

VOLTAGE DETECTOR

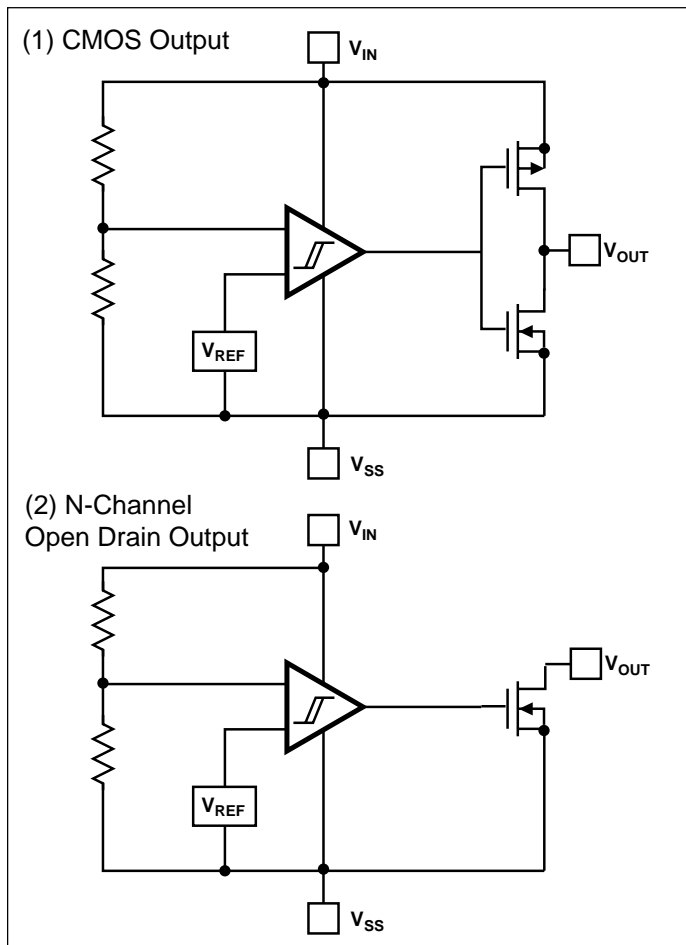
FEATURES

- **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

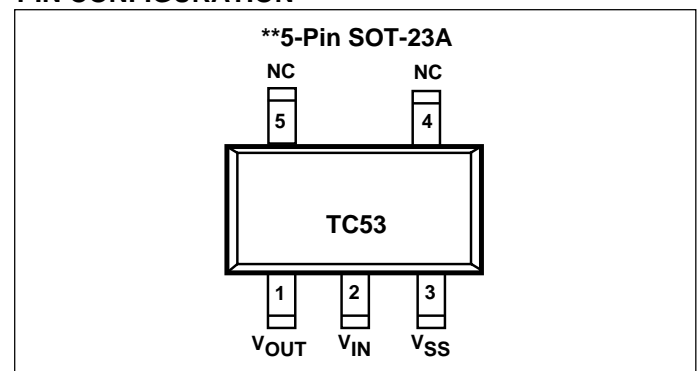
Detect Voltage:
Ex: 28 = 2.8V

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	μA	
		$V_{IN} = 2.0V$	—	1.0	3.0	μA	
		$V_{IN} = 3.0V$	—	1.3	3.4	μA	
		$V_{IN} = 4.0V$	—	1.6	3.8	μA	
		$V_{IN} = 5.0V$	—	2.0	4.2	μA	
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		—	± 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.

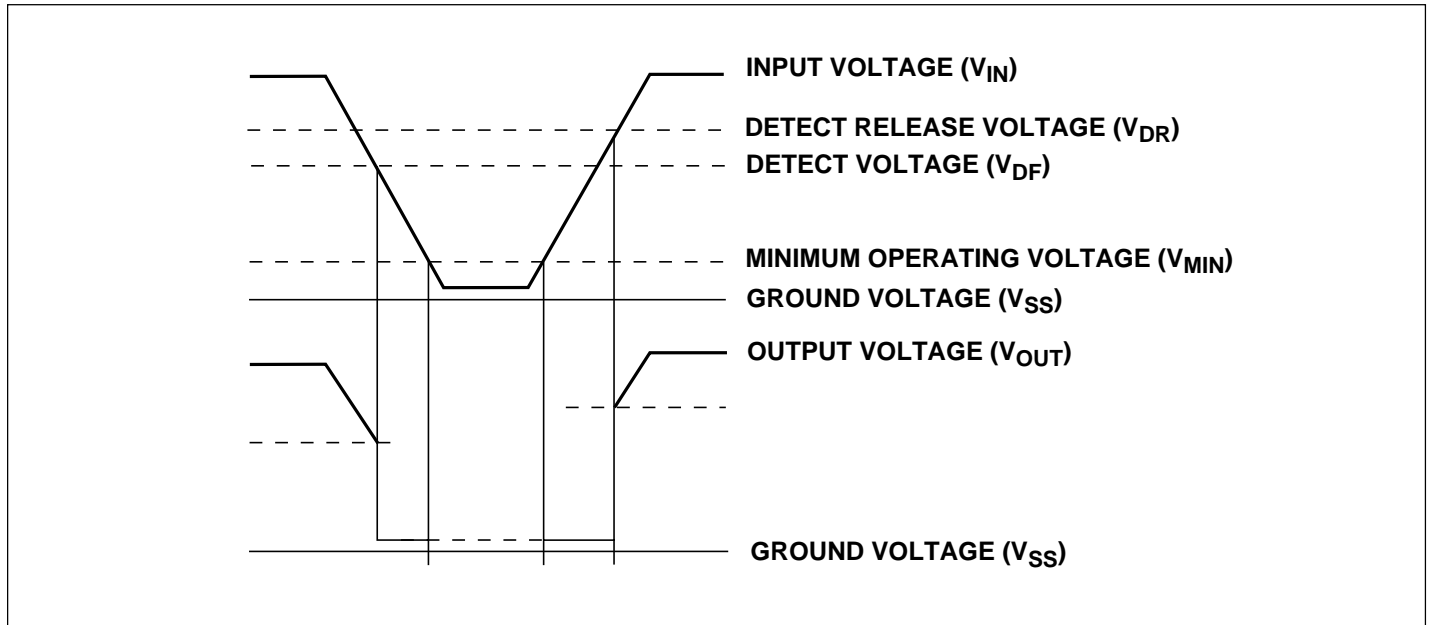
PIN DESCRIPTION

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

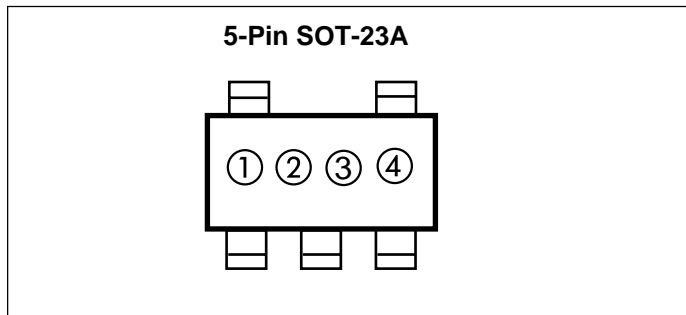
VOLTAGE DETECTOR

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

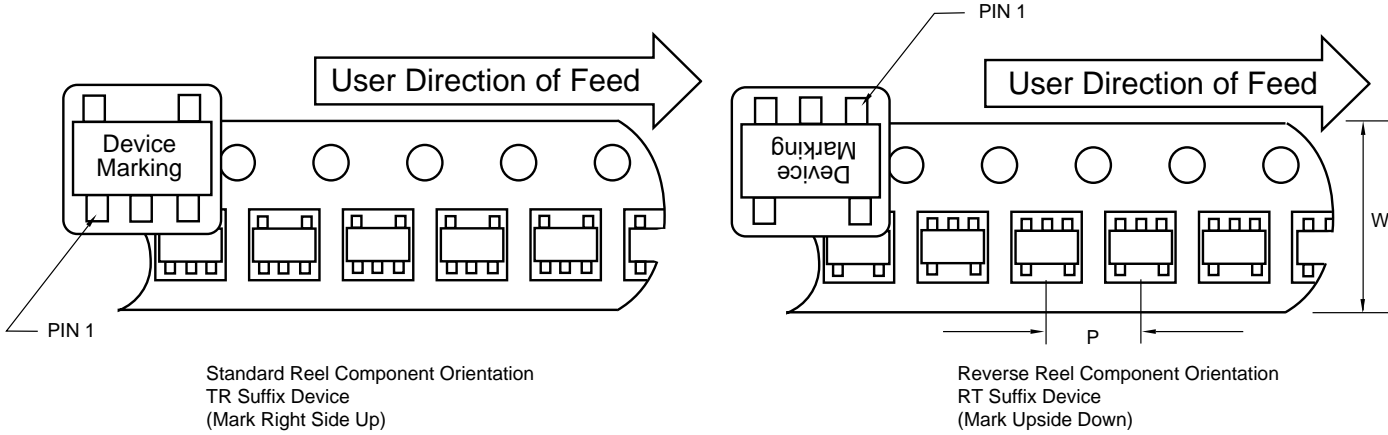
③ represents delay function and delay time
3 = no delay function

④ represents assembly lot code

TC53

TAPE AND REEL

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

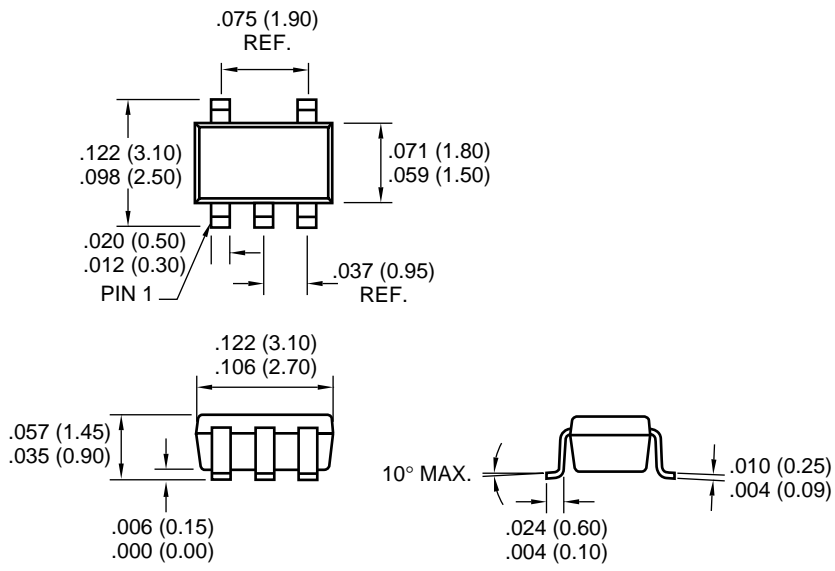


Carrier Tape, Number of Components Per Reel and Reel Size

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)



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