
300 Watt Wireless Power Transmitter Controller IC

Operating Conditions

- 3.0V to 3.6V, -40°C to +85°C
- Up to 300 Watts of Wireless Transfer

Key Features

- Controller for 300 Watt Wireless Power Transmitter
- Three Outputs for General Purpose LEDs
- Five Inputs for Switches Interface
- UART and SPI Serial Communication Channels
- Supports a Wide Range of Input Voltage (11~37V) when Used in the Microchip Recommended Hardware Configuration
- Enables System Efficiency of Up to 90%
- Implements Reliable Foreign Object Detection (FOD) Scheme
- Simplifies Wireless Power Transfer System Design
- 300W Wireless Power Transfer Reference Design Available for Purchase from:
www.microchipdirect.com
- Refer to the “300W Wireless Power Transfer Reference Design User’s Guide” for Setup Details

Wireless Power Transfer (WPT) System Protection Features

- Overvoltage Protection (OVP)
- Undervoltage Protection (UVP)
- Overcurrent Protection (OCP)
- Overpower Protection (OPP)
- Overtemperature Protection

Qualification

- AEC-Q100 REVG Grade 3 (-40°C to +85°C)

Introduction

The WP300TX01 is a Fixed Function Device (FFD) designed to perform the Wireless Power Transfer Transmit function. This chip is paired with the WP300RX01 as a Wireless Power Receiver function. 300 Watts is the maximum power that can be transferred using the digital controller function.

Microchip recommends using the schematic and layout as provided in the “300 Watts Wireless Power Transfer Reference Design User’s Guide”.

WP300TX01-I/ML01

Pin Diagram

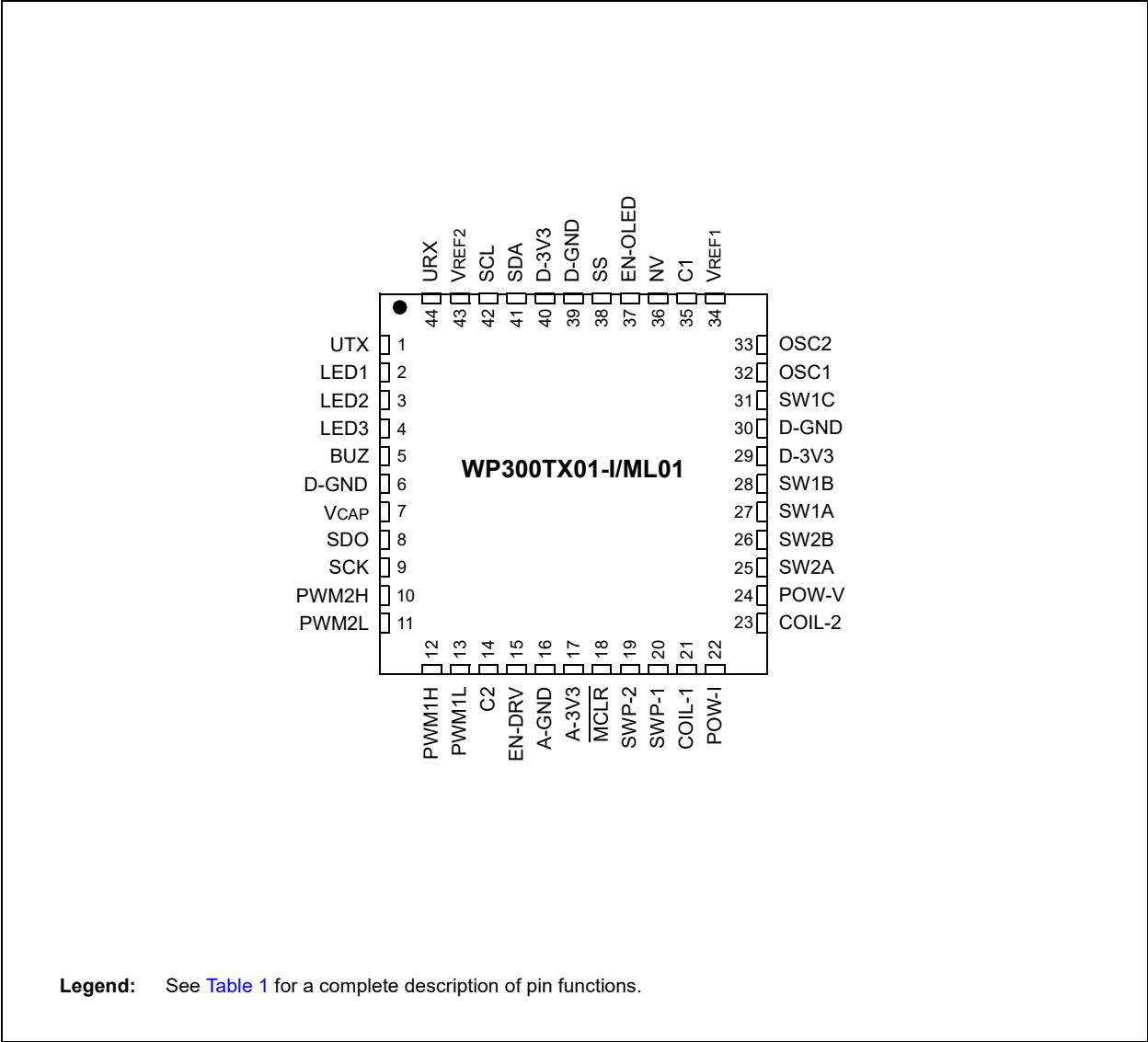


TABLE 1: PIN FUNCTION DESCRIPTIONS

Pin	Name	Function	Description
1	UTX	Digital Output	UART Transmit Interface
2	LED1	Digital Output	LED to Display System Status
3	LED2	Digital Output	LED to Display System Status
4	LED3	Digital Output	LED to Display System Status
5	BUZ	Digital Output	Buzzer Driver Signal
6	D-GND	Power	Digital Ground, Vss
7	VCAP	Power	CPU 1.8V Supply Filter Capacitor, 10 μ F Typical
8	SDO	Digital Output	SPI Communication, Serial Data Output to OLED
9	SCK	Digital Output	SPI Communication, Serial Clock Output to OLED
10	PWM2H	Digital Output	PWM2H Output to NFC Coil
11	PWM2L	Digital Output	PWM2L Output to NFC Coil
12	PWM1H	Digital Output	PWM1H Output to Gate Driver IC U4
13	PWM1L	Digital Output	PWM1L Output to Gate Driver IC U5
14	C2	Digital Output	Internal Comparator Output 2
15	EN-DRV	Digital Output	Enable Gate Drive
16	A-GND	Power	Analog Power Ground, AVss
17	A-3V3	Power	Analog Power Supply, AVDD
18	$\overline{\text{MCLR}}$	Digital Input	Master Clear Pin External Reset
19	SWP-2	Analog Input	IC U5 Phase Node Voltage Measurement
20	SWP-1	Analog Input	IC U4 Phase Node Voltage Measurement
21	COIL-1	Analog Input	Transmitter Coil – 1 Voltage Measurement
22	POW-I	Analog Input	DC Input Current Measurement (U3 analog output signal)
23	COIL-2	Analog Input	Transmitter Coil – 2 Voltage Measurement
24	POW-V	Analog Input	DC Input Voltage Measurement
25	SW2A	Digital Input	Key Detection Input 2A, from OLED Board
26	SW2B	Digital Input	Key Detection Input 2B, from OLED Board
27	SW1A	Digital Input	Key Detection Input 1A, from OLED Board
28	SW1B	Digital Input	Key Detection Input 1B, from OLED Board
29	D-3V3	Power	Digital Power Supply, VDD
30	D-GND	Power	Digital Power Ground, Vss
31	SW1C	Digital Input	Key Detection Input 1C, from OLED Board
32	OSC1	Oscillator	Oscillator (X1) Pin 1
33	OSC2	Oscillator	Oscillator (X1) Pin 2
34	VREF1	Analog Output	Signal Processing Reference Voltage Output
35	C1	Digital Output	Internal Comparator Output 1
36	NV	Analog Input	NFC Coil Signal Detection Input
37	EN-OLED	Digital Output	Enable OLED Display Panel
38	SS	Digital Output	SPI Communication Client Select to OLED Board
39	D-GND	Power	Digital Ground, Vss
40	D-3V3	Power	Digital Power Supply, VDD
41	SDA	Digital Output	I ² C Data
42	SCL	Digital Output	I ² C Clock
43	VREF2	Analog Input	Signal Processing Reference Voltage Input
44	URX	Digital Input	UART Receive Interface

Note: Refer to the “300W Wireless Power Transfer Reference Design User’s Guide”.

WP300TX01-I/ML01

ELECTRICAL CHARACTERISTICS

Absolute maximum ratings for the WP300TX01-I/ML01 are listed below. Exposure to these maximum rating conditions for extended periods may affect device reliability. Functional operation of the device at these, or any other conditions above the parameters indicated in the operation listings of this specification, is not implied.

Absolute Maximum Ratings⁽¹⁾

Ambient temperature under bias	-40°C to +85°C
Storage temperature	-65°C to +150°C
Voltage on VDD with respect to VSS	-0.3V to +4.0V
Voltage on any pin	-0.3V to (VDD + 0.3V)
Maximum current out of VSS pin	300 mA
Maximum current into VDD pin	300 mA
Maximum current sunk by all ports.....	200 mA

Note 1: 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.

TABLE 2: THERMAL OPERATING CONDITIONS

Rating	Symbol	Min.	Typ.	Max.	Unit
Industrial Temperature Devices					
Operating Junction Temperature Range	TJ	-40	—	+125	°C
Operating Ambient Temperature Range	TA	-40	—	+85	°C

TABLE 3: THERMAL PACKAGING CHARACTERISTICS

Characteristic	Symbol	Typ.	Max.	Unit	Notes
Package Thermal Resistance, 44-Pin QFN 8x8 mm	θJA	29.0	—	°C/W	1

Note 1: Junction to ambient thermal resistance, Theta-JA (θJA) numbers are achieved by package simulations.

TABLE 4: DC TEMPERATURE AND VOLTAGE SPECIFICATIONS

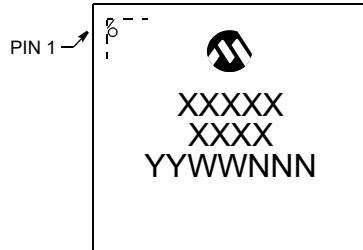
DC CHARACTERISTICS		Standard Operating Conditions: 3.0V to 3.6V (unless otherwise stated) Operating temperature -40°C ≤ TA ≤ +85°C for Industrial				
Symbol	Characteristic	Min.	Typ.	Max.	Units	Conditions
Operating Voltage						
VDD	Supply Voltage	3.0	—	3.6	V	Supply to VDD and AVDD pins
VPOR	VDD Start Voltage to Ensure Internal Power-on Reset Signal	—	—	VSS	V	
SVDD	VDD Rise Rate to Ensure Internal Power-on Reset Signal	1.0	—	—	V/ms	0V-3V in 3 ms
CEFC	External Filter Capacitor Value ⁽¹⁾	4.7	10	—	μF	Capacitor must have a low-series resistance (<1 ohm)

Note 1: Typical VCAP Voltage = 1.8 volts when VDD ≥ VDDMIN.

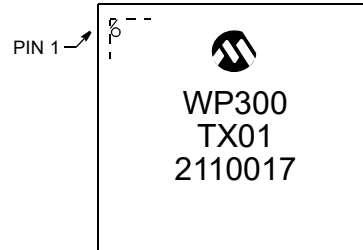
PACKAGING INFORMATION

Package Marking Information

44-Lead QFN (8x8x0.9 mm)



Example



Legend:	XX...X	Customer-specific information
	YY	Year code (last 2 digits of calendar year)
	WW	Week code (week of January 1 is week '01')
	NNN	Alphanumeric traceability code

Note: In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information.

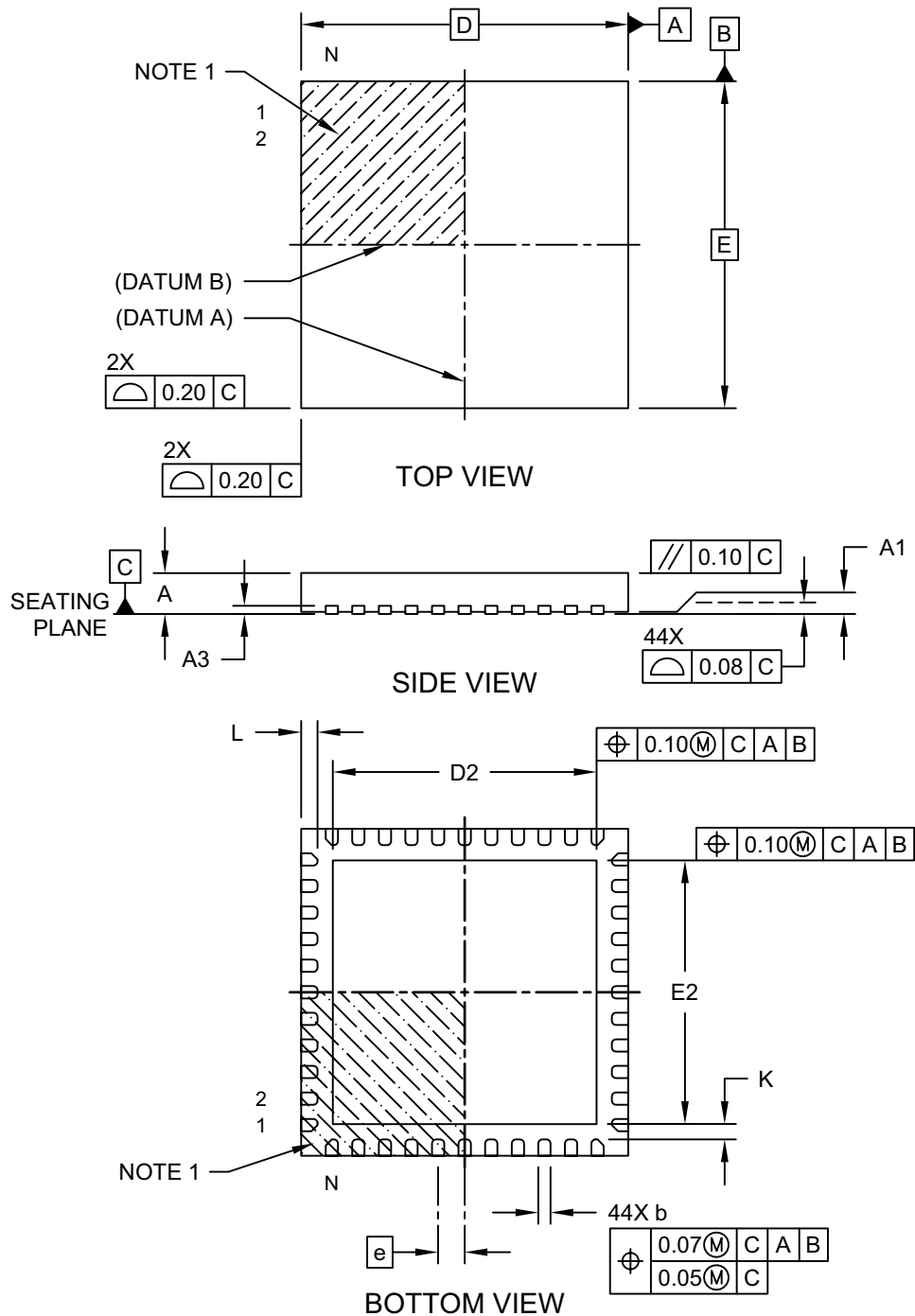
WP300TX01-I/ML01

Package Details

The following sections give the technical details of the packages.

44-Lead Plastic Quad Flat, No Lead Package (ML) - 8x8 mm Body [QFN or VQFN]

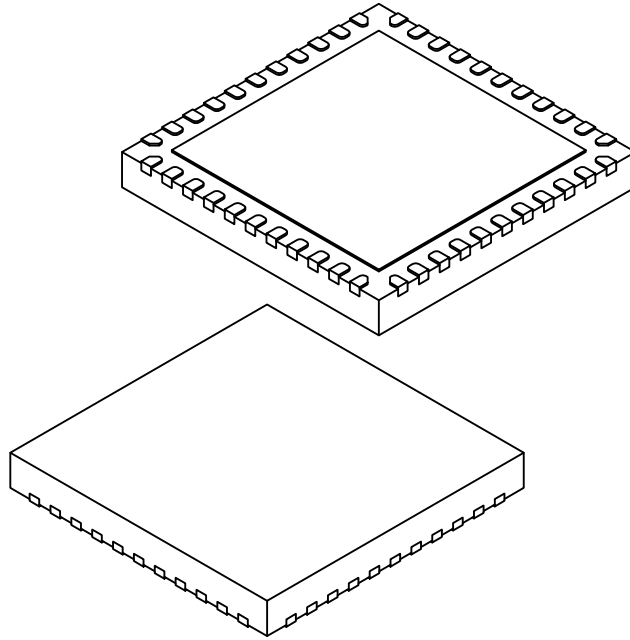
Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Microchip Technology Drawing C04-103D Sheet 1 of 2

44-Lead Plastic Quad Flat, No Lead Package (ML) - 8x8 mm Body [QFN or VQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Pins	N	44		
Pitch	e	0.65 BSC		
Overall Height	A	0.80	0.90	1.00
Standoff	A1	0.00	0.02	0.05
Terminal Thickness	A3	0.20 REF		
Overall Width	E	8.00 BSC		
Exposed Pad Width	E2	6.25	6.45	6.60
Overall Length	D	8.00 BSC		
Exposed Pad Length	D2	6.25	6.45	6.60
Terminal Width	b	0.20	0.30	0.35
Terminal Length	L	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	-	-

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

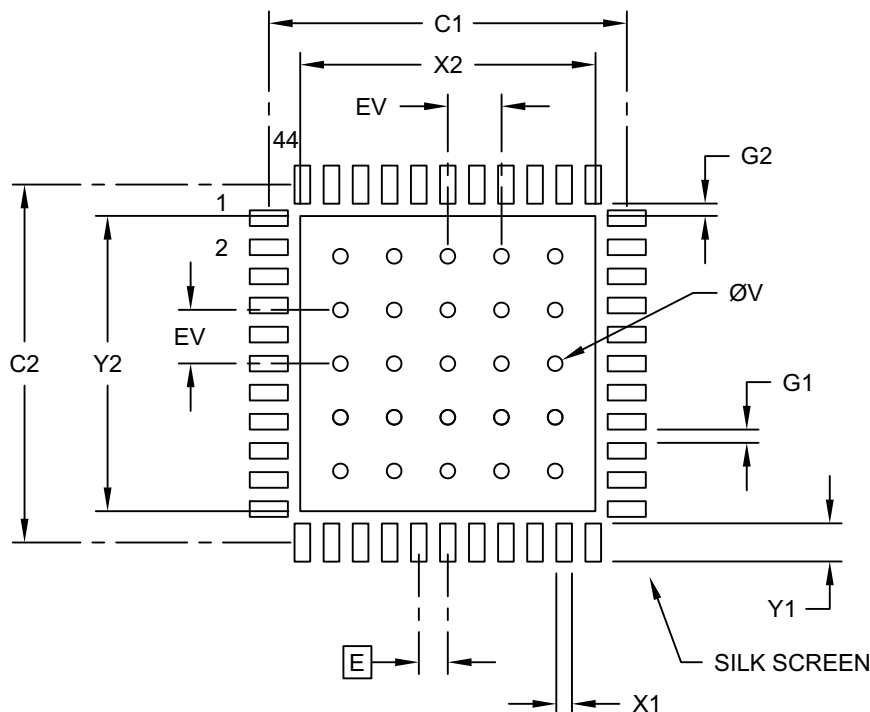
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-103D Sheet 2 of 2

WP300TX01-I/ML01

44-Lead Plastic Quad Flat, No Lead Package (ML) - 8x8 mm Body [QFN or VQFN]

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



RECOMMENDED LAND PATTERN

Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	0.65 BSC		
Optional Center Pad Width	X2			6.60
Optional Center Pad Length	Y2			6.60
Contact Pad Spacing	C1		8.00	
Contact Pad Spacing	C2		8.00	
Contact Pad Width (X44)	X1			0.35
Contact Pad Length (X44)	Y1			0.85
Contact Pad to Contact Pad (X40)	G1	0.30		
Contact Pad to Center Pad (X44)	G2	0.28		
Thermal Via Diameter	V		0.33	
Thermal Via Pitch	EV		1.20	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing No. C04-2103C

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, refer to the factory or the listed sales office.

Transmitter Controller Part Number: **WP 300 TX 01 I/ML 01 C00**

Wireless Power

300 Watt

Transmitter

Denotes silicon variant

Industrial temperature/package type

Software update made by Microchip.

Not marked on package, but used for tracking

Used to track customer specific software version

WP300TX01-I/ML01

NOTES:

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specifications contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is secure when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods being used in attempts to breach the code protection features of the Microchip devices. We believe that these methods require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Attempts to breach these code protection features, most likely, cannot be accomplished without violating Microchip's intellectual property rights.
- Microchip is willing to work with any customer who is concerned about the integrity of its code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of its code. Code protection does not mean that we are guaranteeing the product is "unbreakable." Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

Information contained in this publication is provided for the sole purpose of designing with and using Microchip products. Information regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications.

THIS INFORMATION IS PROVIDED BY MICROCHIP "AS IS". MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE OR WARRANTIES RELATED TO ITS CONDITION, QUALITY, OR PERFORMANCE.

IN NO EVENT WILL MICROCHIP BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE, INCIDENTAL OR CONSEQUENTIAL LOSS, DAMAGE, COST OR EXPENSE OF ANY KIND WHATSOEVER RELATED TO THE INFORMATION OR ITS USE, HOWEVER CAUSED, EVEN IF MICROCHIP HAS BEEN ADVISED OF THE POSSIBILITY OR THE DAMAGES ARE FORESEEABLE. TO THE FULLEST EXTENT ALLOWED BY LAW, MICROCHIP'S TOTAL LIABILITY ON ALL CLAIMS IN ANY WAY RELATED TO THE INFORMATION OR ITS USE WILL NOT EXCEED THE AMOUNT OF FEES, IF ANY, THAT YOU HAVE PAID DIRECTLY TO MICROCHIP FOR THE INFORMATION. Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

Trademarks

The Microchip name and logo, the Microchip logo, Adaptec, AnyRate, AVR, AVR logo, AVR Freaks, BesTime, BitCloud, chipKIT, chipKIT logo, CryptoMemory, CryptoRF, dsPIC, FlashFlex, flexPWR, HELDO, IGLOO, JukeBlox, KeeLoq, Kleer, LANCheck, LinkMD, maXStylus, maXTouch, MediaLB, megaAVR, Microsemi, Microsemi logo, MOST, MOST logo, MPLAB, OptoLyzer, PackTime, PIC, picoPower, PICSTART, PIC32 logo, PolarFire, Prochip Designer, QTouch, SAM-BA, SenGenuity, SpyNIC, SST, SST Logo, SuperFlash, Symmetricom, SyncServer, Tachyon, TimeSource, tinyAVR, UNI/O, Vectron, and XMEGA are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

AgileSwitch, APT, ClockWorks, The Embedded Control Solutions Company, EtherSynch, FlashTec, Hyper Speed Control, HyperLight Load, IntelliMOS, Libero, motorBench, mTouch, Powermite 3, Precision Edge, ProASIC, ProASIC Plus, ProASIC Plus logo, Quiet-Wire, SmartFusion, SyncWorld, Temux, TimeCesium, TimeHub, TimePictra, TimeProvider, WinPath, and ZL are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Adjacent Key Suppression, AKS, Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, Augmented Switching, BlueSky, BodyCom, CodeGuard, CryptoAuthentication, CryptoAutomotive, CryptoCompanion, CryptoController, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, Espresso T1S, EtherGREEN, IdealBridge, In-Circuit Serial Programming, ICSP, INICnet, Intelligent Paralleling, Inter-Chip Connectivity, JitterBlocker, maxCrypto, maxView, memBrain, Mindi, MiWi, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICkit, PICtail, PowerSmart, PureSilicon, QMatrix, REAL ICE, Ripple Blocker, RTAX, RTG4, SAM-ICE, Serial Quad I/O, simpleMAP, SimpliPHY, SmartBuffer, SMART-I.S., storClad, SQI, SuperSwitcher, SuperSwitcher II, Switchtec, SynchroPHY, Total Endurance, TSHARC, USBCheck, VariSense, VectorBlox, VeriPHY, ViewSpan, WiperLock, XpressConnect, and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

The Adaptec logo, Frequency on Demand, Silicon Storage Technology, and Symmcom are registered trademarks of Microchip Technology Inc. in other countries.

GestIC is a registered trademark of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2021, Microchip Technology Incorporated, All Rights Reserved.

ISBN: 978-1-5224-7955-0

For information regarding Microchip's Quality Management Systems, please visit www.microchip.com/quality.

Worldwide Sales and Service

AMERICAS

Corporate Office
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 480-792-7200
Fax: 480-792-7277
Technical Support:
<http://www.microchip.com/support>
Web Address:
www.microchip.com

Atlanta
Duluth, GA
Tel: 678-957-9614
Fax: 678-957-1455

Austin, TX
Tel: 512-257-3370

Boston
Westborough, MA
Tel: 774-760-0087
Fax: 774-760-0088

Chicago
Itasca, IL
Tel: 630-285-0071
Fax: 630-285-0075

Dallas
Addison, TX
Tel: 972-818-7423
Fax: 972-818-2924

Detroit
Novi, MI
Tel: 248-848-4000

Houston, TX
Tel: 281-894-5983

Indianapolis
Noblesville, IN
Tel: 317-773-8323
Fax: 317-773-5453
Tel: 317-536-2380

Los Angeles
Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608
Tel: 951-273-7800

Raleigh, NC
Tel: 919-844-7510

New York, NY
Tel: 631-435-6000

San Jose, CA
Tel: 408-735-9110
Tel: 408-436-4270

Canada - Toronto
Tel: 905-695-1980
Fax: 905-695-2078

ASIA/PACIFIC

Australia - Sydney
Tel: 61-2-9868-6733

China - Beijing
Tel: 86-10-8569-7000

China - Chengdu
Tel: 86-28-8665-5511

China - Chongqing
Tel: 86-23-8980-9588

China - Dongguan
Tel: 86-769-8702-9880

China - Guangzhou
Tel: 86-20-8755-8029

China - Hangzhou
Tel: 86-571-8792-8115

China - Hong Kong SAR
Tel: 852-2943-5100

China - Nanjing
Tel: 86-25-8473-2460

China - Qingdao
Tel: 86-532-8502-7355

China - Shanghai
Tel: 86-21-3326-8000

China - Shenyang
Tel: 86-24-2334-2829

China - Shenzhen
Tel: 86-755-8864-2200

China - Suzhou
Tel: 86-186-6233-1526

China - Wuhan
Tel: 86-27-5980-5300

China - Xian
Tel: 86-29-8833-7252

China - Xiamen
Tel: 86-592-2388138

China - Zhuhai
Tel: 86-756-3210040

ASIA/PACIFIC

India - Bangalore
Tel: 91-80-3090-4444

India - New Delhi
Tel: 91-11-4160-8631

India - Pune
Tel: 91-20-4121-0141

Japan - Osaka
Tel: 81-6-6152-7160

Japan - Tokyo
Tel: 81-3-6880-3770

Korea - Daegu
Tel: 82-53-744-4301

Korea - Seoul
Tel: 82-2-554-7200

Malaysia - Kuala Lumpur
Tel: 60-3-7651-7906

Malaysia - Penang
Tel: 60-4-227-8870

Philippines - Manila
Tel: 63-2-634-9065

Singapore
Tel: 65-6334-8870

Taiwan - Hsin Chu
Tel: 886-3-577-8366

Taiwan - Kaohsiung
Tel: 886-7-213-7830

Taiwan - Taipei
Tel: 886-2-2508-8600

Thailand - Bangkok
Tel: 66-2-694-1351

Vietnam - Ho Chi Minh
Tel: 84-28-5448-2100

EUROPE

Austria - Wels
Tel: 43-7242-2244-39
Fax: 43-7242-2244-393

Denmark - Copenhagen
Tel: 45-4485-5910
Fax: 45-4485-2829

Finland - Espoo
Tel: 358-9-4520-820

France - Paris
Tel: 33-1-69-53-63-20
Fax: 33-1-69-30-90-79

Germany - Garching
Tel: 49-8931-9700

Germany - Haan
Tel: 49-2129-3766400

Germany - Heilbronn
Tel: 49-7131-72400

Germany - Karlsruhe
Tel: 49-721-625370

Germany - Munich
Tel: 49-89-627-144-0
Fax: 49-89-627-144-44

Germany - Rosenheim
Tel: 49-8031-354-560

Israel - Ra'anana
Tel: 972-9-744-7705

Italy - Milan
Tel: 39-0331-742611
Fax: 39-0331-466781

Italy - Padova
Tel: 39-049-7625286

Netherlands - Drunen
Tel: 31-416-690399
Fax: 31-416-690340

Norway - Trondheim
Tel: 47-7288-4388

Poland - Warsaw
Tel: 48-22-3325737

Romania - Bucharest
Tel: 40-21-407-87-50

Spain - Madrid
Tel: 34-91-708-08-90
Fax: 34-91-708-08-91

Sweden - Gothenberg
Tel: 46-31-704-60-40

Sweden - Stockholm
Tel: 46-8-5090-4654

UK - Wokingham
Tel: 44-118-921-5800
Fax: 44-118-921-5820