МЛХІМ

Low-Cost, Power-On Reset and Watchdog Controllers

MAX698/MAX699

General Description

The MAX698/MAX699 monitor the +5V supply in microprocessor (µP) and digital systems. They supply a RESET pulse of at least 140ms duration on power-up, power-down, and during low-voltage brownout conditions. Circuit reliability is increased at reduced cost by eliminating all external components and adjustments.
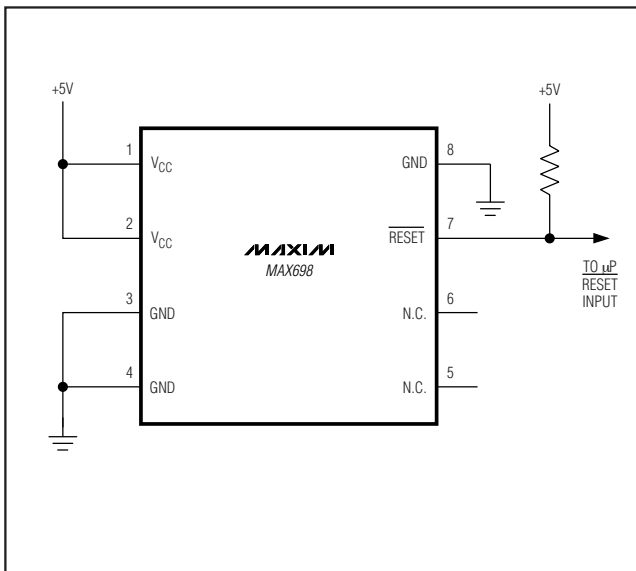
The MAX699 includes all features of the MAX698, but also provides a watchdog input to monitor microprocessor activity. The RESET output goes low if the watchdog input (WDI) is not toggled within 1 second. The watchdog feature can be disabled by leaving WDI open.

Both parts are supplied in 8-lead PDIP and 16-lead 0.3in wide small outline (SO) packages and are specified from 0°C to +70°C for C grade devices and -40°C to +85°C for E devices. The SO versions, with more pins than the 8-lead PDIP, have additional outputs not available in DIP packages. These are RESET (without inversion) and watchdog output (WDO).

Applications

Computers

Controllers

Intelligent Instruments

Automotive Systems

Critical µP Power Monitoring

Features

♦ **Precision Voltage Monitor**

♦ **Power-OK/Reset Time Delay**

♦ **Watchdog Timer**

♦ **Minimum Component Count**

Ordering Information

PART*	TEMP RANGE	PIN-PACKAGE
MAX698CPA	0°C to +70°C	8 PDIP
MAX698CWE	0°C to +70°C	16 Wide SO
MAX698EPA	-40°C to +85°C	8 PDIP
MAX698EWE	-40°C to +85°C	16 Wide SO
MAX699CPA	0°C to +70°C	8 PDIP
MAX699CWE	0°C to +70°C	16 Wide SO
MAX699EPA	-40°C to +85°C	8 PDIP
MAX699EWE	-40°C to +85°C	16 Wide SO

*Devices are available in both leaded and lead-free packaging. Specify lead free by adding the + symbol at the end of the part number when ordering.

Pin Configuration

Typical Operating Circuit

МЛХІМ _____ *Maxim Integrated Products* **1**
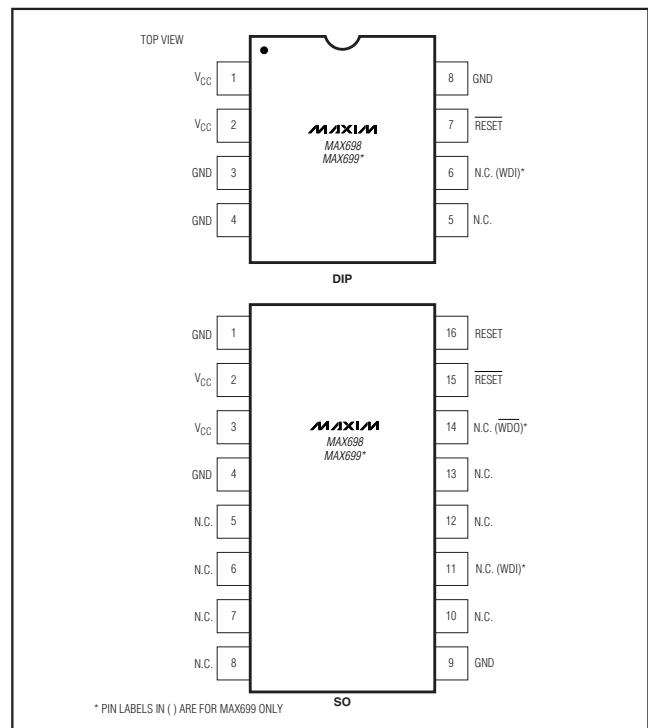
For pricing, delivery, and ordering information, please contact Maxim/Dallas Direct! at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

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ABSOLUTE MAXIMUM RATINGS

V$_{CC}$ ....-0.3V to +6.0V
Input Voltage (with respect to GND)
WDI, $\overline{WDO}$, RESET, $\overline{RESET}$ ..…………………………-0.3V to V$_{CC}$
Operating Temperature Range
   C Suffix…………………………………………………0°C to +70°C
   E Suffix....………………………………………….-40°C to +85°C
Rate of Rise, V$_{CC}$ ....……………………………100V/µs

Power Dissipation (T$_A$ = +70°C)
   8-Pin PDIP (derated 5mW/°C above +70°C).....………..400mW
   16-Pin SO (derated 7mW/°C above +70°C) 600mW
Storage Temperature Range ....-65°C to +150°C
Lead Temperature (soldering, 10s) ....+300°C

Stresses beyond 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 beyond 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

(V$_{CC}$ = +5V, T$_A$ = +25°C, unless otherwise noted.)

PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS
Operating Voltage Range	T$_A$ = full		3.0		5.5	V
Supply Current					5	mA
Power-Up Reset Deassertion	T$_A$ = full		4.50	4.65	4.75	V
Power-Up Reset Assertion	T$_A$ = full		4.4			V
Hysteresis				40		mV
Reset Output Pulse Width			140		500	ms
$\overline{RESET}$ OUTPUT (Open Drain)	Output low	I$_{SINK}$ = 1.6mA, V$_{CC}$ = 4.4V			0.4	V
	Output high	I$_{SOURCE}$ = 1µA, V$_{CC}$ = 5V	3.5			
RESET OUTPUT (SO Package Only)	Output low	I$_{SINK}$ = 1.6mA, V$_{CC}$ = 5V			0.4	V
	Output high	I$_{SOURCE}$ = 1µA, V$_{CC}$ = 4.4V	3.5			
$\overline{WDO}$ Output (MAX699 SO Package Only)	Output low	I$_{SINK}$ = 1.6mA, V$_{CC}$ = 5V			0.4	V
	Output high	I$_{SOURCE}$ = 1µA, V$_{CC}$ = 4.4V	3.5			
MAX699 Watchdog Timeout Period			1.00	1.6	2.25	s
MAX699 Minimum WDI Input Pulse Width			200			ns
MAX699 WDI Input Threshold	V$_{CC}$ = +5V	Locic-low			0.8	V
		Logic-high	3.8			
MAX699 WDI Input Current	WDI = V$_{CC}$			20	50	µA
	WDI = 0V		-50	-15		

/VI/IXI/VI

MAX698/MAX699

Pin Description

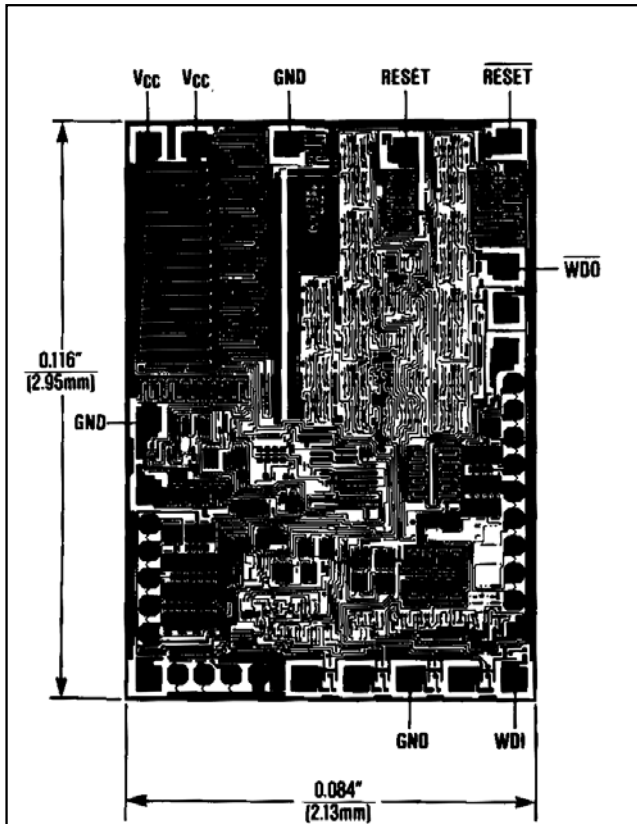| PIN		NAME	FUNCTION
SO	PDIP		
1, 4, 9	3, 4, 8	GND	Chip Power Ground
2, 3	1, 2	V_{CC}	+5V Sense Input and MAX698/MAX699 Chip Power
5–8, 10–14	5, 6	N.C.	No Connection
10	6	WDI (MAX699 Only)	(MAX699 Only.) A three-level input. If WDI remains high or low for more than the watchdog timeout period, $\overline{RESET}$ pulses low ($\overline{WDO}$ also goes low on the MAX699 SO package). If WDI is unconnected, the watchdog circuit is disabled.
14	—	$\overline{WDO}$ (MAX699 Only)	(MAX699 Only.) Goes low when WDI remains high or low for more than the watchdog timeout period. $\overline{WDO}$ is set high at the next WDI transition. If WDI is unconnected or at midsupply, $\overline{WDO}$ remains high. $\overline{WDO}$ also remains high when V_{CC} falls below 4.4V.
15	7	$\overline{RESET}$	Goes low when V_{CC} falls below internally set threshold (see the *Electrical Characteristics* table).
16	—	RESET	Goes high when V_{CC} falls below internally set threshold.
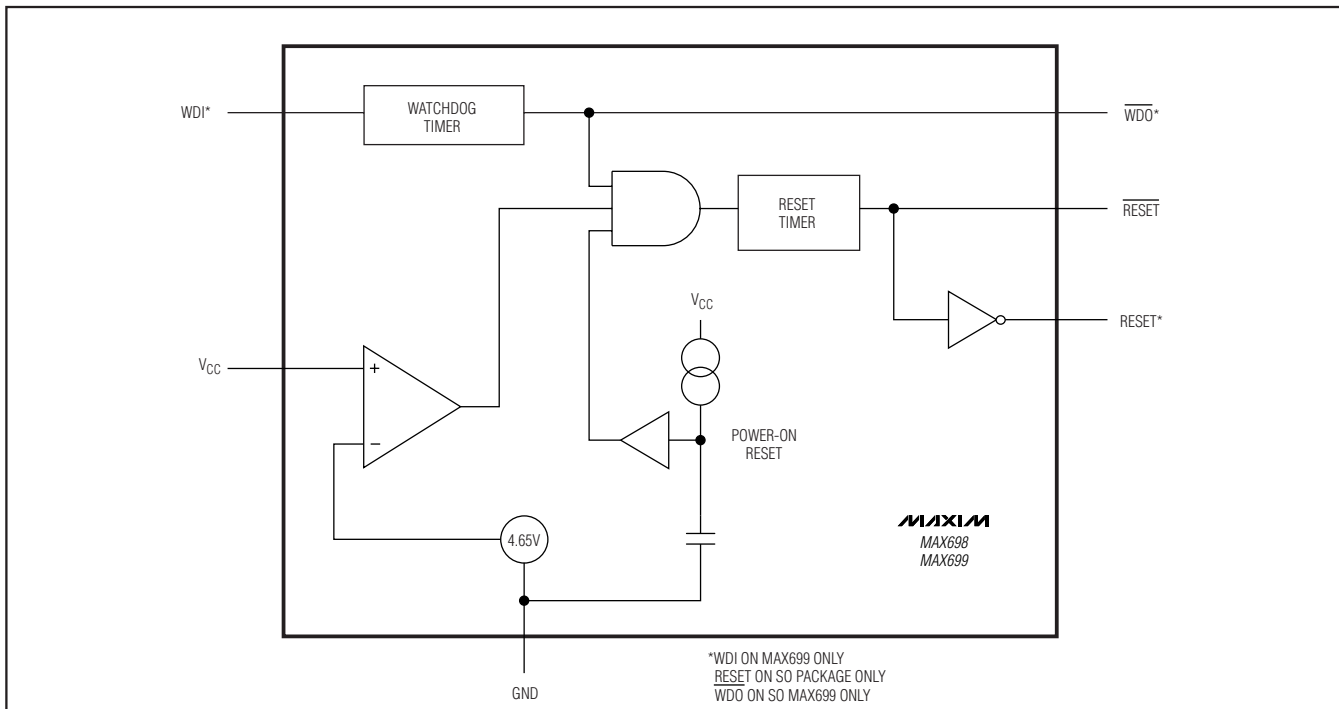
Figure 1. Block Diagram

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_____Chip Topography