

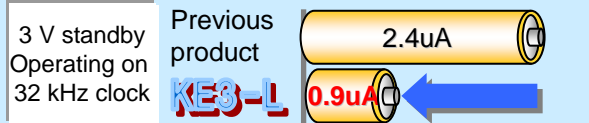
16-bit All Flash Microcontrollers ~ General Purpose ~ Expanded lineup of ultra-low-power microcontrollers

Our best-in-industry lower-power All Flash microcontrollers with extensive built-in peripherals can be used in battery-driven products, mobile devices, security systems, and many other applications to reduce power consumption, save space, and lower system costs.

- Thorough low-power design enabling the industry's lowest level of power consumption in all areas of operation, from high-speed processing to standby.
- Enhanced peripherals including built-in analog conversion circuits and a precision internal oscillator.
- System peripherals are built in, reducing system costs.
- All Flash microcontrollers enable the entire process from development to manufacturing to be completed using flash memory products.

	78K0R/ KC3-L	78K0R/ KD3-L	78K0R/ KE3-L	78K0R/ KF3-L	78K0R/ KG3-L	
Flash (byte)	128K	RAM			8K	8K
	96K				6K	6K
	64K	3K	3K	3K	3K	4K
	48K	2K	2K	2K	2K	
	32K	1.5K	1.5K	1.5K	1.5K	
	16K	1K				
A/D	10ch	11ch	11ch	12ch	12ch	16ch
Pin count	44pin	48pin	52pin	64pin	80pin	100pin

● Industry's lowest level of power consumption



● Built-in oscillator

High-speed and accurate: 8MHz ±2% / 20MHz ±2.4%
Low power: 1MHz ±13%

● Enhanced analog conversion features
10-bit A/D converter operating on 1.8 V
Built-in PGA*1 and comparator*1
(*1: Except in 80-pin and 10-pin products)

● Built-in peripherals

Reset circuits (POC, LVI, WDT)
EEPROM emulation using flash memory (operates on 1.8 V)

Don't worry about the oscillation circuit:
You can use Seiko Instruments' crystal resonator (32.768 kHz) to support ultra-low power consumption during clock operation.

Evaluation with
78K0R/Kx3-L
is complete
*See overleaf

*The information herein is subject to change without notice.



*This document may not be reproduced or duplicated without the prior written permission of Seiko Instruments Inc.

*The names of companies or products that appear in this document are the trademarks or registered trademarks of the respective company.

Good news for designers wanting ultra-low power consumption:
A low-power oscillation circuit that consumes only one tenth of the standby power of previous oscillation circuit.

*We provide ideal tuning fork crystal resonators for NEC Electronics' ultra-low-power microcontrollers.



SII low CL tuning fork resonators	
SSP-T7-FL	
Frequency: 32.768kHz	
CL value: 6pF, 4.4pF, 3.7pF	
Frequency tolerance: ± 20 ppm	
Size: 7.0x1.5x1.4mm	
VT-200-FL	
Frequency: 32.768kHz	
CL value: 6pF, 4.4pF, 3.7pF	
Frequency tolerance: ± 20 ppm	
Size: $\phi 2.0 \times 6.0$ mm	

Ultra-low power consumption is achieved by low the amplitude of the amplifier and low CL resonator.

NEC MCU 78K0R/Kx3-L series
78K0R/KC3-L, 78K0R/KD3-L, 78K0R/KE3-L

Selection of XT1 oscillation mode	Recommended circuit constants and load capacitance of crystal resonator (SSP-T7-FL series)		
	SSP-T7-FL 3.7pF	SSP-T7-FL 4.4pF	SSP-T7-FL 6.0pF
Ultra-low-power oscillation	Cg=4pF, Cd=3pF Isub^{*1} =0.285uA typ RL ^{*2} =-950k Ω typ Ts ^{*3} =0.75sec typ	Cg=5pF, Cd=5pF Isub=0.300uA typ RL=-700k Ω typ Ts=0.95sec typ	Cg=9pF, Cd=8pF Isub=0.320uA typ RL=-395k Ω typ Ts=1.50sec typ
Low-power oscillation	Not recommended.	Cg=5pF, Cd=5pF Isub=0.645uA typ RL=-965k Ω typ Ts=0.70sec typ	Cg=9pF, Cd=8pF Isub=0.680uA typ RL=-620k Ω typ Ts=0.95sec typ

NEC MCU 78K0R/Kx3-L series
78K0R/KF3-L, 78K0R/KG3-L

Selection of XT1 oscillation mode	Recommended circuit constants and load capacitance of crystal resonator (SSP-T7-FL series)		
	SSP-T7-FL 3.7pF	SSP-T7-FL 4.4pF	SSP-T7-FL 6.0pF
Ultra-low-power Oscillation mode	Cg=3pF, Cd=2pF Isub^{*1} =0.215uA typ RL ^{*2} =-990k Ω typ Ts ^{*3} =0.75sec typ	Cg=4pF, Cd=3pF Isub=0.230uA typ RL=-730k Ω typ Ts=0.85sec typ	Cg=9pF, Cd=8pF Isub=0.270uA typ RL=-340k Ω typ Ts=1.60sec typ
Low-power Oscillation mode	Not recommended.	Not recommended.	Cg=9pF, Cd=8pF Isub=0.550uA typ RL=-500k Ω typ Ts=1.05sec typ

*1. Isub: Current consumption, *2. RL: Negative resistance, *3. Ts: Oscillation start-up time

Use the circuit matching reports available on the Seiko Instruments website when designing your oscillation circuit.

<http://www.sii-crystal.com>