1 Standard characteristics

Standard characteristics described below are just examples of the 3803 Group (spec. L)'s characteristics and are not guaranteed. For rated values, refer to **"Electrical characteristics"** of Datasheet.

1.1 Mask ROM version power source current standard characteristics

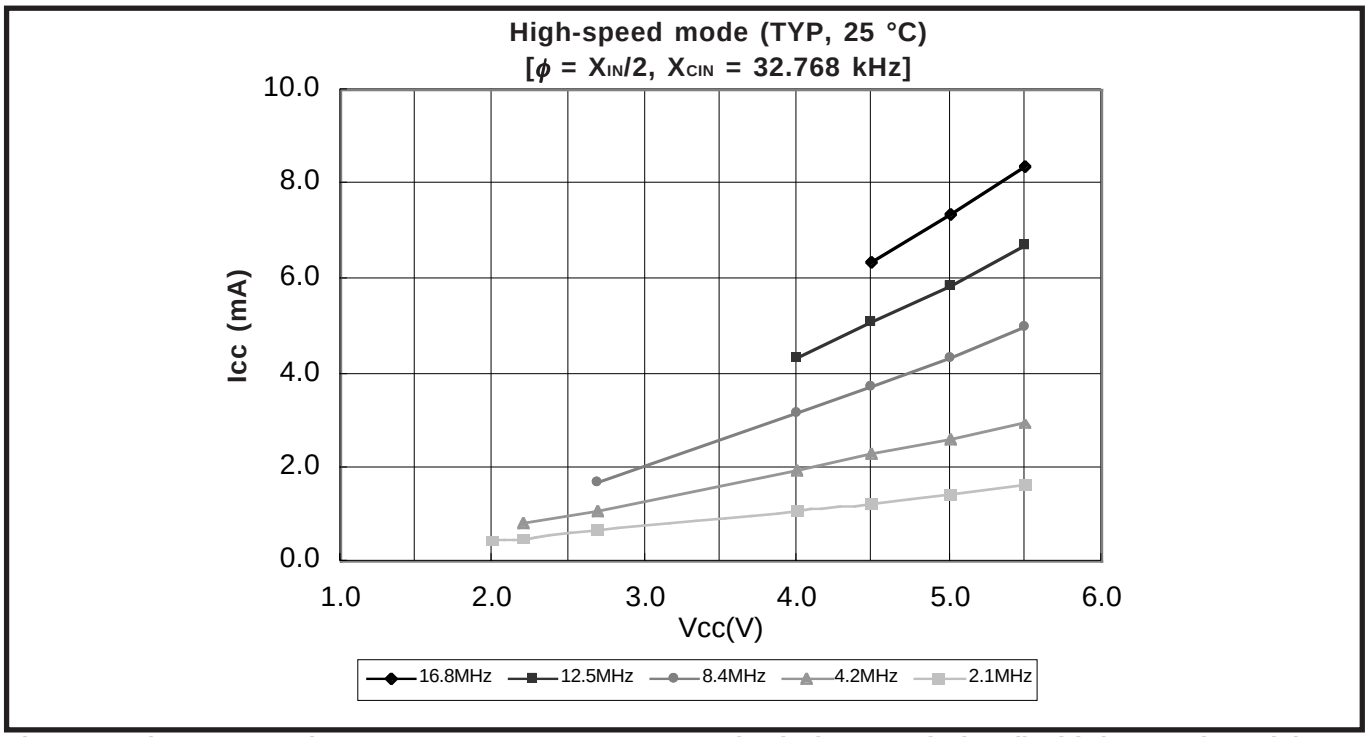

Fig. 1 Mask ROM version power source current standard characteristics (in high-speed mode)

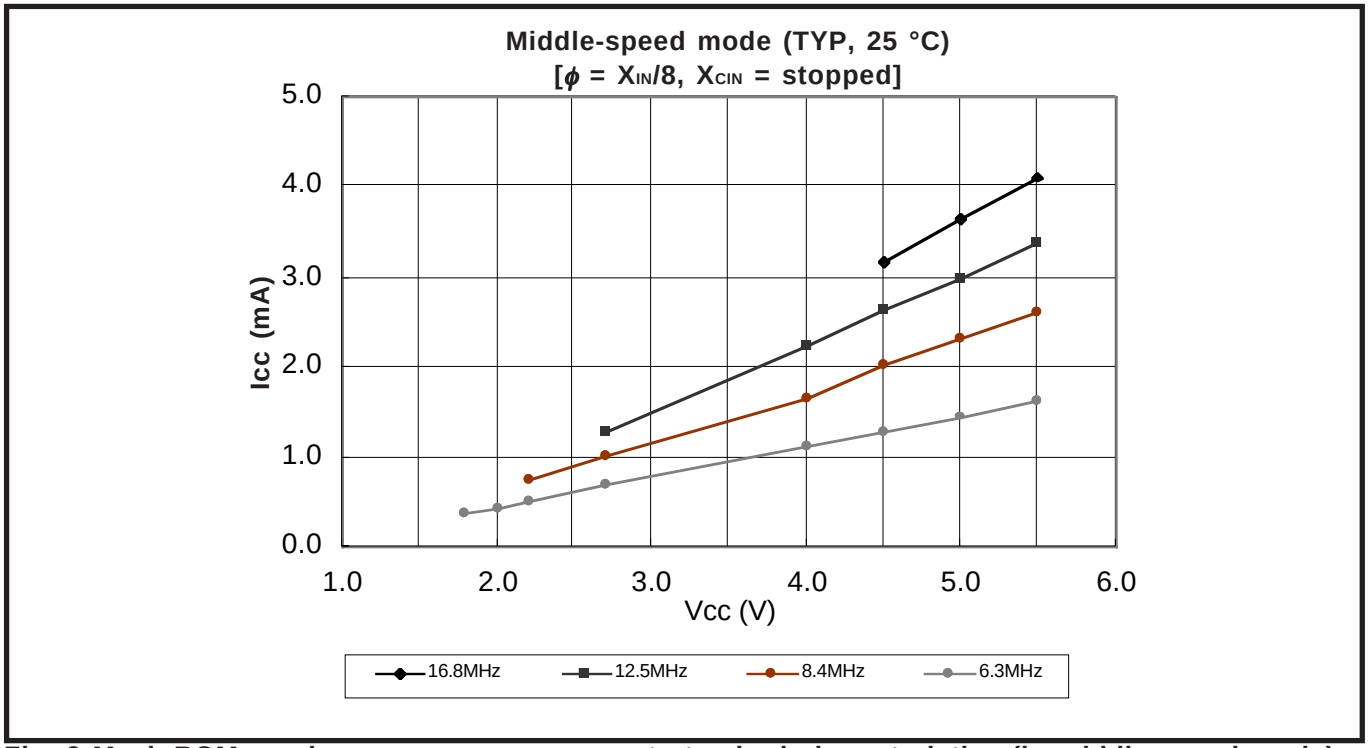

Fig. 2 Mask ROM version power source current standard characteristics (in middle-speed mode)

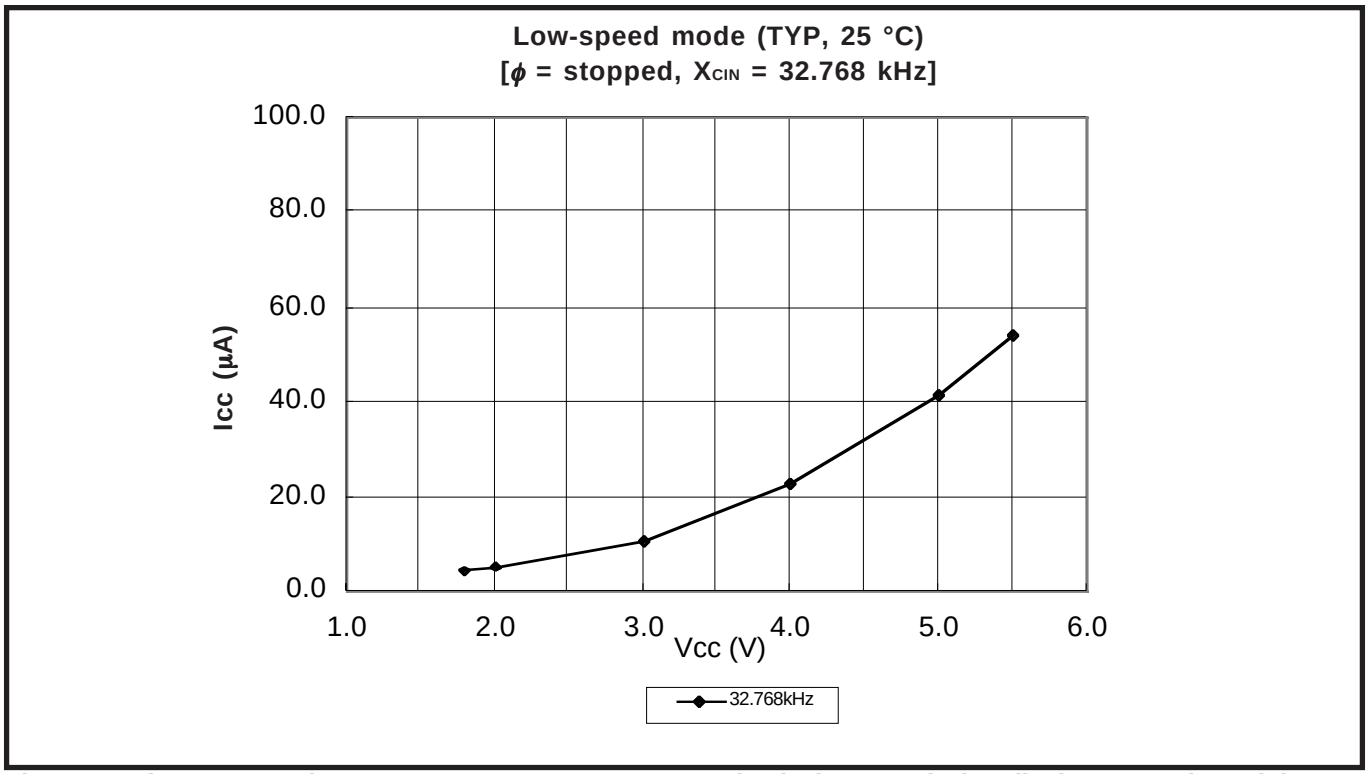

Fig. 3 Mask ROM version power source current standard characteristics (in low-speed mode)

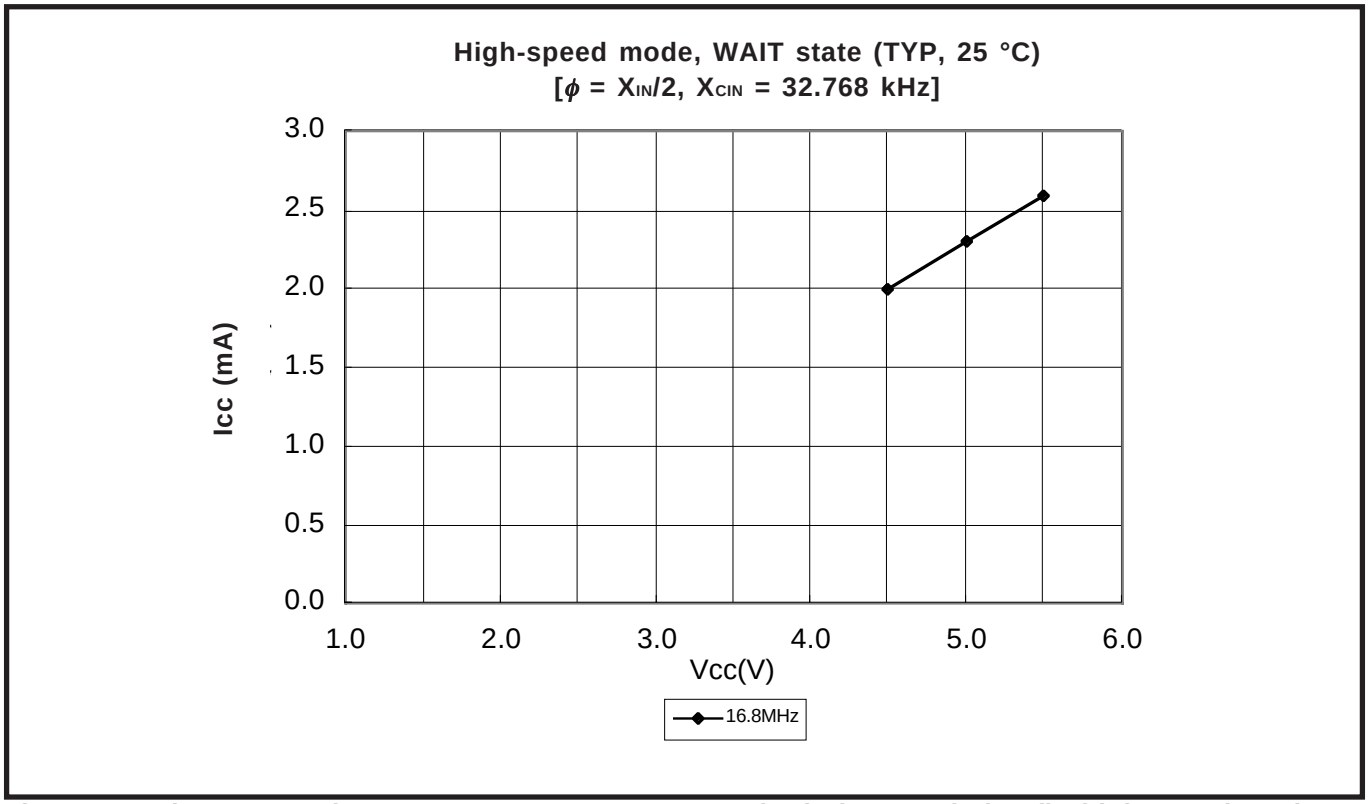

Fig. 4 Mask ROM version power source current standard characteristics (in high-speed mode, f(XIN) = 16.8 MHz, WAIT state)

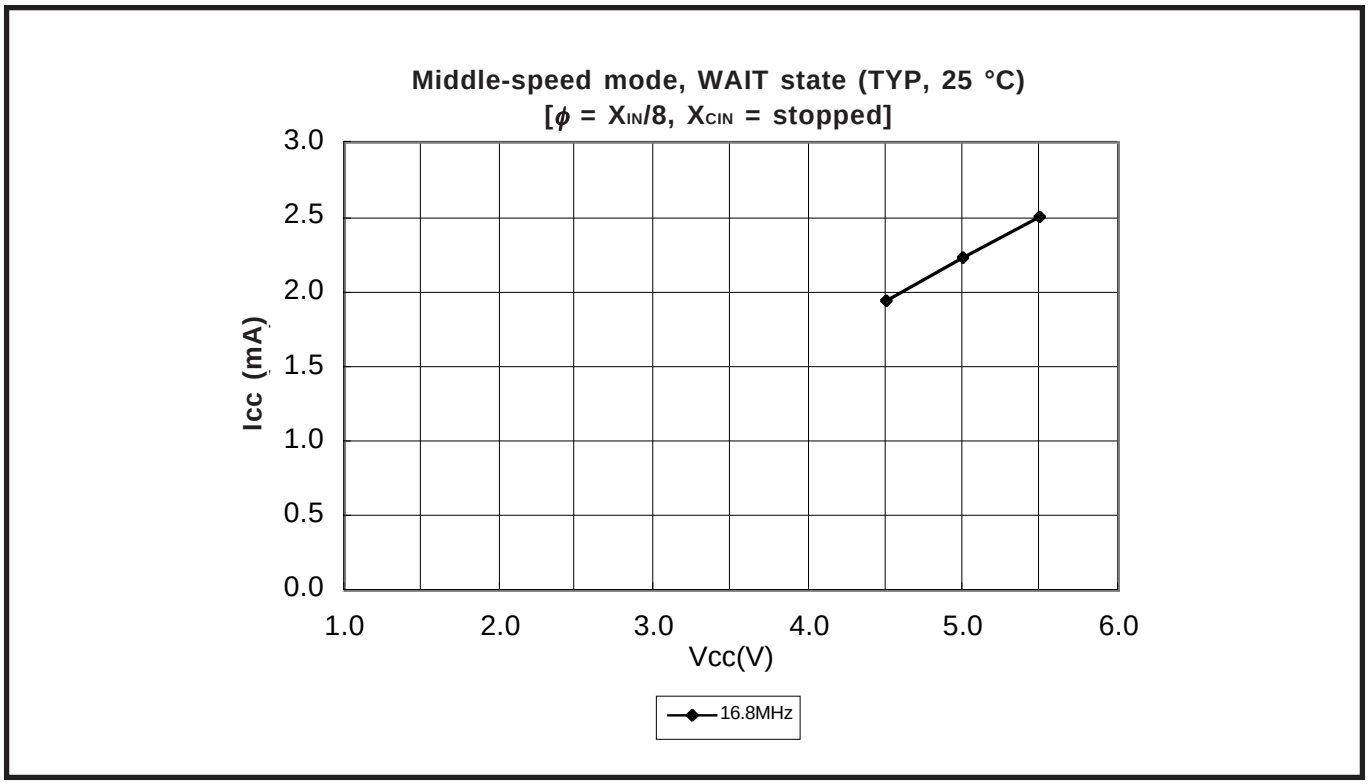

Fig. 5 Mask ROM version power source current standard characteristics (in middle-speed mode, f(XIN) = 16.8 MHz, WAIT state)

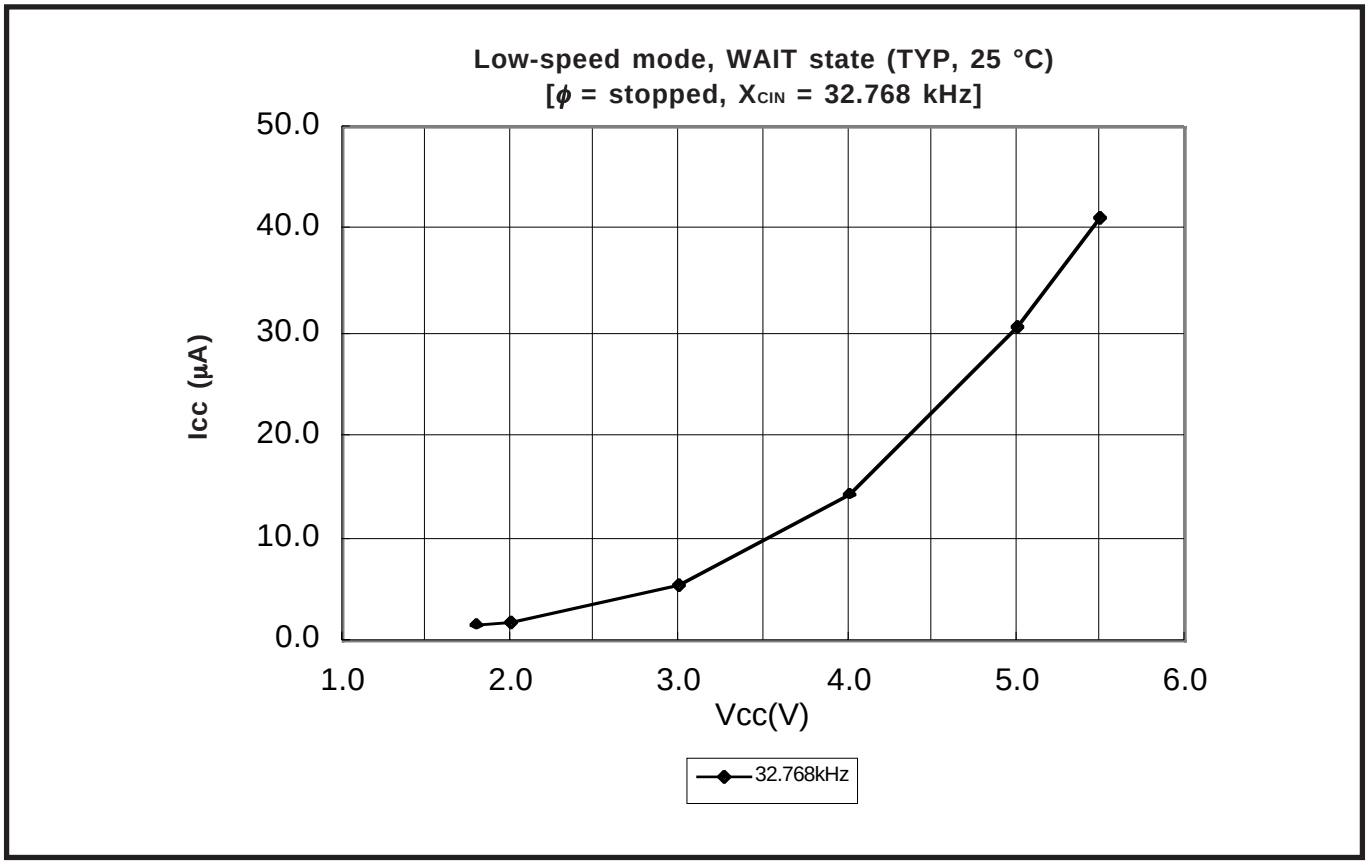

Fig. 6 Mask ROM version power source current standard characteristics (in low-speed mode, WAIT state)

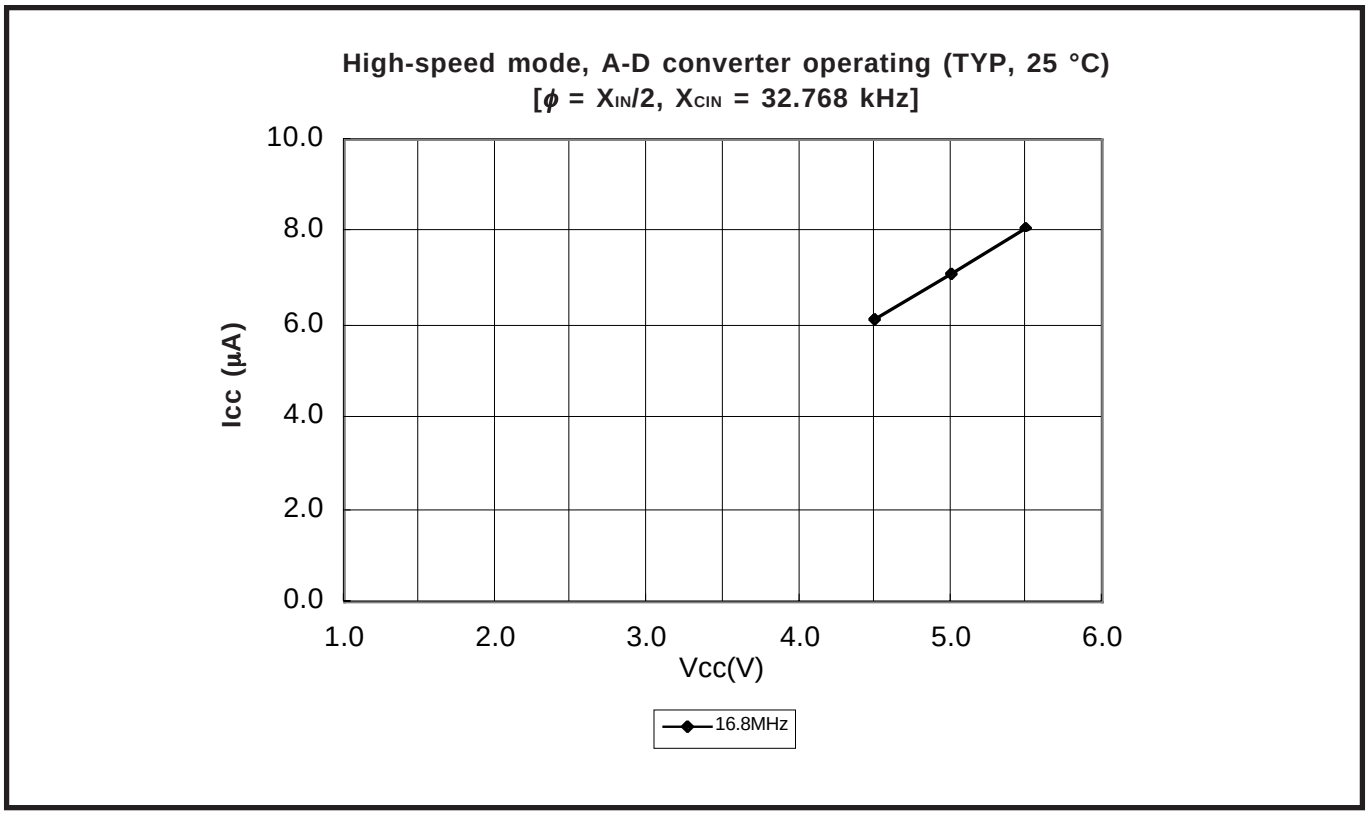

Fig. 7 Mask ROM version power source current standard characteristics (in high-speed mode, f(XIN) = 16.8 MHz, A-D converter operating)

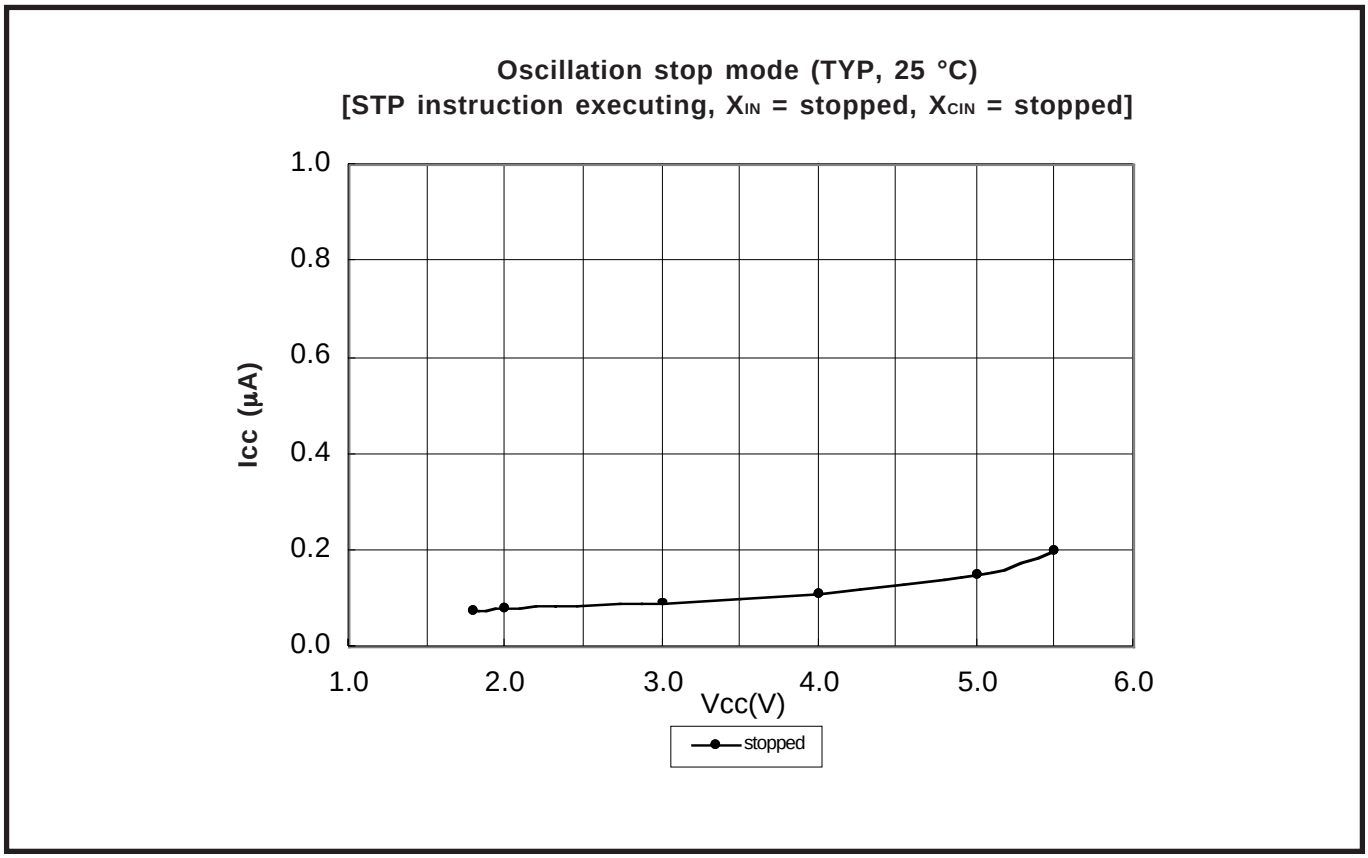

Fig. 8 Mask ROM version power source current standard characteristics (at oscillation stopping)

1.2 Flash memory version power source current standard characteristics

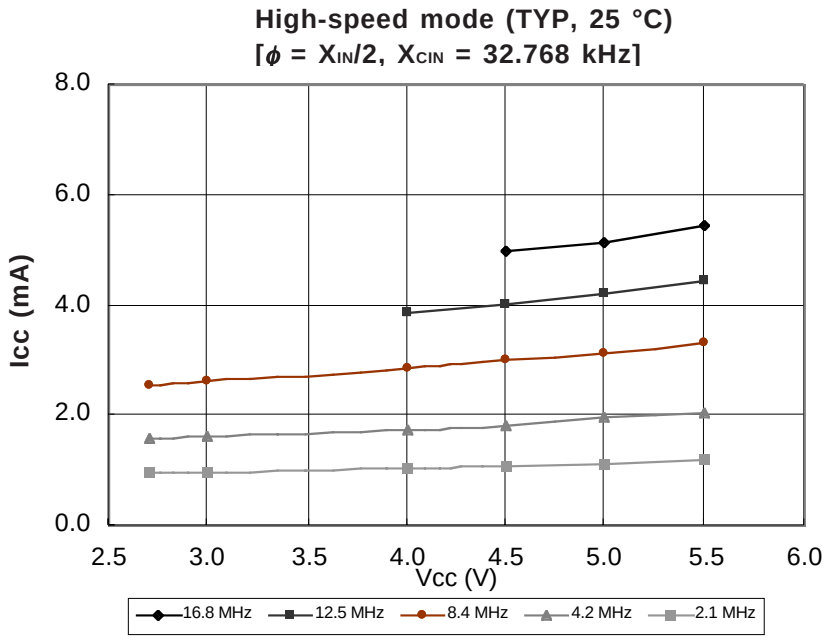

Fig. 9 Flash memory version power source current standard characteristics (in high-speed mode)

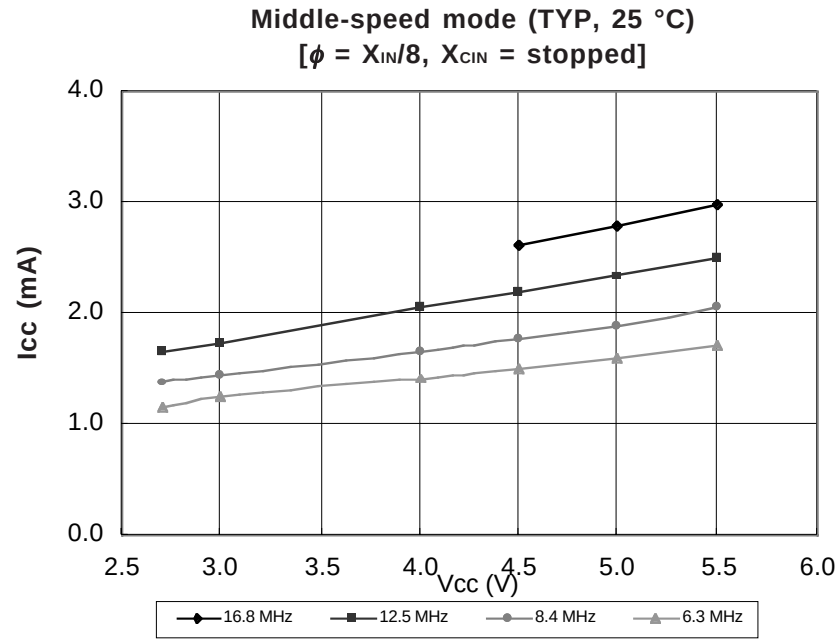

Fig. 10 Flash memory version power source current standard characteristics (in middle-speed mode)

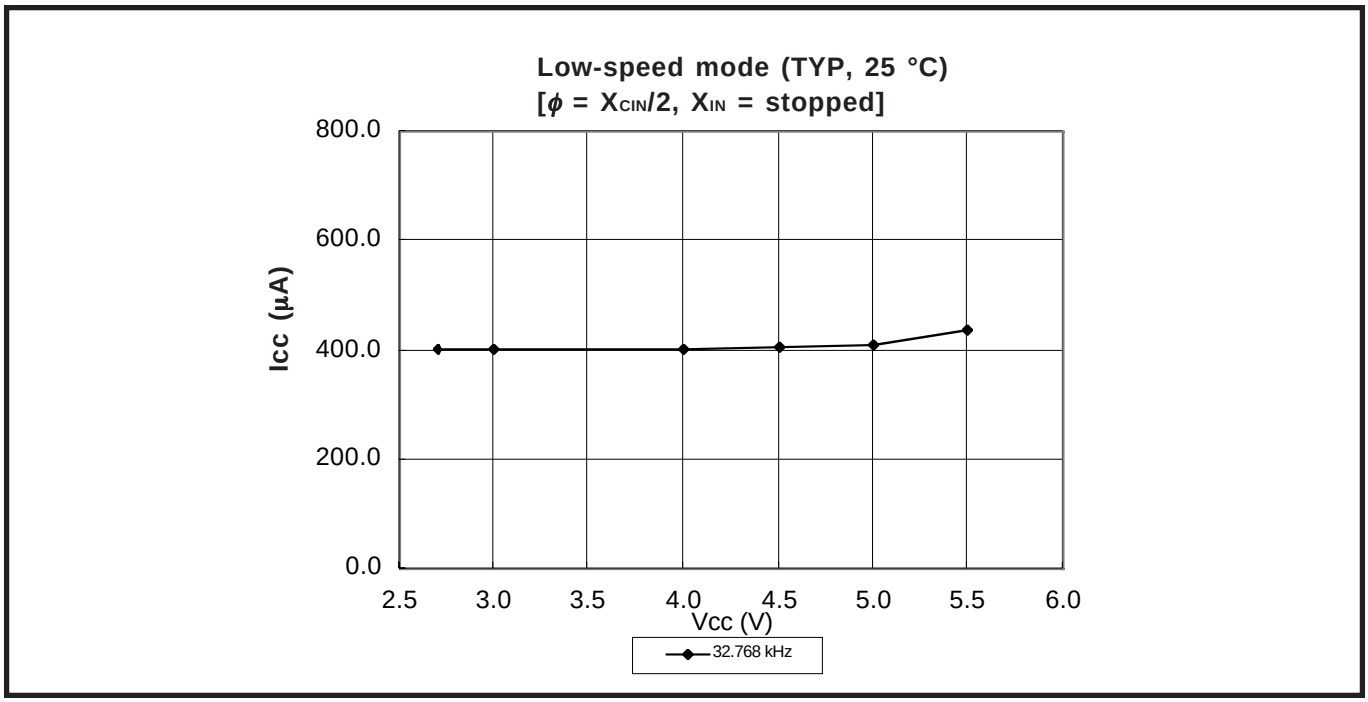

Fig. 11 Flash memory version power source current standard characteristics (in low-speed mode)

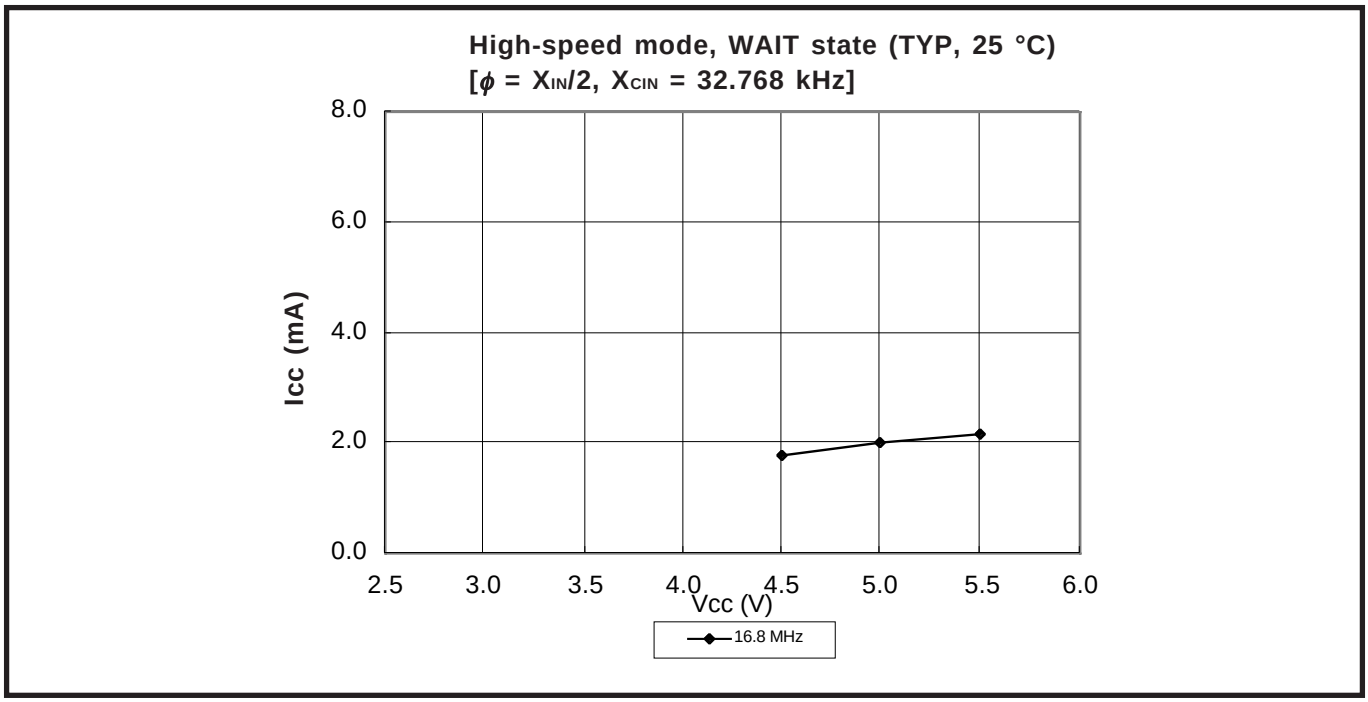

Fig. 12 Flash memory version power source current standard characteristics (in high-speed mode, f(XIN) = 16.8 MHz, WAIT state)

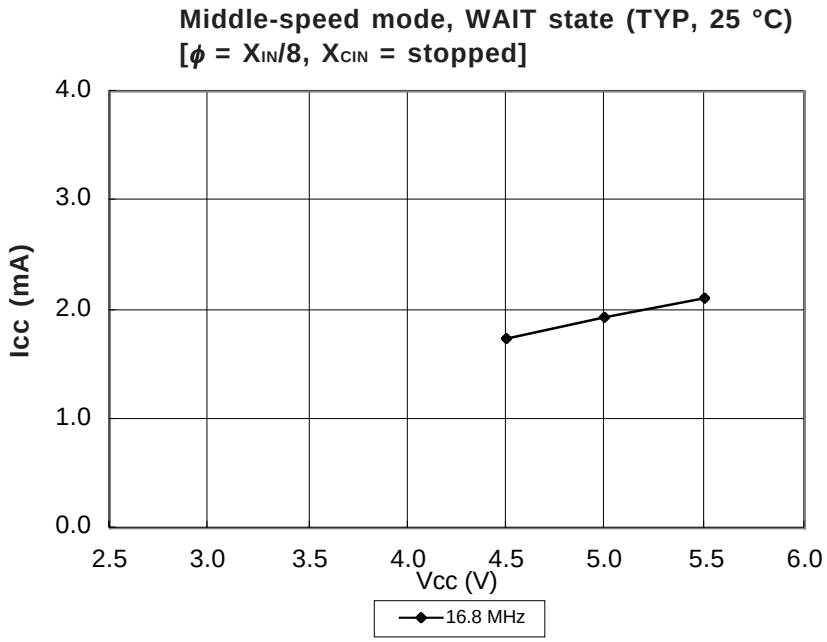

Fig. 13 Flash memory version power source current standard characteristics (in middle-speed mode, f(XIN) = 16.8 MHz, WAIT state)

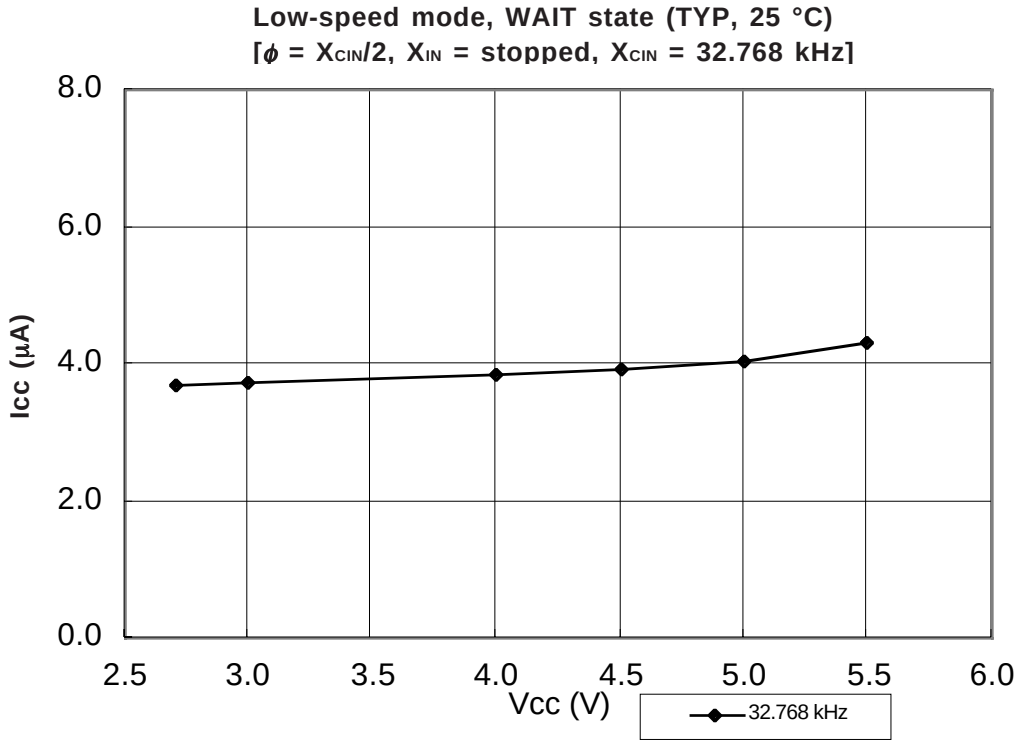

Fig. 14 Flash memory version power source current standard characteristics (in low-speed mode, WAIT state)

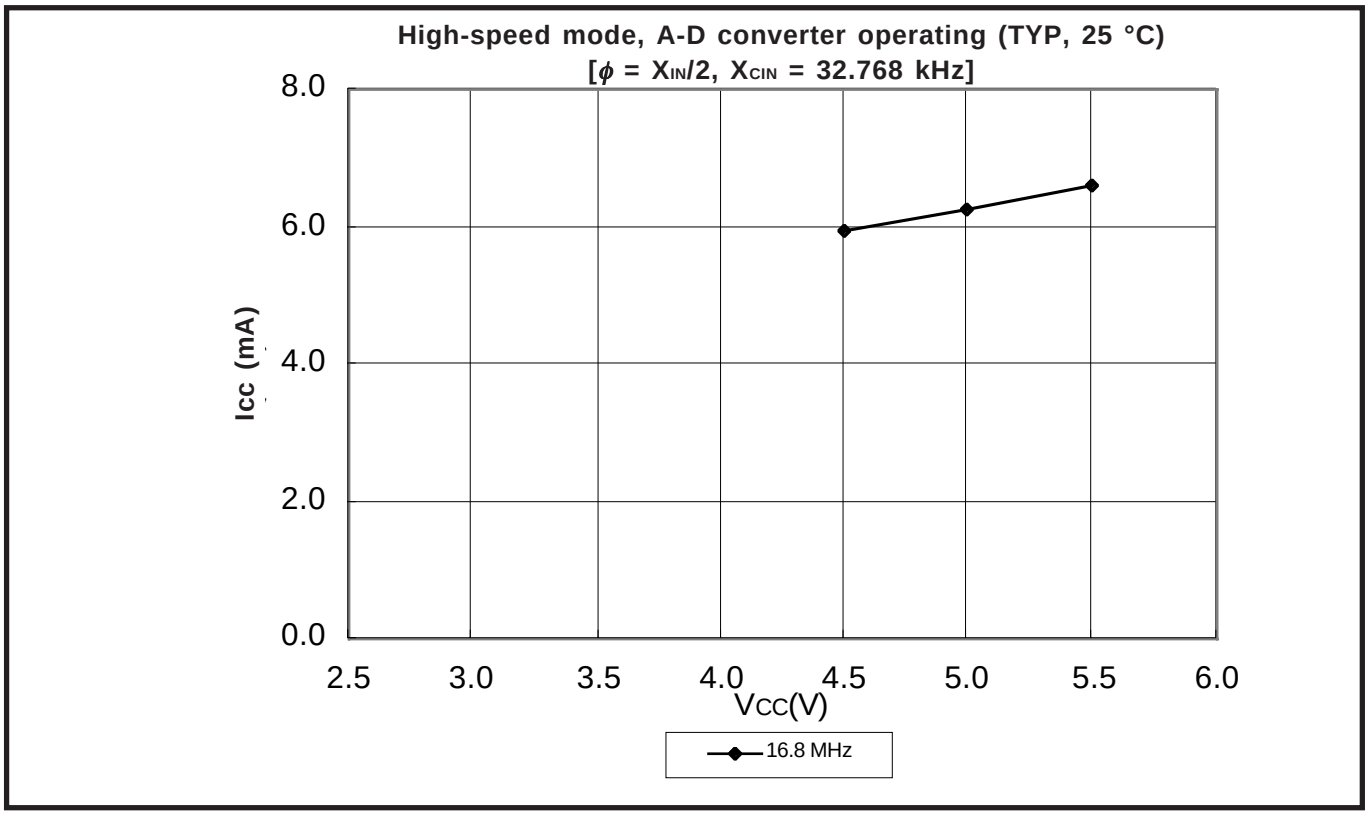

Fig. 15 Flash memory version power source current standard characteristics (in high-speed mode, f(XIN) = 16.8 MHz, A-D converter operating)

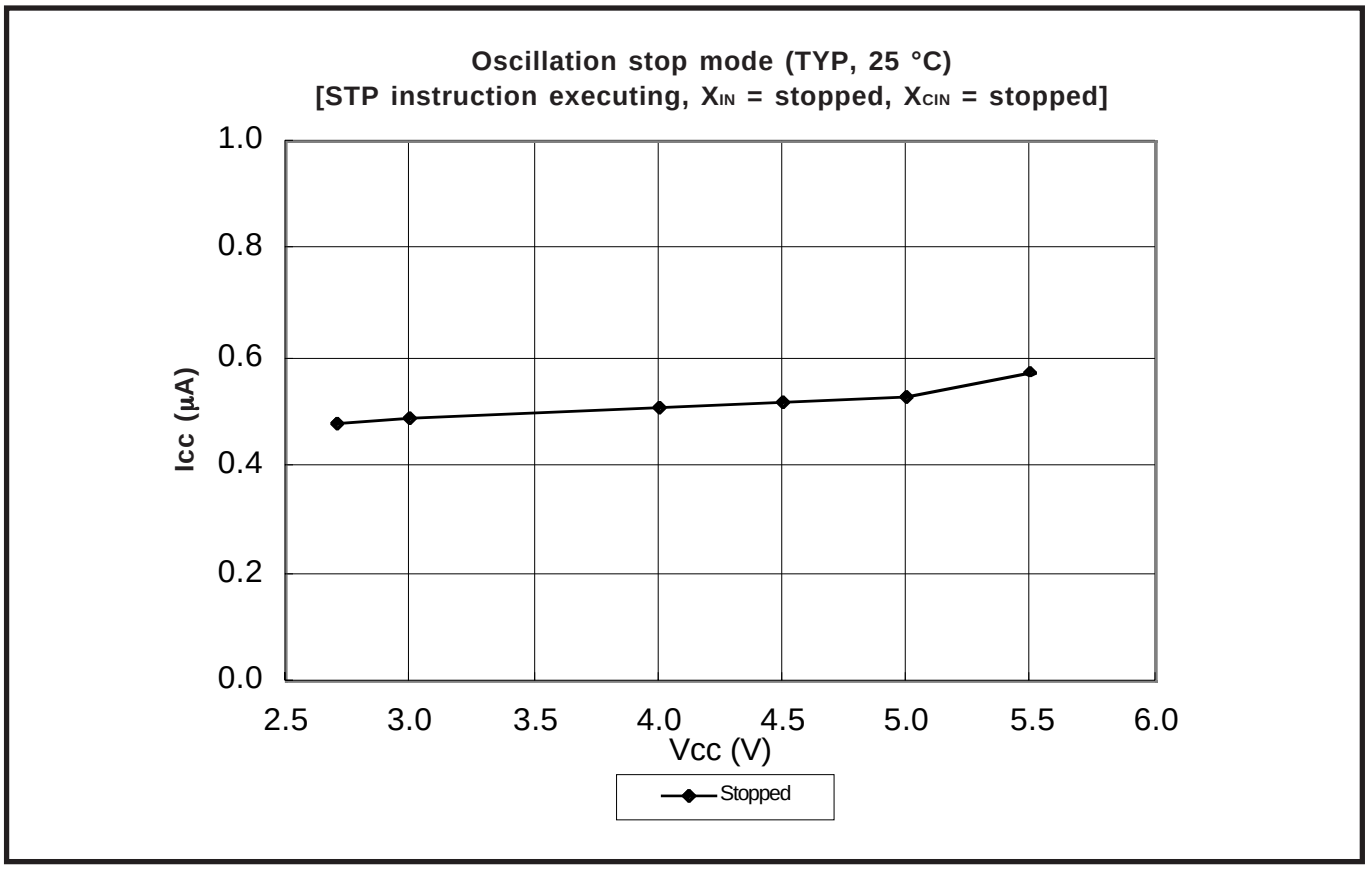

Fig. 16 Flash memory version power source current standard characteristics (at oscillation stopping)

1.3 Mask ROM version port standard characteristics

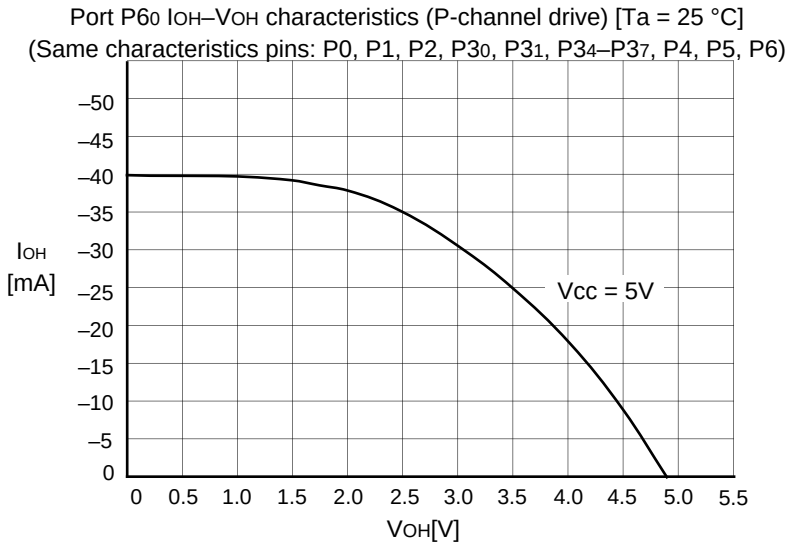

Fig. 17 CMOS output port P-channel side characteristics (Ta = 25 °C)

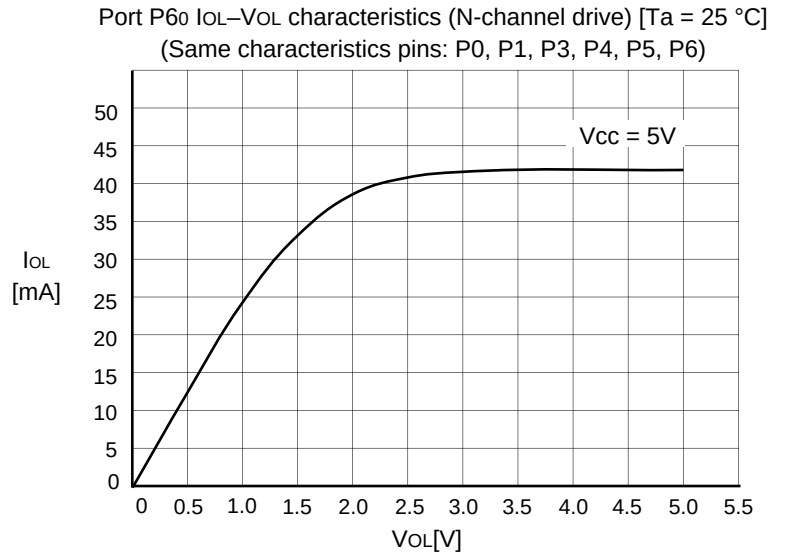

Fig. 18 CMOS output port N-channel side characteristics (Ta = 25 °C)

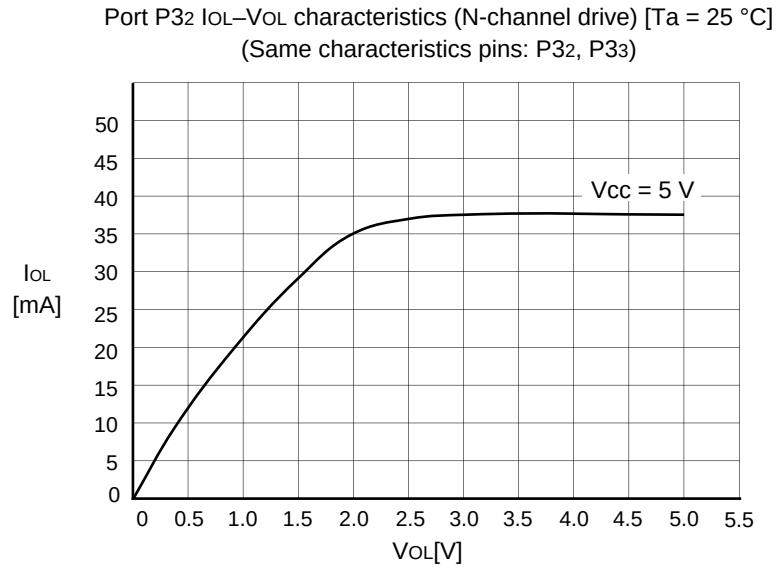

Fig. 19 N-channel open-drain output port N-channel side characteristics (Ta = 25 °C)

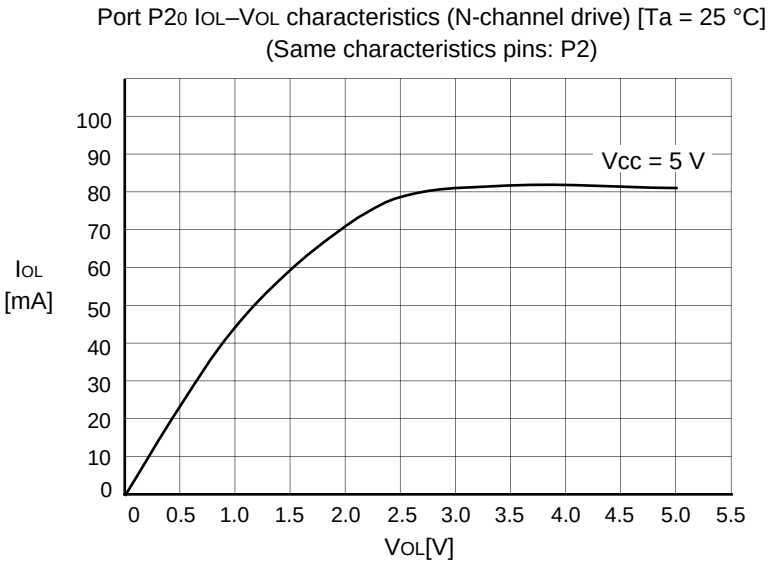

Fig. 20 CMOS large current output port N-channel side characteristics (Ta = 25 °C)

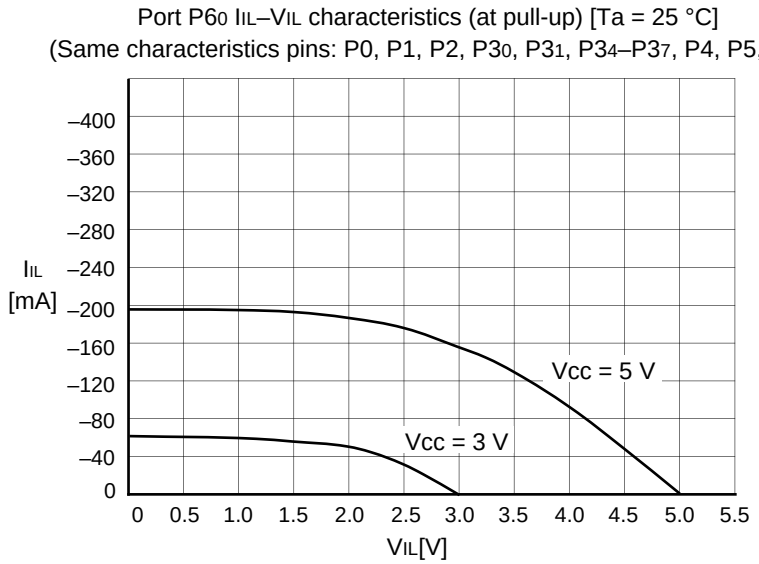

Fig. 21 CMOS input port at pull-up characteristics (Ta = 25 °C)

1.4 Flash memory version port standard characteristics

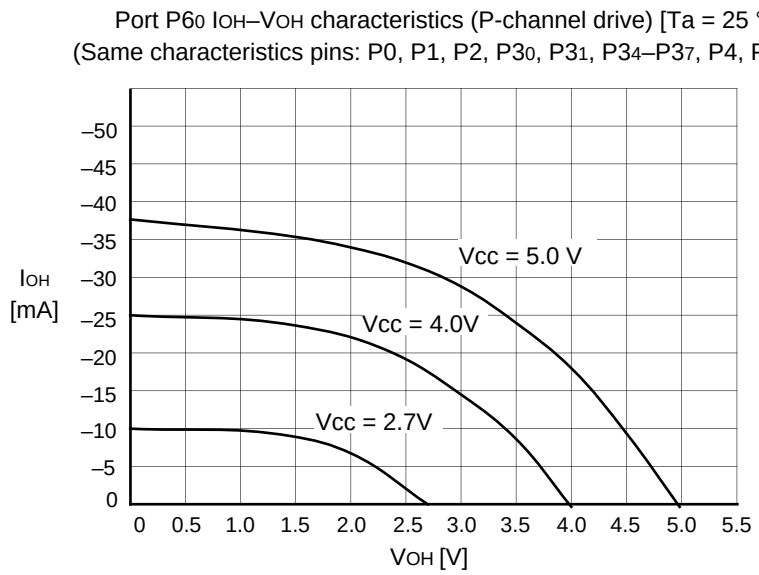

Fig. 22 CMOS output port P-channel side characteristics (Ta = 25 °C)

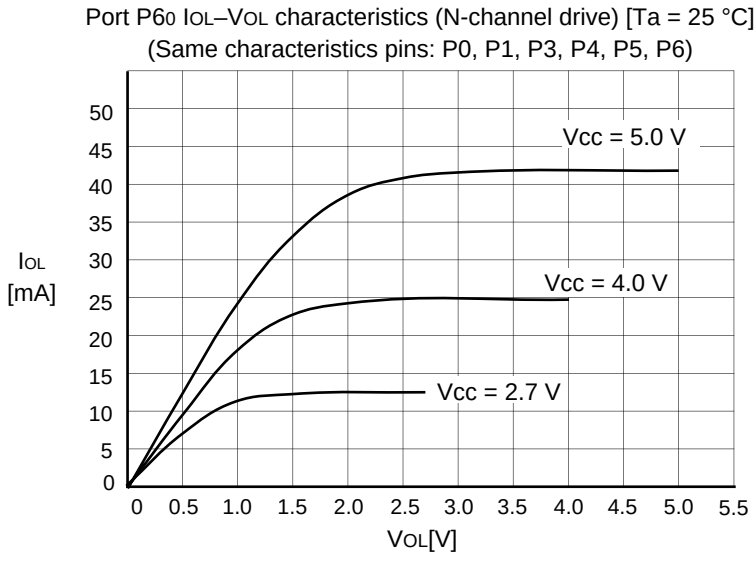

Fig. 23 CMOS output port N-channel side characteristics (Ta = 25 °C)

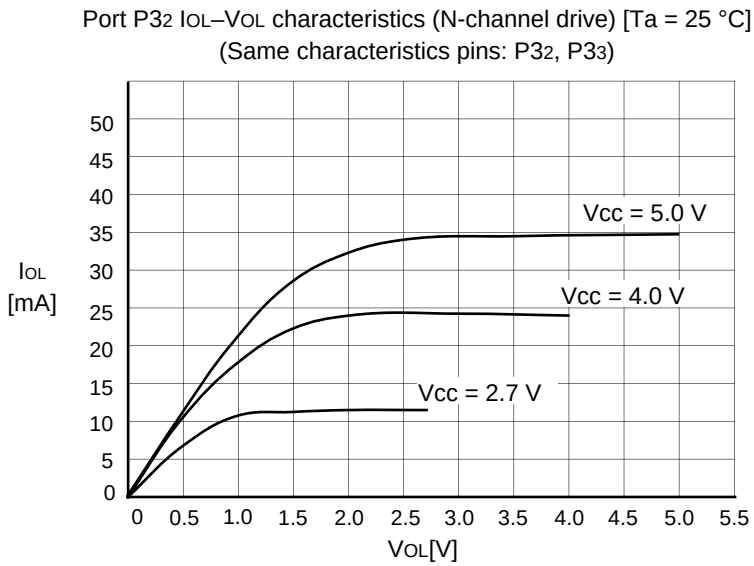

Fig. 24 N-channel open-drain output port N-channel side characteristics (Ta = 25 °C)

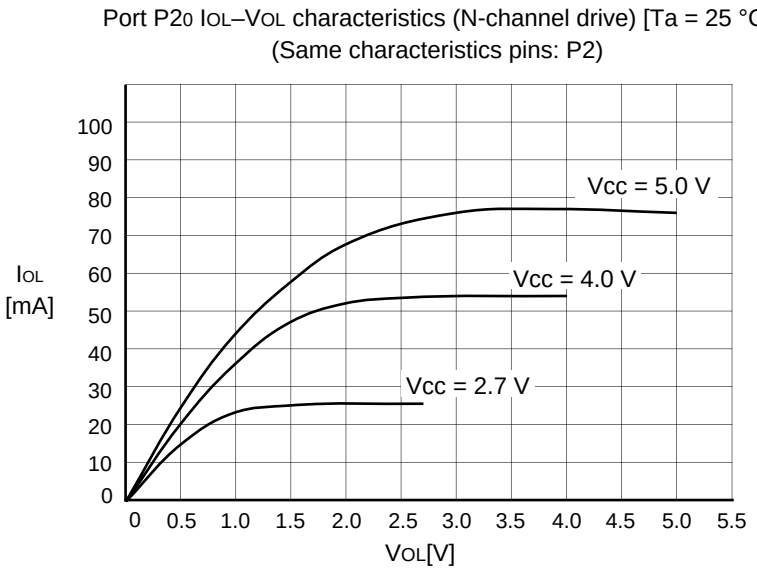

Fig. 25 CMOS large current output port N-channel side characteristics (Ta = 25 °C)

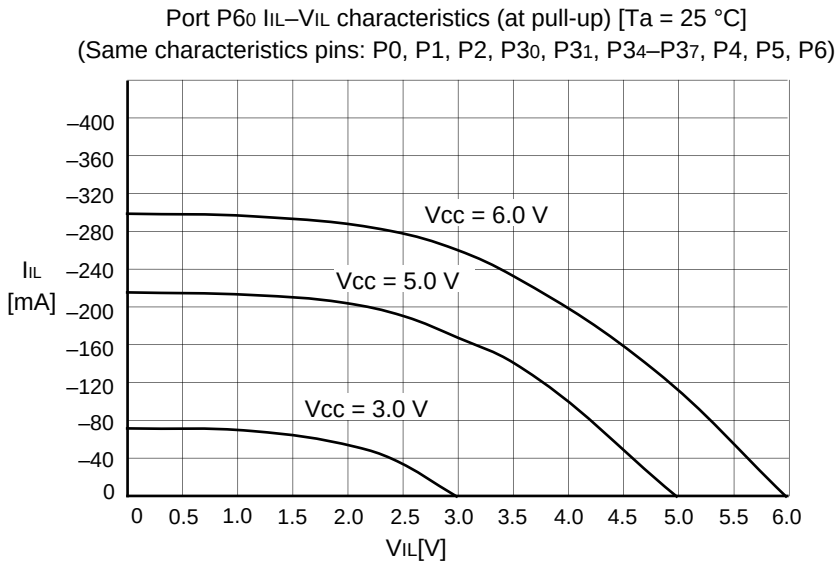

Fig. 26 CMOS input port at pull-up characteristics (Ta = 25 °C)

1.5 A-D conversion standard characteristics

Figure. 27 and Figure. 28 show the mask ROM version A-D conversion standard characteristics. Figure. 29, Figure. 30, and Figure. 31 show the flash memory version A-D conversion standard characteristics. The thick lines of the graph indicate the absolute precision errors, These are expressed as the deviation from the ideal value when the output code changes. For example, the change in output code from 512 to 513 should occur at 2560 mV, but the measured value is –1.0 mV. Accordingly, the measured point of change is 2560 – 1.0 = 2559 mV.

The thin lines of the graph indicate the input voltage width for which the output code is constant. For example, the measured input voltage width for which the output code is 512 is 5.0 mV, so that the differential non-linear error is 5.0 – 5.0 = 0.0 mV (0 LSB).

M38039MFL-001SP A-D CONV. ERROR & STEP WIDTH

V_{DD} = 5.12 [V], V_{REF} = 5.12 [V]
X_{IN} = 8 [MHz], Ta = 25 [deg.]

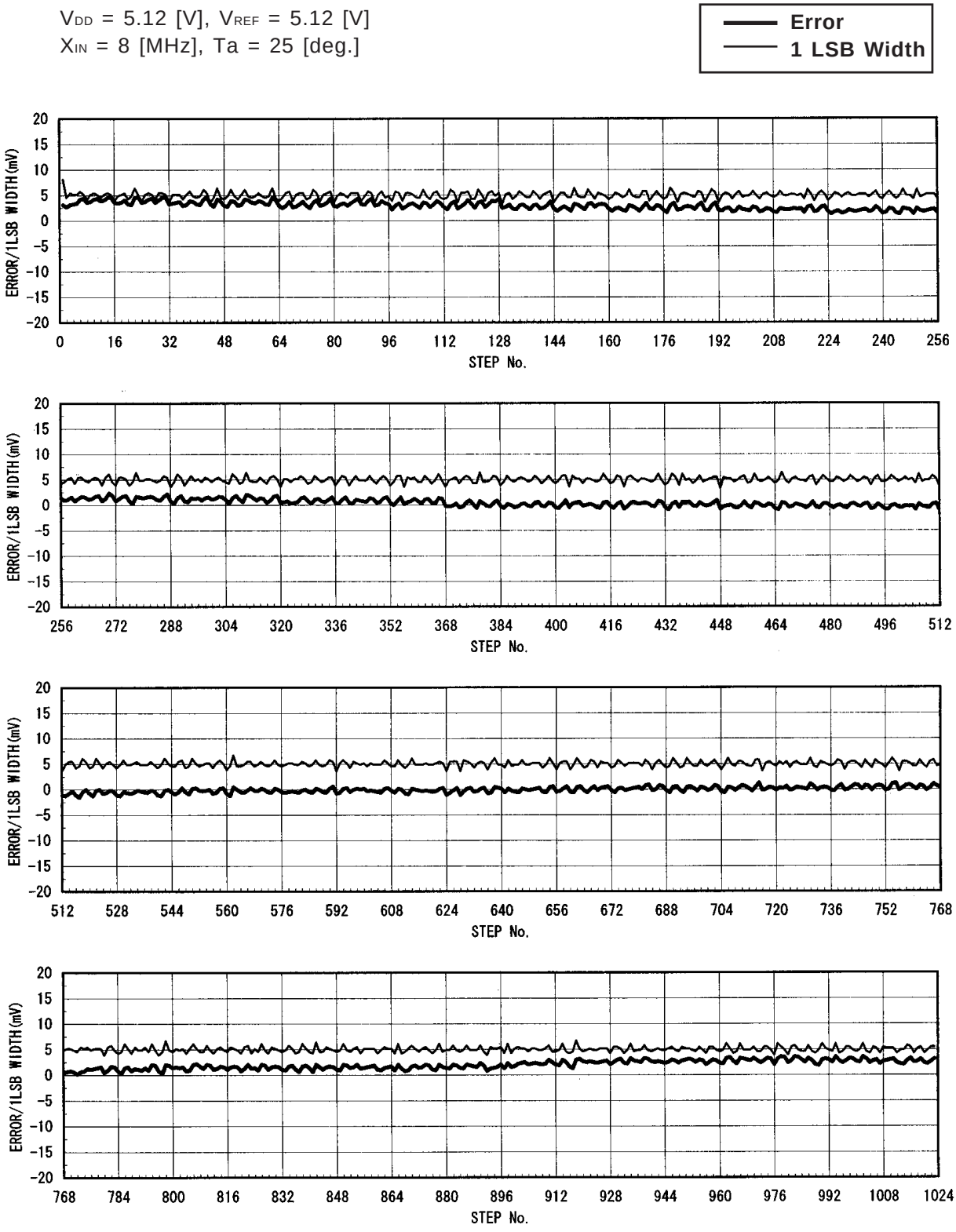

Fig. 27 Mask ROM version A-D conversion standard characteristics (f(X_{IN}) = 8 MHz)

M38039MFL-001SP A-D CONV. ERROR & STEP WIDTH

V_{DD} = 5.12 [V], V_{REF} = 5.12 [V]
X_{IN} = 12 [MHz], Ta = 25 [deg.]

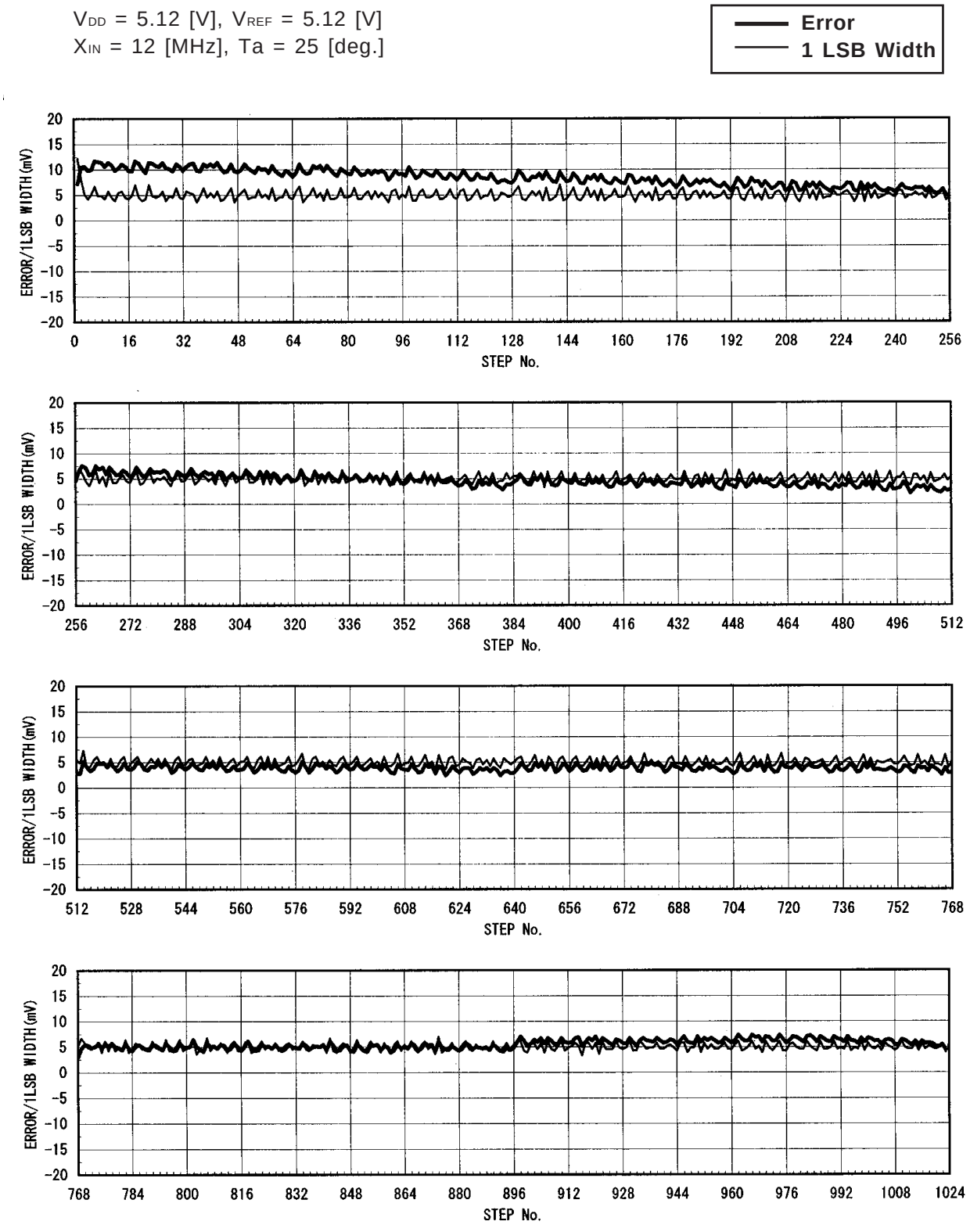

Fig. 28 Mask ROM version A-D conversion standard characteristics (f(X_{IN}) = 12 MHz)

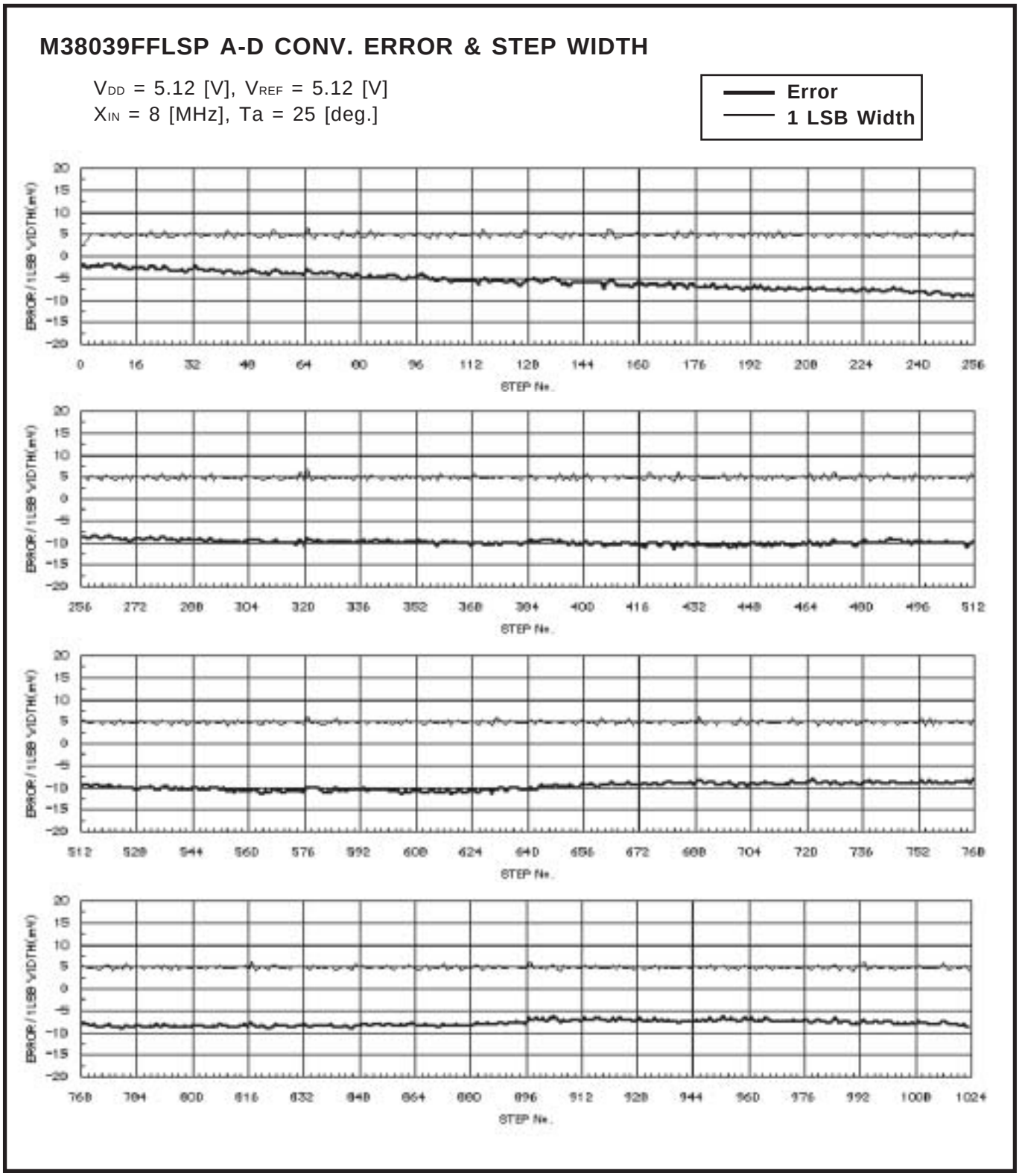

Fig. 29 Flash memory version A-D conversion standard characteristics (f(X_{IN}) = 8 MHz)

M38039FFLSP A-D CONV. ERROR & STEP WIDTH

V_{DD} = 5.12 [V], V_{REF} = 5.12 [V]
X_{IN} = 12 [MHz], Ta = 25 [deg.]

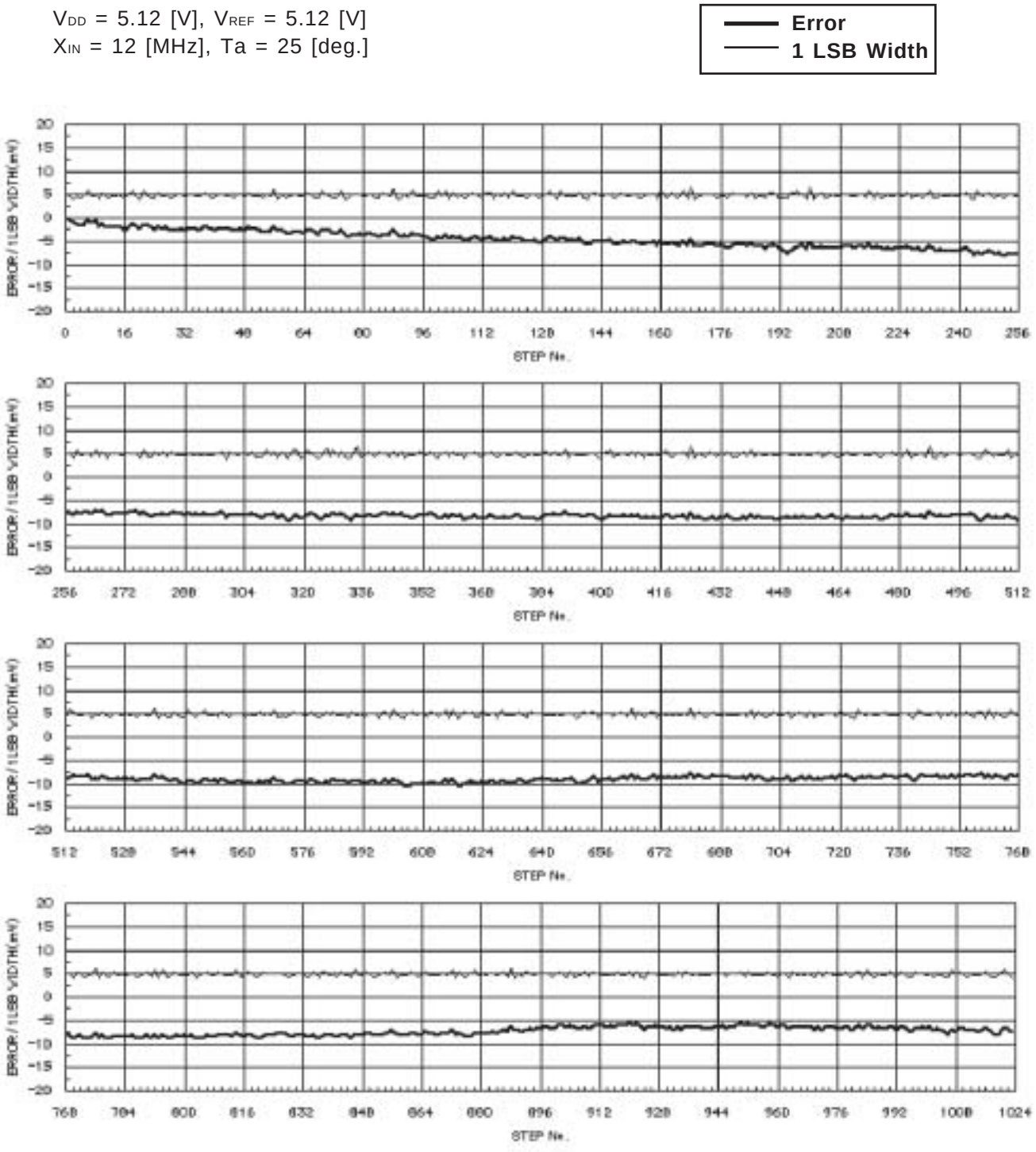

Fig. 30 Flash memory version A-D conversion standard characteristics (f(X_{IN}) = 12 MHz)

M38039FFLSP A-D CONV. ERROR & STEP WIDTH

V_{DD} = 5.12 [V], V_{REF} = 5.12 [V]
X_{IN} = 16 [MHz], Ta = 25 [deg.]

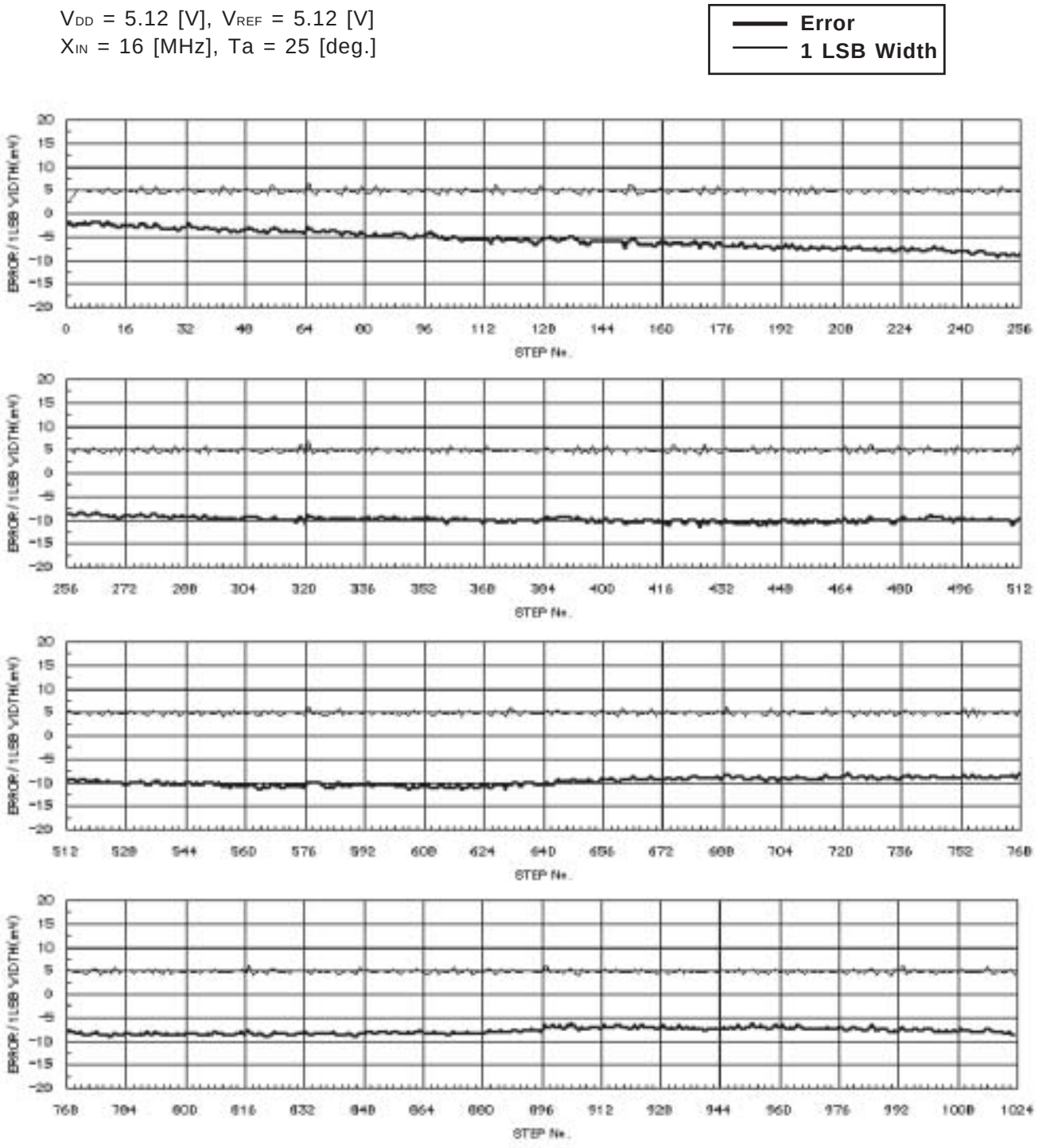

Fig. 31 Flash memory version A-D conversion standard characteristics (f(X_{IN}) = 16 MHz)

1.6 D-A conversion standard characteristics

Figure. 32 shows the mask ROM version D-A conversion standard characteristics. Figure. 33 shows the flash memory version D-A conversion standard characteristics.

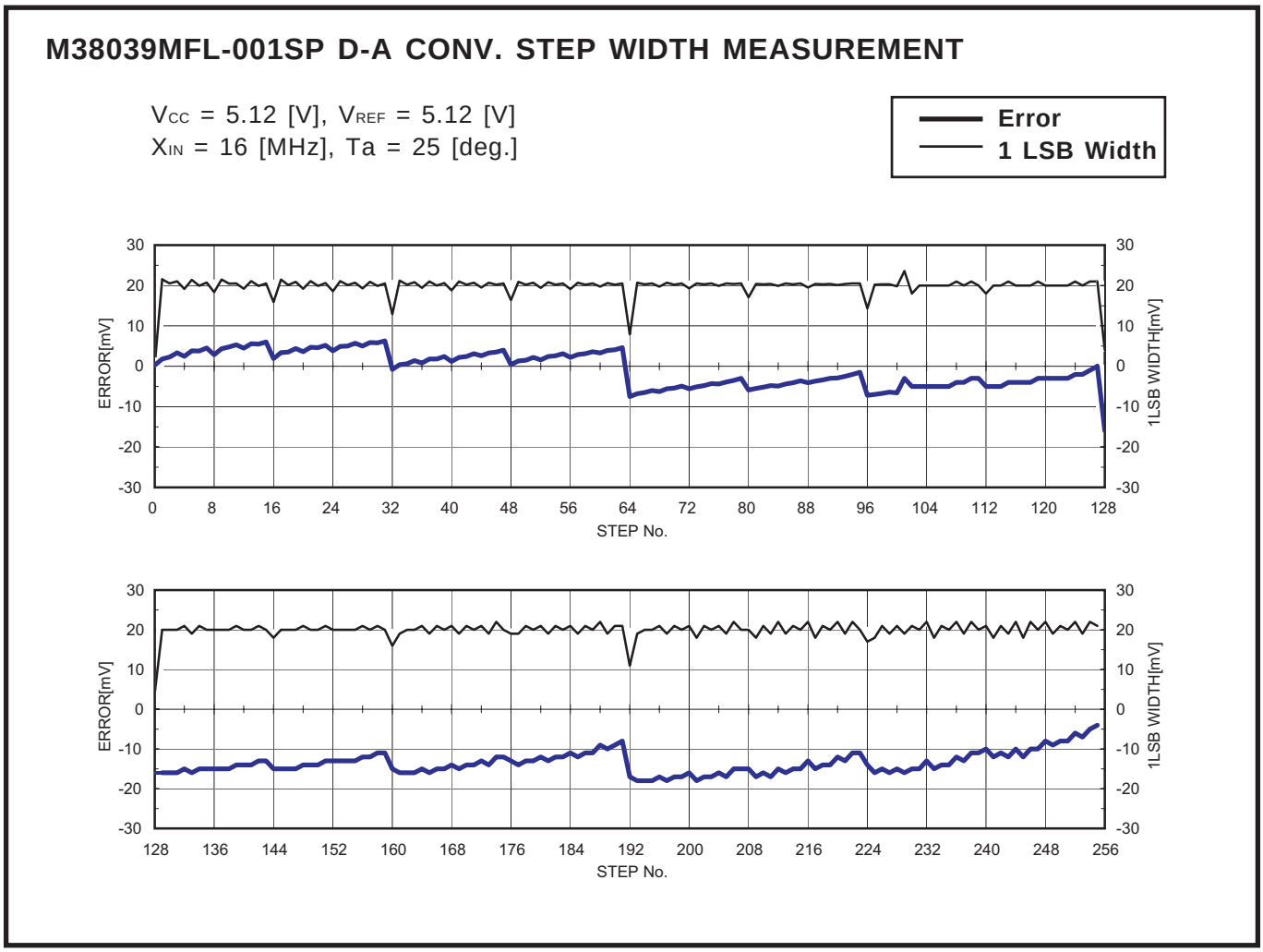

Fig. 32 Mask ROM version D-A conversion standard characteristics (revised in rev. 2.00)

M38039FFLSP D-A CONV. STEP WIDTH MEASUREMENT

V_{CC} = 5.12 [V], V_{REF} = 5.12 [V]
X_{IN} = 16 [MHz], Ta = 25 [deg.]

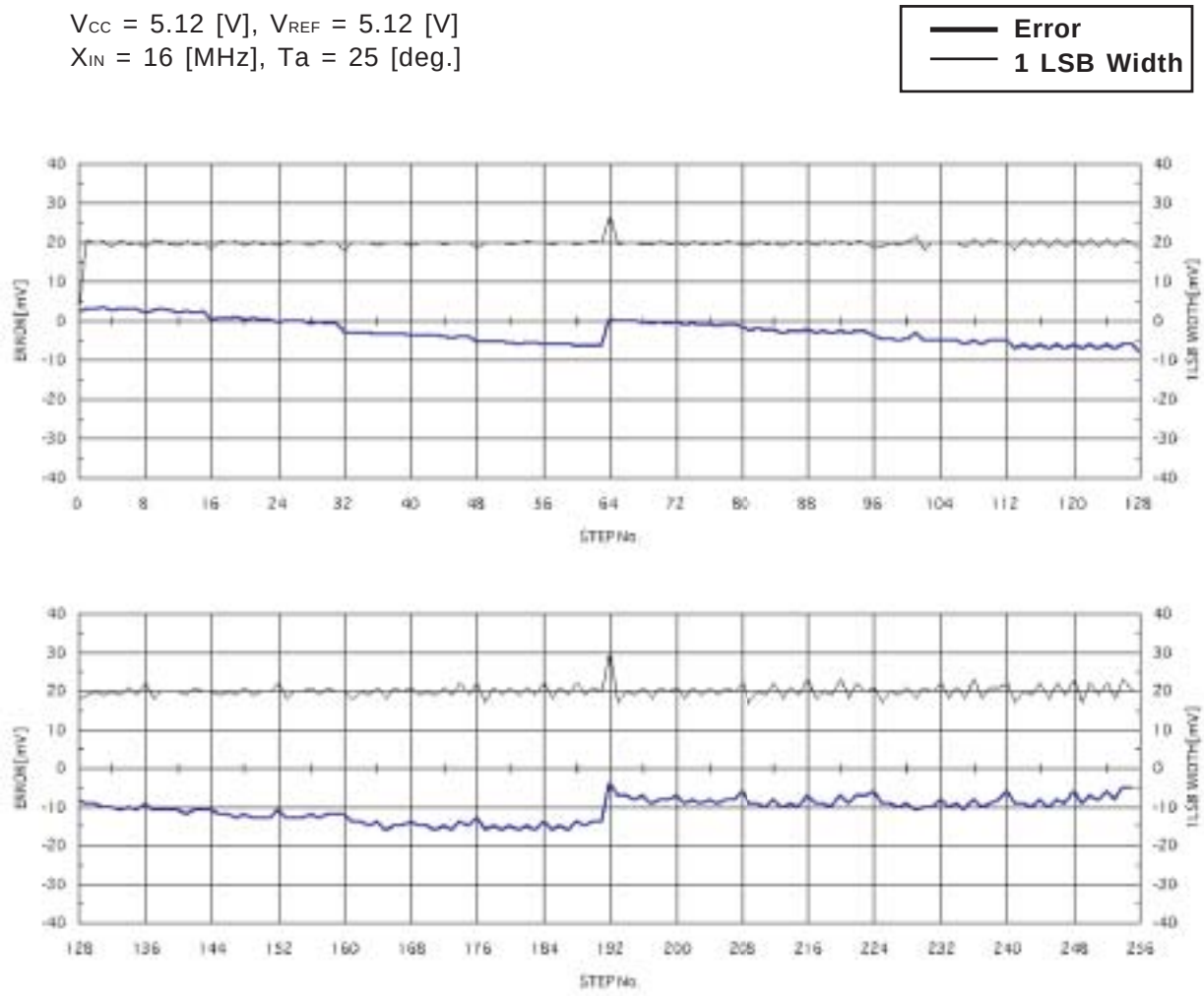

Fig. 33 Flash memory version D-A conversion standard characteristics

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