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## PIC12LF1840T39A Product Brief

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### High-Performance RISC CPU:

- Only 49 Instructions to Learn:
  - All single-cycle instructions except branches
- Operating Speed:
  - DC – 32 MHz oscillator/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

### Flexible Oscillator Structure:

- Precision 32 MHz Internal Oscillator Block:
  - Factory calibrated to  $\pm 1\%$ , typical
  - Software selectable frequencies range of 31 kHz to 32 MHz
- 31 kHz Low-Power Internal Oscillator
- Four Crystal modes up to 32 MHz
- Three External Clock modes up to 32 MHz
- 4x Phase Lock Loop (PLL)
- Fail-Safe Clock Monitor:
  - Allows for safe shutdown if peripheral clock stops
- Two-Speed Oscillator Start-up
- Reference Clock module:
  - Programmable clock output frequency and duty-cycle

### Special Microcontroller Features:

- 1.8V-3.6V Operation
- 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)
- In-Circuit Serial Programming™ (ICSP™) via Two Pins
- In-Circuit Debug (ICD) via Two Pins
- Enhanced Low-Voltage Programming (LVP)
- Programmable Code Protection
- Power-Saving Sleep mode

### Low-Power Features:

- Standby Current:
  - 30 nA @ 3.0V, typical, RF off
  - 530 nA @ 3.0V, typical, RF Sleep
- Operating Current:
  - 0.67 mA @ 8 MHz, 3.0V, RF off, typical
  - 9.67 mA @ 8 MHz, 3.0V, RF on at 0 dBm, typical
  - 15.67 mA @ 8 MHz, 3.0V, RF on at +10 dBm, typical
- Low-Power Watchdog Timer Current:
  - 500 nA @ 3.0V, typical

### RF Transmitter:

- Fully Integrated Transmitter
- FSK Operation up to 100 kbps
- OOK Operation up to 10 kbps
- Frequency-Agile Operation in 310, 433, 868 and 915 MHz Bands
- +10 dBm or 0 dBm Configurable Output Power

### Analog Features:

- Analog-to-Digital Converter (ADC) module:
  - 10-bit resolution, 4 channels
  - Conversion available during Sleep
- Analog Comparator module:
  - One rail-to-rail analog comparator
  - Power mode control
  - Software controllable hysteresis
- Voltage Reference module:
  - Fixed Voltage Reference (FVR) with 1.024V and 2.048V output levels
  - 5-bit rail-to-rail resistive DAC with positive and negative reference selection

### Peripheral Features:

- 5 I/O Pins and 1 Input-only Pin:
  - High current sink/source 25 mA/25 mA
  - Programmable weak pull-ups
  - Programmable interrupt-on-change pins
- Timer0: 8-Bit Timer/Counter with 8-Bit Prescaler
- Enhanced Timer1:
  - 16-bit timer/counter with prescaler
  - External Gate Input mode
  - Dedicated, low-power 32 kHz oscillator driver
- Timer2: 8-Bit Timer/Counter with 8-Bit Period Register, Prescaler and Postscaler

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- Enhanced CCP (ECCP) module:
  - Software selectable time bases
  - Auto-shutdown and auto-restart
  - PWM steering
- Master Synchronous Serial Port (MSSP) with SPI and I<sup>2</sup>C™ with:
  - 7-bit address masking
  - SMBus/PMBus™ compatibility
- Enhanced Universal Synchronous Asynchronous Receiver Transmitter (EUSART) module:
  - RS-232, RS-485 and LIN compatible
  - Auto-Baud Detect
- Capacitive Sensing (CPS) module (mTouch™):
  - 4 input channels
- Data Signal Modulator module:
  - Selectable modulator and carrier sources
- SR Latch:
  - Multiple Set/Reset input options
  - Emulates 555 Timer applications

**TABLE 1: PIC12LF1840T39A FEATURE SUMMARY**

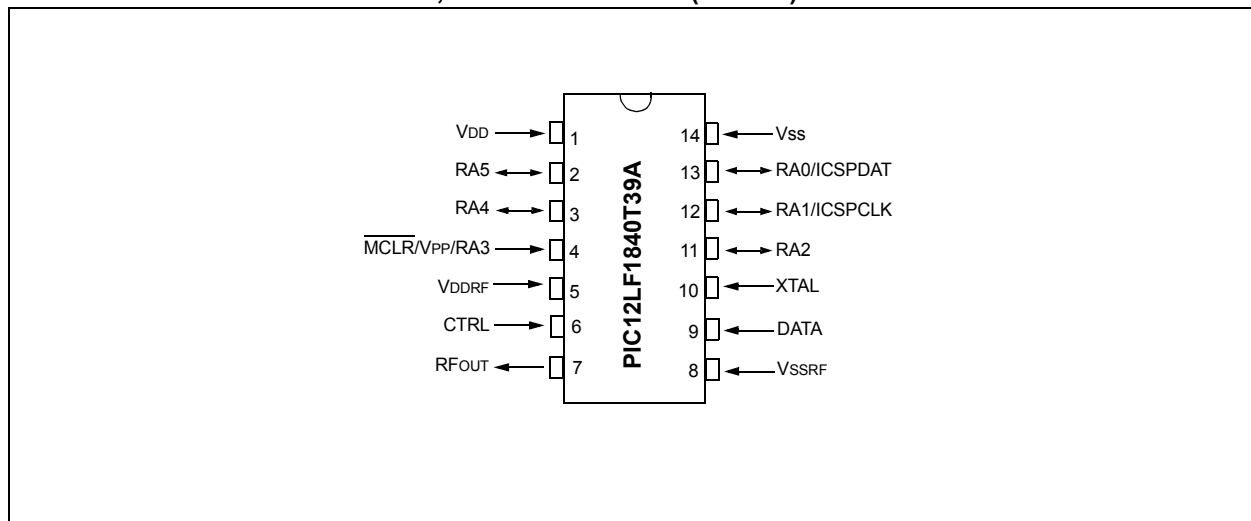
Device	Program Memory Flash (words)	Data Memory EEPROM (Bytes)	Data Memory SRAM (Bytes)	I/Os <sup>(1)</sup>	10-bit ADC (ch)	CapSense (ch)	Comparators	Timers (8/16-bit)	EUSART	MSSP (I <sup>2</sup> C™/SPI)	ECCP (Half-Bridge)	SR Latch	RF Transmitter	Debug <sup>(2)</sup>
PIC12LF1840T39A	4K	256	256	6	4	4	1	2/1	1	1	1	Yes	Yes	I

**Note 1:** One pin is input-only.

**Note 2:** I – Debugging, Integrated on Chip; H – Debugging, Debug Header Available

**Note:** Pin details are subject to change.

**FIGURE 1: 14-PIN DIAGRAM, PIC12LF1840T39A (TSSOP)**



**TABLE 2: 14-PIN ALLOCATION TABLE (PIC12LF1840T39A)**

I/O	14-Pin TSSOP	A/D	Reference	CapSense	Comparator	SR Latch	Timers	ECCP	EUSART	MSSP	Interrupt	Modulator	Pull-up	Basic	RF Transmitter
RA0	13	AN0	DACOUT	CPS0	C1IN+	—	—	P1B <sup>(1)</sup>	TX <sup>(1)</sup> CK <sup>(1)</sup>	SDO <sup>(1)</sup> SS <sup>(1)</sup>	IOC	MDOUT	Y	ICSPDAT ICDDAT	—
RA1	12	AN1	VREF	CPS1	C1IN0-	SRI	—	—	RX <sup>(1)</sup> DT <sup>(1)</sup>	SCL SCK	IOC	MDMIN	Y	ICSPCLK	—
RA2	11	AN2	—	CPS2	C1OUT	SRQ	T0CKI	CCP1 <sup>(1)</sup> P1A <sup>(1)</sup> FLT0	—	SDA SDI	INT IOC	MDCOM1	Y	—	—
RA3	4	—	—	—	—	—	T1G <sup>(2)</sup>	—	—	SS <sup>(1)</sup>	IOC	—	Y	MCLR VPP	—
RA4	3	AN3	—	CPS3	C1IN1-	—	T1G <sup>(1)</sup> T1OSO	P1B <sup>(1)</sup>	TX <sup>(1)</sup> CK <sup>(1)</sup>	SDO <sup>(1)</sup>	IOC	MDCIN2	Y	OSC2 CLKOUT CLKR	—
RA5	2	—	—	—	—	SRNQ	T1CKI T1OSI	CCP1 <sup>(1)</sup> P1A <sup>(1)</sup>	RX <sup>(1)</sup> DT <sup>(1)</sup>	—	IOC	—	Y	OSC1 CLKIN	—
VDD	1	—	—	—	—	—	—	—	—	—	—	—	—	VDD	—
VSS	14	—	—	—	—	—	—	—	—	—	—	—	—	VSS	—
CTRL	6	—	—	—	—	—	—	—	—	—	—	—	—	—	CTRL
RFOUT	7	—	—	—	—	—	—	—	—	—	—	—	—	—	RFOUT
DATA	9	—	—	—	—	—	—	—	—	—	—	—	—	—	DATA
XTAL	10	—	—	—	—	—	—	—	—	—	—	—	—	—	XTAL
VDDRF	5	—	—	—	—	—	—	—	—	—	—	—	—	—	VDDRF
VSSRF	8	—	—	—	—	—	—	—	—	—	—	—	—	—	VSSRF

Note 1: Pin function is selectable via the APFCON register.

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## APPENDIX A: REVISION HISTORY

### Revision A (03/2012)

Initial release of this document.

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ISBN: 9781620761120

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