



Maxim > Products > [Supervisors, Voltage Monitors, Sequencers]

## DS1233D

5V EconoReset

### Description

The DS1233D EconoReset uses a precision temperature-compensated reference and comparator circuit to monitor the status of the power supply ( $V_{CC}$ ). When an out-of-tolerance condition is detected, an internal power-fail signal is generated, which forces reset to the active state. When  $V_{CC}$  returns to an in-tolerance condition, the reset signal is kept in the active state for approximately 350ms to allow the power supply and processor to stabilize.

### Key Features

- Automatically restarts microprocessor after power failure
- Maintains reset for 350ms after  $V_{CC}$  returns to an in-tolerance condition
- Accurate 5%, 10%, or 15% microprocessor 5V power supply monitoring
- Reduces need for discrete components
- Precision temperature-compensated voltage reference and voltage sensor
- Low-cost TO-92 package or surface mount SOT-223 package
- Internal 5k pullup resistor
- Compatible with Motorola 68XXX series and HC16 Microprocessors
- Operating temperature of  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$

### Key Specifications: Supervisors (1 Monitored Voltage)

Part Number	Reset Threshold Range (V)	Active-Low Reset Output	Min. Reset Timeout Range	Watchdog Feature	Reset Thresh. Acc. (% @ $+25^{\circ}\text{C}$ )	Max. $I_{CC}$ ( $\mu\text{A}$ )	
DS1233D	3.3 to 5.5	Open Drain with Internal Pull-Up	85ms to 300ms	No Watchdog	2.5	50	

[See All Supervisors \(1 Monitored Voltage\) \(268\)](#)

**Notes:**

\*\*This pricing is BUDGETARY, for comparing similar parts. Prices are in U.S. dollars and subject to change. Quantity pricing may vary substantially and international prices may differ due to local duties, taxes, fees, and exchange rates. For volume-specific prices and delivery, please see the [price and availability page](#) or contact an authorized distributor.

**Application Notes**

Application Note 3316: Dallas Semiconductor Microprocessor Supervisor Selection Guide - DS1233D

**Evaluation Kits**

none

**Design Guides**

Microprocessor Supervisory (PDF)

**Reliability Reports**

Request Reliability Report for:

**Software/Models**

none

**Ordering Information**

Notes:

1. Other options and links for purchasing parts are listed at:
2. [Didn't Find What You Need?](#) Ask our applications engineers. Expert assistance in finding parts, usually within one business day.
3. Part number suffixes: T or T&R = tape and reel; + = RoHS/lead-free; # = RoHS/lead-exempt. More: See [Full Data Sheet](#) or [Part Naming Conventions](#).
4. \* Some packages have variations, listed on the drawing. "PkgCode/Variation" tells which variation the product uses. Note that "+", "#", "-" in the part number suffix describes RoHS status. Package drawings may show a different suffix character.

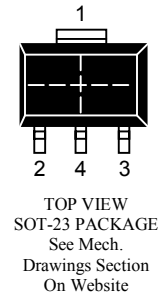
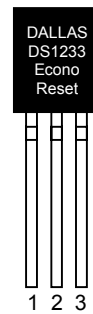
DS1233D	Notes	Free Sample	Buy	Package: TYPE PINS FOOTPRINT DRAWING CODE/VAR *	Temp	RoHS/Lead-Free? Materials Analysis
DS1233DZ-5+	5V/5%, SOT-223, No Pushbutton LF			ST223; 3 pin; Dwg: <a href="#">21-0264</a> (PDF) Use pkgcode/variation: K3+1 *	-40°C to +85°C	RoHS/Lead-Free: <a href="#">Lead Free</a> <a href="#">Materials Analysis</a>
DS1233DZ-10/T&R	5V-10% 2500/Reel			ST223; 3 pin; Dwg: <a href="#">21-0264</a> (PDF) Use pkgcode/variation: K3-1 *	-40°C to +85°C	RoHS/Lead-Free: <a href="#">No</a> <a href="#">Materials Analysis</a>
DS1233DZ-15/T&R	5V-15% 2500/Reel			ST223; 3 pin; Dwg: <a href="#">21-0264</a> (PDF) Use pkgcode/variation: K3-1 *	-40°C to +85°C	RoHS/Lead-Free: <a href="#">No</a> <a href="#">Materials Analysis</a>
DS1233DZ-5	5V-5% Monitor			ST223; 3 pin; Dwg: <a href="#">21-0264</a> (PDF) Use pkgcode/variation: K3-1 *	-40°C to +85°C	RoHS/Lead-Free: <a href="#">No</a> <a href="#">Materials Analysis</a>
DS1233DZ-10	5V-10% Monitor			ST223; 3 pin; Dwg: <a href="#">21-0264</a> (PDF) Use pkgcode/variation: K3-1 *	-40°C to +85°C	RoHS/Lead-Free: <a href="#">No</a> <a href="#">Materials Analysis</a>
DS1233DZ-15	5V-15% Monitor			ST223; 3 pin; Dwg: <a href="#">21-0264</a> (PDF) Use pkgcode/variation: K3-1 *	-40°C to +85°C	RoHS/Lead-Free: <a href="#">No</a> <a href="#">Materials Analysis</a>
DS1233DZ-10+T&R	5V-10% 2500/Reel			ST223; 3 pin; Dwg: <a href="#">21-0264</a> (PDF) Use pkgcode/variation: K3+1 *	-40°C to +85°C	RoHS/Lead-Free: <a href="#">Lead Free</a> <a href="#">Materials Analysis</a>
DS1233DZ-15+T&R	5V-15% 2500/Reel			ST223; 3 pin; Dwg: <a href="#">21-0264</a> (PDF) Use pkgcode/variation: K3+1 *	-40°C to +85°C	RoHS/Lead-Free: <a href="#">Lead Free</a> <a href="#">Materials Analysis</a>
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DS1233DZ-5/T&R	5V-5% 2500/Reel			ST223; 3 pin; Dwg: <a href="#">21-0264</a> (PDF) Use pkgcode/variation: K3-1 *	-40°C to +85°C	RoHS/Lead-Free: <a href="#">No</a> <a href="#">Materials Analysis</a>
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DS1233DZ-15+	5V/15%, SOT-223, No Pushbutton			ST223; 3 pin; Dwg: <a href="#">21-0264</a> (PDF) Use pkgcode/variation: K3+1 *	-40°C to +85°C	RoHS/Lead-Free: <a href="#">Lead Free</a> <a href="#">Materials Analysis</a>

DS1233D-15/T&R	5V-15%, 2000/Reel			TO92; 3 pin; Dwg: <a href="#">21-0250</a> (PDF) Use pkgcode/variation: Q3-4*	-40°C to +85° C	RoHS/Lead-Free: <a href="#">No Materials Analysis</a>
DS1233D-10+	5V/10%, TO-92, No Pushbutton LF			TO92; 3 pin; Dwg: <a href="#">21-0248</a> (PDF) Use pkgcode/variation: Q3+1*	-40°C to +85° C	RoHS/Lead-Free: <a href="#">Lead Free Materials Analysis</a>
DS1233D-5+T&R	5V-5% 2000/Reel			TO92; 3 pin; Dwg: <a href="#">21-0250</a> (PDF) Use pkgcode/variation: Q3+4*	-40°C to +85° C	RoHS/Lead-Free: <a href="#">Lead Free Materials Analysis</a>
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DS1233D-10	5V-10% Monitor			TO92; 3 pin; Dwg: <a href="#">21-0248</a> (PDF) Use pkgcode/variation: Q3-1*	-40°C to +85° C	RoHS/Lead-Free: <a href="#">No Materials Analysis</a>
DS1233D-15	5V-15% Monitor			TO92; 3 pin; Dwg: <a href="#">21-0248</a> (PDF) Use pkgcode/variation: Q3-1*	-40°C to +85° C	RoHS/Lead-Free: <a href="#">No Materials Analysis</a>
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DS1233D-15+	5V/15%, TO-92, No Pushbutton LF			TO92; 3 pin; Dwg: <a href="#">21-0248</a> (PDF) Use pkgcode/variation: Q3+1*	-40°C to +85° C	RoHS/Lead-Free: <a href="#">Lead Free Materials Analysis</a>

## FEATURES

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- Maintains reset for 350 ms after  $V_{CC}$  returns to an in-tolerance condition
- Accurate 5%, 10% or 15% microprocessor 5V power supply monitoring
- Reduces need for discrete components
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- Internal 5 k $\Omega$  pull-up resistor
- Compatible with Motorola 68XXX series and HC16 Microprocessors
- Operating temperature of -40°C to +85°C

## PIN ASSIGNMENT



BOTTOM VIEW  
TO-92 PACKAGE  
See Mech.  
Drawings Section  
On Website

## PIN DESCRIPTION

PIN 1	<u>GROUND</u>
PIN 2	<u>RESET</u>
PIN 3	$V_{CC}$
PIN 4	GROUND (SOT-223 ONLY)

## DESCRIPTION

The DS1233D EconoReset uses a precision temperature-compensated reference and comparator circuit to monitor the status of the power supply ( $V_{CC}$ ). When an out-of-tolerance condition is detected, an internal power-fail signal is generated which forces reset to the active state. When  $V_{CC}$  returns to an in-tolerance condition, the reset signal is kept in the active state for approximately 350 ms to allow the power supply and processor to stabilize.

## OPERATION - POWER MONITOR

The DS1233D provides the functions of detecting out-of-tolerance power supply conditions and warning a processor-based system of impending power failure. When  $V_{CC}$  is detected as out of tolerance as defined by the tolerance of the part selected, the RST signal is asserted. On power-up, RST is kept active for approximately 350 ms after the power supply has reached the selected tolerance. This allows the power supply and microprocessor to stabilize before RST is released.

**ABSOLUTE MAXIMUM RATINGS\***

Voltage on V <sub>CC</sub> Pin Relative to Ground	-0.5V to +7.0V
Voltage on I/O Relative to Ground	-0.5V to V <sub>CC</sub> +0.5V
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +125°C
Soldering Temperature	260°C for 10 seconds

\* This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

**RECOMMENDED DC OPERATING CONDITIONS** (-40°C to +85°C)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Supply Voltage	V <sub>CC</sub>	1.2	5.0	5.5	V	1

**DC ELECTRICAL CHARACTERISTICS** (-40°C to +85°C; V<sub>DD</sub>=5V ± 10%)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Low Level @ $\overline{\text{RST}}$	V <sub>OL</sub>			0.4	V	1
Output Current @ 0.4V	I <sub>OL</sub>	+8			mA	2
Operating Current	I <sub>CC</sub>			50	μA	
V <sub>CC</sub> Trip Point 5%	V <sub>CC</sub> TP1	4.5	4.625	4.74	V	1
V <sub>CC</sub> Trip Point 10%	V <sub>CC</sub> TP2	4.25	4.375	4.49	V	1
V <sub>CC</sub> Trip Point 15%	V <sub>CC</sub> TP3	4.0	4.125	4.24	V	1
Output Capacitance	C <sub>OUT</sub>			10	pF	
Internal Pull-Up Resistor	R <sub>P</sub>	3.75	5	6.25	kΩ	

**AC ELECTRICAL CHARACTERISTICS** (-40°C to +85°C; V<sub>CC</sub>=5V ± 10%)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Reset Active Time	t <sub>RST</sub>	250	350	450	ms	
V <sub>CC</sub> Detect to $\overline{\text{RST}}$	t <sub>RPD</sub>			100	ns	
V <sub>CC</sub> Slew Rate (4.75V - 4.00V)	t <sub>F</sub>	300			μs	
V <sub>CC</sub> Slew Rate (4.00V - 4.75V)	t <sub>R</sub>	0			ns	
V <sub>CC</sub> Detect to RST	t <sub>RPU</sub>	250	350	450	ms	

**NOTES:**

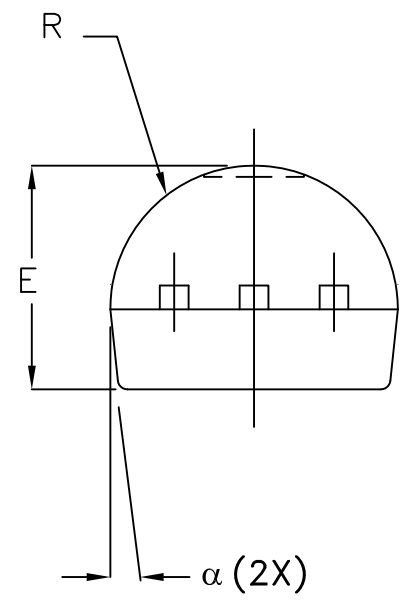
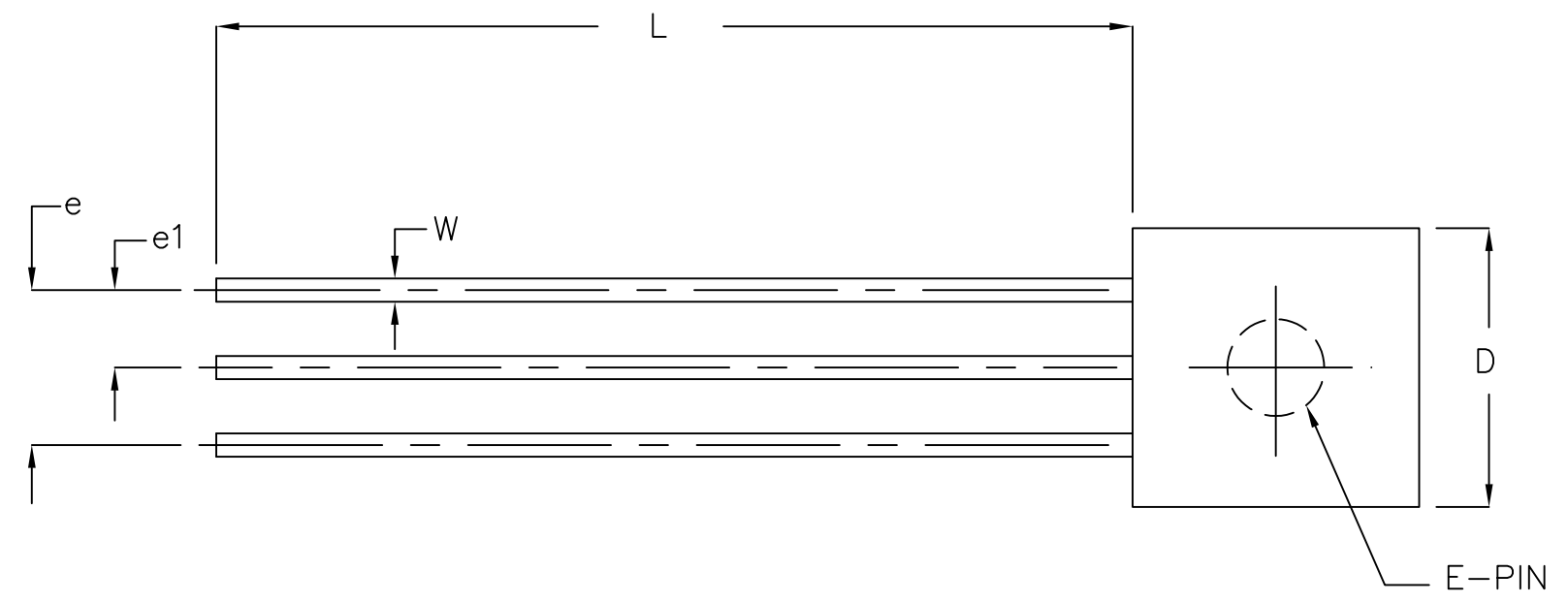
- All voltages are referenced to ground.
- A 1 kΩ external resistor may be required for proper operation of the microprocessor reset control circuit.

**ECONORESET SELECTION GUIDE**

		VCC TRIP POINT			PUSHBUTTON DETECT		
		MIN	TYP	MAX	MIN	TYP	MAX
<b>5V</b>	DS1233-15	4.0	4.125	4.24	2.4	-	3.3
	DS1233-10	4.25	4.375	4.49	2.4	-	3.3
	DS1233-5	4.5	4.625	4.75	2.4	-	3.3
	DS1233D-15	4.0	4.125	4.24	N/A		N/A
	DS1233D-10	4.25	4.375	4.49	N/A		N/A
	DS1233D-5	4.5	4.625	4.75	N/A		N/A
	DS1833-15	4.0	4.125	4.24	N/A		N/A
	DS1833-10	4.25	4.375	4.49	N/A		N/A
	DS1833-5	4.5	4.625	4.75	N/A		N/A
<b>3.3V</b>	DS1233A-15	2.64	2.72	2.80	1.8	-	3.0
	DS1233A-10	2.8	2.88	2.97	1.8	-	3.0

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A			

SYMBOL	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.170	.195	4.32	4.95
b	.014	.020	0.36	0.51
E	.130	.155	3.30	3.94
e	.095	.105	2.41	2.67
e1	.045	.055	1.14	1.40
L	.500	.610	12.70	15.49
R	.085	.095	2.16	2.41
S1	.045	.060	1.14	1.52
W	.016	.022	0.41	0.56
D	.175	.195	4.45	4.95
$\alpha$	4°	6°	4°	6°

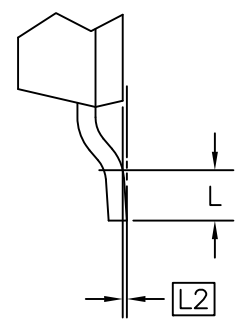
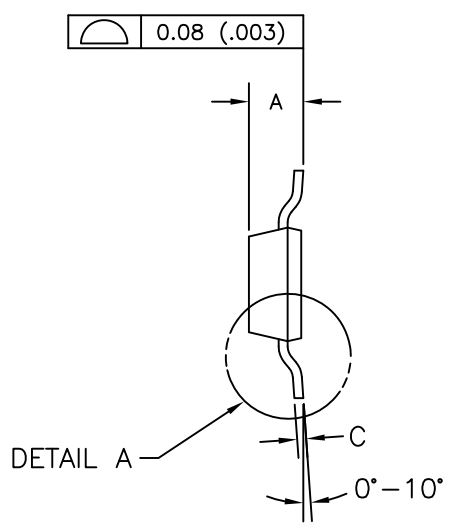
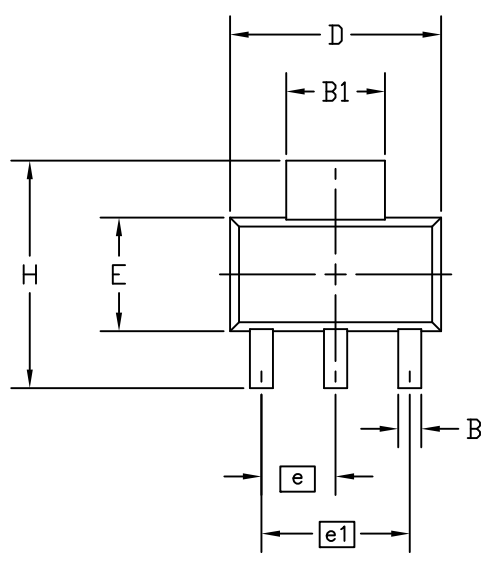


- NOTE:
1. PACKAGE OUTLINE EXCLUSIVE OF ANY MOLD FLASHES DIMENSION.
  2. PACKAGE OUTLINE EXCLUSIVE OF BURR DIMENSION.
  3. CONTROLLED DIMENSION IS INCH.
  4. MEETS JEDEC TO-226 AA.

SIGNATURE	DATE	<b>MAXIM</b>			
ASSY ENGR:					
PROD. ENGR:		MARKETING OUTLINE, TO-92, 3-PIN			
DES. ENGR:					
CHECK BY: TWM	12/01	SIZE D	FSCM NO	DWG NO 21-0248	REV A
DRAWN BY: JFD	12/01	SCALE N/A			SHEET 1 OF 1



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A			



DIM	MIN	NOM	MAX
A IN. MM	- -	- -	.071 1.80
B IN. MM	.024 0.60	.029 0.74	.035 0.88
B1 IN. MM	.114 2.90	.120 3.04	.125 3.18
C IN. MM	.009 0.24	.012 0.30	.016 0.40
D IN. MM	.248 6.30	.256 6.50	.264 6.70
E IN. MM	.130 3.30	.138 3.50	.146 3.70
e IN. MM	.091 BSC 2.30 BSC		
e1 IN. MM	.181 BSC 4.60 BSC		
H IN. MM	.264 6.70	.276 7.00	.287 7.30
L IN. MM	.036 0.91	- -	- -
L2 IN. MM	.0024 BSC 0.06 BSC		

SIGNATURE	DATE
DOC. CONTROL:	
ENGR. MGR:	
MFG. ENGR:	
CHECKED BY:	
DRAWN BY: R. ERBACHER	1-30-96



TITLE		MARKETING OUTLINE SOT-223 (TO-261)	
SIZE	FSCM NO	PART NO.	REV
A		21-0264	A