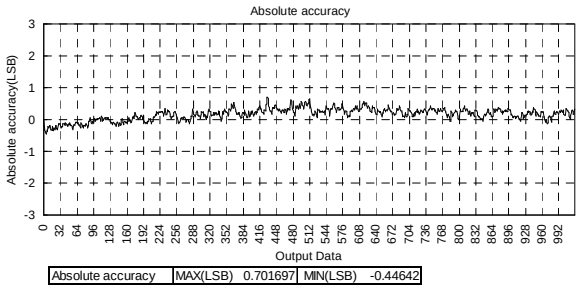
Linearity error	MAX(LSB) 0.52	MIN(LSB) -0.52



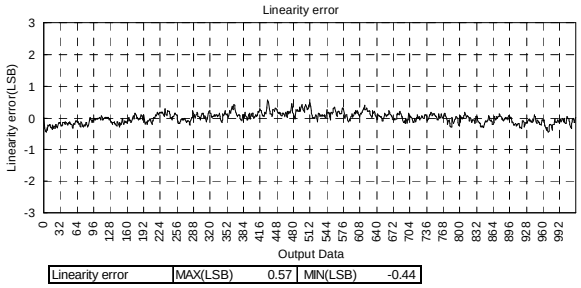
Differential non-linearity error	MAX(LSB) 0.341333	MIN(LSB) -0.27927

Figure30. Topr=-40(degrees C)

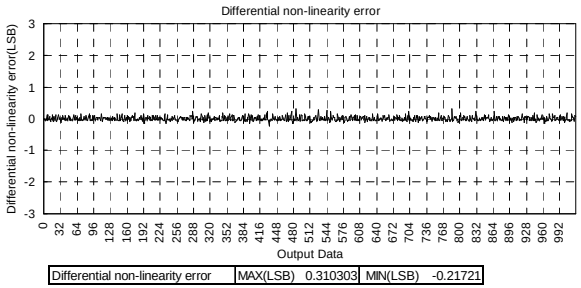
Topr=25degreesC



Absolute accuracy	MAX(LSB) 0.701697	MIN(LSB) -0.44642



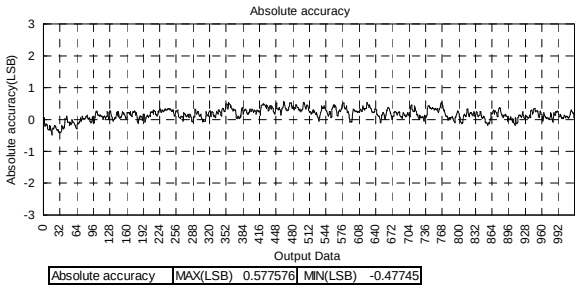
Linearity error	MAX(LSB) 0.57	MIN(LSB) -0.44



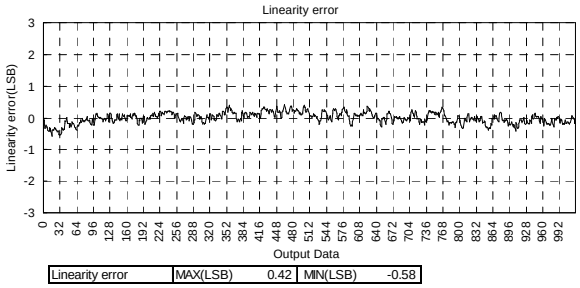
Differential non-linearity error	MAX(LSB) 0.310303	MIN(LSB) -0.21721

Figure31. Topr=25(degrees C)

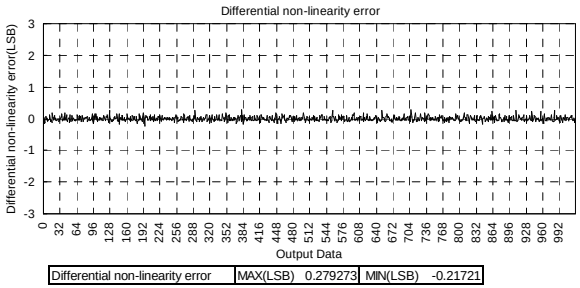
Topr=85degreesC



Absolute accuracy	MAX(LSB) 0.577576	MIN(LSB) -0.47745



Linearity error	MAX(LSB) 0.42	MIN(LSB) -0.58



Differential non-linearity error	MAX(LSB) 0.279273	MIN(LSB) -0.21721

Figure32. 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.

5.A/D Accuracy(7)

■ Related Pin

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

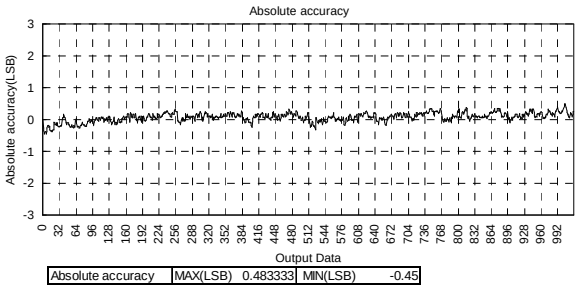
■Operating Condition

Topr=-40,25,85 (degrees C)

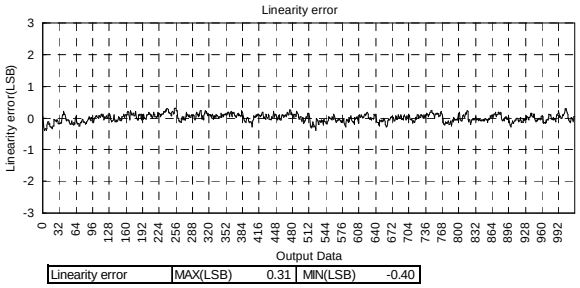
Vcc=AVcc=VREF =3.072V

φAD=10MHz (FOCO40M divided by 4)

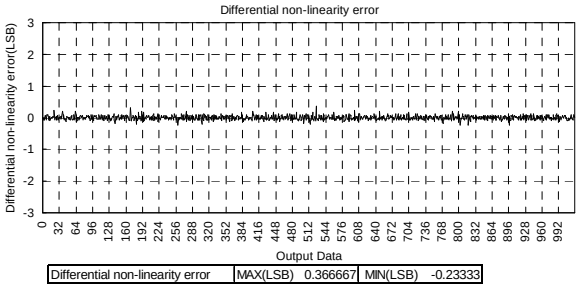
Topr=-40degreesC



Absolute accuracy	MAX(LSB)	0.483333	MIN(LSB)	-0.45



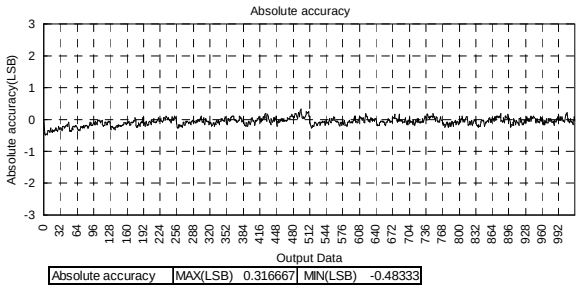
Linearity error	MAX(LSB)	0.31	MIN(LSB)	-0.40



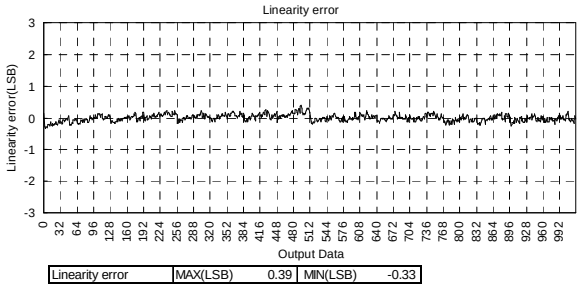
Differential non-linearity error	MAX(LSB)	0.366667	MIN(LSB)	-0.23333

Figure33. Topr=-40(degrees C)

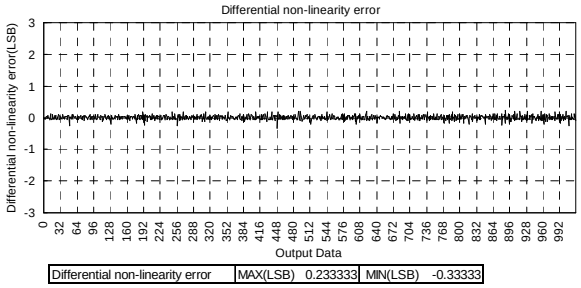
Topr=25degreesC



Absolute accuracy	MAX(LSB)	0.316667	MIN(LSB)	-0.48333



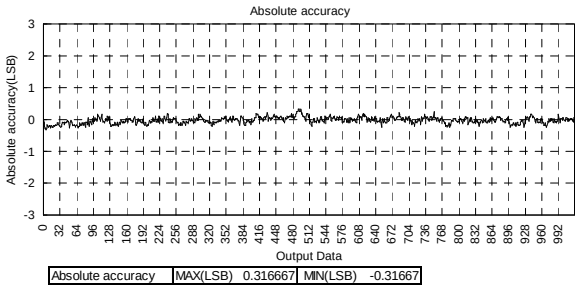
Linearity error	MAX(LSB)	0.39	MIN(LSB)	-0.33



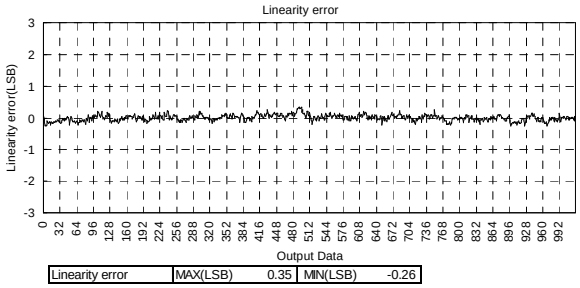
Differential non-linearity error	MAX(LSB)	0.233333	MIN(LSB)	-0.33333

Figure34. Topr=25(degrees C)

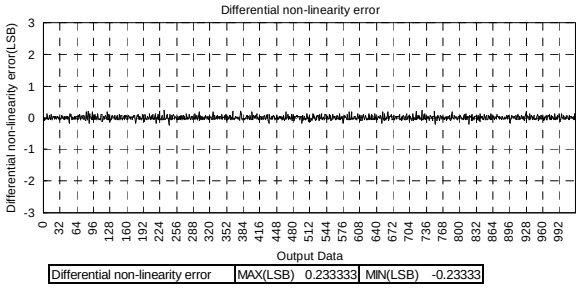
Topr=85degreesC



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

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

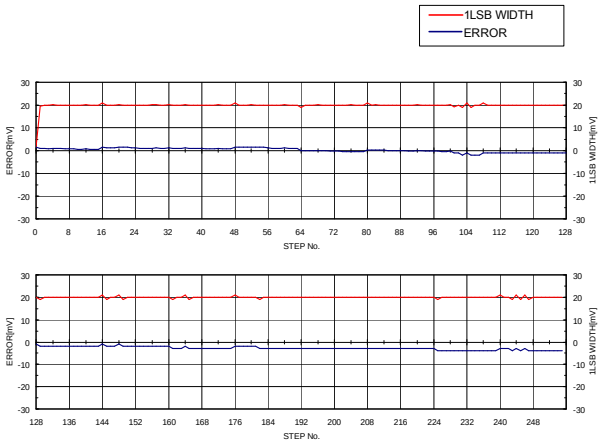


Figure36. Topr=-40(degrees C)

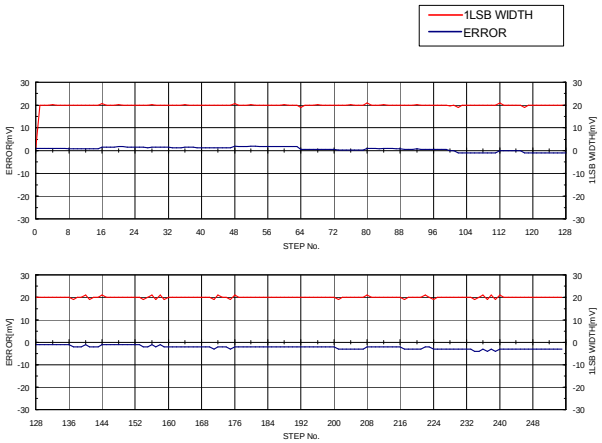


Figure37. Topr=25(degrees C)

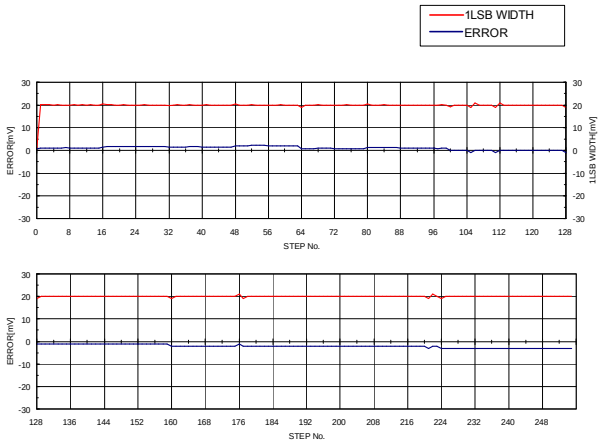


Figure38. Topr=85(degrees C)

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(2)

■ Related Pin
DA0、DA1

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

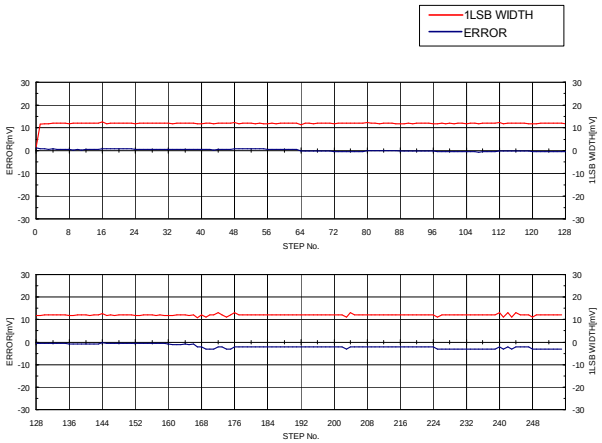


Figure39. Topr=-40(degrees C)

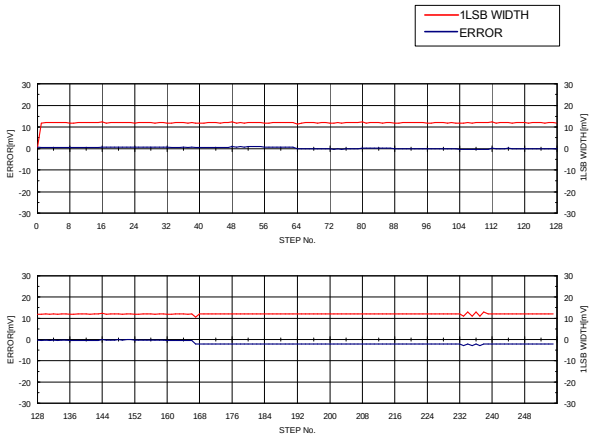


Figure40. Topr=25(degrees C)

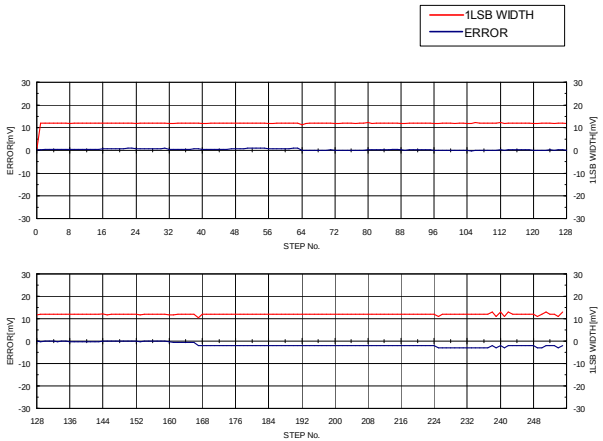


Figure41. Topr=85(degrees C)

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

7.Power supply current(1)

(1)High-speedmode f(Xin)

1.Icc vs f(Xin)

■Operating Condition

XIN = 4 to 20 MHz (square wave)

125 kHz on-chip oscillator stop

Topr = 25(degrees C)

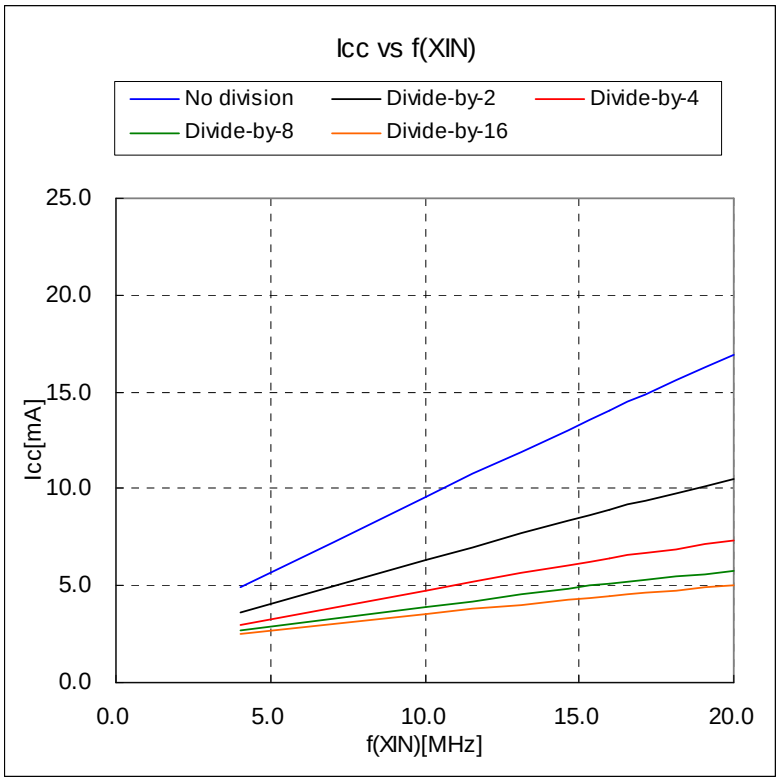


Figure42. Icc vs f(Xin) (Vcc=3.0V)

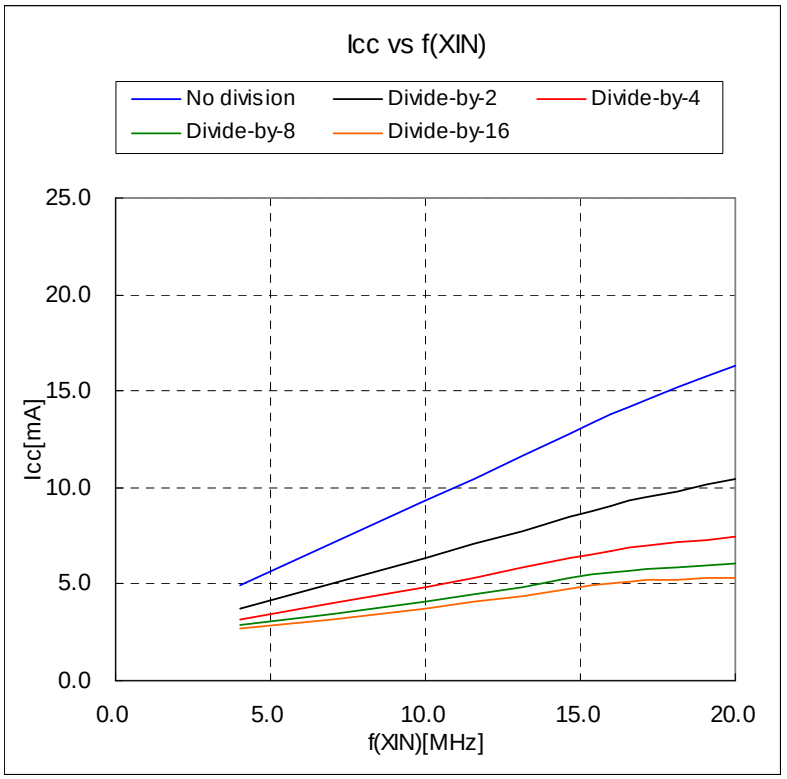


Figure43. Icc vs f(Xin) (Vcc=5.0V)

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

7.Power supply current(2)

(1)High-speedmode f(Xin)

2.Icc vs Vcc

■Operating Condition
XIN = 10 MHz (square wave)
125 kHz on-chip oscillator stop
Topr = -40,25,85(degrees C)
No division

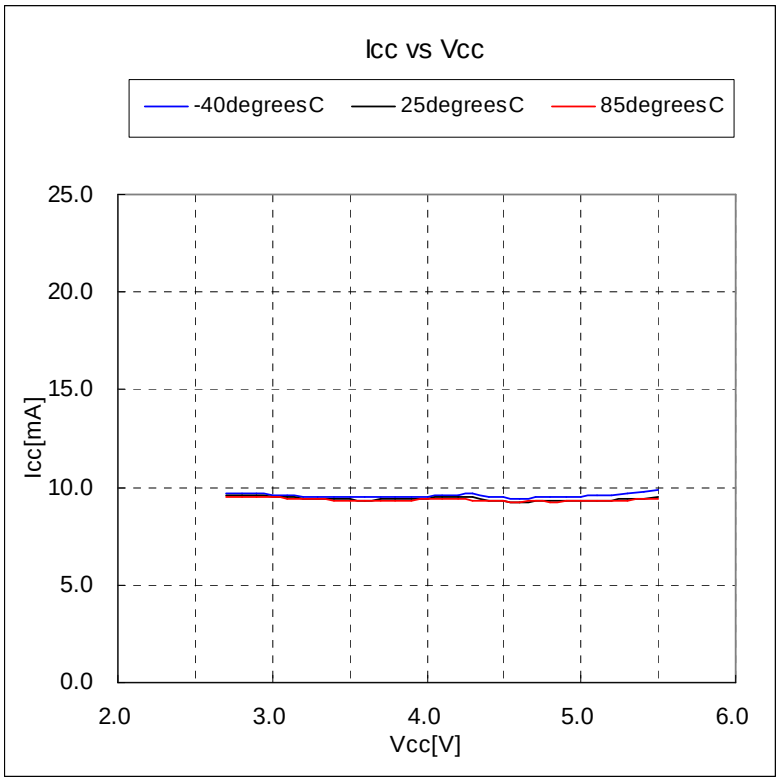


Figure44. Icc vs Vcc (f(Xin)=10MHz)

■Operating Condition
XIN = 20 MHz (square wave)
125 kHz on-chip oscillator stop
Topr = -40,25,85(degrees C)
No division

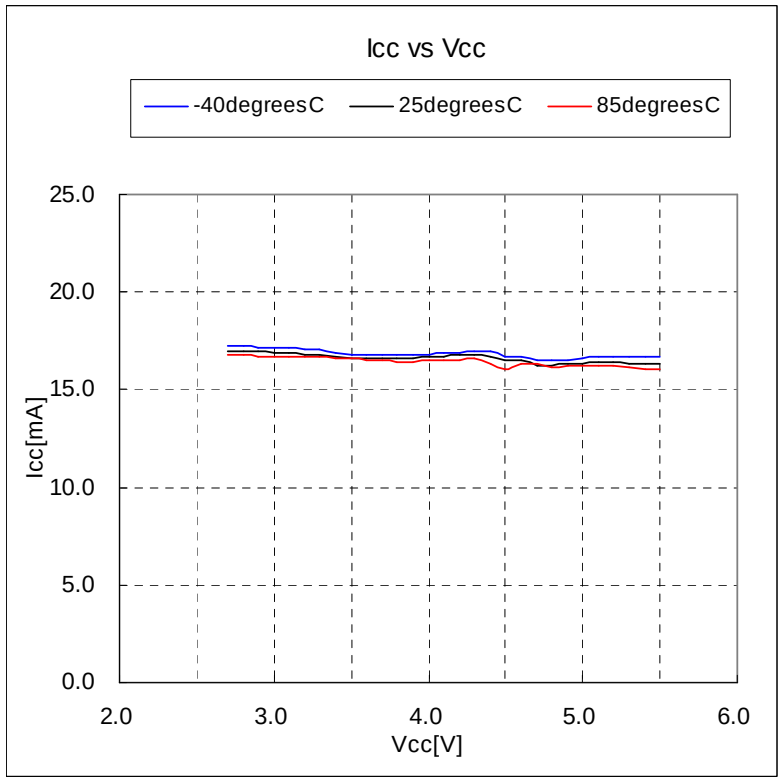


Figure45. Icc vs Vcc (f(Xin)=20MHz)

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(3)

(1)High-speedmode 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

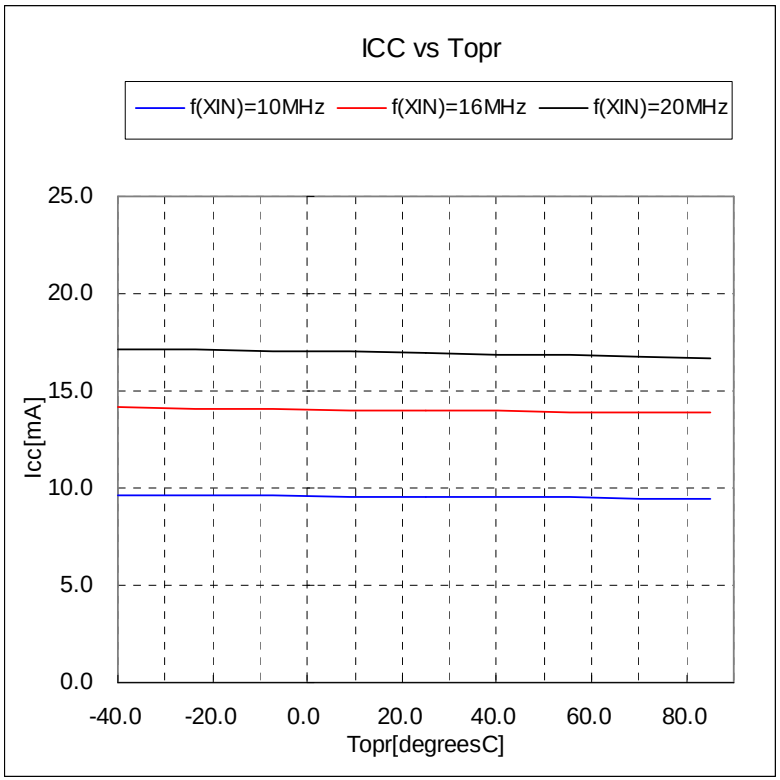


Figure46. Icc vs Topr (Vcc=3.0V)

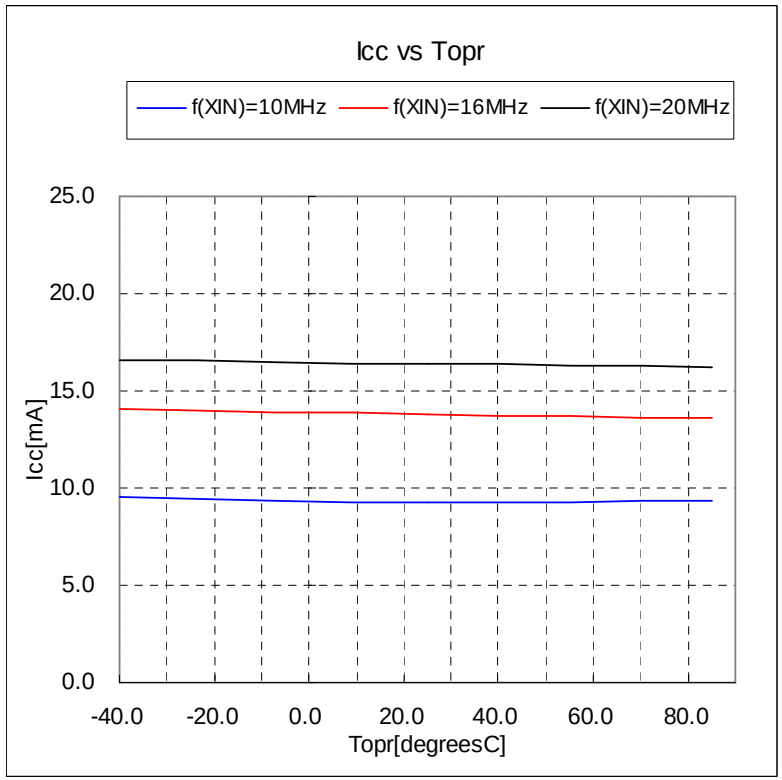


Figure47. Icc vs Topr (Vcc=5.0V)

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

7.Power supply current(4)

(2)High-speedmode f(PLL)

1.Icc vs f(PLL)

■Operating Condition

f(PLL) = 10 to 32 MHz (square wave)

125 kHz on-chip oscillator stop

Topr = 25(degrees C)

No division

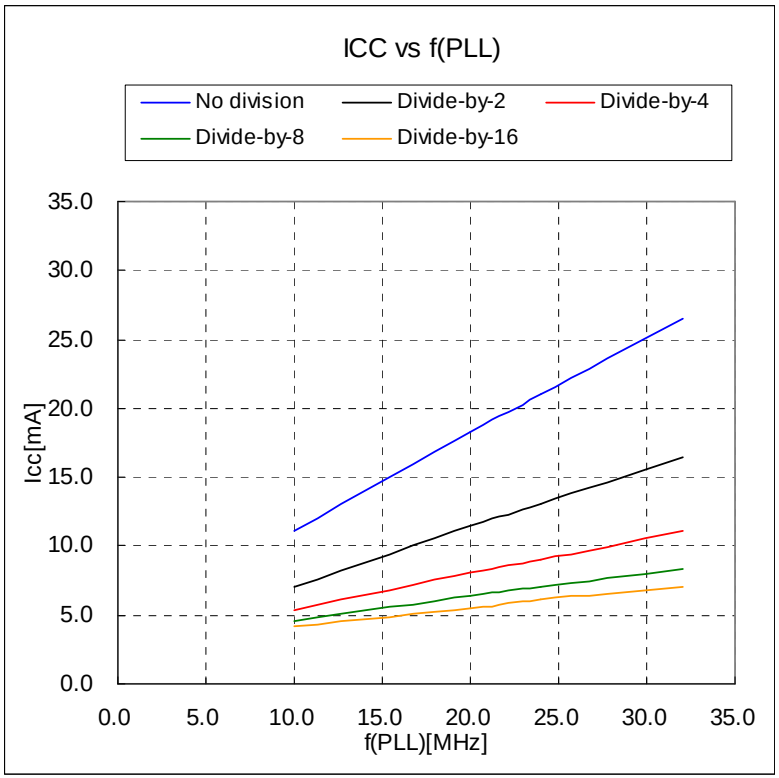


Figure48. Icc vs f(PLL) (Vcc=3.0V)

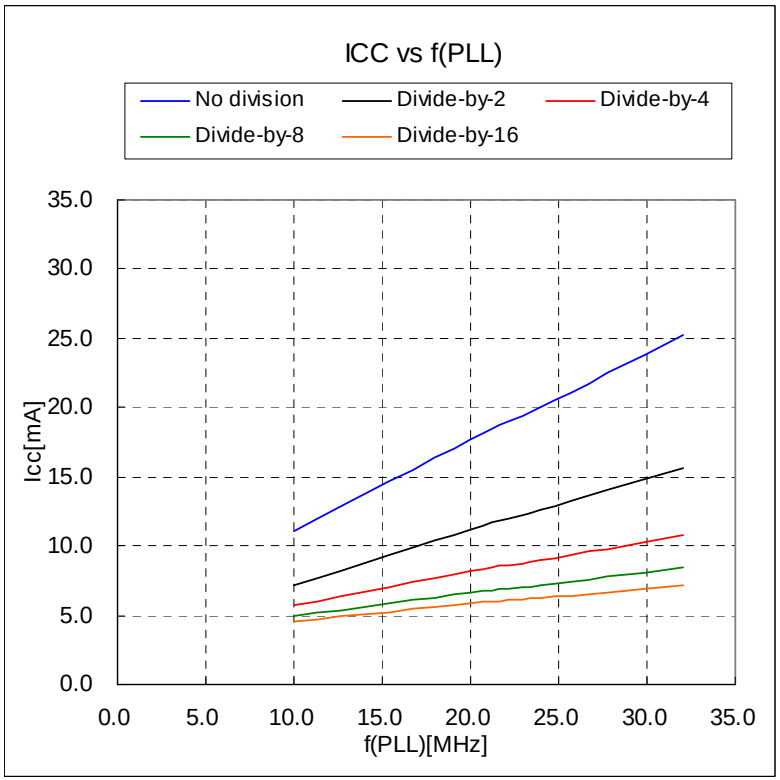


Figure49. Icc vs f(PLL) (Vcc=5.0V)

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

7.Power supply current(5)

(2)High-speedmode f(PLL)

2.Icc vs Vcc

■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

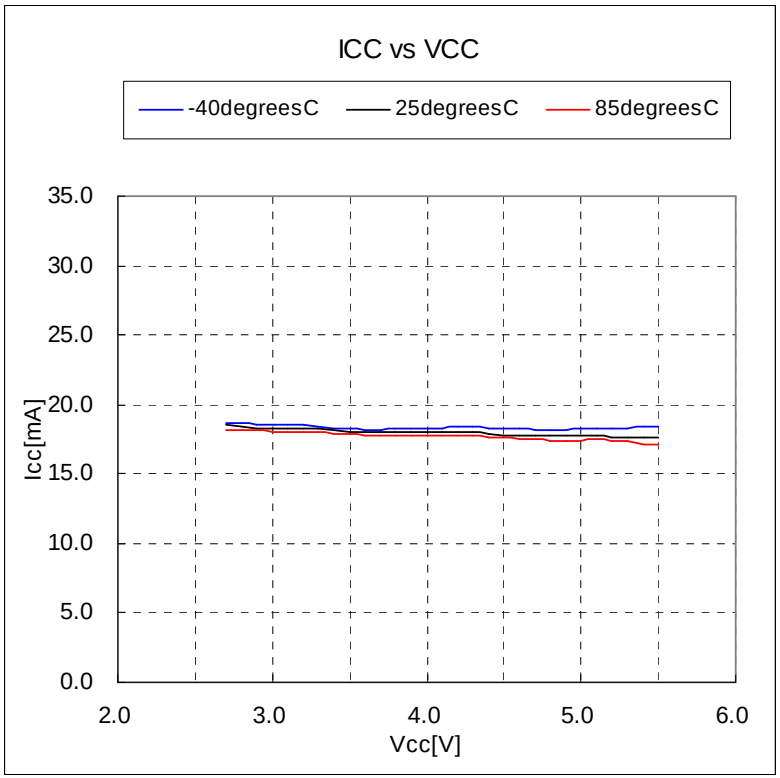


Figure50. Icc vs Vcc (f(PLL)=20MHz)

■Operating Condition
f(PLL) = 32MHz
XIN = 4 MHz (square wave)
PLL multiplied by 8
125 kHz on-chip oscillator stop
Topr = -40,25,85(degrees C)
No division

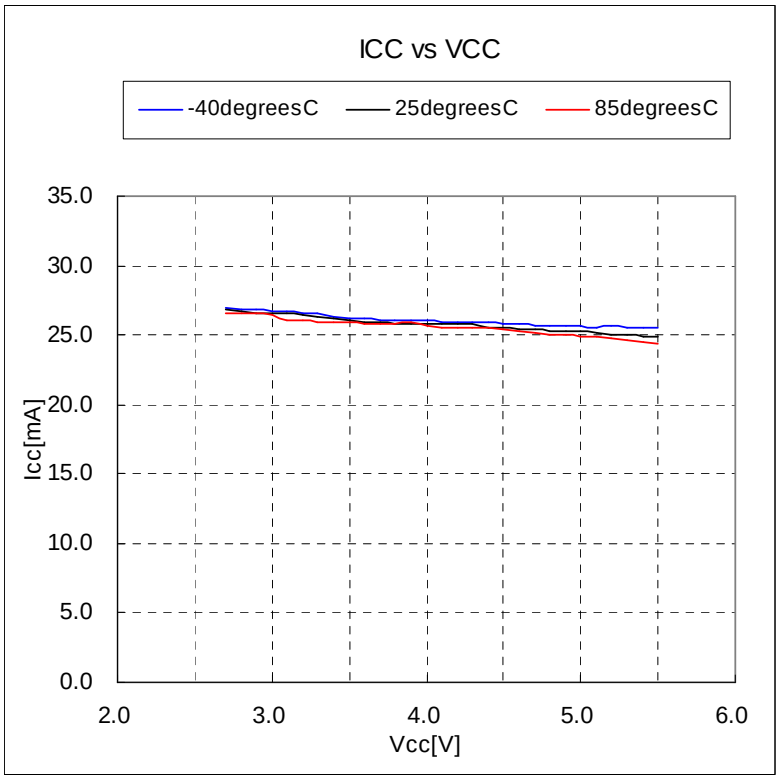


Figure51. Icc vs Vcc (f(PLL)=32MHz)

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-speedmode 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

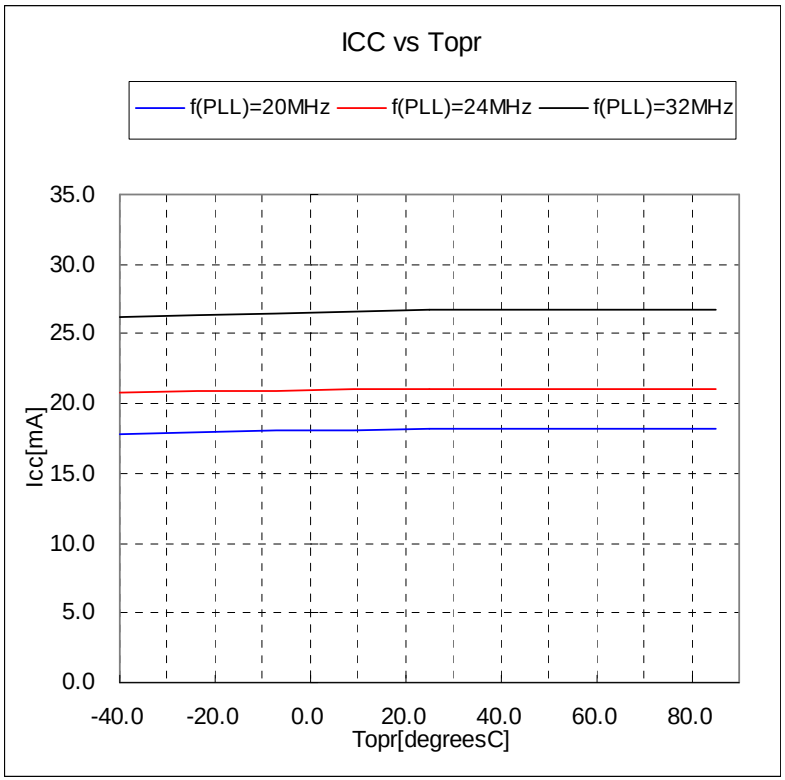


Figure52. Icc vs Topr (Vcc=3.0V)

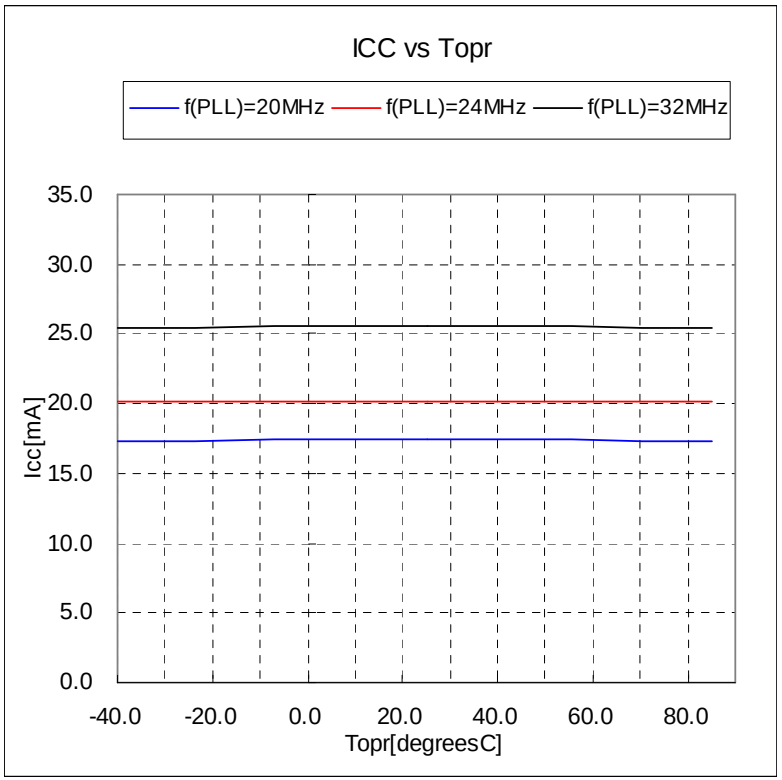


Figure53. Icc vs Topr (Vcc=5.0V)

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

7.Power supply current(7)

(3)40MHz on-chip Oscillator mode

1.Icc vs Vcc

■Operating Condition
40MHz on-chip oscillator on
F(BCLK)=5,10MHz
Main clock stop
125kHz on-chip oscillator stop
Topr = 25(degrees C)

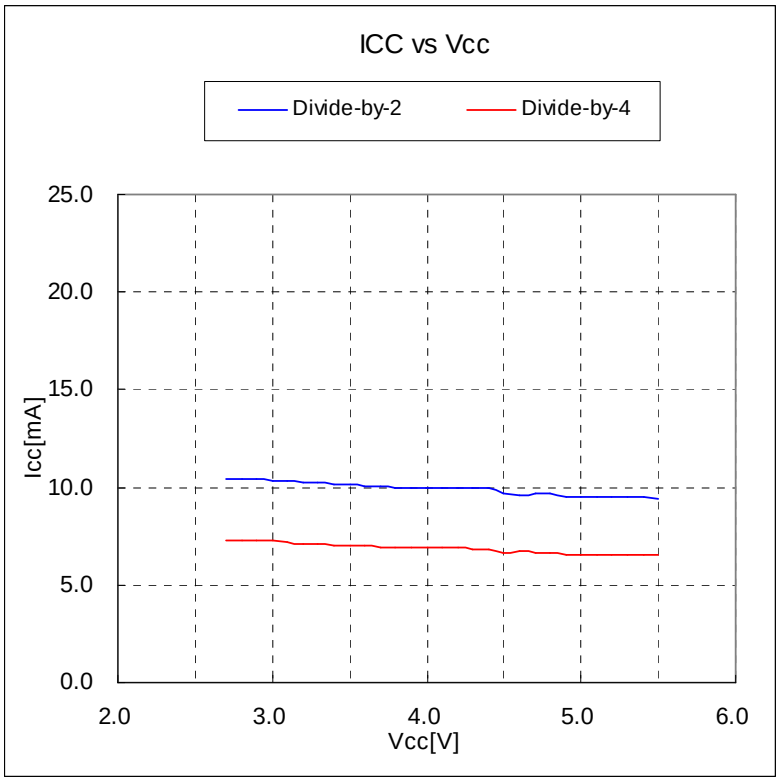


Figure54. Icc vs Vcc

2.Icc vs Topr

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

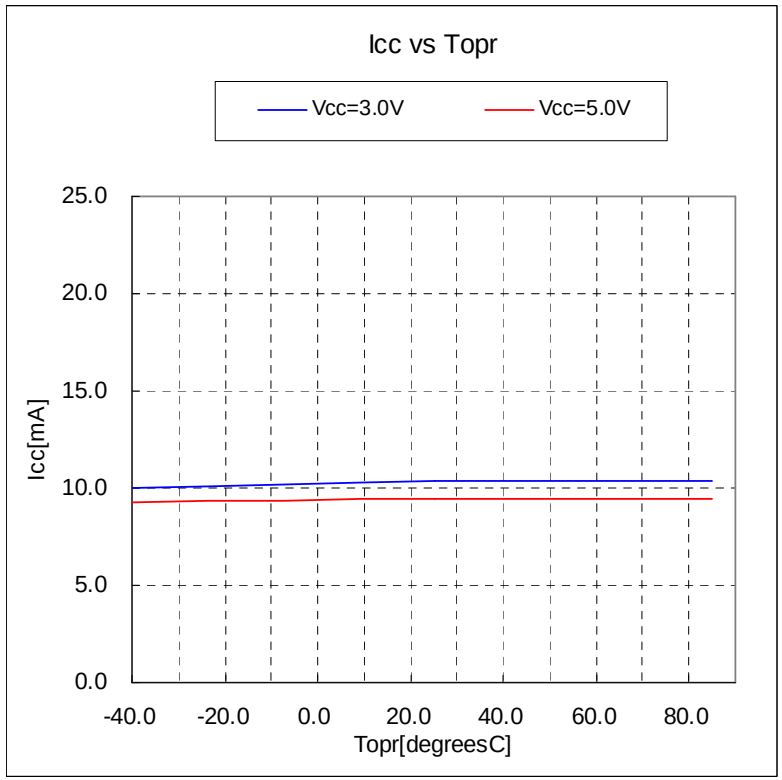


Figure55. Icc vs Vcc

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(8)

(4)125kHz on-chip Oscillator mode

1.Icc vs Vcc

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

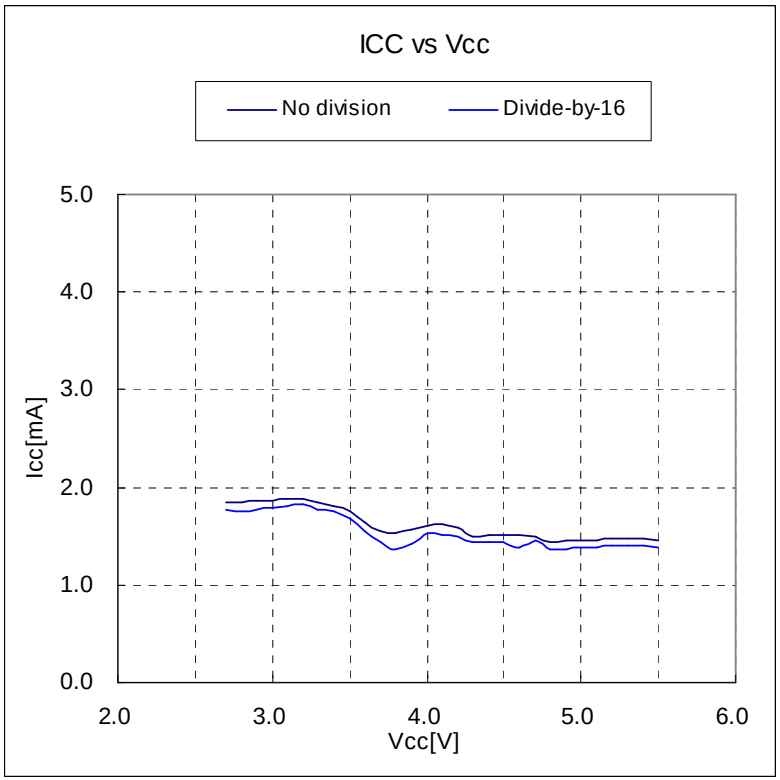


Figure56. Icc vs Vcc

■Operating Condition
Main clock stop
125kHz on-chip oscillator on
FMR22=1
Topr = 25(degrees C)

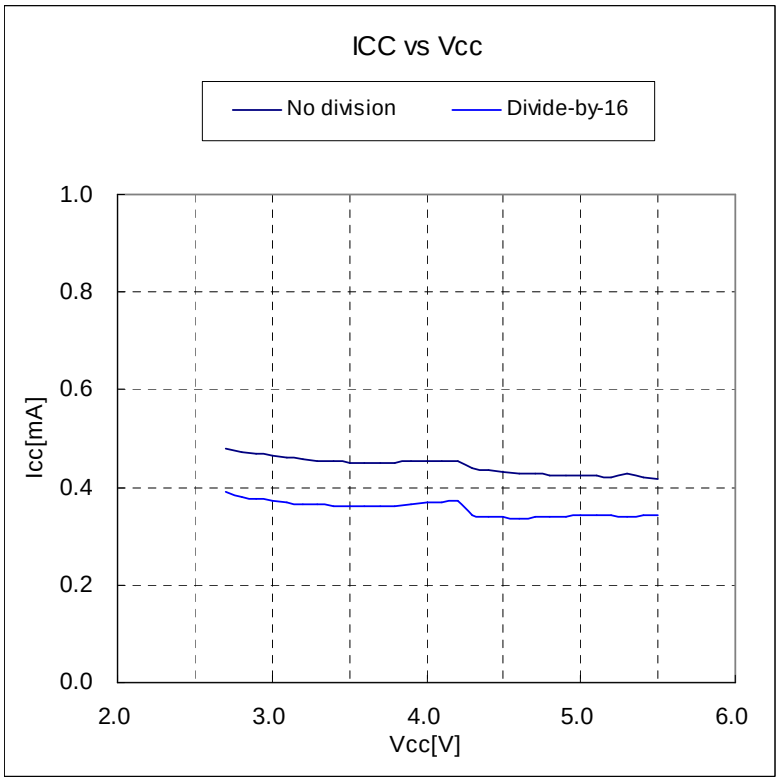


Figure57. Icc vs Vcc

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(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)

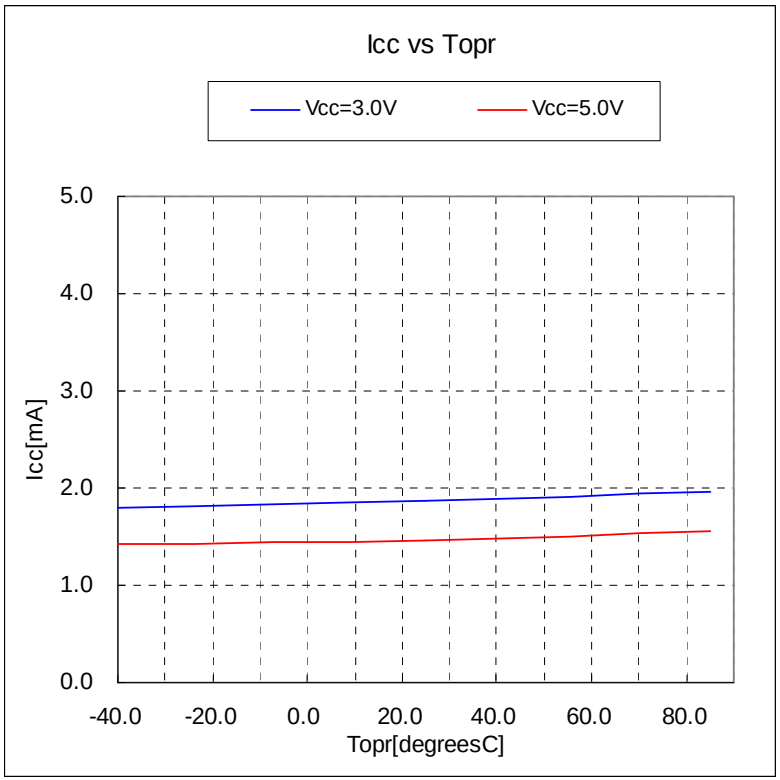


Figure58. Icc vs Topr

■Operating Condition
Main clock stop
125kHz on-chip oscillator on, no division
FMR22=1
Topr = -40 to 85(degrees C)

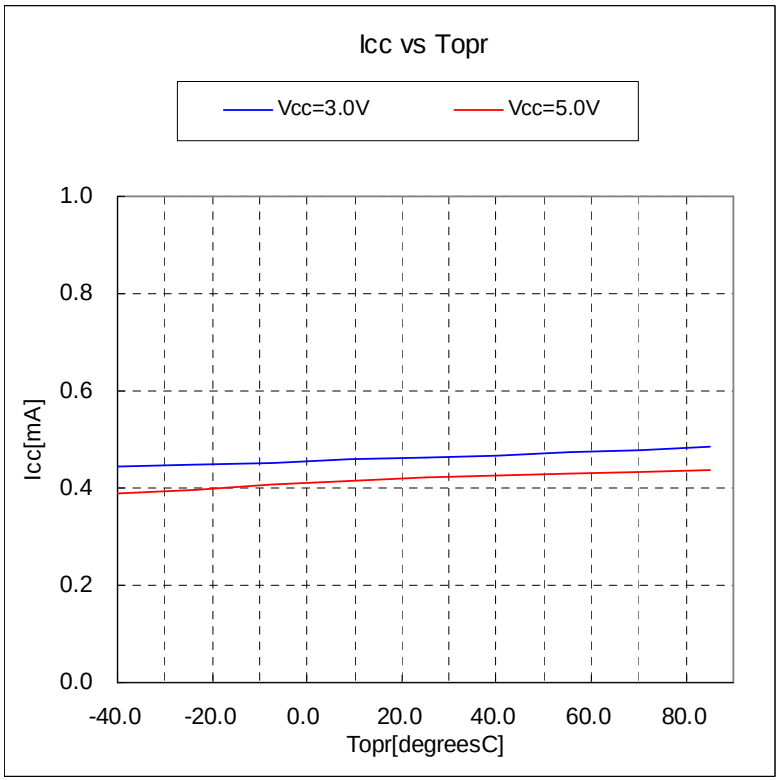


Figure59. Icc vs Topr

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(Xcin)

1.Icc vs Vcc

■Operating Condition
f(Xcin) = 32kHz
In low-power mode
FMR22 = FMR23 = 1
on flash memory
Topr = -40,25,85(degrees C)

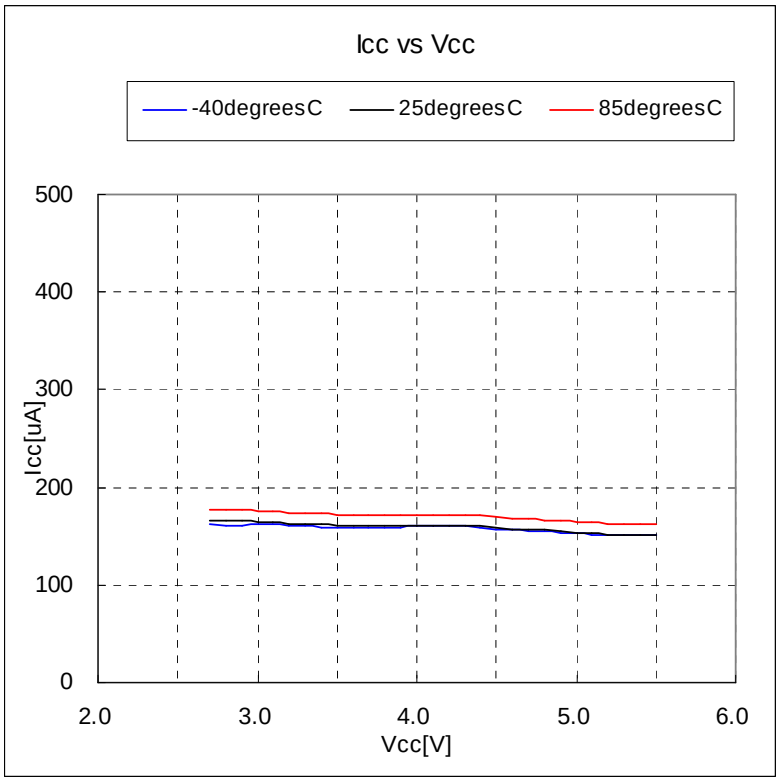


Figure60. Icc vs Vcc

■Operating Condition
f(Xcin) = 32kHz
In low-power mode,
FMR22 = FMR23 = 1
on RAM
Topr = -40,25,85(degrees C)

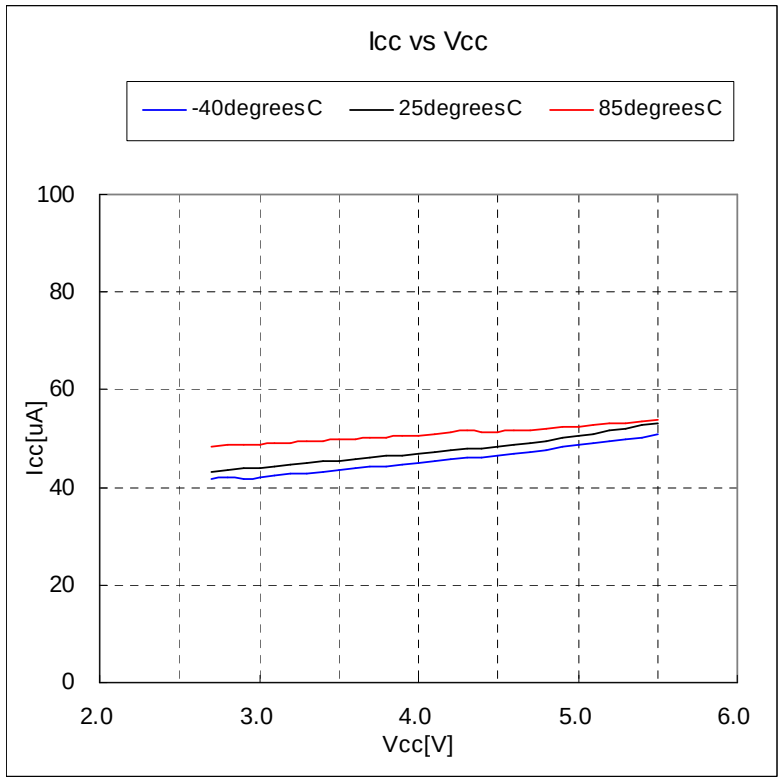


Figure61. Icc vs Vcc

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)

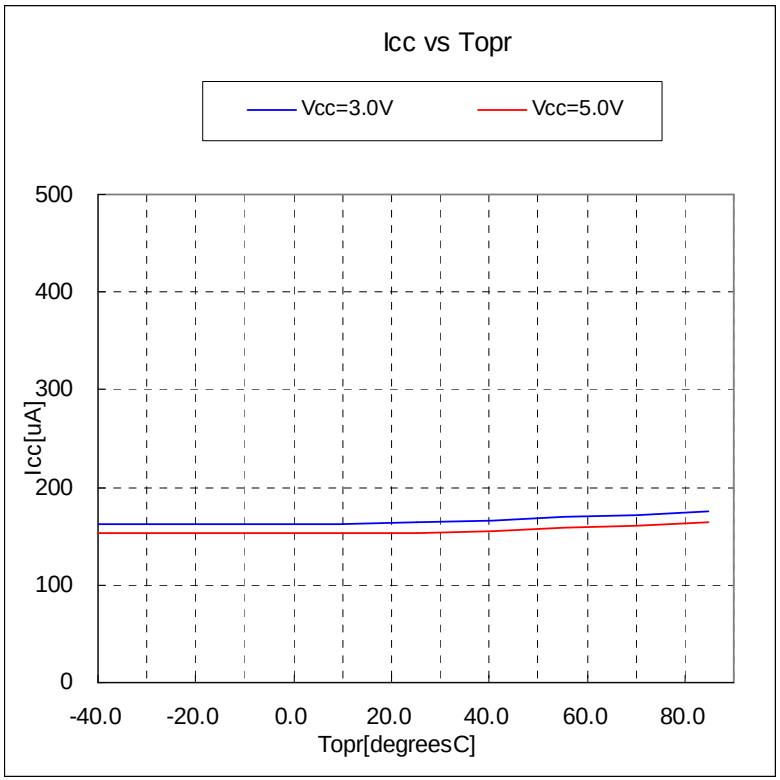


Figure62. Icc vs Topr

■Operating Condition
f(Xcin) = 32kHz
In low-power mode
FMSTP = 1
on RAM
Topr = -40 to 85(degrees C)

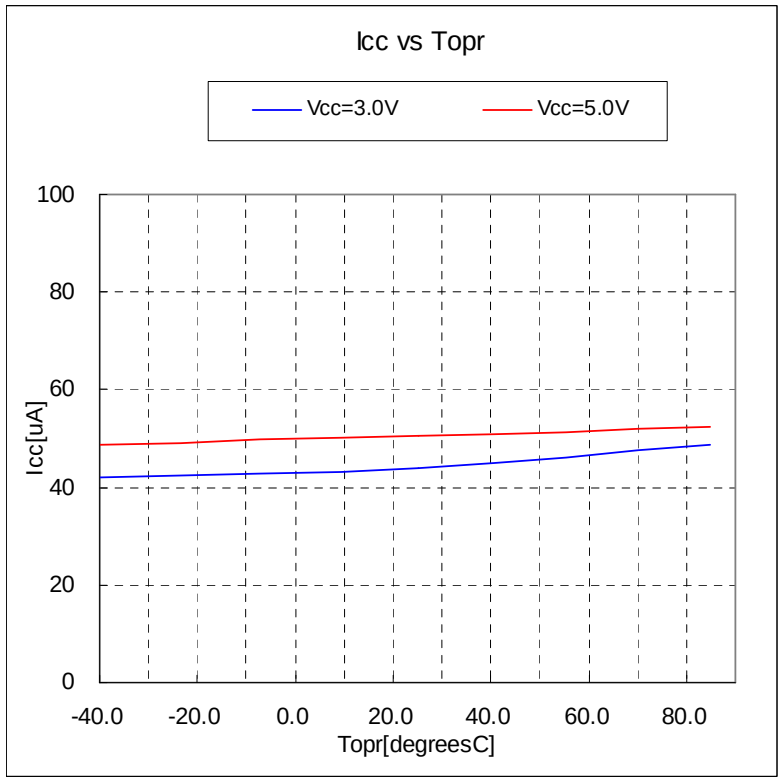


Figure63. Icc vs Topr

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(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)

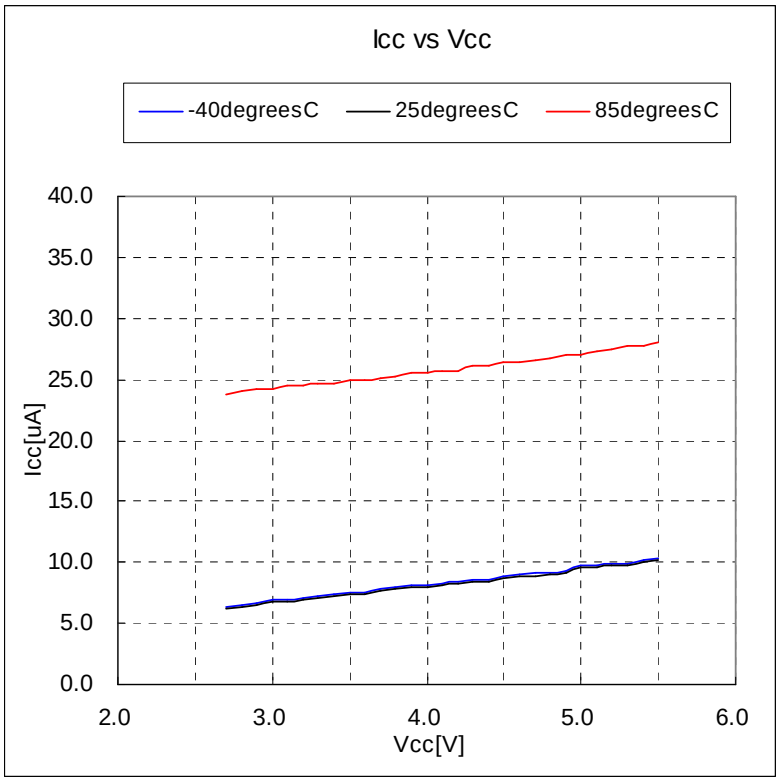


Figure64. Icc vs Vcc

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

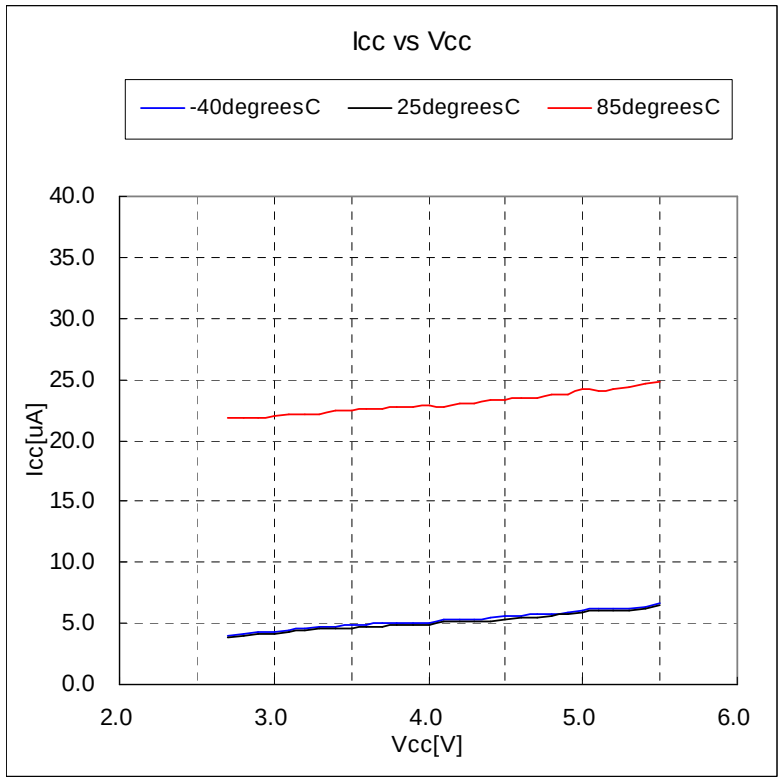


Figure65. Icc vs Vcc

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(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)

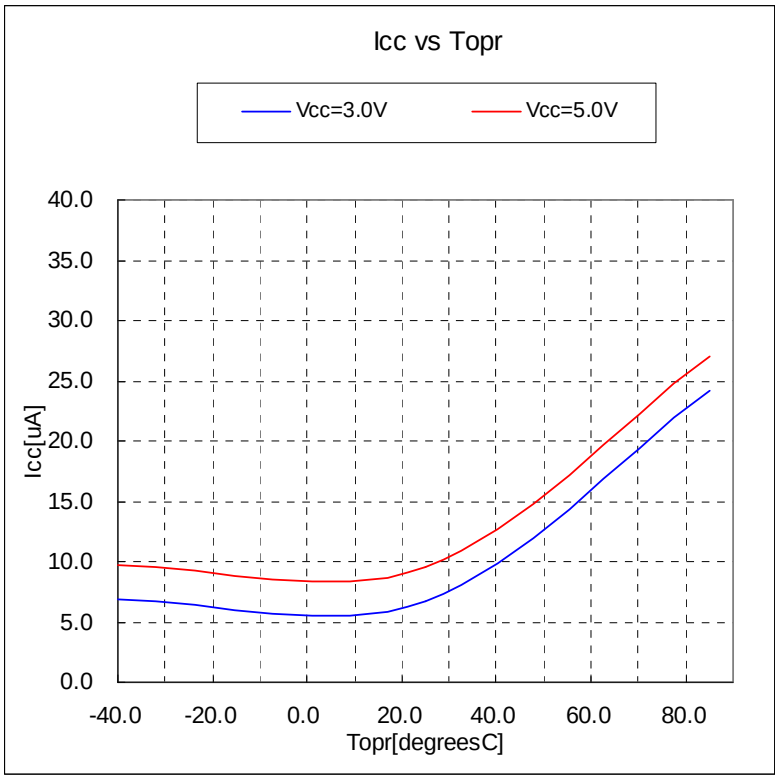


Figure66. Icc vs Topr

■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)

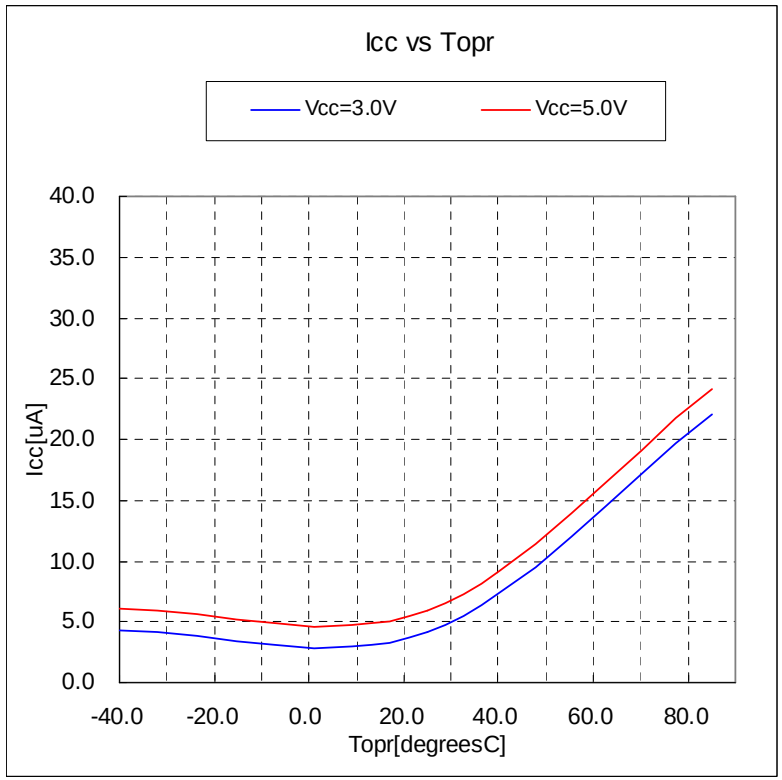


Figure67. Icc vs Topr

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(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)

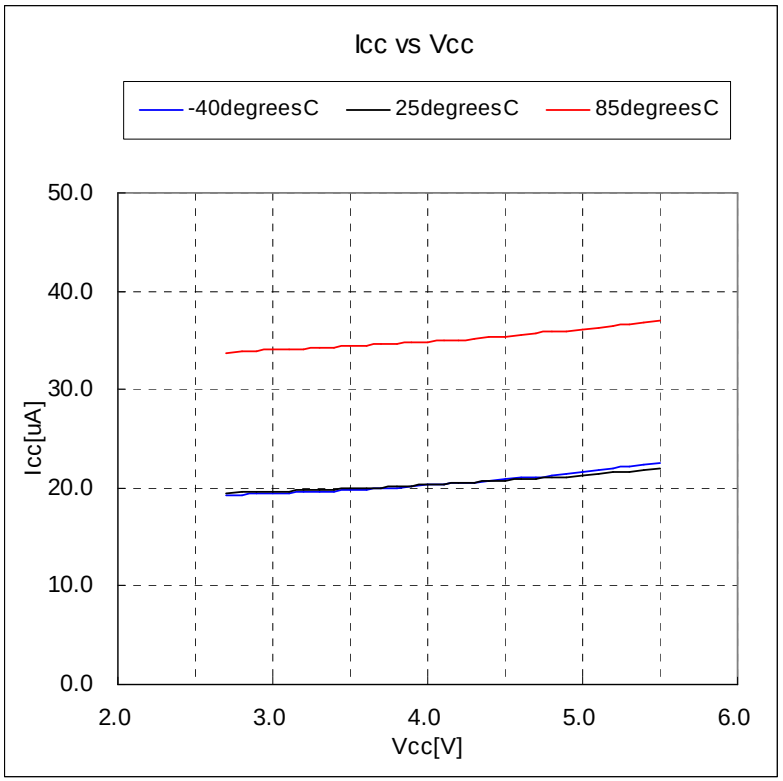


Figure68. Icc vs Vcc

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

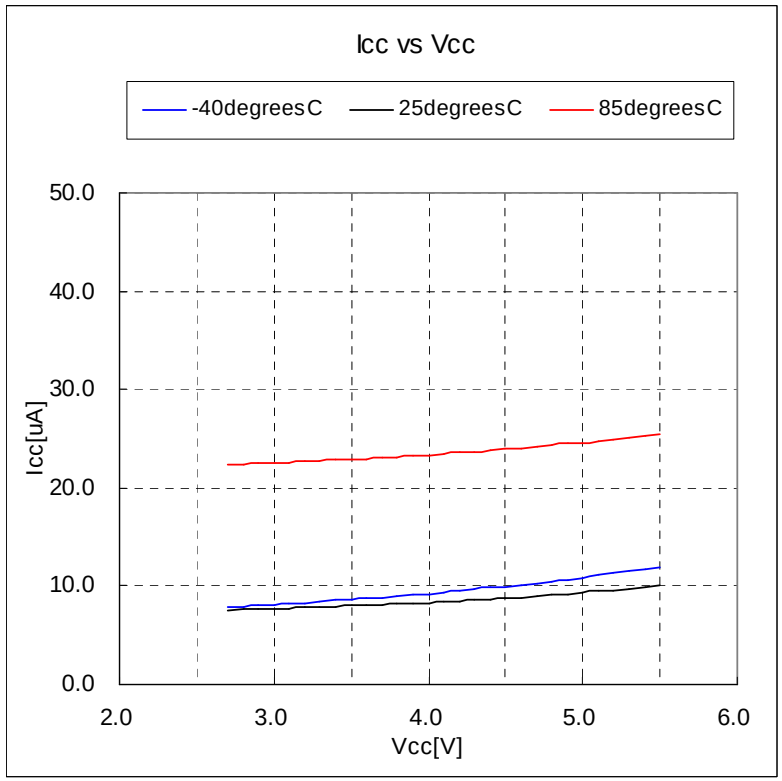


Figure69. Icc vs Vcc

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(15)

(7)Wait mode f(OCO-S)

2.Icc vs Topr

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

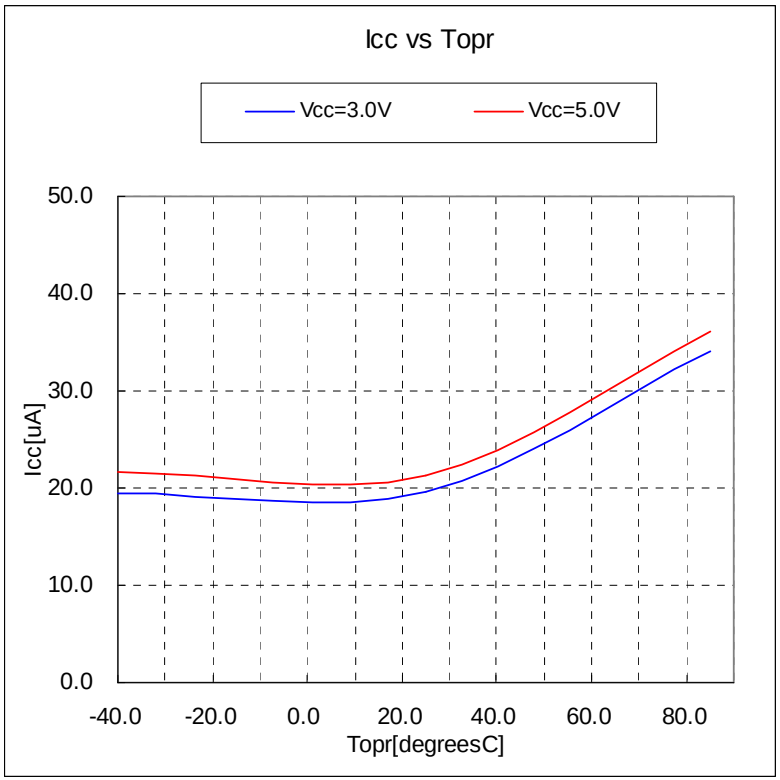


Figure70. Icc vs Topr

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

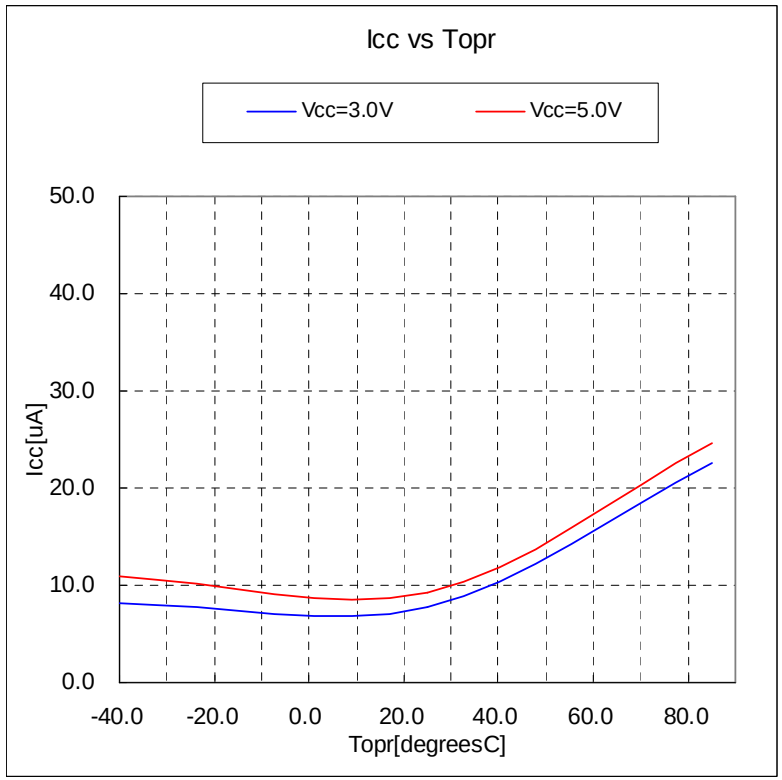


Figure71. Icc vs Topr

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(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)

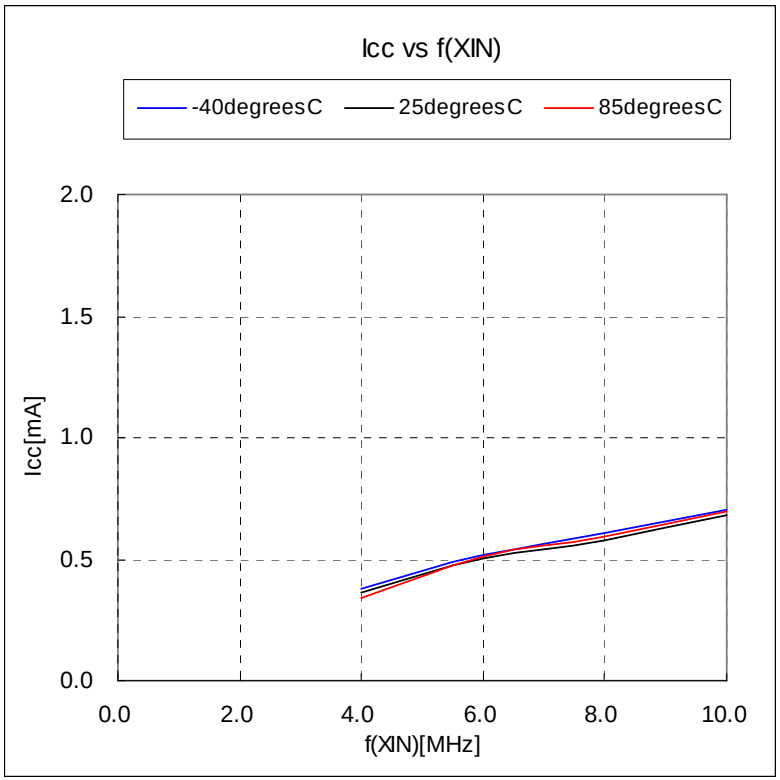


Figure72. Icc vs f(Xin) (Vcc=3.0V)

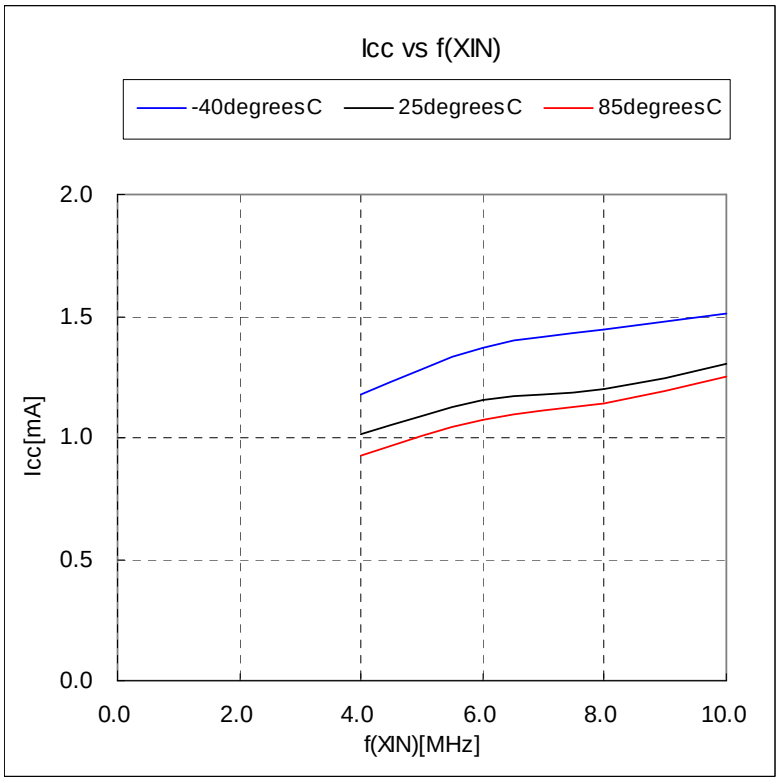


Figure73. Icc vs f(Xin) (Vcc=5.0V)

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

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)

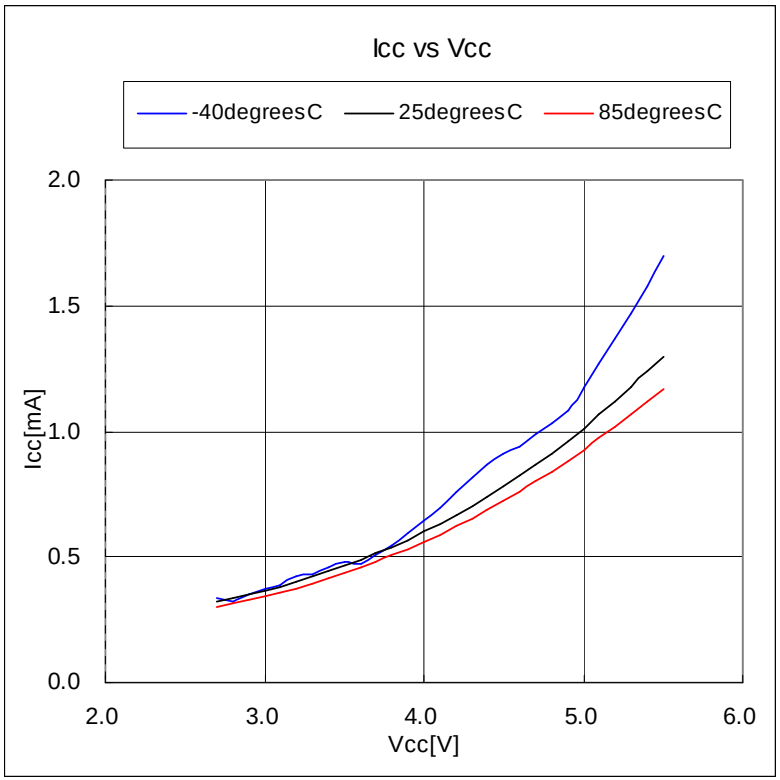


Figure74. Icc vs Vcc (f(Xin)=4MHz)

■Operating Condition
XIN = 6MHz (square wave)
125kHz on-chip oscillator stop
Peripheral clock stop (Timer only)
Topr = -40 to 85(degrees C)

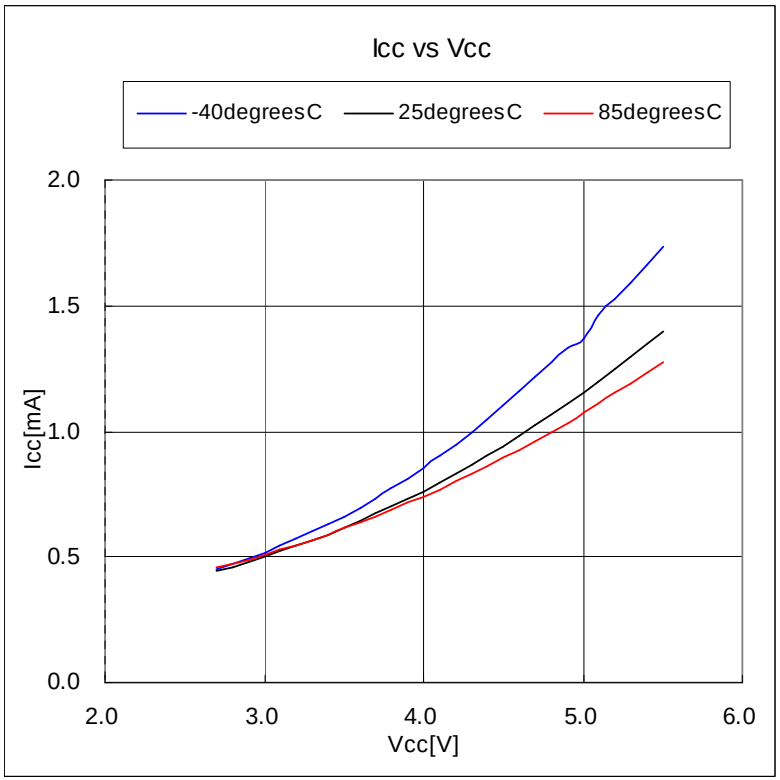


Figure75. Icc vs Vcc (f(Xin)=6MHz)

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(18)

(8)Timer Xin Direct mode f(Xin)

2.Icc vs Vcc

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

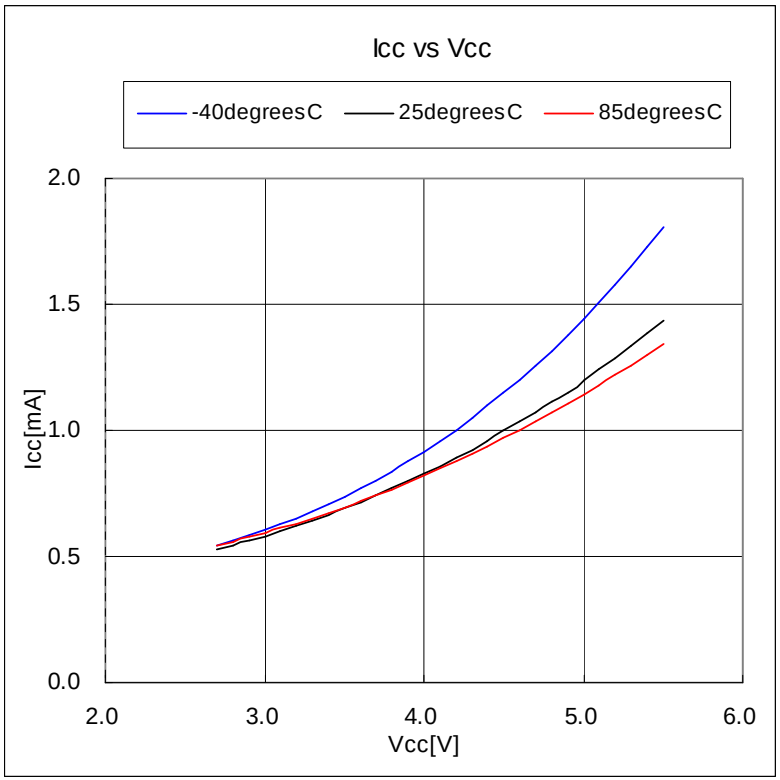


Figure76. Icc vs Vcc (f(Xin)=8MHz)

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

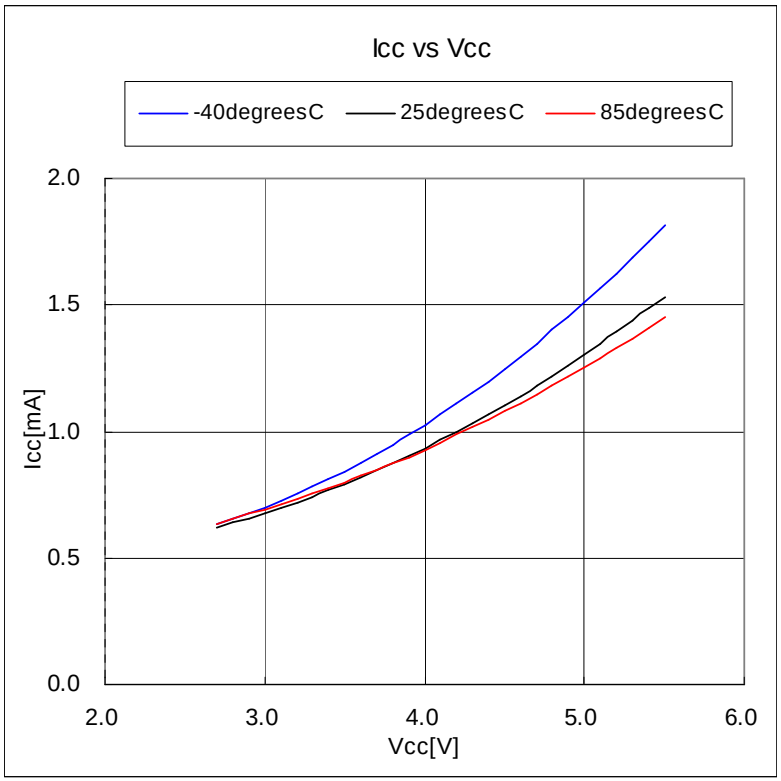


Figure77. Icc vs Vcc (f(Xin)=10MHz)

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(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)

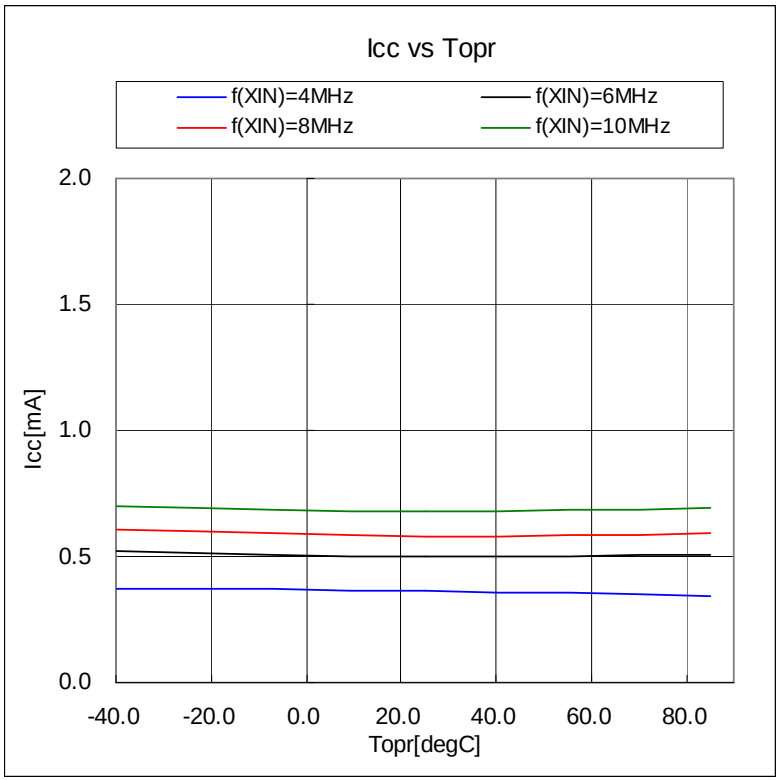


Figure78. Icc vs Topr (Vcc=3.0V)

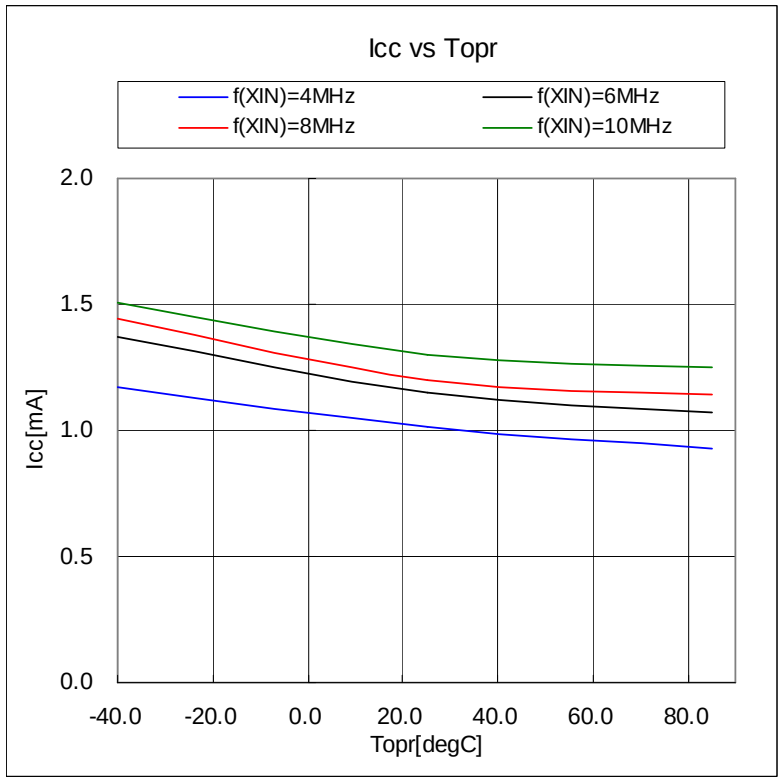


Figure79. Icc vs Topr (Vcc=5.0V)

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

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)

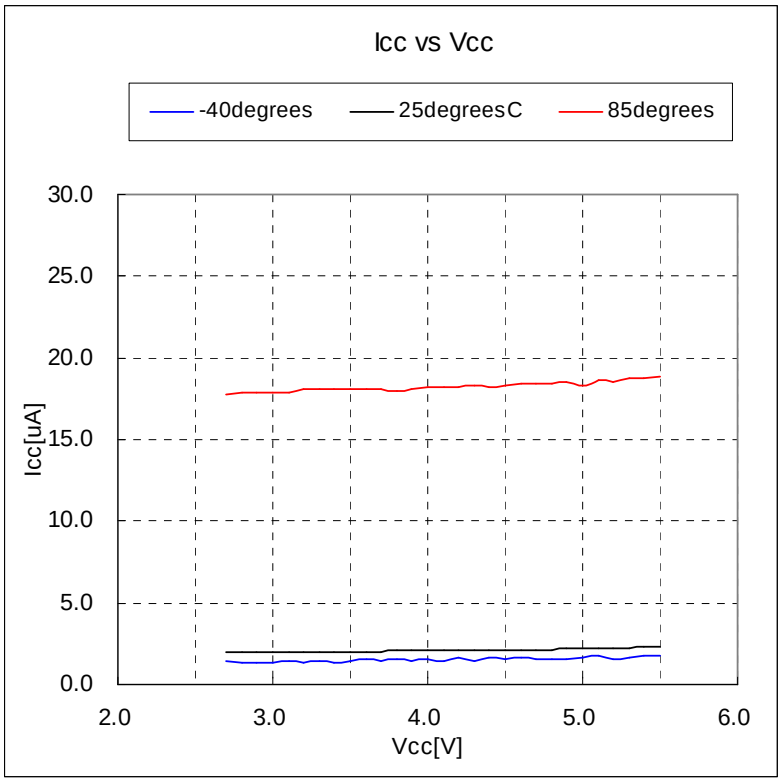


Figure80. Icc vs Vcc

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(degrees C)

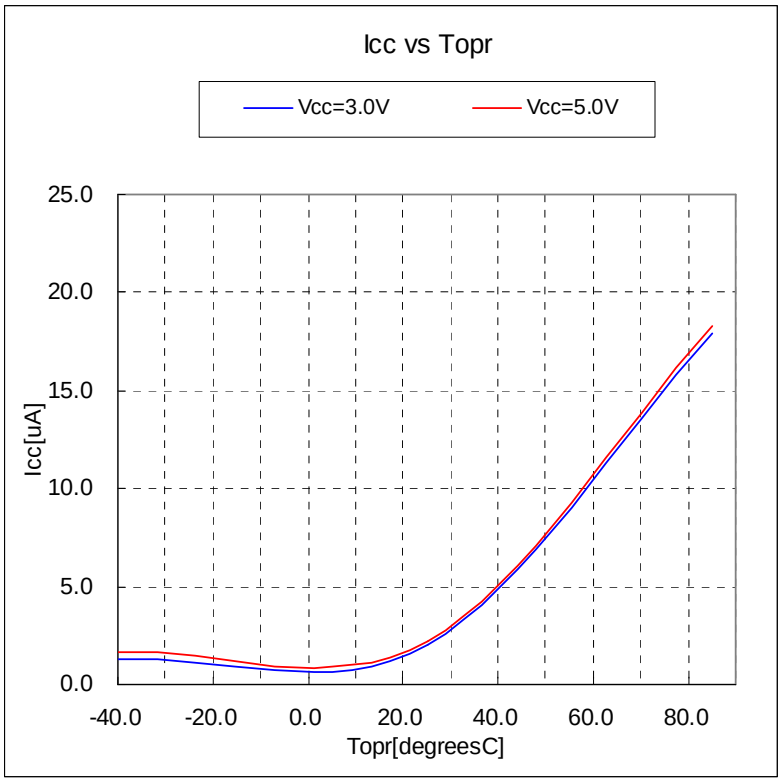


Figure81. Icc vs Topr

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(BCLK) = φAD = 10MHz
Vcc1 = Vcc2 = VREF
Topr = 25(degrees C)
No division

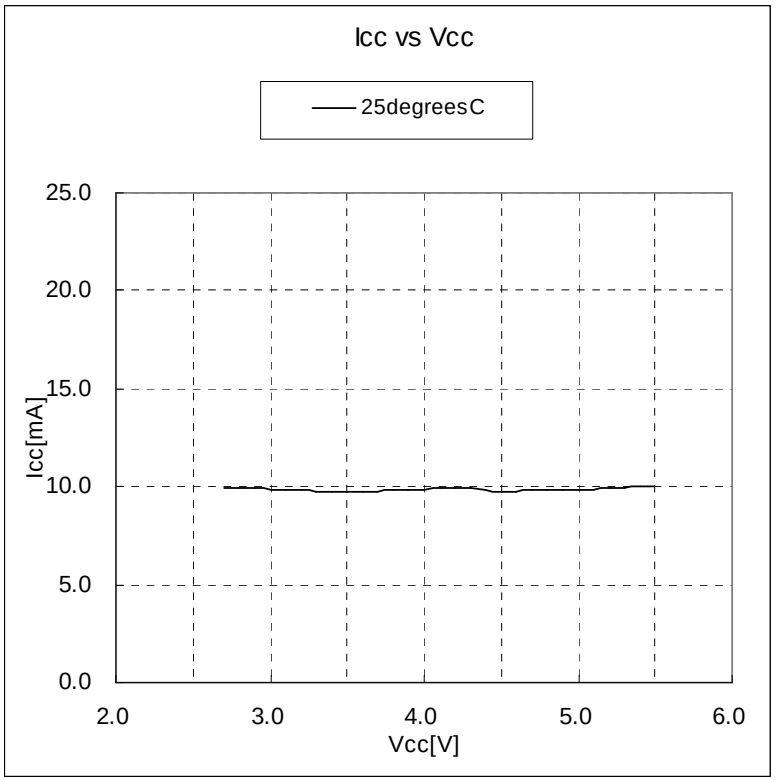


Figure82. Icc vs Vcc

■Operating Condition
f(BCLK) = φAD = 20MHz
Vcc1 = Vcc2 = VREF
Topr = 25(degrees C)
No division

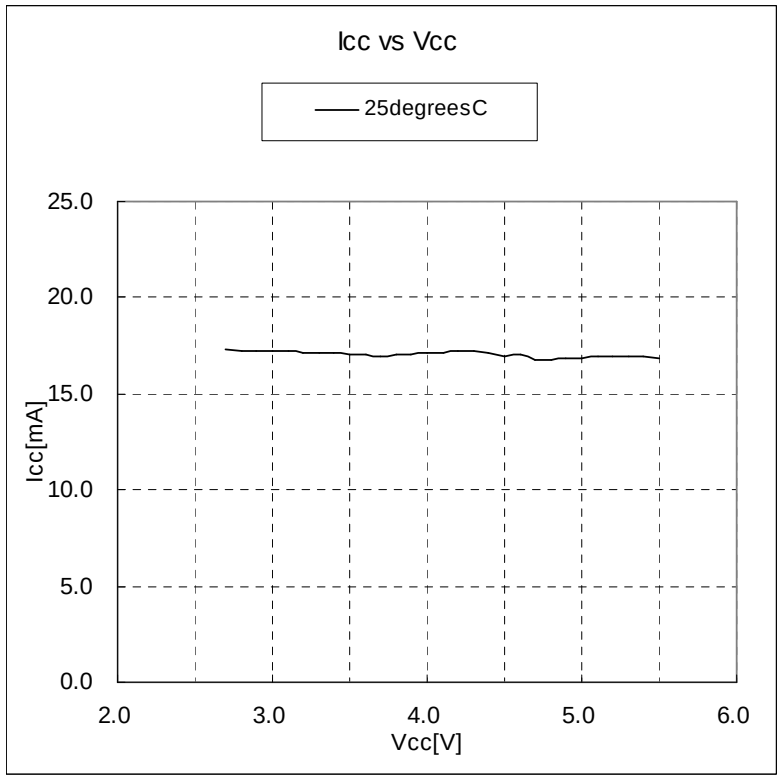


Figure83. Icc vs Vcc

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(23)

(11)During flash memory erase / program

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

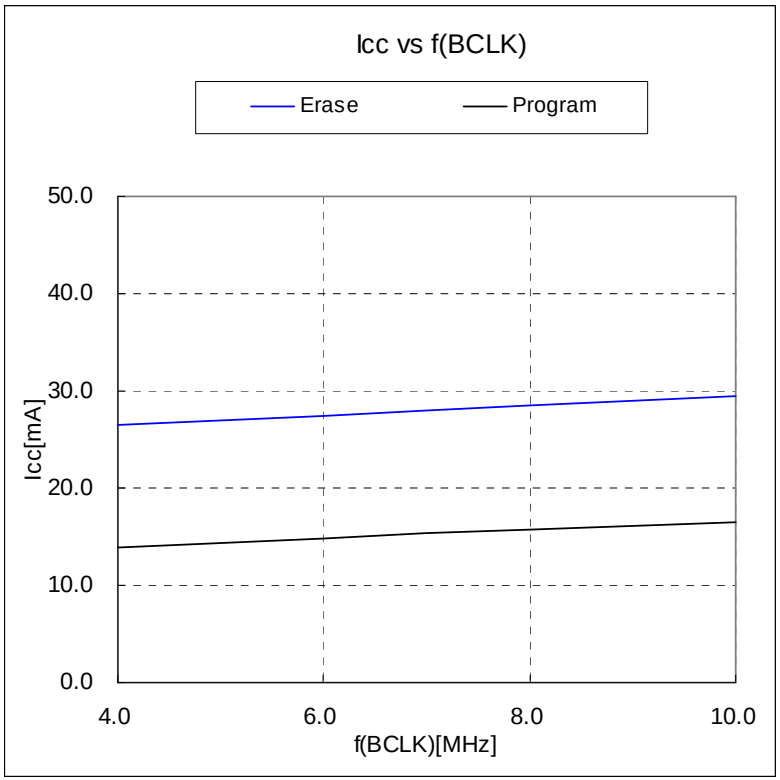


Figure84. Icc vs f(BCLK) (Vcc=3.0V)

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

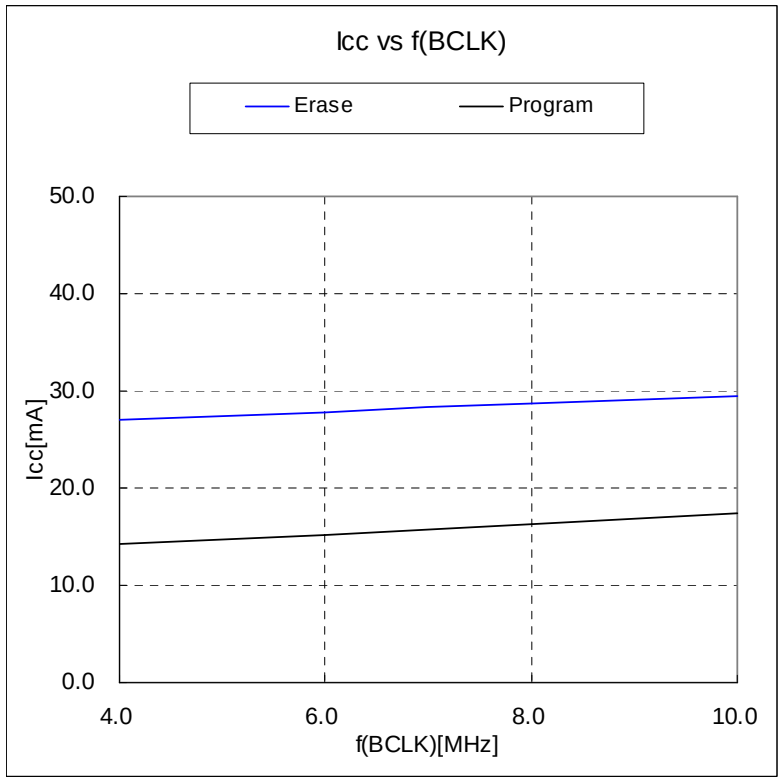


Figure85. Icc vs f(BCLK) (Vcc=5.0V)

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

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