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Details

Product Status	Active
Core Processor	PIC
Core Size	8-Bit
Speed	20MHz
Connectivity	-
Peripherals	Brown-out Detect/Reset, POR, PWM, WDT
Number of I/O	17
Program Memory Size	3.5KB (2K x 14)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	128 x 8
Voltage - Supply (Vcc/Vdd)	2.3V ~ 5.5V
Data Converters	A/D 12x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 125°C (TA)
Mounting Type	Surface Mount
Package / Case	20-SSOP (0.209", 5.30mm Width)
Supplier Device Package	20-SSOP
Purchase URL	https://www.e-xfl.com/product-detail/microchip-technology/pic16f1507-e-ss

PIC16(L)F1507

TABLE 1-2: PIC16(L)F1507 PINOUT DESCRIPTION (CONTINUED)

Name	Function	Input Type	Output Type	Description
RC3/AN7/PWM2/CLC2IN0	RC3	TTL	CMOS	General purpose I/O.
	AN7	AN	—	A/D Channel input.
	PWM2	—	CMOS	Pulse Width Module source output.
	CLC2IN0	ST	—	Configurable Logic Cell source input.
RC4/CLC2IN1/CWG1B	RC4	TTL	CMOS	General purpose I/O.
	CLC2IN1	ST	—	Configurable Logic Cell source input.
	CWG1B	—	CMOS	CWG complementary output.
RC5/PWM1/CLC1 ⁽¹⁾ /CWG1A	RC5	TTL	CMOS	General purpose I/O.
	PWM1	—	CMOS	PWM output.
	CLC1	—	CMOS	Configurable Logic Cell source output.
	CWG1A	—	CMOS	CWG primary output.
RC6/AN8/NCO1 ⁽¹⁾	RC6	TTL	CMOS	General purpose I/O.
	AN8	AN	—	A/D Channel input.
	NCO1	—	CMOS	Numerically Controlled Oscillator source output.
RC7/AN9/CLC1IN1	RC7	TTL	CMOS	General purpose I/O.
	AN8	AN	—	A/D Channel input.
	CLC1IN1	ST	—	Configurable Logic Cell source input.
VDD	VDD	Power	—	Positive supply.
VSS	VSS	Power	—	Ground reference.

Legend: AN = Analog input or output CMOS = CMOS compatible input or output OD = Open Drain
TTL = TTL compatible input ST = Schmitt Trigger input with CMOS levels I²C™ = Schmitt Trigger input with I²C levels
HV = High Voltage XTAL = Crystal

Note 1: Alternate pin function selected with the APFCON (Register 11-1) register.

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TABLE 3-5: SPECIAL FUNCTION REGISTER SUMMARY (CONTINUED)

Address	Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Value on POR, BOR	Value on all other Resets
Bank 10											
50Ch to 51Fh	—	Unimplemented								—	—
Bank 11											
58Ch to 59Fh	—	Unimplemented								—	—
Bank 12											
60Ch to 610h	—	Unimplemented								—	—
611h	PWM1DCL	PWM1DCL<7:6>		—	—	—	—	—	—	00-- ----	00-- ----
612h	PWM1DCH	PWM1DCH<7:0>								xxxx xxxx	uuuu uuuu
613h	PWM1CON0	PWM1EN	PWM1OE	PWM1OUT	PWM1POL	—	—	—	—	0000 ----	0000 ----
614h	PWM2DCL	PWM2DCL<7:6>		—	—	—	—	—	—	00-- ----	00-- ----
615h	PWM2DCH	PWM2DCH<7:0>								xxxx xxxx	uuuu uuuu
616h	PWM2CON0	PWM2EN	PWM2OE	PWM2OUT	PWM2POL	—	—	—	—	0000 ----	0000 ----
617h	PWM3DCL	PWM3DCL<7:6>		—	—	—	—	—	—	00-- ----	00-- ----
618h	PWM3DCH	PWM3DCH<7:0>								xxxx xxxx	uuuu uuuu
619h	PWM3CON0	PWM3EN	PWM3OE	PWM3OUT	PWM3POL	—	—	—	—	0000 ----	0000 ----
61Ah	PWM4DCL	PWM4DCL<7:6>		—	—	—	—	—	—	00-- ----	00-- ----
61Bh	PWM4DCH	PWM4DCH<7:0>								xxxx xxxx	uuuu uuuu
61Ch	PWM4CON0	PWM4EN	PWM4OE	PWM4OUT	PWM4POL	—	—	—	—	0000 ----	0000 ----
61Dh to 61Fh	—	Unimplemented								—	—
Bank 13											
68Ch to 690h	—	Unimplemented								—	—
691h	CWG1DBR	—	—	CWG1DBR<5:0>						--00 0000	--00 0000
692h	CWG1DBF	—	—	CWG1DBF<5:0>						--xx xxxx	--xx xxxx
693h	CWG1CON0	G1EN	G1OEB	G1OEA	G1POLB	G1POLA	—	—	G1CS0	0000 0--0	0000 0--0
694h	CWG1CON1	G1ASDLB<1:0>		G1ASDLA<1:0>		—	G1IS<2:0>			0000 -000	0000 -000
695h	CWG1CON2	G1ASE	G1ARSEN	—	—	—	—	G1ASDSFLT	G1ASDSCLC2	00-- --00	00-- --00
696h to 69Fh	—	Unimplemented								—	—

Legend: x = unknown, u = unchanged, q = value depends on condition, - = unimplemented, r = reserved. Shaded locations are unimplemented, read as '0'.

- Note** 1: PIC16F1507 only.
2: Unimplemented, read as '1'.

5.2 Clock Source Types

Clock sources can be classified as external, internal or peripheral.

External clock sources rely on external circuitry for the clock source to function. Examples are: oscillator modules (ECH, ECM, ECL modes).

Internal clock sources are contained within the oscillator module. The internal oscillator block has two internal oscillators that are used to generate the internal system clock sources: the 16 MHz High-Frequency Internal Oscillator (HFINTOSC) and the 31 kHz Low-Frequency Internal Oscillator (LFINTOSC).

The peripheral clock source is a nominal 600 kHz internal RC oscillator, FRC. The FRC is traditionally used with the ADC module, but is sometimes available to other peripherals. See **Section 5.2.2.4 “Peripheral Clock Sources”**.

The system clock can be selected between external or internal clock sources via the System Clock Select (SCS) bits in the OSCCON register. See **Section 5.3 “Clock Switching”** for additional information.

5.2.1 EXTERNAL CLOCK SOURCES

An external clock source can be used as the device system clock by performing one of the following actions:

- Program the FOSC<1:0> bits in the Configuration Words to select an external clock source that will be used as the default system clock upon a device Reset.
- Write the SCS<1:0> bits in the OSCCON register to switch the system clock source to:
 - Secondary oscillator during run-time, or
 - An external clock source determined by the value of the FOSC bits.

See **Section 5.3 “Clock Switching”** for more information.

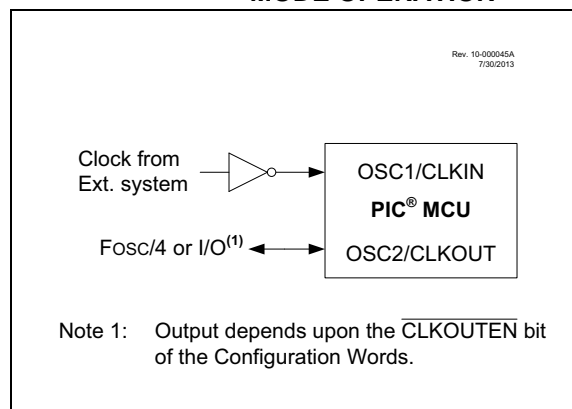
5.2.1.1 EC Mode

The External Clock (EC) mode allows an externally generated logic level signal to be the system clock source. When operating in this mode, an external clock source is connected to the OSC1 input. OSC2/CLKOUT is available for general purpose I/O or CLKOUT. Figure 5-2 shows the pin connections for EC mode.

EC mode has three power modes to select from through the Fosc bits in the Configuration Words:

- ECH – High power, 4-20 MHz
- ECM – Medium power, 0.5-4 MHz
- ECL – Low power, 0-0.5 MHz

FIGURE 5-2: EXTERNAL CLOCK (EC) MODE OPERATION



REGISTER 10-5: PMCON1: PROGRAM MEMORY CONTROL 1 REGISTER

U-1	R/W-0/0	R/W-0/0	R/W/HC-0/0	R/W/HC-x/q ⁽²⁾	R/W-0/0	R/S/HC-0/0	R/S/HC-0/0
— ⁽¹⁾	CFGS	LWLO	FREE	WRERR	WREN	WR	RD
bit 7							bit 0

Legend:

R = Readable bit	W = Writable bit	U = Unimplemented bit, read as '0'
S = Bit can only be set	x = Bit is unknown	-n/n = Value at POR and BOR/Value at all other Resets
'1' = Bit is set	'0' = Bit is cleared	HC = Bit is cleared by hardware

bit 7	Unimplemented: Read as '1'
bit 6	CFGS: Configuration Select bit 1 = Access Configuration, User ID and Device ID Registers 0 = Access Flash program memory
bit 5	LWLO: Load Write Latches Only bit ⁽³⁾ 1 = Only the addressed program memory write latch is loaded/updated on the next WR command 0 = The addressed program memory write latch is loaded/updated and a write of all program memory write latches will be initiated on the next WR command
bit 4	FREE: Program Flash Erase Enable bit 1 = Performs an erase operation on the next WR command (hardware cleared upon completion) 0 = Performs a write operation on the next WR command
bit 3	WRERR: Program/Erase Error Flag bit 1 = Condition indicates an improper program or erase sequence attempt or termination (bit is set automatically on any set attempt (write '1') of the WR bit). 0 = The program or erase operation completed normally.
bit 2	WREN: Program/Erase Enable bit 1 = Allows program/erase cycles 0 = Inhibits programming/erasing of program Flash
bit 1	WR: Write Control bit 1 = Initiates a program Flash program/erase operation. The operation is self-timed and the bit is cleared by hardware once operation is complete. The WR bit can only be set (not cleared) in software. 0 = Program/erase operation to the Flash is complete and inactive.
bit 0	RD: Read Control bit 1 = Initiates a program Flash read. Read takes one cycle. RD is cleared in hardware. The RD bit can only be set (not cleared) in software. 0 = Does not initiate a program Flash read.

- Note**
- 1: Unimplemented bit, read as '1'.
 - 2: The WRERR bit is automatically set by hardware when a program memory write or erase operation is started (WR = 1).
 - 3: The LWLO bit is ignored during a program memory erase operation (FREE = 1).

11.0 I/O PORTS

Each port has three standard registers for its operation. These registers are:

- TRISx registers (data direction)
- PORTx registers (reads the levels on the pins of the device)
- LATx registers (output latch)

Some ports may have one or more of the following additional registers. These registers are:

- ANSELx (analog select)
- WPUx (weak pull-up)

In general, when a peripheral is enabled on a port pin, that pin cannot be used as a general purpose output. However, the pin can still be read.

TABLE 11-1: PORT AVAILABILITY PER DEVICE

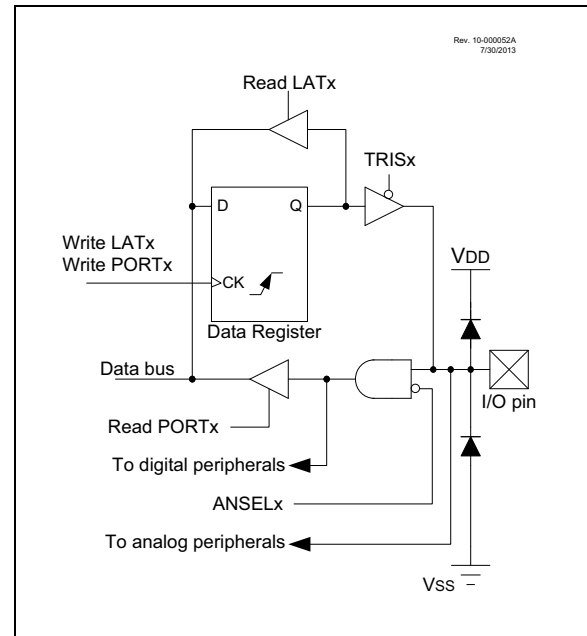
Device	PORTA	PORTB	PORTC
PIC16(L)F1507	•	•	•

The Data Latch (LATx registers) is useful for read-modify-write operations on the value that the I/O pins are driving.

A write operation to the LATx register has the same effect as a write to the corresponding PORTx register. A read of the LATx register reads of the values held in the I/O PORT latches, while a read of the PORTx register reads the actual I/O pin value.

Ports that support analog inputs have an associated ANSELx register. When an ANSEL bit is set, the digital input buffer associated with that bit is disabled. Disabling the input buffer prevents analog signal levels on the pin between a logic high and low from causing excessive current in the logic input circuitry. A simplified model of a generic I/O port, without the interfaces to other peripherals, is shown in Figure 11-1.

FIGURE 11-1: GENERIC I/O PORT OPERATION



REGISTER 11-15: ANSEL: PORTC ANALOG SELECT REGISTER

R/W-1/1	R/W-1/1	U-0	U-0	R/W-1/1	R/W-1/1	R/W-1/1	R/W-1/1
ANSC7	ANSC6	—	—	ANSC3	ANSC2	ANSC1	ANSC0
bit 7							bit 0

Legend:

R = Readable bit

W = Writable bit

U = Unimplemented bit, read as '0'

u = Bit is unchanged

x = Bit is unknown

-n/n = Value at POR and BOR/Value at all other Resets

'1' = Bit is set

'0' = Bit is cleared

- bit 7-6 **ANSC<7:6>**: Analog Select between Analog or Digital Function on pins RC<7:6>, respectively
 1 = Analog input. Pin is assigned as analog input⁽¹⁾. Digital input buffer disabled.
 0 = Digital I/O. Pin is assigned to port or digital special function.
- bit 5-4 **Unimplemented**: Read as '0'
- bit 3-0 **ANSC<3:0>**: Analog Select between Analog or Digital Function on pins RC<3:0>, respectively
 1 = Analog input. Pin is assigned as analog input⁽¹⁾. Digital input buffer disabled.
 0 = Digital I/O. Pin is assigned to port or digital special function.

Note 1: When setting a pin to an analog input, the corresponding TRIS bit must be set to Input mode in order to allow external control of the voltage on the pin.

TABLE 11-9: SUMMARY OF REGISTERS ASSOCIATED WITH PORTC

Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Register on Page
ANSEL	ANSC7	ANSC6	—	—	ANSC3	ANSC2	ANSC1	ANSC0	107
LATC	LATC7	LATC6	LATC5	LATC4	LATC3	LATC2	LATC1	LATC0	106
PORTC	RC7	RC6	RC5	RC4	RC3	RC2	RC1	RC0	106
TRISC	TRISC7	TRISC6	TRISC5	TRISC4	TRISC3	TRISC2	TRISC1	TRISC0	106

Legend: x = unknown, u = unchanged, - = unimplemented locations read as '0'. Shaded cells are not used by PORTC.

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12.6 Register Definitions: Interrupt-on-Change Control

REGISTER 12-1: IOCAP: INTERRUPT-ON-CHANGE PORTA POSITIVE EDGE REGISTER

U-0	U-0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0
—	—	IOCAP5	IOCAP4	IOCAP3	IOCAP2	IOCAP1	IOCAP0
bit 7							bit 0

Legend:

R = Readable bit W = Writable bit U = Unimplemented bit, read as '0'
u = Bit is unchanged x = Bit is unknown -n/n = Value at POR and BOR/Value at all other Resets
'1' = Bit is set '0' = Bit is cleared

bit 7-6 **Unimplemented:** Read as '0'

bit 5-0 **IOCAP<5:0>:** Interrupt-on-Change PORTA Positive Edge Enable bits
1 = Interrupt-on-Change enabled on the pin for a positive going edge. IOCAF_x bit and IOCIF flag will be set upon detecting an edge.
0 = Interrupt-on-Change disabled for the associated pin.

REGISTER 12-2: IOCAN: INTERRUPT-ON-CHANGE PORTA NEGATIVE EDGE REGISTER

U-0	U-0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0
—	—	IOCAN5	IOCAN4	IOCAN3	IOCAN2	IOCAN1	IOCAN0
bit 7							bit 0

Legend:

R = Readable bit W = Writable bit U = Unimplemented bit, read as '0'
u = Bit is unchanged x = Bit is unknown -n/n = Value at POR and BOR/Value at all other Resets
'1' = Bit is set '0' = Bit is cleared

bit 7-6 **Unimplemented:** Read as '0'

bit 5-0 **IOCAN<5:0>:** Interrupt-on-Change PORTA Negative Edge Enable bits
1 = Interrupt-on-Change enabled on the pin for a negative going edge. IOCAF_x bit and IOCIF flag will be set upon detecting an edge.
0 = Interrupt-on-Change disabled for the associated pin.

REGISTER 12-3: IOCAF: INTERRUPT-ON-CHANGE PORTA FLAG REGISTER

U-0	U-0	R/W/HS-0/0	R/W/HS-0/0	R/W/HS-0/0	R/W/HS-0/0	R/W/HS-0/0	R/W/HS-0/0
—	—	IOCAF5	IOCAF4	IOCAF3	IOCAF2	IOCAF1	IOCAF0
bit 7							bit 0

Legend:

R = Readable bit W = Writable bit U = Unimplemented bit, read as '0'
u = Bit is unchanged x = Bit is unknown -n/n = Value at POR and BOR/Value at all other Resets
'1' = Bit is set '0' = Bit is cleared HS - Bit is set in hardware

bit 7-6 **Unimplemented:** Read as '0'

bit 5-0 **IOCAF<5:0>:** Interrupt-on-Change PORTA Flag bits
1 = An enabled change was detected on the associated pin.
Set when IOCAP_x = 1 and a rising edge was detected on RAX, or when IOCAN_x = 1 and a falling edge was detected on RAX.
0 = No change was detected, or the user cleared the detected change.

REGISTER 15-3: ADCON2: ADC CONTROL REGISTER 2

R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0	U-0	U-0	U-0	U-0
TRIGSEL<3:0> ⁽¹⁾				—	—	—	—
bit 7				bit 0			

Legend:

R = Readable bit

W = Writable bit

U = Unimplemented bit, read as '0'

u = Bit is unchanged

x = Bit is unknown

-n/n = Value at POR and BOR/Value at all other Resets

'1' = Bit is set

'0' = Bit is cleared

bit 7-4

TRIGSEL<3:0>: Auto-Conversion Trigger Selection bits⁽¹⁾

0000 = No auto-conversion trigger selected

0001 = Reserved

0010 = Reserved

0011 = Timer0 – T0_overflow⁽²⁾

0100 = Timer1 – T1_overflow⁽²⁾

0101 = Timer2 – T2_match

0110 = Reserved

0111 = Reserved

1000 = CLC1 – LC1_out

1001 = CLC2 – LC2_out

1010 = Reserved

1011 = Reserved

1100 = Reserved

1101 = Reserved

1110 = Reserved

1111 = Reserved

bit 3-0

Unimplemented: Read as '0'

Note 1: This is a rising edge sensitive input for all sources.

2: Signal also sets its corresponding interrupt flag.

18.0 TIMER2 MODULE

The Timer2 module incorporates the following features:

- 8-bit Timer and Period registers (TMR2 and PR2, respectively)
- Readable and writable (both registers)
- Software programmable prescaler (1:1, 1:4, 1:16, and 1:64)
- Software programmable postscaler (1:1 to 1:16)
- Interrupt on TMR2 match with PR2

See Figure 18-1 for a block diagram of Timer2.

FIGURE 18-1: TIMER2 BLOCK DIAGRAM

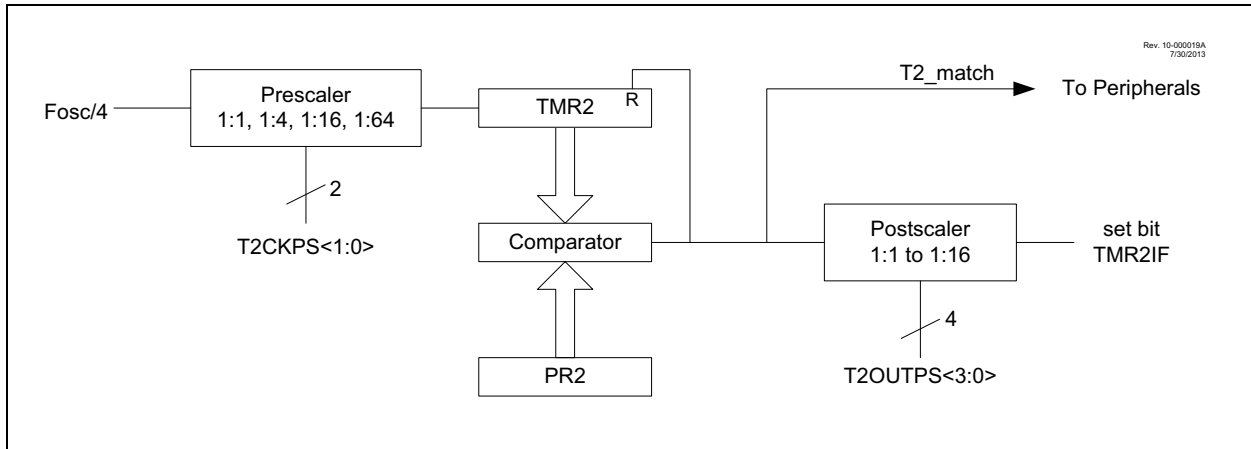
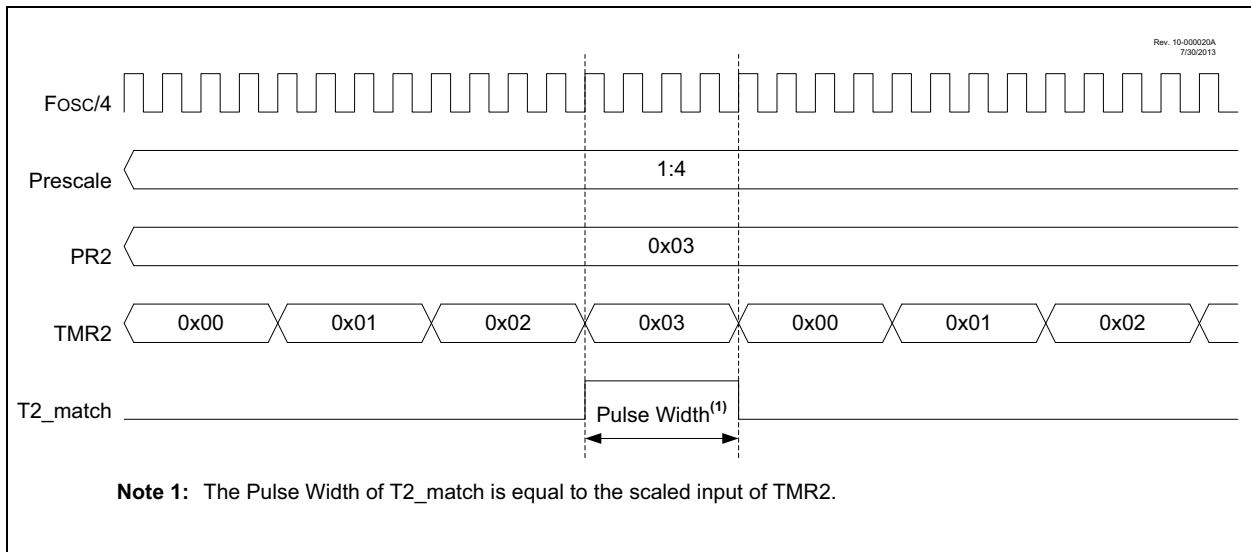


FIGURE 18-2: TIMER2 TIMING DIAGRAM



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20.0 CONFIGURABLE LOGIC CELL (CLC)

The Configurable Logic Cell (CLCx) provides programmable logic that operates outside the speed limitations of software execution. The logic cell takes up to 16 input signals, and through the use of configurable gates, reduces the 16 inputs to four logic lines that drive one of eight selectable single-output logic functions.

Input sources are a combination of the following:

- I/O pins
- Internal clocks
- Peripherals
- Register bits

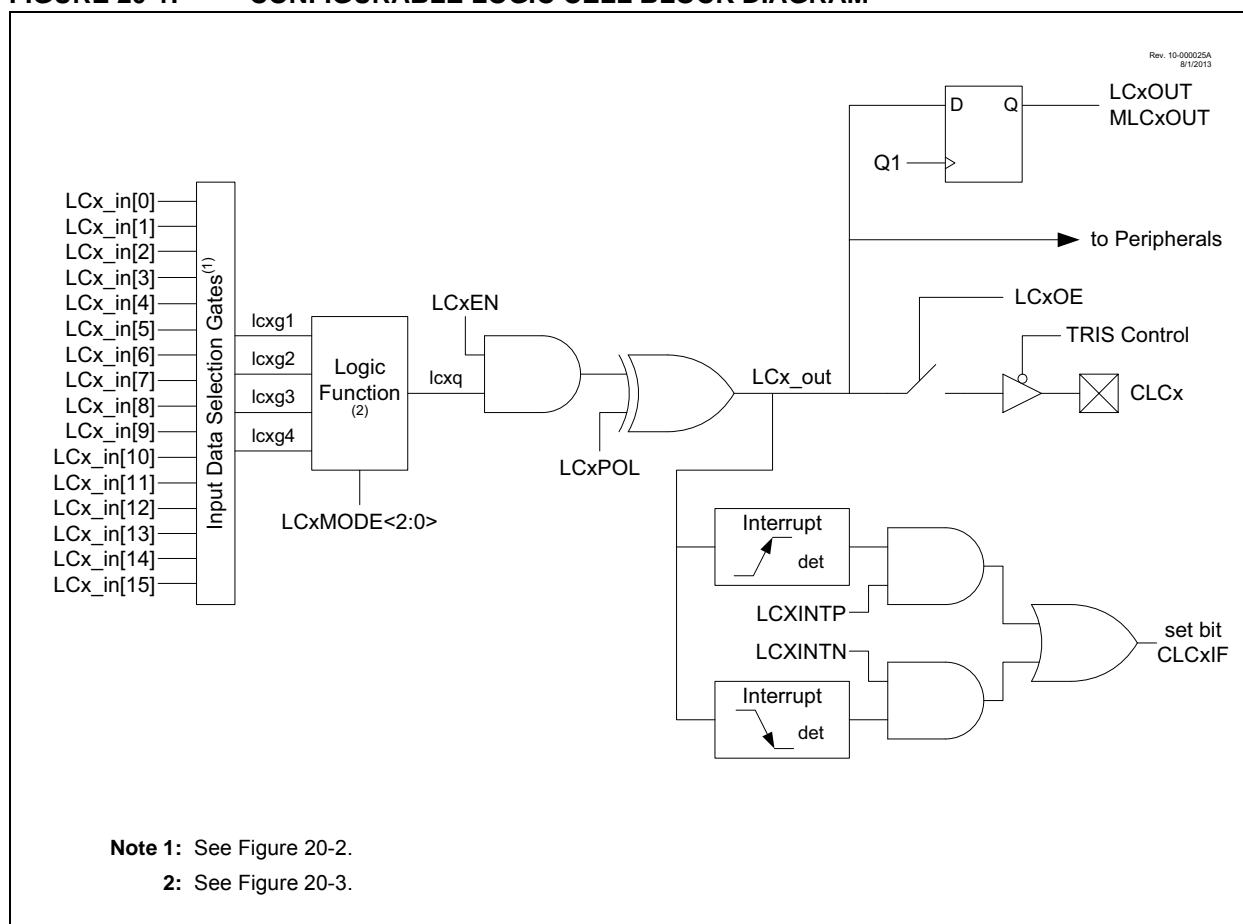
The output can be directed internally to peripherals and to an output pin.

Refer to Figure 20-1 for a simplified diagram showing signal flow through the CLCx.

Possible configurations include:

- Combinatorial Logic
 - AND
 - NAND
 - AND-OR
 - AND-OR-INVERT
 - OR-XOR
 - OR-XNOR
- Latches
 - S-R
 - Clocked D with Set and Reset
 - Transparent D with Set and Reset
 - Clocked J-K with Reset

FIGURE 20-1: CONFIGURABLE LOGIC CELL BLOCK DIAGRAM



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20.1.2 DATA GATING

Outputs from the input multiplexers are directed to the desired logic function input through the data gating stage. Each data gate can direct any combination of the four selected inputs.

Note: Data gating is undefined at power-up.

The gate stage is more than just signal direction. The gate can be configured to direct each input signal as inverted or non-inverted data. Directed signals are ANDed together in each gate. The output of each gate can be inverted before going on to the logic function stage.

The gating is in essence a 1-to-4 input AND/NAND/OR/NOR gate. When every input is inverted and the output is inverted, the gate is an OR of all enabled data inputs. When the inputs and output are not inverted, the gate is an AND of all enabled inputs.

Table 20-2 summarizes the basic logic that can be obtained in gate 1 by using the gate logic select bits. The table shows the logic of four input variables, but each gate can be configured to use less than four. If no inputs are selected, the output will be zero or one, depending on the gate output polarity bit.

TABLE 20-2: DATA GATING LOGIC

CLCxGLS0	LCxG1POL	Gate Logic
0x55	1	AND
0x55	0	NAND
0xAA	1	NOR
0xAA	0	OR
0x00	0	Logic 0
0x00	1	Logic 1

It is possible (but not recommended) to select both the true and negated values of an input. When this is done, the gate output is zero, regardless of the other inputs, but may emit logic glitches (transient-induced pulses). If the output of the channel must be zero or one, the recommended method is to set all gate bits to zero and use the gate polarity bit to set the desired level.

Data gating is configured with the logic gate select registers as follows:

- Gate 1: CLCxGLS0 (Register 20-5)
- Gate 2: CLCxGLS1 (Register 20-6)
- Gate 3: CLCxGLS2 (Register 20-7)
- Gate 4: CLCxGLS3 (Register 20-8)

Register number suffixes are different than the gate numbers because other variations of this module have multiple gate selections in the same register.

Data gating is indicated in the right side of Figure 20-2. Only one gate is shown in detail. The remaining three gates are configured identically with the exception that the data enables correspond to the enables for that gate.

20.1.3 LOGIC FUNCTION

There are eight available logic functions including:

- AND-OR
- OR-XOR
- AND
- S-R Latch
- D Flip-Flop with Set and Reset
- D Flip-Flop with Reset
- J-K Flip-Flop with Reset
- Transparent Latch with Set and Reset

Logic functions are shown in Figure 20-3. Each logic function has four inputs and one output. The four inputs are the four data gate outputs of the previous stage. The output is fed to the inversion stage and from there to other peripherals, an output pin, and back to the CLCx itself.

20.1.4 OUTPUT POLARITY

The last stage in the configurable logic cell is the output polarity. Setting the LCxPOL bit of the CLCxCON register inverts the output signal from the logic stage. Changing the polarity while the interrupts are enabled will cause an interrupt for the resulting output transition.

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20.6 Register Definitions: CLC Control

REGISTER 20-1: CLCxCON: CONFIGURABLE LOGIC CELL CONTROL REGISTER

R/W-0/0	R/W-0/0	R-0/0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0
LCxEN	LCxOE	LCxOUT	LCxINTP	LCxINTN	LCxMODE<2:0>		
bit 7							bit 0

Legend:

R = Readable bit

W = Writable bit

U = Unimplemented bit, read as '0'

u = Bit is unchanged

x = Bit is unknown

-n/n = Value at POR and BOR/Value at all other Resets

'1' = Bit is set

'0' = Bit is cleared

- bit 7 **LCxEN:** Configurable Logic Cell Enable bit
1 = Configurable logic cell is enabled and mixing input signals
0 = Configurable logic cell is disabled and has logic zero output
- bit 6 **LCxOE:** Configurable Logic Cell Output Enable bit
1 = Configurable logic cell port pin output enabled
0 = Configurable logic cell port pin output disabled
- bit 5 **LCxOUT:** Configurable Logic Cell Data Output bit
Read-only: logic cell output data, after LCxPOL; sampled from lcx_out wire.
- bit 4 **LCxINTP:** Configurable Logic Cell Positive Edge Going Interrupt Enable bit
1 = CLCxIF will be set when a rising edge occurs on lcx_out
0 = CLCxIF will not be set
- bit 3 **LCxINTN:** Configurable Logic Cell Negative Edge Going Interrupt Enable bit
1 = CLCxIF will be set when a falling edge occurs on lcx_out
0 = CLCxIF will not be set
- bit 2-0 **LCxMODE<2:0>:** Configurable Logic Cell Functional Mode bits
111 = Cell is 1-input transparent latch with S and R
110 = Cell is J-K flip-flop with R
101 = Cell is 2-input D flip-flop with R
100 = Cell is 1-input D flip-flop with S and R
011 = Cell is S-R latch
010 = Cell is 4-input AND
001 = Cell is OR-XOR
000 = Cell is AND-OR

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REGISTER 20-7: CLCxGLS2: GATE 3 LOGIC SELECT REGISTER

R/W-x/u	R/W-x/u	R/W-x/u	R/W-x/u	R/W-x/u	R/W-x/u	R/W-x/u	R/W-x/u
LCxG3D4T	LCxG3D4N	LCxG3D3T	LCxG3D3N	LCxG3D2T	LCxG3D2N	LCxG3D1T	LCxG3D1N
bit 7							bit 0

Legend:

R = Readable bit	W = Writable bit	U = Unimplemented bit, read as '0'
u = Bit is unchanged	x = Bit is unknown	-n/n = Value at POR and BOR/Value at all other Resets
'1' = Bit is set	'0' = Bit is cleared	

bit 7	LCxG3D4T: Gate 3 Data 4 True (non-inverted) bit 1 = lcx4T is gated into lcxg3 0 = lcx4T is not gated into lcxg3
bit 6	LCxG3D4N: Gate 3 Data 4 Negated (inverted) bit 1 = lcx4N is gated into lcxg3 0 = lcx4N is not gated into lcxg3
bit 5	LCxG3D3T: Gate 3 Data 3 True (non-inverted) bit 1 = lcx3T is gated into lcxg3 0 = lcx3T is not gated into lcxg3
bit 4	LCxG3D3N: Gate 3 Data 3 Negated (inverted) bit 1 = lcx3N is gated into lcxg3 0 = lcx3N is not gated into lcxg3
bit 3	LCxG3D2T: Gate 3 Data 2 True (non-inverted) bit 1 = lcx2T is gated into lcxg3 0 = lcx2T is not gated into lcxg3
bit 2	LCxG3D2N: Gate 3 Data 2 Negated (inverted) bit 1 = lcx2N is gated into lcxg3 0 = lcx2N is not gated into lcxg3
bit 1	LCxG3D1T: Gate 3 Data 1 True (non-inverted) bit 1 = lcx1T is gated into lcxg3 0 = lcx1T is not gated into lcxg3
bit 0	LCxG3D1N: Gate 3 Data 1 Negated (inverted) bit 1 = lcx1N is gated into lcxg3 0 = lcx1N is not gated into lcxg3

REGISTER 21-3: NCOxACCL: NCOx ACCUMULATOR REGISTER – LOW BYTE

R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0
NCOxACC<7:0>							
bit 7				bit 0			

Legend:

R = Readable bit	W = Writable bit	U = Unimplemented bit, read as '0'
u = Bit is unchanged	x = Bit is unknown	-n/n = Value at POR and BOR/Value at all other Resets
'1' = Bit is set	'0' = Bit is cleared	

bit 7-0 **NCOxACC<7:0>**: NCOx Accumulator, Low Byte

REGISTER 21-4: NCOxACCH: NCOx ACCUMULATOR REGISTER – HIGH BYTE

R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0
NCOxACC<15:8>							
bit 7				bit 0			

Legend:

R = Readable bit	W = Writable bit	U = Unimplemented bit, read as '0'
u = Bit is unchanged	x = Bit is unknown	-n/n = Value at POR and BOR/Value at all other Resets
'1' = Bit is set	'0' = Bit is cleared	

bit 7-0 **NCOxACC<15:8>**: NCOx Accumulator, High Byte

REGISTER 21-5: NCOxACCU: NCOx ACCUMULATOR REGISTER – UPPER BYTE

U-0	U-0	U-0	U-0	R/W-0/0	R/W-0/0	R/W-0/0	R/W-0/0
—	—	—	—	NCOxACC<19:16>			
bit 7				bit 0			

Legend:

R = Readable bit	W = Writable bit	U = Unimplemented bit, read as '0'
u = Bit is unchanged	x = Bit is unknown	-n/n = Value at POR and BOR/Value at all other Resets
'1' = Bit is set	'0' = Bit is cleared	

bit 7-4 **Unimplemented:** Read as '0'

bit 3-0 **NCOxACC<19:16>**: NCOx Accumulator, Upper Byte

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TABLE 25-8: OSCILLATOR PARAMETERS

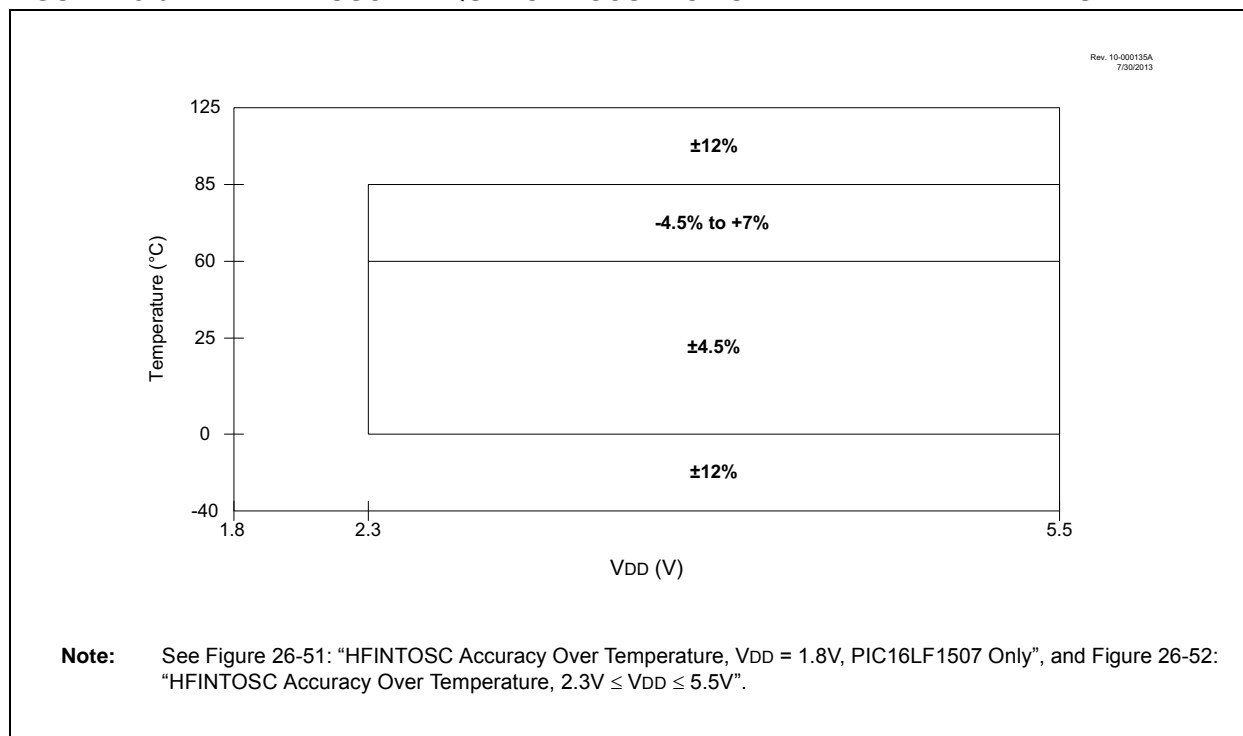
Standard Operating Conditions (unless otherwise stated)								
Param. No.	Sym.	Characteristic	Freq. Tolerance	Min.	Typ†	Max.	Units	Conditions
OS08	HFOSC	Internal Calibrated HFINTOSC Frequency ⁽¹⁾	±2%	—	16.0	—	MHz	V _{DD} = 3.0V, T _A = 25°C, (Note 2)
OS09	LFOSC	Internal LFINTOSC Frequency	—	—	31	—	kHz	(Note 3)
OS10*	TOSC ST	HFINTOSC Wake-up from Sleep Start-up Time	—	—	5	15	μs	
OS10A*	TLFOSC ST	LFINTOSC Wake-up from Sleep Start-up Time	—	—	0.5	—	ms	-40°C ≤ T _A ≤ +125°C

* These parameters are characterized but not tested.

† Data in "Typ" column is at 3.0V, 25°C unless otherwise stated. These parameters are for design guidance only and are not tested.

- Note 1:** To ensure these oscillator frequency tolerances, V_{DD} and V_{SS} must be capacitively decoupled as close to the device as possible. 0.1 μF and 0.01 μF values in parallel are recommended.
- 2:** See Figure 25-6: "HFINTOSC Frequency Accuracy over Device V_{DD} and Temperature", Figure 26-51: "HFINTOSC Accuracy Over Temperature, V_{DD} = 1.8V, PIC16LF1507 Only", and Figure 26-52: "HFINTOSC Accuracy Over Temperature, 2.3V ≤ V_{DD} ≤ 5.5V".
- 3:** See Figure 26-49: "LFINTOSC Frequency over V_{DD} and Temperature, PIC16LF1507 Only", and Figure 26-50: "LFINTOSC Frequency over V_{DD} and Temperature, PIC16F1507".

FIGURE 25-6: HFINTOSC FREQUENCY ACCURACY OVER V_{DD} AND TEMPERATURE



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FIGURE 26-9: I_{DD} TYPICAL, EXTERNAL CLOCK (ECH), HIGH-POWER MODE, PIC16LF1507 ONLY

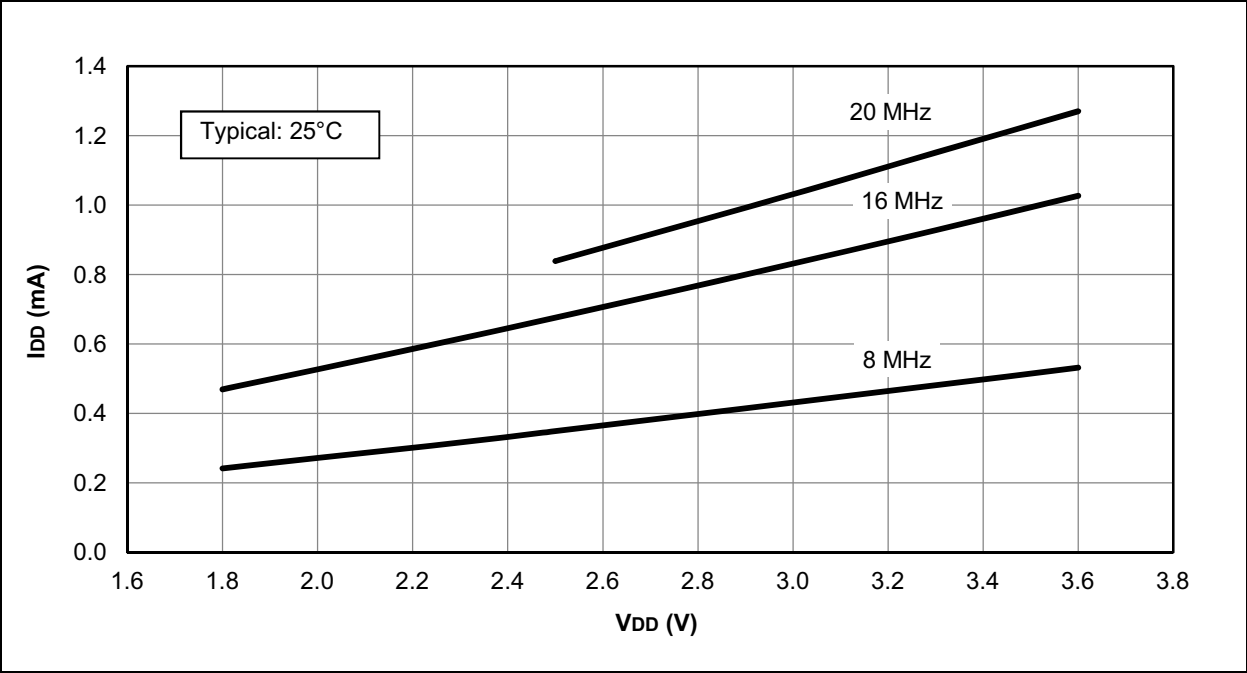


FIGURE 26-10: I_{DD} MAXIMUM, EXTERNAL CLOCK (ECH), HIGH-POWER MODE, PIC16LF1507 ONLY

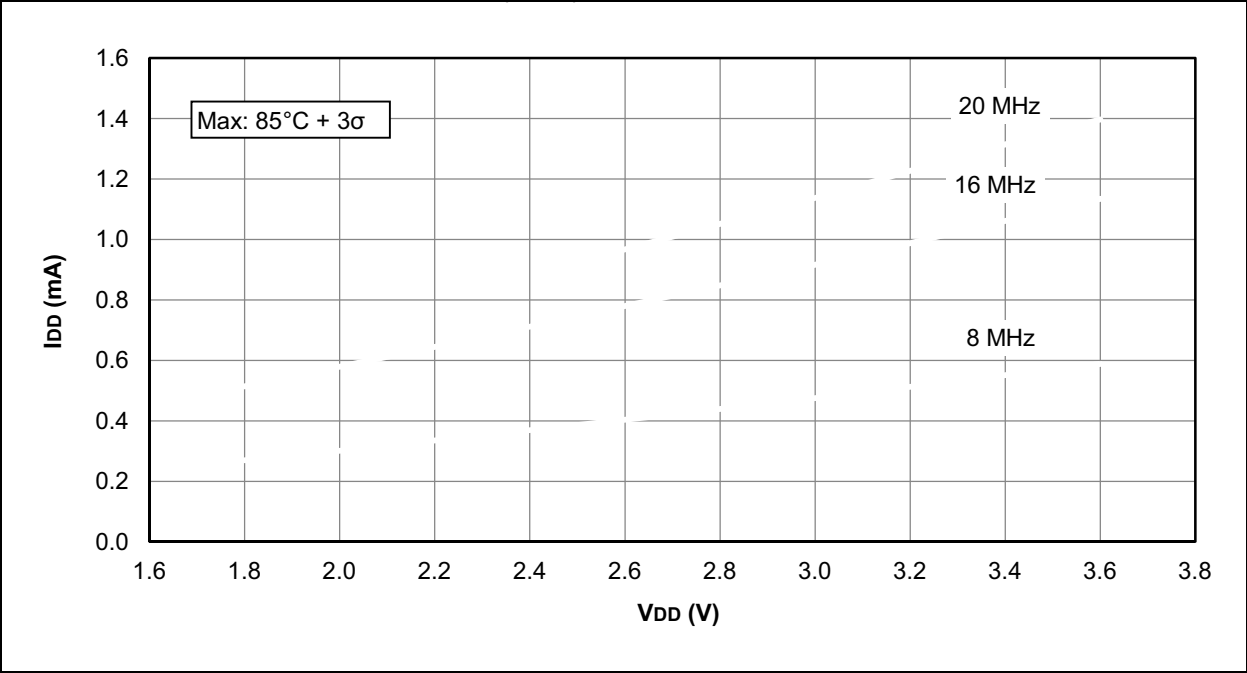


FIGURE 26-11: I_{DD} TYPICAL, EXTERNAL CLOCK (ECH), HIGH-POWER MODE, PIC16F1507 ONLY

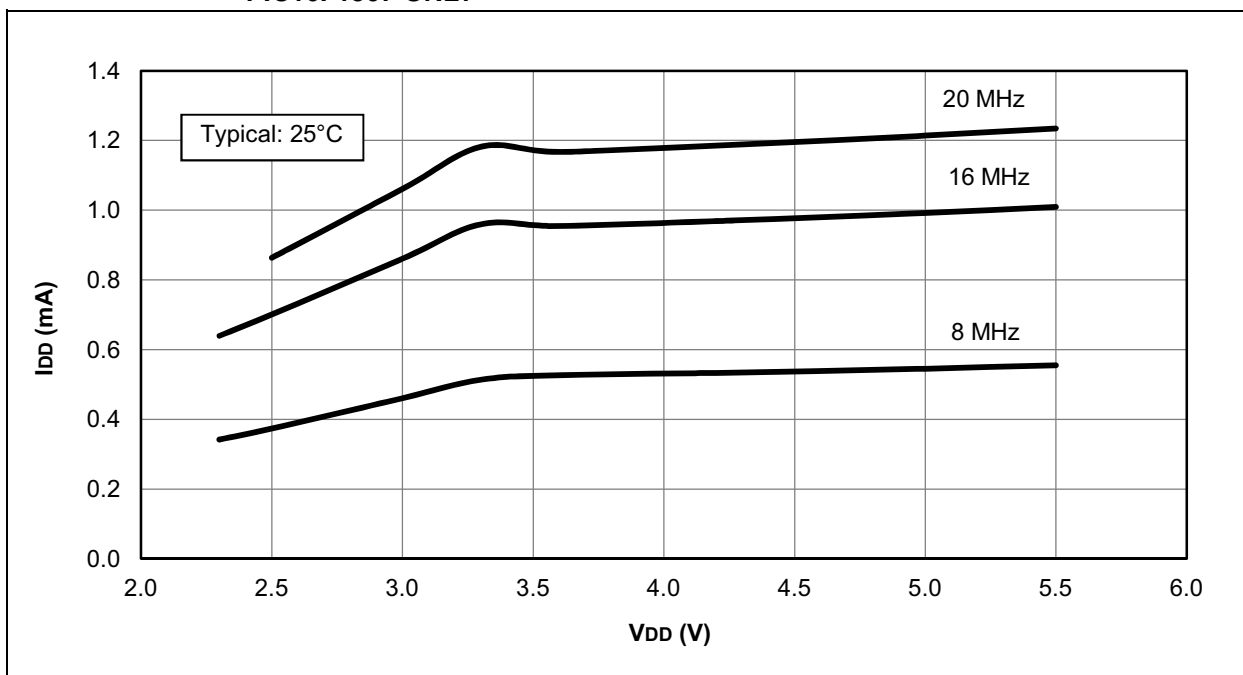
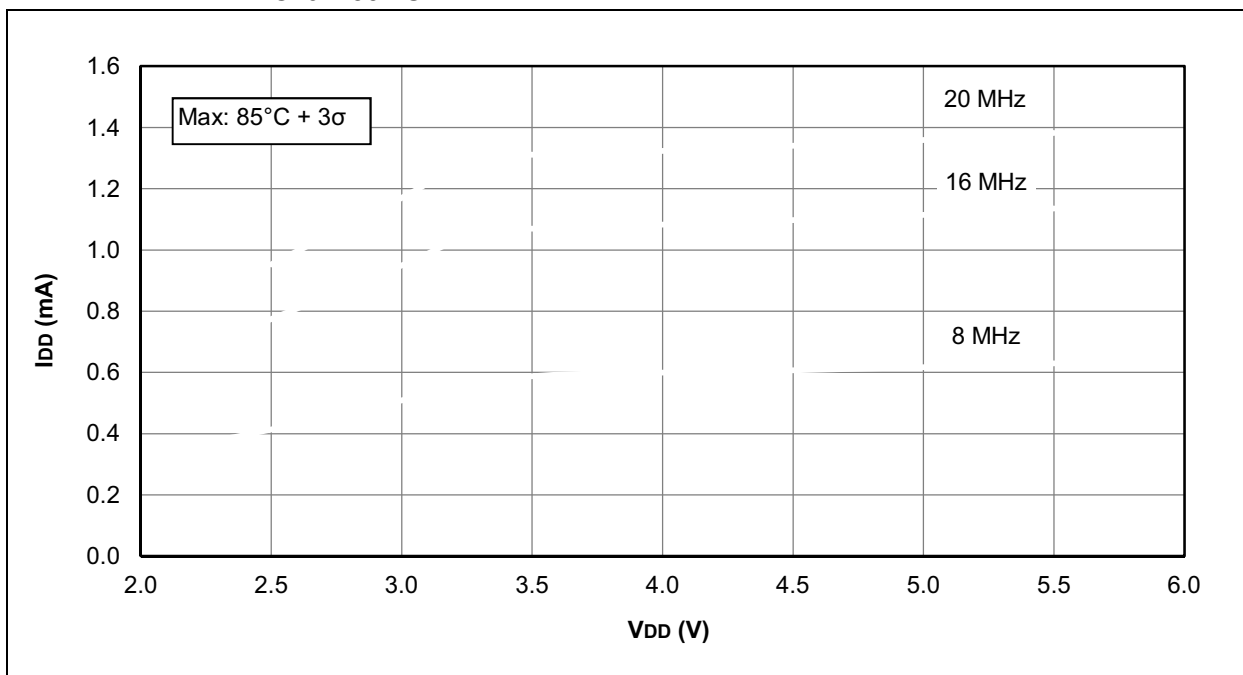


FIGURE 26-12: I_{DD} MAXIMUM, EXTERNAL CLOCK (ECH), HIGH-POWER MODE, PIC16F1507 ONLY



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FIGURE 26-13: I_{DD} , LFINTOSC, $F_{OSC} = 31\text{ kHz}$, PIC16LF1507 ONLY

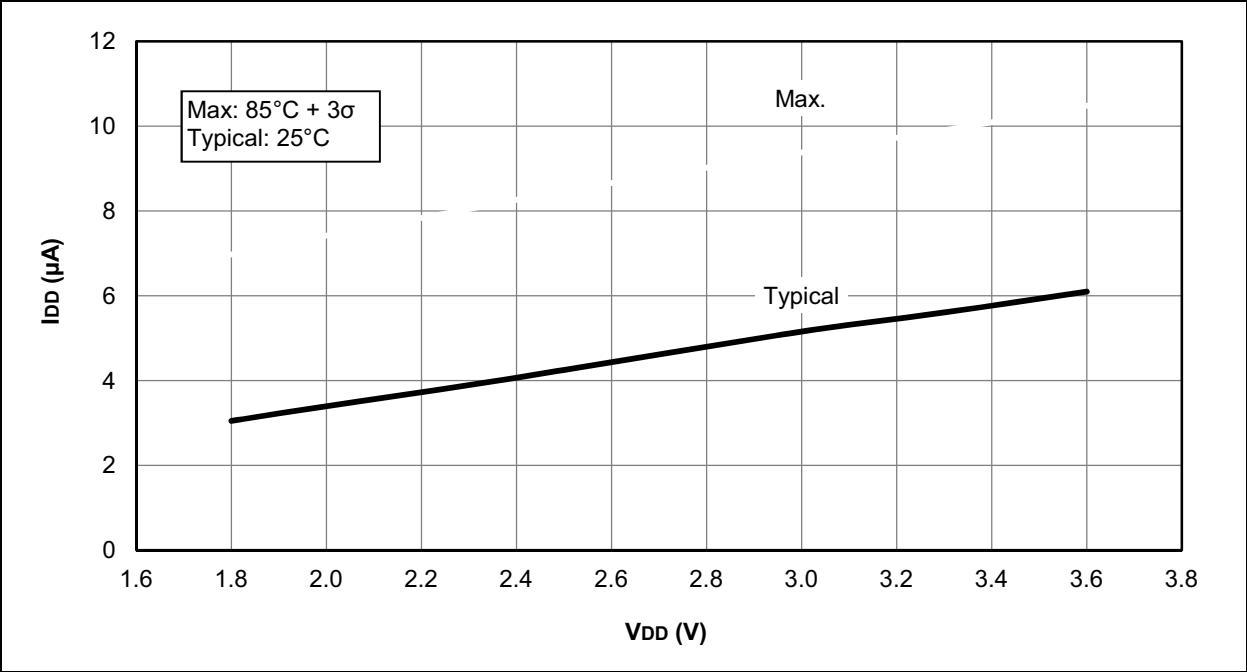
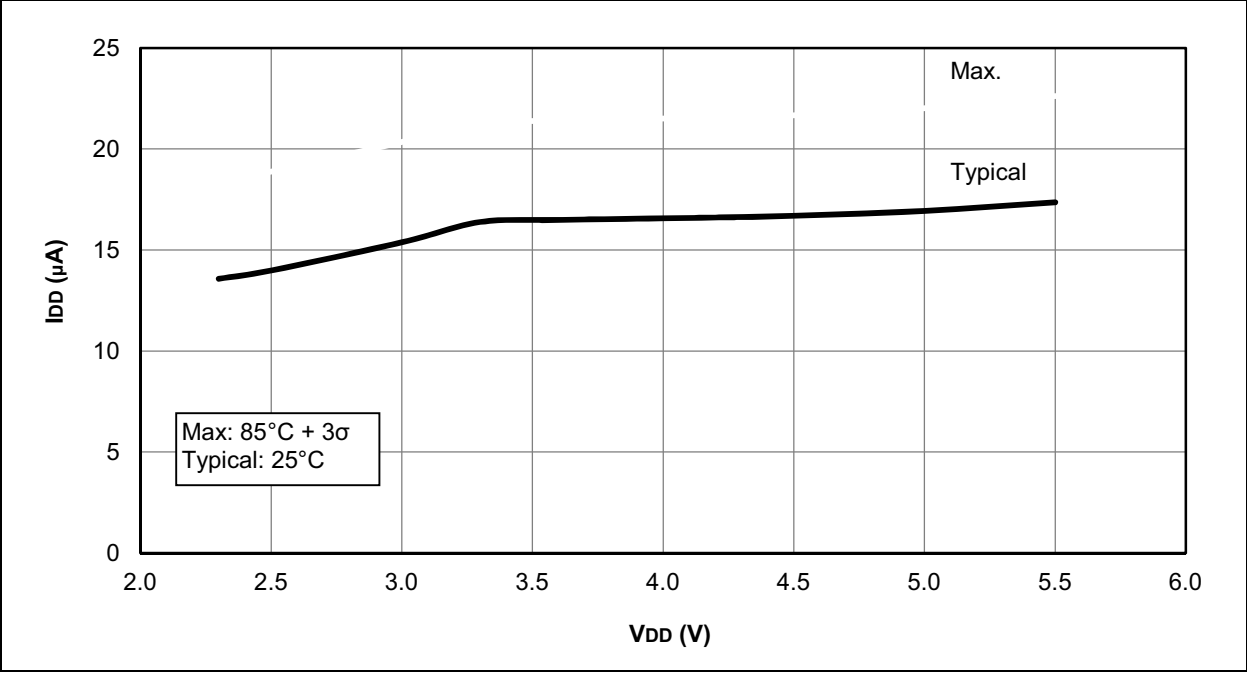


FIGURE 26-14: I_{DD} , LFINTOSC, $F_{OSC} = 31\text{ kHz}$, PIC16F1507 ONLY



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FIGURE 26-41: BROWN-OUT RESET VOLTAGE, BORV = 1, PIC16F1507 ONLY

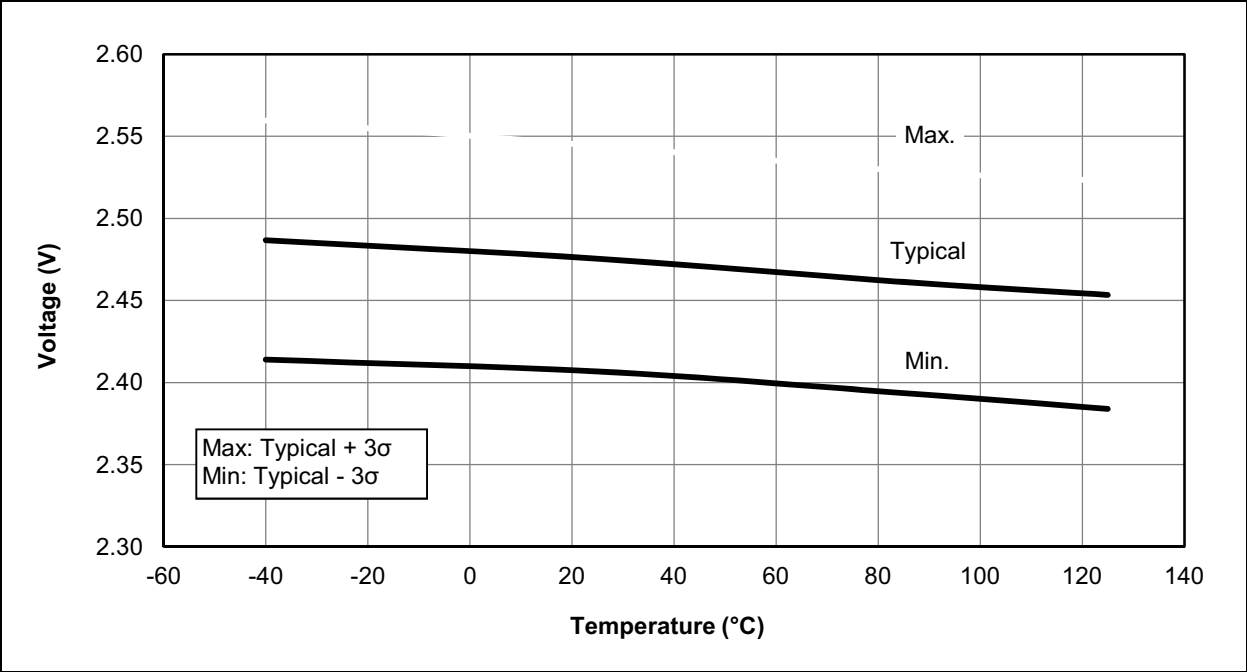


FIGURE 26-42: BROWN-OUT RESET HYSTERESIS, BORV = 1, PIC16F1507 ONLY

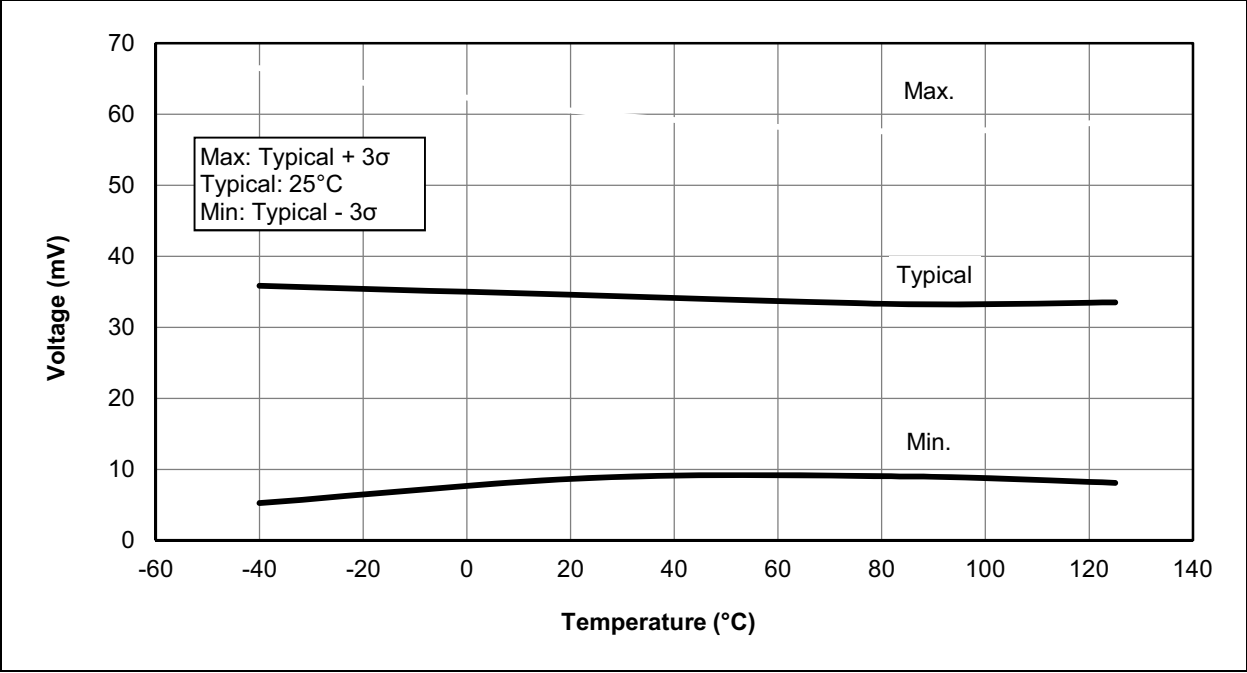


FIGURE 26-46: WDT TIME-OUT PERIOD

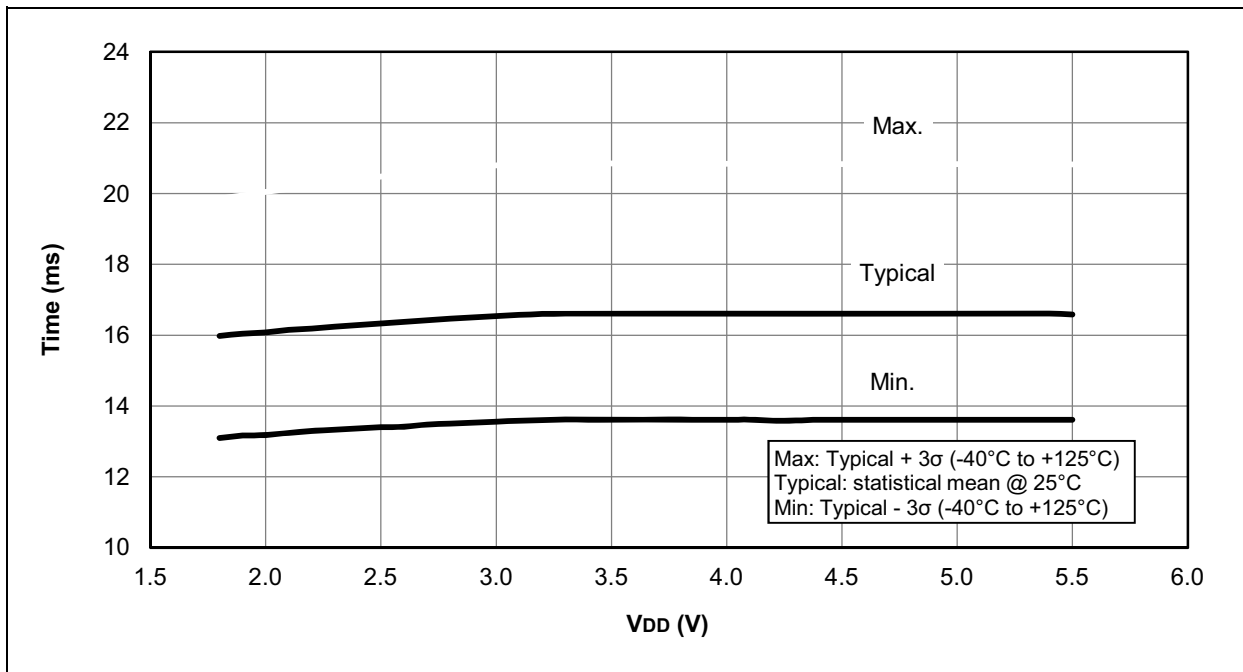


FIGURE 26-47: PWRT PERIOD

