

Standard Characteristics Example

Standard characteristics described below are just examples of the 7546/7547 Group's characteristics and are not guaranteed.
For rated values, refer to "7546 Group Data sheet" and "7547 Group Data sheet".

(1) Power Supply Current Standard Characteristics Example (Vcc-Icc)

Double-speed mode (A/D conversion not executed)
(ceramic oscillation, Ta = 25 °C, output transistor is in the cut-off state)
QzROM version (A/D conversion not executed)

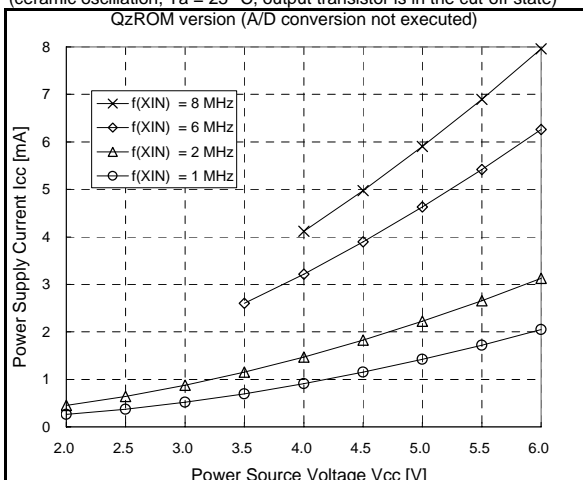


Fig. 1. Vcc-Icc (Double-speed mode)

High-speed mode (A/D conversion not executed)
(ceramic oscillation, Ta = 25 °C, output transistor is in the cut-off state)
QzROM version (A/D conversion not executed)

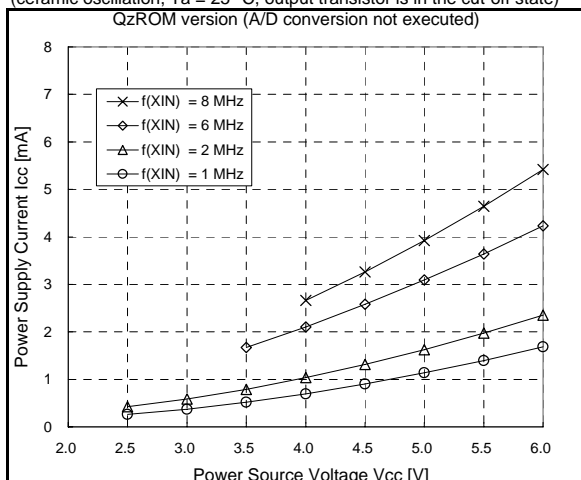


Fig. 2. Vcc-Icc (High-speed mode)

Middle-speed mode (A/D conversion not executed)
(ceramic oscillation, Ta = 25 °C, output transistor is in the cut-off state)
QzROM version (A/D conversion not executed)

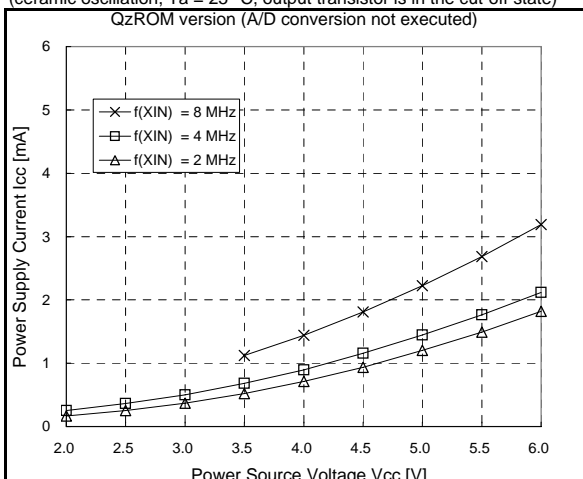


Fig. 3. Vcc-Icc (Middle-speed mode)

At WIT instruction executed
(ceramic oscillation, Ta = 25 °C, output transistor is in the cut-off state)
QzROM Version

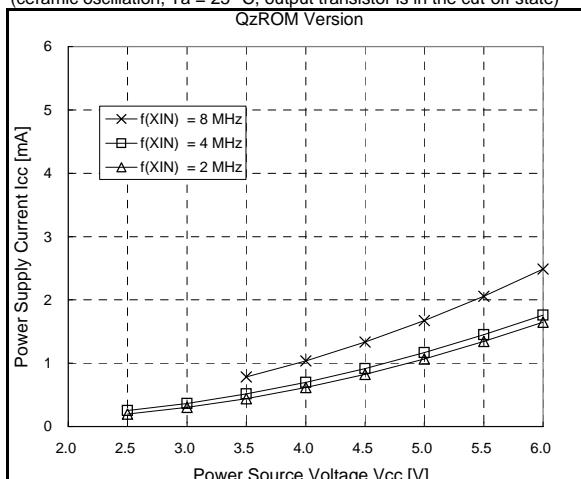


Fig. 4. Vcc-Icc (At WIT instruction executed)

At STP instruction executed
(Ta = 25 °C, output transistor is in the cut-off state)
QzROM Version

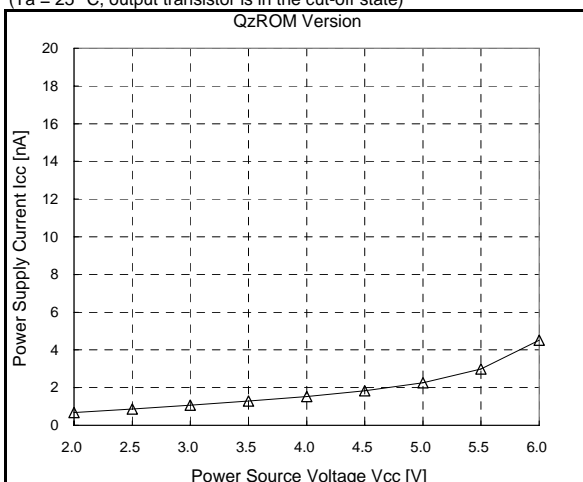


Fig. 5. Vcc-Icc (At STP instruction executed)

At 8 MHz double-speed mode, increment at A/D conversion executed
(ceramic oscillation, $T_a = 25^\circ\text{C}$, output transistor is in the cut-off state)

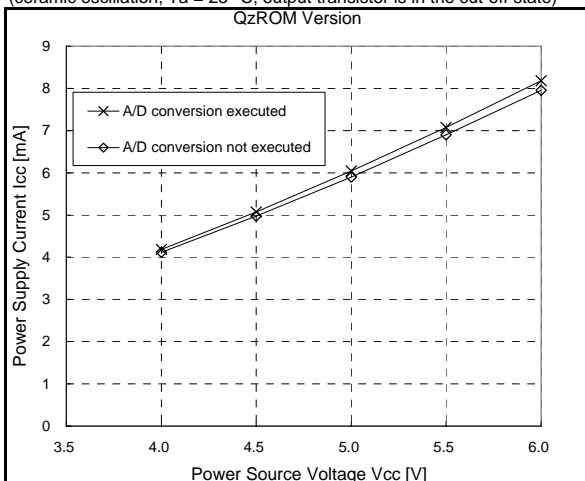


Fig. 6. V_{cc} - I_{cc} (Increment at A/D conversion executed)

At 8 MHz high-speed mode, increment at A/D conversion executed
(ceramic oscillation, $T_a = 25^\circ\text{C}$, output transistor is in the cut-off state)

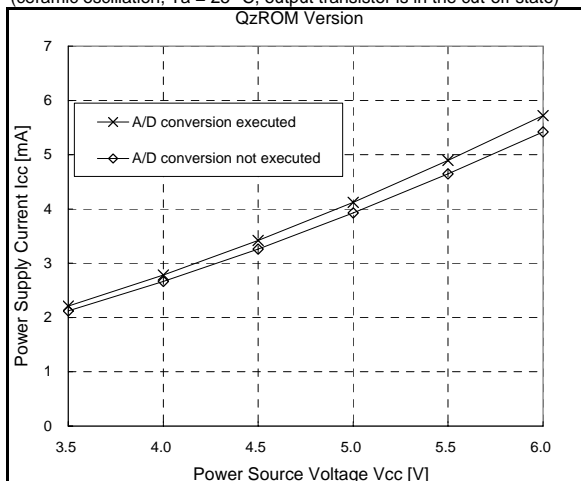


Fig. 7. V_{cc} - I_{cc} (Increment at A/D conversion executed)

At 8 MHz middle-speed mode, increment at A/D conversion executed
(ceramic oscillation, $T_a = 25^\circ\text{C}$, output transistor is in the cut-off state)

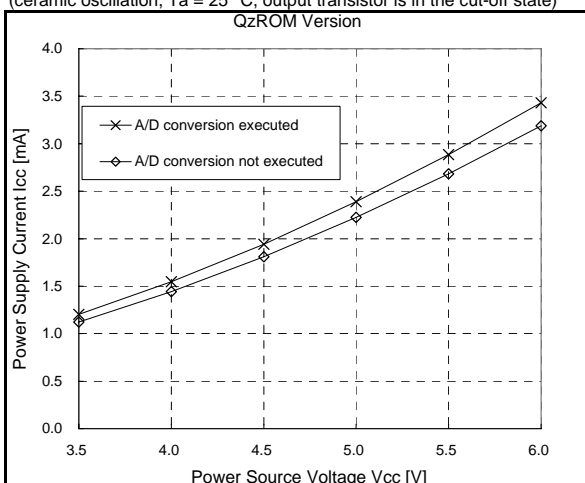


Fig. 8. V_{cc} - I_{cc} (Increment at A/D conversion executed)

When system is operating in on-chip oscillator double-speed mode
(external oscillation stop, output transistor is in the cut-off state)

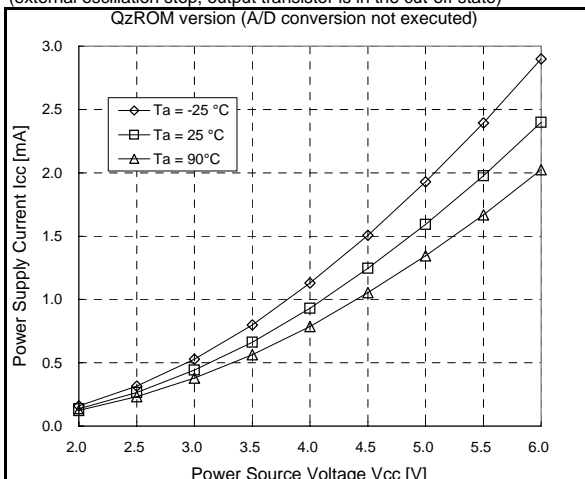


Fig. 9. Vcc-Icc (On-chip oscillator double-speed mode)

When system is operating in on-chip oscillator high-speed mode
(external oscillation stop, output transistor is in the cut-off state)

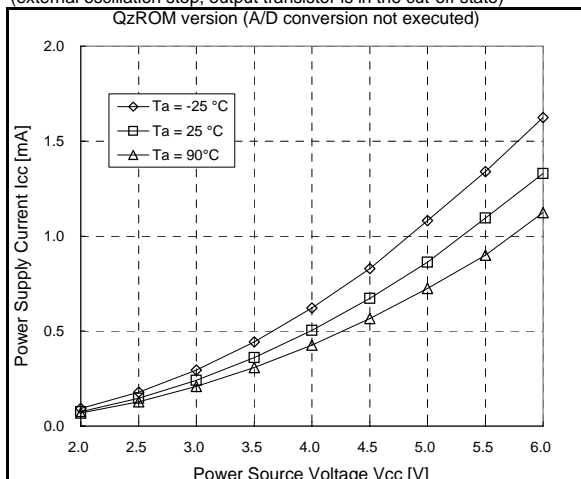


Fig. 10. Vcc-Icc (On-chip oscillator high-speed mode)

When system is operating in on-chip oscillator middle-speed mode
(external oscillation stop, output transistor is in the cut-off state)

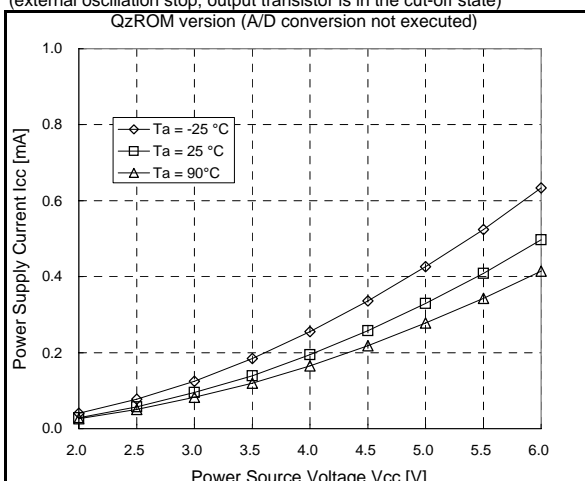


Fig. 11. Vcc-Icc (On-chip oscillator middle-speed mode)

When system is operating in on-chip oscillator low-speed mode
(external oscillation stop, output transistor is in the cut-off state)

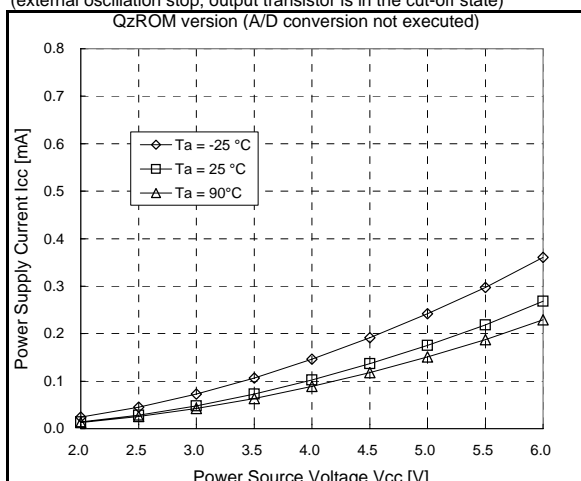


Fig. 12. Vcc-Icc (On-chip oscillator low-speed mode)

On-chip oscillator operating mode, at WIT instruction executed
(external oscillation stop, output transistor is in the cut-off state)

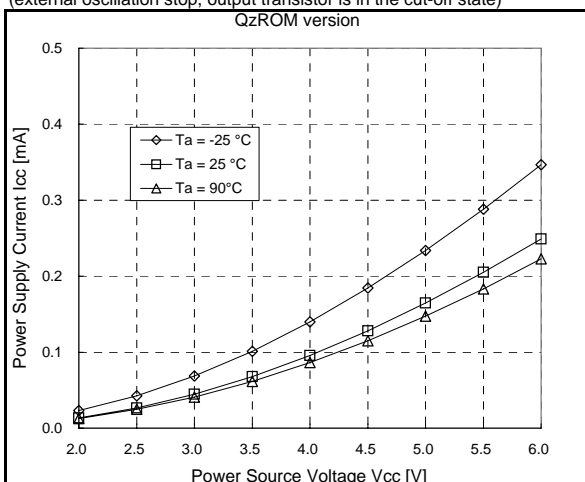


Fig. 13. Vcc-Icc (On-chip oscillator mode at WIT instruction executed)

(2) Power Supply Current Standard Characteristics Example (f(XIN) -Icc)

When system is operating in double-speed mode
(ceramic oscillation, Ta = 25 °C, output transistor is in the cut-off state)
QzROM version (A/D conversion not executed)

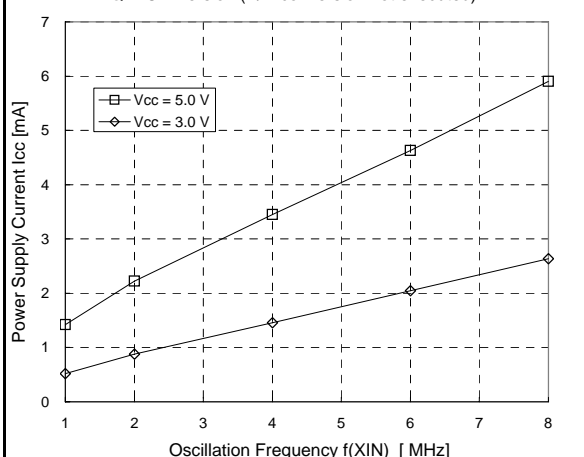


Fig. 14. f(XIN) -Icc (Double-speed mode)

When system is operating in high-speed mode
(ceramic oscillation, Ta = 25 °C, output transistor is in the cut-off state)
QzROM version (A/D conversion not executed)

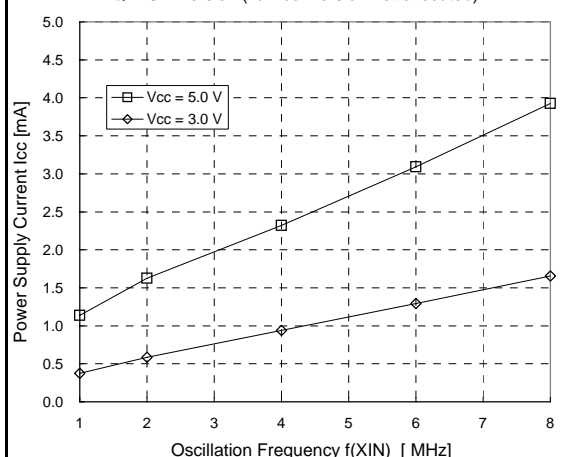


Fig. 15. f(XIN) -Icc (High-speed mode)

When system is operating in middle-speed mode
(ceramic oscillation, Ta = 25 °C, output transistor is in the cut-off state)
QzROM version (A/D conversion not executed)

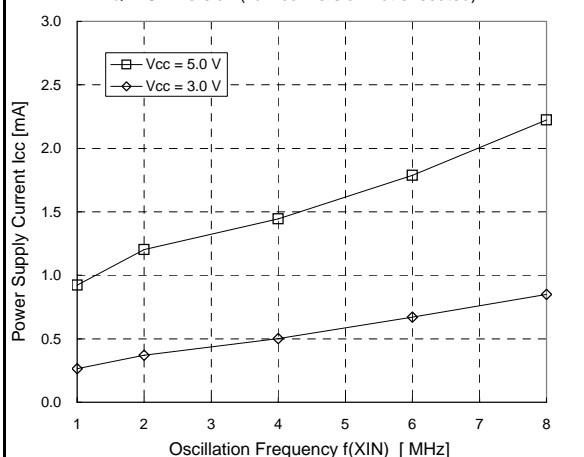


Fig. 16. f(XIN) -Icc (Middle-speed mode)

At WIT instruction executed
(ceramic oscillation, Ta = 25 °C, output transistor is in the cut-off state)
QzROM version

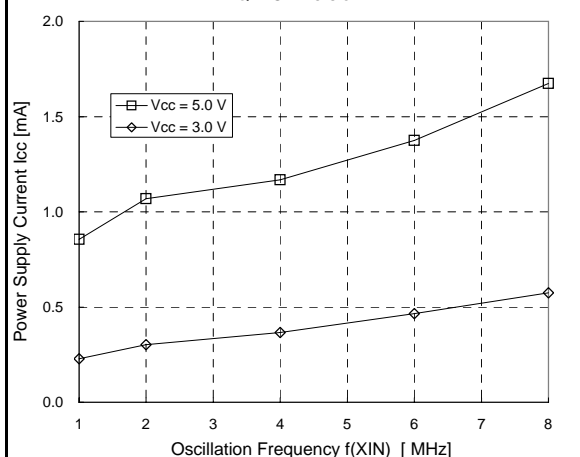


Fig. 17. f(XIN) -Icc (At WIT instruction executed)

(3) Power Supply Current Standard Characteristics Example (Ta-icc)

When system is operating in on-chip oscillator double-speed mode
(external oscillation stop, output transistor is in the cut-off state)

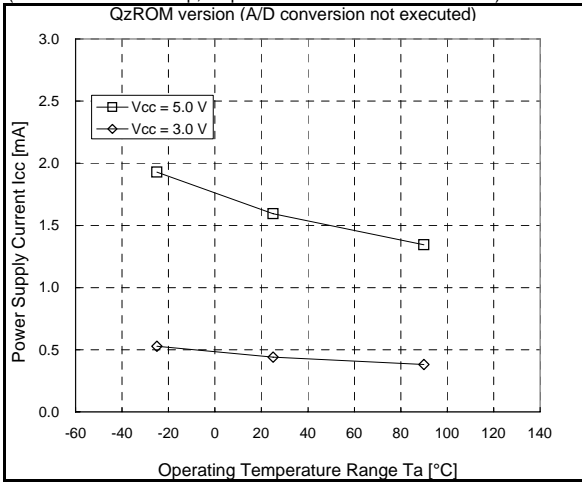


Fig. 18. Ta-icc (On-chip oscillator double-speed mode)

When system is operating in on-chip oscillator high-speed mode
(external oscillation stop, output transistor is in the cut-off state)

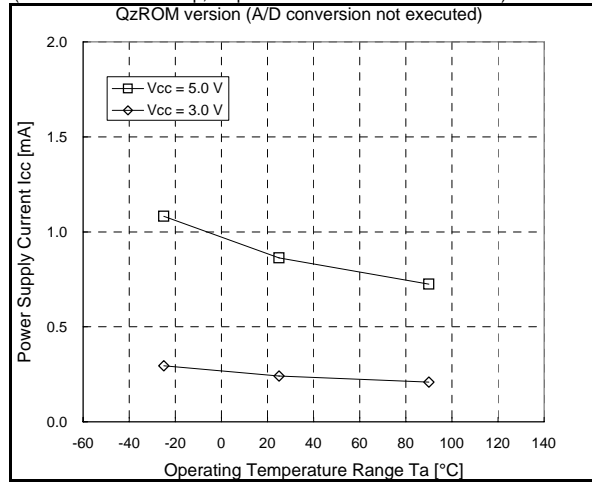


Fig. 19. Ta-icc (On-chip oscillator high-speed mode)

When system is operating in on-chip oscillator middle-speed mode
(external oscillation stop, output transistor is in the cut-off state)

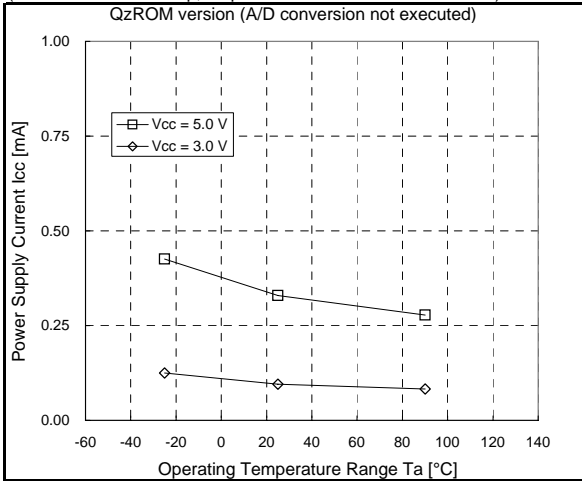


Fig. 20. Ta-icc (On-chip oscillator middle-speed mode)

When system is operating in on-chip oscillator low-speed mode
(external oscillation stop, output transistor is in the cut-off state)

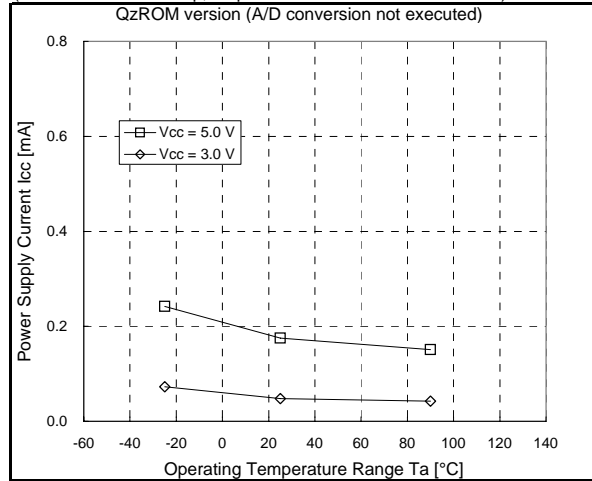


Fig. 21. Ta-icc (On-chip oscillator low-speed mode)

On-chip oscillator operating mode at WIT instruction executed
(external oscillation stop, output transistor is in the cut-off state)

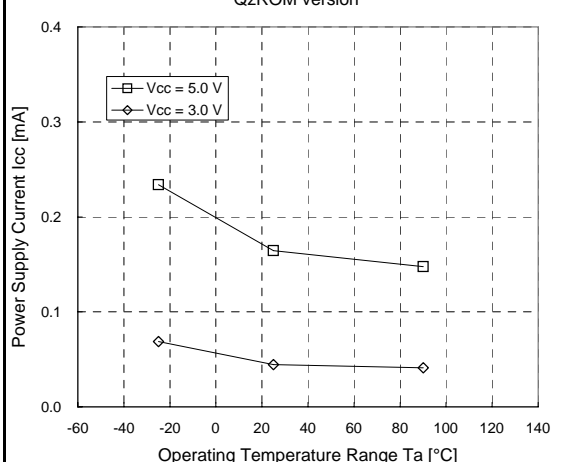


Fig. 22. Ta-icc (On-chip oscillator mode at WIT instruction executed)

(4) Port Standard characteristics Example (VOH-IOH)

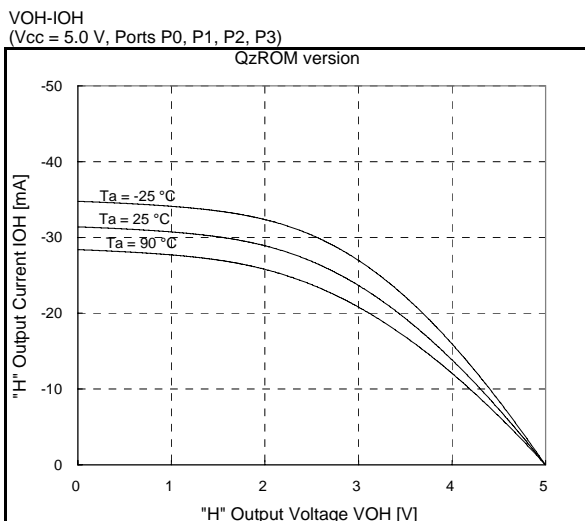


Fig. 23. VOH-IOH (Vcc = 5.0 V, Ports P0, P1, P2, P3)

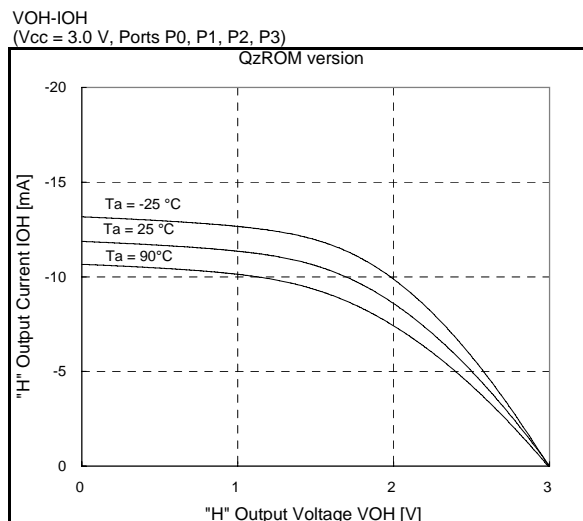


Fig. 24. VOH-IOH (Vcc = 3.0 V, Ports P0, P1, P2, P3)

(5) Port Standard Characteristics Example (VOL-IOL)

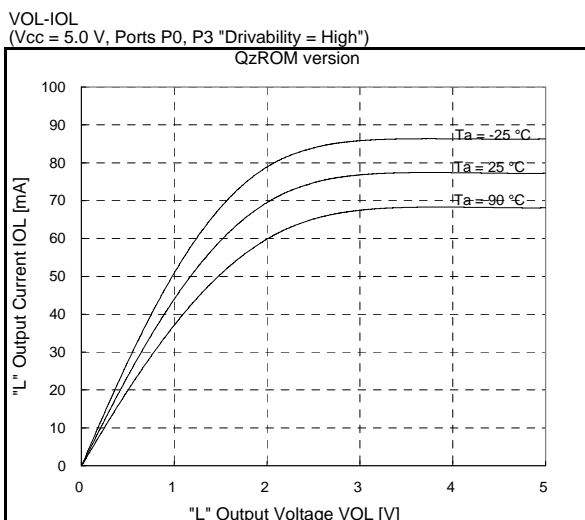


Fig. 25. VOL-IOL (Vcc = 5.0 V, Ports P0, P3 "Drivability = High")

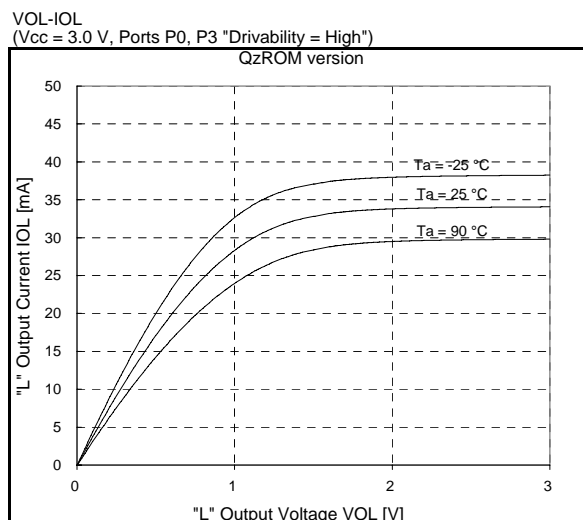


Fig. 26. VOL-IOL (Vcc = 3.0 V, Ports P0, P3 "Drivability = High")

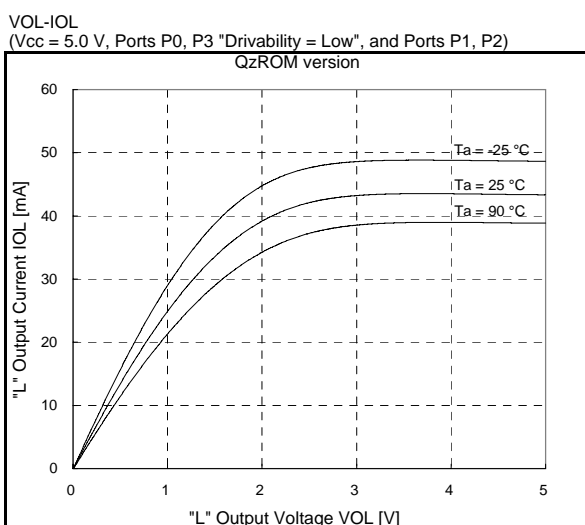


Fig. 27. VOL-IOL (Vcc = 5.0 V, Ports P0, P3 "Drivability = Low", and Ports P1, P2)

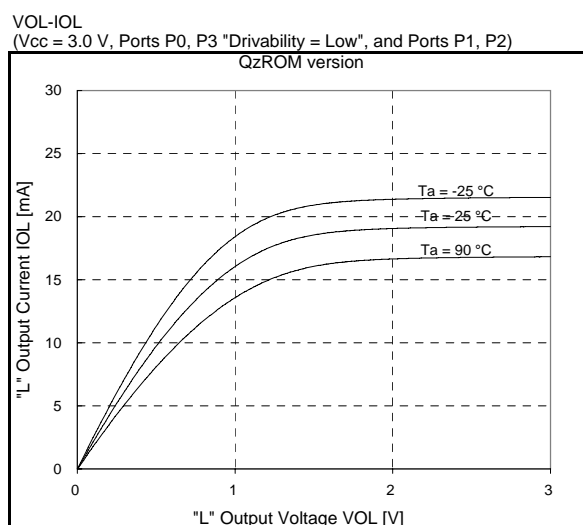


Fig. 28. VOL-IOL (Vcc = 3.0 V, Ports P0, P3 "Drivability = Low", and Ports P1, P2)

(6) Port Standard Characteristics Example (Vcc-IIL)

Vcc-IIL
(Ports P0, P3 when connecting pull-up transistor)

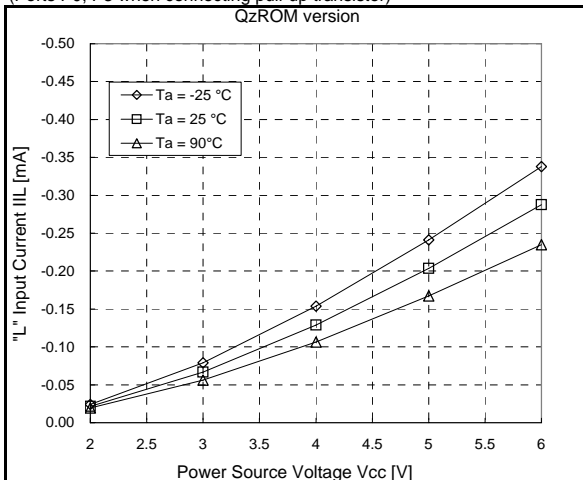


Fig. 29. Vcc-IIL (when connecting pull-up transistor)

(7) Port Standard Characteristics Example (Vcc-VIHL)

Vcc-VIHL
(I/O Ports (CMOS) , Ta = 25 °C, Ports P0, P1, P2, P3)

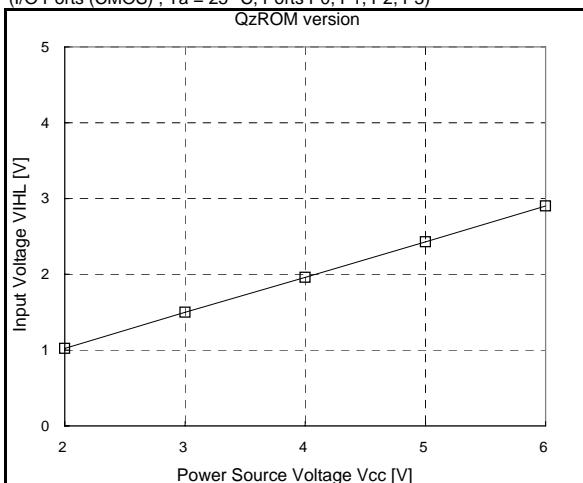


Fig. 30. Vcc-VIHL (I/O Port (CMOS))

Vcc-VIHL
(I/O Port (when selecting TTL input level) , Ta = 25 °C, Port P10, P22, P13, P36, P37)

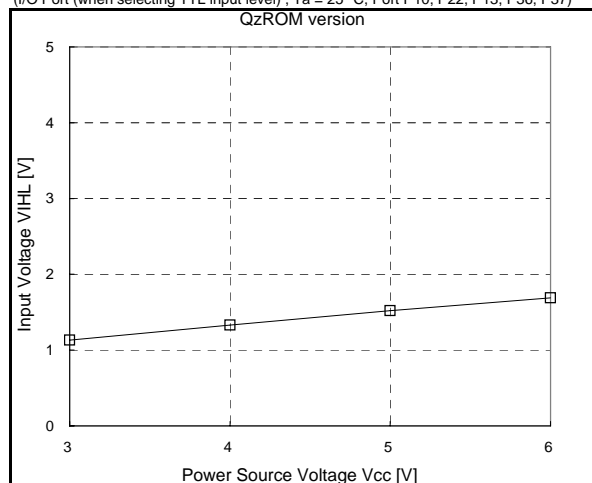


Fig. 31. Vcc-VIHL (I/O Port (TTL))

Vcc-VIHL
(RESET pin, Ta = 25 °C)

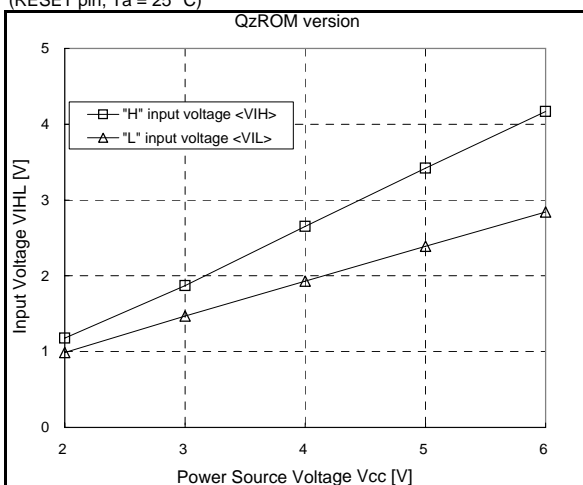


Fig. 32. Vcc-VIHL (RESET pin)

Vcc-VIHL
(CNVss pin, Ta = 25 °C)

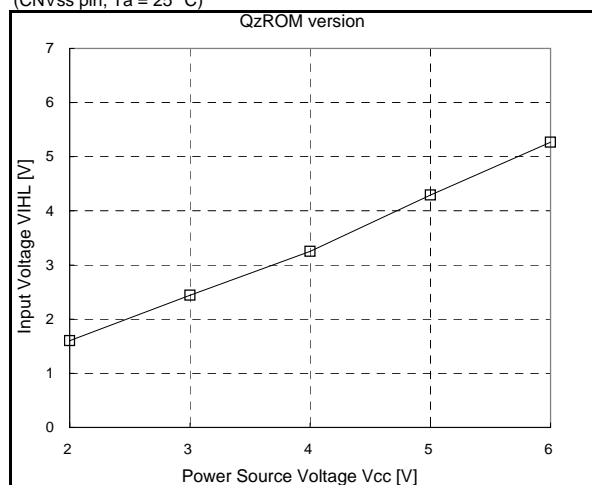


Fig. 33. Vcc-VIHL (CNVss pin)

Vcc-HYS
(RESET pin, Ta = 25 °C)

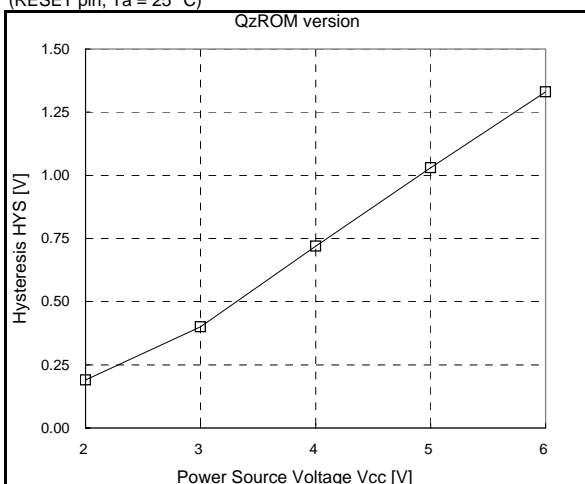


Fig. 34. Vcc-HYS (RESET pin)

Vcc-HYS
(SIO function pin (RXD1, SCLK1, RXD2, SCLK2), Ta = 25 °C)

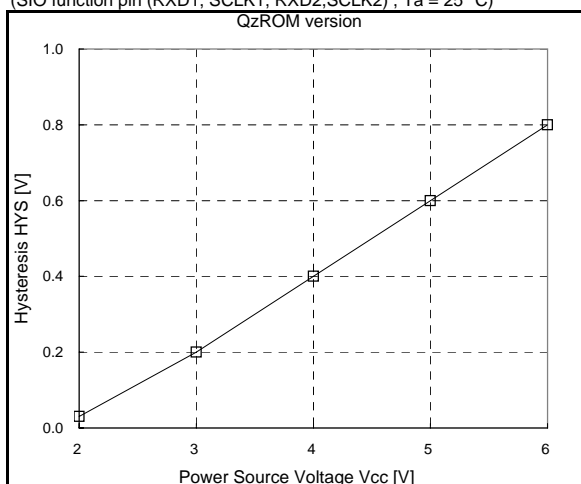


Fig. 35. Vcc-HYS (SIO function pin)

Vcc-HYS
(INT•Capture function pin (INT0, INT1, CNTR0, P00-P07, CAP0, CAP1), Ta = 25 °C)

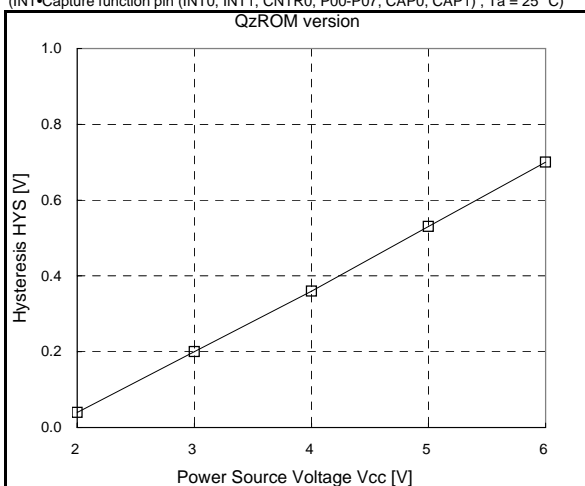


Fig. 36. Vcc-HYS (INT•Capture function pin)

(8) Port Standard Characteristics Example (VIN-II (AD))

VIN-II (AD)

(A/D converter operation, $f(X_{in}) = 8 \text{ MHz}$, Double-speed mode, $V_{cc} = 5.0 \text{ V}$, $T_a = 25^\circ\text{C}$)

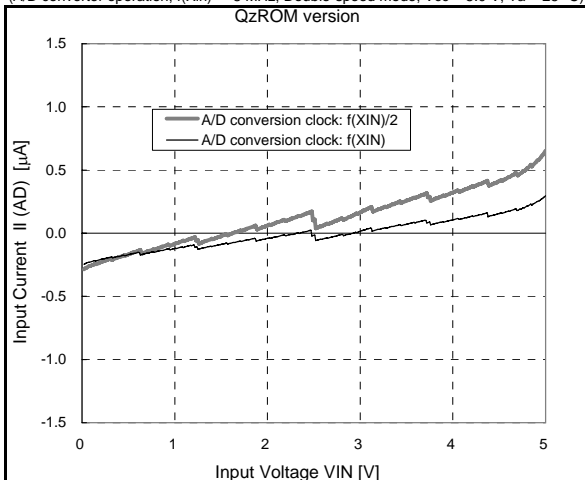


Fig. 37. VIN-II (AD) ($f(X_{in}) = 8 \text{ MHz}$ Double-speed mode)

VIN-II (AD)

(A/D converter operation, $f(X_{in}) = 6 \text{ MHz}$, Double-speed mode, $V_{cc} = 5.0 \text{ V}$, $T_a = 25^\circ\text{C}$)

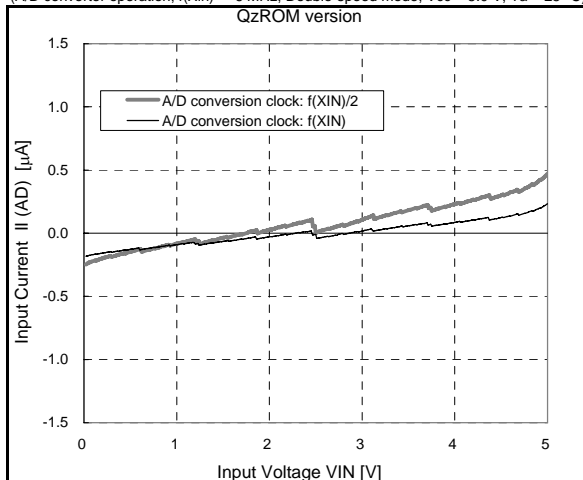


Fig. 38. VIN-II (AD) ($f(X_{in}) = 6 \text{ MHz}$ Double-speed mode)

VIN-II (AD)

(A/D converter operation, $f(X_{in}) = 4 \text{ MHz}$, Double-speed mode, $V_{cc} = 5.0 \text{ V}$, $T_a = 25^\circ\text{C}$)

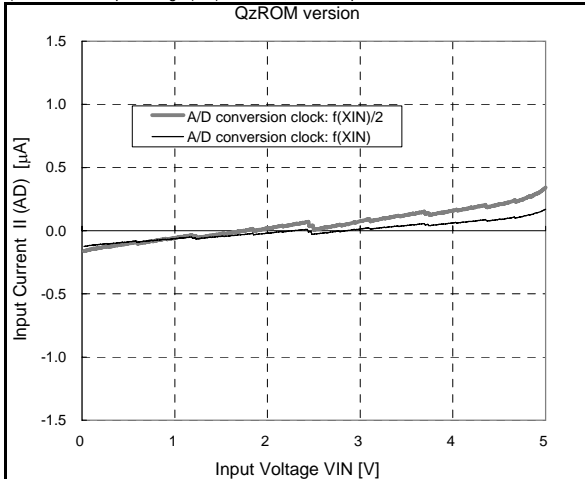


Fig. 39. VIN-II (AD) ($f(X_{in}) = 4 \text{ MHz}$ Double-speed mode)

(9) On-chip Oscillator Frequency Characteristics Example

On-chip oscillator frequency characteristics (revised in rev.2.00)
(Vcc-Rosc)

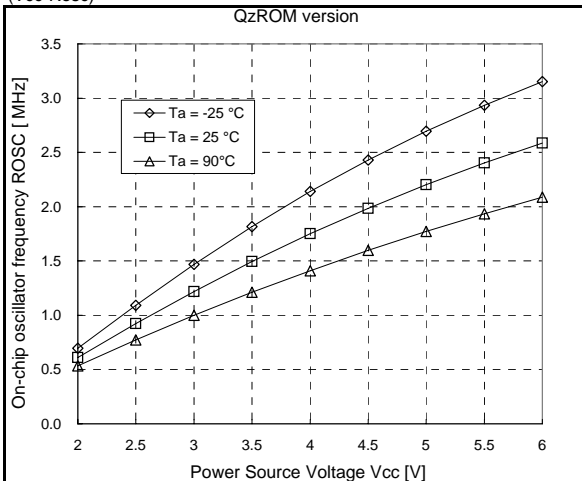


Fig. 40. Vcc-Rosc

On-chip oscillator frequency characteristics (revised in rev.2.00)
(Ta-Rosc)

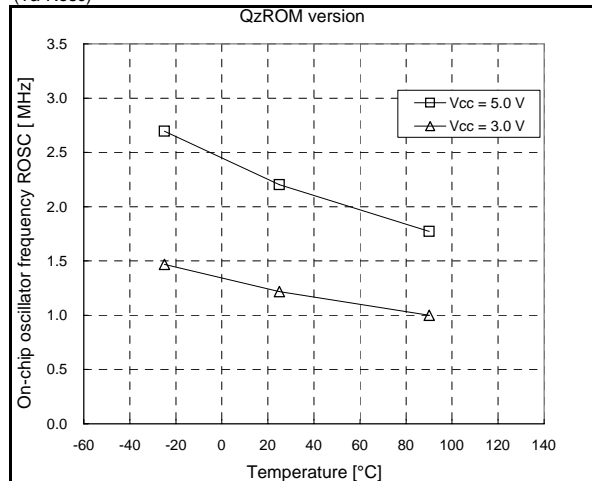


Fig. 41. Ta-Rosc

(10) RC Oscillation Frequency Characteristics Example

RC Oscillation frequency characteristics
(R-f(XIN))

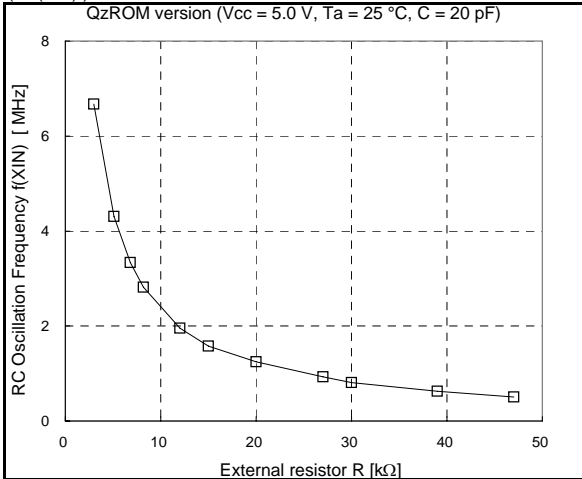


Fig. 42. R-f(XIN)

RC Oscillation frequency characteristics
(C-f(XIN) characteristics)

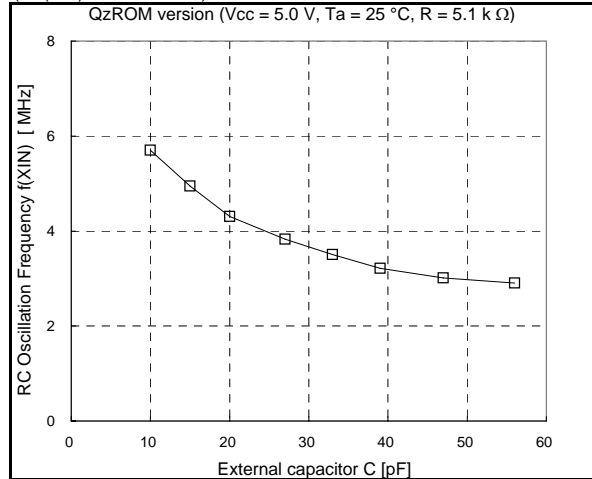


Fig. 43. C-f(XIN)

RC Oscillation Frequency characteristics
(Vcc-f(XIN))

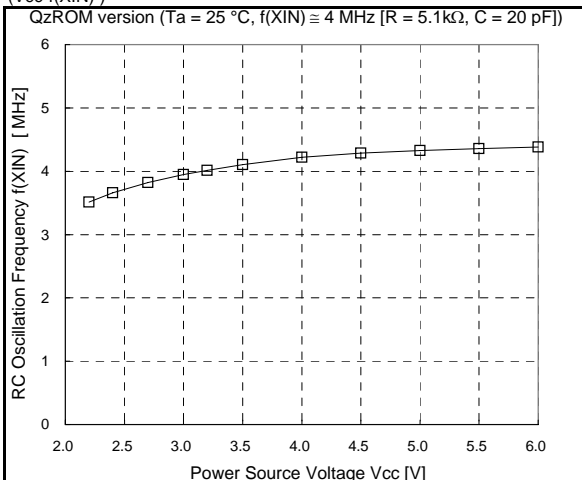


Fig. 44. Vcc-f(XIN)

RC Oscillation Frequency characteristics
(Ta-f(XIN))

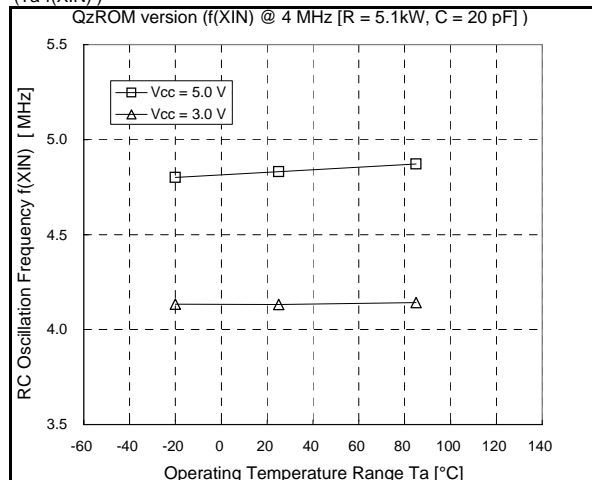


Fig. 45. Ta-f(XIN)

(11) A/D Conversion Accuracy Characteristics
A/D conversion accuracy standard characteristics example-1

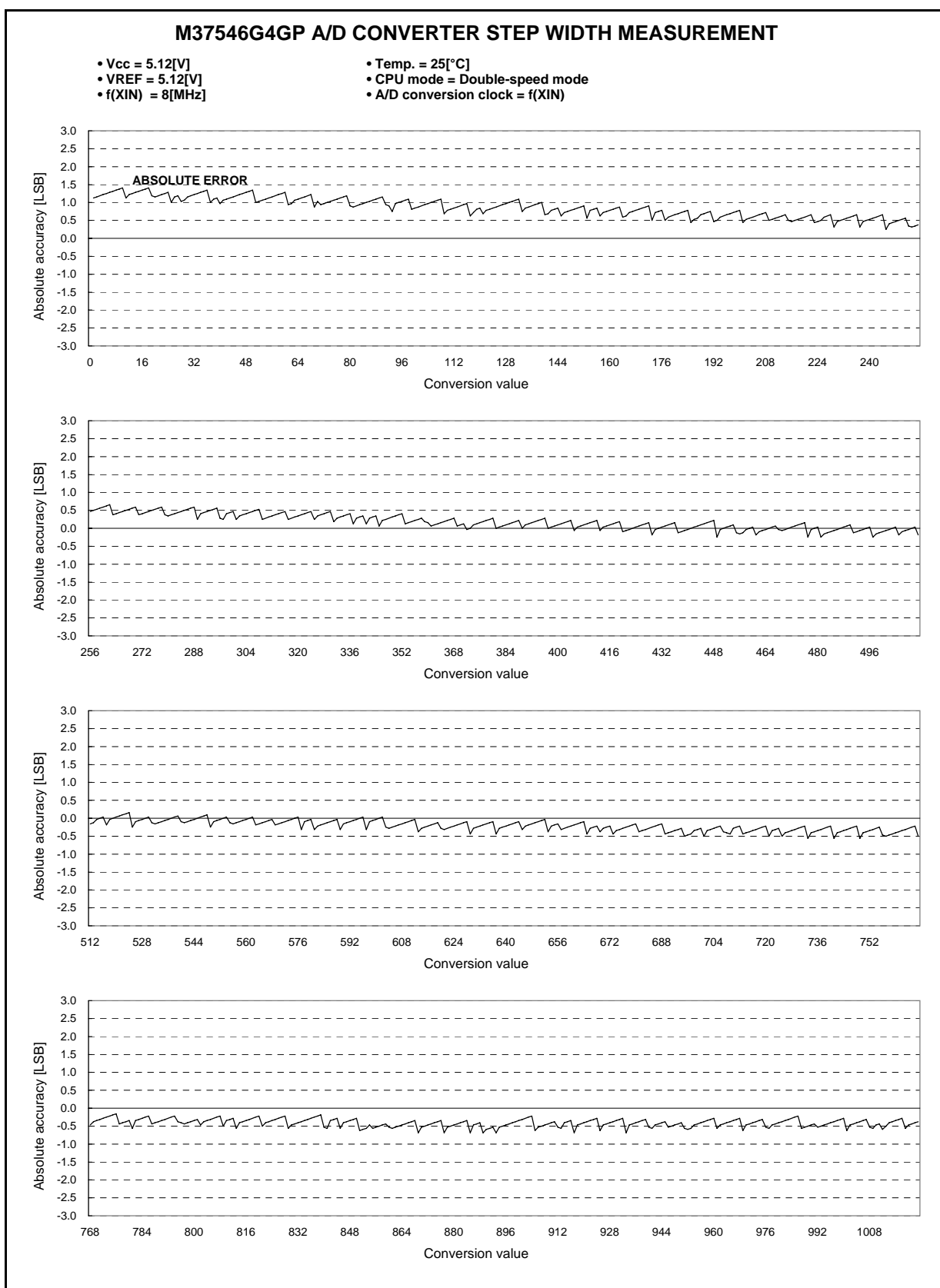


Fig. 46. A/D conversion accuracy standard characteristics example-1

A/D conversion accuracy standard characteristics example-2

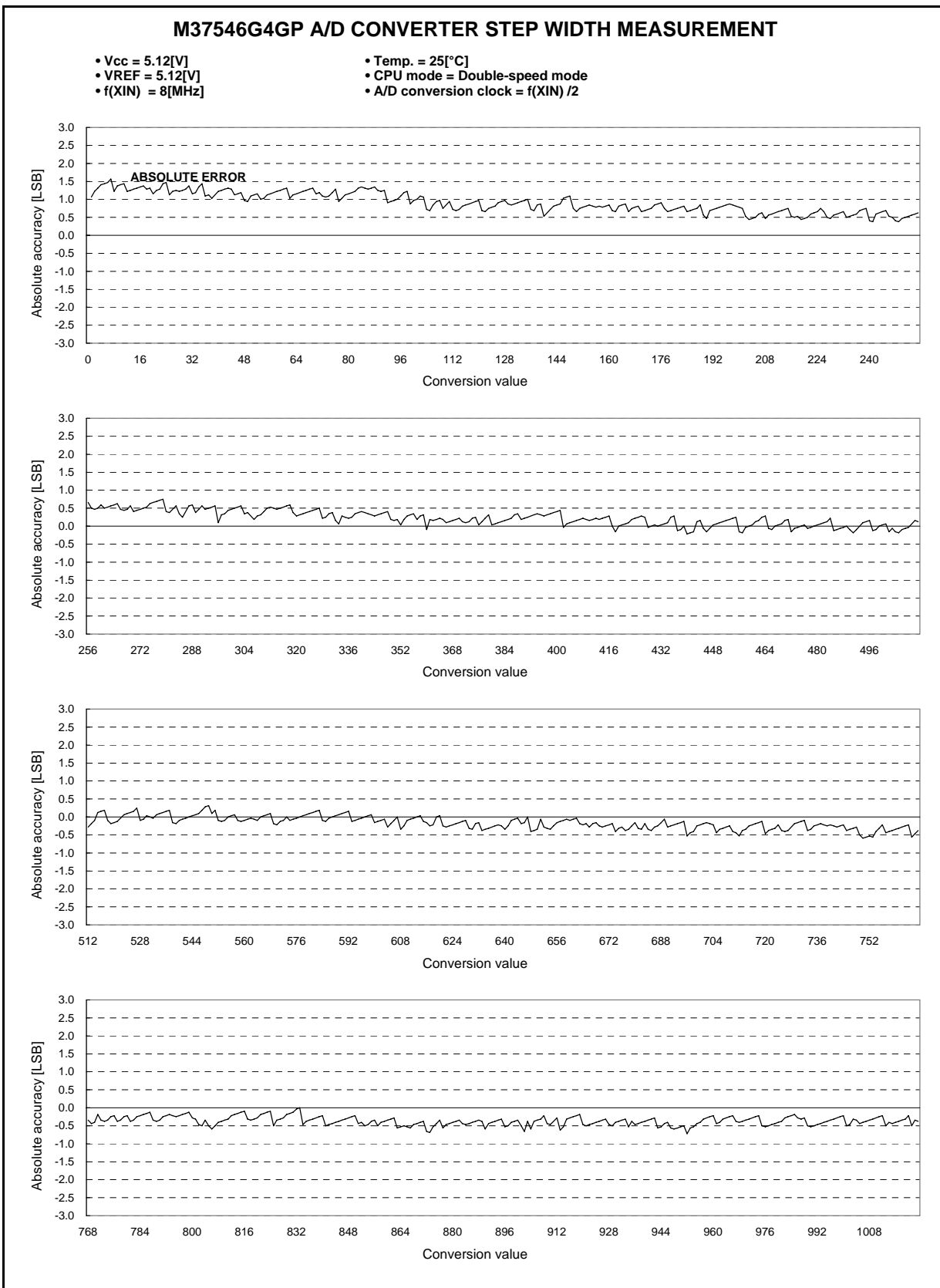


Fig. 47. A/D conversion accuracy standard characteristics example-2

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April 1st, 2010
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