

## VOLTAGE DETECTOR

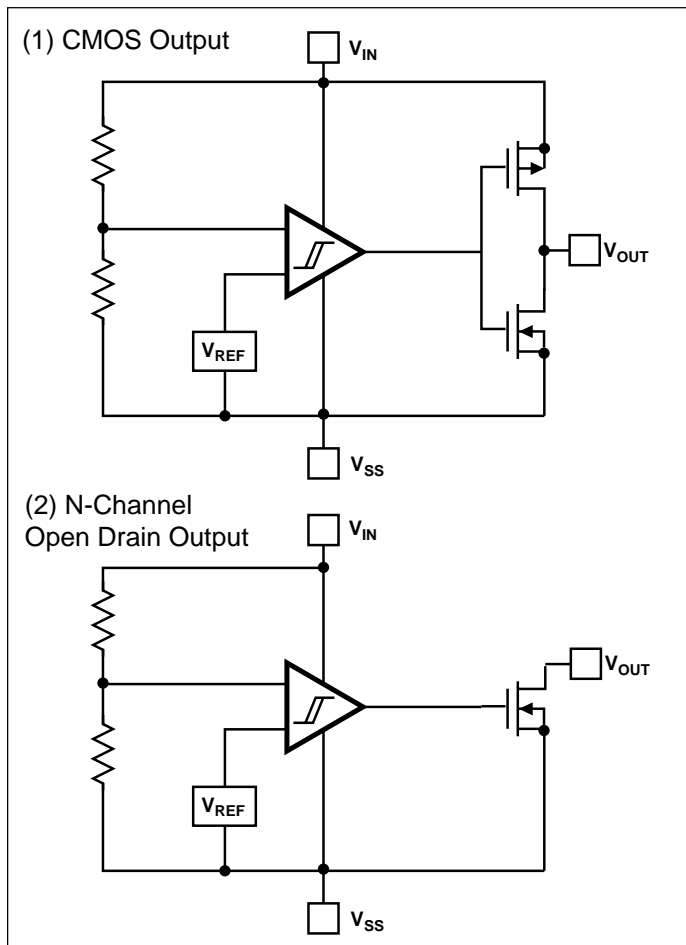
### FEATURES

- **Highly Accurate** .....  $\pm 2\%$
- **Low Power Consumption** .....  $1.0\mu\text{A}$ , Typ.
- **Detect Voltage Range** ... **1.6V to 6.0V in 0.1V Steps**
- **Operating Voltage** ..... **1.5V to 10.0V**
- **Output Configuration** ..... **Open Drain or CMOS**
- **Space-Saving** ..... **5-Pin SOT-23A Package**,

### TYPICAL APPLICATIONS

- **Microprocessor Reset Circuits**
- **Battery Life Monitors and Recharge Voltage Monitors**
- **Memory Battery Backup Circuitry**
- **Power-On Reset Circuits**
- **Power Failure Detection**
- **Delay Circuitry**

### FUNCTIONAL BLOCK DIAGRAM



### GENERAL DESCRIPTION

The TC53 is a low power voltage detector. Typical supply current consumption is only  $1\mu\text{A}$  at an input voltage of 2V. The voltage detection threshold setting is factory-programmed and guaranteed to  $\pm 2\%$  accuracy. Threshold settings are available over a range of 1.6V to 6.0V in 100mV steps. The TC53 has both complementary (CMOS) and open drain (NMOS) output configuration options. TC53 is the ideal voltage detector for precision applications in which small size, low installed cost, high accuracy, and low supply current consumption are critical.

### ORDERING INFORMATION

PART CODE	TC-53	N	18	02	ECX	XX
		C	18	02	ECX	XX
		N	28	02	ECX	XX
		C	28	02	ECX	XX
		N	30	02	ECX	XX
		C	30	02	ECX	XX

**Output Configuration:**

N = NMOS  
C = CMOS

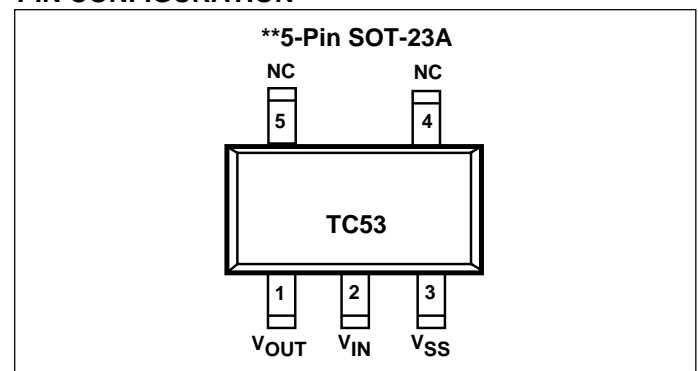
**Detect Voltage:**  
Ex: 28 = 2.8V

**Tolerance:**  
02 =  $\pm 2\%$  Tolerance

**Temperature/Package:**  
-40°C to +85°C = E  
5-Pin SOT-23A Package = CT

**Taping Direction:**  
TR = Standard  
RT = Reverse

### PIN CONFIGURATION



## TC53

### ABSOLUTE MAXIMUM RATINGS\*

Input Voltage ( $V_{IN}$ )	..... 12V
Output Voltage ( $V_{OUT}$ )	..... $V_{IN} + 0.3V$ to $V_{SS} - 0.3V$
Output Current ( $I_{OUT}$ )	..... 50mA
Power Dissipation ( $P_d$ )	
SOT-23A	..... 240mW
Operating Ambient Temperature ( $T_{OPR}$ )	.. $-40^{\circ}C$ to $+85^{\circ}C$
Storage Temperature ( $T_{STG}$ )	..... $-40^{\circ}C$ to $+125^{\circ}C$

\*Static-sensitive device. Unused devices must be stored in conductive material. Protect devices from static discharge and static fields. 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 operational sections of the specifications is not implied. Exposure to Absolute Maximum Rating Conditions for extended periods may affect device reliability.

### ELECTRICAL CHARACTERISTICS: $T_A = +25^{\circ}C$ , unless otherwise specified. (Note1), (Note 2).

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit	
$V_{DF}$	Detect Voltage	Note 3	$V_T \times 0.98$	$V_T \pm 0.5\%$	$V_T \times 1.02$	V	
$V_{HYS}$	Hysteresis Range		$V_{DF} \times 0.02$	$V_{DF} \times 0.05$	$V_{DF} \times 0.08$	V	
$I_{SS}$	Supply Current	$V_{IN} = 1.5V$	—	0.9	2.6	$\mu A$	
		$V_{IN} = 2.0V$	—	1.0	3.0	$\mu A$	
		$V_{IN} = 3.0V$	—	1.3	3.4	$\mu A$	
		$V_{IN} = 4.0V$	—	1.6	3.8	$\mu A$	
		$V_{IN} = 5.0V$	—	2.0	4.2	$\mu A$	
$V_{IN}$	Operating Voltage	$V_{DF} = 2.1$ to $6.0V$	1.5	—	10.0	V	
$I_{OUT}$	Output Current	N-ch; $V_{DS} = 0.5V$	$V_{IN} = 1.0V$	—	2.2	—	mA
			$V_{IN} = 2.0V$	—	7.7	—	mA
			$V_{IN} = 3.0V$	—	10.1	—	mA
			$V_{IN} = 4.0V$	—	11.5	—	mA
			$V_{IN} = 5.0V$	—	13.0	—	mA
		P-ch; $V_{DS} = 2.1V$ (CMOS Output)	$V_{IN} = 8.0V$	—	-10.0	—	mA
$\Delta V_{DF}/(\Delta T_{OPR} V_{DF})$	Temperature Characteristics		—	$\pm 100$	—	ppm/ $^{\circ}C$	
$t_{DLY}$	Delay Time ( $V_{DR} \rightarrow V_{OUT}$ Inversion)			—	0.2	msec	

- NOTES:**
1. An additional resistor between the  $V_{IN}$  pin and the supply voltage may cause alterations in the characteristics due to the increasing values of  $V_{DR}$ .
  2. The power consumption during power-start to output being stable (release operation) is  $2\mu A$  greater than it is after that period (completion of release operation) because of rush current in the delay circuit.
  3.  $V_T$  is the factory-programmed voltage detection threshold.

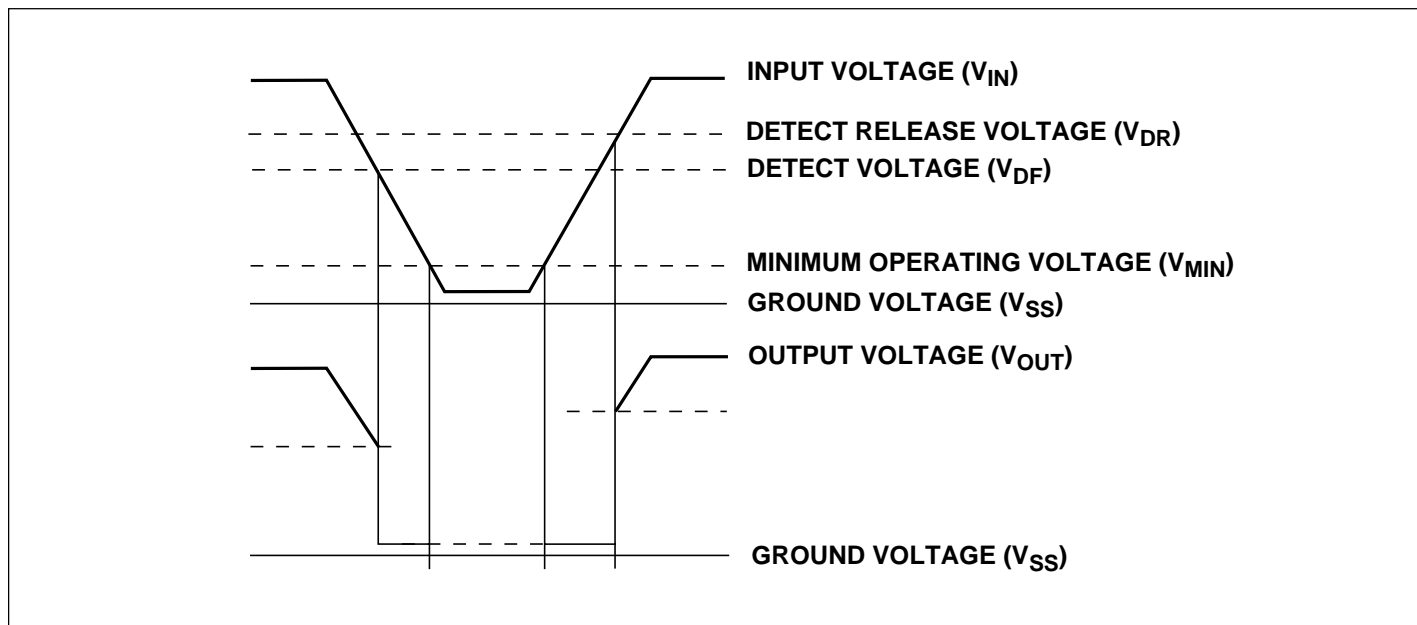
### PIN DESCRIPTION

Pin Number	Name	Description
1	$V_{OUT}$	Output
2	$V_{IN}$	Supply Voltage Input
3	$V_{SS}$	Ground Terminal
4	NC	Not Connected
5	NC	Not Connected

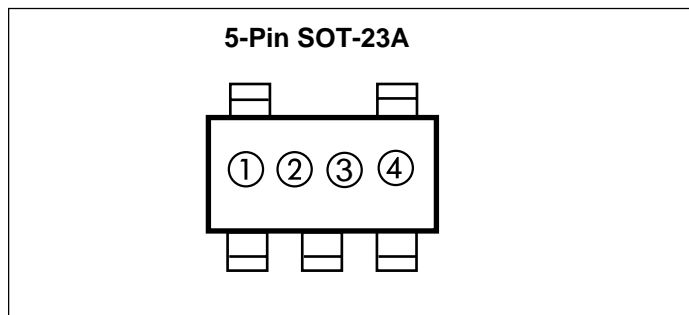
# VOLTAGE DETECTOR

TC53

## TIMING DIAGRAM



## MARKINGS



① represents output configuration and 1st integer of voltage

Symbol	Output	Voltage
A	CMOS	0.
B	CMOS	1.
C	CMOS	2.
D	CMOS	3.
E	CMOS	4.
F	CMOS	5.
H	CMOS	6.

Symbol	Output	Voltage
K	Nch	0.
L	Nch	1.
M	Nch	2.
N	Nch	3.
P	Nch	4.
R	Nch	5.
S	Nch	6.

② represents 1st decimal of voltage

Symbol	Voltage	Symbol	Voltage
0	.0	5	.5
1	.1	6	.6
2	.2	7	.7
3	.3	8	.8
4	.4	9	.9

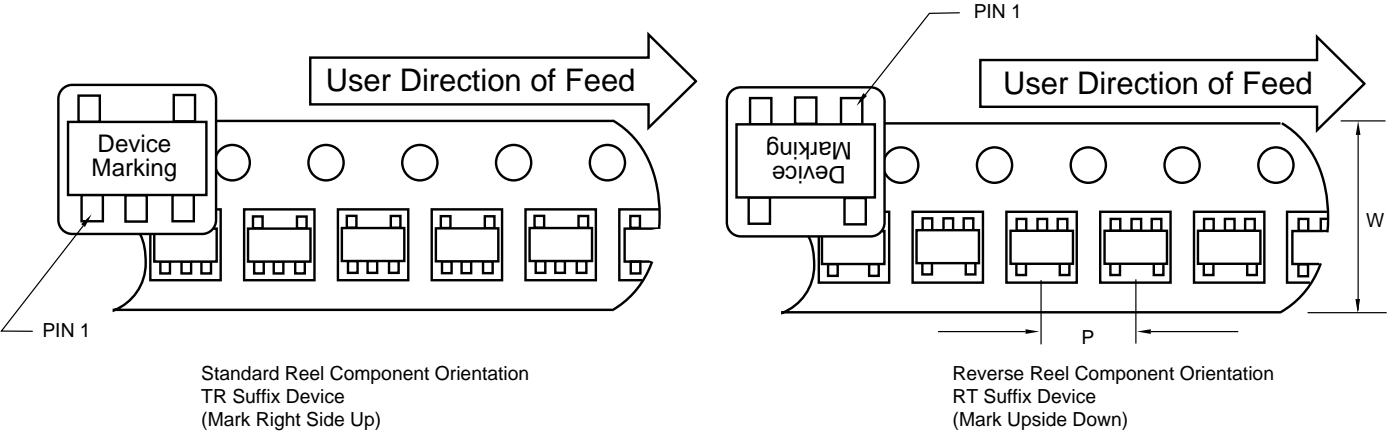
③ represents delay function and delay time  
3 = no delay function

④ represents assembly lot code

## TC53

### TAPE AND REEL

Component Taping Orientation for 5-Pin SOT-23A (EIAJ SC-74A) Devices

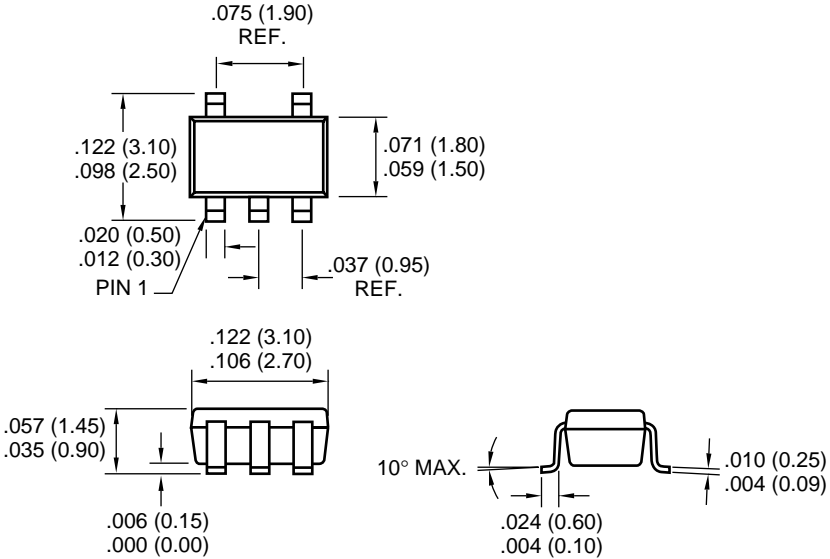


Carrier Tape, Number of Components Per Reel and Reel Size

Package	Carrier Width (W)	Pitch (P)	Part Per Full Reel	Reel Size
5-Pin SOT-23A	8 mm	4 mm	3000	7 in

### PACKAGE DIMENSIONS

5-Pin SOT-23A (EIAJ SC-74A)



Dimensions: inches (mm)



## 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: 480-792-7627  
Web Address: <http://www.microchip.com>

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Two Prestige Place, Suite 130  
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32255 Northwestern Highway, Suite 190  
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Tel: 248-538-2250 Fax: 248-538-2260

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#### New York

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Tel: 631-273-5305 Fax: 631-273-5335

#### San Jose

Microchip Technology Inc.  
2107 North First Street, Suite 590  
San Jose, CA 95131  
Tel: 408-436-7950 Fax: 408-436-7955

#### Toronto

6285 Northam Drive, Suite 108  
Mississauga, Ontario L4V 1X5, Canada  
Tel: 905-673-0699 Fax: 905-673-6509

### ASIA/PACIFIC

#### China - Beijing

Microchip Technology Beijing Office  
Unit 915  
New China Hong Kong Manhattan Bldg.  
No. 6 Chaoyangmen Beidajie  
Beijing, 100027, No. China  
Tel: 86-10-85282100 Fax: 86-10-85282104

#### China - Shanghai

Microchip Technology Shanghai Office  
Room 701, Bldg. B  
Far East International Plaza  
No. 317 Xian Xia Road  
Shanghai, 200051  
Tel: 86-21-6275-5700 Fax: 86-21-6275-5060

#### Hong Kong

Microchip Asia Pacific  
RM 2101, Tower 2, Metroplaza  
223 Hing Fong Road  
Kwai Fong, N.T., Hong Kong  
Tel: 852-2401-1200 Fax: 852-2401-3431

#### India

Microchip Technology Inc.  
India Liaison Office  
Divyasree Chambers  
1 Floor, Wing A (A3/A4)  
No. 11, O'Shaughnessy Road  
Bangalore, 560 025, India  
Tel: 91-80-2290061 Fax: 91-80-2290062

#### Japan

Microchip Technology Intl. Inc.  
Benex S-1 6F  
3-18-20, Shinyokohama  
Kohoku-Ku, Yokohama-shi  
Kanagawa, 222-0033, Japan  
Tel: 81-45-471-6166 Fax: 81-45-471-6122

#### Korea

Microchip Technology Korea  
168-1, Youngbo Bldg. 3 Floor  
Samsung-Dong, Kangnam-Ku  
Seoul, Korea  
Tel: 82-2-554-7200 Fax: 82-2-558-5934

### ASIA/PACIFIC (continued)

#### Singapore

Microchip Technology Singapore Pte Ltd.  
200 Middle Road  
#07-02 Prime Centre  
Singapore, 188980  
Tel: 65-334-8870 Fax: 65-334-8850

#### Taiwan

Microchip Technology Taiwan  
11F-3, No. 207  
Tung Hua North Road  
Taipei, 105, Taiwan  
Tel: 886-2-2717-7175 Fax: 886-2-2545-0139

### EUROPE

#### Australia

Microchip Technology Australia Pty Ltd  
Suite 22, 41 Rawson Street  
Epping 2121, NSW  
Australia  
Tel: 61-2-9868-6733 Fax: 61-2-9868-6755

#### Denmark

Microchip Technology Denmark ApS  
Regus Business Centre  
Lautrup høj 1-3  
Ballerup DK-2750 Denmark  
Tel: 45 4420 9895 Fax: 45 4420 9910

#### France

Arizona Microchip Technology SARL  
Parc d'Activite du Moulin de Massy  
43 Rue du Saule Trapu  
Batiment A - 1er Etage  
91300 Massy, France  
Tel: 33-1-69-53-63-20 Fax: 33-1-69-30-90-79

#### Germany

Arizona Microchip Technology GmbH  
Gustav-Heinemann Ring 125  
D-81739 Munich, Germany  
Tel: 49-89-627-144 0 Fax: 49-89-627-144-44

#### Germany

Analog Product Sales  
Lochhamer Strasse 13  
D-82152 Martinsried, Germany  
Tel: 49-89-895650-0 Fax: 49-89-895650-22

#### Italy

Arizona Microchip Technology SRL  
Centro Direzionale Colleoni  
Palazzo Taurus 1 V. Le Colleoni 1  
20041 Agrate Brianza  
Milan, Italy  
Tel: 39-039-65791-1 Fax: 39-039-6899883

#### United Kingdom

Arizona Microchip Technology Ltd.  
505 Eskdale Road  
Winnersh Triangle  
Wokingham  
Berkshire, England RG41 5TU  
Tel: 44 118 921 5869 Fax: 44-118 921-5820

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