PIC16F18325/18345 Description
PIC16(L)F18325/18345 high-temperature microcontrollers feature Intelligent Analog, Core Independent Peripherals (CIPs) and Communication Peripherals, combined with an extended temperature range for a variety of general purpose applications. The Peripheral Pin Select (PPS) functionality enables pin mapping when using the digital peripherals Configurable Logic Cell (CLC), Complementary Waveform Generator (CWG), Capture/Compare/PWM (CCP), Pulse-Width Modulation (PWM), and communications to add flexibility to the application design.

Core Features
• C Compiler Optimized RISC Architecture
• Only 48 Instructions
• Operating Speed:
  - DC – 32 MHz clock input
  - 125 ns minimum instruction cycle
• Interrupt Capability
• 16-Level Deep Hardware Stack
• Up to Four 8-Bit Timers
• Up to Three 16-Bit Timers
• Low-Current Power-on Reset (POR)
• Power-up Timer (PWRT)
• Brown-out Reset (BOR)
• Low-Power BOR (LPBOR) Option
• Extended Watchdog Timer (WDT) with Dedicated On-Chip Oscillator for Reliable Operation
• Programmable Code Protection

Memory
• 14 Kbytes Program Flash Memory
• 1 KB Data SRAM Memory
• 256B of EEPROM
• Direct, Indirect and Relative Addressing modes

Operating Characteristics
• Operating Voltage Range:
  - 2.3V to 5.5V(PIC16F18325/18345)
• Temperature Range:
  - High-Temp: -40°C to 150°C

Power-Saving Functionality
• IDLE mode: ability to put the CPU core to Sleep from the system clock, while internal peripherals continue operating
• DOZE mode: ability to run the CPU core slower than the system clock used by the internal peripherals
• SLEEP mode: lowest power consumption
• Peripheral Module Disable (PMD): peripheral power disable hardware module to minimize power consumption of unused peripherals

Digital Peripherals
• Configurable Logic Cell (CLC):
  - Four CLCs
  - Integrated combinational and sequential logic
• Complementary Waveform Generator (CWG):
  - Two CWGs
  - Rising and falling edge dead-band control
  - Full-bridge, half-bridge, 1-channel drive
  - Multiple signal sources
• Capture/Compare/PWM (CCP) modules:
  - Four CCPs
  - 16-bit resolution for Capture/Compare modes
  - 10-bit resolution for PWM mode
• Pulse-Width Modulators (PWM)
  - Two 10-bit PWMs
• Numerically Controlled Oscillator (NCO):
  - Precision linear frequency generator (@50% duty cycle) with 0.0001% step size of source input clock
    - Input clock: 0 Hz < FNCO < 32 MHz
    - Resolution: FNCO/2^{20}
• Serial Communications:
  - EUSART
    - RS-232, RS-485, LIN compatible
    - Auto-Baud detect, auto-wake-up on Start
    - Master Synchronous Serial Port (MSSP)
  - SPI
  - i²C, SMBus, PMBus™ compatible
• Data Signal Modulator (DSM):
  - Modulates a carrier signal with digital data to create custom carrier synchronized output waveforms
• Up to 18 I/O Pins:
  - Individually programmable pull-ups
  - Slew rate control
  - Interrupt-on-change with edge-select
  - Input level selection control (ST or TTL)
  - Digital open-drain enable
• Peripheral Pin Select (PPS):
  - I/O pin remapping of digital peripherals
• Timer modules:
  - Timer0:
    - 8/16-bit timer/counter
    - Synchronous or asynchronous operation
    - Programmable prescaler/postscaler
    - Time base for capture/compare function
  - Timer1/3/5 with Gate Control:
    - 16-bit timer/counter
    - Programmable internal or external clock sources
    - Multiple gate sources
    - Multiple gate modes
    - Time base for capture/compare function
  - Timer2/4/6:
    - 8-bit timers
    - Programmable prescaler/postscaler
    - Time base for PWM function
• Voltage Reference:
  - Positive reference selection
  - Unbuffered I/O pin output
  - Internal connections to ADCs and comparators
• Analog Peripherals
  - 10-Bit Analog-to-Digital Converter (ADC):
    - 17 external channels
    - Conversion available during Sleep
  - Comparator:
    - Two comparators
    - Fixed Voltage Reference at non-inverting input(s)
    - Comparator outputs externally accessible
  - 5-Bit Digital-to-Analog Converter (DAC):
    - 5-bit resolution, rail-to-rail

Flexible Oscillator Structure
• High-Precision Internal Oscillator:
  - Software-selectable frequency range up to 32 MHz
  - ±2% at nominal 4 MHz calibration point
• 4x PLL with External Sources
• Low-Power Internal 31 kHz Oscillator (LFINTOSC)
• External Low-Power 32 kHz Crystal Oscillator (SOSC)
• External Oscillator Block with:
  - Three Crystal/Resonator modes up to 20 MHz
  - Three External Clock modes up to 32 MHz
  - Fail-safe clock monitor
  - Detects clock source failure
  - Oscillator Start-up Timer (OST)
  - Ensures stability of crystal oscillator sources

Note: This document is supplemented by the "PIC16(L)F18325/18345 Full-Featured, Low Pin Count Microcontrollers with XLP" Data Sheet (DS40001795). See Section 1.0, Device Overview.
<table>
<thead>
<tr>
<th>Device</th>
<th>Data Sheet Index</th>
<th>Program Flash Memory (Words)</th>
<th>Program Flash Memory (Kbytes)</th>
<th>Data Memory (bytes)</th>
<th>Data SRAM (bytes)</th>
<th>10-bit ADC (ch)</th>
<th>5-bit DAC</th>
<th>High-Speed Comparators</th>
<th>CWG</th>
<th>Clock Ref</th>
<th>Timers</th>
<th>CCP</th>
<th>10-bit PWM</th>
<th>NCO</th>
<th>EUSART</th>
<th>i2C/SPI</th>
<th>CLC</th>
<th>DSM</th>
<th>PPS</th>
<th>XLP</th>
<th>Idle and Doze</th>
<th>Debug(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIC16(L)F18313</td>
<td>(1) 2048</td>
<td>3.5 256</td>
<td>256</td>
<td>6</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2/1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1/1</td>
<td>2</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIC16(L)F18323</td>
<td>(1) 2048</td>
<td>3.5 256</td>
<td>256</td>
<td>12</td>
<td>11</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2/1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1/1</td>
<td>1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIC16(L)F18324</td>
<td>(2) 4096</td>
<td>7 256</td>
<td>512</td>
<td>12</td>
<td>11</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>4/3</td>
<td>1</td>
<td>1</td>
<td>1/1</td>
<td>1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIC16(L)F18325</td>
<td>(3) 8192</td>
<td>14 256</td>
<td>1024</td>
<td>12</td>
<td>11</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>4/3</td>
<td>1</td>
<td>1</td>
<td>1/1</td>
<td>2/2</td>
<td>4</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIC16(L)F18326</td>
<td>(4) 16384</td>
<td>28 256</td>
<td>2048</td>
<td>12</td>
<td>15</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2/1</td>
<td>1</td>
<td>1</td>
<td>1/1</td>
<td>2/2</td>
<td>4</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIC16(L)F18344</td>
<td>(2) 4096</td>
<td>7 256</td>
<td>512</td>
<td>18</td>
<td>17</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>4/3</td>
<td>1</td>
<td>1</td>
<td>1/1</td>
<td>1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIC16(L)F18345</td>
<td>(3) 8192</td>
<td>14 256</td>
<td>1024</td>
<td>18</td>
<td>17</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>4/3</td>
<td>1</td>
<td>1</td>
<td>1/1</td>
<td>1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIC16(L)F18346</td>
<td>(4) 16384</td>
<td>28 256</td>
<td>2048</td>
<td>18</td>
<td>21</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2/1</td>
<td>1</td>
<td>1</td>
<td>1/1</td>
<td>2/2</td>
<td>4</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note 1: Debugging Methods: (I) – Integrated on Chip;
2: One pin is input-only.

Data Sheet Index: (Unshaded devices are described in this document.)
1. DS40001799 PIC16(L)F18313/18323 Data Sheet, Full-Featured, Low Pin Count Microcontrollers with XLP
2. DS40001800 PIC16(L)F18324/18344 Data Sheet, Full-Featured, Low Pin Count Microcontrollers with XLP
3. DS40001795 PIC16(L)F18325/18345 Data Sheet, Full Featured, Low Pin Count Microcontrollers with XLP
4. DS40001839 PIC16(L)F18326/18346 Data Sheet, Full Featured, Low Pin Count Microcontrollers with XLP
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An errata sheet, describing minor operational differences from the data sheet and recommended workarounds, may exist for current devices. As device/documentation issues become known to us, we will publish an errata sheet. The errata will specify the revision of silicon and revision of document to which it applies.

To determine if an errata sheet exists for a particular device, please check with one of the following:

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• Your local Microchip sales office (see last page)

When contacting a sales office, please specify which device, revision of silicon and data sheet (include literature number) you are using.

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1.0 DEVICE OVERVIEW

This document contains device-specific information for the following devices, operating in an ambient temperature range between -40°C and 150°C:

- PIC16F18325
- PIC16F18345

The primary differentiating features and specifications of the high-temperature PIC16F18325/18345 devices are:

- Above 125°C, the number of program Flash memory and EEPROM are significantly reduced (see Section 3.0 “Electrical Characteristics”)
- All AC timing specifications are increased by 30%

This derating factor includes parameters, such as TPWR
- Maximum HS frequency of operation is 20 MHz

Note: This data sheet documents only the devices’ features and specifications that are in addition to the features and specifications of the non-specialty PIC16(L)F18325/18345 devices. For information on the features and specifications shared by this document’s high-temperature devices and the non-specialty devices, see the “PIC16(L)F18325/18345 Full-Featured, Low Pin Count Microcontrollers with XLP” Data Sheet (DS40001795).

Note: The test duration for AEC-Q100 reliability testing for devices operating at 150°C is 1,000 hours. Any design operating at 125°C to 150°C for longer than that period is not warranted without prior written approval from Microchip Technology Inc.
2.0 DEVICE/REVISION ID REGISTERS

The Device and Revision ID registers are read-only registers. They identify the device type and revision for device programmers and can be read by firmware.

**Note:** For additional details on the Device ID, Revision ID or Configuration bits, refer to Section 5.0 “Device Configuration” in the "PIC16(L)F18325/18345 Full-Featured, Low Pin Count Microcontrollers with XLP" Data Sheet (DS40001795). Device/Revision ID information presented in this section is for the high-temperature PIC16F18325/18345 devices only.

**REGISTER 2-1: DEVID: DEVICE ID REGISTER**

<table>
<thead>
<tr>
<th>bit 13-0</th>
<th>DEV&lt;13:0&gt;: Device ID bits</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Device</th>
<th>DEVID&lt;13:0&gt; Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIC16F18325</td>
<td>11 0000 0011 1110 (303Eh)</td>
</tr>
<tr>
<td>PIC16F18345</td>
<td>11 0000 0011 1111 (303Fh)</td>
</tr>
</tbody>
</table>

**Legend:**
- R = Readable bit
- W = Writable bit
- U = Unimplemented bit, read as ‘0’
- -n = Value at POR
- ‘1’ = Bit is set
- ‘0’ = Bit is cleared
- x = Bit is unknown
### REGISTER 2-2: REVID: REVISION ID REGISTER 2

<table>
<thead>
<tr>
<th>R-1</th>
<th>R-0</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>bit 13</th>
<th>bit 8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>REV&lt;13:8&gt;</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>R</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>R</th>
<th>bit 7</th>
<th>bit 0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>REV&lt;7:0&gt;</td>
<td></td>
</tr>
</tbody>
</table>

**Legend:**

R = Readable bit  
W = Writable bit  
U = Unimplemented bit, read as '0'  
-n = Value at POR  
'1' = Bit is set  
'0' = Bit is cleared  
x = Bit is unknown

**bit 13-0**  
**DEV<13:0>: Revision ID bits**

**Note:** The upper two bits of the Revision ID register will always read '10'.
3.0 ELECTRICAL CHARACTERISTICS

Note: Other than some basic data, this section documents only the high-temperature PIC16F18325/18345 devices: specifications that differ from those of the non-specialty PIC16F18325/18345 devices. For detailed information on the electrical specifications shared by the high-temperature and non-specialty devices, see the “PIC16(L)F18325/18345 Full-Featured, Low Pin Count Microcontrollers with XLP” Data Sheet (DS40001795).

3.1 Absolute Maximum Ratings

Ambient temperature under bias .................................................................................................................. -40°C to +150°C
Storage temperature .................................................................................................................................... -65°C to +155°C
Maximum junction temperature .................................................................................................................. 155°C
Voltage on pins with respect to VSS

<table>
<thead>
<tr>
<th>Condition</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>on VDD pin</td>
<td>-0.3V to +6.5V</td>
</tr>
<tr>
<td>PIC16F18325/18345</td>
<td>-0.3V to +9.0V</td>
</tr>
<tr>
<td>on MCLR pin</td>
<td>-0.3V to +9.0V</td>
</tr>
<tr>
<td>on all other pins</td>
<td>-0.3V to (VDD + 0.3V)</td>
</tr>
</tbody>
</table>

Maximum current

<table>
<thead>
<tr>
<th>Condition</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>on VSS pin</td>
<td>250 mA</td>
</tr>
<tr>
<td>-40°C ≤ TA ≤ +85°C</td>
<td></td>
</tr>
<tr>
<td>85°C &lt; TA ≤ +125°C</td>
<td>85 mA</td>
</tr>
<tr>
<td>125°C ≤ TA ≤ +150°C</td>
<td>10 mA</td>
</tr>
<tr>
<td>on VDD pin</td>
<td>250 mA</td>
</tr>
<tr>
<td>-40°C ≤ TA ≤ +85°C</td>
<td></td>
</tr>
<tr>
<td>85°C &lt; TA ≤ +125°C</td>
<td>85 mA</td>
</tr>
<tr>
<td>125°C ≤ TA ≤ +150°C</td>
<td>10 mA</td>
</tr>
<tr>
<td>on any I/O pin</td>
<td>±5 mA</td>
</tr>
</tbody>
</table>

Maximum current rating requires even load distribution across I/O pins. Maximum current rating may be limited by the device package power dissipation characterizations, see Table XX-Y to calculate device specifications.

Clamp current, Ik (VPIN < VSS or VPIN > VDD) .................................................................................. ±20 mA
Total power dissipation

<table>
<thead>
<tr>
<th>Condition</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>800 mW</td>
</tr>
</tbody>
</table>

Note 1: Power dissipation is calculated as follows:
PDIS = VDD x (IDD - Σ IOH) + Σ ((VDD - VOH) x IOH) + Σ (VOL x IOL)

† NOTICE: Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operation listings of this specification is not implied. Exposure above maximum rating conditions for extended periods may affect device reliability.
### 3.2 Standard Operating Conditions

The standard operating conditions for any device are defined as:

- **Operating Voltage**: \( V_{DD_{MIN}} \leq V_{DD} \leq V_{DD_{MAX}} \)
- **Operating Temperature**: \( T_{A_{MIN}} \leq T_{A} \leq T_{A_{MAX}} \)

**VDD** — **Operating Supply Voltage**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDDMIN (Fosc ( \leq 16 \text{ MHz} ))</td>
<td>( V_{DD} )</td>
<td>+2.3V</td>
</tr>
<tr>
<td>VDDMIN (Fosc &gt; 16 MHz)</td>
<td>( V_{DD} )</td>
<td>+2.7V</td>
</tr>
<tr>
<td>VDDMAX</td>
<td>( V_{DD} )</td>
<td>+5.5V</td>
</tr>
</tbody>
</table>

**Ta** — **Operating Ambient Temperature Range**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Temperature</td>
<td>( T_{A_{MIN}} )</td>
</tr>
<tr>
<td></td>
<td>( T_{A_{MAX}} )</td>
</tr>
</tbody>
</table>

**Note 1:** See Parameter Supply Voltage, DS Characteristics: Supply Voltage.

### 3.3 DC Characteristics

**TABLE 3-1: SUPPLY VOLTAGE (HIGH TEMPERATURE)**

<table>
<thead>
<tr>
<th>Param No.</th>
<th>Symbol</th>
<th>Characteristic</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>D002</td>
<td>VDD</td>
<td></td>
<td>2.3</td>
<td>—</td>
<td>5.5</td>
<td>V</td>
<td>Fosc ( \leq 16 \text{ MHz} )</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2.7</td>
<td>—</td>
<td>5.5</td>
<td>V</td>
<td>Fosc &gt; 16 MHz</td>
</tr>
</tbody>
</table>

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

**FIGURE 3-1: VOLTAGE-FREQUENCY GRAPH, -40°C \( \leq T_{A} \leq +150°C \)**

Note 1: The shaded region indicates the permissible combinations of voltage and frequency.
## TABLE 3-2: DC CHARACTERISTICS: SUPPLY CURRENT \(^{(1,2)}\)

<table>
<thead>
<tr>
<th>PIC16F18325/18345</th>
<th>Standard Operating Conditions (unless otherwise stated)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Param No.</strong></td>
<td><strong>Symbol</strong></td>
</tr>
<tr>
<td>D100</td>
<td>IDDXT4</td>
</tr>
<tr>
<td>D101</td>
<td>IDDHFO16</td>
</tr>
<tr>
<td>D102</td>
<td>IDDHFOPLL</td>
</tr>
<tr>
<td>D103</td>
<td>IDDHSPPLL2</td>
</tr>
<tr>
<td>D104</td>
<td>IDDIDLE</td>
</tr>
</tbody>
</table>

† 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:** The test conditions for all IDD measurements in Active-Operation mode are: OSC1: external square wave, from rail-to-rail; all I/O pins tri-stated, pulled to VDD; MCLR = VDD; WDT disabled.

**Note 2:** The supply current is mainly a function of the operating voltage and frequency. Other factors, such as I/O pin loading and switching rate, oscillator type, internal code execution pattern and temperature, also have an impact on the current consumption.

## TABLE 3-3: DC CHARACTERISTICS: POWER-DOWN CURRENTS (IPD) \(^{(1,2,3)}\)

<table>
<thead>
<tr>
<th>PIC16F18325/18345</th>
<th>Standard Operating Conditions (unless otherwise stated)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Param No.</strong></td>
<td><strong>Symbol</strong></td>
</tr>
<tr>
<td>D200</td>
<td>IPD</td>
</tr>
<tr>
<td>D201</td>
<td>IPD_WDT</td>
</tr>
<tr>
<td>D202</td>
<td>IPD_SOSC</td>
</tr>
<tr>
<td>D203</td>
<td>IPD_FVR</td>
</tr>
<tr>
<td>D204</td>
<td>IPD_BOR</td>
</tr>
<tr>
<td>D207</td>
<td>IPD_ADCA</td>
</tr>
<tr>
<td>D208</td>
<td>IPD_CMP</td>
</tr>
</tbody>
</table>

† 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:** The peripheral current is the sum of the base IPD and the additional current consumed when this peripheral is enabled. The peripheral Δ current can be determined by subtracting the base IDD or IPD current from this limit. Max. values should be used when calculating total current consumption.

**Note 2:** The power-down current in Sleep mode does not depend on the oscillator type. Power-down current is measured with the part in Sleep mode, with all I/O pins in high-impedance state and tied to VSS.

**Note 3:** All peripheral currents listed are on a per-peripheral basis if more than one instance of a peripheral is available.

**Note 4:** ADC clock source is ADCRC.
### 3.4 AC Characteristics

#### TABLE 3-4: INTERNAL OSCILLATOR PARAMETERS

<table>
<thead>
<tr>
<th>PIC16F18325/18345</th>
<th>Standard Operating Conditions (unless otherwise stated)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min. +150°C</td>
</tr>
<tr>
<td>OS20</td>
<td>FHFOSC</td>
</tr>
<tr>
<td></td>
<td>3.64</td>
</tr>
<tr>
<td></td>
<td>7.28</td>
</tr>
<tr>
<td></td>
<td>10.92</td>
</tr>
<tr>
<td></td>
<td>14.56</td>
</tr>
<tr>
<td>OS21</td>
<td>FHFOSCLP</td>
</tr>
<tr>
<td></td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td>1.66</td>
</tr>
<tr>
<td>OS24</td>
<td>THFOSCLP</td>
</tr>
<tr>
<td></td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>—</td>
</tr>
</tbody>
</table>

* 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, VDD and VSS must be capacitively decoupled as close to the device as possible. 0.1 µF and 0.01 µF values in parallel are recommended.

#### FIGURE 3-2: PRECISION-CALIBRATED HFINTOSC FREQUENCY ACCURACY OVER DEVICE VDD AND TEMPERATURE
### TABLE 3-5: RESET, WATCHDOG TIMER, OSCILLATOR START-UP TIMER, POWER-UP TIMER, BROWN-OUT TIMER AND LOW-POWER BROWN-OUT RESET SPECIFICATIONS

<table>
<thead>
<tr>
<th>PIC16F18325/18345</th>
<th>Standard Operating Conditions (unless otherwise stated)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
</tr>
<tr>
<td>RST06 BOR</td>
<td></td>
</tr>
<tr>
<td>Brown-out Reset Voltage</td>
<td>2.55</td>
</tr>
<tr>
<td></td>
<td>2.30</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 3-6: MEMORY SPECIFICATIONS (150°C)

<table>
<thead>
<tr>
<th>Param. No.</th>
<th>Sym.</th>
<th>Characteristic</th>
<th>Min.</th>
<th>Typ.†</th>
<th>Max.</th>
<th>Units</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Data EEPROM Memory Specifications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEM20</td>
<td>ED</td>
<td>DataEE Byte Endurance</td>
<td>1k</td>
<td>—</td>
<td>—</td>
<td>E/W</td>
<td>125°C ≤ Ta ≤ 150°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Program Flash Memory Specifications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEM30</td>
<td>EP</td>
<td>Flash Memory Cell Endurance</td>
<td>100</td>
<td>—</td>
<td>—</td>
<td>E/W</td>
<td>125°C ≤ Ta ≤ 150°C</td>
</tr>
</tbody>
</table>

### TABLE 3-7: COMPARATOR SPECIFICATIONS

<table>
<thead>
<tr>
<th>Param. No.</th>
<th>Sym.</th>
<th>Characteristic</th>
<th>Min.</th>
<th>Typ.†</th>
<th>Max.</th>
<th>Units</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VIOFF</td>
<td>Input Offset Voltage</td>
<td>—</td>
<td>—</td>
<td>±60</td>
<td>mV</td>
<td>VICM=VDD/2</td>
</tr>
</tbody>
</table>
APPENDIX A: REVISION HISTORY

Revision B (October 2018)
Added Table 3-7; Updated Table 3-3; Other minor corrections.

Revision A (April 2018)
Original mini data sheet for the high-temperature devices in the PIC16F18325/18345 devices.
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<table>
<thead>
<tr>
<th>PART NO.</th>
<th>Device</th>
<th>Tape and Reel Option</th>
<th>Temperature Range</th>
<th>Package</th>
<th>Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>PIC16F18325</td>
<td>Blank = Standard packaging (tube or tray)</td>
<td>I = -40°C to +85°C (Industrial)</td>
<td>ST = TSSOP</td>
<td>QTP, SQTP, Code or Special Requirements</td>
</tr>
<tr>
<td>/XX</td>
<td>PIC16F18345</td>
<td>T = Tape and Reel(1)</td>
<td>E = -40°C to +125°C (Extended)</td>
<td>ML = UQFN</td>
<td>(blank otherwise)</td>
</tr>
<tr>
<td>XXX</td>
<td></td>
<td></td>
<td>H = -40°C to +150°C (High-Temperature)</td>
<td>SO/SL = SOIC</td>
<td></td>
</tr>
</tbody>
</table>

Examples:


**Note 1:** Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option.

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ISBN: 978-1-5224-3614-0