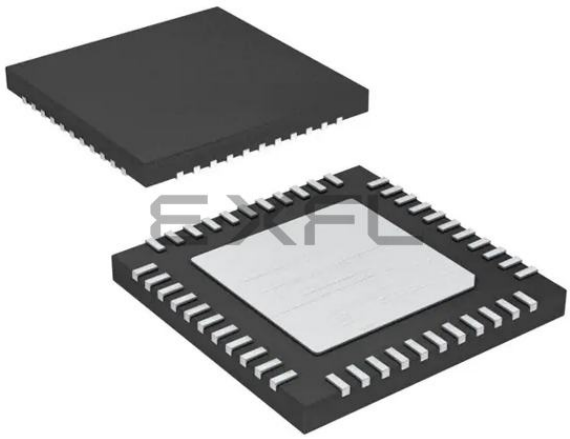

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Peripherals	Brown-out Detect/Reset, HLVD, POR, PWM, WDT
Number of I/O	36
Program Memory Size	64KB (32K x 16)
Program Memory Type	FLASH
EEPROM Size	1K x 8
RAM Size	3.25K x 8
Voltage - Supply (Vcc/Vdd)	4.2V ~ 5.5V
Data Converters	A/D 11x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 150°C (TA)
Mounting Type	Surface Mount
Package / Case	44-VQFN Exposed Pad
Supplier Device Package	44-QFN (8x8)
Purchase URL	https://www.e-xfl.com/product-detail/microchip-technology/pic18f4680-h-ml

PIC18F2585/2680/4585/4680
Data Sheet

28/40/44-Pin, High-Temperature, High-Performance Microcontrollers with ECAN™, 10-Bit A/D and nanoWatt Technology

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PIC18F2585/2680/4585/4680

28/40/44-Pin, High-Temperature, High-Performance MCUs with ECAN™, 10-Bit A/D and nanoWatt Technology

High-Temperature Features:
- Ambient Temperature Range of -40°C to 150°C

ECAN Module Features:
- Message Bit Rates, up to 1 Mbps
- Conforms to CAN 2.0B ACTIVE Specification
- Fully Backward Compatible with PIC18XXX8 CAN modules
- Three Modes of Operation:
  - Legacy, Enhanced Legacy, FIFO
- Three Dedicated Transmit Buffers with Prioritization
- Two Dedicated Receive Buffers
- Six Programmable Receive/Transmit Buffers
- Three Full 29-Bit Acceptance Masks
- 16 Full 29-Bit Acceptance Filters w/ Dynamic Association
- DeviceNet™ Data Byte Filter Support
- Automatic Remote Frame Handling
- Advanced Error Management Features

Power-Managed Modes:
- Run: CPU on, Peripherals on
- Idle: CPU off, Peripherals on
- Sleep: CPU off, Peripherals off
- Two-Speed Oscillator Start-up

Flexible Oscillator Structure:
- Four Crystal modes, up to 40 MHz
- 4x Phase Lock Loop (PLL) – Available for Crystal and Internal Oscillators
- Two External RC modes, up to 4 MHz
- Two External Clock modes, up to 40 MHz
- Internal Oscillator Block:
  - 8 user-selectable frequencies, from 31 kHz to 8 MHz
  - Provides a complete range of clock speeds, from 31 kHz to 32 MHz when used with PLL
  - User-tunable to compensate for frequency drift
- Secondary Oscillator using Timer1 @ 32 kHz
- Fail-Safe Clock Monitor
  - Allows for safe shutdown if peripheral clock stops

Special Microcontroller Features:
- C Compiler Optimized Architecture with Optional Extended Instruction Set
- Priority Levels for Interrupts
- 8 x 8 Single-Cycle Hardware Multiplier
- Extended Watchdog Timer (WDT):
  - Programmable period from 41 ms to 131s
- Single-Supply 5V In-Circuit Serial Programming™ (ICSP™) via Two Pins
- In-Circuit Debug (ICD) via Two Pins

Peripheral Highlights:
- High-Current Sink/Source 25 mA/25 mA
- Three External Interrupts
- One Capture/Compare/PWM (CCP1) module
- Enhanced Capture/Compare/PWM (ECCP1) module (40/44-pin devices only):
  - One, two or four PWM outputs
  - Selectable polarity
  - Programmable dead time
  - Auto-shutdown and auto-restart
- Master Synchronous Serial Port (MSSP) module Supporting 3-Wire SPI (all 4 modes) and I^2C™ Master and Slave modes
- Enhanced Addressable USART module:
  - Supports RS-485, RS-232 and LIN/J2602 support
  - RS-232 operation using internal oscillator block (no external crystal required)
  - Auto-wake-up on Start bit
  - Auto-Baud Detect (ABD)
- 10-bit, up to 11-Channel Analog-to-Digital Converter module (A/D), up to 100 ksps
  - Auto-acquisition capability
  - Conversion available during Sleep
- Dual Analog Comparators with Input Multiplexing

Note: This document is supplemented by the *"PIC18F2585/2680/4585/4680 Data Sheet"* (DS39625). See **Section 1.0 "Device Overview"**.

Device	Program Memory		Data Memory		I/O	10-Bit A/D (ch)	CCP1/ ECCP1 (PWM)	MSSP		EUSART	Comp.	Timers 8/16-Bit
	Flash (bytes)	# Single-Word Instructions	SRAM (bytes)	EEPROM (bytes)				SPI	Master I^2C™			
PIC18F2585	48K	24576	3328	1024	28	8	1/0	Y	Y	1	0	1/3
PIC18F2680	64K	32768	3328	1024	28	8	1/0	Y	Y	1	0	1/3
PIC18F4585	48K	24576	3328	1024	44	11	1/1	Y	Y	1	2	1/3
PIC18F4680	64K	32768	3328	1024	40/44	11	1/1	Y	Y	1	2	1/3

Table of Contents

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NOTES:

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:

- PIC18F2585
- PIC18F2680
- PIC18F4585
- PIC18F4680

Note: This data sheet documents only the devices' features and specifications that are in addition to the features and specifications of the non-specialty PIC18F2585/2680/4585/4680 devices. For information on the features and specifications shared by this document's High-Temperature devices and the non-specialty devices, see the *"PIC18F2585/2680/4585/4680 Data Sheet"* (DS39625).

This family of devices offers the advantages of all PIC18 microcontrollers – namely, high computational performance at an economical price. In addition to these features, the PIC18F2585/2680/4585/4680 family introduces design enhancements that make these microcontrollers a logical choice for many high-performance, power-sensitive applications.

The primary differentiating features and specifications of the High-Temperature PIC18F2585/2680/4585/4680 family devices are:

- Above 125°C, writes are not allowed for Flash program memory
- All AC timing specifications are increased by 30%

  This de-rating factor includes parameters, such as TPWRT
- Maximum HS frequency of operation is 20 MHz

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.

NOTES:

2.0 SPECIAL FEATURES OF THE CPU

Note: For additional details on the Configuration bits, refer to **Section 24.1 "Configuration Bits"** in the *"PIC18F2585/2680/4585/4680 Data Sheet"* (DS39625). Device ID information presented in this section is for the High-Temperature PIC18F2585/2680/4585/4680 family only.

2.1 Device ID Registers

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

TABLE 2-1: DEVICE IDs

File Name		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Default/ Unprogrammed Value
3FFFFEh	DEVID1	DEV2	DEV1	DEV0	REV4	REV3	REV2	REV1	REV0	xxxx xxxx(1)
3FFFFFh	DEVID2	DEV10	DEV9	DEV8	DEV7	DEV6	DEV5	DEV4	DEV3	000 1100

Legend: x = unknown, u = unchanged, — = unimplemented. Shaded cells are unimplemented, read as '0'.

Note 1: See Register 2-1 for DEVID1 values. DEVID registers are read-only and cannot be programmed by the user.

REGISTER 2-1: DEVID1: DEVICE ID REGISTER 1

R	R	R	R	R	R	R	R
DEV2	DEV1	DEV0	REV4	REV3	REV2	REV1	REV0
bit 7							bit 0

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 7-5 **DEV<2:0>:** Device ID bits
111 = PIC18F2585
110 = PIC18F2680
101 = PIC18F4585
100 = PIC18F4680

bit 4-0 **REV<4:0>:** Revision ID bits
These bits are used to indicate the device revision.

REGISTER 2-2: DEVID2: DEVICE ID REGISTER 2

R	R	R	R	R	R	R	R
DEV10	DEV9	DEV8	REV7	REV6	REV5	REV4	REV3
bit 7							bit 0

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 7-0 **DEV<10:3>:** Device ID bits

These bits are used with the DEV<2:0> bits in the Device ID Register 1 to identify the part number.

0000 1110 = PIC18F2585/2680/4585/4680 family devices

Note: These values for DEV<10:3> may be shared with other devices. The specific device is always identified by using the entire DEV<10:0> bit sequence.

3.0 ELECTRICAL CHARACTERISTICS

Note: Other than some basic data, this section documents only the High-Temperature PIC18F2585/2680/4585/4680 family devices' specifications that differ from those of the non-specialty PIC18F2585/2680/4585/4680 devices. For detailed information on the electrical specifications shared by the High-Temperature and non-specialty devices, see the *"PIC18F2585/2680/4585/4680 Data Sheet"* (DS39625).

Unless otherwise noted, this section's parameters assume a minimum voltage of 4.2V.

3.1 Absolute Maximum Ratings(†)

Maximum ambient temperature.....150°C

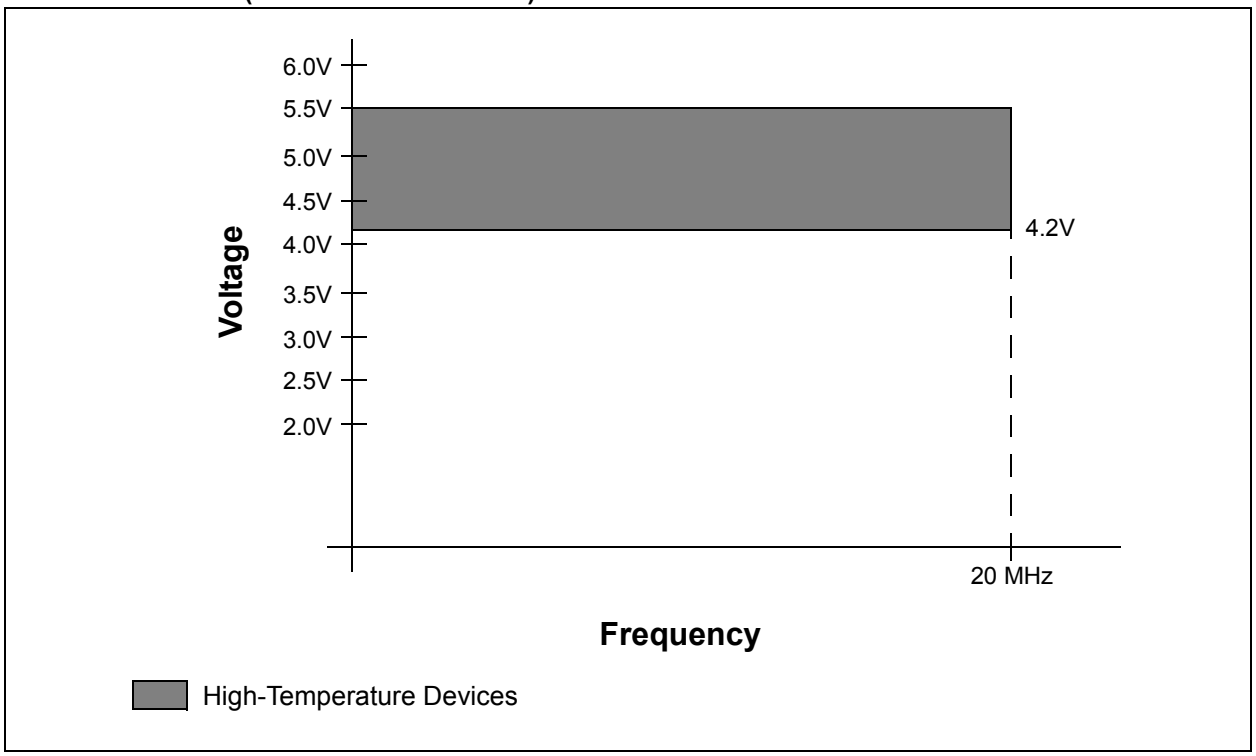
† **NOTICE:** Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operation listings of this specification is not implied.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

3.2 DC Characteristics

TABLE 3-1: SUPPLY VOLTAGE (HIGH TEMPERATURE)

PIC18F2585/2680/4585/4680 (High Temperature)			**Standard Operating Conditions (unless otherwise stated)** Operating temperature 125°C ≤ TA ≤ 150°C for high temperature					
Param No.	**Symbol**	**Characteristic**	**Min**	**Typ**	**Max**	**Units**	**VDD**	**Conditions**
	IDD	Supply Current	—	—	3.5	mA	5.0	FOSC = 1.5 MHz (PRI_RU mode, EC oscillator)
			—	—	8.5	mA	5.0	FOSC = 4 MHz (PRI_RU mode, EC oscillator)
			—	—	25	mA	5.0	FOSC = 16 MHz (PRI_RU mode, EC oscillator)
			—	—	34	mA	5.0	FOSC = 25 MHz (PRI_RU mode, EC oscillator)
D026	IPD	ΔIA/D	—	2.0	30	mA	5.0	A/D on, not converting
D030	VIL	I/O Ports with TTL Buffer	VSS	—	0.15 VDD	V	<4.5	
D030A	VIL	I/O Ports with TTL Buffer	VSS	—	0.7	V	5.0	4.2V < VDD < 5.5V
D031	VIL	I/O Ports with Schmitt Trigger Buffer	VSS	—	0.25 VDD	V	5.0	
D032	VIL	$\overline{MCLR}$	VSS	—		V	5.0	
D041	VIH	I/O Ports with Schmitt Trigger Buffer	0.85 VDD	—	VDD	V	5.0	
D042	VIH	$\overline{MCLR}$, OSC1 (EC mode)	0.85 VDD	—	VDD	V	5.0	

FIGURE 3-1: PIC18F2585/2680/4585/4680 VOLTAGE-FREQUENCY GRAPH (HIGH TEMPERATURE)



3.3 AC Characteristics

TABLE 3-2: OSCILLATOR PARAMETERS

Param No.	Symbol	Characteristics	Freq. Tolerance	Min	Typ	Max	Units	Conditions
OSO8	INTOSC	Internal Calibrated INTOSC Frequency(1)	±20%	6.4	8.0	9.6	MHz	4.2V ≤ VDD ≤ 5.5V, -40°C ≤ TA ≤ 150°C

Note 1: To ensure these oscillator frequency tolerances, VDD and VSS must be capacitively decoupled as close to the device as possible. These values, in parallel, are recommended: 0.1 μF and 0.01 μF.

APPENDIX A: REVISION HISTORY

Revision A (October 2009)

Original mini data sheet for the high-temperature devices in the PIC18F2585/2680/4585/4680 family.

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PART NO.	X	/XX	XXX
Device	Temperature Range	Package	Pattern

Device[1,2]	PIC18F2585/2680, PIC18F4585/4680 PIC18F2585/2680T, PIC18F4585/4680T VDD range 4.2V to 5.5V	
Temperature Range	I = -40°C to +85°C	(Industrial)
	E = -40°C to +125°C	(Extended)
	H = -40°C to +150°C	(High Temperature)
Package	PT = TQFP (Thin Quad Flatpack)	
	L = PLCC	
	SO = SOIC	
	SP = Skinny Plastic DIP	
	P = PDIP	
	ML = QFN	
Pattern	QTP, SQTP, Code or Special Requirements (blank otherwise)	

Examples:

a) PIC18F4680T-H/PT = High Temperature, TQFP package in tape and reel configuration

b) PIC18LF258-I/L 301 = Industrial temp., PLCC package, extended VDD limits, QTP pattern #301.

c) PIC18LF458-I/PT = Industrial temp., TQFP package, Extended VDD limits.

d) PIC18F258-E/L = Extended temp., PLCC package, normal VDD limits.

Note 1: F = Standard Voltage Range
LF = Wide Voltage Range
2: T = In tape and reel PLCC and TQFP packages only.

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