



Maxim > Products > [Supervisors, Voltage Monitors, Sequencers] [Military/Aerospace]

MAX690, MAX691, MAX692, MAX693, MAX694, MAX695

Microprocessor Supervisory Circuits

Industry-Standard, Full-Function μ P Supervisor

Key Specifications: Battery Backup Circuits										
Part Number	Reset Threshold Range (V)	Active-Low Reset Output	Active-High Reset Output	Max. I_{CC} (μ A)	Features	RoHS Available	Industry Qualified	Package	Operating Temp. Range ($^{\circ}$ C)	
MAX690			-		<ul style="list-style-type: none"> Adjustable Reset Input Power Fail Comparator <ul style="list-style-type: none"> Watchdog 			Ceramic DIP/8 FPCK/10 LCC/20 PDIP/8		
MAX691			Push-Pull		<ul style="list-style-type: none"> Adjustable Reset Input <ul style="list-style-type: none"> Battery On Chip Enable Gate <ul style="list-style-type: none"> Low Line Power Fail Comparator <ul style="list-style-type: none"> Watchdog 			Ceramic DIP/16 LCC/20 PDIP/16 SOIC/16		

MAX692	3.3 to 5.5	Push-Pull	-	5000	<ul style="list-style-type: none"> Adjustable Reset Input Power Fail Comparator <ul style="list-style-type: none"> Watchdog 	Yes	MIL-STD-883B	Ceramic DIP/8 PDIP/8	-55 to +125 -40 to +85 0 to +70	
MAX693			Push-Pull		<ul style="list-style-type: none"> Adjustable Reset Input <ul style="list-style-type: none"> Battery On Chip Enable Gate <ul style="list-style-type: none"> Low Line Power Fail Comparator <ul style="list-style-type: none"> Watchdog 			Ceramic DIP/16 LCC/20 PDIP/16 SOIC/16		
MAX694			-		<ul style="list-style-type: none"> Adjustable Reset Input Power Fail Comparator <ul style="list-style-type: none"> Watchdog 			Ceramic DIP/8 LCC/20 PDIP/8		
MAX695			Push-Pull		<ul style="list-style-type: none"> Adjustable Reset Input <ul style="list-style-type: none"> Battery On Chip Enable Gate <ul style="list-style-type: none"> Low Line Power Fail Comparator <ul style="list-style-type: none"> Watchdog 			Ceramic DIP/16 PDIP/16 SOIC/16		
See All Battery Backup Circuits (86)										

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 23: μ P-Supervisor Chip Controls Programmable Filter - MAX690
- Application Note 42: Large Capacitor Replaces Backup Battery - MAX690

Evaluation Kits

none

Design Guides

- Microprocessor Supervisory (PDF)

Reliability Reports

Show FIT data for:

Reliability Report: [MAX690xxxA.pdf](#) [MAX691xxE.pdf](#)

Request Reliability Report for:

Underwriters Laboratories (UL®) Recognized

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.

Devices: 1-78 of 78

MAX690	Free Sample	Buy	Package: TYPE PINS FOOTPRINT DRAWING CODE/VAR *	Temp	RoHS/Lead-Free? Materials Analysis
MAX690EJA			Ceramic DIP; 8 pin; Dwg: 21-0045 (PDF) Use pkgcode/variation: J8-2*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX690MJA/883B			Ceramic DIP; 8 pin; Dwg: 21-0045 (PDF) Use pkgcode/variation: J8-2*	-55°C to +125°C	RoHS/Lead-Free: No Materials Analysis
MAX690MJA			Ceramic DIP; 8 pin; Dwg: 21-0045 (PDF) Use pkgcode/variation: J8-2*	-55°C to +125°C	RoHS/Lead-Free: No Materials Analysis
MAX690C/D					See data sheet

MAX690MFB/883B			FPCK; 10 pin; Dwg: 21-0010 (PDF) Use pkgcode/variation: F10-3*	-55°C to +125°C	See data sheet
MAX690MLP/883B			LCC; 20 pin; Dwg: 21-0658 (PDF) Use pkgcode/variation: L20-3*	-55°C to +125°C	RoHS/Lead-Free: No Materials Analysis
MAX690CPA			PDIP; 8 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P8-2*	0°C to +70°C	RoHS/Lead-Free: No Materials Analysis
MAX690CPA+			PDIP; 8 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P8+2*	0°C to +70°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX690EPA			PDIP; 8 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P8-2*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX690EPA+			PDIP; 8 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P8+2*	-40°C to +85°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX691	Free Sample	Buy	Package: TYPE PINS FOOTPRINT DRAWING CODE/VAR *	Temp	RoHS/Lead-Free? Materials Analysis
MAX691EJE			Ceramic DIP; 16 pin; Dwg: 21-0045 (PDF) Use pkgcode/variation: J16-3*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX691MJE/883B			Ceramic DIP; 16 pin; Dwg: 21-0045 (PDF) Use pkgcode/variation: J16-3*	-55°C to +125°C	RoHS/Lead-Free: No Materials Analysis
MAX691MJE			Ceramic DIP; 16 pin; Dwg: 21-0045 (PDF) Use pkgcode/variation: J16-3*	-55°C to +125°C	RoHS/Lead-Free: No Materials Analysis
MAX691C/D					See data sheet
MAX691MLP/883B			LCC; 20 pin; Dwg: 21-0658 (PDF) Use pkgcode/variation: L20-3*	-55°C to +125°C	RoHS/Lead-Free: No Materials Analysis
MAX691CPE+			PDIP; 16 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P16+1*	0°C to +70°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX691CPE			PDIP; 16 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P16-1*	0°C to +70°C	RoHS/Lead-Free: No Materials Analysis

MAX691EPE			PDIP; 16 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P16-1*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX691EPE+			PDIP; 16 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P16+1*	-40°C to +85°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX691CWE+T			SOIC; 16 pin; Dwg: 21-0042 (PDF) Use pkgcode/variation: W16+1*	0°C to +70°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX691CWE+			SOIC; 16 pin; Dwg: 21-0042 (PDF) Use pkgcode/variation: W16+1*	0°C to +70°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX691CWE-T			SOIC; 16 pin; Dwg: 21-0042 (PDF) Use pkgcode/variation: W16-1*	0°C to +70°C	RoHS/Lead-Free: No Materials Analysis
MAX691CWE			SOIC; 16 pin; Dwg: 21-0042 (PDF) Use pkgcode/variation: W16-1*	0°C to +70°C	RoHS/Lead-Free: No Materials Analysis
MAX691EWE+T			SOIC; 16 pin; Dwg: 21-0042 (PDF) Use pkgcode/variation: W16+1*	-40°C to +85°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX691EWE-T			SOIC; 16 pin; Dwg: 21-0042 (PDF) Use pkgcode/variation: W16-1*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX691EWE			SOIC; 16 pin; Dwg: 21-0042 (PDF) Use pkgcode/variation: W16-1*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX691EWE+			SOIC; 16 pin; Dwg: 21-0042 (PDF) Use pkgcode/variation: W16+1*	-40°C to +85°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX692	Free Sample	Buy	Package: TYPE PINS FOOTPRINT DRAWING CODE/VAR *	Temp	RoHS/Lead-Free? Materials Analysis
MAX692EJA			Ceramic DIP; 8 pin; Dwg: 21-0045 (PDF) Use pkgcode/variation: J8-2*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX692MJA/883B			Ceramic DIP; 8 pin; Dwg: 21-0045 (PDF) Use pkgcode/variation: J8-2*	-55°C to +125°C	RoHS/Lead-Free: No Materials Analysis
MAX692MJA			Ceramic DIP; 8 pin; Dwg: 21-0045 (PDF) Use pkgcode/variation: J8-2*	-55°C to +125°C	RoHS/Lead-Free: No Materials Analysis

MAX693EPE			PDIP; 16 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P16-1*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX693EPE+			PDIP; 16 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P16+1*	-40°C to +85°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX693CWE+T			SOIC; 16 pin; Dwg: 21-0042 (PDF) Use pkgcode/variation: W16+1*	0°C to +70°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX693CWE+			SOIC; 16 pin; Dwg: 21-0042 (PDF) Use pkgcode/variation: W16+1*	0°C to +70°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX693CWE			SOIC; 16 pin; Dwg: 21-0042 (PDF) Use pkgcode/variation: W16-1*	0°C to +70°C	RoHS/Lead-Free: No Materials Analysis
MAX693CWE-T			SOIC; 16 pin; Dwg: 21-0042 (PDF) Use pkgcode/variation: W16-1*	0°C to +70°C	RoHS/Lead-Free: No Materials Analysis
MAX693EWE+T			SOIC; 16 pin; Dwg: 21-0042 (PDF) Use pkgcode/variation: W16+1*	-40°C to +85°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX693EWE+			SOIC; 16 pin; Dwg: 21-0042 (PDF) Use pkgcode/variation: W16+1*	-40°C to +85°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX693EWE-T			SOIC; 16 pin; Dwg: 21-0042 (PDF) Use pkgcode/variation: W16-1*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX693EWE			SOIC; 16 pin; Dwg: 21-0042 (PDF) Use pkgcode/variation: W16-1*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX694	Free Sample	Buy	Package: TYPE PINS FOOTPRINT DRAWING CODE/VAR *	Temp	RoHS/Lead-Free? Materials Analysis
MAX694EJA			Ceramic DIP; 8 pin; Dwg: 21-0045 (PDF) Use pkgcode/variation: J8-2*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX694MJA			Ceramic DIP; 8 pin; Dwg: 21-0045 (PDF) Use pkgcode/variation: J8-2*	-55°C to +125°C	RoHS/Lead-Free: No Materials Analysis
MAX694MJA/883B			Ceramic DIP; 8 pin; Dwg: 21-0045 (PDF) Use pkgcode/variation: J8-2*	-55°C to +125°C	RoHS/Lead-Free: No Materials Analysis

MAX694C/D					See data sheet
MAX694MLP/883B			LCC; 20 pin; Dwg: 21-0658 (PDF) Use pkgcode/variation: L20-3*	-55°C to +125°C	RoHS/Lead-Free: No Materials Analysis
MAX694CPA+			PDIP; 8 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P8+2*	0°C to +70°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX694CPA			PDIP; 8 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P8-2*	0°C to +70°C	RoHS/Lead-Free: No Materials Analysis
MAX694EPA			PDIP; 8 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P8-2*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX694EPA+			PDIP; 8 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P8+2*	-40°C to +85°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX695	Free Sample	Buy	Package: TYPE PINS FOOTPRINT DRAWING CODE/VAR *	Temp	RoHS/Lead-Free? Materials Analysis
MAX695C/D					See data sheet
MAX695EJE			Ceramic DIP; 16 pin; Dwg: 21-0045 (PDF) Use pkgcode/variation: J16-3*	-40°C to +85°C	RoHS/Lead-Free: No Materials Analysis
MAX695MJE/883B			Ceramic DIP; 16 pin; Dwg: 21-0045 (PDF) Use pkgcode/variation: J16-3*	-55°C to +125°C	RoHS/Lead-Free: No Materials Analysis
MAX695MJE			Ceramic DIP; 16 pin; Dwg: 21-0045 (PDF) Use pkgcode/variation: J16-3*	-55°C to +125°C	RoHS/Lead-Free: No Materials Analysis
MAX695CPE			PDIP; 16 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P16-1*	0°C to +70°C	RoHS/Lead-Free: No Materials Analysis
MAX695CPE+			PDIP; 16 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P16+1*	0°C to +70°C	RoHS/Lead-Free: Lead Free Materials Analysis
MAX695EPE+			PDIP; 16 pin; Dwg: 21-0043 (PDF) Use pkgcode/variation: P16+1*	-40°C to +85°C	RoHS/Lead-Free: Lead Free Materials Analysis

MAXIM

Microprocessor Supervisory Circuits

MAX690/91/92/93/94/95

General Description

The MAX690 Family of supervisory circuits reduce the complexity and number of components required for power supply monitoring and battery control functions in microprocessor systems. These include μ P reset and backup-battery switchover, watchdog timer, CMOS RAM write protection, and power-failure warning. The MAX690 Family significantly improves system reliability and accuracy compared to that obtainable with separate ICs or discrete components.

The MAX690, MAX692 and MAX694 are supplied in 8-pin packages and provide four functions:

- 1) A Reset output during power-up, power-down and brownout conditions.
- 2) Battery backup switching for CMOS RAM, CMOS microprocessor or other low power logic.
- 3) A Reset pulse if the optional watchdog timer has not been toggled within a specified time.
- 4) A 1.3V threshold detector for power fail warning, low battery detection, or to monitor a power supply other than +5V.

The MAX691, MAX693 and MAX695 are supplied in 16-pin packages and perform all MAX690/692/694 functions, plus:

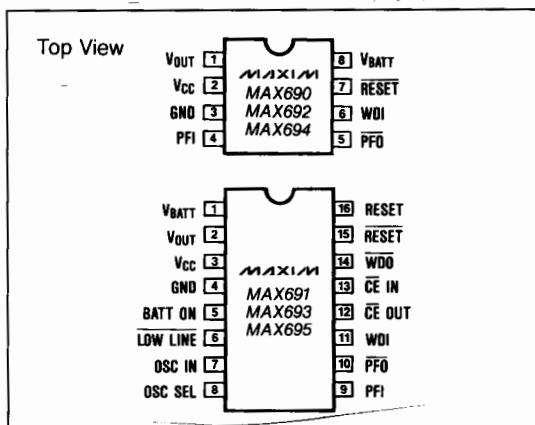
- 1) Write protection of CMOS RAM or EEPROM.
- 2) Adjustable reset and watchdog timeout periods.
- 3) Separate outputs for indicating a watchdog timeout, backup-battery switchover, and low V_{CC} .

Applications

Computers
Controllers
Intelligent Instruments
Automotive Systems
Critical μ P Power Monitoring

Ordering information continued on last page.

Pin Configuration



Features

- ◆ **Precision Voltage Monitor**
4.65V in MAX690, MAX691, MAX694 and MAX695
4.40V in MAX692 and MAX693
- ◆ **Power OK/Reset Time Delay** – 50, 200ms, or adjustable
- ◆ **Watchdog Timer** – 100ms, 1.6 sec, or adjustable
- ◆ **Minimum Component Count**
- ◆ **1 μ A Standby Current**
- ◆ **Battery Backup Power Switching**
- ◆ **Onboard Gating of Chip Enable Signals**
- ◆ **Voltage Monitor for Power Fail or Low Battery Warning**

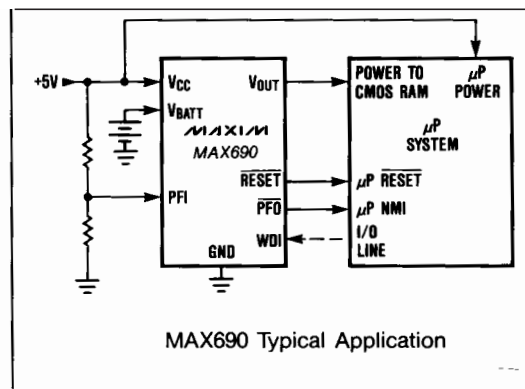
Ordering Information

PART	TEMP. RANGE	PIN-PACKAGE
MAX690CPA	0°C to +70°C	8 Lead Plastic DIP
MAX690C/D	0°C to +70°C	Dice*
MAX690EPA	-40°C to +85°C	8 Lead Plastic DIP
MAX690EJA	-40°C to +85°C	8 Lead Cerdip
MAX690MJA	-55°C to +125°C	8 Lead Cerdip
MAX691CPE	0°C to +70°C	16 Lead Plastic DIP
MAX691CWE	0°C to +70°C	16 Lead Wide SO
MAX691C/D	0°C to +70°C	Dice*
MAX691EPE	-40°C to +85°C	16 Lead Plastic DIP
MAX691EWE	-40°C to +85°C	16 Lead Wide SO
MAX691EJE	-40°C to +85°C	16 Lead Cerdip
MAX691MJE	-55°C to +125°C	16 Lead Cerdip

*Contact factory for dice specifications.

Devices in PDIP and SO packages 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. Lead free not available for Cerdip package.

Typical Operating Circuit



Microprocessor Supervisory Circuits

ABSOLUTE MAXIMUM RATINGS

Terminal Voltage (with respect to GND)	
V _{CC}	-0.3V to 6.0V
V _{BATT}	-0.3V to 6.0V
All Other Inputs (Note 1) ..	-0.3V to (V _{OUT} + 0.5V)
Input Current	
V _{CC}	200mA
V _{BATT}	50mA
GND	20mA
Output Current	
V _{OUT}	short circuit protected
All Other Outputs	20mA
Rate-of-Rise, V _{BATT} , V _{CC}	100V/μs
Operating Temperature Range	
C suffix	0°C to +70°C
E suffix	-40°C to +85°C
M suffix	-55°C to +125°C

Power Dissipation	
8-Pin Plastic DIP	(Derate 5mW/°C above +70°C)
8-Pin Cerdip	(Derate 8mW/°C above +85°C)
16-Pin Plastic DIP	(Derate 7mW/°C above +70°C)
16-Pin Small Outline	(Derate 7mW/°C above +70°C)
16-Pin Cerdip	(Derate 10mW/°C above +85°C)
Storage Temperature Range	-65°C to +160°C
Lead Temperature (Soldering, 10s)	300°C

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 ratings conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

(V_{CC} = full operating range, V_{BATT} = 2.8V, T_A = 25°C, unless otherwise noted.)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
BATTERY BACKUP SWITCHING					
Operating Voltage Range MAX690, MAX691, MAX694, MAX695 V _{CC} MAX690, MAX691, MAX694, MAX695 V _{BATT} MAX692, MAX693 V _{CC} MAX692, MAX693 V _{BATT}		4.75 2.0 4.5 2.0		5.5 4.25 5.5 4.0	V
V _{OUT} Output Voltage	I _{OUT} = 1mA I _{OUT} = 50mA	V _{CC} -0.3 V _{CC} -0.5	V _{CC} -0.1 V _{CC} -0.25		V
V _{OUT} in Battery Backup Mode	I _{OUT} = 250μA, V _{CC} < V _{BATT} -0.2V	V _{BATT} -0.1	V _{BATT} -0.02		V
Supply Current (excludes I _{OUT})	I _{OUT} = 1mA I _{OUT} = 50mA		2 3.5	5 10	mA
Supply Current in Battery Backup Mode	V _{CC} = 0V, V _{BATT} = 2.8V		0.6	1	μA
Battery Standby Current (+ = Discharge, - = Charge)	5.5V > V _{CC} > V _{BATT} +1V T _A = 25°C T _A = Full Operating Range	-0.1 -1.0		+0.02 +0.02	μA
Battery Switchover Threshold V _{CC} - V _{BATT}	Power Up Power Down		70 50		mV
Battery Switchover Hysteresis			20		mV
BATT ON Output Voltage	I _{SINK} = 3.2mA			0.4	V
BATT ON Output Short Circuit Current	BATT ON = V _{OUT} = 4.5V Sink Current BATT ON = 0V Source Current	0.5	25 1	25	mA μA
RESET AND WATCHDOG TIMER					
Reset Voltage Threshold	T _A = Full Operating Range MAX690, MAX691, MAX694, MAX695 MAX692, MAX693	4.5 4.25	4.65 4.4	4.75 4.5	V V

Note 1: The input voltage limits on PFI and WDI may be exceeded provided the input current is limited to less than 10mA.

Microprocessor Supervisory Circuits

MAX690/91/92/93/94/95

ELECTRICAL CHARACTERISTICS (continued)

(V_{CC} = full operating range, V_{BATT} = 2.8V, T_A = 25°C, unless otherwise noted.)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Reset Threshold Hysteresis			40		mV
Reset Timeout Delay (MAX690/91/92/93)	Figure 6. OSC SEL HIGH, V_{CC} = 5V	35	50	70	ms
Reset Timeout Delay (MAX694/95)	Figure 6. OSC SEL HIGH, V_{CC} = 5V	140	200	280	ms
Watchdog Timeout Period, Internal Oscillator	Long Period, V_{CC} = 5V	1.0	1.6	2.25	sec
	Short Period, V_{CC} = 5V	70	100	140	ms
Watchdog Timeout Period, External Clock	Long Period	3840		4097	Clock Cycles
	Short Period	768		1025	Clock Cycles
Minimum WDI Input Pulse Width	V_{IL} = 0.4, V_{IH} = 0.8 V_{CC}	200			ns
RESET and LOW LINE Output Voltage	I_{SINK} = 1.6mA, V_{CC} = 4.25V I_{SOURCE} = 1 μ A, V_{CC} = 5V	3.5		0.4	V
RESET and WDO Output Voltage	I_{SINK} = 1.6mA I_{SOURCE} = 1 μ A, V_{CC} = 5V	3.5		0.4	V
Output Short Circuit Current	RESET, RESET, WDO, LOW LINE	1	3	25	μ A
WDI Input Threshold Logic Low Logic High	V_{CC} = 5V (Note 2)			0.8	V
		3.5			
WDI Input current	WDI = V_{OUT} WDI = 0V	-50	-15	50	μ A
POWER FAIL DETECTOR					
PFI Input Threshold	V_{CC} = +5V, T_A = Full	1.2	1.3	1.4	V
PFI Input Current			± 0.01	± 25	nA
PFO Output Voltage	I_{SINK} = 3.2mA I_{SOURCE} = 1 μ A	3.5		0.4	V
PFO Short Circuit Source Current	PFI = V_{IH} , PFO = 0V	1	3	25	μ A
CHIP ENABLE GATING					
CE IN Thresholds	V_{IL} V_{IH}	3.0		0.8	V
CE IN Pullup Current			3		μ A
CE OUT Output Voltage	I_{SINK} = 3.2mA I_{SOURCE} = 3.0mA I_{SOURCE} = 1 μ A, V_{CC} = 0V	$V_{OUT} - 1.5$ $V_{OUT} - 0.05$		0.4	V
CE Propagation Delay	V_{CC} = 5V		50	200	ns
OSCILLATOR					
OSC IN Input Current			± 2		μ A
OSC SEL Input Pullup Current			5		μ A
OSC IN Frequency Range	OSC SEL = 0V	0		250	kHz
OSC IN Frequency with External Capacitor	OSC SEL = 0V C_{OSC} = 47pF		4		kHz

Note 1: The input voltage limits on PFI and WDI may be exceeded provided the input current is limited to less than 10mA.

Note 2: WDI is guaranteed to be in the mid-level (inactive) state if WDI is floating and V_{CC} is in the operating voltage range. WDI is internally biased to 38% of V_{CC} with an impedance of approximately 125 kilohms.

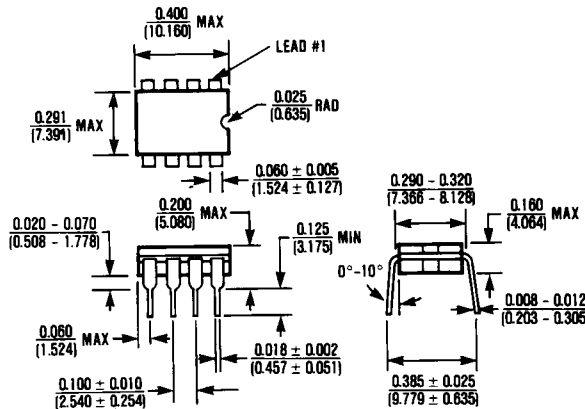
Microprocessor Supervisory Circuits

Table 2. Input and Output Status In Battery Backup Mode

V_{BATT} , V_{OUT}	V_{BATT} is connected to V_{OUT} via internal MOSFET.
RESET	Logic low
RESET	Logic high. The open circuit output voltage is equal to V_{OUT} .
$\overline{LOW\ LINE}$	Logic low
BATT ON	Logic high
WDI	WDI is internally disconnected from its internal pullup and does not source or sink current as long as its input voltage is between GND and V_{OUT} . The input voltage does not affect supply current.
\overline{WDO}	Logic high
PFI	The Power Fail Comparator is turned off and the Power Fail Input voltage has no effect on the Power Fail Output.
\overline{PFO}	Logic low
$\overline{CE\ IN}$	$\overline{CE\ IN}$ is internally disconnected from its internal pullup and does not source or sink current as long as its input voltage is between GND and V_{OUT} . The input voltage does not affect supply current.
$\overline{CE\ OUT}$	Logic high
OSC IN	OSC IN is ignored.
OSC SEL	OSC SEL is ignored.
V_{CC}	Approximately 12 μ A is drawn from the V_{BATT} input when V_{CC} is between $V_{BATT} + 100mV$ and $V_{BATT} - 700mV$. The supply current is 1 μ A maximum when V_{CC} is less than $V_{BATT} - 700mV$.

Package Information

(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information, go to www.maxim-ic.com/packages.)



8 Lead Cerdip (JA)

$$\theta_{JA} = 125^{\circ}C/W$$

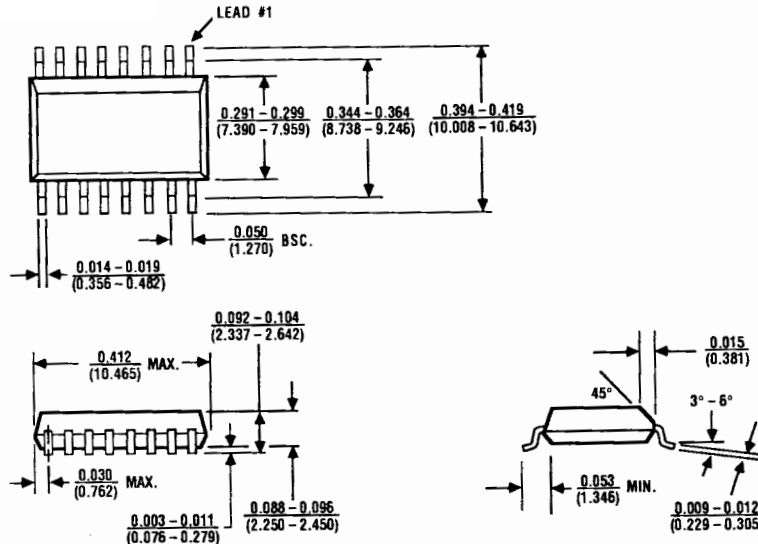
$$\theta_{JC} = 55^{\circ}C/W$$

Microprocessor Supervisory Circuits

Package Information (continued)

(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information

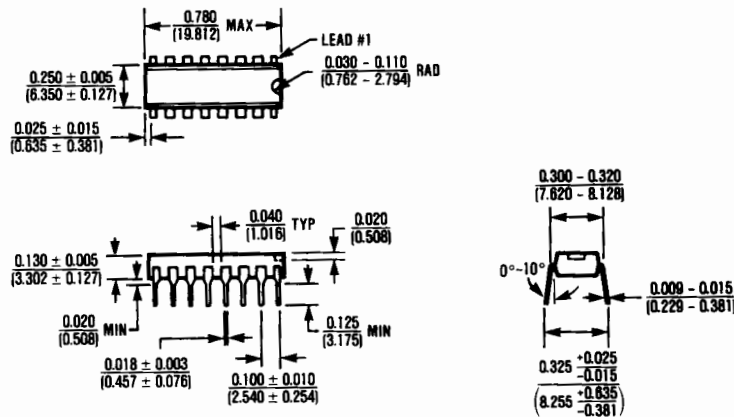
MAX690/91/92/93/94/95



16 Lead Small Outline, Wide (WE)

$$\theta_{JA} = 105^{\circ}\text{C/W}$$

$$\theta_{JC} = 60^{\circ}\text{C/W}$$



16 Lead Plastic DIP (PE)

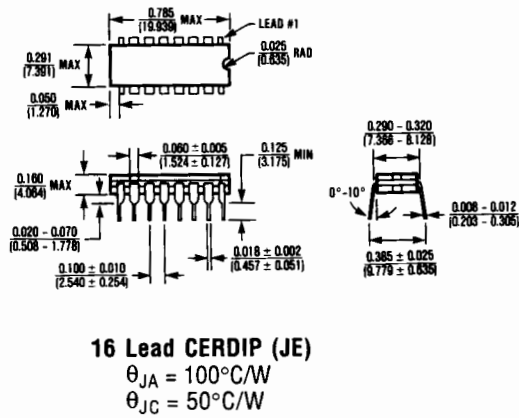
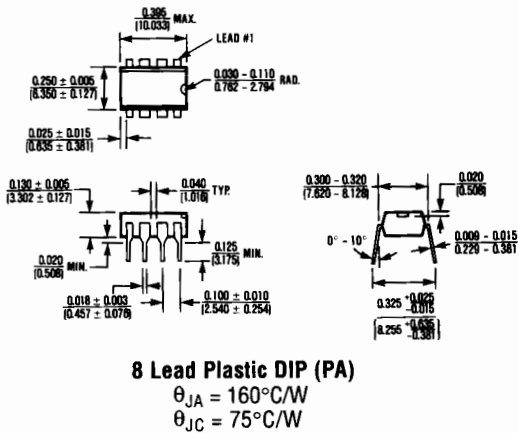
$$\theta_{JA} = 135^{\circ}\text{C/W}$$

$$\theta_{JC} = 65^{\circ}\text{C/W}$$

Microprocessor Supervisory Circuits

Package Information (continued)

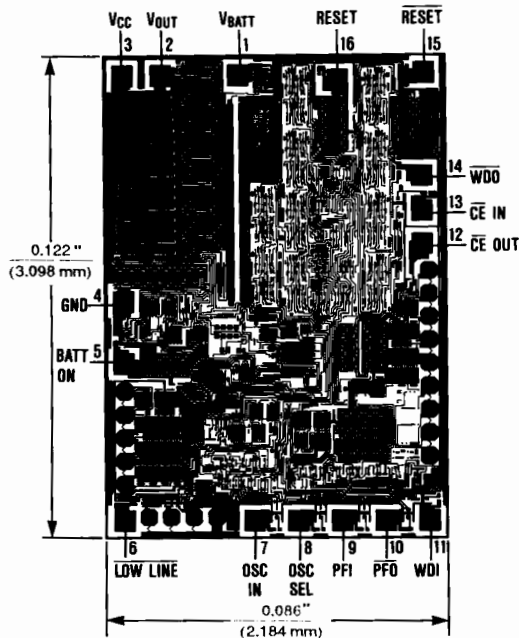
(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information



Ordering Information (continued)

PART	TEMP. RANGE	PIN-PACKAGE
MAX692C/D	0°C to +70°C	Dice
MAX692CPA	0°C to +70°C	8 Lead Plastic DIP
MAX692EPA	-40°C to +85°C	8 Lead Plastic DIP
MAX692EJA	-40°C to +85°C	8 Lead Cerdip
MAX692MJA	-55°C to +125°C	8 Lead Cerdip
MAX693C/D	0°C to +70°C	Dice
MAX693CPE	0°C to +70°C	16 Lead Plastic DIP
MAX693CWE	0°C to +70°C	16 Lead Wide SO
MAX693EPE	-40°C to +85°C	16 Lead Plastic DIP
MAX693EJA	-40°C to +85°C	16 Lead Cerdip
MAX693EWE	-40°C to +85°C	16 Lead Wide SO
MAX693MJE	-55°C to +125°C	16 Lead Cerdip
MAX694C/D	0°C to +70°C	Dice
MAX694CPA	0°C to +70°C	8 Lead Plastic DIP
MAX694EPA	-40°C to +85°C	8 Lead Plastic DIP
MAX694EJA	-40°C to +85°C	8 Lead Cerdip
MAX694MJA	-55°C to +125°C	8 Lead Cerdip
MAX695C/D	0°C to +70°C	Dice
MAX695CPE	0°C to +70°C	16 Lead Plastic DIP
MAX695CWE	0°C to +70°C	16 Lead Wide SO
MAX695EPE	-40°C to +85°C	16 Lead Plastic DIP
MAX695EJA	-40°C to +85°C	16 Lead Cerdip
MAX695EWE	-40°C to +85°C	16 Lead Wide SO
MAX695MJE	-55°C to +125°C	16 Lead Cerdip

Chip Topography



Devices in PDIP and SO packages 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. Lead free not available for Cerdip package.

Maxim cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim product. No circuit patent licenses are implied. Maxim reserves the right to change the circuitry and specifications without notice at any time.