

# DATA SHEET

## **74F280B**

9-bit odd/even parity generator/checker

Product specification

1996 Mar 12

IC15 Data Handbook

# 9-bit odd/even parity generator/checker

# 74F280B

## FEATURES

- High-impedance NPN base inputs for reduced loading (20µA in Low and High states)
- Buffered inputs — one normalized load
- Word length easily expanded by cascading
- Industrial temperature range available (−40°C to +85°C)

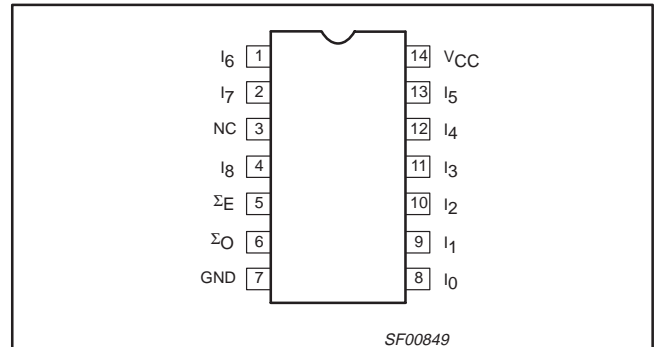
## DESCRIPTION

The 74F280B is a 9-bit Parity Generator or Checker commonly used to detect errors in high speed data transmission or data retrieval systems. Both Even ( $\Sigma_E$ ) and Odd ( $\Sigma_O$ ) parity outputs are available for generating or checking even or odd parity on up to 9 bits.

The Even ( $\Sigma_E$ ) parity output is High when an even number of Data inputs ( $I_0 - I_8$ ) are High. The Odd ( $\Sigma_O$ ) parity output is High when an odd number of Data inputs are High.

Expansion to larger word sizes is accomplished by tying the Even ( $\Sigma_E$ ) outputs of up to nine parallel devices to the data inputs of the final stage. This expansion scheme allows an 81-bit data word to be checked in less than 20ns.

## PIN CONFIGURATION



TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F280B	5.5ns	26mA

## ORDERING INFORMATION

DESCRIPTION	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$ , $T_{amb} = 0^\circ C \text{ to } +70^\circ C$	INDUSTRIAL RANGE $V_{CC} = 5V \pm 10\%$ , $T_{amb} = -40^\circ C \text{ to } +85^\circ C$	PKG. DWG. #
14-pin plastic DIP	N74F280BN	I74F280BN	SOT27-1
14-pin plastic SO	N74F280BD	I74F280BD	SOT108-1

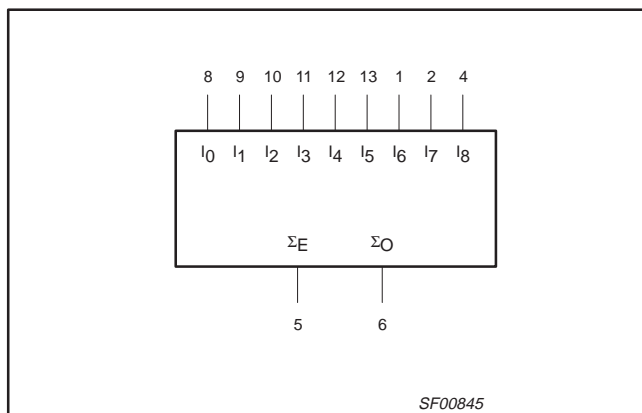
## INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
$I_0 - I_8$	Data inputs	1.0/0.033	20µA/20µA
$\Sigma_E, \Sigma_O$	Parity outputs	50/33	1.0mA/20mA

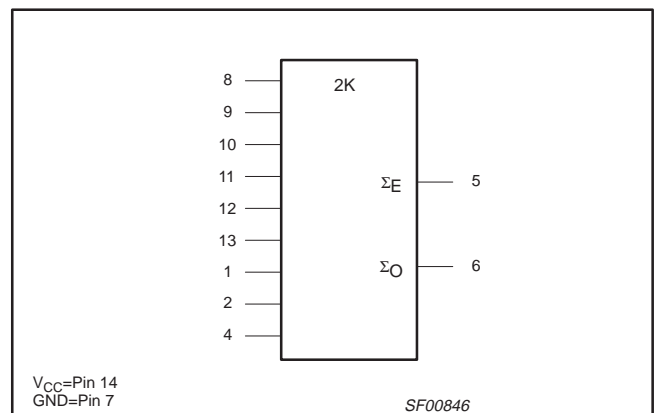
### NOTE:

One (1.0) FAST Unit Load is defined as: 20µA in the High state and 0.6mA in the Low state.

## LOGIC SYMBOL



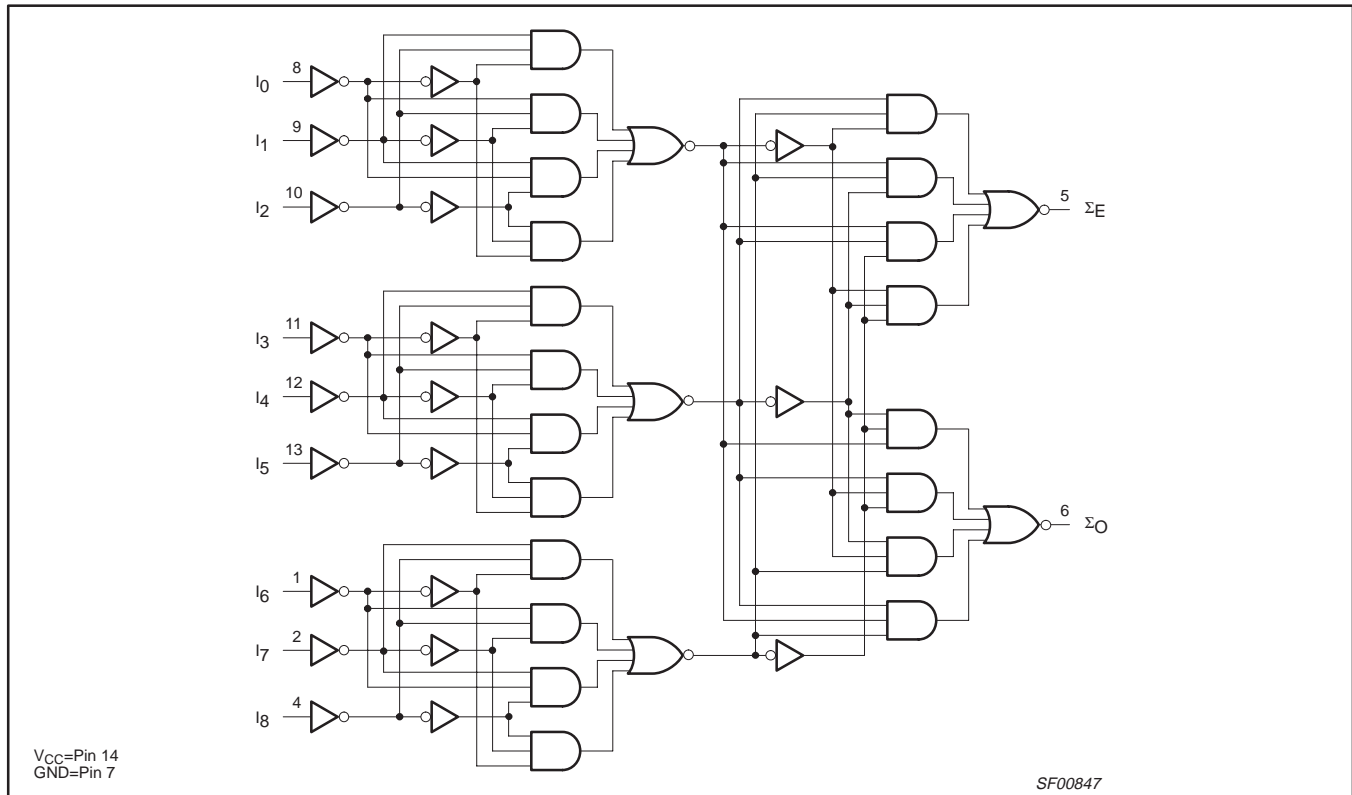
## IEC/IEEE SYMBOL



# 9-bit odd/even parity generator/checker

## 74F280B

### LOGIC DIAGRAM



### FUNCTION TABLE

INPUTS	OUTPUTS	
	$\Sigma_E$	$\Sigma_O$
Number of High Data Inputs ( $I_0 - I_8$ )		
Even — 0, 2, 4, 6, 8	H	L
Odd — 1, 3, 5, 7, 9	L	H

H = High voltage level  
L = Low voltage level

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## ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER		RATING	UNIT
$V_{CC}$	Supply voltage		-0.5 to +7.0	V
$V_{IN}$	Input voltage		-0.5 to +7.0	V
$I_{IN}$	Input current		-30 to +5	mA
$V_{OUT}$	Voltage applied to output in High output state		-0.5 to $V_{CC}$	V
$I_{OUT}$	Current applied to output in Low output state		40	mA
$T_{amb}$	Operating free-air temperature range	Commercial range	0 to +70	°C
		Industrial range	-40 to +85	°C
$T_{stg}$	Storage temperature		-65 to +150	°C

## RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS			UNIT
		Min	Nom	Max	
$V_{CC}$	Supply voltage	4.5	5.0	5.5	V
$V_{IH}$	High-level input voltage	2.0			V
$V_{IL}$	Low-level input voltage			0.8	V
$I_{IK}$	Input clamp current			-18	mA
$I_{OH}$	High-level output current			-1	mA
$I_{OL}$	Low-level output current			20	mA
$T_{amb}$	Operating free-air temperature range	Commercial range	0	70	°C
		Industrial range	-40	85	°C

## DC ELECTRICAL CHARACTERISTICS

(Over recommended operating free-air temperature range unless otherwise noted.)

SYMBOL	PARAMETER	TEST CONDITIONS <sup>1</sup>	LIMITS			UNIT
			MIN	TYP <sup>2</sup>	MAX	
$V_{OH}$	High-level output voltage	$V_{CC} = \text{MIN}, V_{IL} = \text{MAX}$	$\pm 10\%V_{CC}$	2.5		V
		$V_{IH} = \text{MIN}, I_{OH} = \text{MAX}$	$\pm 5\%V_{CC}$	2.7	3.4	
$V_{OL}$	Low-level output voltage	$V_{CC} = \text{MIN}, V_{IL} = \text{MAX}$	$\pm 10\%V_{CC}$		0.35	V
		$V_{IH} = \text{MIN}, I_{OL} = \text{MAX}$	$\pm 5\%V_{CC}$		0.35	
$V_{IK}$	Input clamp voltage	$V_{CC} = \text{MIN}, I_I = I_{IK}$		-0.73	-1.2	V
$I_I$	Input current at maximum input voltage	$V_{CC} = 0.0V, V_I = 7.0V$			100	$\mu\text{A}$
$I_{IH}$	High-level input current	Commercial range	$V_{CC} = \text{MAX}, V_I = 2.7V$		20	$\mu\text{A}$
		Industrial range			40	$\mu\text{A}$
$I_{IL}$	Low-level input current	$V_{CC} = \text{MAX}, V_I = 0.5V$			-20	$\mu\text{A}$
$I_{OS}$	Short-circuit output current <sup>3</sup>	$V_{CC} = \text{MAX}$		-60	-150	mA
$I_{CC}$	Supply current (total)	$V_{CC} = \text{MAX}$		26	35	mA

## NOTES:

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
- All typical values are at  $V_{CC} = 5V, T_{amb} = 25^\circ\text{C}$ .
- Not more than one output should be shorted at a time. For testing  $I_{OS}$ , the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a High output may raise the chip temperature well above normal and thereby cause invalid readings in other parameter tests. In any sequence of parameter tests,  $I_{OS}$  tests should be performed last.

# 9-bit odd/even parity generator/checker

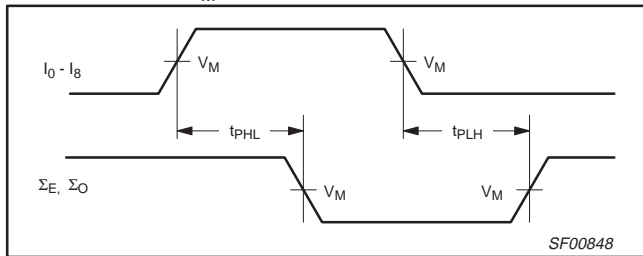
# 74F280B

## AC ELECTRICAL CHARACTERISTICS

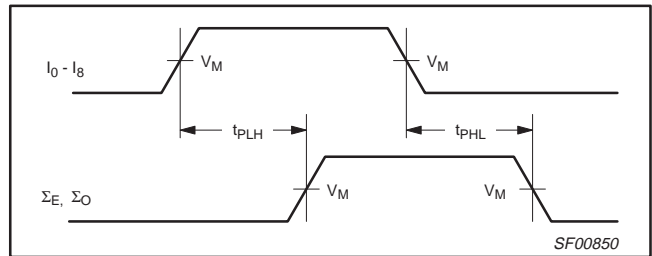
SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS								UNIT	
			$T_{amb} = +25^{\circ}\text{C}$ $V_{CC} = +5.0\text{V}$ $C_L = 50\text{pF}$ $R_L = 500\Omega$			$T_{amb} = 0^{\circ}\text{C to } +70^{\circ}\text{C}$ $V_{CC} = +5.0\text{V} \pm 10\%$ $C_L = 50\text{pF}$ $R_L = 500\Omega$		$T_{amb} = -40^{\circ}\text{C to } +85^{\circ}\text{C}$ $V_{CC} = +5.0\text{V} \pm 10\%$ $C_L = 50\text{pF}$ $R_L = 500\Omega$				
			Min	Typ	Max	Min	Max	Min	Max			
$t_{PLH}$ $t_{PHL}$	Propagation delay $I_0 - I_8$ to $\Sigma_E$	74F280B	Waveform 1, 2		4.0	6.5	9.0	3.5	10.0	3.0	11.0	ns
$t_{PLH}$ $t_{PHL}$	Propagation delay $I_0 - I_8$ to $\Sigma_O$		Waveform 1, 2		4.0	6.5	9.0	3.5	11.0	3.5	12.0	ns

## AC WAVEFORMS

For all waveforms,  $V_M = 1.5\text{V}$ .



Waveform 1. Propagation Delay for Inverting Outputs



Waveform 2. Propagation Delay for Non-Inverting Outputs

## TEST CIRCUIT AND WAVEFORM

**Test Circuit for Totem-Pole Outputs**

**Input Pulse Definition**

**DEFINITIONS:**

- $R_L$  = Load resistor; see AC ELECTRICAL CHARACTERISTICS for value.
- $C_L$  = Load capacitance includes jig and probe capacitance; see AC ELECTRICAL CHARACTERISTICS for value.
- $R_T$  = Termination resistance should be equal to  $Z_{OUT}$  of pulse generators.

family	INPUT PULSE REQUIREMENTS					
	amplitude	$V_M$	rep. rate	$t_w$	$t_{TLH}$	$t_{THL}$
74F	3.0V	1.5V	1MHz	500ns	2.5ns	2.5ns

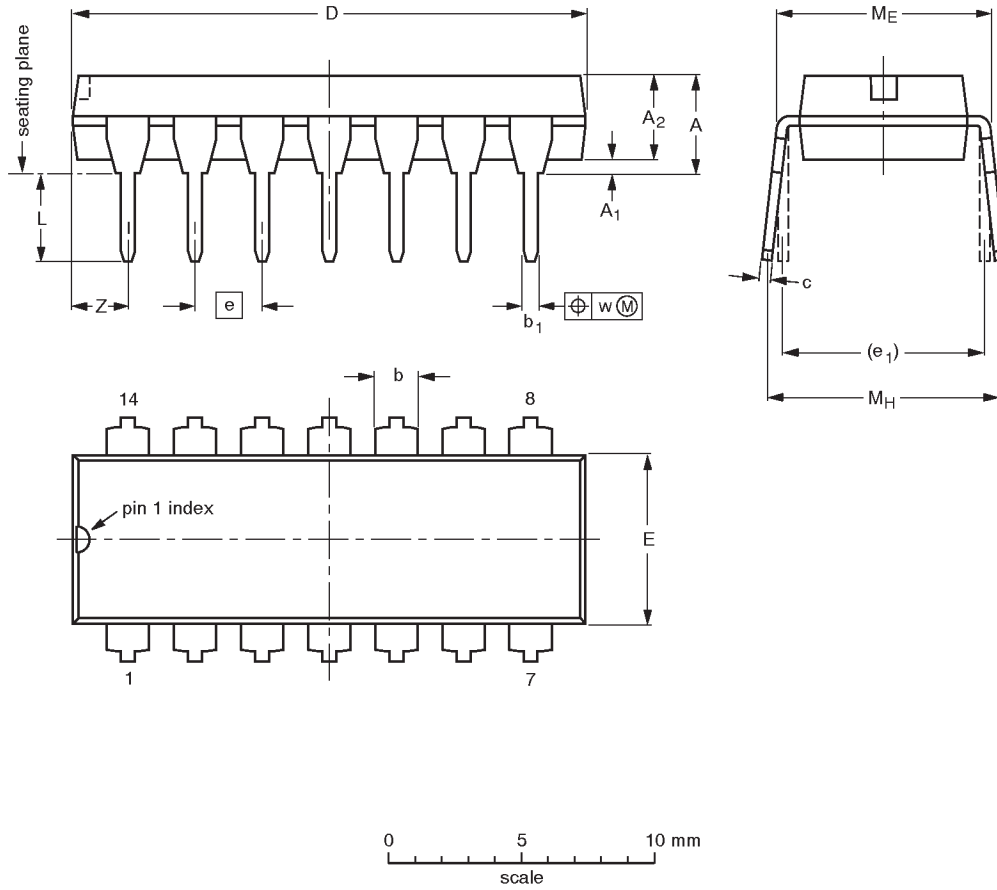
SF00006

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DIP14: plastic dual in-line package; 14 leads (300 mil)

SOT27-1



**DIMENSIONS (inch dimensions are derived from the original mm dimensions)**

UNIT	A max.	A <sub>1</sub> min.	A <sub>2</sub> max.	b	b <sub>1</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	e <sub>1</sub>	L	M <sub>E</sub>	M <sub>H</sub>	w	Z <sup>(1)</sup> max.
mm	4.2	0.51	3.2	1.73 1.13	0.53 0.38	0.36 0.23	19.50 18.55	6.48 6.20	2.54	7.62	3.60 3.05	8.25 7.80	10.0 8.3	0.254	2.2
inches	0.17	0.020	0.13	0.068 0.044	0.021 0.015	0.014 0.009	0.77 0.73	0.26 0.24	0.10	0.30	0.14 0.12	0.32 0.31	0.39 0.33	0.01	0.087

**Note**

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

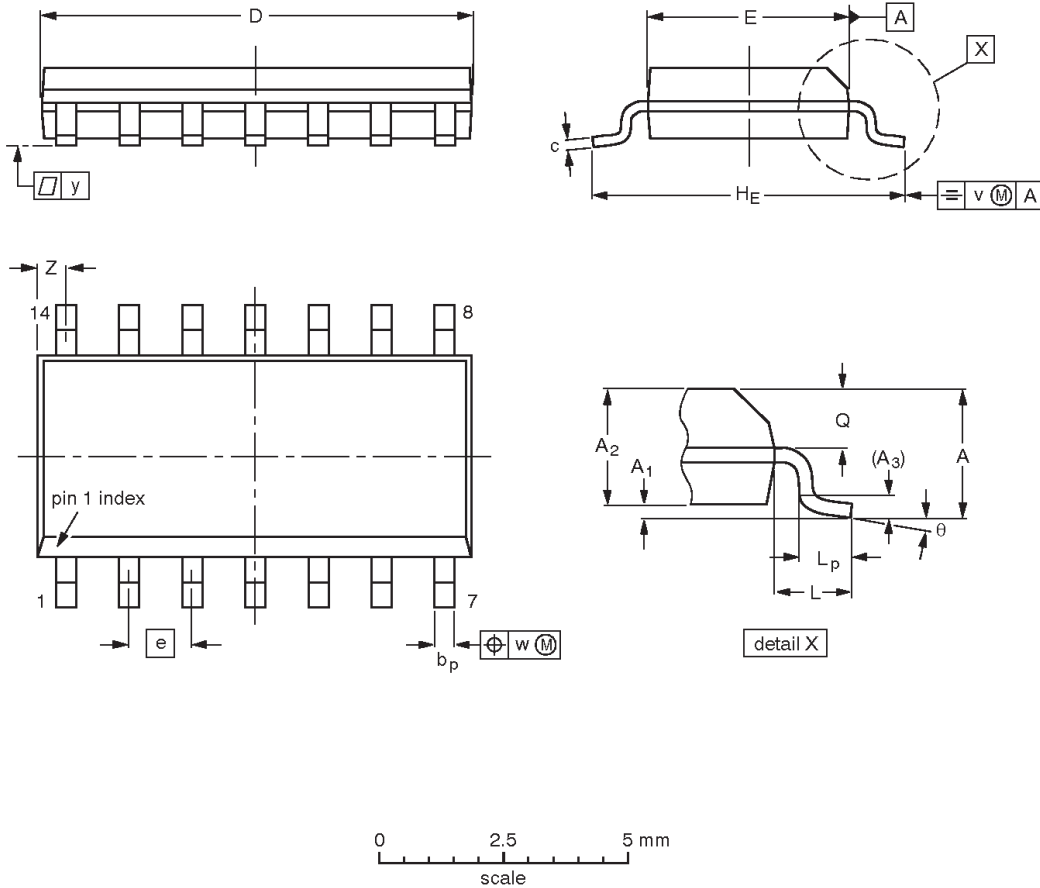
OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT27-1	050G04	MO-001AA			92-11-17 95-03-11

9-bit parity odd/even parity generator/checker

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SO14: plastic small outline package; 14 leads; body width 3.9 mm

SOT108-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	Q	v	w	y	z <sup>(1)</sup>	θ
mm	1.75	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	8.75 8.55	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8° 0°
inches	0.069	0.010 0.004	0.057 0.049	0.01	0.019 0.014	0.0100 0.0075	0.35 0.34	0.16 0.15	0.050	0.244 0.228	0.041	0.039 0.016	0.028 0.024	0.01	0.01	0.004	0.028 0.012	

Note

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT108-1	076E06S	MS-012AB				95-01-23 97-05-22

## 9-bit parity odd/even parity generator/checker

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## Data sheet status

Data sheet status	Product status	Definition [1]
Objective specification	Development	This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.
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[1] Please consult the most recently issued datasheet before initiating or completing a design.

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