



PIC12F1822/16F182X

8/14/20-Pin 8-Bit Flash Microcontroller Product Brief

High-Performance RISC CPU:

- Only 49 Instructions to learn
- Operating Speed:
 - DC – 32 MHz clock input
 - DC – 125 ns instruction cycle
- Interrupt Capability with Automatic Context Saving
- 16-Level Deep Hardware Stack with Optional Overflow/Underflow Reset
- Direct, Indirect and Relative Addressing modes:
 - Two full 16-bit File Select Registers (FSRs)
 - FSRs can read program and data memory

Special Microcontroller Features:

- Precision Internal Oscillator:
 - Factory calibrated to $\pm 1\%$, typical
 - Software selectable frequency range from 32 MHz to 31 kHz
- 31 kHz Low-Power Internal Oscillator
- External Oscillator Block with:
 - 4 crystal/resonator modes up to 32 MHz using 4xPLL
 - 3 external clock modes up to 32 MHz
- 4x Phase Locked Loop (PLL)
- Fail-Safe Clock Monitor
- Two-Speed Start-up
- Power-Saving Sleep mode
- Power-on Reset (POR)
- Power-up Timer (PWRT)
- Oscillator Start-Up Timer (OST)
- Brown-out Reset (BOR) with Selectable Trip Point
- Extended Watchdog Timer (WDT)
- In-Circuit Serial Programming™ (ICSP™) via two pins
- In-Circuit Debug (ICD) via Two Pins
- Enhanced Low-Voltage Programming (LVP)
- Operating Voltage Range:
 - 1.8V to 3.6V (PIC1XLF182X)
 - 1.8V to 5.5V (PIC1XF182X)
- Programmable Code Protection
- Self-Programmable under Software Control

Low-Power Features:

- Standby Current (PIC1XLF182X):
 - 30 nA @ 1.8V, typical
- Operating Current (PIC1XLF182X):
 - 75 μ A @ 1 MHz, 1.8V, typical
- Low-Power Watchdog Timer Current (PIC1XLF182X):
 - 500 nA @ 1.8V, typical

Peripheral Features:

- Up to 17 I/O Pins and 1 Input-only Pin:
 - High current sink/source for LED drivers
 - Individually programmable interrupt-on-change pins
 - Individually programmable weak pull-ups
- Timer0: 8-Bit Timer/Counter with 8-Bit Programmable Prescaler
- Enhanced Timer1:
 - 16-bit timer/counter with prescaler
 - External Gate Input mode
 - Dedicated low-power 32 kHz oscillator driver
- Up to three Timer2 modules (Timer2,4,6): 8-Bit Timer/Counter with 8-Bit Period Register, Prescaler and Postscaler
- Up to two Enhanced Capture, Compare, PWM modules (ECCP):
 - Software selectable time-bases
 - Auto-shutdown and auto-restart
 - PWM steering
- Up to two Capture, Compare, PWM modules (CCP):
 - Software selectable time-bases
- Up to two Master Synchronous Serial Port (MSSP) with SPI and I²C™ with:
 - 7-bit address masking
 - SMBus/PMBus™ compatibility
- Enhanced Universal Synchronous Asynchronous Receiver Transmitter (EUSART):
 - RS-232, RS-485 and LIN compatible
 - Auto-Baud Detect
 - Auto-wake-up on start
- SR Latch (Integrated 555 Timer):
 - Multiple Set/Reset input options
- Analog-to-Digital Converter (ADC):
 - 10-bit resolution
 - Up to 12 channels
- Up to 2 Comparators:
 - Rail-to-rail inputs
 - Power mode control
 - Software controllable hysteresis
- Voltage Reference module:
 - Fixed voltage reference (FVR) with 1.024V, 2.048V and 4.096V output levels
 - 5-bit rail-to-rail resistive DAC with positive and negative reference selection
- Capacitive Touch oscillator module:
 - Up to 12 channels
- Data Signal Modulator:
 - Select modulator and carrier sources from various module outputs.

PIC12F1822/16F182X

TABLE 1: PIC12F1822/16F182X AND PIC12LF1822/16LF1823 FAMILY TYPES

| Device | Program Memory Flash (words) | Data EEPROM (bytes) | SRAM (bytes) | I/Os | 10-bit A/D (ch) | Timers 8/16-bit | EUSART | MSSP | ECCP/ CCP | Cap Touch Channels |
|-------------|------------------------------|---------------------|--------------|------|-----------------|-----------------|--------|------|-----------|--------------------|
| PIC12F1822 | 2048 | 256 | 128 | 6 | 4 | 2/1 | 1 | 1 | 1/0 | 4 |
| PIC12LF1822 | 2048 | 256 | 128 | 6 | 4 | 2/1 | 1 | 1 | 1/0 | 4 |
| PIC16F1823 | 2048 | 256 | 128 | 12 | 8 | 2/1 | 1 | 1 | 1/0 | 8 |
| PIC16LF1823 | 2048 | 256 | 128 | 12 | 8 | 2/1 | 1 | 1 | 1/0 | 8 |
| PIC16F1824 | 4096 | 256 | 256 | 12 | 8 | 4/1 | 1 | 1 | 2/2 | 8 |
| PIC16LF1824 | 4096 | 256 | 256 | 12 | 8 | 4/1 | 1 | 1 | 2/2 | 8 |
| PIC16F1825 | 8192 | 256 | 1024 | 12 | 8 | 4/1 | 1 | 1 | 2/2 | 8 |
| PIC16LF1825 | 8192 | 256 | 1024 | 12 | 8 | 4/1 | 1 | 1 | 2/2 | 8 |
| PIC16F1828 | 4096 | 256 | 256 | 18 | 12 | 4/1 | 1 | 1 | 2/2 | 12 |
| PIC16LF1828 | 4096 | 256 | 256 | 18 | 12 | 4/1 | 1 | 1 | 2/2 | 12 |
| PIC16F1829 | 8192 | 256 | 1024 | 18 | 12 | 4/1 | 1 | 2 | 2/2 | 12 |
| PIC16LF1829 | 8192 | 256 | 1024 | 18 | 12 | 4/1 | 1 | 2 | 2/2 | 12 |

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Note: Pin details are subject to change.

FIGURE 1: 8-PIN DIAGRAM FOR PIC12F1822/LF1822

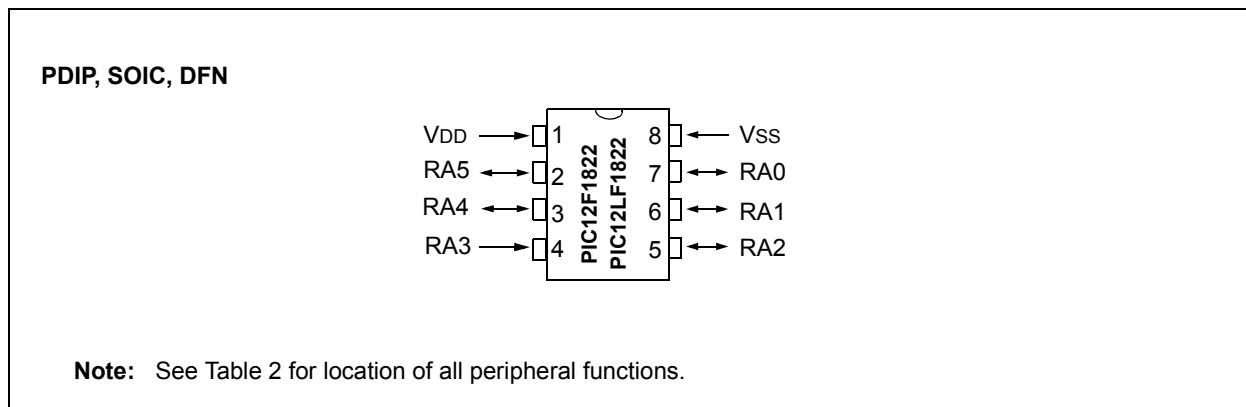


TABLE 2: 8-PIN ALLOCATION TABLE (PIC12F1822/LF1822)

| I/O | 8-Pin PDIP/SOIC/DFN | A/D | Reference | Cap Sense | Comparator | SR Latch | Timers | CCP | EUSART | MSSP | Interrupt | Modulator | Pull-up | Basic |
|-----|---------------------|-----|-----------|-----------|------------|----------|-----------------------------|---|--|---|-------------|-----------|---------|------------------------------------|
| RA0 | 7 | AN0 | DACOUT | CPS0 | C1IN+ | — | — | P1B ⁽¹⁾ | TX ⁽¹⁾ CK ⁽¹⁾ | SDO ⁽¹⁾ SS ⁽¹⁾ | IOC | MDOUT | Y | ICSPDAT/ ICDDAT |
| RA1 | 6 | AN1 | VREF | CPS1 | C1IN0- | SRI | — | — | RX ⁽¹⁾ DT ⁽¹⁾ | SCL SCK | IOC | MDMIN | Y | ICSPCLK/ ICDCLK |
| RA2 | 5 | AN2 | — | CPS2 | C1OUT | SRQ | T0CKI | CCP1 ⁽¹⁾ P1A ⁽¹⁾ FLT0 | — | SDA SDI | INT/ IOC | MDCIN1 | Y | — |
| RA3 | 4 | — | — | — | — | — | T1G ⁽¹⁾ | — | — | SS ⁽¹⁾ | IOC | — | Y | MCLR V _{PP} ICDMCLR |
| RA4 | 3 | AN3 | — | CPS3 | C1IN1- | — | T1G ⁽¹⁾ T1OSO | P1B ⁽¹⁾ | TX ⁽¹⁾ CK ⁽¹⁾ | SDO ⁽¹⁾ | IOC | MDCIN2 | Y | OSC2 CLKOUT CLKR |
| RA5 | 2 | — | — | — | — | SRNQ | T1CKI T1OSI | CCP1 ⁽¹⁾ P1A ⁽¹⁾ | RX ⁽¹⁾ DT ⁽¹⁾ | — | IOC | — | Y | OSC1 CLKIN |
| VDD | 1 | — | — | — | — | — | — | — | — | — | — | — | — | VDD |
| Vss | 8 | — | — | — | — | — | — | — | — | — | — | — | — | Vss |

Note 1: Pin functions can be assigned to one of two pin locations via software.

PIC12F1822/16F182X

FIGURE 2: 14-PIN DIAGRAM FOR PIC16F/LF1823/1824/1825

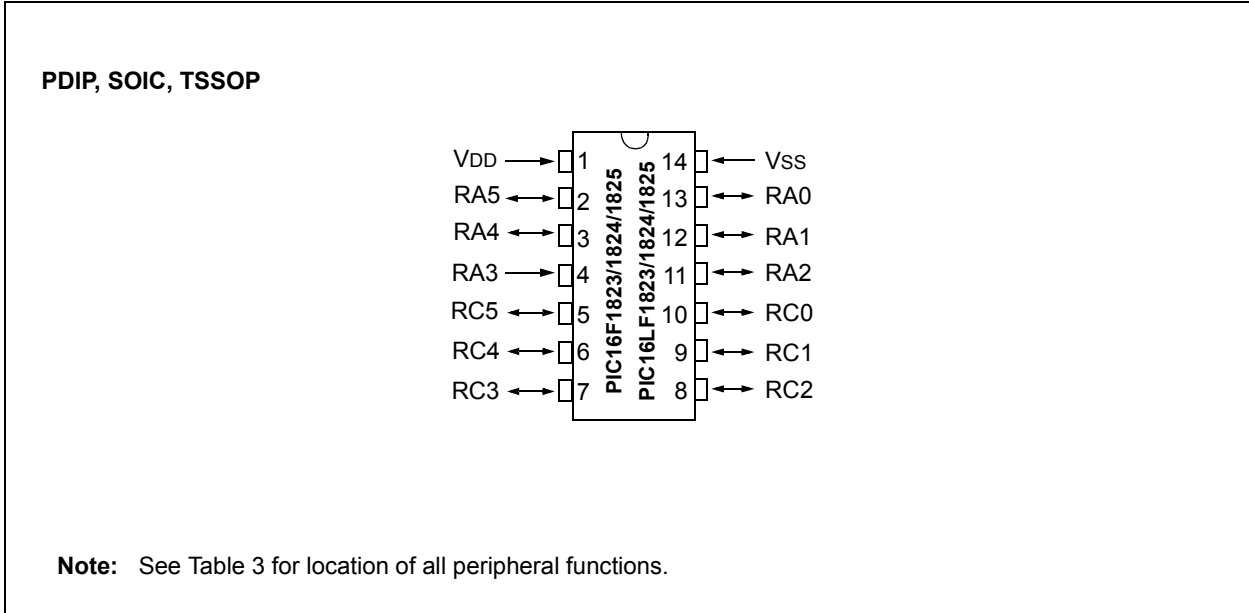
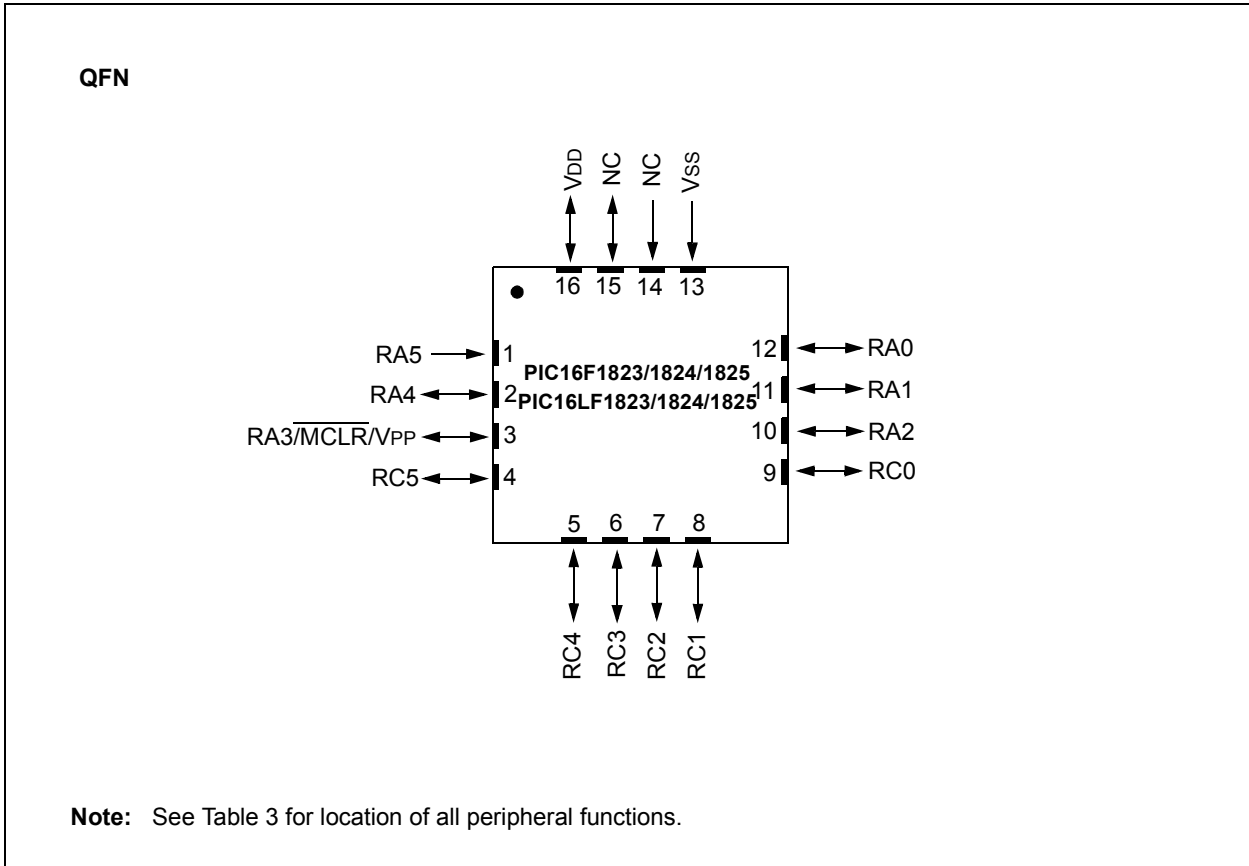


FIGURE 3: 16-PIN DIAGRAM FOR PIC16F/LF1823/1824/1825



PIC12F1822/16F182X

TABLE 3: 14-PIN AND 16-PIN ALLOCATION TABLE (PIC16F/LF1823/1824/1825)

| I/O | 14-Pin PDIP/SOIC/TSSOP | 16-Pin QFN | A/D | Reference | Cap Sense | Comparator | SR Latch | Timers | CCP | EUSART | MSSP | Interrupt | Modulator | Pull-up | Basic |
|-----|------------------------|------------|-----|-----------|-----------|------------|----------|-----------------------------|---|--|-----------------------|-------------|-----------|---------|--------------------------|
| RA0 | 13 | 7 | AN0 | DACOUT | CPS0 | C1IN+ | — | — | — | TX ⁽¹⁾ CK ⁽¹⁾ | — | IOC | — | Y | ICSPDAT/ ICDDAT |
| RA1 | 12 | 11 | AN1 | VREF | CPS1 | C12IN0- | SRI | — | — | RX ⁽¹⁾ DT ⁽¹⁾ | — | IOC | — | Y | ICSPCLK ICDCLK |
| RA2 | 11 | 10 | AN2 | — | CPS2 | C1OUT | SRQ | T0CKI | CCP3 ⁽²⁾ FLT0 | — | — | INT/ IOC | — | Y | — |
| RA3 | 4 | 3 | — | — | — | — | — | T1G ⁽¹⁾ | — | — | $\overline{SS}^{(1)}$ | IOC | — | Y | \overline{MCLR} VPP |
| RA4 | 3 | 2 | AN3 | — | CPS3 | — | — | T1G ⁽¹⁾ T1OSO | P2B ^(1,2) | — | SDO ⁽¹⁾ | IOC | — | Y | OSC2 CLKOUT CLKR |
| RA5 | 2 | 1 | — | — | — | — | — | T1CKI T1OSI | CCP2 ^(1,2) P2A ^(1,2) | — | — | IOC | — | Y | OSC1 CLKIN |
| RC0 | 10 | 9 | AN4 | — | CPS4 | C2IN+ | — | — | P1D ^(1,2) | — | SCL SCK | — | — | Y | — |
| RC1 | 9 | 8 | AN5 | — | CPS5 | C12IN1- | — | — | P1C ^(1,2) CCP4 ⁽²⁾ | — | SDA SDI | — | — | Y | — |
| RC2 | 8 | 7 | AN6 | — | CPS6 | C12IN2- | — | — | P1D ⁽¹⁾ P2B ^(1,2) | — | SDO ⁽¹⁾ | — | MDCIN1 | Y | — |
| RC3 | 7 | 6 | AN7 | — | CPS7 | C12IN3- | — | — | P1C ⁽¹⁾ CCP2 ^(1,2) P2A ^(1,2) | — | $\overline{SS}^{(1)}$ | — | MDMIN | Y | — |
| RC4 | 6 | 5 | — | — | — | C2OUT | SRNQ | — | P1B | TX ⁽¹⁾ CK ⁽¹⁾ | — | — | MDOUT | Y | — |
| RC5 | 5 | 4 | — | — | — | — | — | — | CCP1 P1A | RX ⁽¹⁾ DT ⁽¹⁾ | — | — | MDCIN2 | Y | — |
| VDD | 1 | 16 | — | — | — | — | — | — | — | — | — | — | — | — | VDD |
| VSS | 14 | 13 | — | — | — | — | — | — | — | — | — | — | — | — | VSS |

Note 1: Pin functions can be assigned to one of two pin locations via software.
 2: Pin function only available on PIC16F1824 and PIC16F1825.

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FIGURE 4: 20-PIN DIAGRAM FOR PIC16F/LF1828/1829

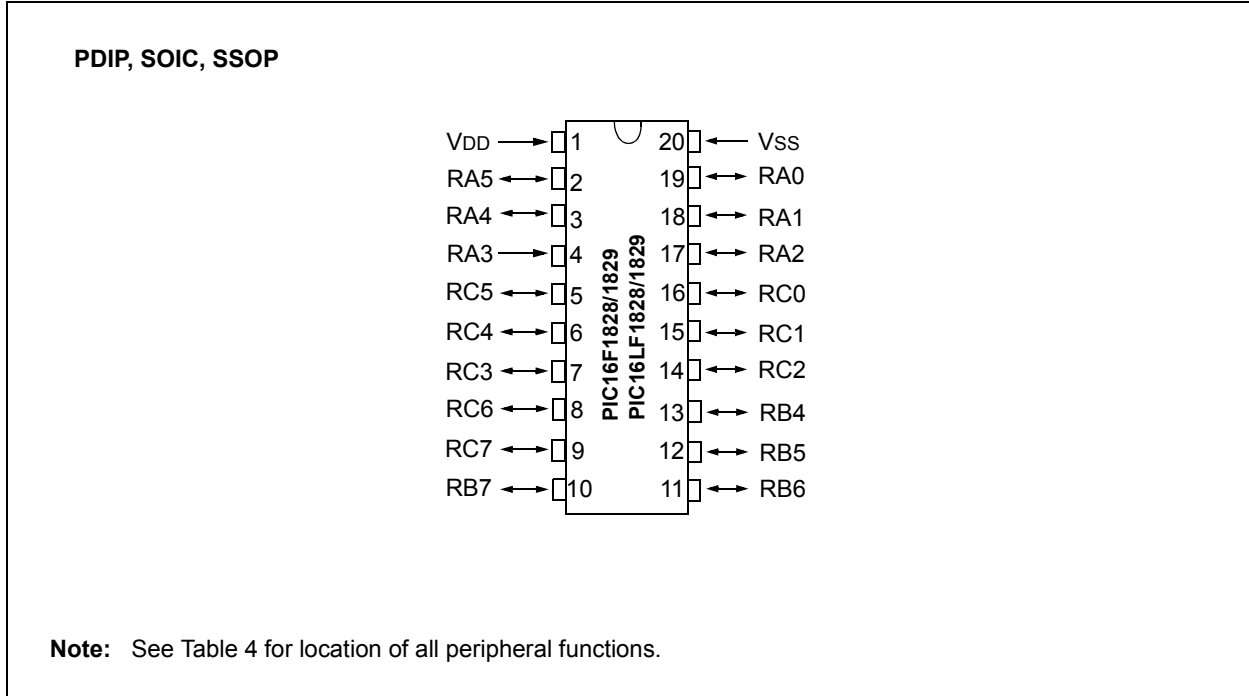
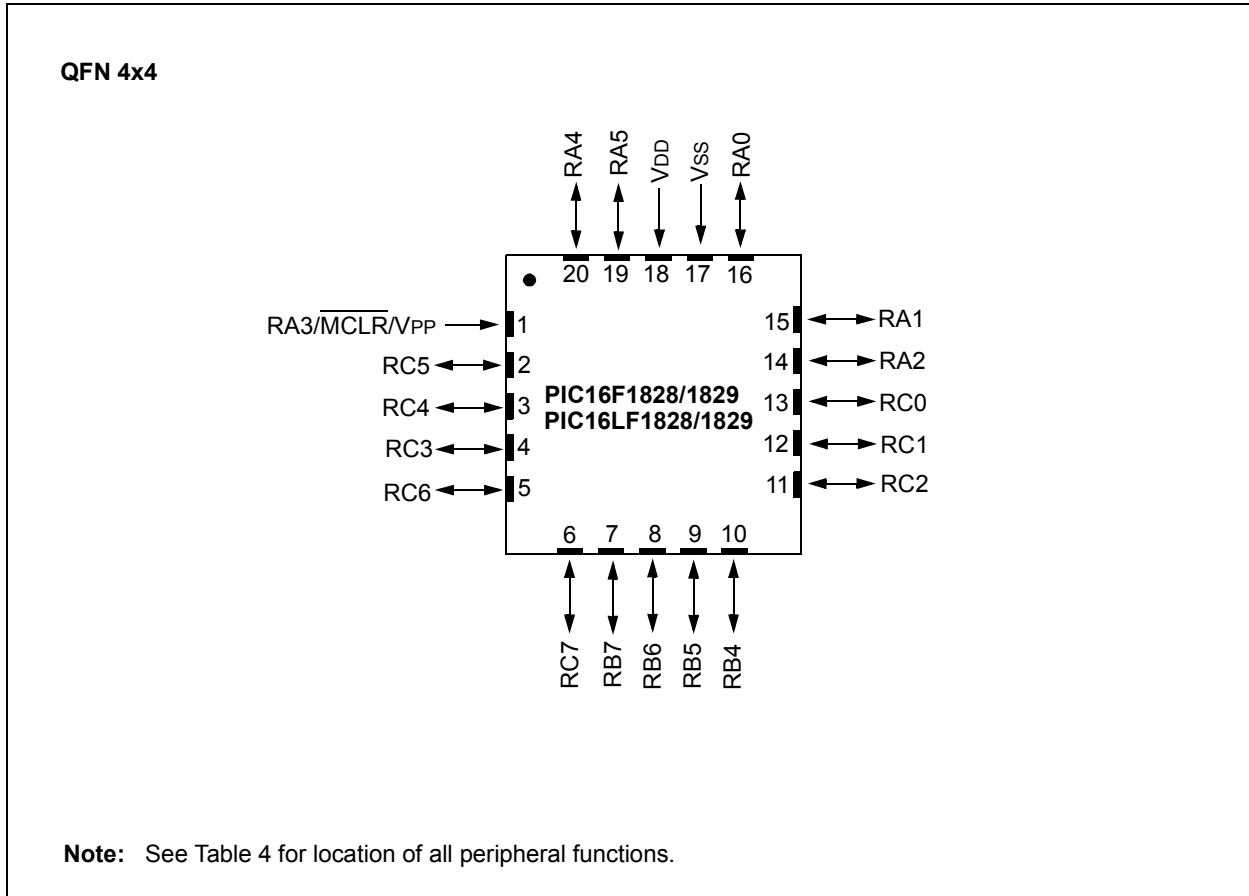


FIGURE 5: 20-PIN DIAGRAM FOR PIC16F/LF1828/1829



PIC12F1822/16F182X

TABLE 4: 20-PIN ALLOCATION TABLE (PIC16F/LF1828/1829)

| I/O | 20-Pin PDIP/SOIC/SSOP | 20-Pin QFN | A/D | Reference | Cap Sense | Comparator | SR Latch | Timers | CCP | EUSART | MSSP | Interrupt | Modulator | Pull-up | Basic |
|-----|-----------------------|------------|------|-------------|-----------|------------|----------|-----------------------------|---|--|--|-----------|-----------|---------|----------------------|
| RA0 | 19 | 16 | AN0 | VREF-DACOUT | CPS0 | C1IN+ | — | — | — | — | — | IOC | — | Y | ICSPDAT/ICDDAT |
| RA1 | 18 | 15 | AN1 | VREF+ | CPS1 | C12IN0- | SRI | — | — | — | — | IOC | — | Y | ICSPCLK/ICDCLK |
| RA2 | 17 | 14 | AN2 | — | CPS2 | C1OUT | SRQ | T0CKI | CCP3 FLT0 | — | — | INT/IOC | — | Y | — |
| RA3 | 4 | 1 | — | — | — | — | — | T1G ⁽¹⁾ | — | — | — | IOC | — | Y | MCLR V _{PP} |
| RA4 | 3 | 20 | AN3 | — | CPS3 | — | — | T1G ⁽¹⁾ T1OSO | P2B ⁽¹⁾ | — | SS ^(1,2) | IOC | — | Y | OSC2 CLKOUT |
| RA5 | 2 | 19 | — | — | — | — | — | T1CKI T1OSI | CCP2 ⁽¹⁾ P2A ⁽¹⁾ | — | SDO2 ^(1,2) | IOC | — | Y | OSC1 CLKIN |
| RB4 | 13 | 10 | AN10 | — | CPS10 | — | — | — | — | — | SDA1 SDI1 | IOC | — | Y | — |
| RB5 | 12 | 9 | AN11 | — | CPS11 | — | — | — | — | RX ⁽¹⁾ DT ⁽¹⁾ | SDA2 ⁽²⁾ SDI2 ⁽²⁾ | IOC | — | Y | — |
| RB6 | 11 | 8 | — | — | — | — | — | — | — | — | SCL1 SCK1 | IOC | — | Y | — |
| RB7 | 10 | 7 | — | — | — | — | — | — | — | TX ⁽¹⁾ CK ⁽¹⁾ | SCL2 ⁽²⁾ SCK2 ⁽²⁾ | IOC | — | Y | — |
| RC0 | 16 | 13 | AN4 | — | CPS4 | C2IN+ | — | — | P1D ⁽¹⁾ | — | SS ^(1,2) | — | — | Y | — |
| RC1 | 15 | 12 | AN5 | — | CPS5 | C12IN1- | — | — | P1C ⁽¹⁾ | — | SDO2 ^(1,2) | — | — | Y | — |
| RC2 | 14 | 11 | AN6 | — | CPS6 | C12IN2- | — | — | P1D ⁽¹⁾ P2B ⁽¹⁾ | — | — | — | MDCIN1 | Y | — |
| RC3 | 7 | 4 | AN7 | — | CPS7 | C12IN3- | — | — | P1C ⁽¹⁾ CCP2 ⁽¹⁾ P2A ⁽¹⁾ | — | — | — | MDMIN | Y | — |
| RC4 | 6 | 3 | — | — | — | C2OUT | SRNQ | — | P1B | TX ⁽¹⁾ CK ⁽¹⁾ | — | — | MDOUT | Y | — |
| RC5 | 5 | 2 | — | — | — | — | — | — | CCP1 P1A | RX ⁽¹⁾ DT ⁽¹⁾ | — | — | MDCIN2 | Y | — |
| RC6 | 8 | 5 | AN8 | — | CPS8 | — | — | — | CCP4 | — | SS | — | — | Y | — |
| RC7 | 9 | 6 | AN9 | — | CPS9 | — | — | — | — | — | SDO | — | — | Y | — |
| VDD | 1 | 18 | — | — | — | — | — | — | — | — | — | — | — | — | VDD |
| VSS | 20 | 20 | — | — | — | — | — | — | — | — | — | — | — | — | VSS |

Note 1: Pin functions can be assigned to one of two pin locations via software.

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NOTES:

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