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CONTACT FACTORY FOR COMPLETE DATA SHEET

MAXIM

Low-Cost µP Supervisory Circuits with Battery Backup

General Description

The MAX703 and MAX704 microprocessor (µP) supervisory circuits reduce the complexity and number of components required to monitor power-supply and battery functions in µP systems. These devices significantly improve system reliability and accuracy compared to separate ICs or discrete components.

The MAX703/MAX704 are available in 8-pin DIP and SO packages and provide four functions:

1) An active-low reset during power-up, power-down, and brownout conditions.
2) Battery-backup switching for CMOS RAM, CMOS µPs, or other low-power logic circuitry.
3) A 1.25V threshold detector for power-fail warning, low-battery detection, or for monitoring a power supply other than +5V.
4) An active-low manual-reset input.

The MAX703 and MAX704 differ only in their supply-voltage monitor levels. The MAX703 generates a reset when the supply drops below 4.65V, while the MAX704 generates a reset below 4.4V.

Applications

Computers

Controllers

Intelligent Instruments

Automotive Systems

Critical µP Power Monitoring

Features

- ♦ **Battery-Backup Power Switching**
- ♦ **Precision Supply-Voltage Monitor**
  4.65V (MAX703)
  4.40V (MAX704)
- ♦ **200ms Reset Pulse Width**
- ♦ **Debounced TTL-/CMOS-Compatible Manual-Reset Input**
- ♦ **200µA Quiescent Current**
- ♦ **50nA Quiescent Current in Battery-Backup Mode**
- ♦ **Voltage Monitor for Power-Fail or Low-Battery Warning**
- ♦ **8-Pin DIP and SO Packages**
- ♦ **Guaranteed $\overline{\text{RESET}}$ Assertion to V_{CC} = 1V**

Ordering Information

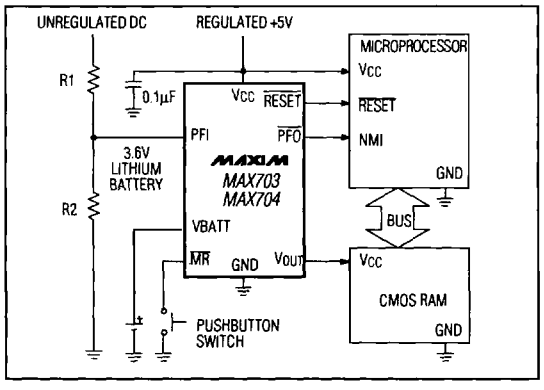
PART	TEMP. RANGE	PIN-PACKAGE
MAX703CPA	0°C to +70°C	8 Plastic DIP
MAX703CSA	0°C to +70°C	8 SO
MAX703C/D	0°C to +70°C	Dice*
MAX703EPA	-40°C to +85°C	8 Plastic DIP
MAX703ESA	-40°C to +85°C	8 SO
MAX703MJA	-55°C to +125°C	8 CERDIP**

Ordering Information continued on last page.

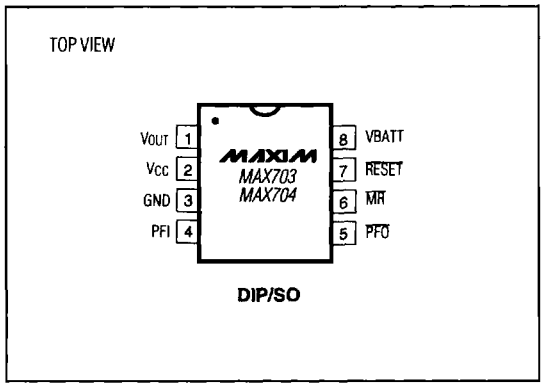
* *Dice are tested at T_A = +25°C only.*

** *Contact factory for availability and processing to MIL-STD-883.*

Typical Operating Circuit



Pin Configuration



Low-Cost µP Supervisory Circuits with Battery Backup

ABSOLUTE MAXIMUM RATINGS

Terminal Voltage (with respect to GND)
- V_{CC} ..... -0.3V to 6.0V
- VBATT ..... -0.3V to 6.0V
- All Other Inputs (Note 1) ..... -0.3V to (V_{CB} + 0.3V)

Input Current
- V_{CC} 200mA
- VBATT 50mA
- GND 20mA

Output Current
- V_{OUT} ..... Short-Circuit Protected for up to 10 sec
- All Other Outputs 20mA

Rate-of-Rise, V_{CC}, VBATT 100V/µs

Continuous Power Dissipation (T_A = +70°C)
- Plastic DIP (derate 9.09mW/°C above +70°C) 727mW
- SO (derate 5.88mW/°C above +70°C) 471mW
- CERDIP (derate 8.00mW/°C above +70°C) 640mW

Operating Temperature Ranges:
- MAX70_C__ ..... 0°C to +70°C
- MAX70_E__ ..... -40°C to +85°C
- MAX70_MJA ..... -55°C to +125°C

Storage Temperature Range ..... -65°C to +160°C

Lead Temperature (soldering, 10 sec) ..... +300°C

Note 1: V_{CB} is the greater of V_{CC} and VBATT. The input voltage limits on PFI and $\overline{MR}$ may be exceeded if the current into these pins is limited to less than 10mA.

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} = +4.75V to +5.5V for MAX703, V_{CC} = +4.5V to +5.5V for MAX704, V_{BATT} = 2.8V, T_A = T_{MIN} to T_{MAX}, unless otherwise noted.)

PARAMETER	SYMBOLS	CONDITIONS		MIN	TYP	MAX	UNITS
Operating Voltage Range V_{CC}, VBATT (Note 2)				0		5.5	V
Supply Current (Excluding I_{OUT})	I_{SUPPLY}	MAX70_C			200	350	µA
		MAX70_E/M			200	500	
I_{SUPPLY} in Battery-Backup Mode (Excluding I_{OUT})		V_{CC} = 0V, VBATT = 2.8V	T_A = +25°C		0.05	1.0	µA
			T_A= T_{MIN} to T_{MAX}			5.0	
VBATT Standby Current (Note 3)		5.5V> V_{CC} > VBATT + 0.2V	T_A = +25°C	-0.1		0.02	µA
			T_A=T_{MIN} to T_{MAX}	-1.0		0.02	
V_{OUT} Output		I_{OUT} = 5mA		V_{CC}-0.05	V_{CC}-0.025		V
		I_{OUT} = 50mA		V_{CC}-0.5	V_{CC}-0.25		
V_{OUT} in Battery-Backup Mode		I_{OUT} = 250µA, V_{CC} < VBATT-0.2V		VBATT-0.1	VBATT-0.02		V
Battery-Switch Threshold (V_{CC} - VBATT)		V_{CC} < V_{RST}	Power-Up		20		mV
			Power-Down		-20		
Battery-Switchover Hysteresis					40		mV
$\overline{RESET}$ Threshold	V_{RST}	MAX703		4.50	4.65	4.75	V
		MAX704		4.25	4.40	4.50	
$\overline{RESET}$ Threshold Hysteresis					40		mV
$\overline{RESET}$ Pulse Width	t_{RST}			140	200	280	ms
$\overline{RESET}$ Output Voltage	V_{OH}	I_{SOURCE} = 800µA		V_{CC}-1.5			V
	V_{OL}	I_{SINK} = 3.2mA				0.4	
		MAX70_C, V_{CC} = 1V, V_{CC} falling, VBATT = 0V, I_{SINK} = 50µA				0.3	
		MAX70_E/M, V_{CC} = 1.2V, V_{CC} falling, VBATT = 0V, I_{SINK} = 100µA				0.3	