



PIC18F1XK22/LF1XK22

Data Sheet

20-Pin Flash Microcontrollers
with nanoWatt XLP Technology



MICROCHIP

PIC18F1XK22/LF1XK22

20-Pin Flash Microcontrollers with nanoWatt XLP Technology

High-Performance RISC CPU:

- C Compiler Optimized Architecture:
 - Optional extended instruction set designed to optimize re-entrant code
- 256 bytes Data EEPROM
- Up to 16 Kbytes Linear Program Memory Addressing
- Up to 512 bytes Linear Data Memory Addressing
- Up to 16 MIPS Operation
- 16-bit Wide Instructions, 8-bit Wide Data Path
- Priority Levels for Interrupts
- 31-Level, Software Accessible Hardware Stack
- 8 x 8 Single-Cycle Hardware Multiplier

Flexible Oscillator Structure:

- Precision 16 MHz Internal Oscillator Block:
 - Factory calibrated to $\pm 1\%$
 - Software selectable frequencies range of 31 kHz to 16 MHz
 - 64 MHz performance available using PLL – no external components required
- Four Crystal modes up to 64 MHz
- Two External Clock modes up to 64 MHz
- 4X Phase Lock Loop (PLL)
- Secondary Oscillator using Timer1 @ 32 kHz
- Fail-Safe Clock Monitor
 - Allows for safe shutdown if peripheral clock stops
- Two-Speed Oscillator Start-up

Special Microcontroller Features:

- Full 5.5V Operation – PIC18F1XK22
- 1.8V-3.6V Operation – PIC18LF1XK22
- Self-reprogrammable under Software Control
- Power-on Reset (POR), Power-up Timer (PWRT) and Oscillator Start-up Timer (OST)
- Programmable Brown-out Reset (BOR)
- Extended Watchdog Timer (WDT):
 - Programmable period from 4ms to 131s
- Programmable Code Protection
- In-Circuit Serial Programming™ (ICSP™) via two pins
- In-Circuit Debug via Two Pins

Extreme Low-Power Management PIC18LF1XK22 with nanoWatt XLP:

- Sleep mode: 34 nA
- Watchdog Timer: 460 nA
- Timer1 Oscillator: 650 nA @ 32 kHz

Analog Features:

- Analog-to-Digital Converter (ADC) module
 - 10-bit resolution, 12 channels
 - Auto acquisition capability
 - Conversion available during Sleep
- Analog Comparator module:
 - Two rail-to-rail analog comparators
 - Independent input multiplexing
 - Inputs and outputs externally accessible
- Voltage Reference module:
 - Programmable (% of VDD), 16 steps
 - Two 16-level voltage ranges using VREF pins
 - Programmable Fixed Voltage Reference (FVR), 3 levels

Peripheral Highlights:

- 17 I/O Pins and 1 Input-only Pin:
 - High current sink/source 25 mA/25 mA
 - Programmable weak pull-ups
 - Programmable interrupt-on-change
 - Three external interrupt pins
- Four Timer modules:
 - 3 16-bit timers/counters with prescaler
 - 1 8-bit timer/counter with 8-bit period register, prescaler and postscaler
 - Dedicated, low-power Timer1 oscillator
- Enhanced Capture/Compare/PWM (ECCP) module:
 - One, two or four PWM outputs
 - Selectable polarity
 - Programmable dead time
 - Auto-shutdown and Auto-restart
 - PWM output steering control
- Master Synchronous Serial Port (MSSP) module
 - 3-wire SPI (supports all 4 SPI modes)
 - I²C™ Master and Slave modes (Slave mode address masking)
- Enhanced Universal Synchronous Asynchronous Receiver Transmitter module (EUSART)
 - Supports RS-232, RS-485 and LIN 2.0
 - Auto-Baud Detect
 - Auto Wake-up on Break
- SR Latch (555 Timer) module with:
 - Configurable inputs and outputs
 - Supports mTouch™ capacitive sensing applications

PIC18F1XK22/LF1XK22

TABLE 1: DEVICE OVERVIEW

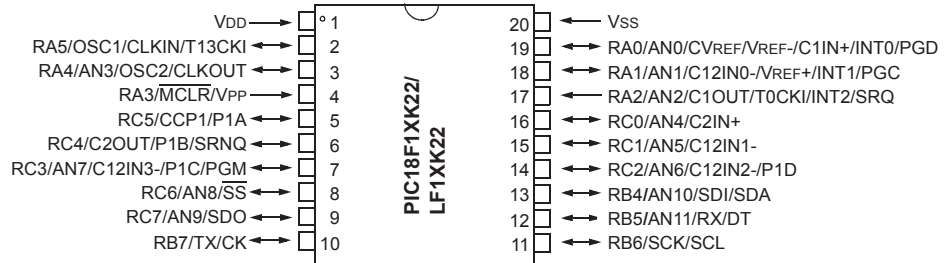
Device	Program Memory		Data Memory		Pins	I/O ⁽¹⁾	10-bit A/D Channels	Comparators	Timers 8-bit/16-bit	ECCP	MSSP	EUSART	SR Latch
	Bytes	Words	SRAM (bytes)	Data EEPROM (bytes)									
PIC18F13K22 PIC18LF13K22	8K	4K	256	256	20	18	12-ch	2	1 / 3	1	1	1	Yes
PIC18F14K22 PIC18LF14K22	16K	8K	512	256	20	18	12-ch	2	1 / 3	1	1	1	Yes

Note 1: One pin is input-only.

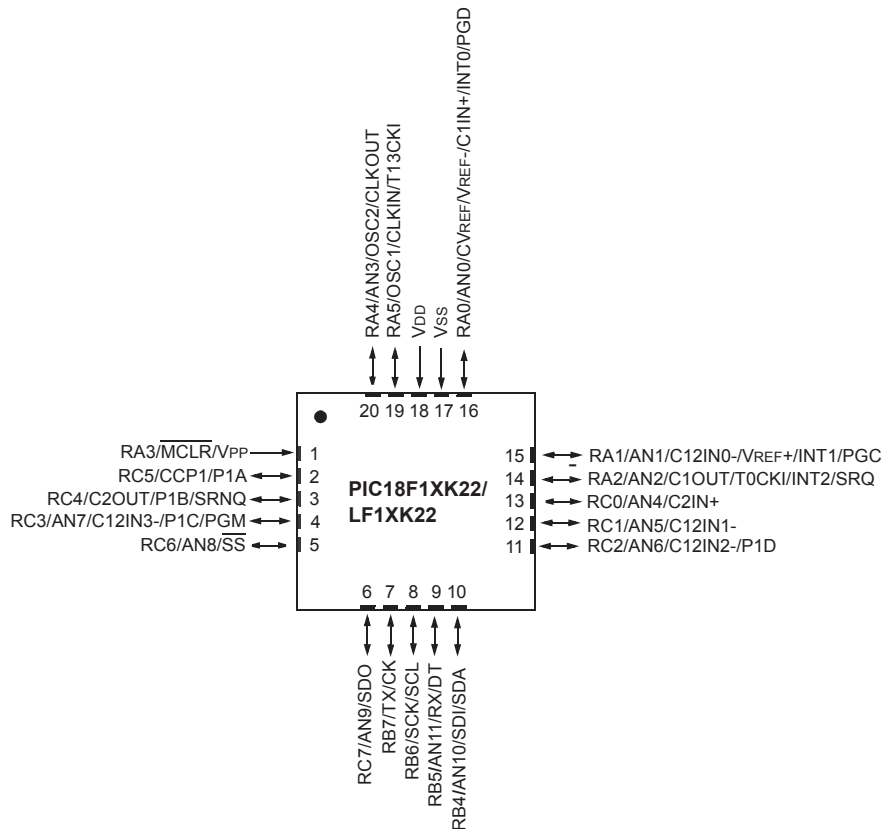
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Pin Diagrams

20-pin PDIP, SSOP, SOIC (300 MIL)



20-Pin QFN 4x4



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TABLE 1-1: PIC18F1XK22/LF1XK22 PIN SUMMARY

20-Pin DIL	20-Pin QFN	I/O	Analog	Comparator	Reference	ECCP	EUSART	MSSP	SR Latch	Timers	Interrupts	Pull-up	Basic
19	16	RA0	AN0	C1IN+	VREF-/CVREF	—	—	—	—	—	IOC/INT0	Y	PGD
18	15	RA1	AN1	C12IN0-	VREF+	—	—	—	—	—	IOC/INT1	Y	PGC
17	14	RA2	AN2	C1OUT	—	—	—	—	SRQ	T0CKI	IOC/INT2	Y	—
4	1	RA3	—	—	—	—	—	—	—	—	IOC	Y	MCLR/VPP
3	20	RA4	AN3	—	—	—	—	—	—	—	IOC	Y	OSC2/CLKOUT
2	19	RA5	—	—	—	—	—	—	—	T13CKI	IOC	Y	OSC1/CLKIN
13	10	RB4	AN10	—	—	—	—	SDI/SDA	—	—	IOC	Y	—
12	9	RB5	AN11	—	—	—	RX/DT	—	—	—	IOC	Y	—
11	8	RB6	—	—	—	—	—	SCL/SCK	—	—	IOC	Y	—
10	7	RB7	—	—	—	—	TX/CK	—	—	—	IOC	Y	—
16	13	RC0	AN4	C2IN+	—	—	—	—	—	—	—	—	—
15	12	RC1	AN5	C12IN1-	—	—	—	—	—	—	—	—	—
14	11	RC2	AN6	C12IN2-	—	P1D	—	—	—	—	—	—	—
7	4	RC3	AN7	C12IN3-	—	P1C	—	—	—	—	—	—	PGM
6	3	RC4	—	C2OUT	—	P1B	—	—	SRNQ	—	—	—	—
5	2	RC5	—	—	—	CCP1/P1A	—	—	—	—	—	—	—
8	5	RC6	AN8	—	—	—	—	SS	—	—	—	—	—
9	6	RC7	AN9	—	—	—	—	SDO	—	—	—	—	—
1	18	—	—	—	—	—	—	—	—	—	—	—	VDD
20	17	—	—	—	—	—	—	—	—	—	—	—	VSS

PIC18F1XK22/LF1XK22

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, refer to the factory or the listed sales office.

<u>PART NO.</u>	<u>X</u>	<u>/XX</u>	<u>XXX</u>
Device	Temperature Range	Package	Pattern
Device:	PIC18F13K22 ⁽¹⁾ , PIC18F14K22 ⁽¹⁾ , PIC18LF13K22 ⁽¹⁾ , PIC18LF14K22		
Temperature Range:	E = -40°C to +125°C (Extended) I = -40°C to +85°C (Industrial)		
Package:	ML = QFN P = PDIP SO = SOIC SS = SSOP		
Pattern:	QTP, SQTP, Code or Special Requirements (blank otherwise)		
Examples:			
a) PIC18F14K22-E/P 301 = Extended temp., PDIP package, Extended V _{DD} limits, QTP pattern #301.			
b) PIC18LF14K22-E/SO = Extended temp., SOIC package.			
c) PIC18LF14K22-E/P = Extended temp., PDIP package.			
Note 1: T = in tape and reel PLCC, and TQFP packages only.			