

14-Pin Flash-Based, 8-Bit CMOS Microcontrollers with Intelligent Analog

High-Performance RISC CPU:

- Only 35 Instructions to Learn
- All Single-Cycle Instructions except Branches
- Operating Speed:
 - DC – 20 MHz clock input
 - DC – 200 ns instruction cycle
- 2048 x 14 On-Chip Flash Program Memory
- Self Read/Write Program Memory
- Interrupt Capability with Automatic Context Saving
- 8-Level Deep Hardware Stack
- Direct, Indirect and Relative Addressing modes

Special Microcontroller Features:

- Precision Internal Oscillator:
 - Factory calibrated to $\pm 1\%$, typical
 - Software selectable frequency:
8 MHz, 4 MHz, 1 MHz, or 31 kHz
- Power-Saving Sleep mode
- Operating Voltage Range (PIC16F753):
 - 2.0V-5.5V
- Shunt Voltage Regulator (PIC16HV753):
 - 5.0V regulation
 - 1 mA to 50 mA shunt range
 - 2.0V to user defined
- Multiplexed Master Clear with Pull-up/Input Pin
- Interrupt-on-Change Pins
- Individually Programmable Weak Pull-ups
- Power-on Reset (POR)
- Power-up Timer (PWRT)
- Brown-out Reset (BOR)
- Watchdog Timer (WDT) with Internal Oscillator for Reliable Operation
- Industrial and Extended Temperature Range
- High Endurance Flash/EEPROM Cell:
 - 100,000 write Flash endurance
 - Flash retention: >40 years
- Programmable Code Protection
- In-Circuit Serial Programming™ (ICSP™) via Two Pins
- In-Circuit Debug (ICD) via Two Pins

Low-Power Features:

- Standby Current:
 - 50 nA @ 2.0V, typical
- Operating Current:
 - 11 μ A @ 32 kHz, 2.0V, typical
 - 260 μ A @ 4 MHz, 2.0V, typical
- Watchdog Timer Current:
 - <1 μ A @ 2.0V, typical

Peripheral Features:

- 11 I/O Pins (1 input-only pin):
- High Current Sink/Source:
 - 50 mA I/O (2 pins)
 - 25 mA I/O (9 pins)
- Two High-Speed Analog Comparator Modules:
 - 50 ns response time
 - Fixed Voltage Reference (FVR)
 - Programmable on-chip voltage reference via integrated 9-bit DAC
 - Internal/external inputs and outputs (selectable)
 - Built-in Hysteresis (software selectable)
- Analog-to-Digital Converter (ADC):
 - 10-bit resolution
 - Eight external channels
 - Two internal reference voltage channels
- Operational Amplifier:
 - Three terminal operation
 - Internal connections to DAC and FVR
- Digital-to-Analog Converter (DAC):
 - 9-bit resolution
 - Full range resolution
 - 4 mV steps at 2.0V
- Fixed Voltage Reference (FVR), 1.2V Reference
- Capture, Compare, PWM (CCP) Module:
 - 16-bit Capture, max. resolution 12.5 ns
 - 16-bit Compare, max. resolution 200 ns
 - 10-bit PWM, max. frequency 20 kHz
- Timer0: 8-Bit Timer/Counter with 8-Bit Programmable Prescaler
- Enhanced Timer1:
 - 16-bit timer/counter with prescaler
 - External Timer1 gate (count enable)
 - Four selectable clock sources
- Timer2: 8-Bit Timer/Counter with 8-Bit Period Register, Prescaler and Postscaler

PIC16F753/HV753

Peripheral Features (Continued):

- Complementary Output Generator (COG):
 - Slope Compensation Circuit for use with SMPS power supplies
 - Complementary Waveforms for Full and Half-Bridge topologies
 - Two I/O (50 mA) for direct MOSFET drive
 - Rising and/or Falling edge input sources for flexible control topologies
 - Phase, Blanking dead-band control
 - Auto-shutdown
 - Hardware Limit Timer (HLT)
 - 8-bit Timer with prescaler
 - 8-bit period register and postscaler
 - Asynchronous H/W Reset sources

PIC12F752/HV752/PIC16F753/HV753 Family Types

Device	Data Sheet Index	Program Memory Flash (words)	Self Read/Write Flash Memory	Data SRAM (bytes)	I/O's ⁽²⁾	10-bit ADC (ch)	Comparators	Timers (8/16-bit)	CCP	Complementary Output Generator (COG)	DAC	Operational Amplifiers	Shunt Regulator	Debug ⁽¹⁾
PIC12F752	(1)	1K	Y	64	6	4	2	3/1	1	Y	5-bit	N	N	H
PIC12HV752	(1)	1K	Y	64	6	4	2	3/1	1	Y	5-bit	N	Y	H
PIC16F753	(2)	2K	Y	128	12	8	2	3/1	1	Y	9-bit	Y	N	I/H
PIC16HV753	(2)	2K	Y	128	12	8	2	3/1	1	Y	9-bit	Y	Y	I/H

Note 1: I - Debugging, Integrated on Chip; H – Debugging, Available using Debug Header

Note 2: One pin is input-only.

Data Sheet Index:

- 1: DS41576 [PIC12F752/HV752 Data Sheet, 8-Pin, Flash-Based 8-Bit CMOS Microcontrollers.](#)
- 2: Future Release [PIC16F753/HV753 Data Sheet, 14-Pin, Flash-Based 8-Bit CMOS Microcontrollers with Intelligent Analog.](#)

Note: For other small form-factor package availability and marking information, please visit <http://www.microchip.com/packaging> or contact your local sales office.

PIC16F753/HV753

FIGURE 1: 14-PIN PDIP, SOIC, TSSOP DIAGRAM FOR PIC16F753/HV753

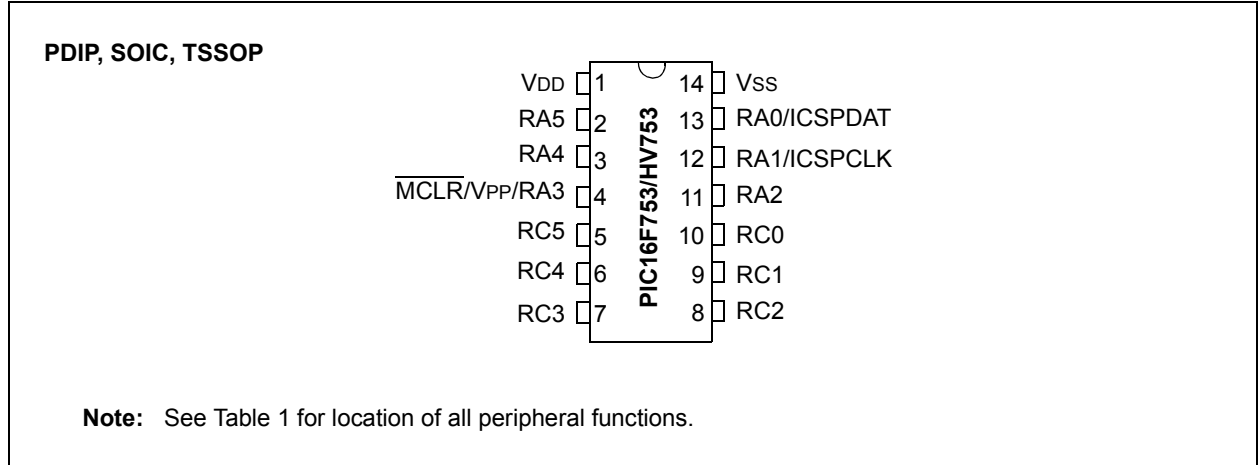
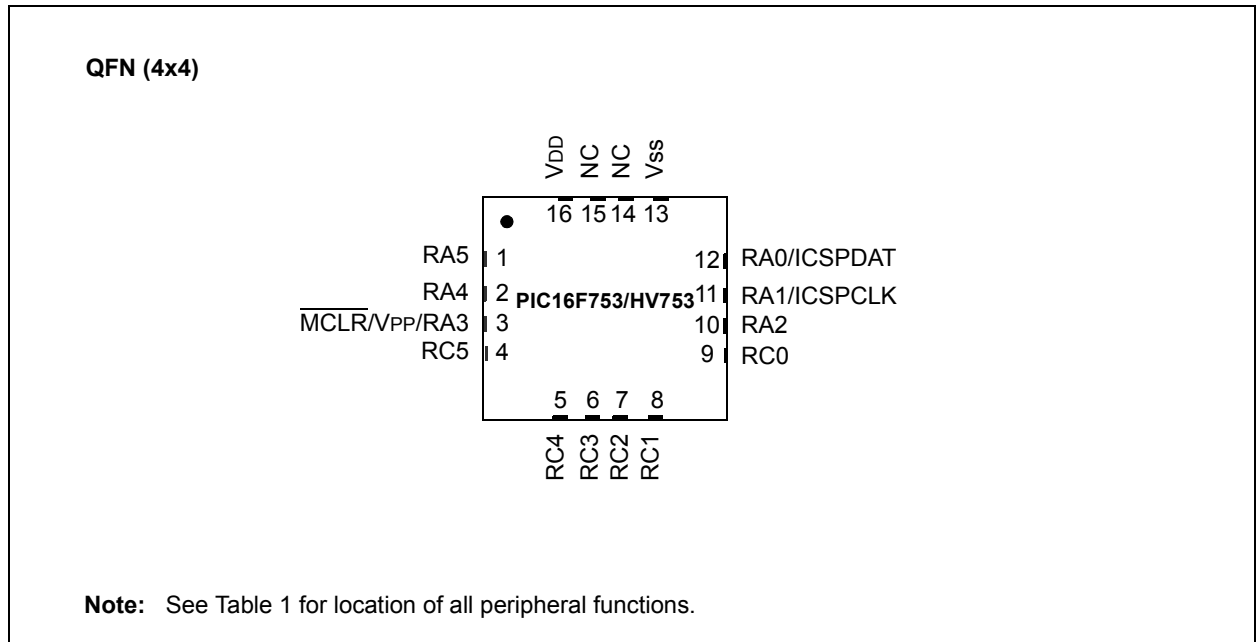


FIGURE 2: 16-PIN QFN DIAGRAM FOR PIC16F753/HV753



PIC16F753/HV753

TABLE 1: 14-PIN ALLOCATION TABLE (PIC16F753/HV753)

I/O	14-Pin PDIP/SOIC/TSSOP	16-Pin QFN	ADC	Reference	Op Amp	Comparator	Timer	CCP	Interrupt	Pull-Up	Basic
RA0	13	12	AN0	FVR0UT DAC0UT	—	C1IN0+	—	—	IOC	Y	ICSPDAT
RA1	12	11	AN1	VREF FVRIN	—	C1IN0- C2IN0-	—	—	IOC	Y	ICSPCLK
RA2	11	10	AN2	COG1FLT	—	C1OUT	T0CKI	—	INT IOC	Y	—
RA3	4	3	—	—	—	—	T1G ⁽²⁾	—	IOC	Y	$\overline{\text{MCLR}}$
RA4	3	2	AN3	—	—	—	T1G ⁽¹⁾	—	IOC	Y	CLKOUT
RA5	2	1	—	—	—	—	T1CKI	—	IOC	Y	—
RC0	10	9	AN4	—	OPA1IN+	C2IN0+	—	—	IOC	—	—
RC1	9	8	AN5	—	OPA1IN-	C1IN1- C2IN1-	—	—	IOC	—	—
RC2	8	7	AN6	—	OPA1OUT	C1IN2- C2IN2-	—	—	IOC	—	—
RC3	7	6	AN7	—	—	C1IN3- C2IN3-	—	—	IOC	—	—
RC4	6	5	—	COG1OUT1	—	C2OUT	—	—	IOC	—	—
RC5	5	4	—	COG1OUT0	—	—	—	CCP1	IOC	—	—
VDD	1	16	—	—	—	—	—	—	—	—	VDD
VSS	14	13	—	—	—	—	—	—	—	—	VSS

- Note 1:** Default location for peripheral pin function. Alternate location can be selected using the APFCON register.
Note 2: Alternate location for peripheral pin function selected by the APFCON register.

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