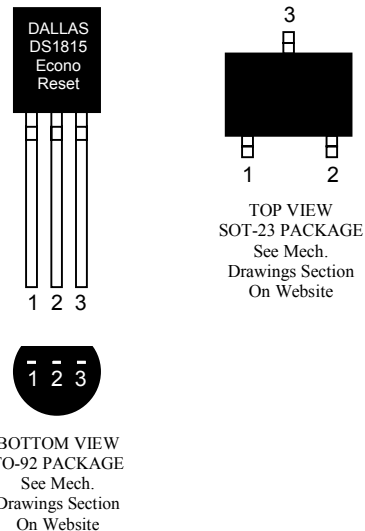


### FEATURES

- Automatically restarts a microprocessor after power failure
- Maintains reset for 150ms after  $V_{CC}$  returns to an in-tolerance condition
- Reduces need for discrete components
- Precision temperature-compensated voltage reference and voltage sensor
- Accurate 5%, 10% or 20% power monitoring
- Low-cost TO-92 or space saving surface-mount SOT-23 packages available
- Push-pull output for low current operation
- Operating temperature  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$

### PIN ASSIGNMENT



### PIN DESCRIPTION

#### TO-92

1	$\overline{\text{RST}}$	Active Low Reset Output
2	$V_{CC}$	Power Supply
3	GND	Ground

#### SOT-23

1	$\overline{\text{RST}}$	Active Low Reset Output
2	$V_{CC}$	Power Supply
3	GND	Ground

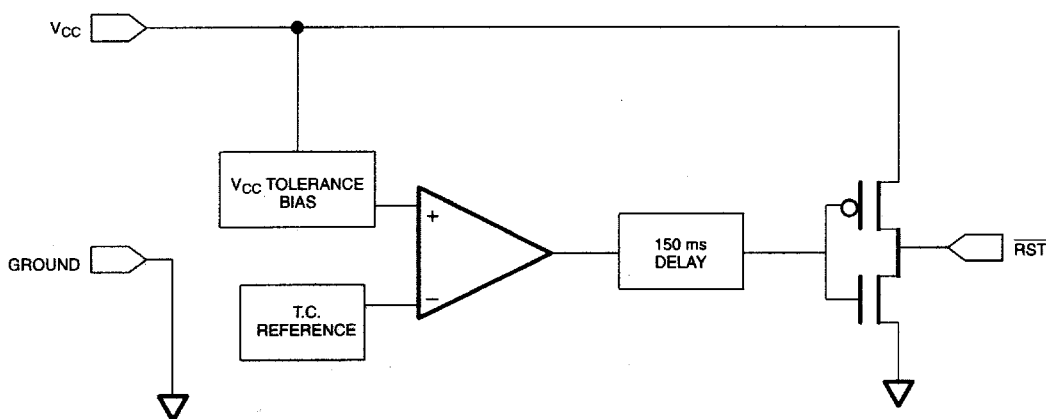
### DESCRIPTION

The DS1815 EconoReset uses a precision temperature 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 150ms to allow the power supply and processor to stabilize.

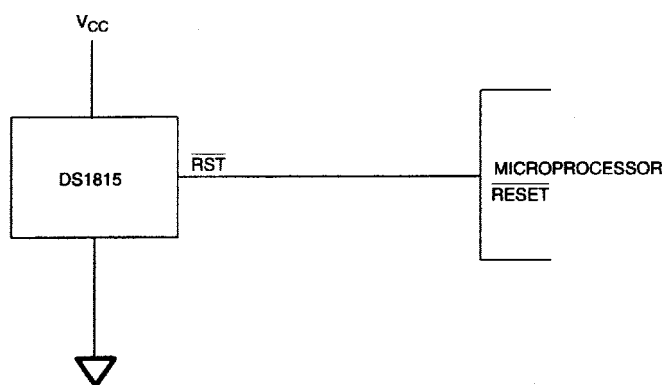
## OPERATION — POWER MONITOR

The DS1815 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, the  $\overline{RST}$  signal is asserted. On power-up,  $\overline{RST}$  is kept active for approximately 150ms after the power supply has reached the selected tolerance. This allows the power supply and microprocessor to stabilize before  $\overline{RST}$  is released.

## BLOCK DIAGRAM (CMOS OUTPUT) Figure 1

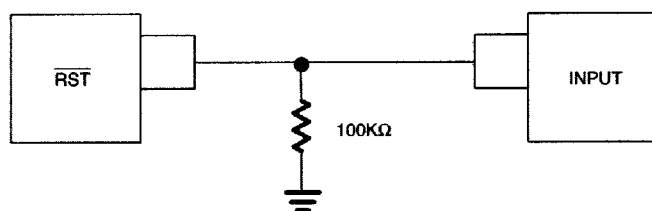


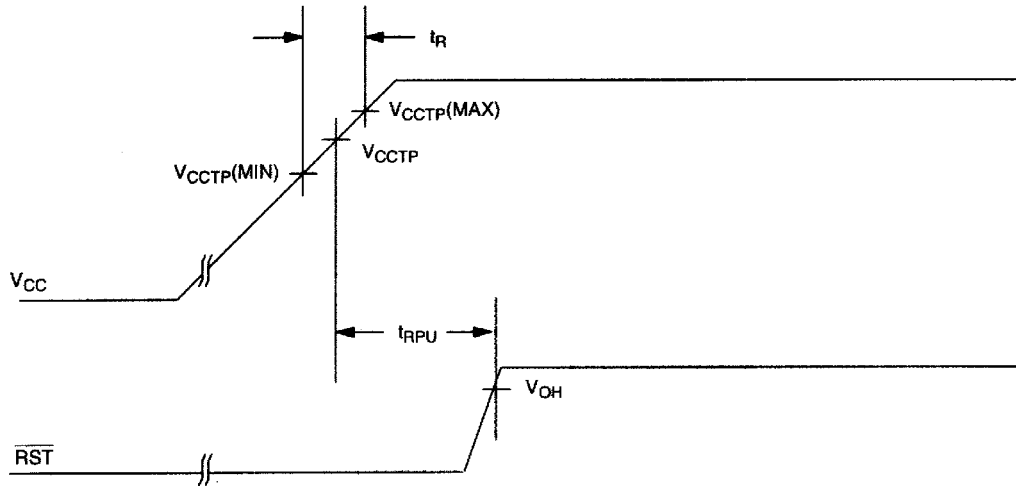
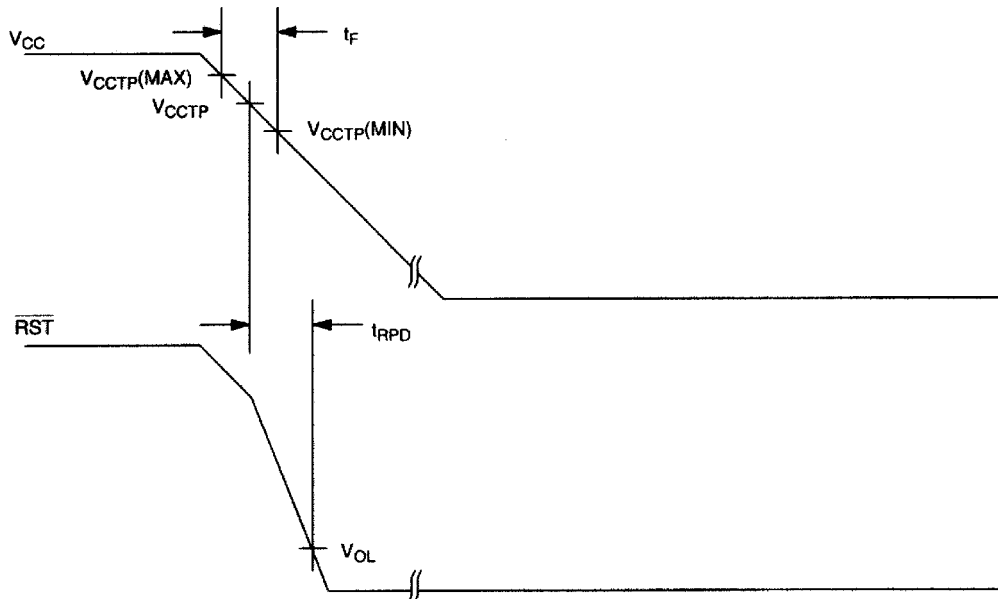
## APPLICATION EXAMPLE Figure 2



## APPLICATION DIAGRAM:

$\overline{RST}$  VALID TO 0 VOLTS  $V_{CC}$  ON THE DS1815 Figure 3



**TIMING DIAGRAM: POWER-UP** Figure 4**TIMING DIAGRAM: POWER-DOWN** Figure 5

**ABSOLUTE MAXIMUM RATINGS\***

Voltage on $V_{CC}$ Pin Relative to Ground	-0.5V to +7.0V
Voltage on $RST$ Relative to Ground	-0.5V to +5 $V_{CC}$ +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	$V_{CC}$	0.0		5.5	V	1

**DC ELECTRICAL CHARACTERISTICS** (-40°C to +85°C;  $V_{CC} = 1.2V$  to 5.5V)

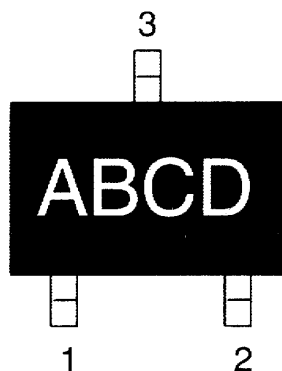
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Output Voltage @ -500 $\mu$ A	$V_{OH}$	$V_{CC}$ -0.5V	$V_{CC}$ -0.1V		V	1
Output Current @ 2.4V	$I_{OH}$		350		$\mu$ A	2
Output Current @ 0.4V	$I_{OL}$	+10			mA	2
Operating Current $V_{CC} < 5.5$	$I_{CC}$		28	35	$\mu$ A	3
$V_{CC}$ Trip Point (DS1815-5)	$V_{CCTP}$	2.98	3.06	3.15	V	1
$V_{CC}$ Trip Point (DS1815-10)	$V_{CCTP}$	2.80	2.88	2.97	V	1
$V_{CC}$ Trip Point (DS1815-20)	$V_{CCTP}$	2.47	2.55	2.64	V	1
Output Capacitance	$C_{OUT}$			10	pF	

**AC ELECTRICAL CHARACTERISTICS** (-40°C to +85°C;  $V_{CC} = 1.2V$  to 5.5V)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
RESET Active Time	$t_{RST}$	100	150	250	ms	4
$V_{CC}$ Detect to $\overline{RST}$	$t_{RPD}$		2	5	$\mu$ s	
$V_{CC}$ Slew Rate ( $V_{CCTP}$ (MAX) to $V_{CCTP}$ (MIN))	$t_F$	300			$\mu$ s	6
$V_{CC}$ Slew Rate ( $V_{CCTP}$ (MIN) to $V_{CCTP}$ (MAX))	$t_R$	0			ns	
$V_{CC}$ Detect to $\overline{RST}$	$t_{RPU}$	100	150	250	ms	4, 5

**NOTES:**

1. All voltages are referenced to ground.
2. Measured with  $V_{CC} \geq 2.7V$ .
3. Measured with  $\overline{RST}$  output open.
4. Measured with  $2.7V \leq V_{CC} \leq 3.3V$ .
5.  $t_R = 5\mu s$ .
6. The  $t_F$  value is for reference in defining values for  $T_{RPD}$  and should not be considered a requirement for proper operation or use of the device.

**PART MARKING CODES**

“A”, “B”, & “C” represent the device type.

810 . . . . DS1810  
 811 . . . . DS1811  
 812 . . . . DS1812  
 813 . . . . DS1813  
 815 . . . . DS1815  
 816 . . . . DS1816  
 817 . . . . DS1817  
 818 . . . . DS1818

“D” represents the device tolerance.

A . . . . . 5%  
 B . . . . . 10%  
 C . . . . . 15%  
 D . . . . . 20%

## [DS1815](#)

### Part Number Table

#### Notes:

1. See the [DS1815 QuickView Data Sheet](#) for further information on this product family or download the [DS1815 full data sheet](#) (PDF, 128kB).
2. Other options and links for purchasing parts are listed at: <http://www.maxim-ic.com/sales>.
3. [Didn't Find What You Need?](#) Ask our applications engineers. Expert assistance in finding parts, usually within one business day.
4. 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](#).
5. \* Some packages have variations, listed on the drawing. "PkgCode/Variation" tells which variation the product uses.

Part Number	Notes	Free Sample	Buy Direct	Package: TYPE PINS SIZE DRAWING CODE/VAR *	Temp	RoHS/Lead-Free? Materials Analysis
DS1815R-5-U+				SOT23;3 pin;50 Dwg: <a href="#">21-0051G</a> (PDF) Use pkgcode/variation: U3+4*	-40C to +85C	RoHS/Lead-Free: <a href="#">Yes</a> <a href="#">Materials Analysis</a>
DS1815R-20+T&R	3.3V- 20%			SOT23;3 pin;50 Dwg: <a href="#">21-0051G</a> (PDF) Use pkgcode/variation: U3+4*	-40C to +85C	RoHS/Lead-Free: <a href="#">Yes</a> <a href="#">Materials Analysis</a>
DS1815R-5+T&R	3.3V-5%			SOT23;3 pin;50 Dwg: <a href="#">21-0051G</a> (PDF) Use pkgcode/variation: U3+4*	-40C to +85C	RoHS/Lead-Free: <a href="#">Yes</a> <a href="#">Materials Analysis</a>
DS1815R-20-U	3.3V- 20%			SOT23;3 pin;50 Dwg: <a href="#">21-0051G</a> (PDF) Use pkgcode/variation: U3-4*	-40C to +85C	RoHS/Lead-Free: <a href="#">No</a> <a href="#">Materials Analysis</a>

DS1815R-10-U	3.3V-10%	SOT23;3 pin;50 Dwg: <a href="#">21-0051G</a> (PDF) Use pkgcode/variation: U3-4*	-40C to +85C RoHS/Lead-Free: <a href="#">No Materials Analysis</a>
DS1815R-5-U	3.3V-5%	SOT23;3 pin;50 Dwg: <a href="#">21-0051G</a> (PDF) Use pkgcode/variation: U3-4*	-40C to +85C RoHS/Lead-Free: <a href="#">No Materials Analysis</a>
DS1815R-20/T&R	3.3V-20% Tolerance	SOT23;3 pin;50 Dwg: <a href="#">21-0051G</a> (PDF) Use pkgcode/variation: U3-4*	-40C to +85C RoHS/Lead-Free: <a href="#">No Materials Analysis</a>
DS1815R-10/T&R	3.3V-10% Tolerance	SOT23;3 pin;50 Dwg: <a href="#">21-0051G</a> (PDF) Use pkgcode/variation: U3-4*	-40C to +85C RoHS/Lead-Free: <a href="#">No Materials Analysis</a>
DS1815R-5/T&R	3.3V-5%	SOT23;3 pin;50 Dwg: <a href="#">21-0051G</a> (PDF) Use pkgcode/variation: U3-4*	-40C to +85C RoHS/Lead-Free: <a href="#">No Materials Analysis</a>
DS1815R-10-U+		SOT23;3 pin;50 Dwg: <a href="#">21-0051G</a> (PDF) Use pkgcode/variation: U3+4*	-40C to +85C RoHS/Lead-Free: <a href="#">Yes Materials Analysis</a>
DS1815R-20-U+		SOT23;3 pin;50 Dwg: <a href="#">21-0051G</a> (PDF) Use pkgcode/variation: U3+4*	-40C to +85C RoHS/Lead-Free: <a href="#">Yes Materials Analysis</a>
DS1815R-10+T&R	3.3V-10%	SOT23;3 pin;50 Dwg: <a href="#">21-0051G</a> (PDF) Use pkgcode/variation: U3+4*	-40C to +85C RoHS/Lead-Free: <a href="#">Yes Materials Analysis</a>
DS1815-10+T&R	3.3V-10%	TO92;3 pin;185 Dwg: <a href="#">56-G0006-003A</a> (PDF) Use pkgcode/variation: Q3+4*	-40C to +85C RoHS/Lead-Free: <a href="#">Yes Materials Analysis</a>
DS1815-20+T&R	3.3V-20%	TO92;3 pin;185 Dwg: <a href="#">56-G0006-003A</a> (PDF) Use pkgcode/variation: Q3+4*	-40C to +85C RoHS/Lead-Free: <a href="#">Yes Materials Analysis</a>
DS1815-5+T&R	3.3V-5%	TO92;3 pin;185 Dwg: <a href="#">56-G0006-003A</a> (PDF) Use pkgcode/variation: Q3+4*	-40C to +85C RoHS/Lead-Free: <a href="#">Yes Materials Analysis</a>

DS1815-20/T&R	3.3V- 20%	TO92;3 pin;185 Dwg: <a href="#">56-G0006-003A</a> (PDF) Use pkgcode/variation: Q3-4*	-40C to +85C RoHS/Lead-Free: <a href="#">No Materials Analysis</a>
DS1815-10/T&R	3.3V- 10%	TO92;3 pin;185 Dwg: <a href="#">56-G0006-003A</a> (PDF) Use pkgcode/variation: Q3-4*	-40C to +85C RoHS/Lead-Free: <a href="#">No Materials Analysis</a>
DS1815-5/T&R	3.3V-5%	TO92;3 pin;185 Dwg: <a href="#">56-G0006-003A</a> (PDF) Use pkgcode/variation: Q3-4*	-40C to +85C RoHS/Lead-Free: <a href="#">No Materials Analysis</a>
DS1815-20	3.3V- 20% Monitor	TO92;3 pin;185 Dwg: <a href="#">56-G0006-001A</a> (PDF) Use pkgcode/variation: Q3-1*	-40C to +85C RoHS/Lead-Free: <a href="#">No Materials Analysis</a>
DS1815-10	3.3V- 10% Monitor	TO92;3 pin;185 Dwg: <a href="#">56-G0006-001A</a> (PDF) Use pkgcode/variation: Q3-1*	-40C to +85C RoHS/Lead-Free: <a href="#">No Materials Analysis</a>
DS1815-5	3.3V-5% Monitor	TO92;3 pin;185 Dwg: <a href="#">56-G0006-001A</a> (PDF) Use pkgcode/variation: Q3-1*	-40C to +85C RoHS/Lead-Free: <a href="#">No Materials Analysis</a>
DS1815-5+		TO92;3 pin;185 Dwg: <a href="#">56-G0006-001A</a> (PDF) Use pkgcode/variation: Q3+1*	-40C to +85C RoHS/Lead-Free: <a href="#">Yes Materials Analysis</a>
DS1815-10+		TO92;3 pin;185 Dwg: <a href="#">56-G0006-001A</a> (PDF) Use pkgcode/variation: Q3+1*	-40C to +85C RoHS/Lead-Free: <a href="#">Yes Materials Analysis</a>
DS1815-20+		TO92;3 pin;185 Dwg: <a href="#">56-G0006-001A</a> (PDF) Use pkgcode/variation: Q3+1*	-40C to +85C RoHS/Lead-Free: <a href="#">Yes Materials Analysis</a>

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