

## 8-Bit Digital-to-Analog Converter with Two-Wire Interface

### Features

- 8-bit Digital-to-Analog Converter
- $\pm 2$  LSB INL
- $\pm 0.8$  LSB DNL
- 2.7-5.5V Single Supply Operation
- Simple SMBus/I<sup>2</sup>C™ Serial Interface
- Low Power: 350 $\mu$ A Operation, 0.5 $\mu$ A Shutdown
- 8-Pin SOIC and 8-Pin MSOP Packages

### Applications

- Programmable Voltage Sources
- Digital Controlled Amplifiers/Attenuators
- Process Monitoring and Control

### Device Selection Table

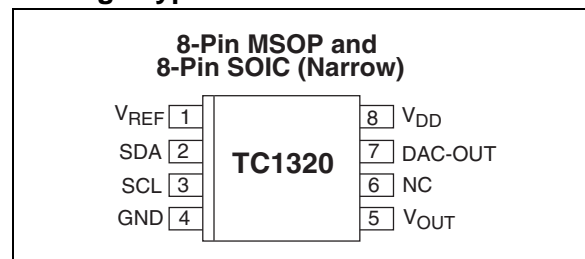
Part Number	Package	Temperature Range
TC1320EOA	8-Pin SOIC (Narrow)	-40°C to +85°C
TC1320EUA	8-Pin MSOP	-40°C to +85°C

### General Description

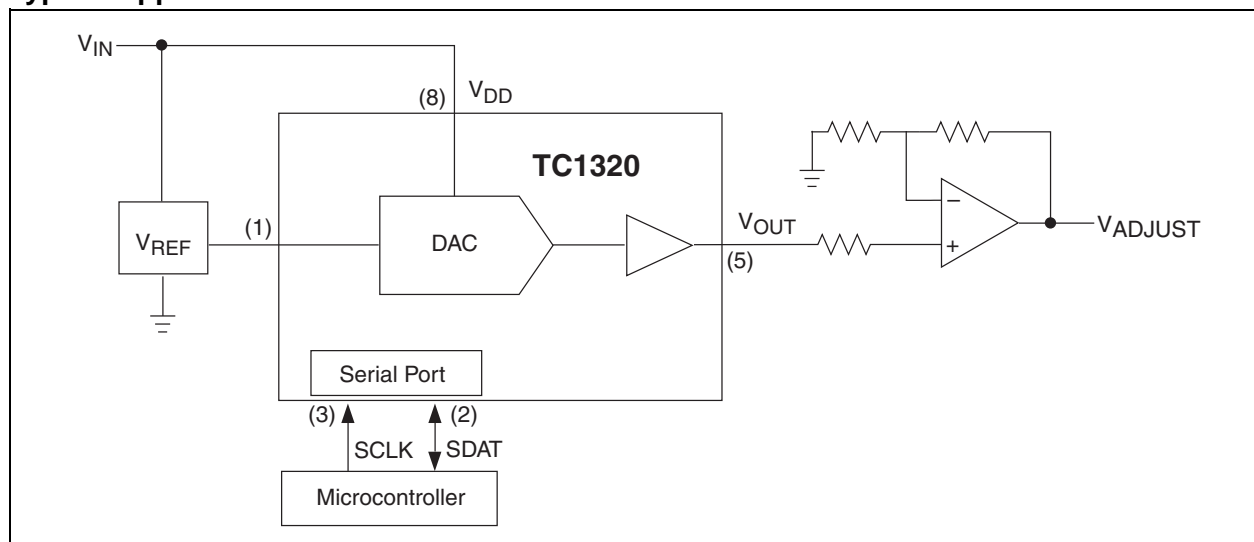
The TC1320 is a serially accessible 8-bit voltage output digital-to-analog converter (DAC). The DAC produces an output voltage that ranges from ground to an externally supplied reference voltage. It operates from a single power supply that can range from 2.7V to 5.5V, making it ideal for a wide range of applications. Built into the part is a Power-on Reset function that ensures that the device starts at a known condition.

Communication with the TC1320 is accomplished via a simple 2-wire SMBus/I<sup>2</sup>C™ compatible serial port with the TC1320 acting as a slave only device. The host can enable the SHDN bit in the CONFIG register to activate the Low Power Standby mode.

### Package Type

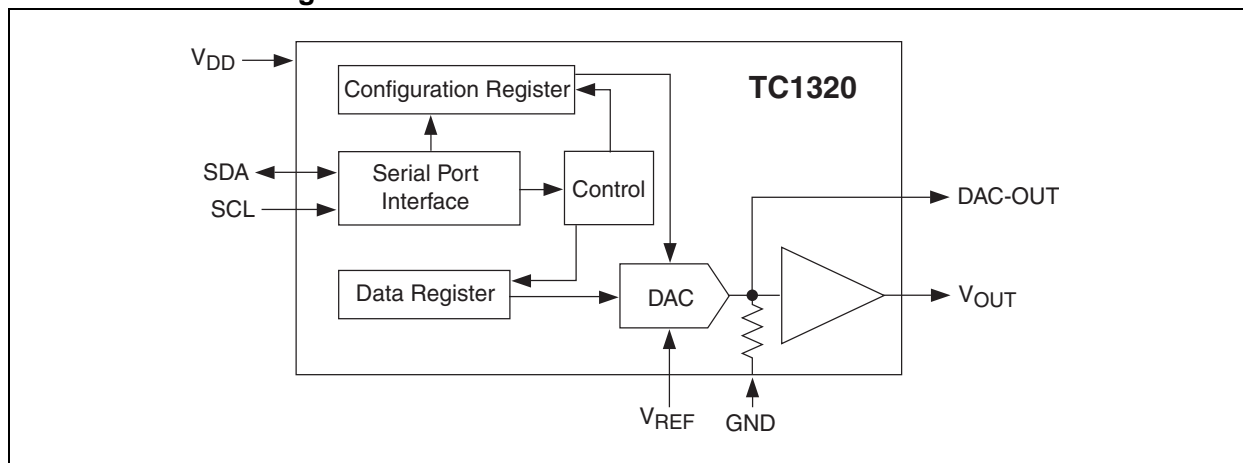


### Typical Application



# TC1320

## Functional Block Diagram



## 1.0 ELECTRICAL CHARACTERISTICS

### Absolute Maximum Ratings\*

Supply Voltage ( $V_{DD}$ )	+6V
Voltage on any Pin .. (GND – 0.3V) to ( $V_{DD}$ + 0.3V)	
Current on any Pin	±50mA
Package Thermal Resistance ( $\theta_{JA}$ )	330°C C/W
Operating Temperature ( $T_A$ )	See Below
Storage Temperature ( $T_{STG}$ )	-65°C to +150°C

\*Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions above those indicated in the operation sections of the specifications is not implied. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability.

### TC1320 ELECTRICAL SPECIFICATIONS

Electrical Characteristics: $V_{DD} = 2.7V$ to $5.5V$ , $-40^\circ C \leq T_A \leq +85^\circ C$ , $V_{REF} = 1.2V$ unless otherwise noted.						
Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
<b>Power Supply</b>						
$V_{DD}$	Supply Voltage	2.7	350	500	$\mu A$	
$I_{DD}$	Operating Current	—	0.35	0.5	mA	$V_{DD} = 5.5V$ , $V_{REF} = 1.2V$ Serial Port Inactive ( <b>Note 1</b> )
$I_{DD-STANDBY}$	Standby Supply Current	—	0.1	1	$\mu A$	$V_{DD} = 3.3V$ Serial Port Inactive ( <b>Note 1</b> )
<b>Static Performance - Analog Section</b>						
	Resolution	—	—	8	Bits	
INL	Integral Non-Linearity at FS, $T_A = +25^\circ C$	—	—	±2	LSB	( <b>Note 2</b> )
FSE	Full Scale Error	—	—	±3	%FS	
DNL	Differential Non-Linearity, $T_A = +25^\circ C$	—	—	±0.8	LSB	All Codes ( <b>Note 2</b> )
$V_{OS}$	Offset Error at $V_{OUT}$	—	±0.3	±8	mV	( <b>Note 2</b> )
$TCV_{OS}$	Offset Error Tempco at $V_{OUT}$	—	10	—	$\mu V/^\circ C$	
PSRR	Power Supply Rejection Ratio	—	80	—	dB	$V_{DD}$ at DC
$V_{REF}$	Voltage Reference Range	0	—	$V_{DD} - 1.2$	V	
$I_{REF}$	Reference Input Leakage Current	—	—	±1.0	$\mu A$	
$V_{SW}$	Voltage Swing	0	—	$V_{REF}$	V	$V_{REF} \leq (V_{DD} - 1.2V)$
$R_{OUT}$	Output Resistance @ $V_{OUT}$	—	5	—	$\Omega$	$R_{OUT} (\Omega)$
$I_{OUT}$	Output Current (Source or Sink)	—	2	—	mA	
$I_{SC}$	Output Short-Circuit Current $V_{DD} = 5.5V$	—	30	50	mA	Source
		—	20	50	mA	Sink
<b>Dynamic Performance</b>						
SR	Voltage Output Slew Rate	—	0.8	—	V/ $\mu s$	
$t_{SETTLE}$	Output Voltage Full Scale Settling Time	—	10	—	$\mu sec$	
$t_{WU}$	Wake-up Time	—	20	—	$\mu s$	
	Digital Feed Through and Crosstalk	—	5	—	nV-s	$SDA = V_{DD}$ , $SCL = 100kHz$
<b>Serial Port Interface</b>						
$V_{IH}$	Logic Input High	2.4	—	$V_{DD}$	V	
$V_{IL}$	Logic Input Low	—	—	0.6	—	
$V_{OL}$	SDA Output Low	—	—	0.4	V	$I_{OL} = 3mA$ (Sinking Current) $I_{OL} = 6mA$
		—	—	0.6	V	
$C_{IN}$	Input Capacitance SDA, SCL	—	5	0.4	pF	
$I_{LEAK}$	I/O Leakage	—	—	±1.0	$\mu A$	

**Note 1:** SDA and SCL must be connected to  $V_{DD}$  or GND.

**Note 2:** Measured at  $V_{OUT} \geq 50mV$  referred to GND to avoid output buffer clipping.

# TC1320

## TC1320 ELECTRICAL SPECIFICATIONS (CONTINUED)

Electrical Characteristics: $V_{DD} = 2.7V$ to $5.5V$ , $-40^{\circ}C \leq T_A \leq +85^{\circ}C$ , $V_{REF} = 1.2V$ unless otherwise noted.						
Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
<b>Serial Port AC Timing</b>						
$f_{SMB}$	SMBus Clock Frequency	10	—	100	kHz	
$t_{IDLE}$	Bus Free Time Prior to New Transition	4.7	—	—	$\mu$ sec	
$t_{H(START)}$	START Condition Hold Time	4.0	—	—	$\mu$ sec	
$t_{SU(START)}$	START Condition Setup Time	4.7	—	—	$\mu$ sec	90% SCL to 10% SDA (for Repeated START Condition)
$t_{SU(STOP)}$	STOP Condition Setup Time	4.0	—	—	$\mu$ sec	
$t_{H-DATA}$	Data In Hold Time	100	—	—	nsec	
$t_{SU-DATA}$	Data In Setup Time	100	—	—	nsec	
$t_{LOW}$	Low Clock Period	4.7	—	—	$\mu$ sec	10% to 10%
$t_{HIGH}$	High Clock Period	4	—	—	$\mu$ sec	90% to 90%
$t_F$	SMBus Fall Time	—	—	300	nsec	90% to 10%
$t_R$	SMBus Rise Time	—	—	1000	nsec	10% to 90%
$t_{POR}$	Power-on Reset Delay	—	500	—	$\mu$ sec	$V_{DD} \geq V_{POR}$ (Rising Edge)

**Note 1:** SDA and SCL must be connected to  $V_{DD}$  or GND.

**Note 2:** Measured at  $V_{OUT} \geq 50mV$  referred to GND to avoid output buffer clipping.

## 2.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in Table 2-1.

**TABLE 2-1: PIN FUNCTION TABLE**

Pin Number	Symbol	Type	Description
1	$V_{REF}$	Input	Input. Voltage Reference Input can range from 0V to 1.2V below $V_{DD}$ .
2	SDA	Bi-Directional	Bi-directional. Serial data is transferred on the SMBus in both directions using this pin.
3	SCL	Input	Input. SMBus serial clock. Clocks data into and out of the TC1320.
4	GND	Power	Ground.
5	$V_{OUT}$	Output	Output. Buffered DAC output voltage. This voltage is a function of the reference voltage and the contents of the DATA register.
6	NC	None	No connection.
7	DAC-OUT	Output	Output. Unbuffered DAC output voltage. This voltage is a function of the reference voltage and the contents of the DATA register. This output is unbuffered and care must be taken that the pin is connected only to a high-impedance node.
8	$V_{DD}$	Power	Positive power supply input. See electrical specifications.



## 4.0 SERIAL PORT OPERATION

The Serial Clock input (SCL) and bi-directional data port (SDA) form a 2-wire bi-directional serial port for programming and interrogating the TC1320. The following conventions are used in this bus architecture:

**TABLE 4-1: TC1320 SERIAL BUS CONVENTIONS**

Term	Explanation
Transmitter	The device sending data to the bus.
Receiver	The device receiving data from the bus.
Master	The device which controls the bus: initiating transfers (START), generating the clock, and terminating transfers (STOP).
Slave	The device addressed by the master.
START	A unique condition signaling the beginning of a transfer indicated by SDA falling (High - Low) while SCL is high.
STOP	A unique condition signaling the end of a transfer indicated by SDA rising (Low - High) while SCL is high.
ACK	A Receiver Acknowledges the receipt of each byte with this unique condition. The Receiver drives SDA low during SCL high of the ACK clock pulse. The Master provides the clock pulse for the ACK cycle.
Busy	Communication is not possible because the bus is in use.
Not Busy	When the bus is IDLE, both SDA and SCL will remain high.
Data Valid	The state of SDA must remain stable during the High period of SCL in order for a data bit to be considered valid. SDA only changes state while SCL is low during normal data transfers. (See START and STOP conditions.)

All transfers take place under control of a host, usually a CPU or microcontroller, acting as the Master, which provides the clock signal for all transfers. The TC1320 *always* operates as a Slave. The serial protocol is illustrated in Figure 3-1. All data transfers have two phases; all bytes are transferred MSB first. Accesses are initiated by a START condition (START), followed by a device address byte and one or more data bytes. The device address byte includes a Read/Write selection bit. Each access must be terminated by a STOP Condition (STOP). A convention called *Acknowledge* (ACK) confirms receipt of each byte. Note that SDA can change only during periods when SCL is LOW (SDA changes while SCL is HIGH is reserved for START and STOP Conditions).

## 4.1 START Condition (START)

The TC1320 continuously monitors the SDA and SCL lines for a START condition (a HIGH to LOW transition of SDA while SCL is HIGH), and will not respond until this condition is met.

## 4.2 Address Byte

Immediately following the START Condition, the host must transmit the address byte to the TC1320. The 7-bit SMBus address for the TC1320 is 1001000. The 7-bit address transmitted in the serial bit stream must match for the TC1320 to respond with an Acknowledge (indicating the TC1320 is on the bus and ready to accept data). The eighth bit in the Address Byte is a Read/Write bit. This bit is a 1 for a read operation, or 0 for a write operation. During the first phase of any transfer, this bit will be set = 0 to indicate that the command byte is being written.

## 4.3 Acknowledge (ACK)

Acknowledge (ACK) provides a positive handshake between the host and the TC1320. The host releases SDA after transmitting eight bits, then generates a ninth clock cycle to allow the TC1320 to pull the SDA line LOW to Acknowledge that it successfully received the previous eight bits of data or address.

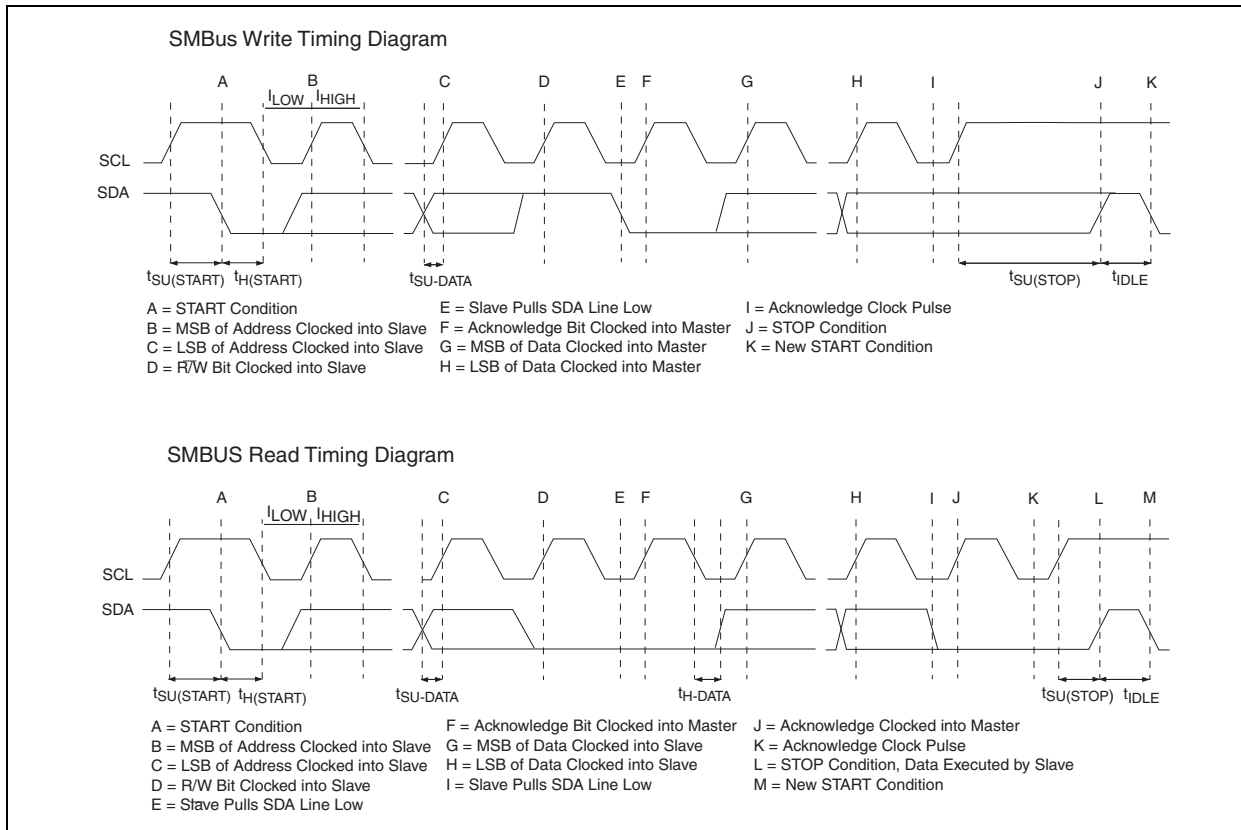
## 4.4 Data Byte

After a successful ACK of the address byte, the host must transmit the data byte to be written, or clock out the data to be read. (See the appropriate timing diagrams.) ACK will be generated after a successful write of a data byte into the TC1320.

## 4.5 STOP Condition (STOP)

Communications must be terminated by a STOP condition (a LOW to HIGH transition of SDA while SCL is HIGH). The STOP Condition must be communicated by the transmitter to the TC1320. Refer to Figure 4-1, Timing Diagrams for serial bus timing.

**FIGURE 4-1: TIMING DIAGRAMS**



## 4.6 Register Set and Programmer's Model

**TABLE 4-2: TC1320 COMMAND SET (SMBus READ\_BYTE AND WRITE\_BYTE)**

Command Byte Description		
Command	Code	Function
RWD	00h	Read/Write Data (DATA)
RWCR	01h	Read/Write Configuration (CONFIG)

**TABLE 4-3: CONFIGURATION REGISTER (CONFIG), 8-BIT, READ/WRITE**

Configuration Register (CONFIG)							
D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
Reserved							SHDN
Bit	POR	Function	Type	Operation			
D[0]	0	Standby Switch	Read/Write	1 = Standby 0 = Normal			
D[7]-D[1]	0	Reserved; Always returns Zero when Read	N/A	N/A			



**TABLE 4-4: DATA REGISTER (DATA), 8-BIT, READ/WRITE**

Data Register (DATA)							
D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
MSB	X	X	X	X	X	X	LSB

The DAC output voltage is a function of reference voltage and the binary value of the contents of the Data register. The transfer function is given by the expression:

**EQUATION 4-1:**

$$V_{OUT} = V_{REF} \times \left[ \frac{DATA}{256} \right]$$

## 4.7 Register Set Summary

The TC1320's register set is summarized in Table 4-5 below. All registers are 8-bits wide.

**TABLE 4-5: TC1320 REGISTER SET SUMMARY**

Name	Description	POR State	Read	Write
Data	Data Register	0000 0000b	X	X
Config	CONFIG Register	0000 0000b	X	X

# TC1320

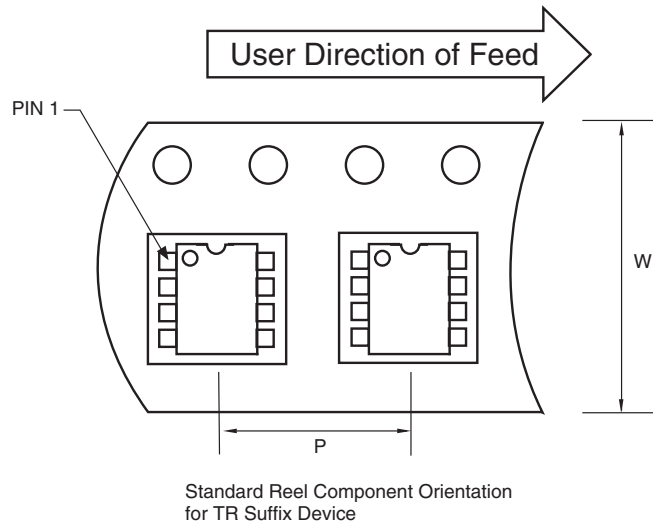
## 5.0 PACKAGING INFORMATION

### 5.1 Package Marking Information

Package marking data not available at this time.

### 5.2 Taping Forms

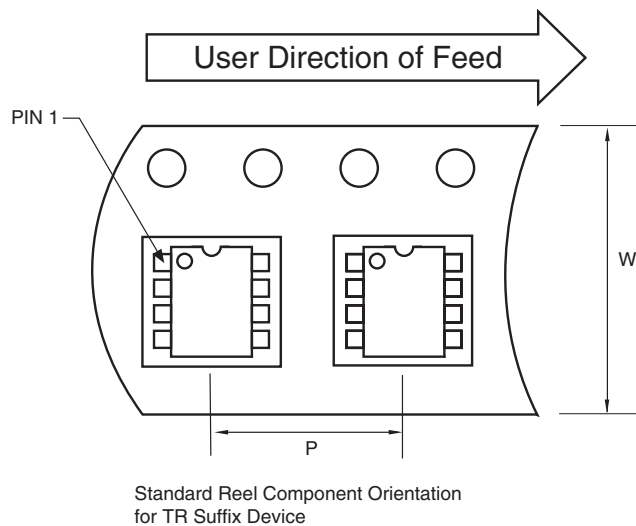
#### Component Taping Orientation for 8-Pin MSOP Devices



Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
8-Pin MSOP	12 mm	8 mm	2500	13 in

#### Component Taping Orientation for 8-Pin SOIC (Narrow) Devices



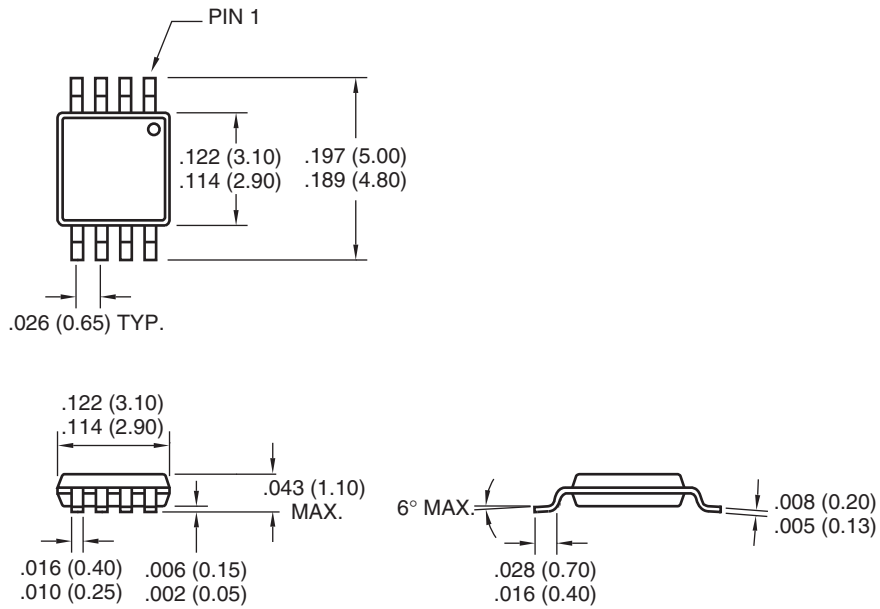
Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
8-Pin SOIC (N)	12 mm	8 mm	2500	13 in

## 5.3 Package Dimensions

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

### 8-Pin MSOP

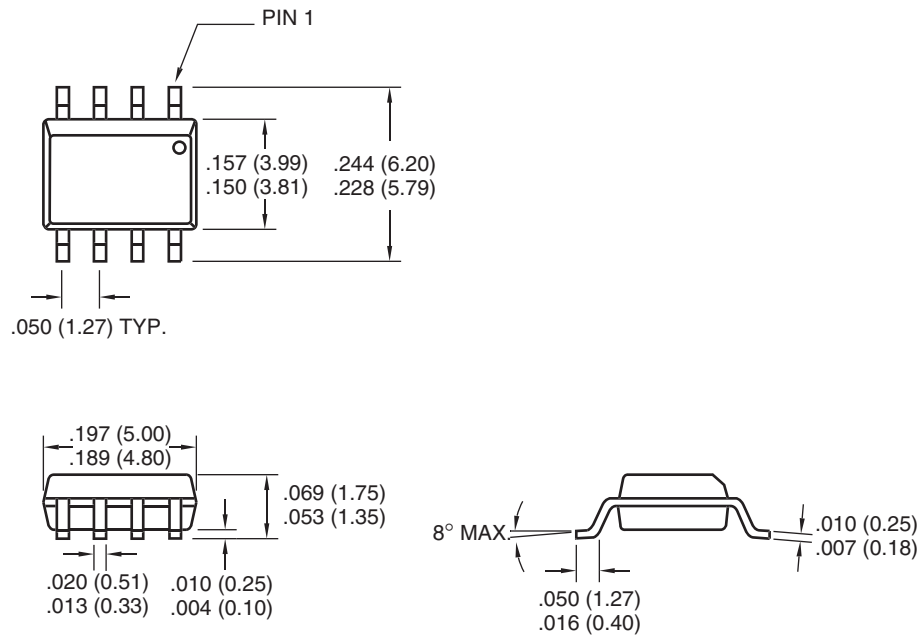


Dimensions: inches (mm)

# TC1320

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

## 8-Pin SOIC



Dimensions: inches (mm)

## 6.0 REVISION HISTORY

### Revision C (November 2012)

Added a note to each package outline drawing.

## SALES AND SUPPORT

### **Data Sheets**

Products supported by a preliminary Data Sheet may have an errata sheet describing minor operational differences and recommended workarounds. To determine if an errata sheet exists for a particular device, please contact one of the following:

1. Your local Microchip sales office
2. The Microchip Worldwide Site ([www.microchip.com](http://www.microchip.com))

Please specify which device, revision of silicon and Data Sheet (include Literature #) you are using.

### **New Customer Notification System**

Register on our web site ([www.microchip.com/cn](http://www.microchip.com/cn)) to receive the most current information on our products.

---

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

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as “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 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. 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 ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. 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.

#### **Trademarks**

The Microchip name and logo, the Microchip logo, dsPIC, FlashFlex, KEELOQ, KEELOQ logo, MPLAB, PIC, PICmicro, PICSTART, PIC<sup>32</sup> logo, rPIC, SST, SST Logo, SuperFlash and UNI/O are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

FilterLab, Hampshire, HI-TECH C, Linear Active Thermistor, MTP, SEEVAL and The Embedded Control Solutions Company are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Silicon Storage Technology is a registered trademark of Microchip Technology Inc. in other countries.

Analog-for-the-Digital Age, Application Maestro, BodyCom, chipKIT, chipKIT logo, CodeGuard, dsPICDEM, dsPICDEM.net, dsPICworks, dsSPEAK, ECAN, ECONOMONITOR, FanSense, HI-TIDE, In-Circuit Serial Programming, ICSP, Mindi, MiWi, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, mTouch, Omniclient Code Generation, PICC, PICC-18, PICDEM, PICDEM.net, PICkit, PICTail, REAL ICE, rLAB, Select Mode, SQI, Serial Quad I/O, Total Endurance, TSHARC, UniWinDriver, WiperLock, ZENA and Z-Scale 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.

GestIC and ULPP are registered trademarks 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.

© 2002-2012, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

 Printed on recycled paper.

ISBN: 9781620767849

**QUALITY MANAGEMENT SYSTEM**  
**CERTIFIED BY DNV**  
**== ISO/TS 16949 ==**

*Microchip received ISO/TS-16949:2009 certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona; Gresham, Oregon and design centers in California and India. The Company's quality system processes and procedures are for its PIC<sup>®</sup> MCUs and dsPIC<sup>®</sup> DSCs, KEELOQ<sup>®</sup> code hopping devices, Serial EEPROMs, microperipherals, nonvolatile memory and analog products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001:2000 certified.*



# MICROCHIP

## 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](http://www.microchip.com)

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

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

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

**Cleveland**  
Independence, OH  
Tel: 216-447-0464  
Fax: 216-447-0643

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

**Detroit**  
Farmington Hills, MI  
Tel: 248-538-2250  
Fax: 248-538-2260

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

**Los Angeles**  
Mission Viejo, CA  
Tel: 949-462-9523  
Fax: 949-462-9608

**Santa Clara**  
Santa Clara, CA  
Tel: 408-961-6444  
Fax: 408-961-6445

**Toronto**  
Mississauga, Ontario,  
Canada  
Tel: 905-673-0699  
Fax: 905-673-6509

### ASIA/PACIFIC

**Asia Pacific Office**  
Suites 3707-14, 37th Floor  
Tower 6, The Gateway  
Harbour City, Kowloon  
Hong Kong  
Tel: 852-2401-1200  
Fax: 852-2401-3431

**Australia - Sydney**  
Tel: 61-2-9868-6733  
Fax: 61-2-9868-6755

**China - Beijing**  
Tel: 86-10-8569-7000  
Fax: 86-10-8528-2104

**China - Chengdu**  
Tel: 86-28-8665-5511  
Fax: 86-28-8665-7889

**China - Chongqing**  
Tel: 86-23-8980-9588  
Fax: 86-23-8980-9500

**China - Hangzhou**  
Tel: 86-571-2819-3187  
Fax: 86-571-2819-3189

**China - Hong Kong SAR**  
Tel: 852-2943-5100  
Fax: 852-2401-3431

**China - Nanjing**  
Tel: 86-25-8473-2460  
Fax: 86-25-8473-2470

**China - Qingdao**  
Tel: 86-532-8502-7355  
Fax: 86-532-8502-7205

**China - Shanghai**  
Tel: 86-21-5407-5533  
Fax: 86-21-5407-5066

**China - Shenyang**  
Tel: 86-24-2334-2829  
Fax: 86-24-2334-2393

**China - Shenzhen**  
Tel: 86-755-8864-2200  
Fax: 86-755-8203-1760

**China - Wuhan**  
Tel: 86-27-5980-5300  
Fax: 86-27-5980-5118

**China - Xian**  
Tel: 86-29-8833-7252  
Fax: 86-29-8833-7256

**China - Xiamen**  
Tel: 86-592-2388138  
Fax: 86-592-2388130

**China - Zhuhai**  
Tel: 86-756-3210040  
Fax: 86-756-3210049

### ASIA/PACIFIC

**India - Bangalore**  
Tel: 91-80-3090-4444  
Fax: 91-80-3090-4123

**India - New Delhi**  
Tel: 91-11-4160-8631  
Fax: 91-11-4160-8632

**India - Pune**  
Tel: 91-20-2566-1512  
Fax: 91-20-2566-1513

**Japan - Osaka**  
Tel: 81-66-152-7160  
Fax: 81-66-152-9310

**Japan - Yokohama**  
Tel: 81-45-471-6166  
Fax: 81-45-471-6122

**Korea - Daegu**  
Tel: 82-53-744-4301  
Fax: 82-53-744-4302

**Korea - Seoul**  
Tel: 82-2-554-7200  
Fax: 82-2-558-5932 or  
82-2-558-5934

**Malaysia - Kuala Lumpur**  
Tel: 60-3-6201-9857  
Fax: 60-3-6201-9859

**Malaysia - Penang**  
Tel: 60-4-227-8870  
Fax: 60-4-227-4068

**Philippines - Manila**  
Tel: 63-2-634-9065  
Fax: 63-2-634-9069

**Singapore**  
Tel: 65-6334-8870  
Fax: 65-6334-8850

**Taiwan - Hsin Chu**  
Tel: 886-3-5778-366  
Fax: 886-3-5770-955

**Taiwan - Kaohsiung**  
Tel: 886-7-213-7828  
Fax: 886-7-330-9305

**Taiwan - Taipei**  
Tel: 886-2-2508-8600  
Fax: 886-2-2508-0102

**Thailand - Bangkok**  
Tel: 66-2-694-1351  
Fax: 66-2-694-1350

### EUROPE

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

**Denmark - Copenhagen**  
Tel: 45-4450-2828  
Fax: 45-4485-2829

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

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

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

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

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

**UK - Wokingham**  
Tel: 44-118-921-5869  
Fax: 44-118-921-5820

11/27/12





Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.