

R8C/38T-A Group

Current Consumption

Prepared on Feb. 24, 2012

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I_{cc} vs f(XIN) (High-speed clock mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

V_{cc}=5V

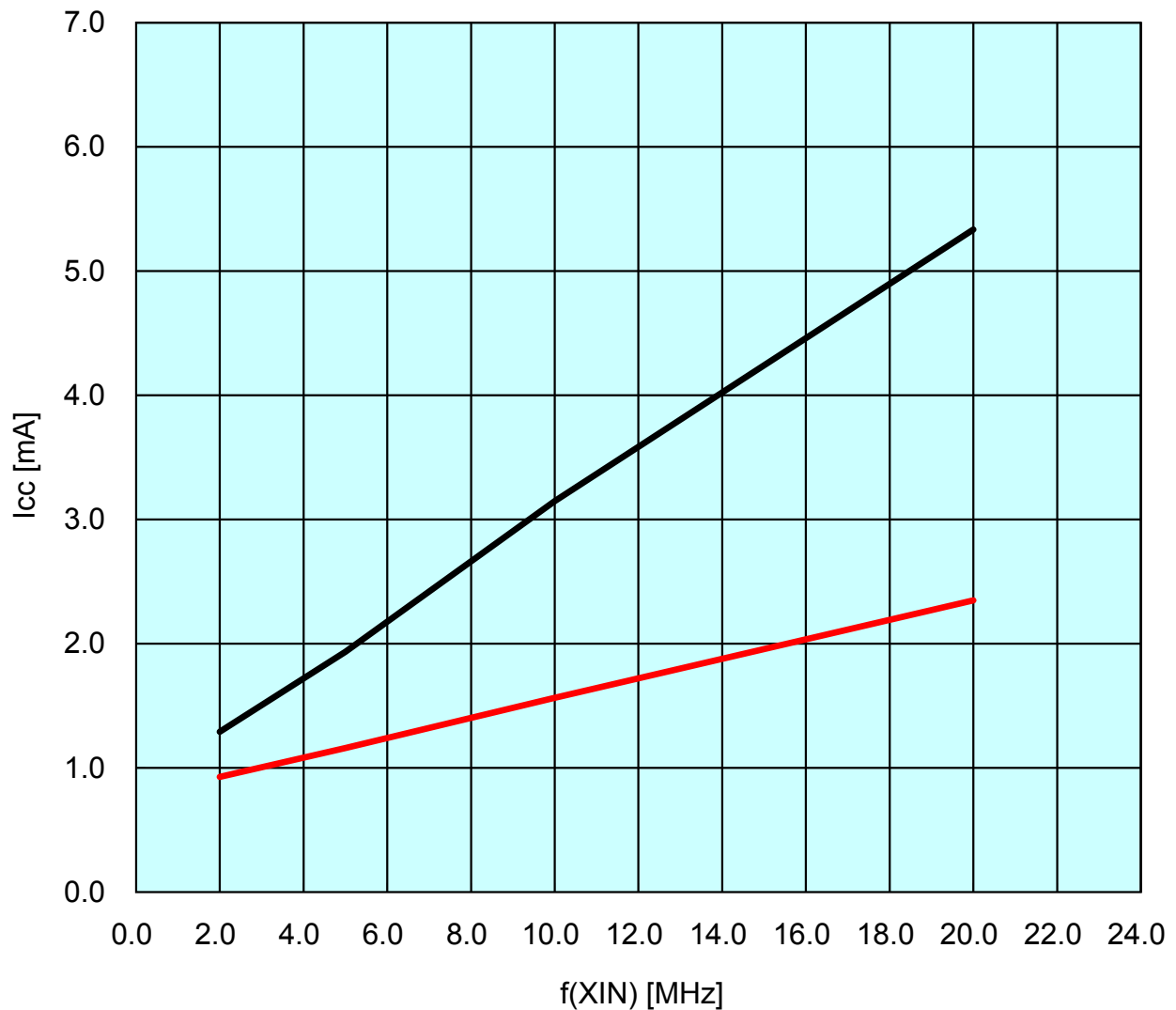
T_{opr}=25degrees C

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125kHz

— No division

— Divide-by-8



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

I_{cc} vs f(XIN) (High-speed clock mode)

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V_{cc}=5V

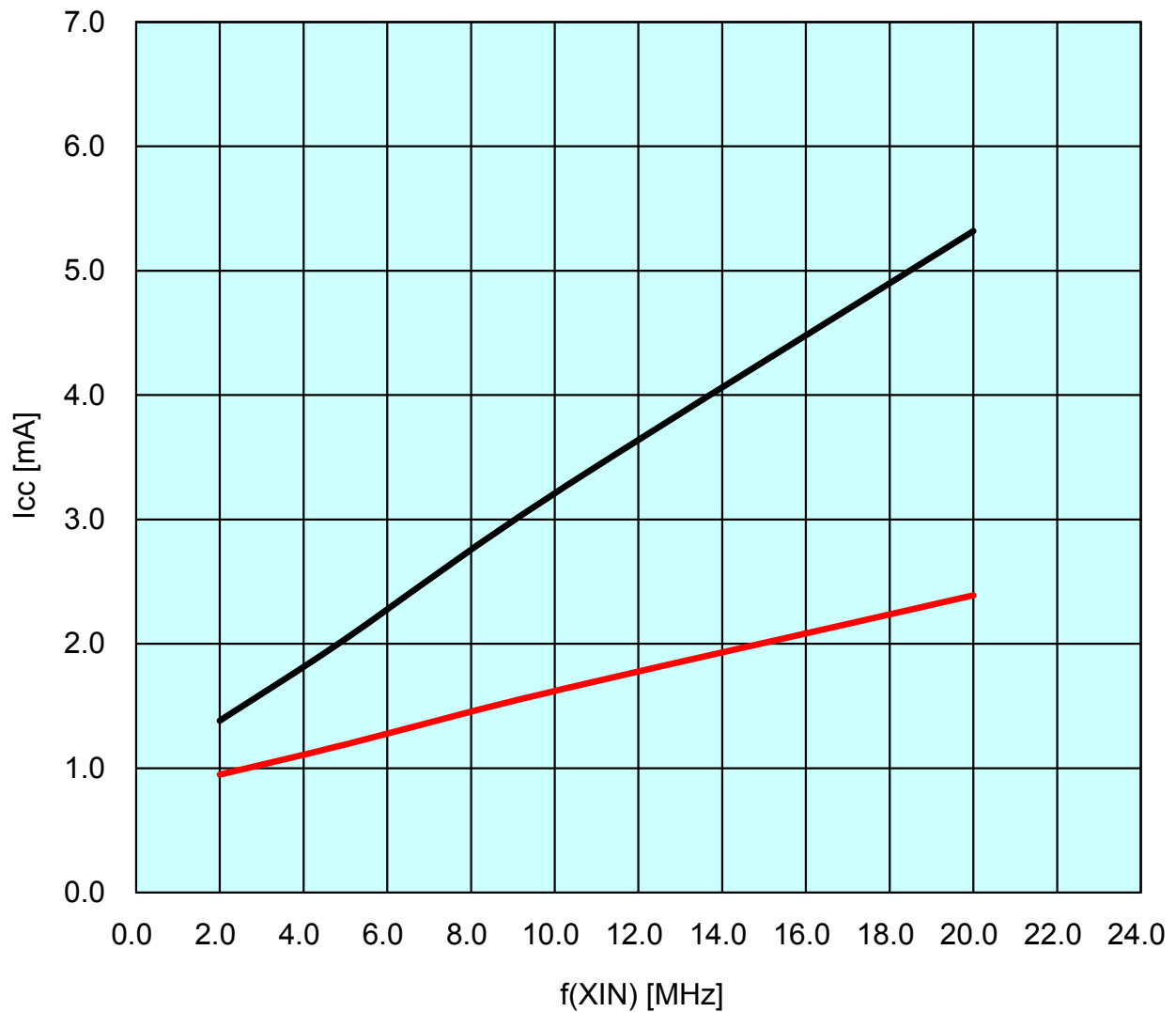
T_{opr}=85degrees C

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

— No division

— Divide-by-8



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I_{cc} vs f(XIN) (High-speed clock mode)

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V_{cc}=5V

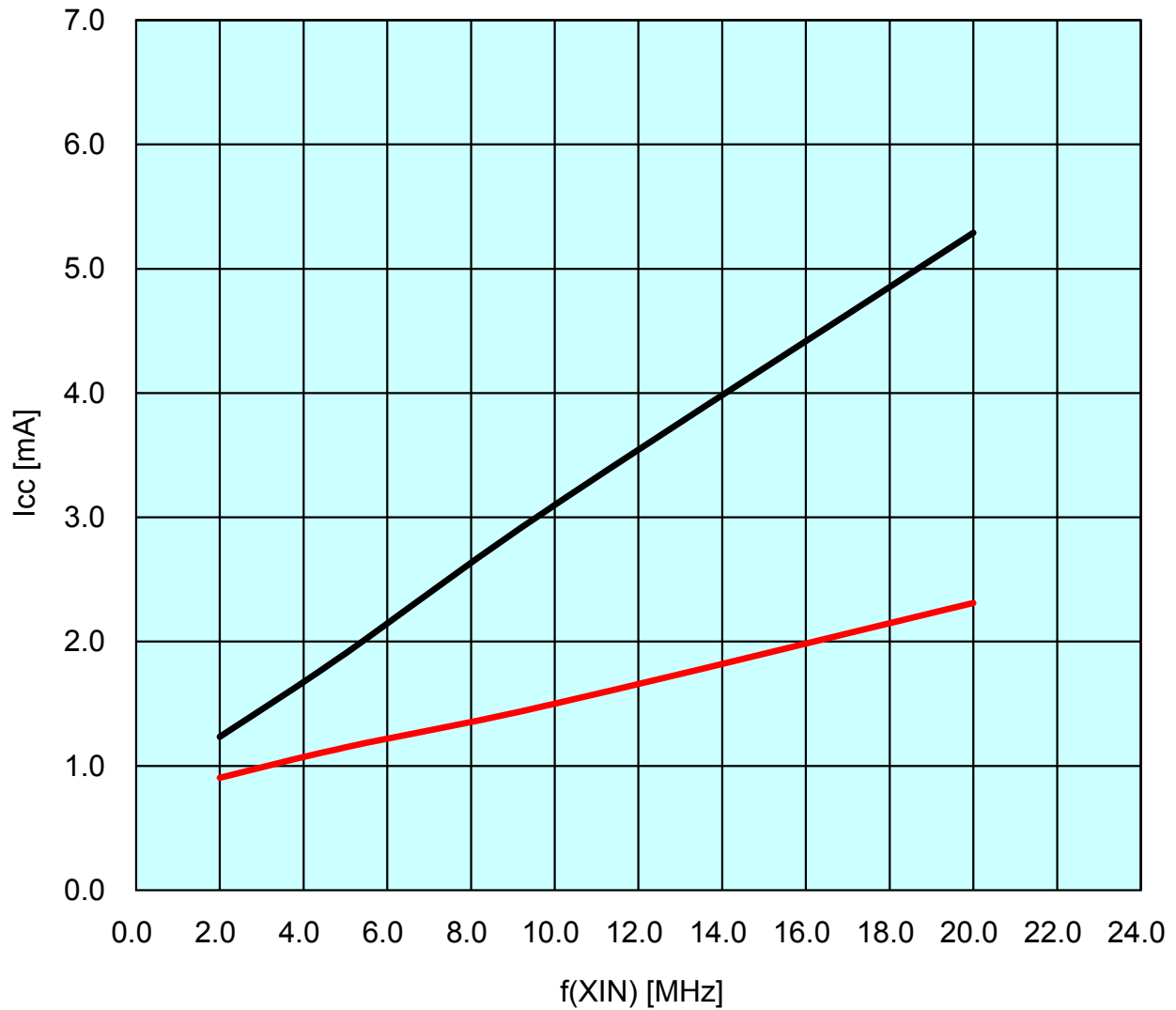
T_{opr}=-40degrees C

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

— No division

— Divide-by-8



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I_{cc} vs f(XIN) (High-speed clock mode)

Prepared on Feb. 24, 2012

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V_{cc}=3V

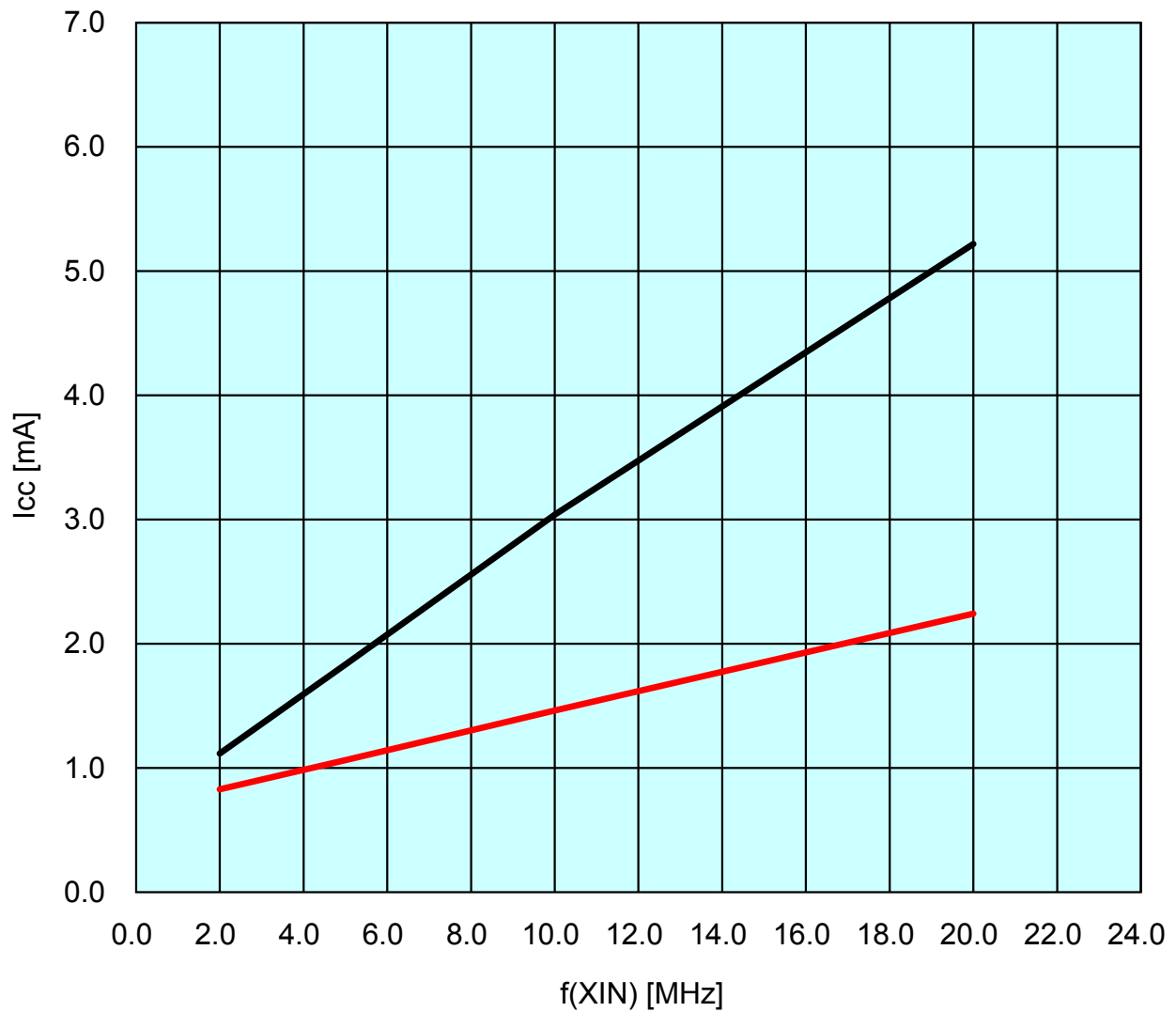
T_{opr}=25degrees C

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125kHz

— No division

— Divide-by-8



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I_{cc} vs f(XIN) (High-speed clock mode)

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V_{cc}=3V

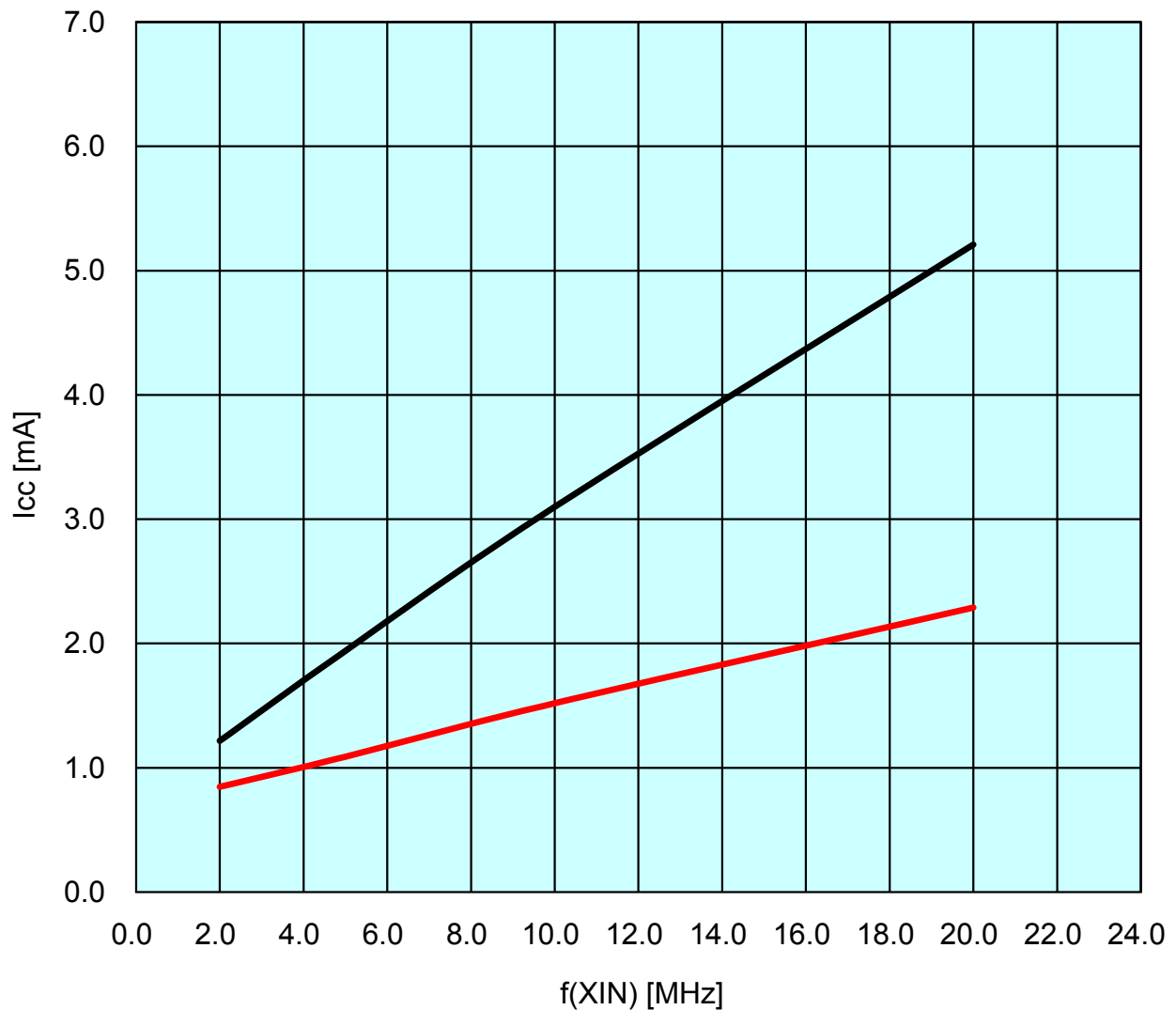
T_{opr}=85degrees C

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

— No division

— Divide-by-8



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I_{cc} vs f(XIN) (High-speed clock mode)

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V_{cc}=3V

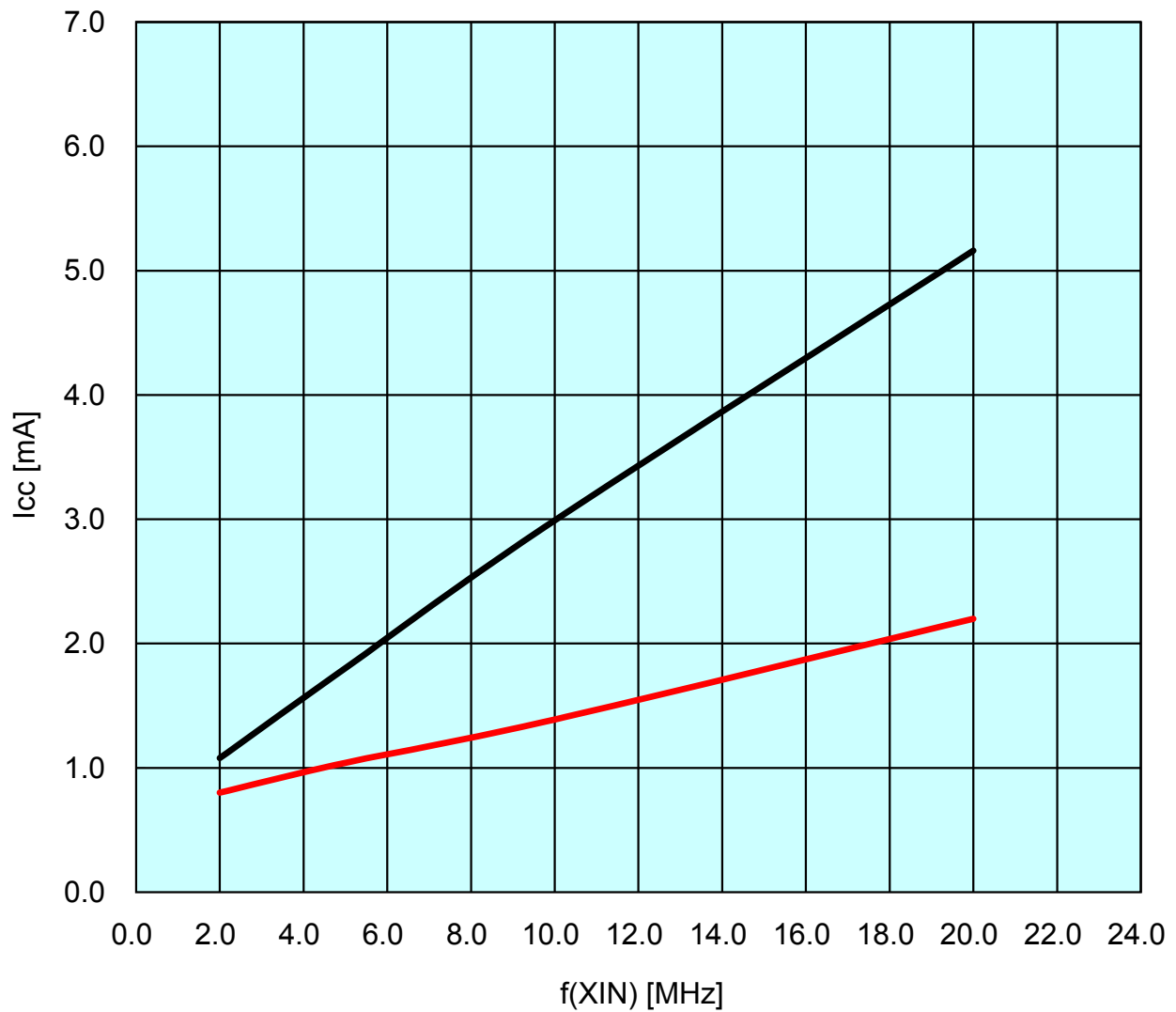
T_{opr}=-40degrees C

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

— No division

— Divide-by-8



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I_{cc} vs f(XIN) (High-speed clock mode)

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V_{cc}=1.8V

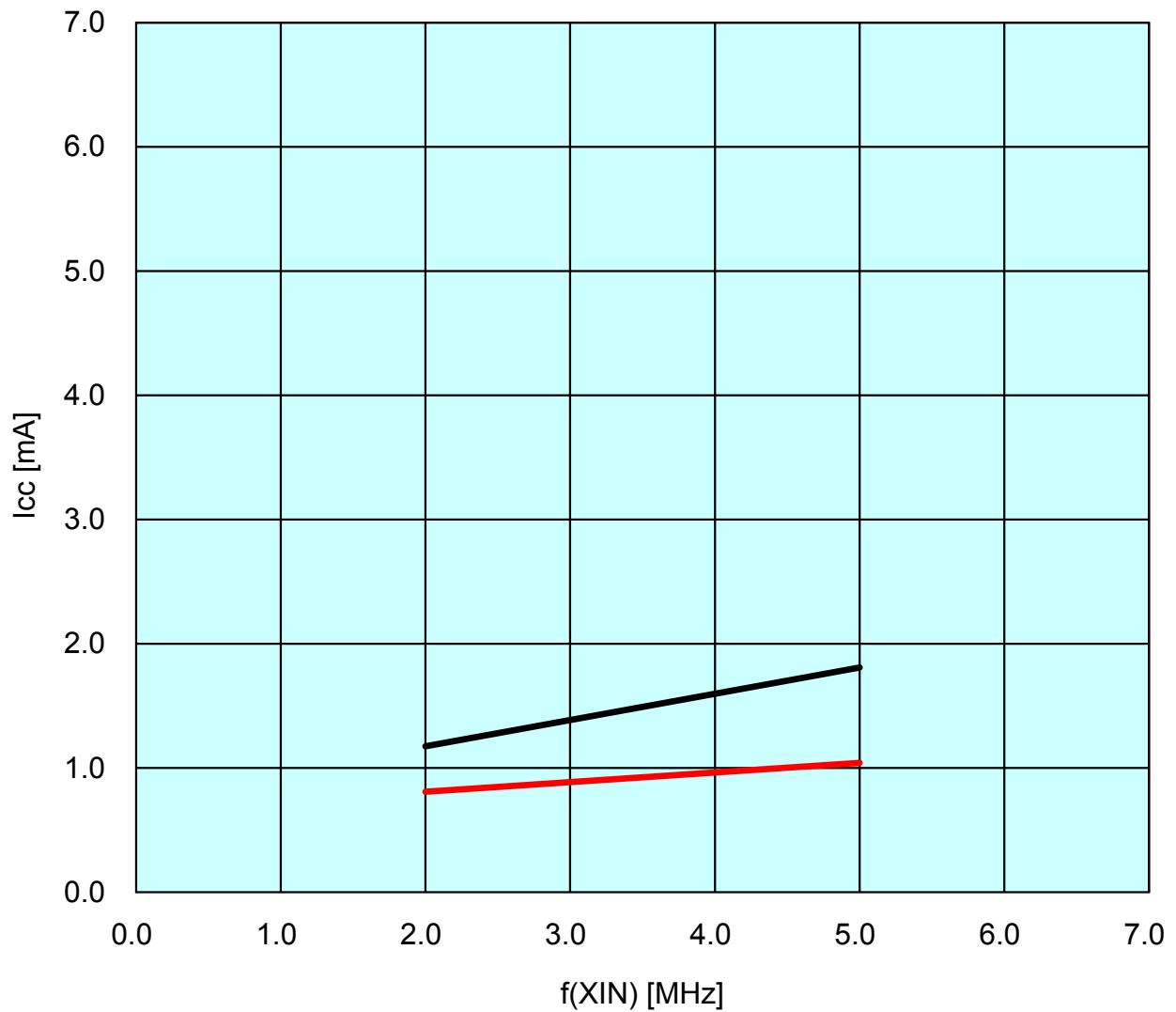
T_{opr}=25degrees C

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125kHz

— No division

— Divide-by-8



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I_{cc} vs f(XIN) (High-speed clock mode)

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V_{cc}=1.8V

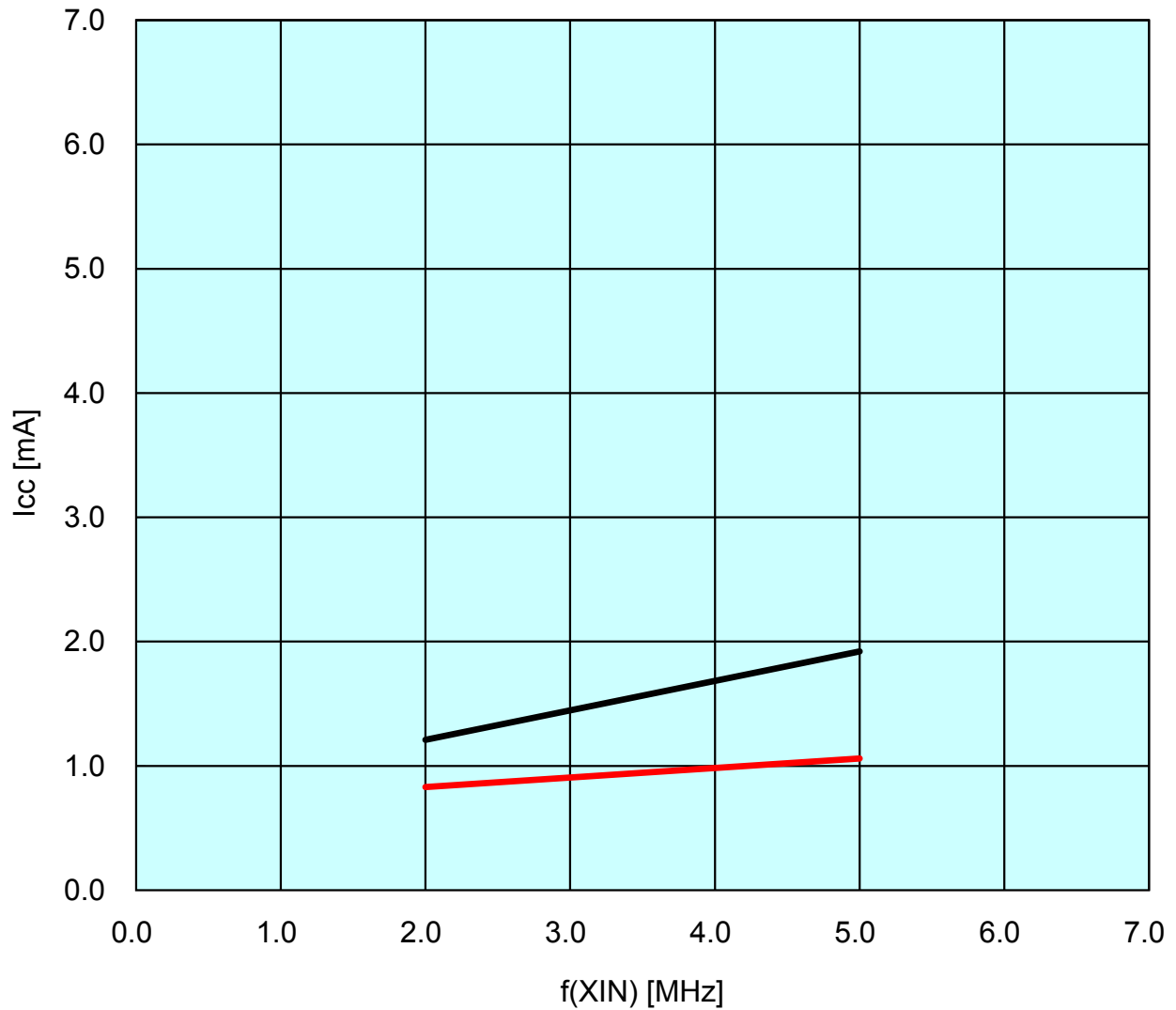
T_{opr}=85degrees C

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

— No division

— Divide-by-8



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I_{CC} VS f(XIN) (High-speed clock mode)

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V_{CC}=1.8V

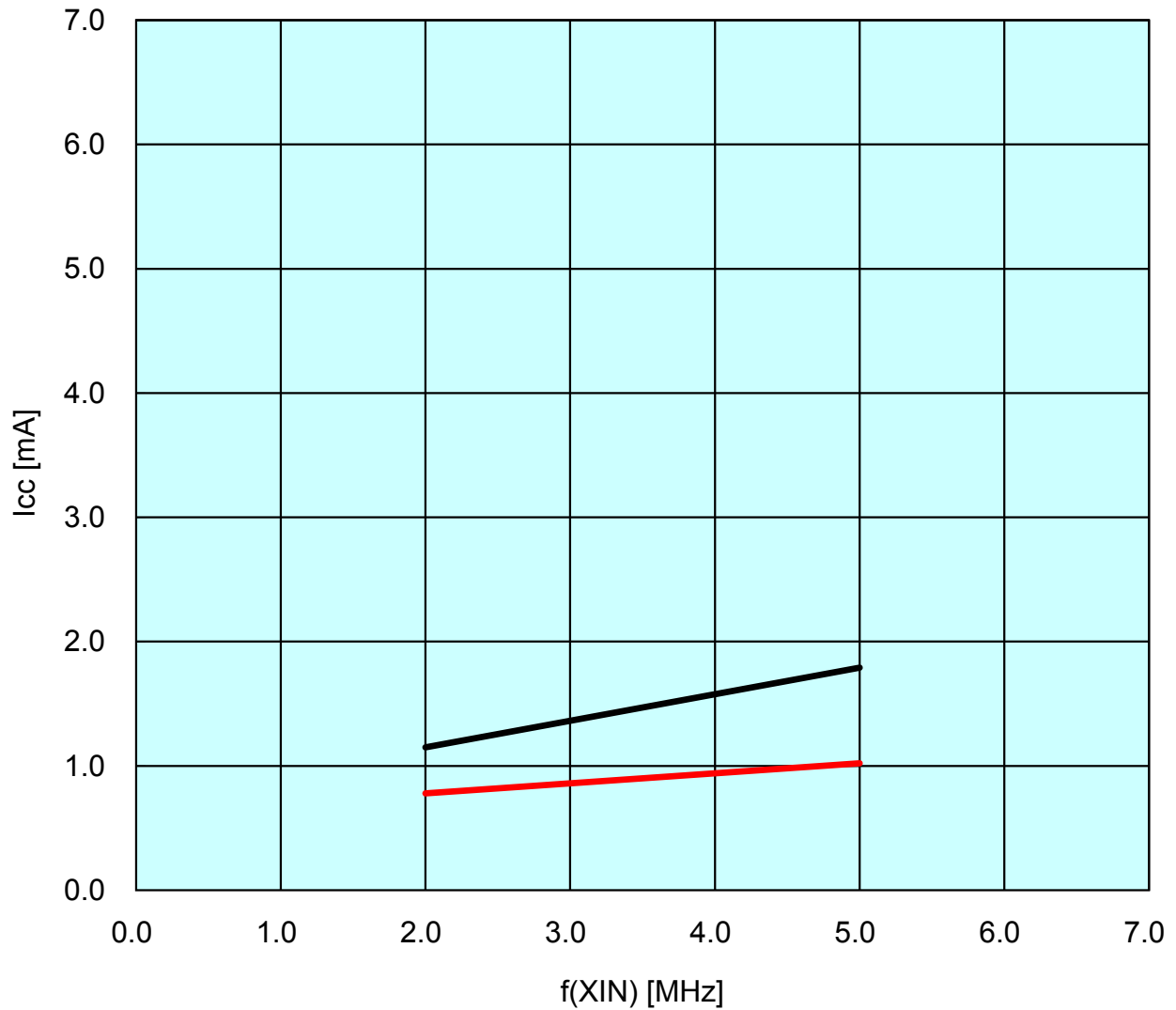
T_{opr}=-40degrees C

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

— No division

— Divide-by-8



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Icc vs Topr (Low-Speed On-Chip Oscillator mode)

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Divide-by-8

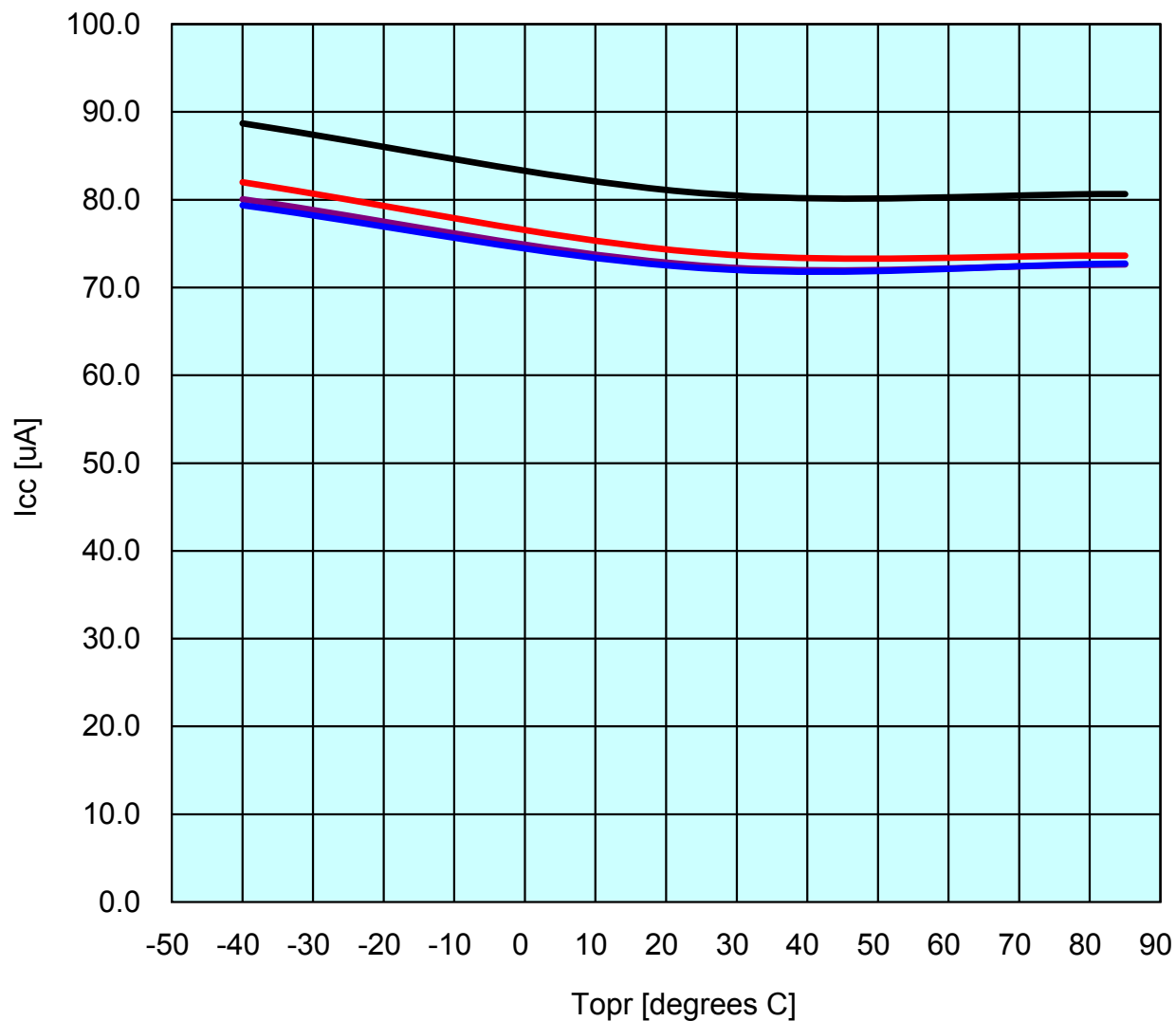
XIN clock off

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

FMR27 = 1, VCA20 = 0

— Vcc=5V
— Vcc=3V
— Vcc=2.2V
— Vcc=1.8V



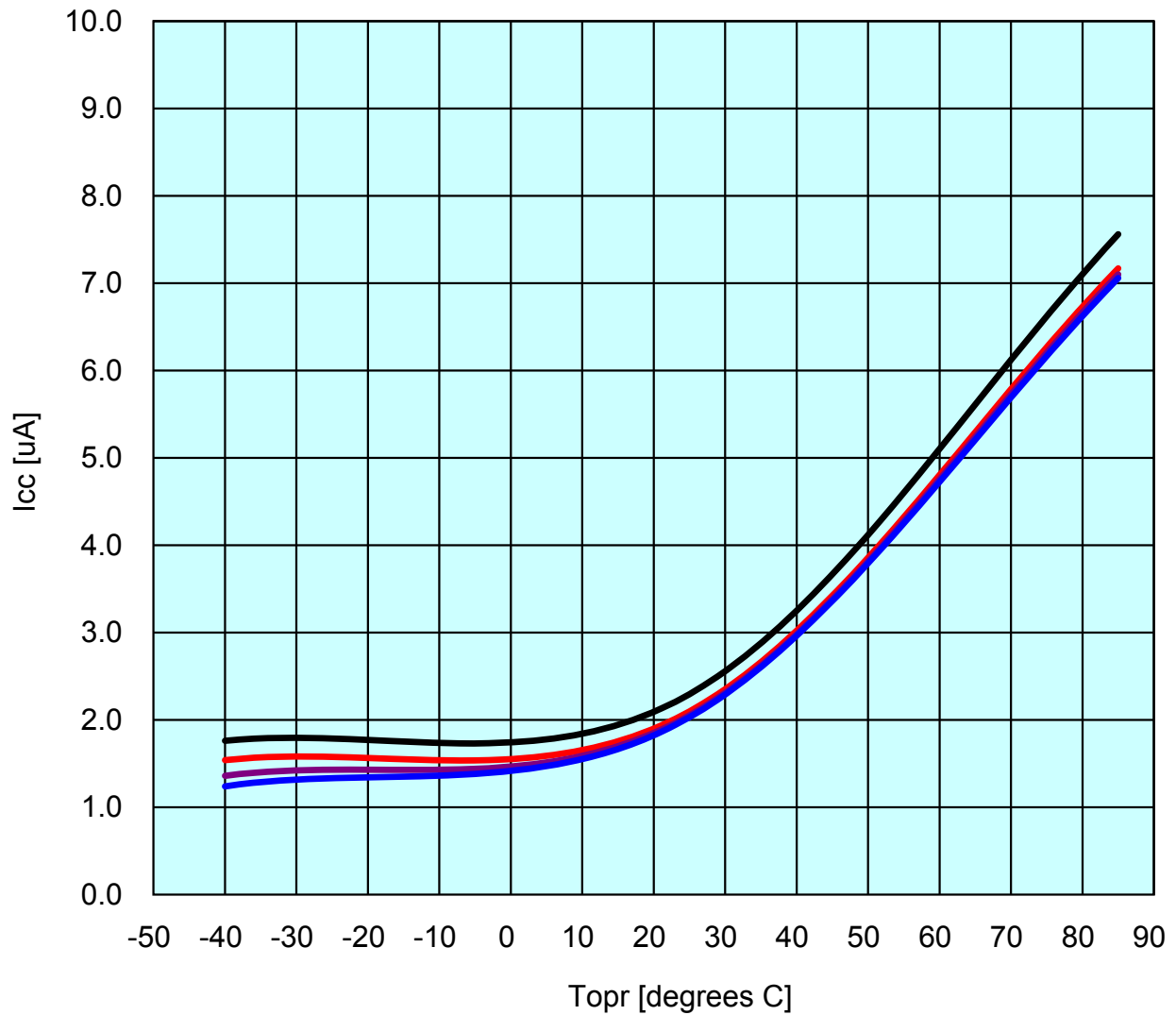
The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

I_{cc} vs Topr (Stop mode)

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R8C/38T-A Group
XIN clock off
High-speed on-chip oscillator off
Low-speed on-chip oscillator off
CM10 = 1
Peripheral clock off
VCA27 = VCA26 = VCA25 = 0

— V_{cc}=5V
— V_{cc}=3V
— V_{cc}=2.2V
— V_{cc}=1.8V



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Icc vs Topr (Wait mode)

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XIN clock off

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

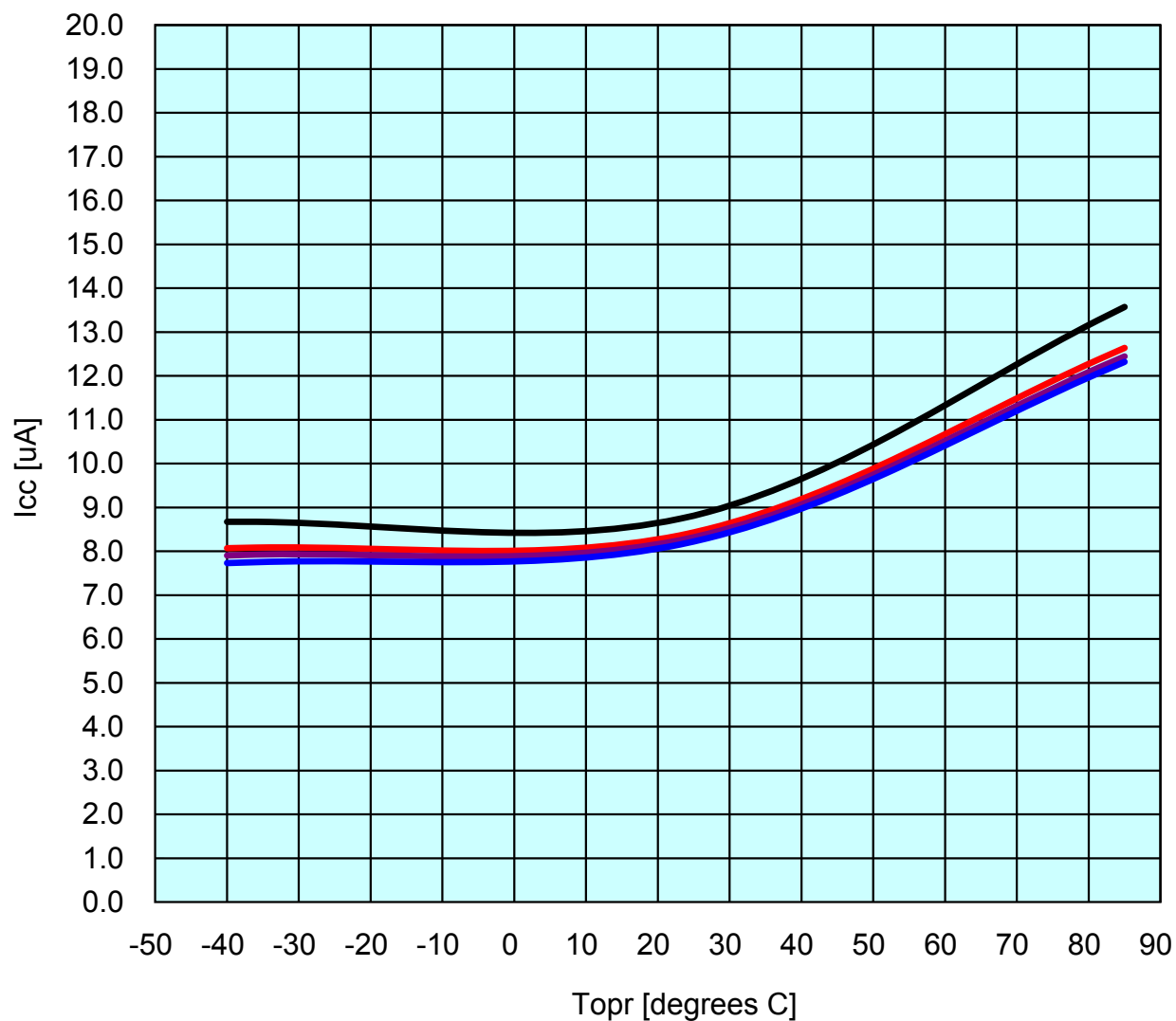
While a WAIT instruction is executed

Peripheral clock operation

VCA27 = VCA26 = VCA25 = 0

VCA20 = 1

— Vcc=5V
— Vcc=3V
— Vcc=2.2V
— Vcc=1.8V



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Icc vs Topr (Wait mode)

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XIN clock off

High-speed on-chip oscillator off

Low-speed on-chip oscillator =125KHz

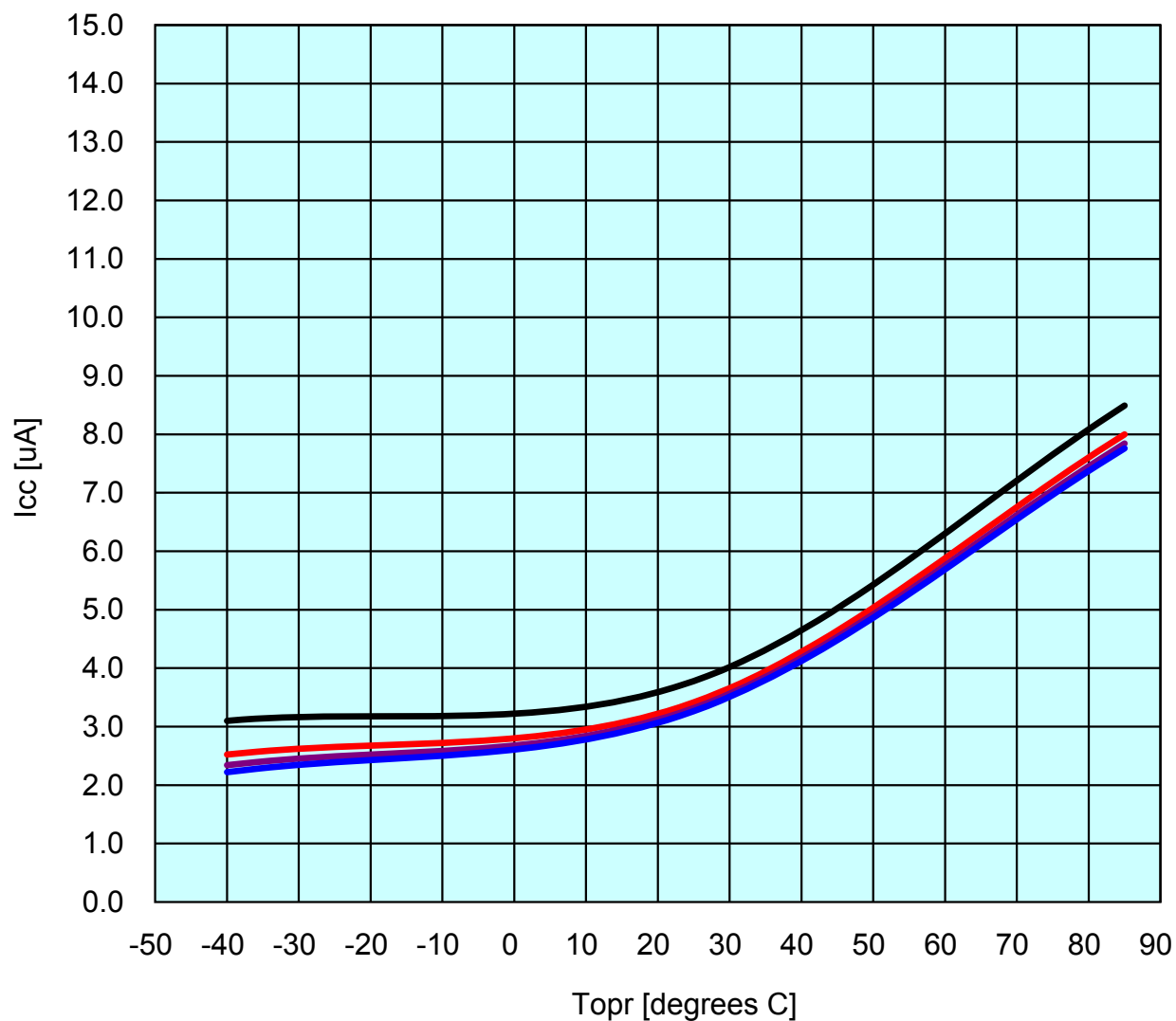
While a WAIT instruction is executed

Peripheral clock off

VCA27 = VCA26 = VCA25 = 0

VCA20 = 1

— Vcc=5V
— Vcc=3V
— Vcc=2.2V
— Vcc=1.8V



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Icc vs Topr (Wait mode)

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XIN clock off

High-speed on-chip oscillator off

Low-speed on-chip oscillator off

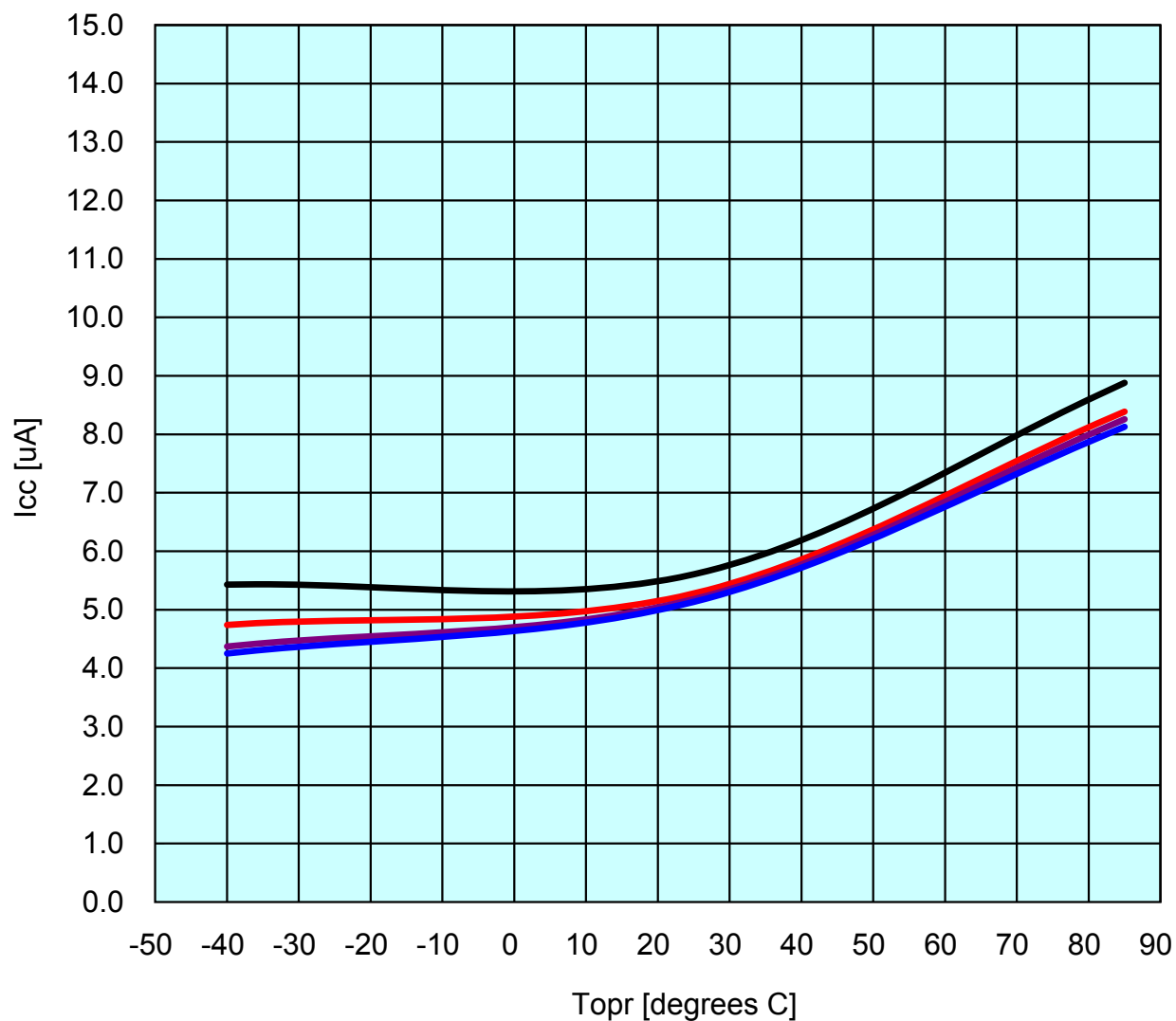
XCIN clock oscillator on = 32 kHz (peripheral clock off)

While a WAIT instruction is executed

VCA27 = VCA26 = VCA25 = 0

VCA20 = 1

— Vcc=5V
— Vcc=3V
— Vcc=2.2V
— Vcc=1.8V



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Icc vs Topr (Wait mode)

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XIN clock off

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

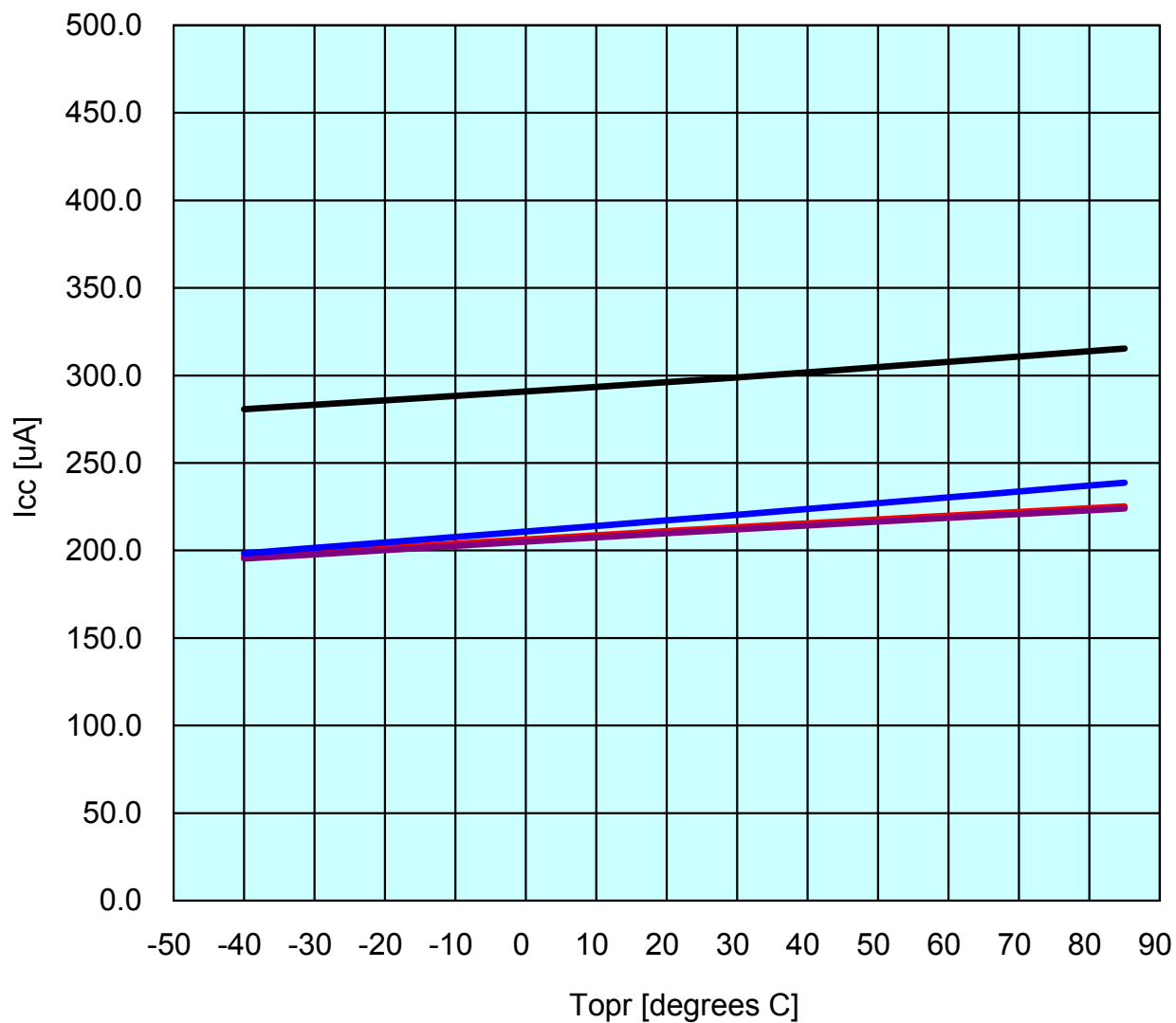
While a WAIT instruction is executed

Peripheral clock operation

VCA27 = VCA26 = VCA25 = 0

VCA20 = 1 TSCU=1

— Vcc=5V
— Vcc=3V
— Vcc=2.2V
— Vcc=1.8V



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Icc vs Topr (Wait mode)

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XIN clock off

High-speed on-chip oscillator off

Low-speed on-chip oscillator =125KHz

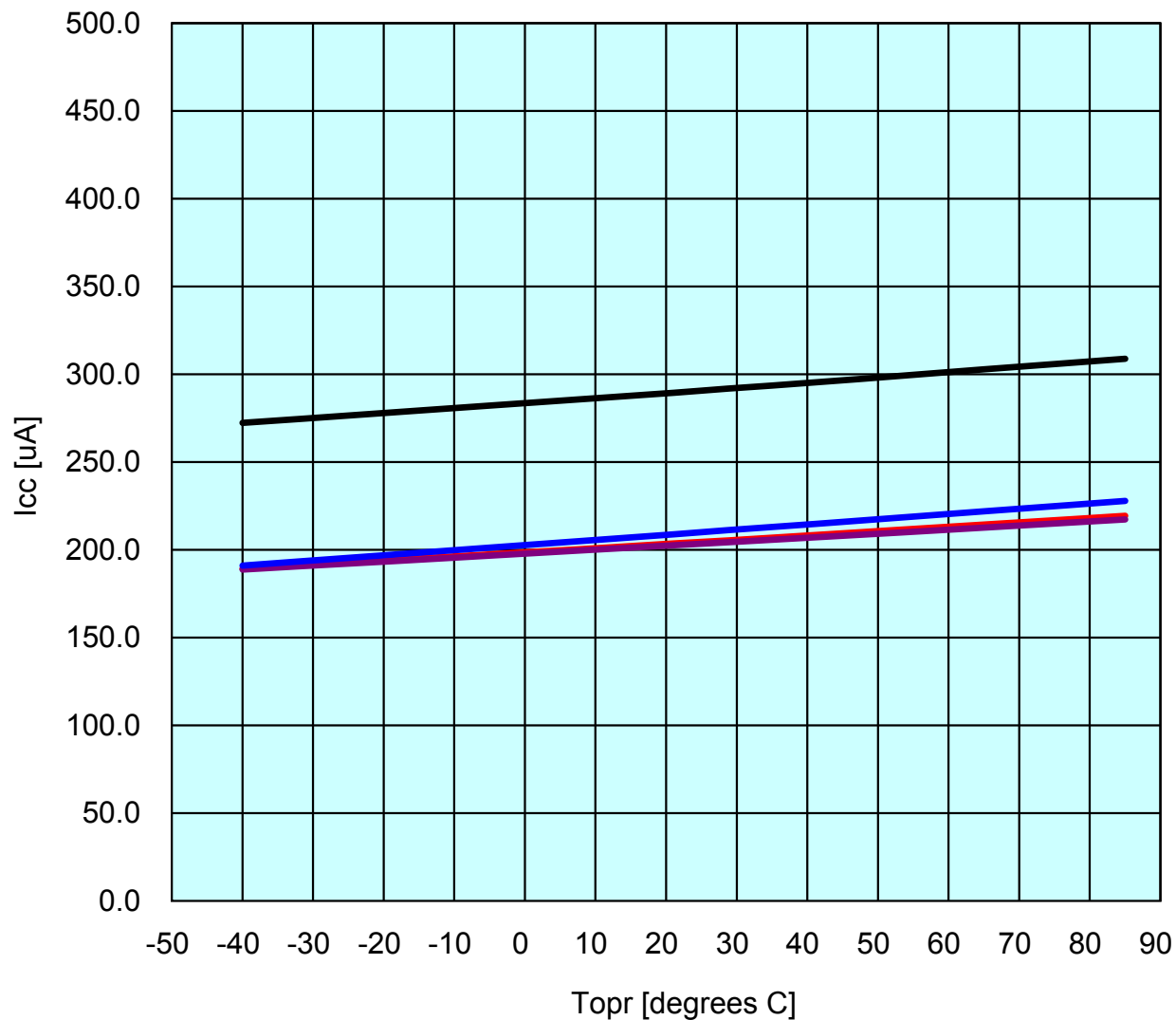
While a WAIT instruction is executed

Peripheral clock off

VCA27 = VCA26 = VCA25 = 0

VCA20 = 1 TSCU=1

— Vcc=5V
— Vcc=3V
— Vcc=2.2V
— Vcc=1.8V



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Icc vs Topr (Wait mode)

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XIN clock off

High-speed on-chip oscillator off

Low-speed on-chip oscillator off

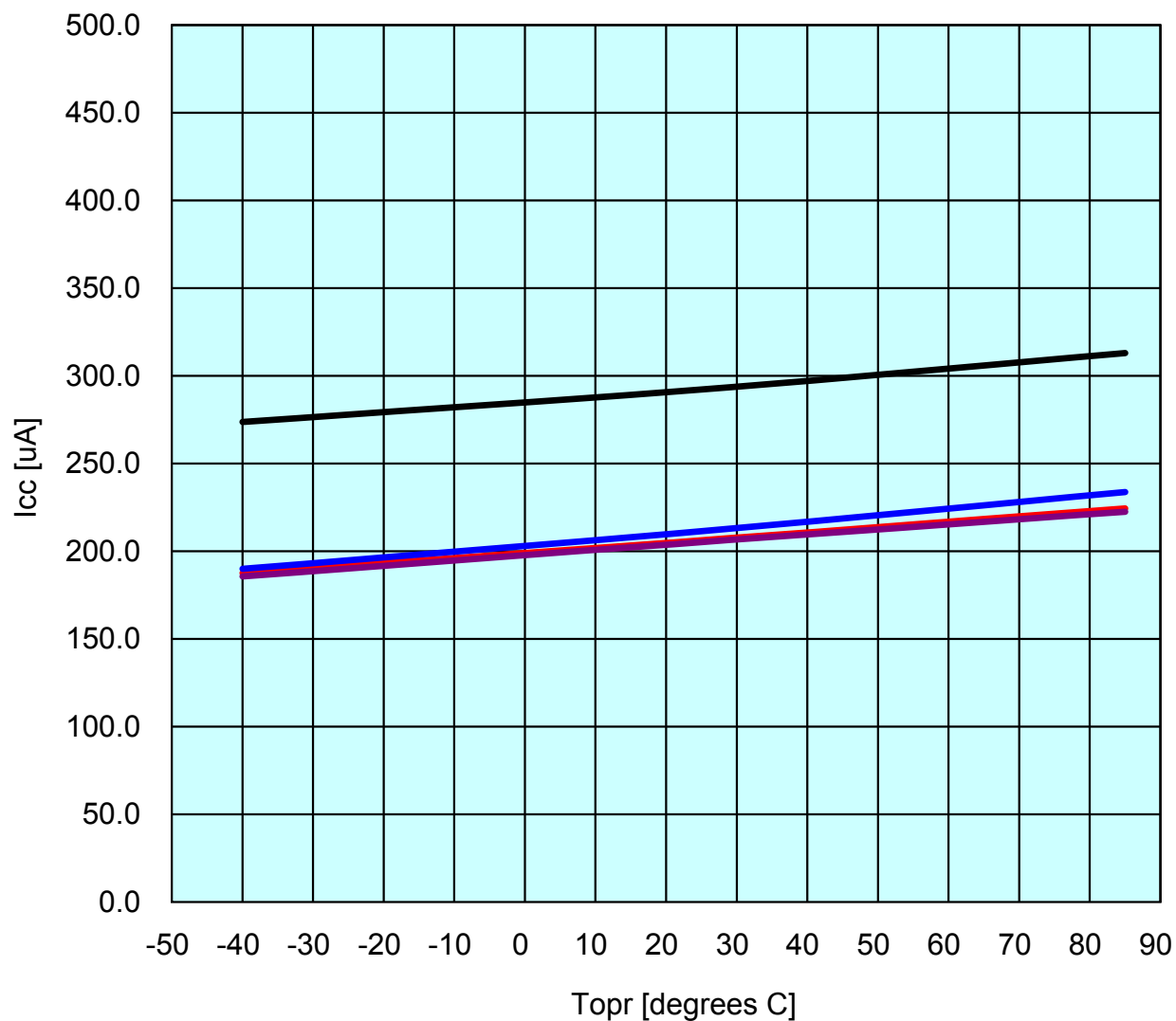
XCIN clock oscillator on = 32 kHz (peripheral clock off)

While a WAIT instruction is executed

VCA27 = VCA26 = VCA25 = 0

VCA20 = 1 TSCU=1

— Vcc=5V
— Vcc=3V
— Vcc=2.2V
— Vcc=1.8V



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Icc vs Topr (Low-Speed clock mode)

Prepared on Feb. 24, 2012

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XIN clock off

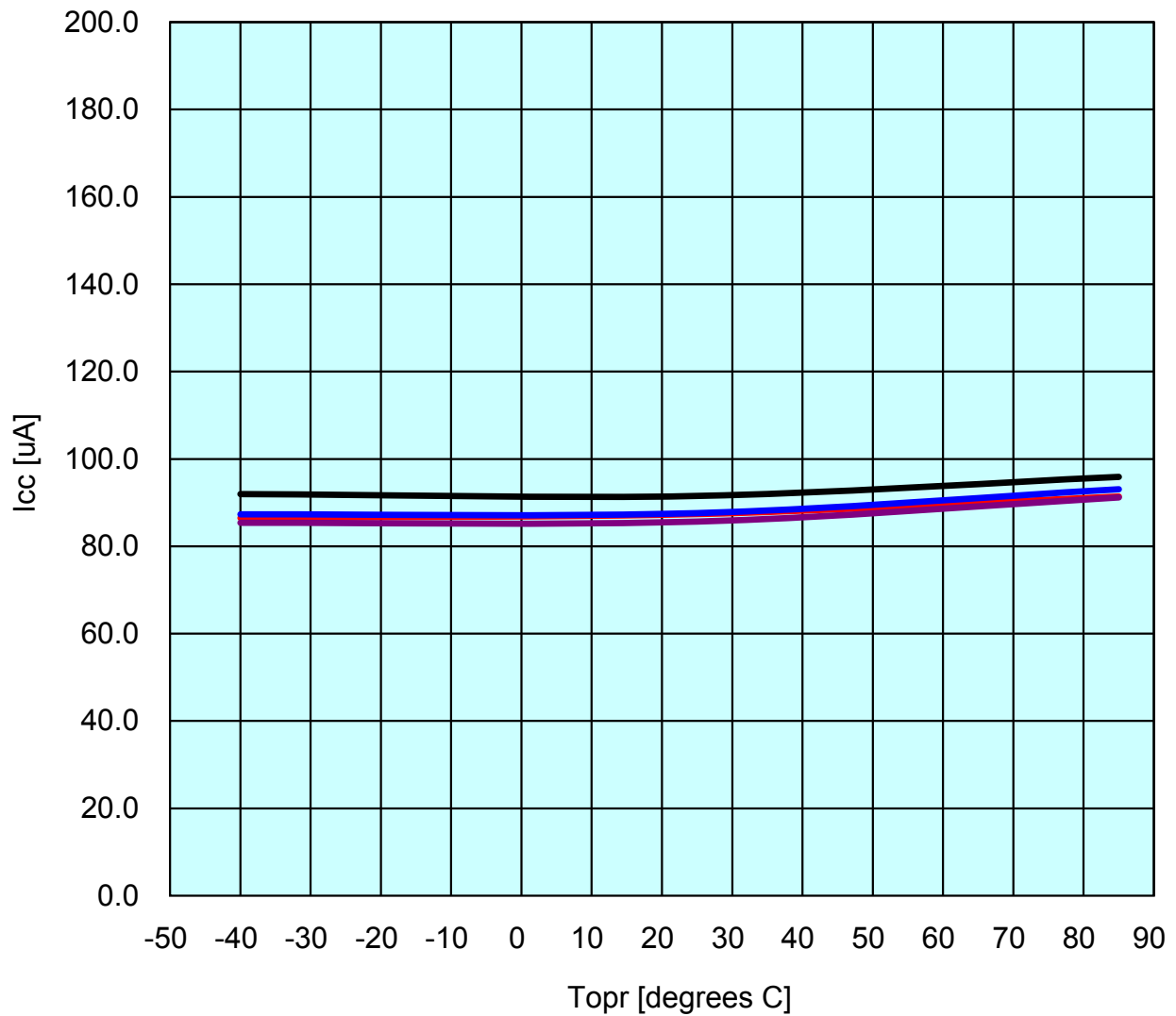
High-speed on-chip oscillator off

Low-speed on-chip oscillator off

XCIN clock oscillator on = 32 kHz

FMR27 = 1, VCA20 = 0

— Vcc=5V
— Vcc=3V
— Vcc=2.2V
— Vcc=1.8V



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Icc vs Topr (Low-Speed clock mode)

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XIN clock off

High-speed on-chip oscillator off

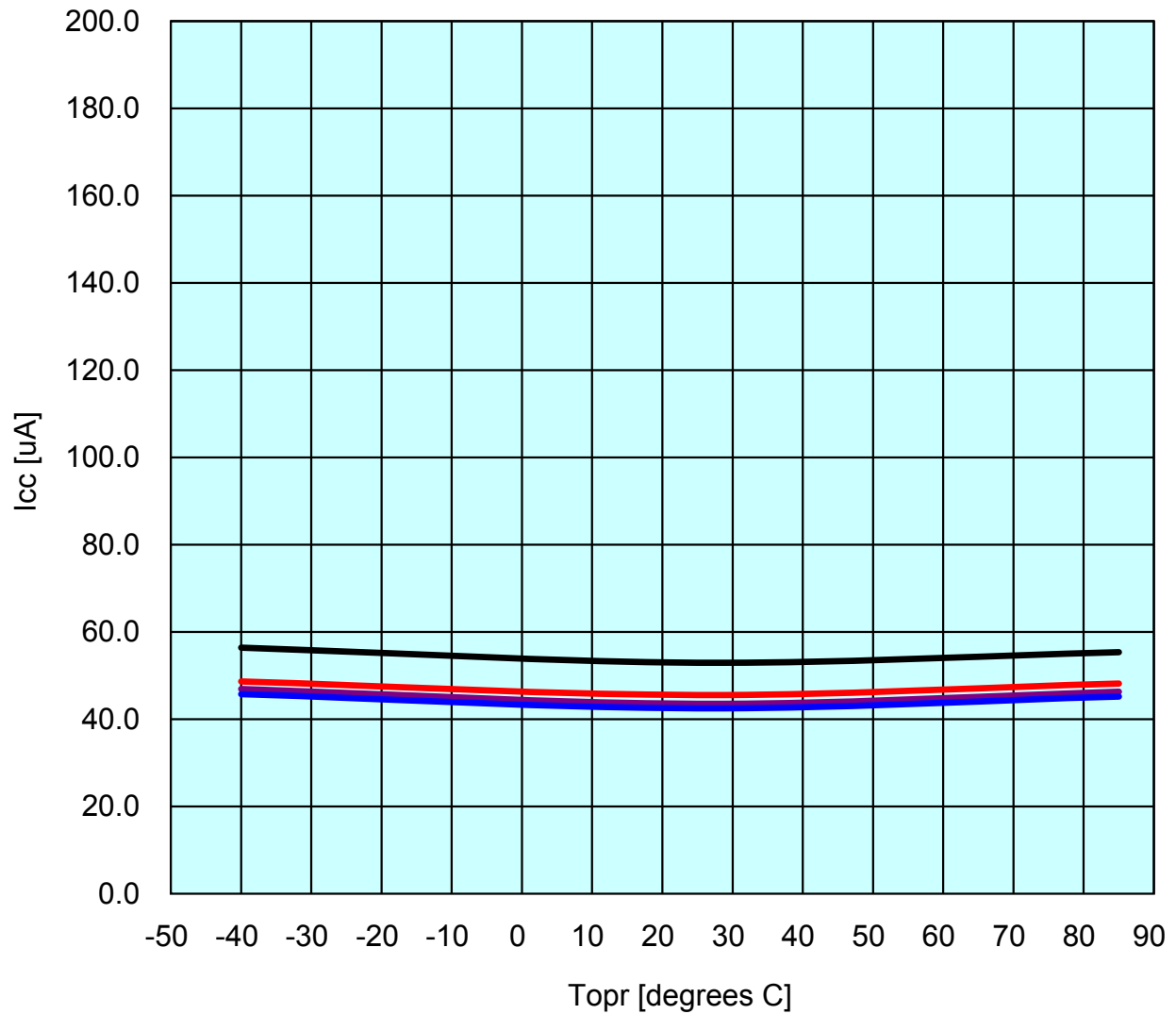
Low-speed on-chip oscillator off

XCIN clock oscillator on = 32 kHz

Program operation on RAM

Flash memory off, FMSTP = 1, VCA20 = 0

— Vcc=5V
— Vcc=3V
— Vcc=2.2V
— Vcc=1.8V



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Icc vs Topr (High-speed clock mode)

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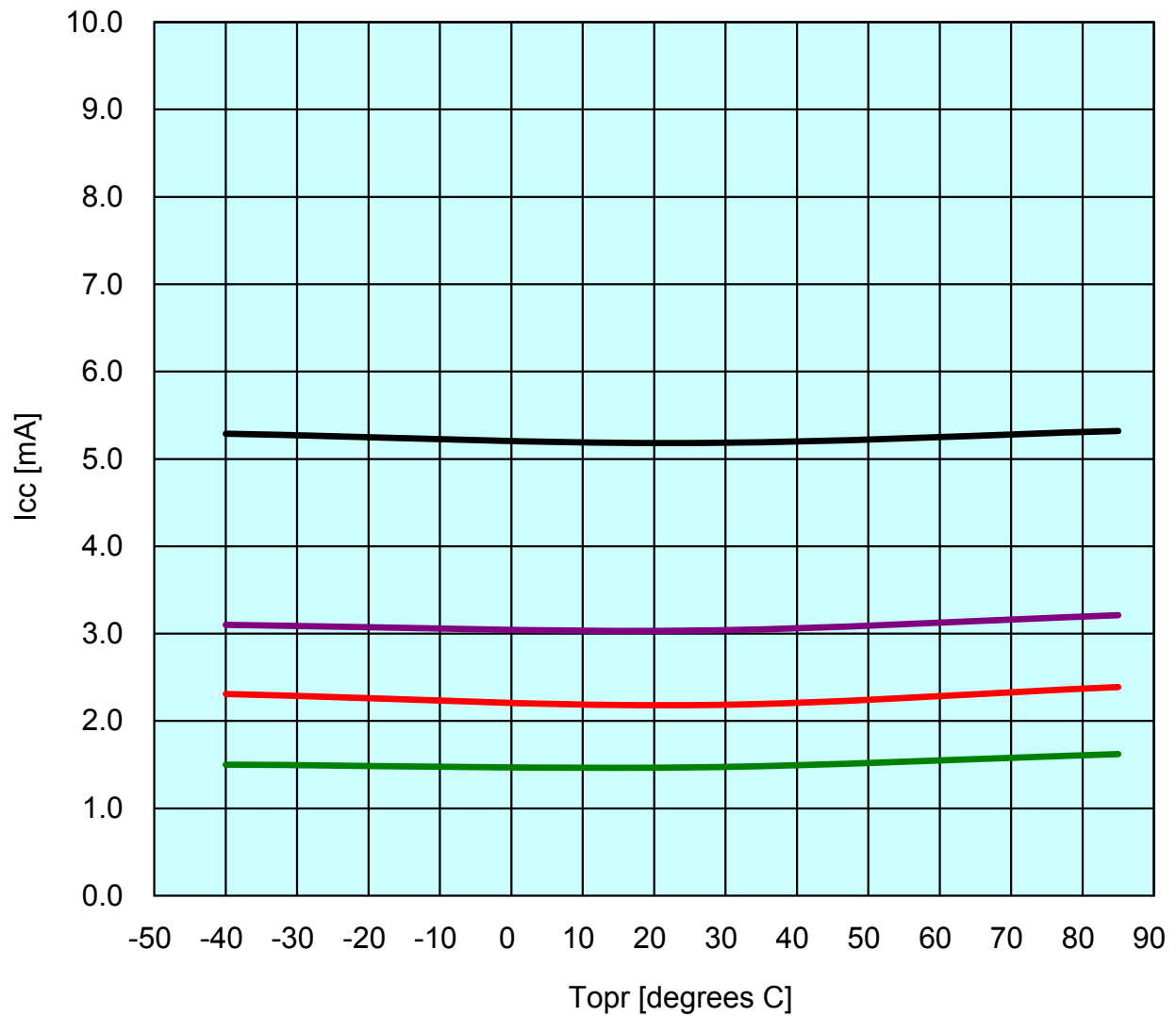
Vcc=5V

XIN (square wave)

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

- XIN=20MHz no division
- XIN=20MHz divide-by-8
- XIN=10MHz no division
- XIN=10MHz divide-by-8



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Icc vs Topr (High-speed clock mode)

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Vcc=3V

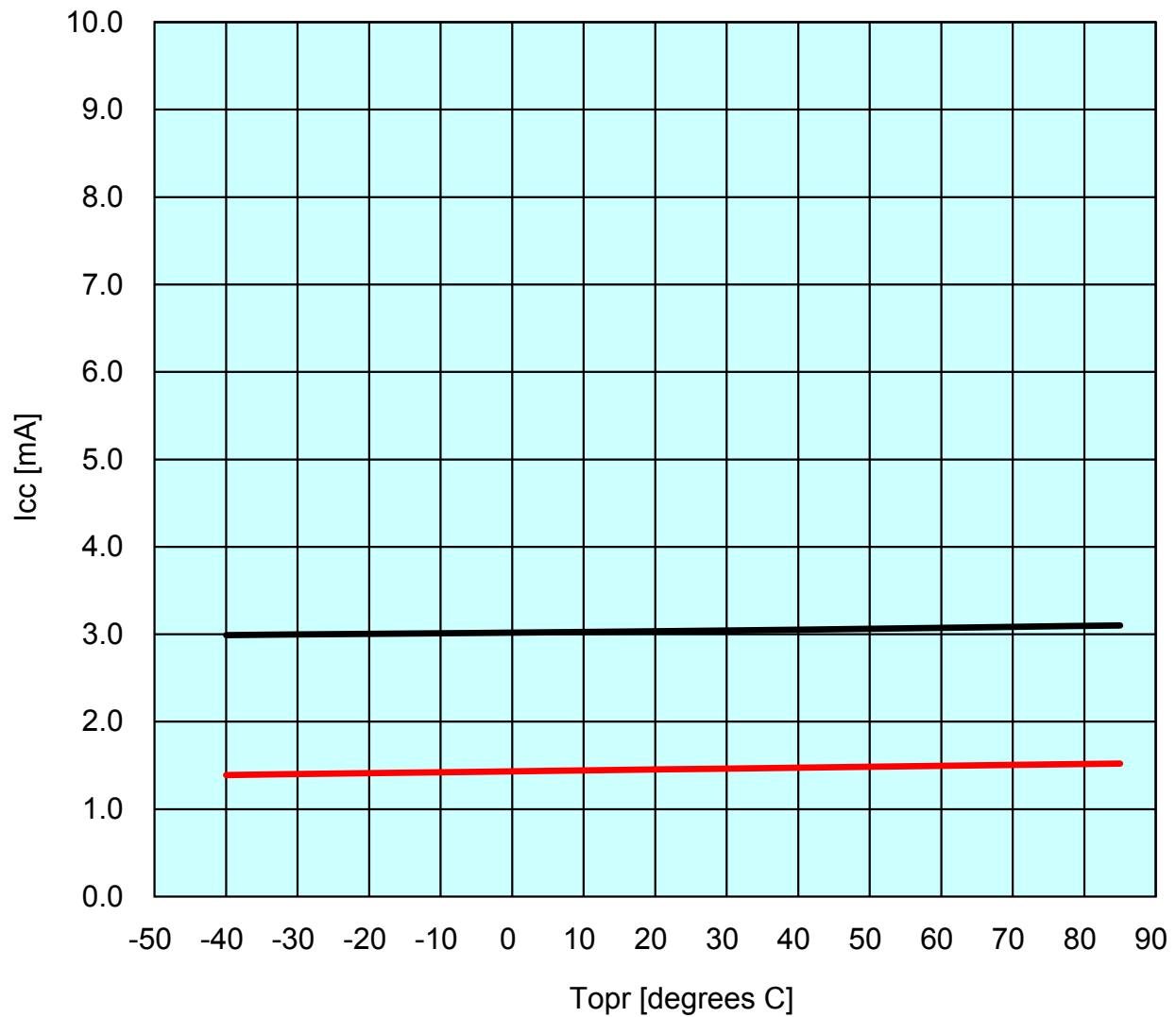
XIN (square wave)

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

— XIN=10MHz no division

— XIN=10MHz divide-by-8



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Icc vs Topr (High-speed clock mode)

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Vcc=1.8V

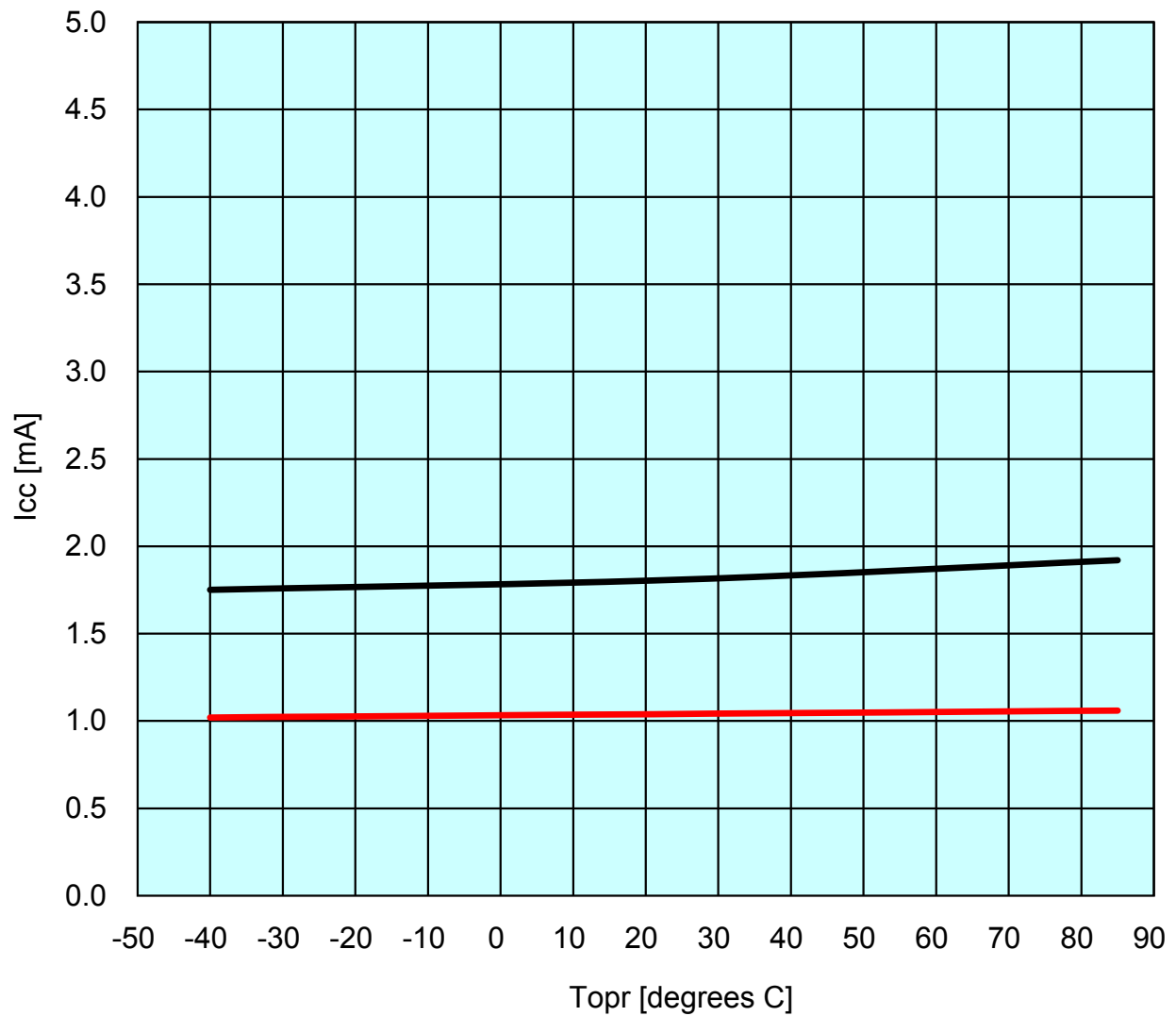
XIN (square wave)

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

— XIN=5MHz no division

— XIN=5MHz divide-by-8



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Icc vs Topr (High-speed on-chip oscillator mode)

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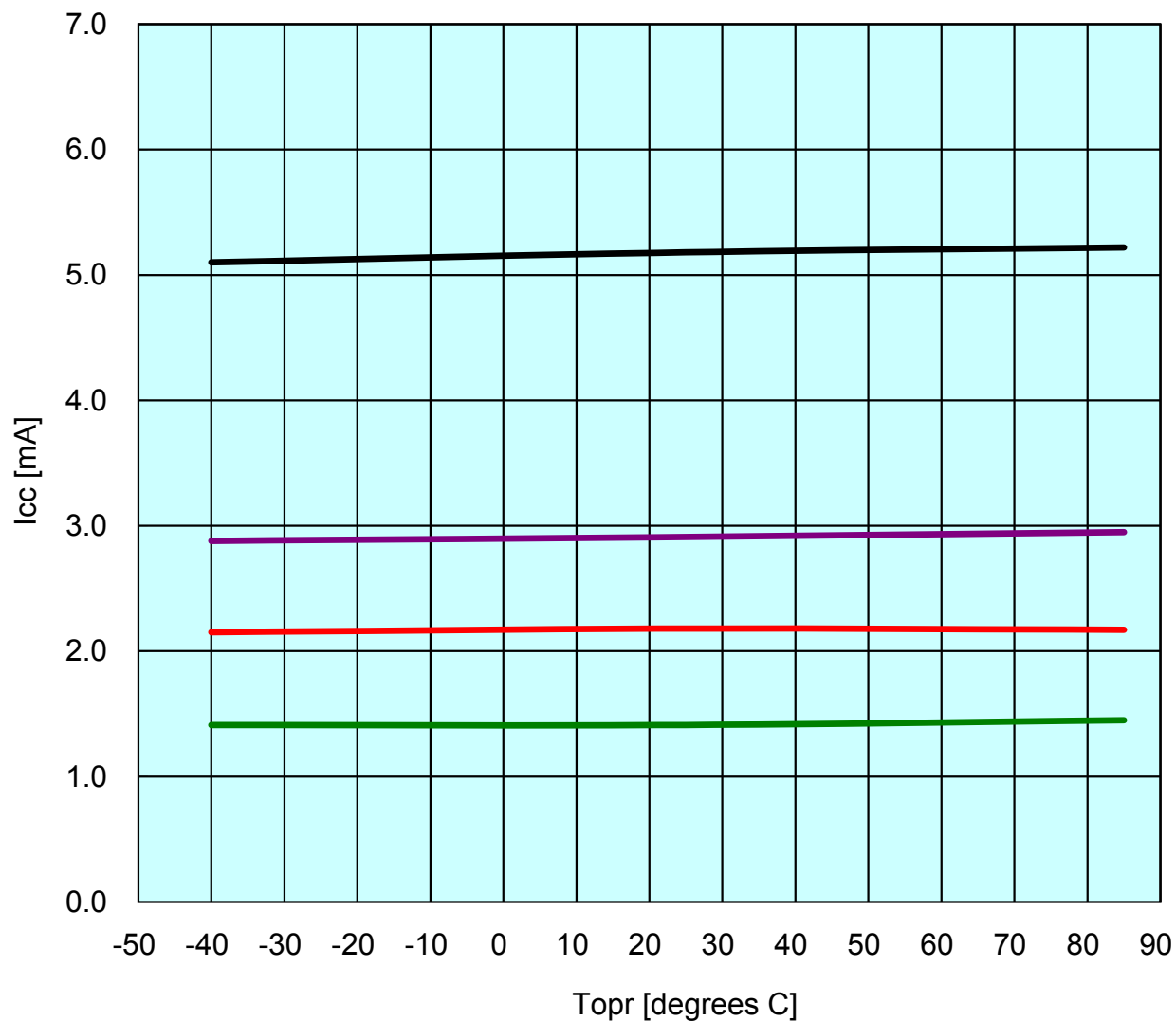
Vcc=5V

XIN clock off

High-speed on-chip oscillator on

Low-speed on-chip oscillator on = 125 kHz

- fOCO=20MHz no division
- fOCO=20MHz divide-by-8
- fOCO=10MHz no division
- fOCO=10MHz divide-by-8



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Icc vs Topr (High-speed on-chip oscillator mode)

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Vcc=3V

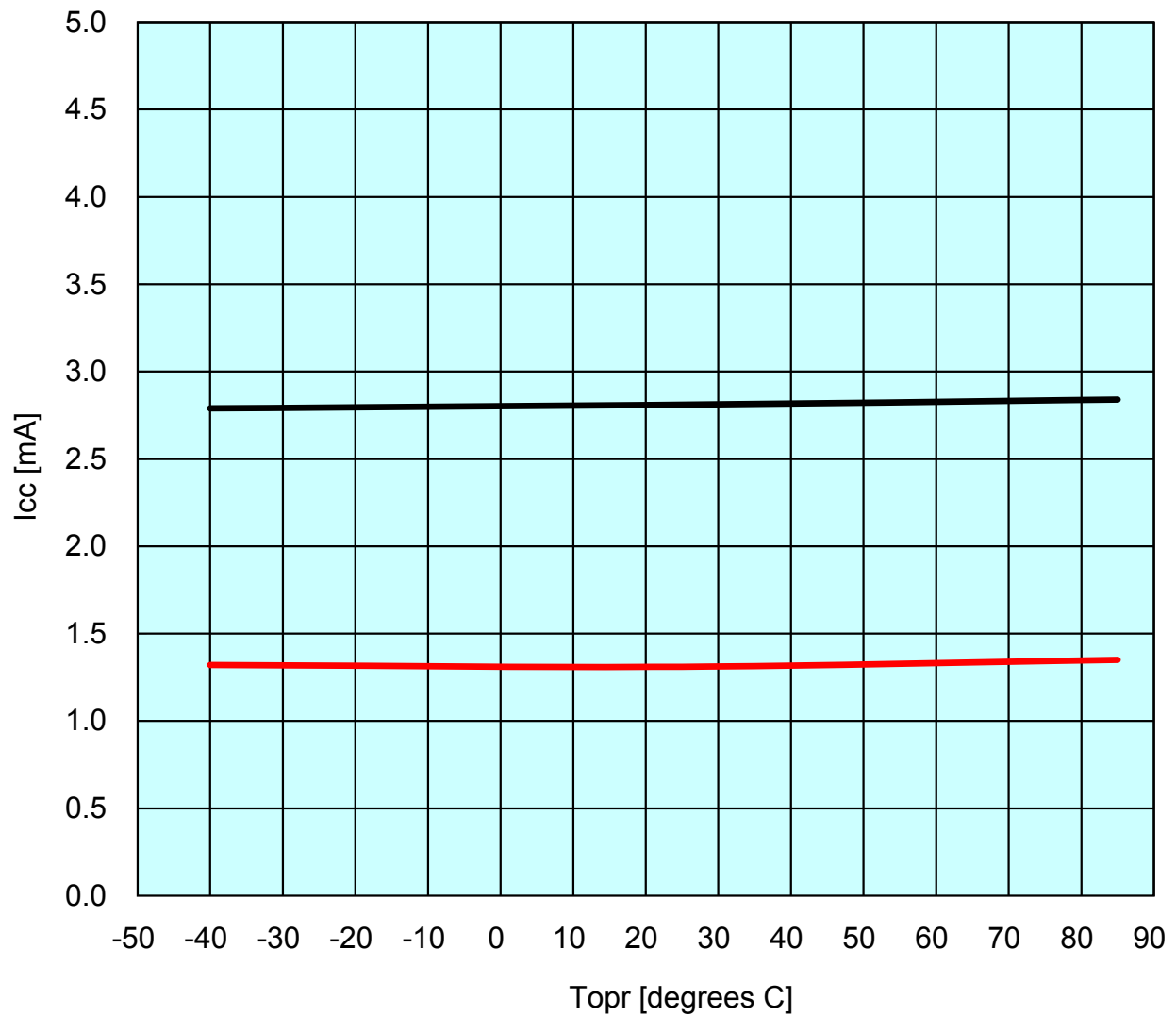
XIN clock off

High-speed on-chip oscillator on

Low-speed on-chip oscillator on = 125 kHz

— fOCO=10MHz no division

— fOCO=10MHz divide-by-8



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Icc vs Topr (High-speed on-chip oscillator mode)

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Vcc=1.8V

XIN clock off

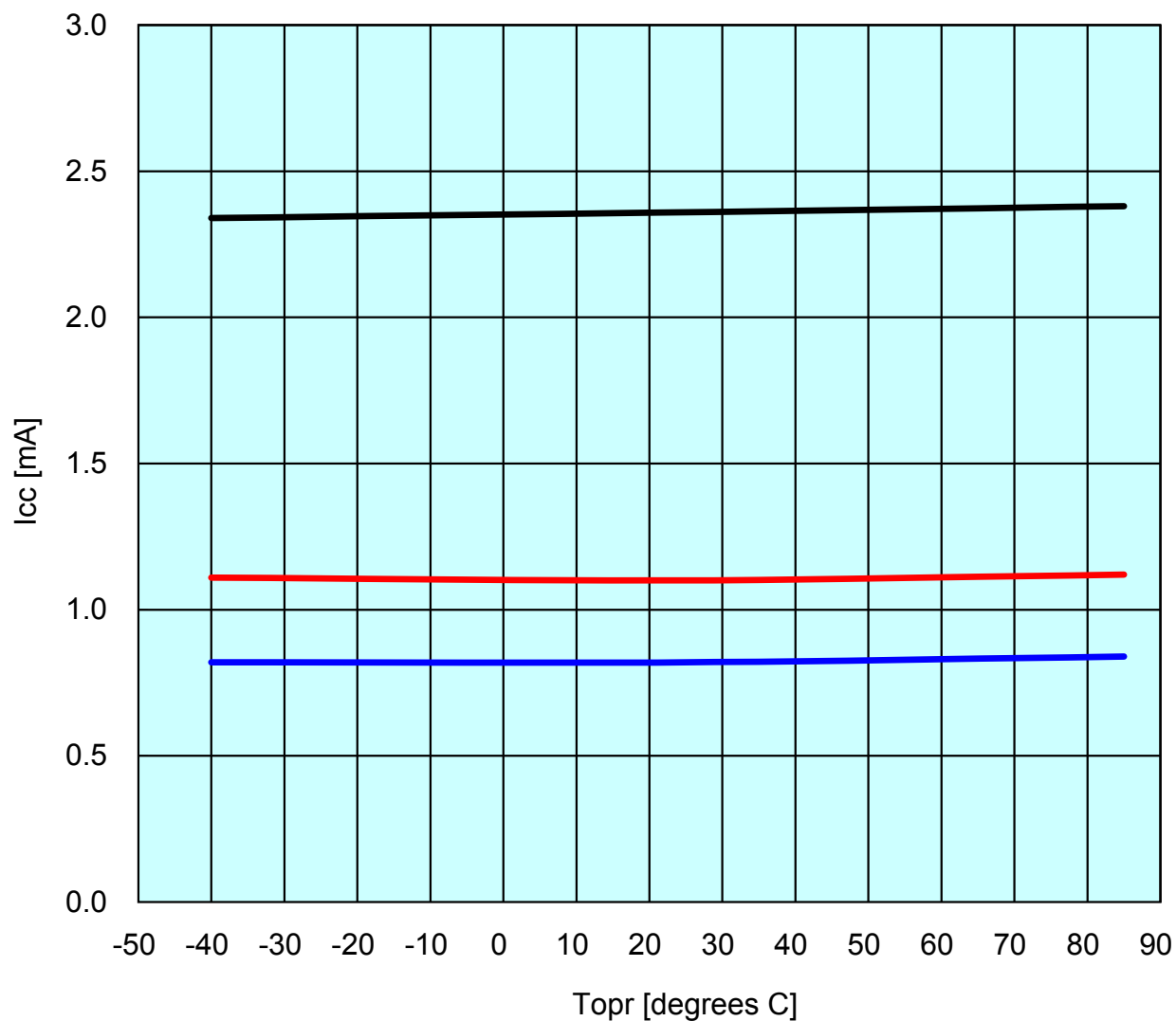
High-speed on-chip oscillator on

Low-speed on-chip oscillator on = 125 kHz

— fOCO=5MHz no division

— fOCO=5MHz divide-by-8

— fOCO=4MHz divide-by-16 MSTIIC
= MSTTRD = MSTTRC = 1



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I_{cc} vs V_{cc} (Low-Speed On-Chip Oscillator mode)

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Divide-by-8

XIN clock off

High-speed on-chip oscillator off

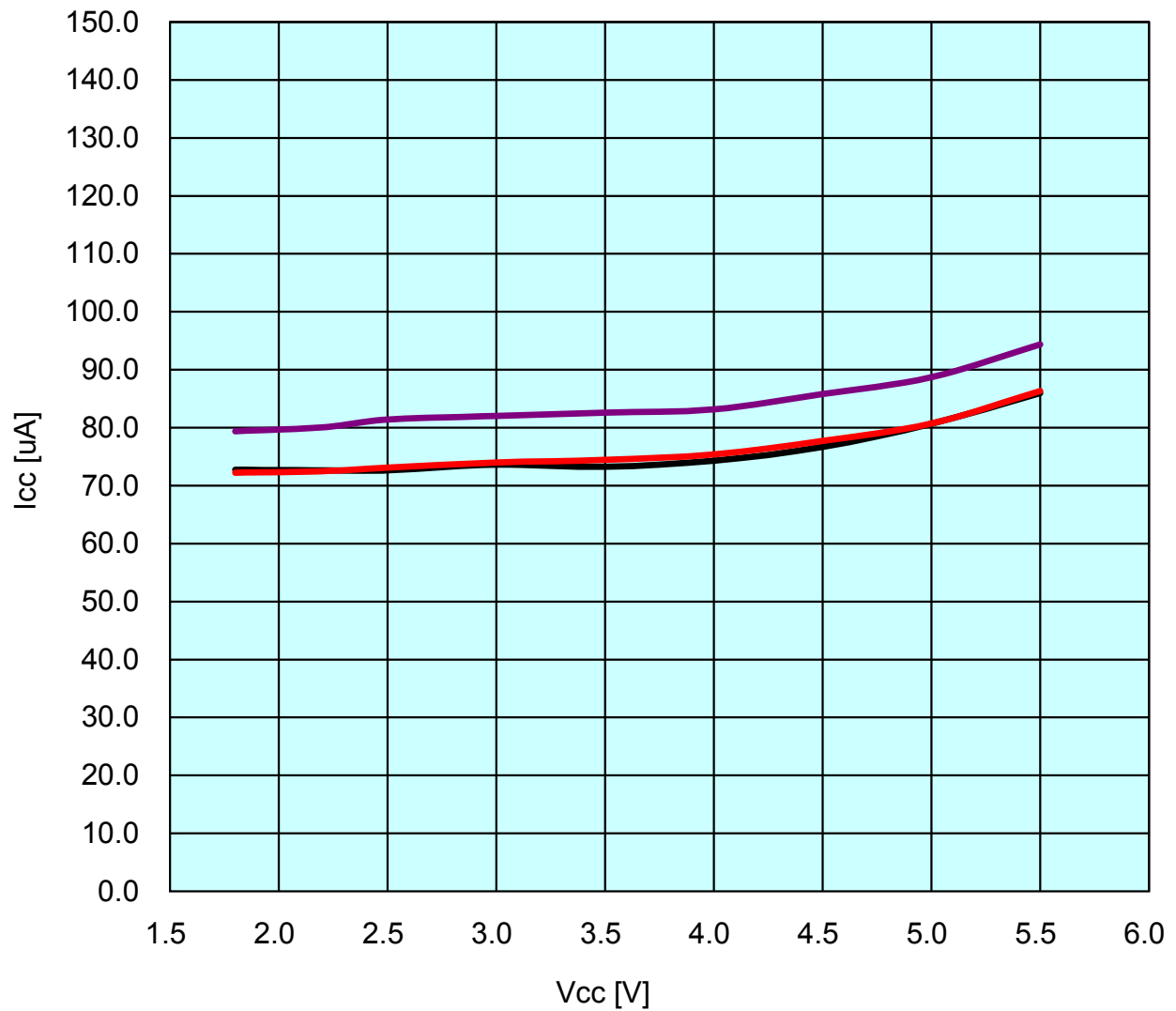
Low-speed on-chip oscillator on = 125 kHz

FMR27 = 1, VCA20 = 0

— 85degreesC

— 25degreesC

— -40degreesC



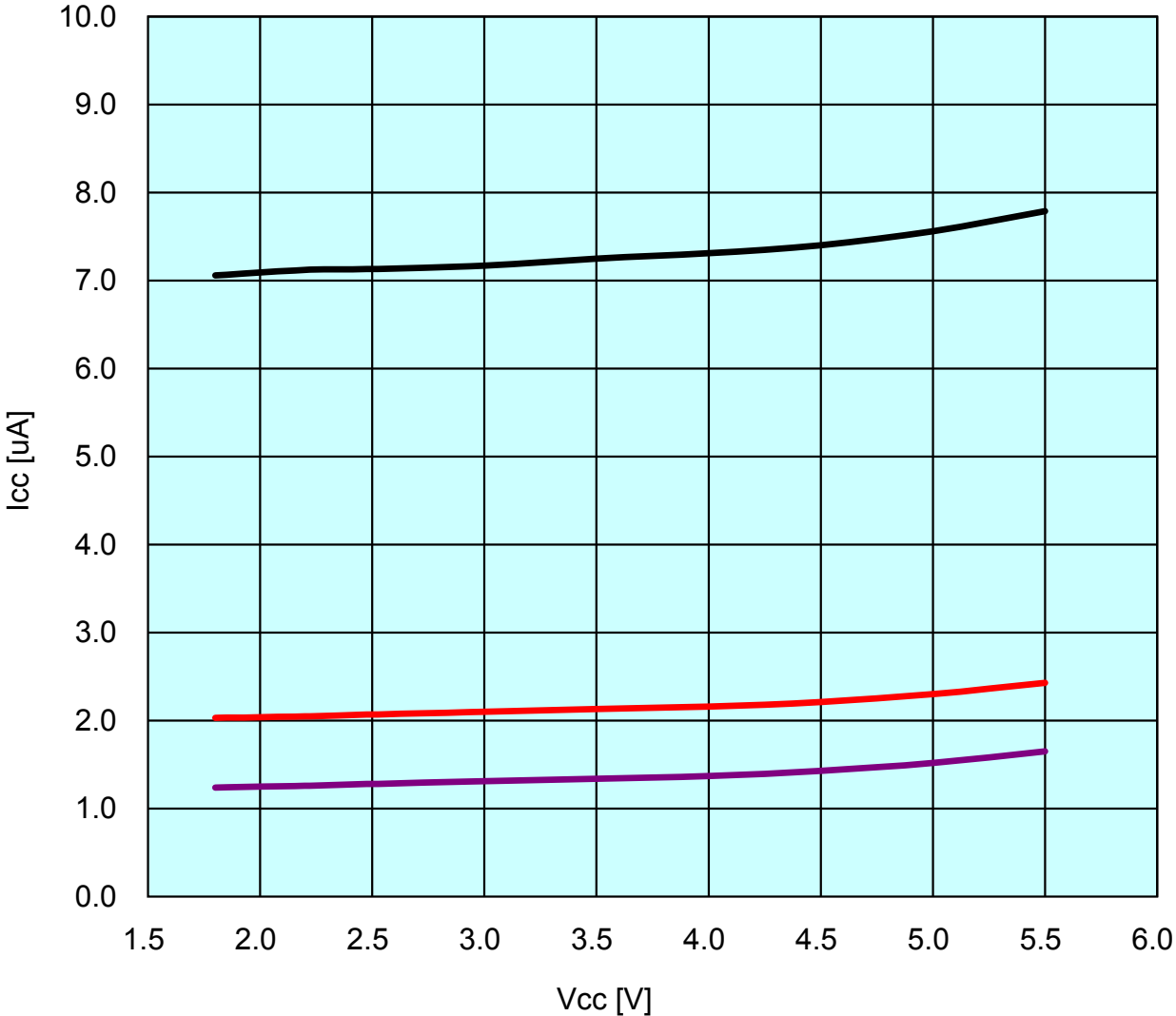
The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

I_{cc} vs V_{cc} (Stop mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group
XIN clock off
High-speed on-chip oscillator off
Low-speed on-chip oscillator off
CM10 = 1
Peripheral clock off
VCA27 = VCA26 = VCA25 = 0

— 85degreesC
— 25degreesC
— -40degreesC



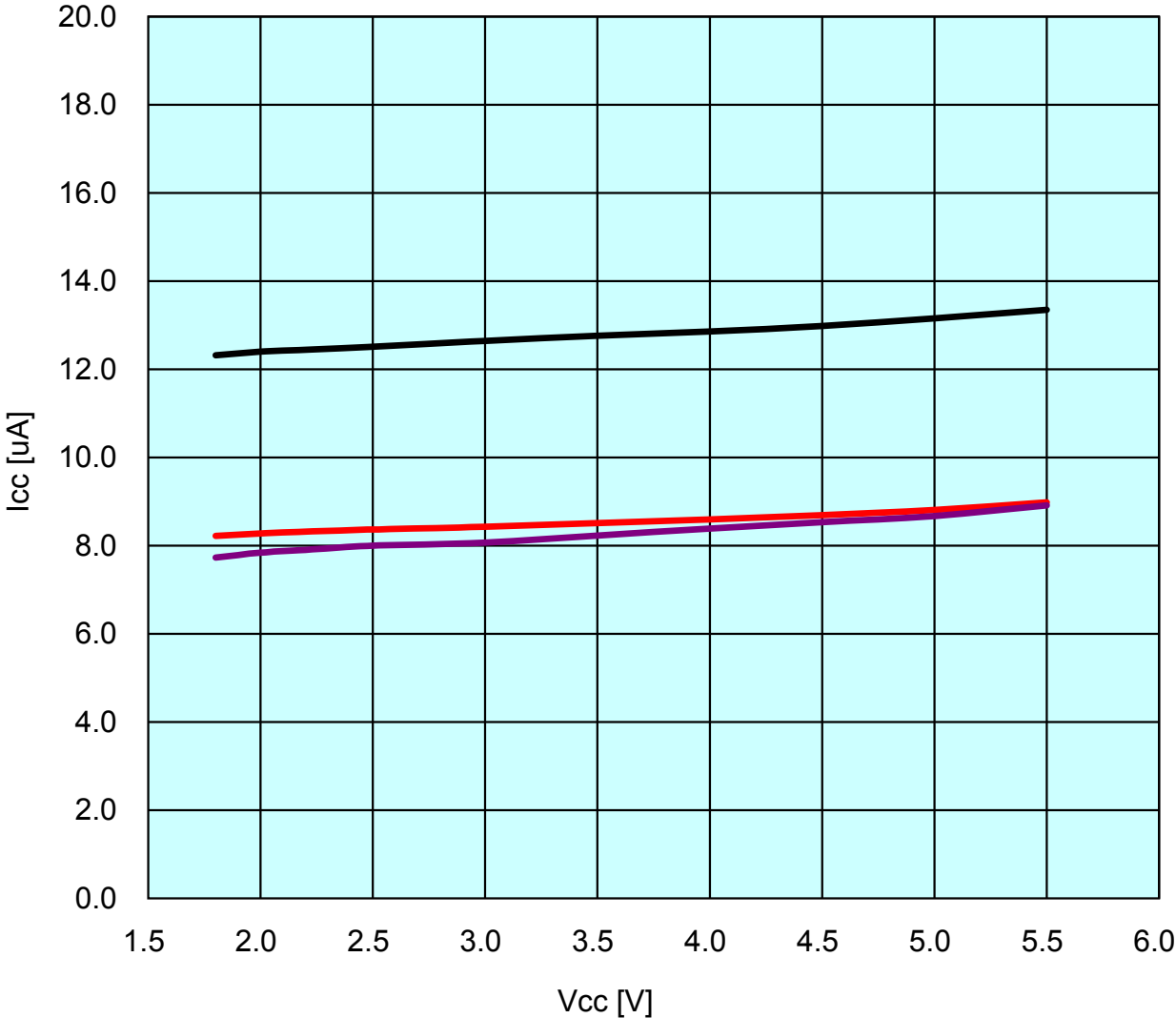
The mentioned value is only for your reference. The value is for the arbitrary samples and does not guarantee the product's characteristics.

Icc vs Vcc (Wait mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group
XIN clock off
High-speed on-chip oscillator off
Low-speed on-chip oscillator on = 125 kHz
While a WAIT instruction is executed
Peripheral clock operation
VCA27 = VCA26 = VCA25 = 0
VCA20 = 1

— 85degreesC
— 25degreesC
— -40degreesC



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

I_{cc} vs V_{cc} (Wait mode)

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XIN clock off

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

While a WAIT instruction is executed

Peripheral clock off

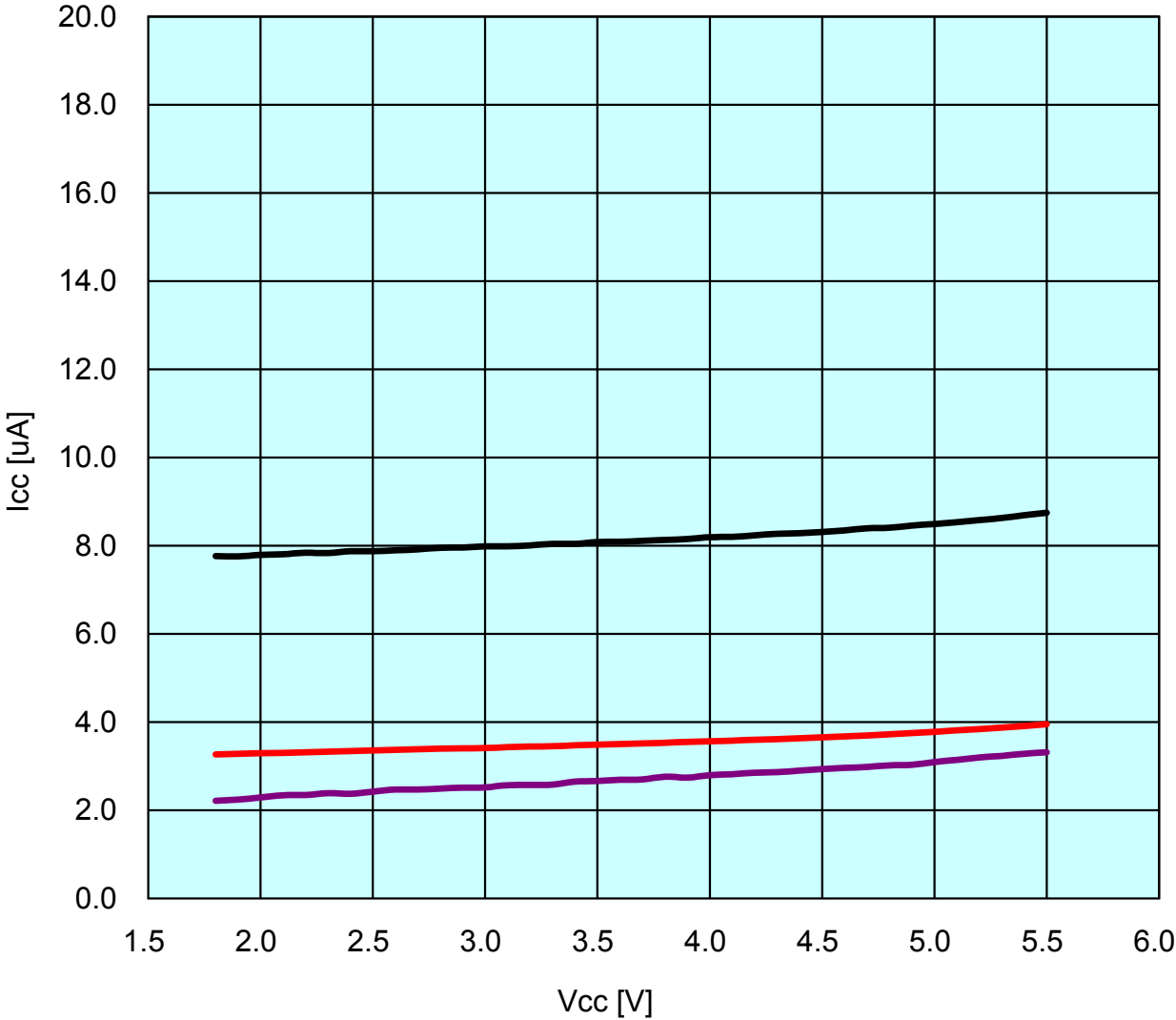
VCA27 = VCA26 = VCA25 = 0

VCA20 = 1

— 85degreesC

— 25degreesC

— -40degreesC



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Icc vs Vcc (Low-speed clock mode)

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R8C/38T-A Group

XIN clock off

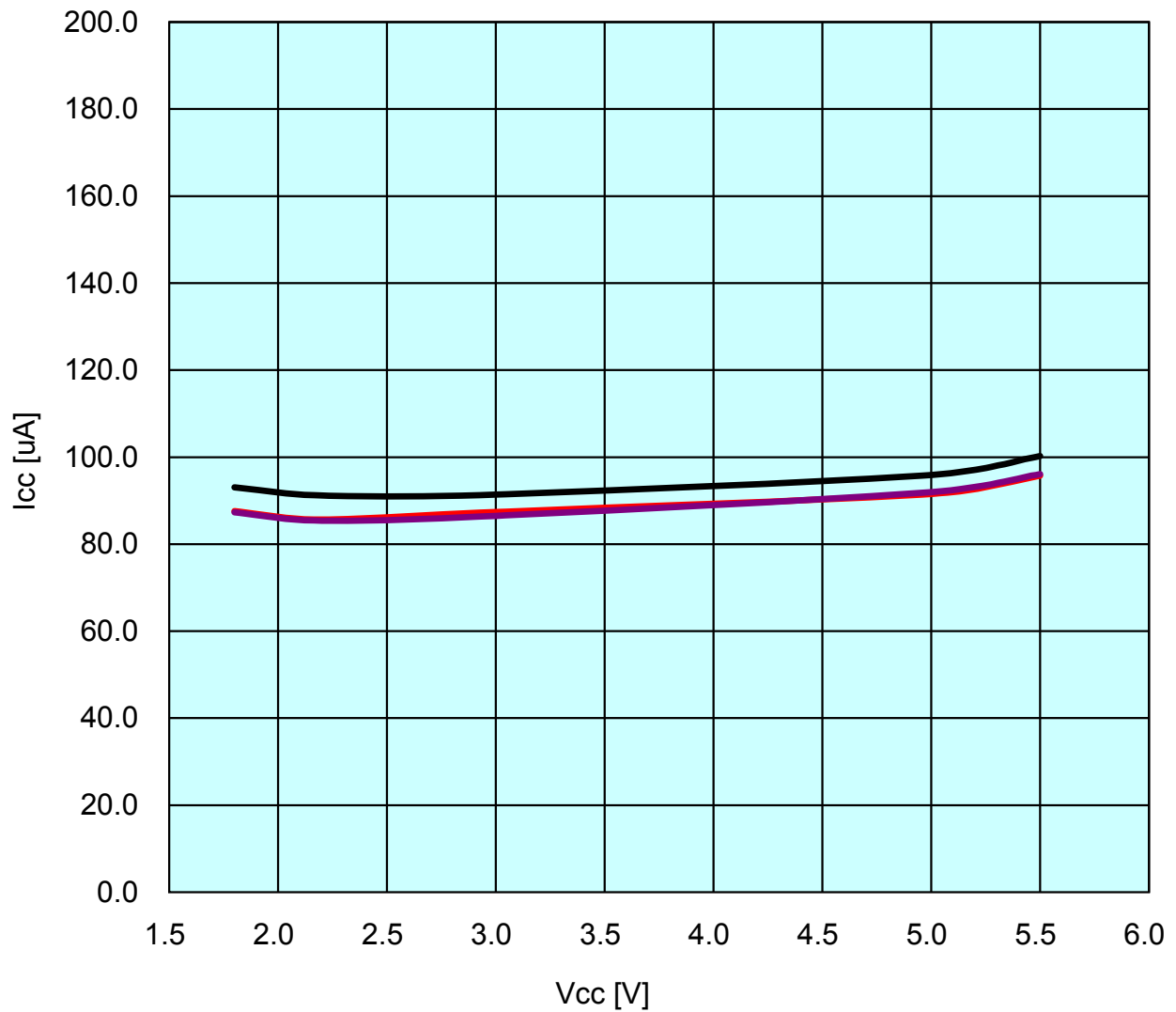
High-speed on-chip oscillator off

Low-speed on-chip oscillator off

XCIN clock oscillator on = 32 kHz

FMR27 = 1, VCA20 = 0

— 85degreesC
— 25degreesC
— -40degreesC



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 (Low-speed clock mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

XIN clock off

High-speed on-chip oscillator off

Low-speed on-chip oscillator off

XCIN clock oscillator on = 32 kHz

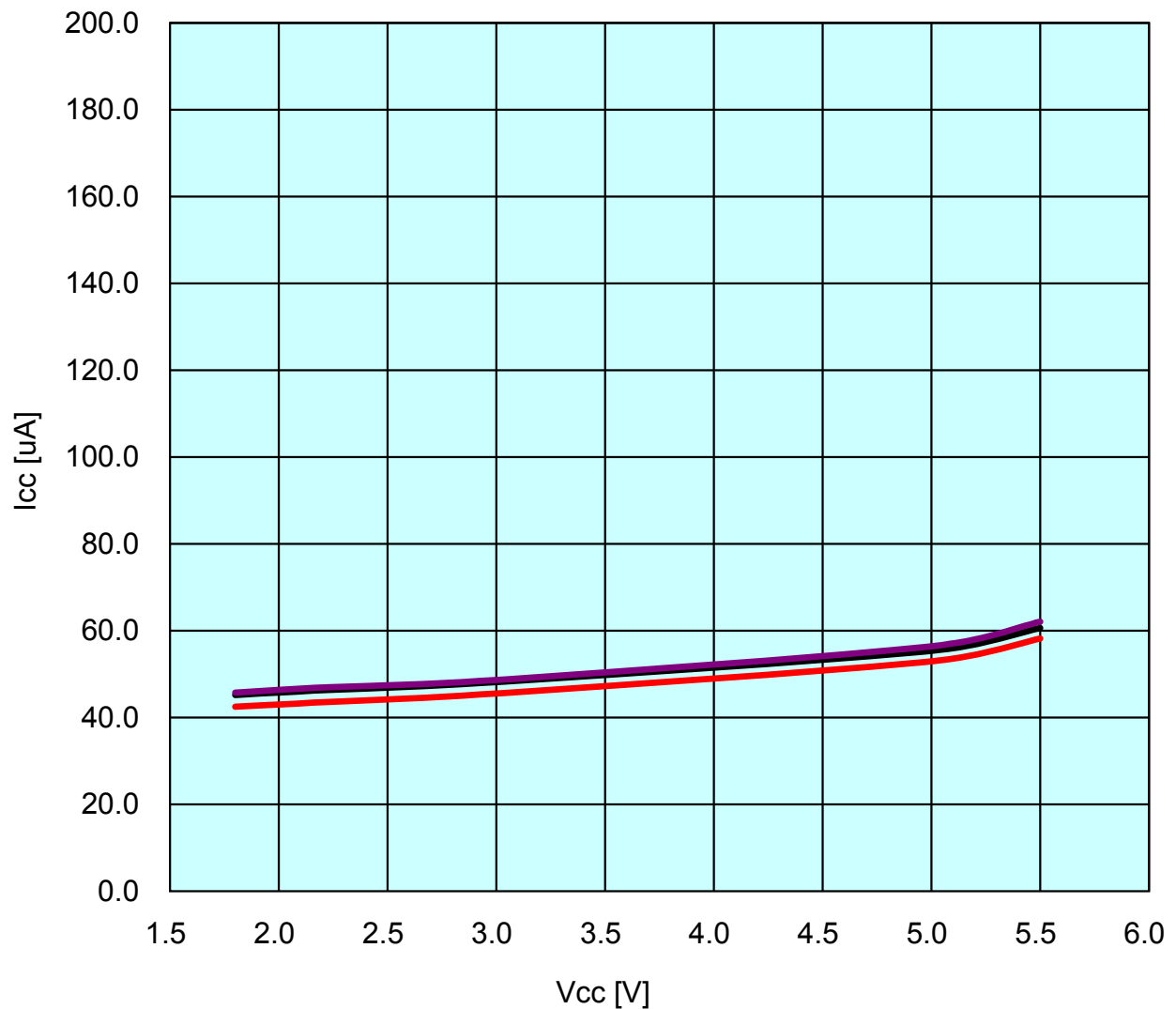
Program operation on RAM

Flash memory off, FMSTP = 1, VCA20 = 0

— 85degreesC

— 25degreesC

— -40degreesC



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Icc vs Vcc (High-speed clock mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

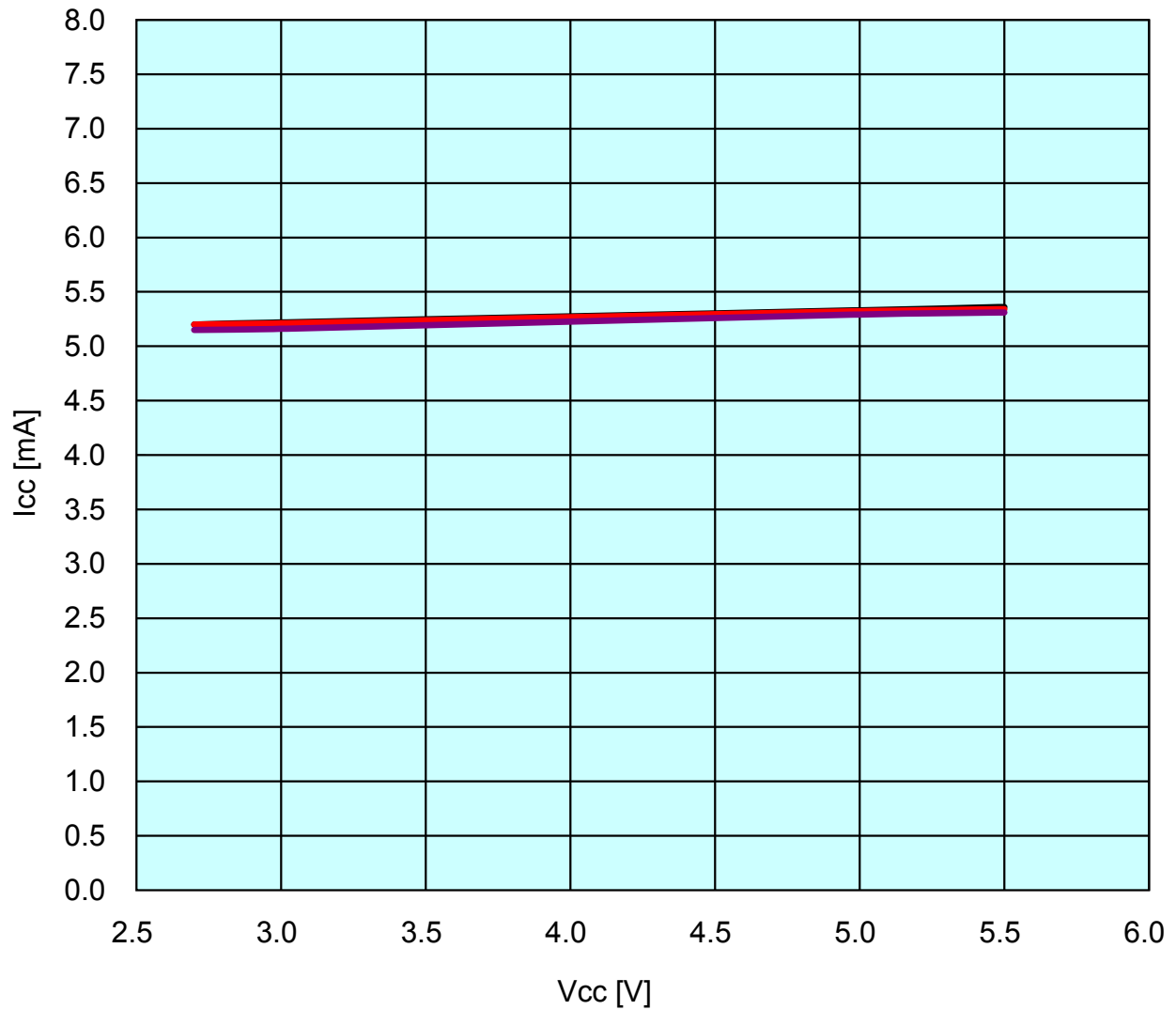
XIN = 20 MHz (square wave)

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

No division

— 85degreesC
— 25degreesC
— -40degreesC



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I_{cc} vs V_{cc} (High-speed clock mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

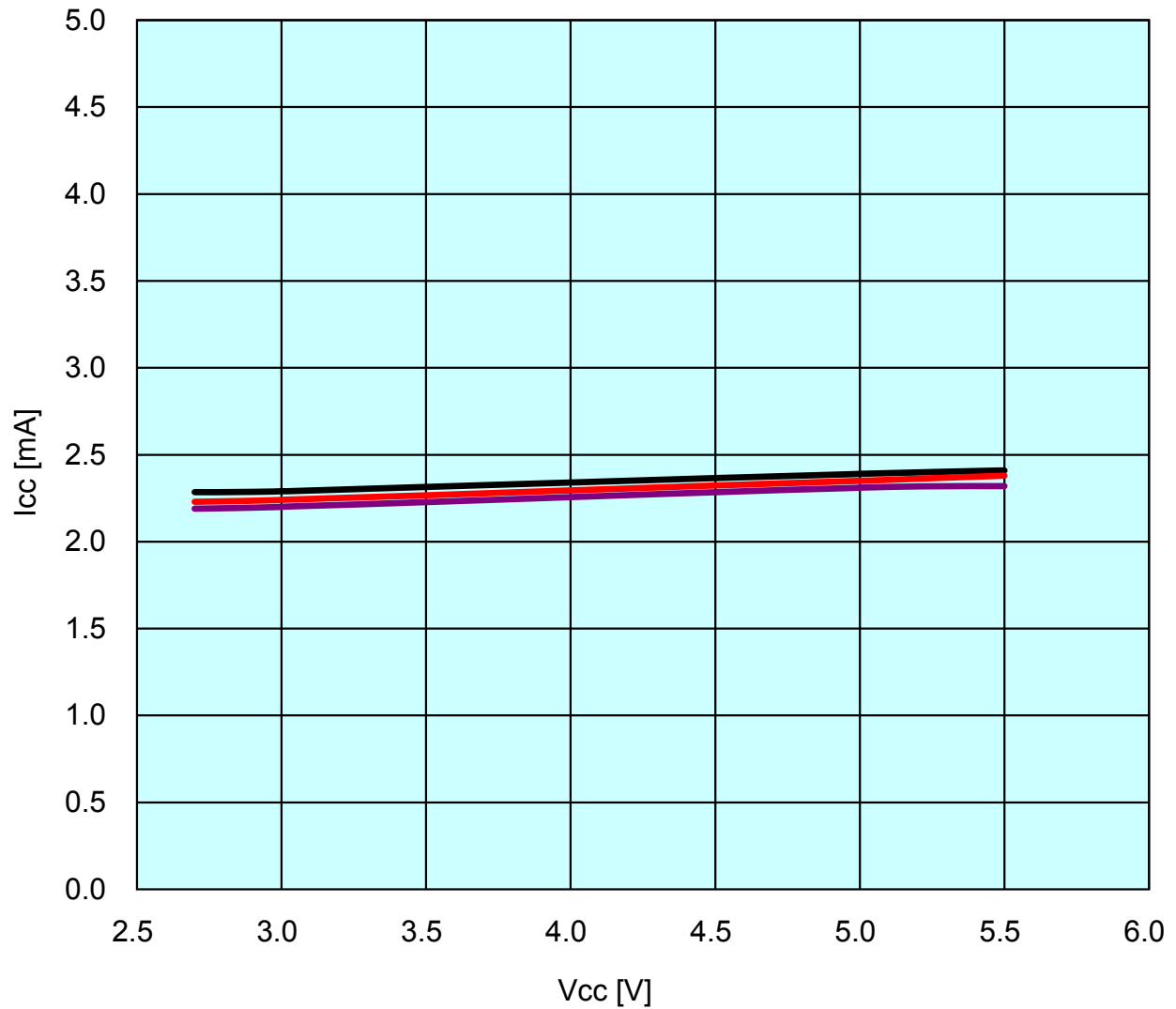
XIN = 20 MHz (square wave)

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

Divide-by-8

— 85degreesC
— 25degreesC
— -40degreesC



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I_{cc} vs V_{cc} (High-speed clock mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

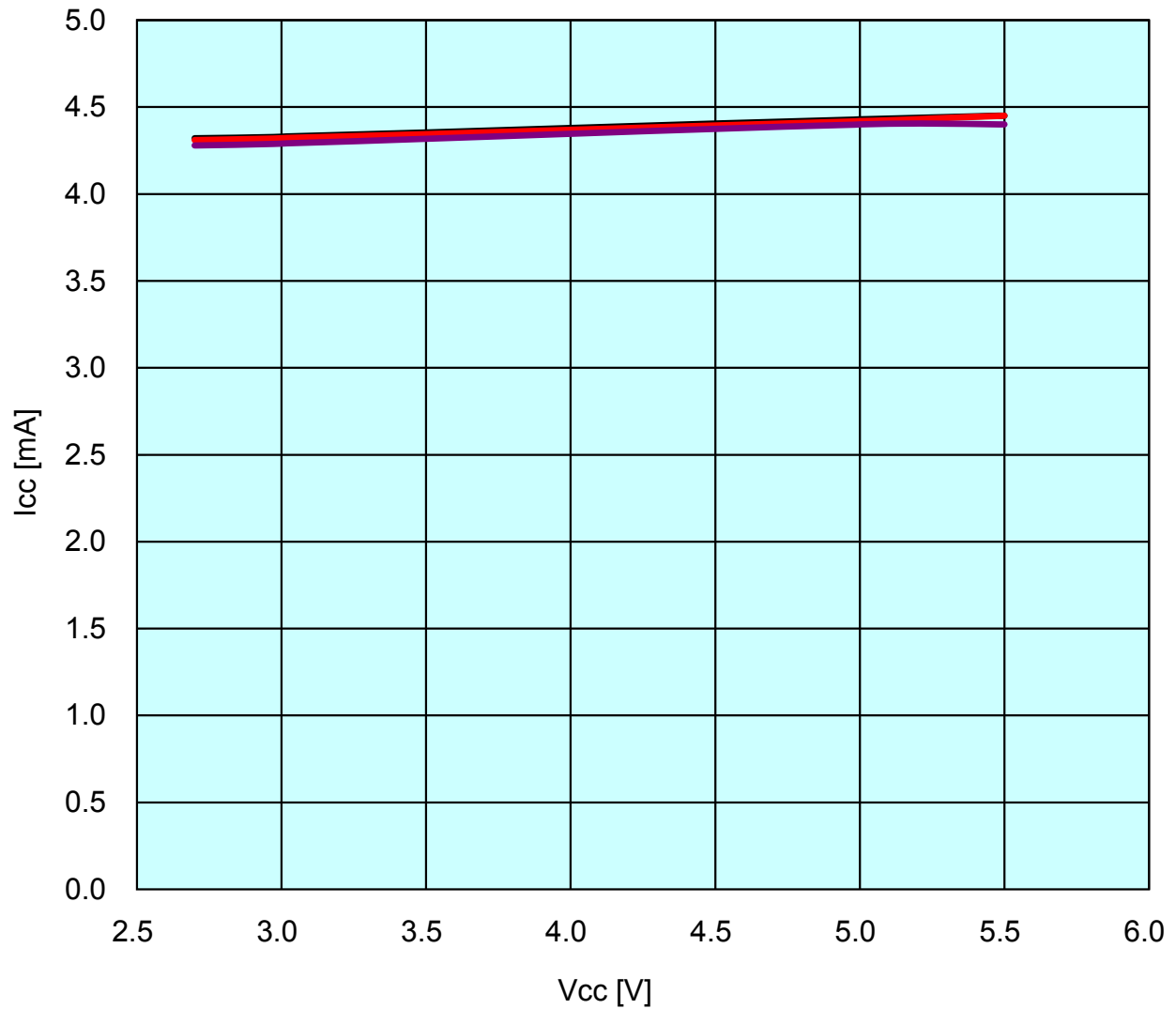
XIN = 16 MHz (square wave)

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

No division

— 85degreesC
— 25degreesC
— -40degreesC



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I_{cc} vs V_{cc} (High-speed clock mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

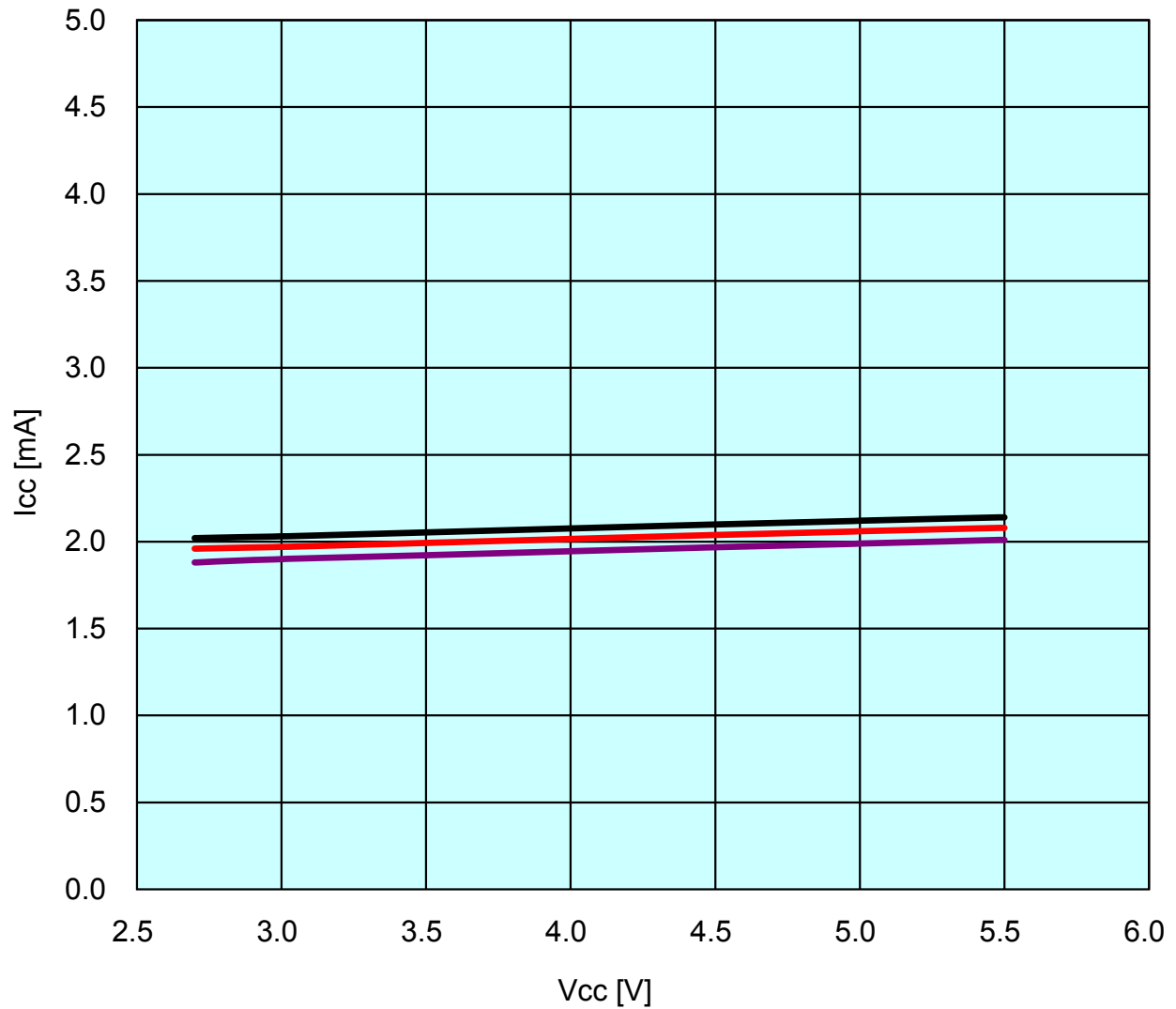
XIN = 16 MHz (square wave)

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

Divide-by-8

— 85degreesC
— 25degreesC
— -40degreesC



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Icc vs Vcc (High-speed clock mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

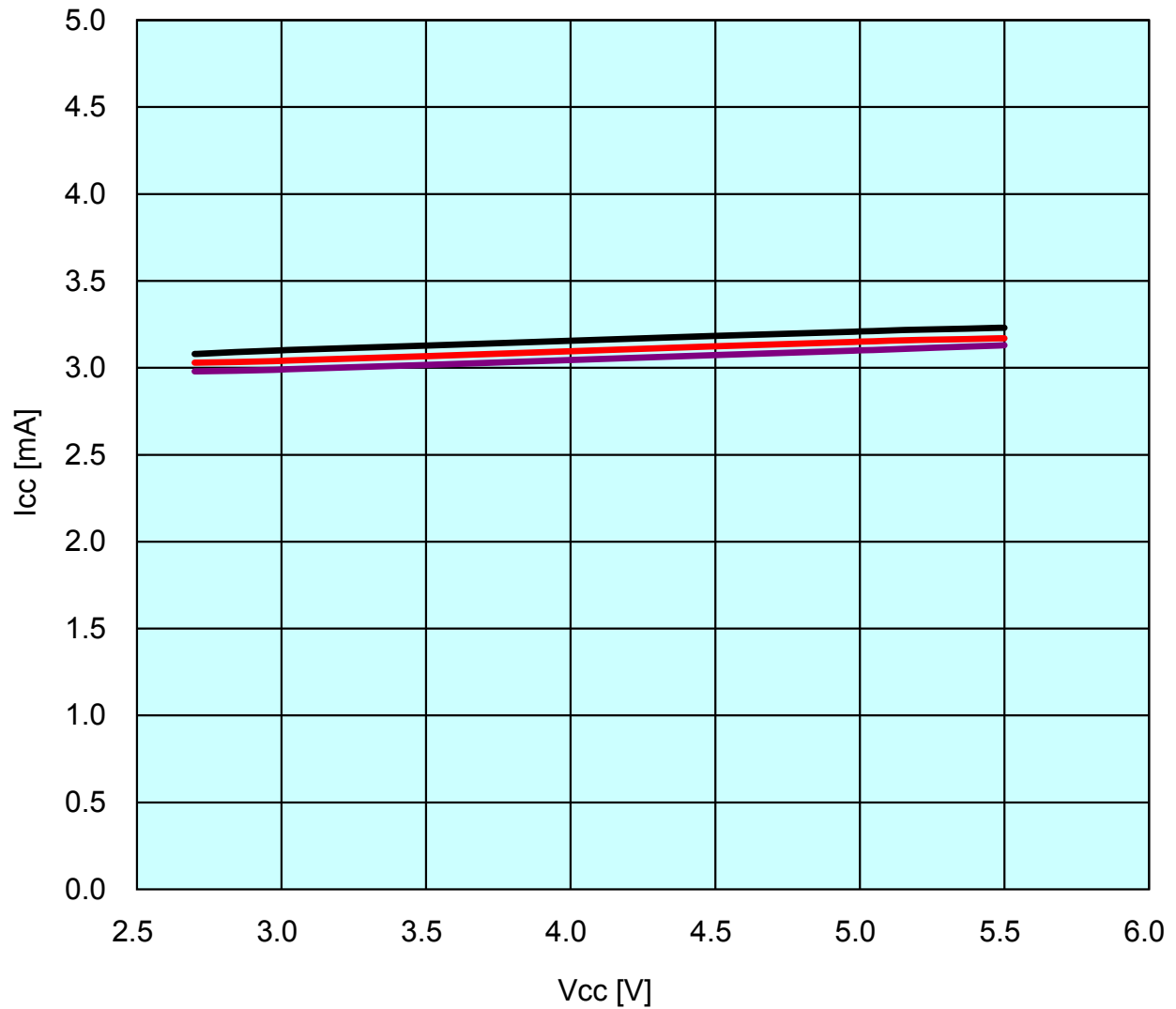
XIN = 10 MHz (square wave)

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

No division

— 85degreesC
— 25degreesC
— -40degreesC



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Icc vs Vcc (High-speed clock mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

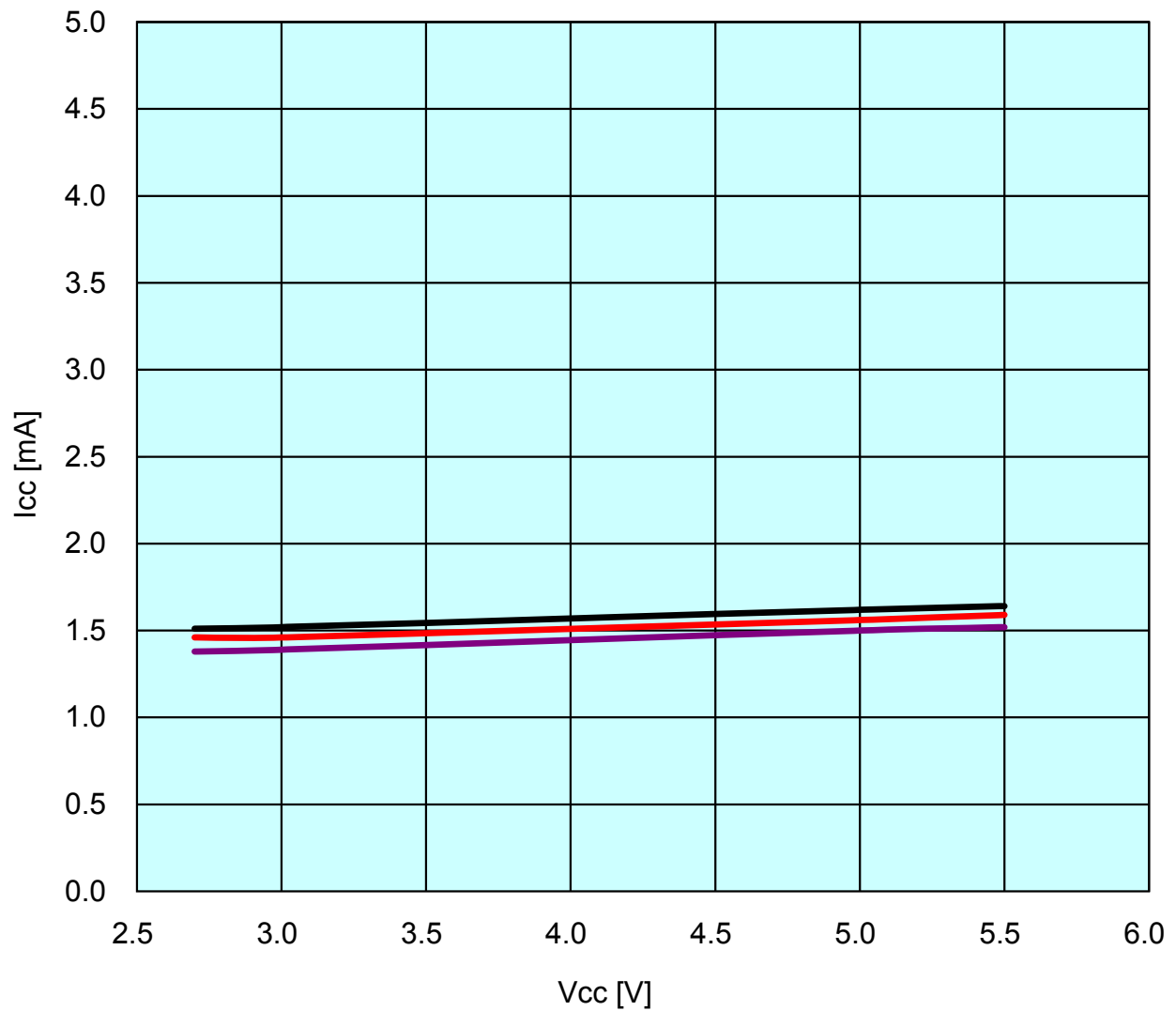
XIN = 10 MHz (square wave)

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

Divide-by-8

— 85degreesC
— 25degreesC
— -40degreesC



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I_{cc} vs V_{cc} (High-speed clock mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

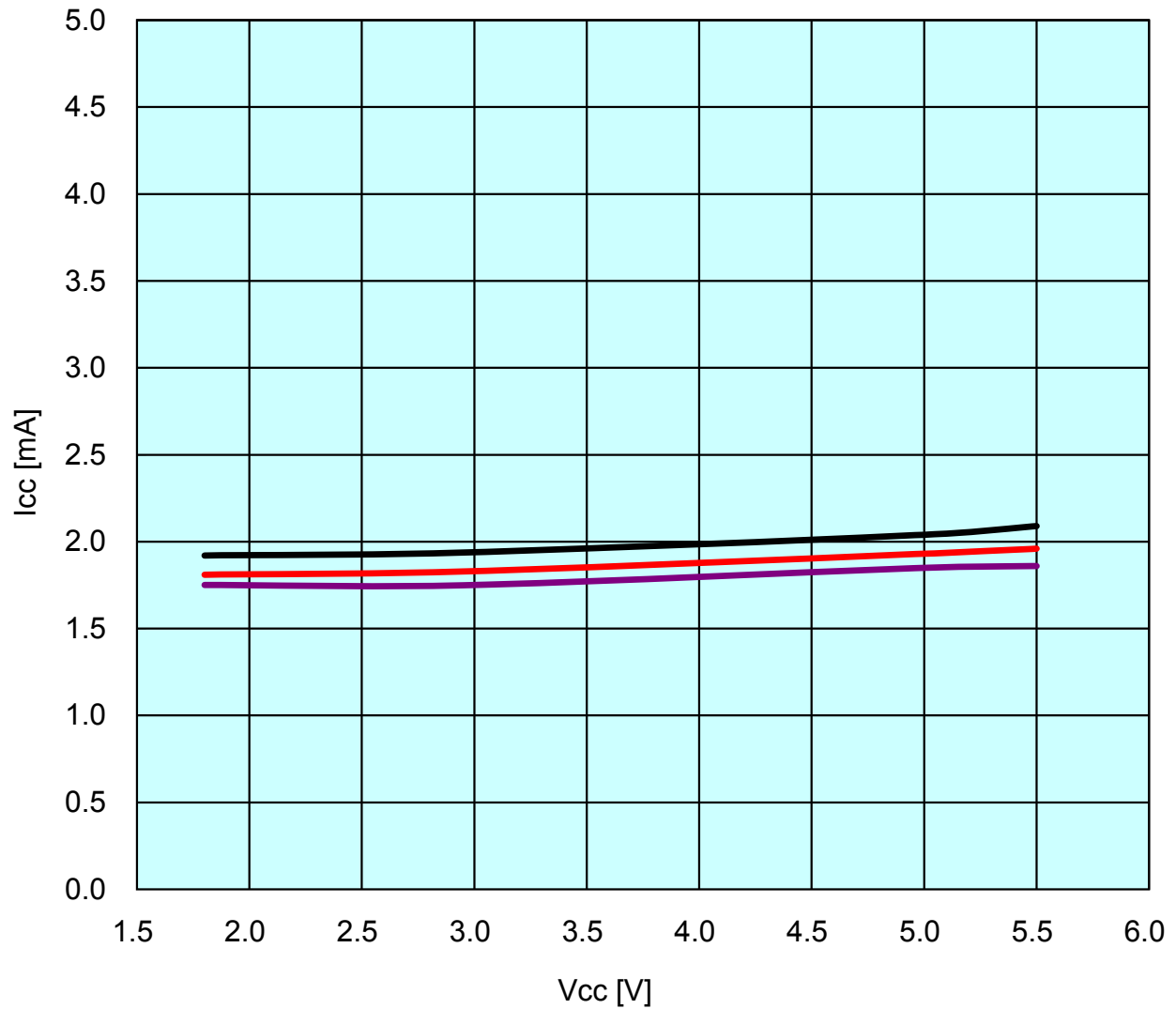
XIN = 5 MHz (square wave)

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

No division

— 85degreesC
— 25degreesC
— -40degreesC



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I_{cc} vs V_{cc} (High-speed clock mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

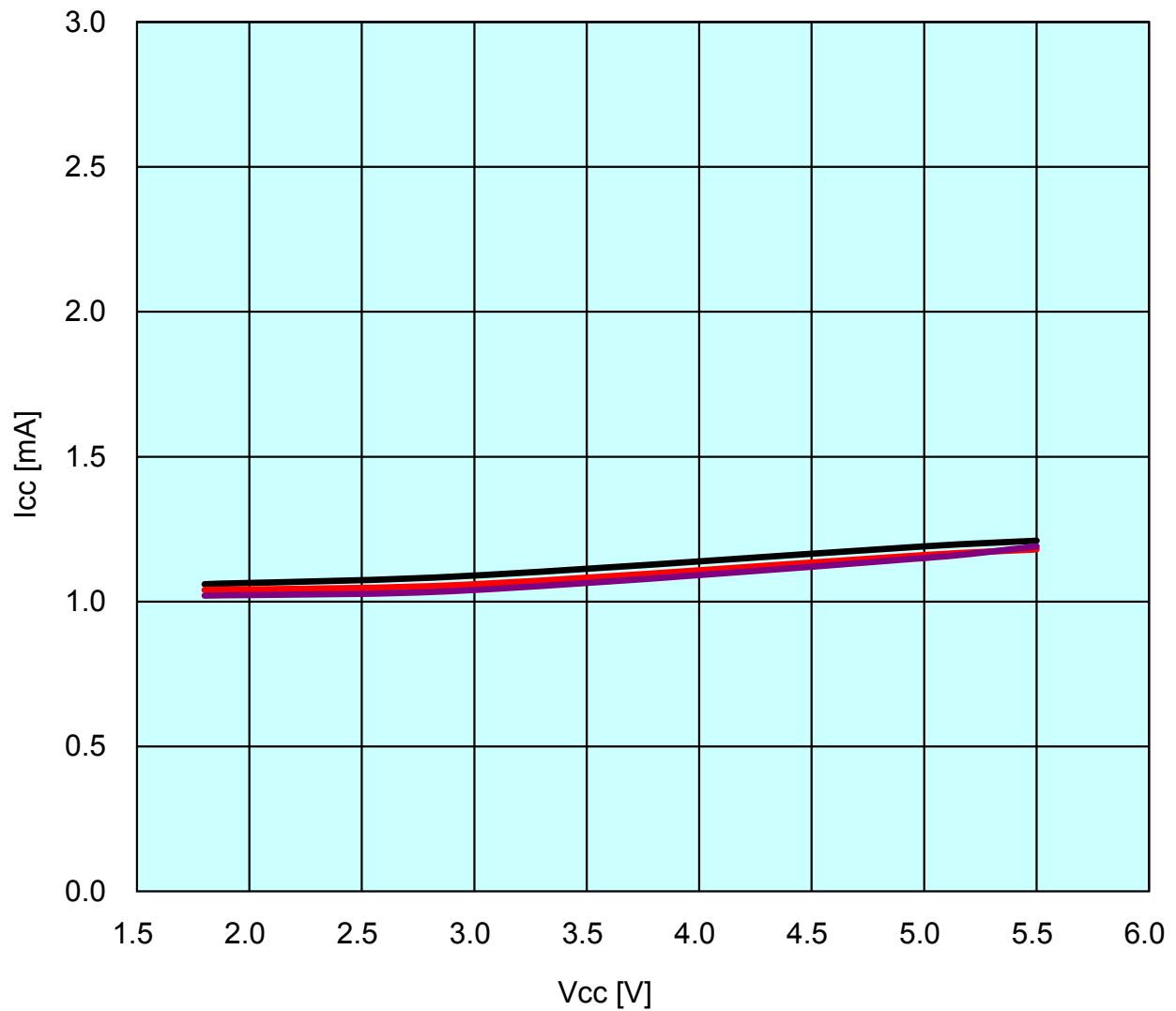
XIN = 5 MHz (square wave)

High-speed on-chip oscillator off

Low-speed on-chip oscillator on = 125 kHz

Divide-by-8

— 85degreesC
— 25degreesC
— -40degreesC



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Icc vs Vcc (High-speed on-chip oscillator mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

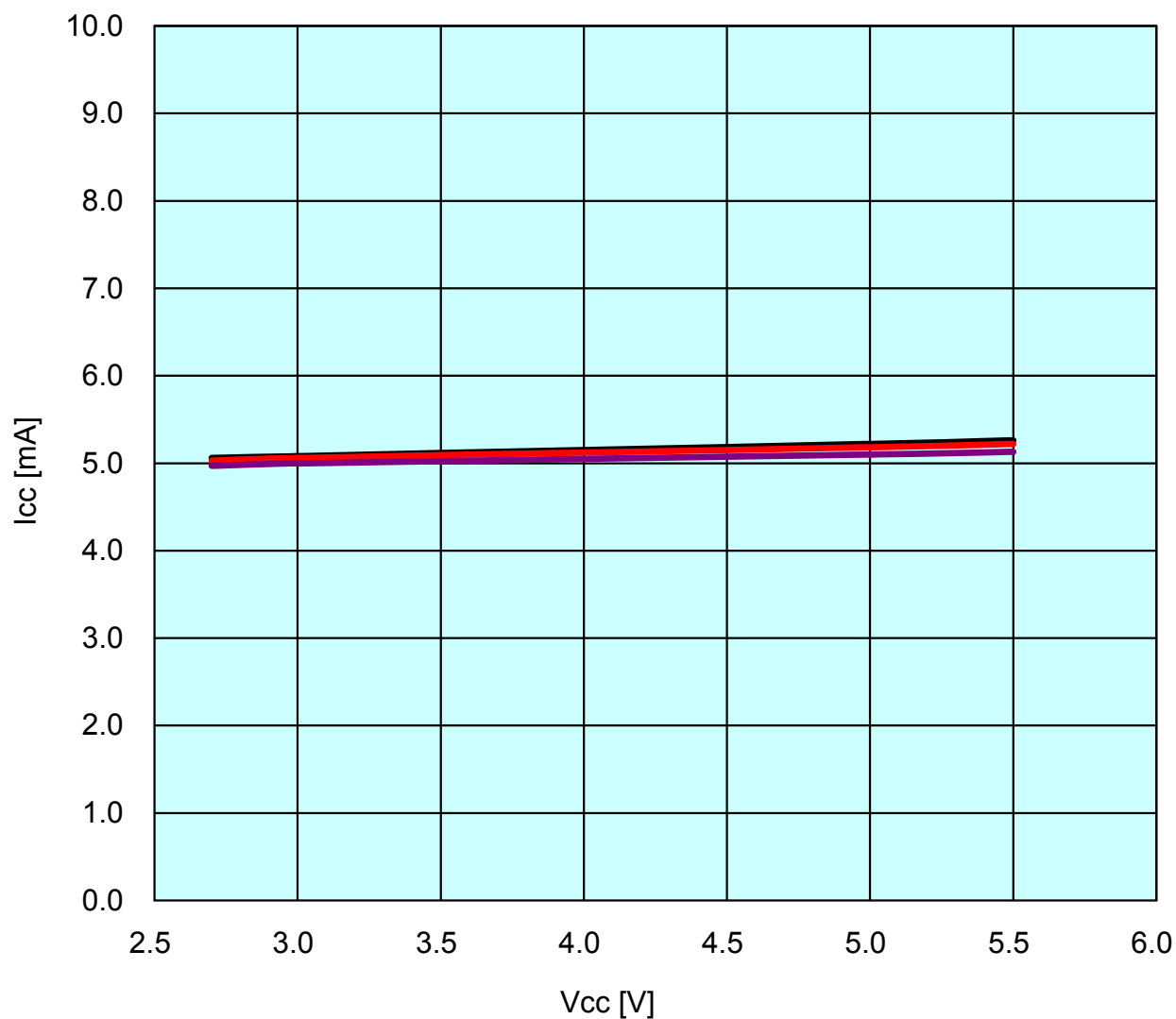
XIN clock off

High-speed on-chip oscillator on = 20MHz

Low-speed on-chip oscillator on = 125 kHz

No division

— 85degreesC
— 25degreesC
— -40degreesC



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I_{cc} vs V_{cc} (High-speed on-chip oscillator mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

XIN clock off

High-speed on-chip oscillator on = 20MHz

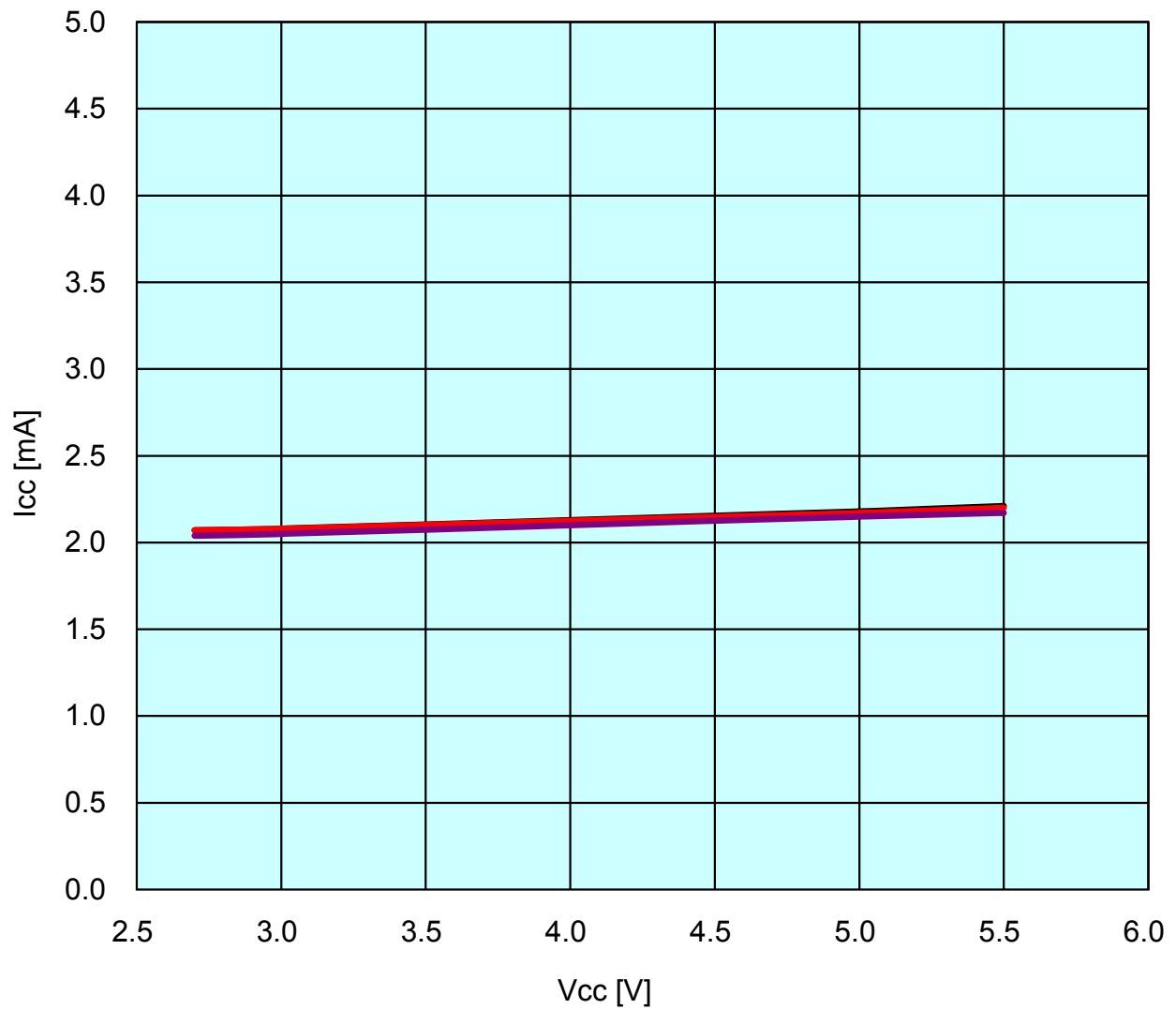
Low-speed on-chip oscillator on = 125 kHz

Divide-by-8

— 85degreesC

— 25degreesC

— -40degreesC



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I_{cc} vs V_{cc} (High-speed on-chip oscillator mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

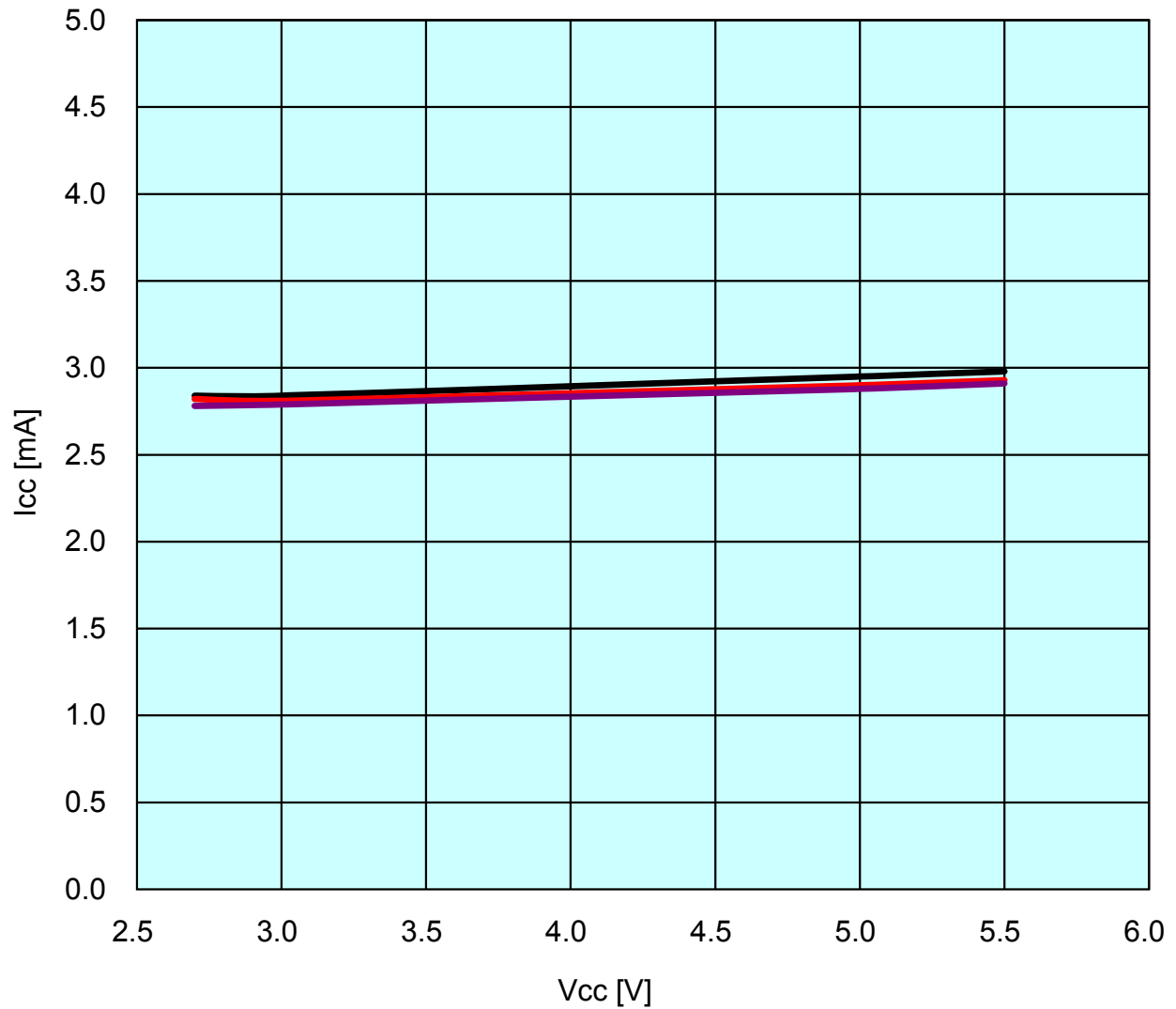
XIN clock off

High-speed on-chip oscillator on = 10MHz

Low-speed on-chip oscillator on = 125 kHz

No division

— 85degreesC
— 25degreesC
— -40degreesC



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Icc vs Vcc

(High-speed on-chip oscillator mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

XIN clock off

High-speed on-chip oscillator on = 10MHz

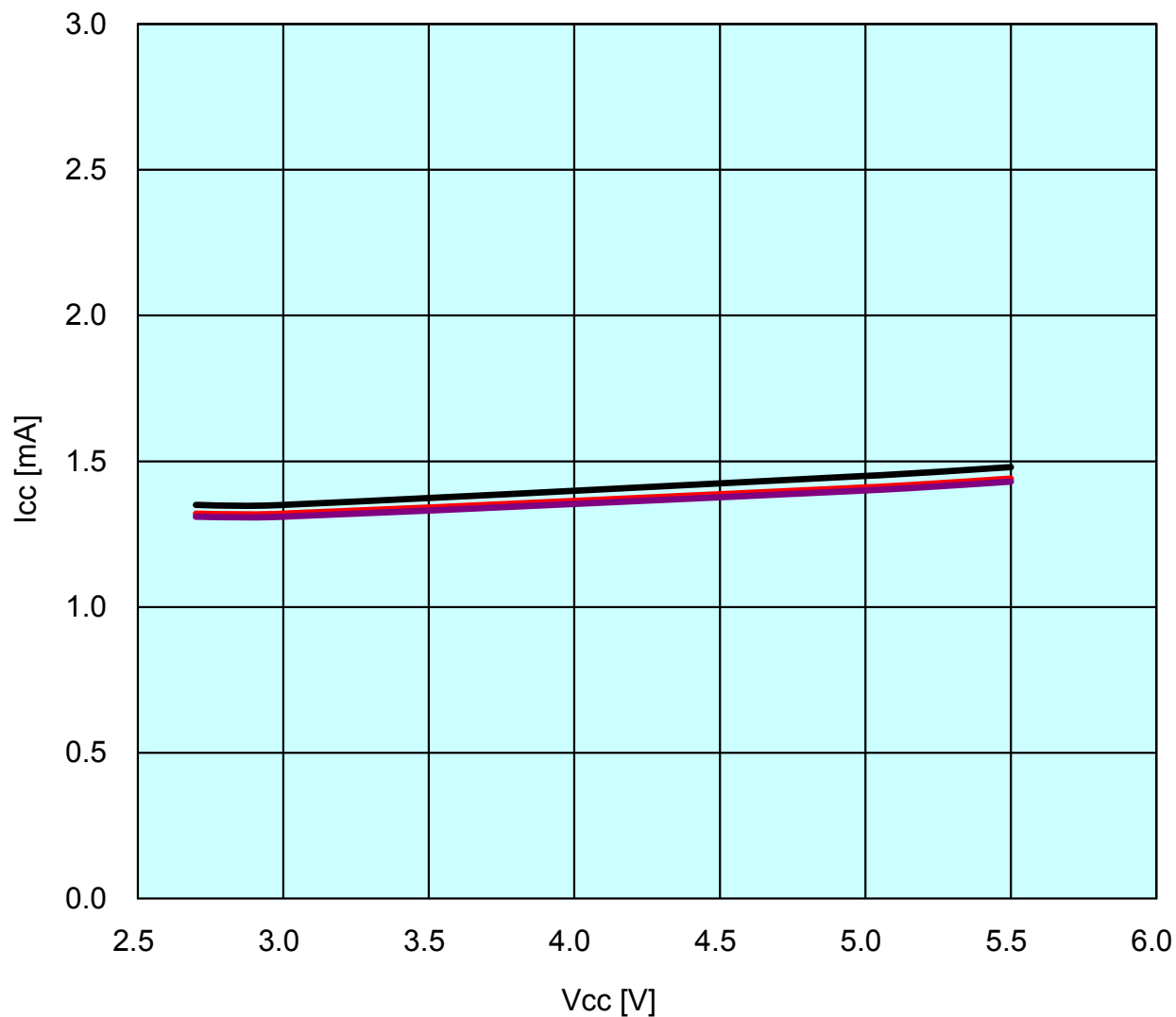
Low-speed on-chip oscillator on = 125 kHz

Divide-by-8

— 85degreesC

— 25degreesC

— -40degreesC



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I_{cc} vs V_{cc} (High-speed on-chip oscillator mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

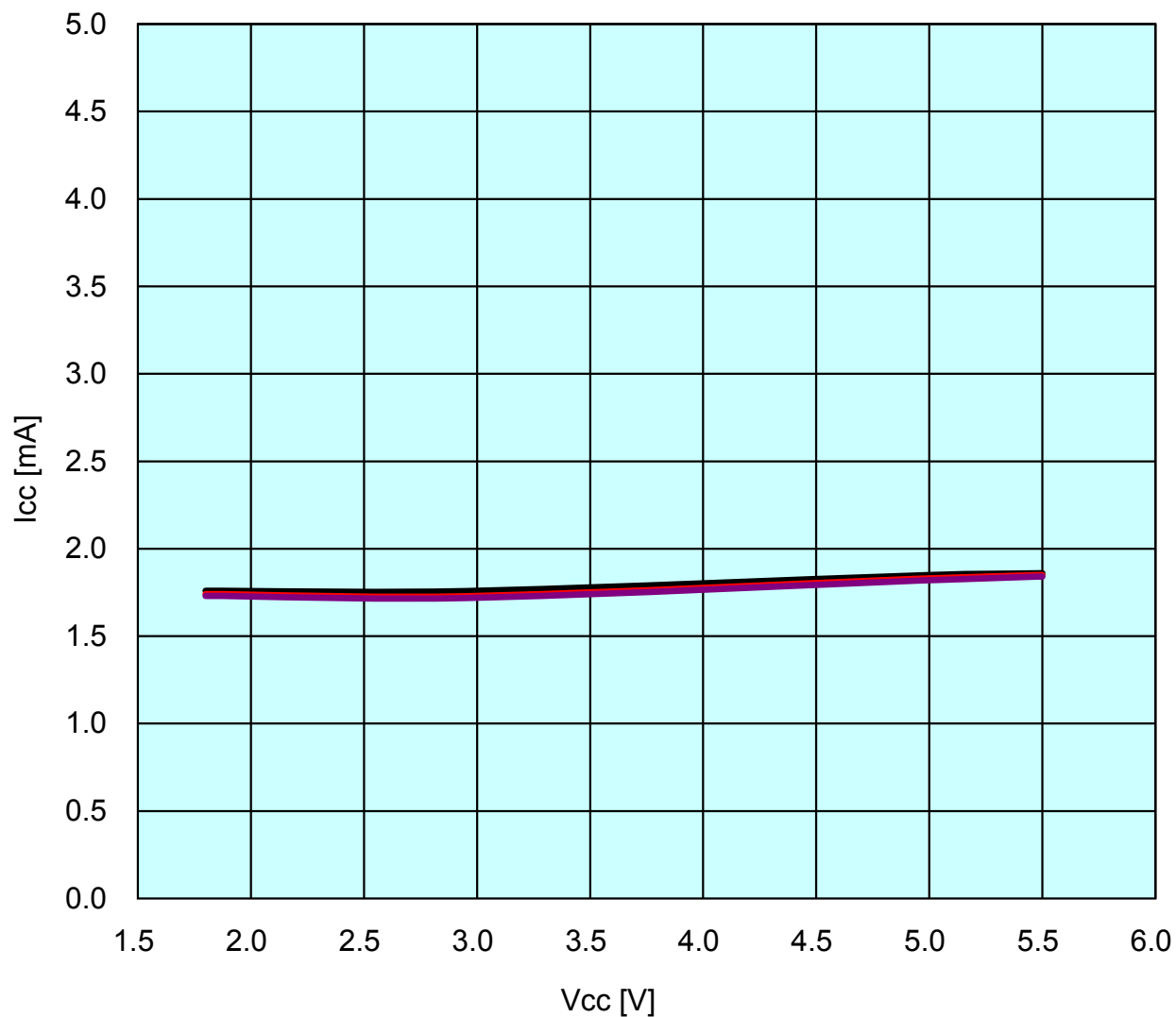
XIN clock off

High-speed on-chip oscillator on = 5MHz

Low-speed on-chip oscillator on = 125 kHz

No division

— 85degreesC
— 25degreesC
— -40degreesC



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Icc vs Vcc

(High-speed on-chip oscillator mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

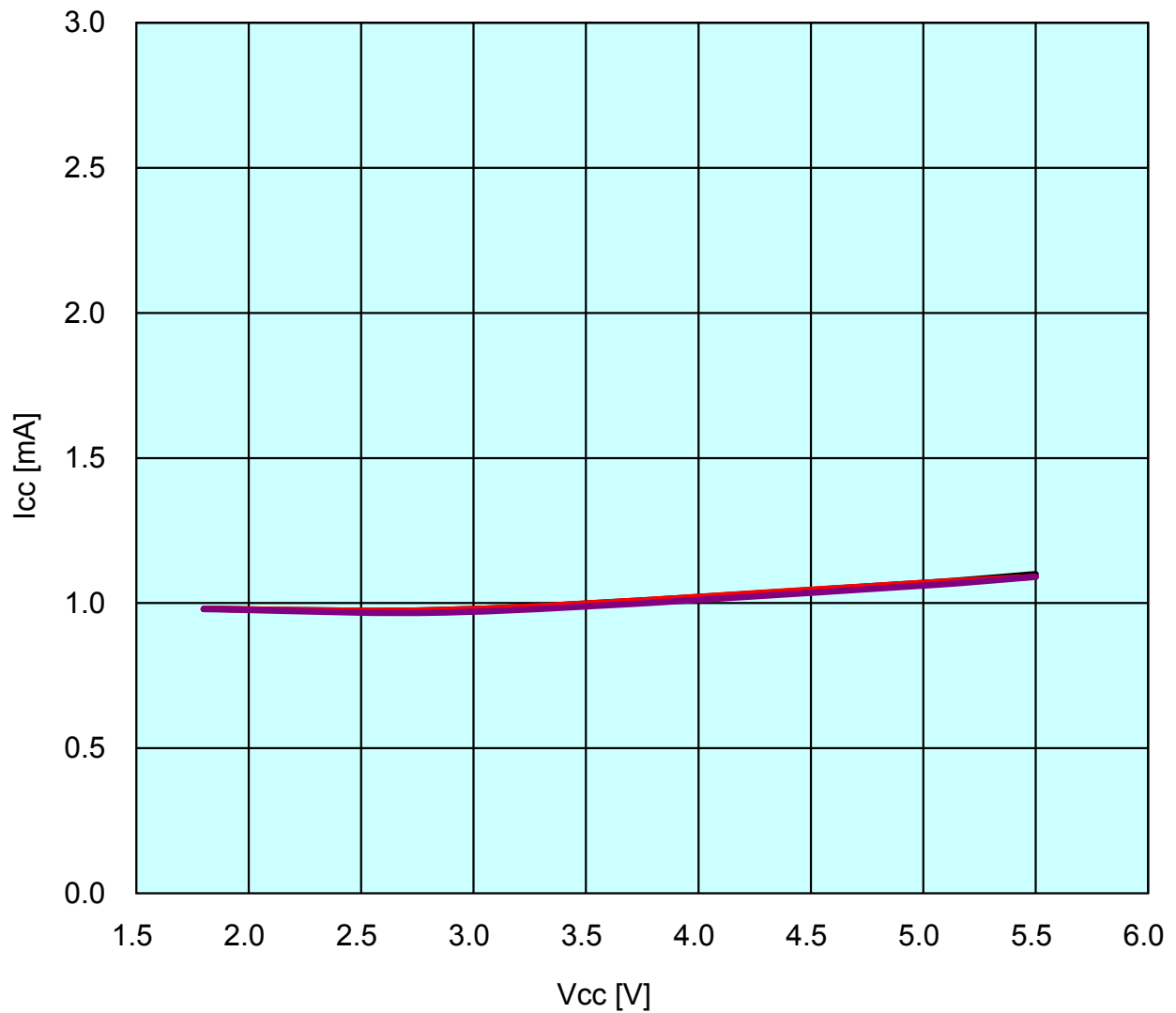
XIN clock off

High-speed on-chip oscillator on = 5MHz

Low-speed on-chip oscillator on = 125 kHz

Divide-by-8

— 85degreesC
— 25degreesC
— -40degreesC



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I_{CC} vs V_{CC} (High-speed on-chip oscillator mode)

Prepared on Feb. 24, 2012

R8C/38T-A Group

XIN clock off

High-speed on-chip oscillator on = 4MHz

Low-speed on-chip oscillator on = 125 kHz

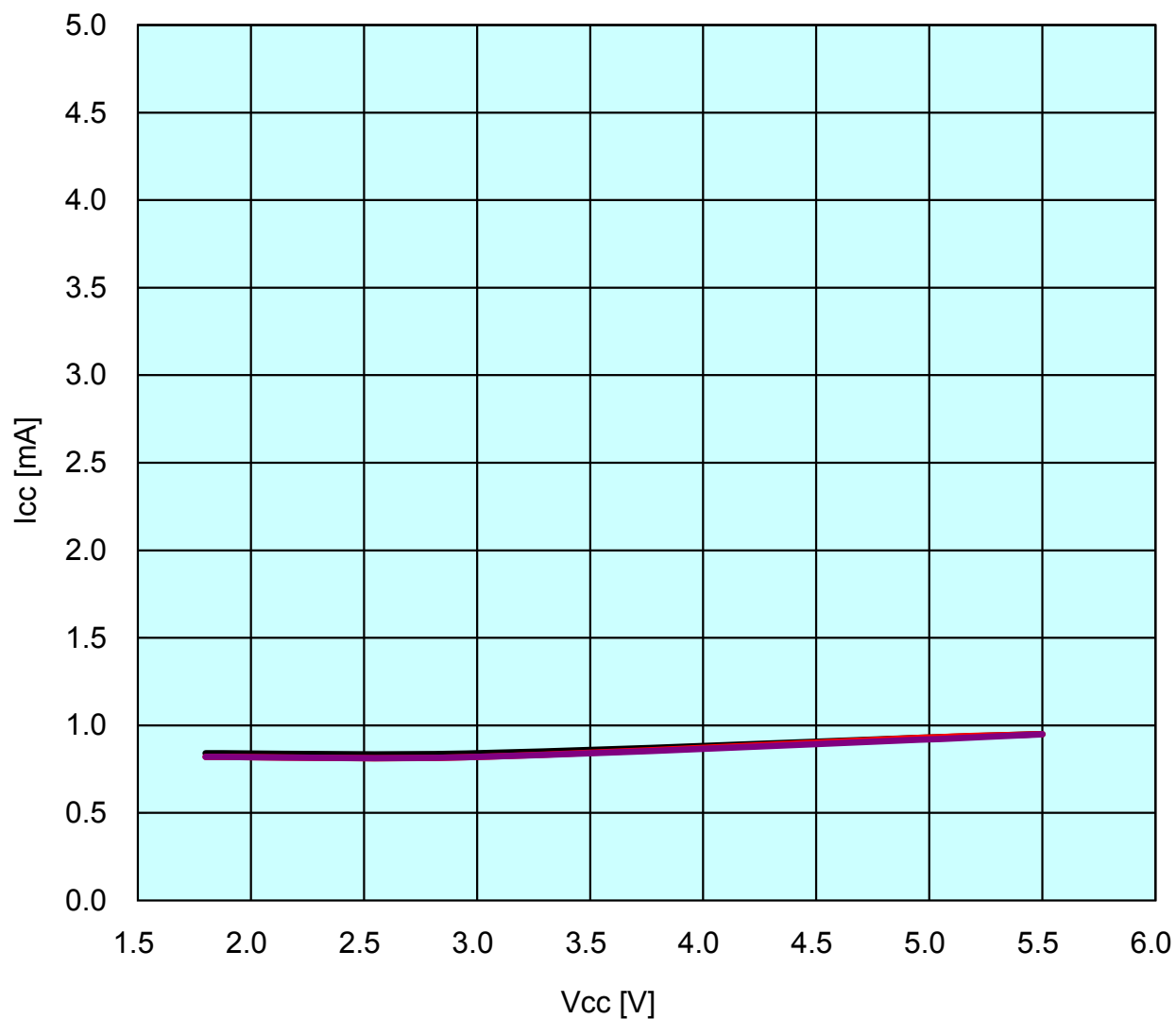
Divide-by-16

MSTIIC = MSTTRD = MSTTRC = 1

— 85degreesC

— 25degreesC

— -40degreesC



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Alcc vs AVcc

(during A/D conversion)

Prepared on Feb. 24, 2012

R8C/38T-A Group

Topr = 25 degrees C

AVcc-Vss:0.1uF Vref-Vss:0.1uF

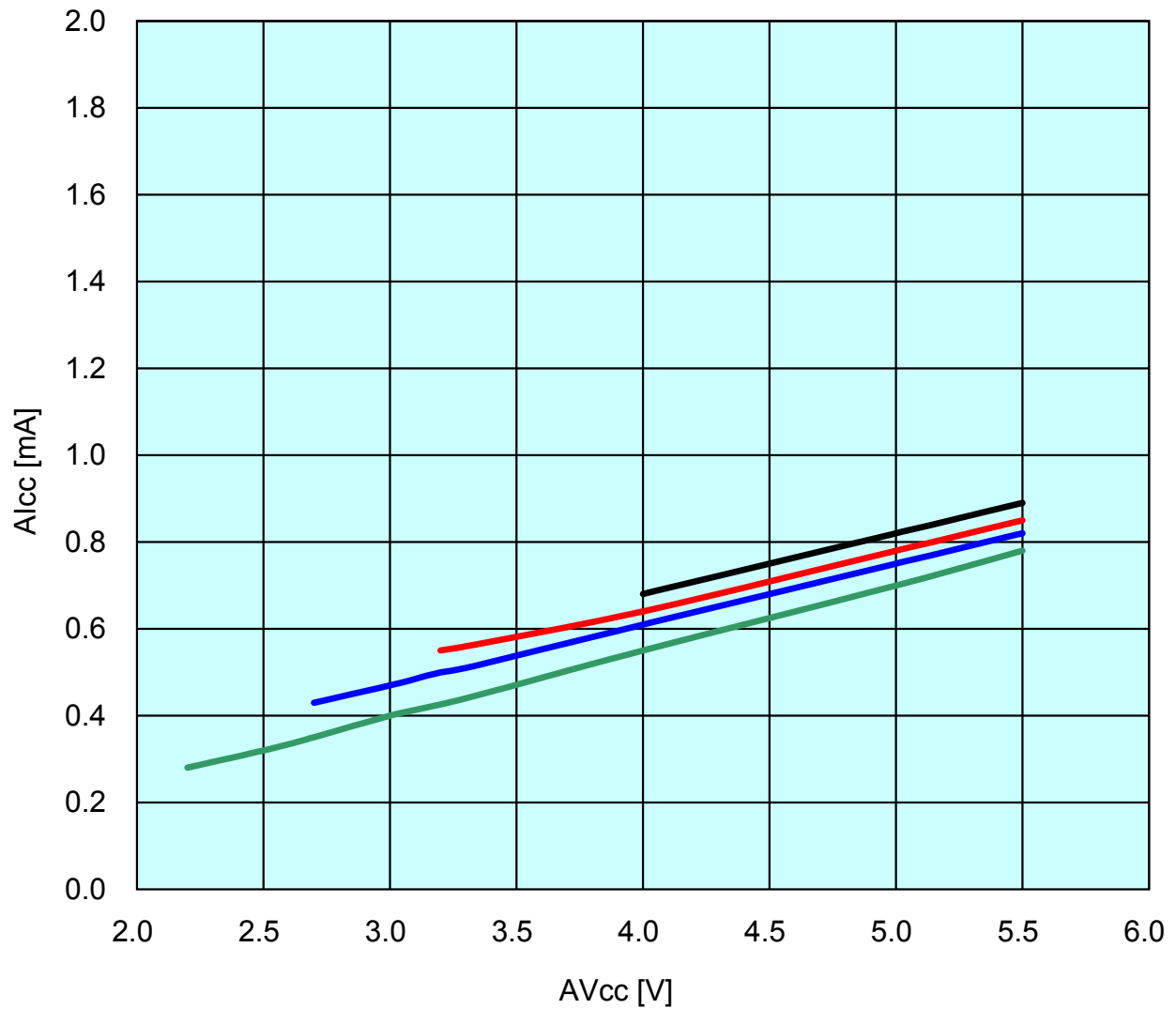
ANIN-Vss:0.1uF

10-bit mode

Repeat mode 0

The ICC amount of increase when analog to digital conversion operates

- XIN=20MHz, φAD=20MHz
- XIN=16MHz, φAD=16MHz
- XIN=10MHz, φAD=10MHz
- XIN=5MHz, φAD=5MHz



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