LX6433

Precision Voltage Monitor

PRODUCTION DATA SHEET

DESCRIPTION

The LX6433 is a precise voltage monitor programmed to signal a low supply line condition. VMON is connected to the "monitored" supply line, when VMON drops below the threshold of 1.085V, RESET line goes low. When power is restored and VMON moves above the threshold voltage, RESET remains low for an additional 100ms to ensure system reset is fully applied.

Digital filtering inside the LX6433 ignores temporary dips in the VMON line lasting for less than 10µS to avoid false triggering.

The monitor operates over a supply range (VIN) of 3V to 6V. The RESET line is capable of sinking an output load current of 1mA. This line is protected from short circuit to VIN or Ground without damage.

Tight threshold detection allows for a 1.085V to 1.125V window over temperature. System efficiency is maintained with ultra low IQ of 20µA.

The 5 pin SOT-23 package provides a small form factor similar to industry standard device types in this category. This package is RoHS compliant allowing Pb free PCB assembly.

IMPORTANT: For the most current data, consult *MICROSEMI*'s website: **http://www.microsemi.com**

KEY FEATURES

- Precise Threshold Detection 1.105V ±0.02V
- 3V to 6.0V Operating Range
- Active Low RESET, Sink Current > 1mA
- RESET Pulse Duration Controlled, typical 100mS
- Quiescent Current < 40µA
- Wide Temperature: 0-85°C
- No External Components Required
- SOT-23, 5-Pin Package, RoHS Compliant (Pb-Free)
- Similar Devices: FM803, NCP803 and LM3724

APPLICATIONS/BENEFITS

- Portable Microprocessor Core Voltage Supply Monitor
- Supply Monitoring: 1.2V, 2.5V, 3.3V, 5V or any other level.

PRODUCT HIGHLIGHT

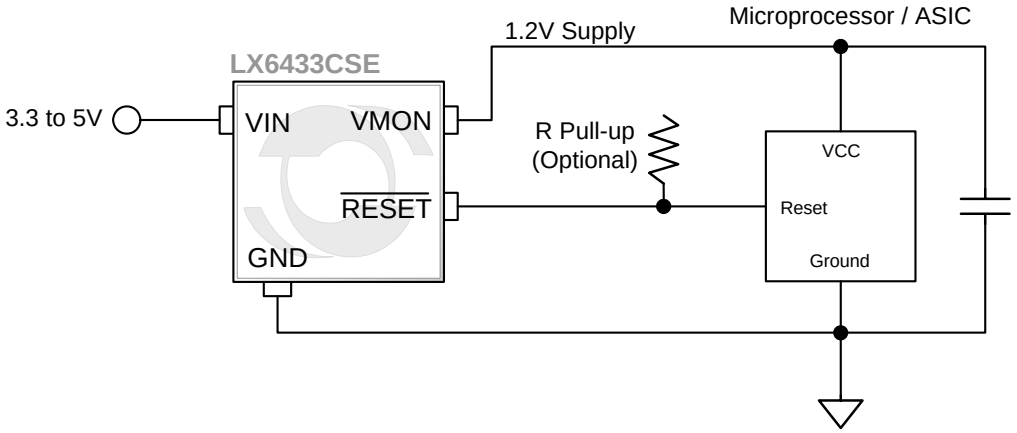


Figure 1 – LX6433 Typical Application Circuit

PACKAGE ORDER INFORMATION

T_A(°C)	Supply Voltage (VIN)	Fault Detection Threshold Voltage	SE Plastic SOT-23 5-PIN (Pb Free) RoHS Compliant / Pb-free
0 to 85	3 to 6V	1.105V +/-1.8%	**LX6433CSE**

Device Marking: 2975

Note: Available in Tape & Reel. Append the letters "TR" to the part number. (i.e. LX6433CSE-TR)

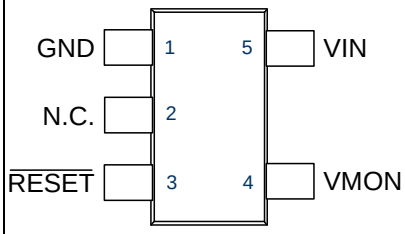
Microsemi
Analog Mixed Signal Group
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570

ABSOLUTE MAXIMUM RATINGS

Input Voltage (IN) ..... -0.3V to 7.0V
Monitor (VMON) ..... -0.3V to 7.0V
$\overline{\text{RESET}}$ to GND ..... -0.3V to (V_{IN} + 0.3V)
Operating Temperature Range ..... -40°C to +125°C
Storage Temperature Range, T_A ..... -65°C to 150°C
Maximum Junction Temperature ..... 150°C
RoHS / Pb-free Peak Package Solder Reflow Temperature
(40 seconds maximum exposure) ..... 260°C (+0,-5)

Note: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of specified terminal.

PACKAGE PIN OUT



SE PACKAGE
(Top View)

RoHS / Pb-free 100% Matte Tin Pin Finish

THERMAL DATA

SE **Plastic SOT-23 5-Pin**

THERMAL RESISTANCE-JUNCTION TO AMBIENT, θ_{JA}	300°C/W

Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$.
The θ_{JA} numbers are guidelines for the thermal performance of the device/pc-board system. All of the above assume no ambient airflow.

FUNCTIONAL PIN DESCRIPTION

NAME	DESCRIPTION
VIN	Supply voltage, Operational From 3.0V to 6.0V.
VMON	Monitored input of 1.2V supply.
GND	Circuit ground.
$\overline{\text{RESET}}$	Output pin, low level indicates fault mode.

ELECTRICAL CHARACTERISTICS

Specifications apply over the ambient temperature of: 0°C ≤ T ≤ 85°C for V_{IN} = 5V (except where otherwise noted). Typical values are at T_A=25°C.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Operating Range	VIN_{OP}	Functional operation (correct logic state for RESET)	3.0		6.0	V
Reset High	$VMON_{TH+}$	VMON rising, RESET = high (after timeout cycle is completed)	1.085			V
Reset Low	$VMON_{TH-}$	VMON falling, RESET = low			1.125	V
RESET Pulse Duration	$RESET_{PW}$	Time RESET remains low after VMON rises above the threshold	50	100	150	mS
Quiescent Current (Ground Pin)	I_Q	RESET Open			40	µA
VMON Transient Filter	$VMON_{TRANSIENT}$	RESET unchanged for VMON drop below $VMON_{TH-}$			10	µS
	$VMON_{TRIGGER\ PW}$	RESET activated for momentary dip in VMON below $VMON_{TH-}$	5			µS
RESET VOUT LOW	V_{OL}	I_{SINK} = 10mA, V_{IN} = 5V ± 10%		.05	0.4	V
RESET VOUT LOW	V_{OL}	I_{SINK} = 20mA, V_{IN} = 5V ±10% T_A 0°C to 70°C		.05	0.4	V
RESET Leakage	I_{LKG}	VMON > 1.2V, V_{RESET} = 5V		.02	1	µA
RESET DELAY after Trigger	T_{DELAY}	Time from VMON falling below threshold to RESET going low, VMON overdrive of 50mV.			11	µS

Microsemi
Analog Mixed Signal Group
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570

SIMPLIFIED BLOCK DIAGRAM

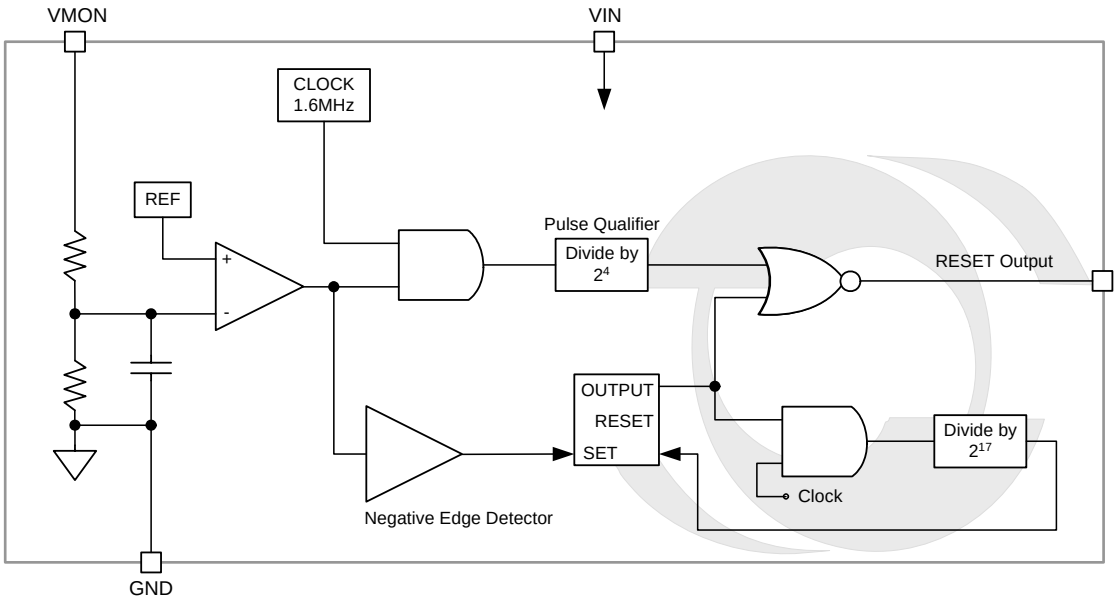
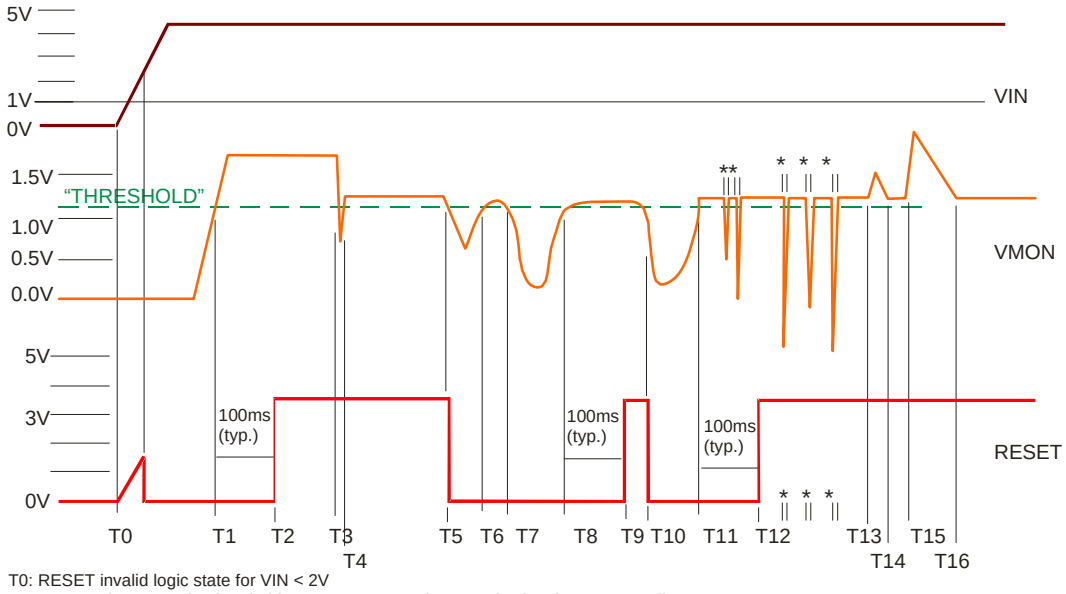


Figure 2 – Simplified Block Diagram



T0: RESET invalid logic state for VIN < 2V
T1- T1 Vmonitor exceeds Threshold, at T1, RESET pulse remains low for 100ms until T2.
T3 - T4: Transient on VIN is ignored, less than 10usec duration for Vmonitor < THRESHOLD. (Same applies for *)
T5: Vmonitor drops below Threshold, remains low for > 10usec which activates RESET Low.
T6: Vmonitor rises above Threshold but previous fault at T5 has not cycled through full timeout (T 6-T7 < 50mS), RESET remains low.
T7: Vmonitor fals below Threshold, RESET remains low.
T7-T8 duration > 10uS, RESET timer restarted for 100mS timeout
T8-T9: Duration exceeds 150ms, RESET timer cycle completed, output rises
T10-T11: Vmonitor falls below Threshold for > 10uS, RESET signal goes low.
T13-T14, T15-T16 :Vmonitor is above Threshold, no limits apply for peak voltage or duration.

Figure 3 – Timing Diagram

Microsemi
Analog Mixed Signal Group
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570

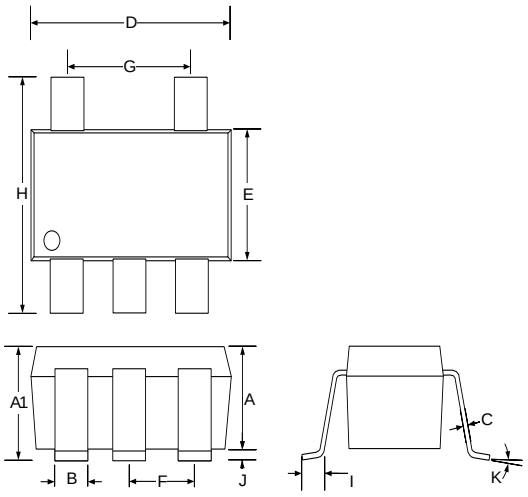
FUNCTIONAL DESCRIPTION

The LX6433 operates as a power supply monitor with a threshold window of 1.085V to 1.125V (±1.8%) that can be programmable using external resistors. The VMON pin is the input to the internal comparator and VIN is the power source for the IC. The RESET pin is an open drain, with active low logic. An external pull-up resistor can be used if the device (ASIC) driven does not provide this feature.

As VMON ramps upwards from zero, RESET is held low until VMON exceeds the threshold, this starts an internal 100ms timer which continues to hold RESET low for that interval. As long as VMON remains above the threshold level and the 100ms timer has completed the cycle, RESET remains high (high impedance state). If a transient of less than 10uS interrupts VMON causing a drop below the threshold the LX6433 will ignore the event. If VMON does drop below the threshold for greater than 12µS the RESET will remain low until VMON recovers above the threshold and the RESET time pulse has been timed out (100ms).

PACKAGE DIMENSIONS

SE 5 Pin Plastic SOT-23



Dim	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.90	1.30	0.035	0.051
A1	0.90	1.45	0.035	0.057
B	0.25	0.50	0.010	0.020
C	0.09	0.20	0.004	0.008
D	2.80	3.10	0.110	0.122
E	1.50	1.75	0.059	0.069
F	0.95 BSC		0.038 BSC	
G	1.90 BSC		0.075 BSC	
H	2.60	3.00	0.102	0.118
I	0.35	0.55	0.014	0.022
J	0.00	0.15	0.000	0.006
K	10° MAX		10° MAX	

Note:

1. Controlled dimensions are in mm, inches are for reference only.
2. Dimensions do not include mold flash or protrusions; these shall not exceed 0.155mm (.006") on any side. Lead dimension shall not include solder coverage

Microsemi
Analog Mixed Signal Group
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570

CHARACTERISTIC CURVES

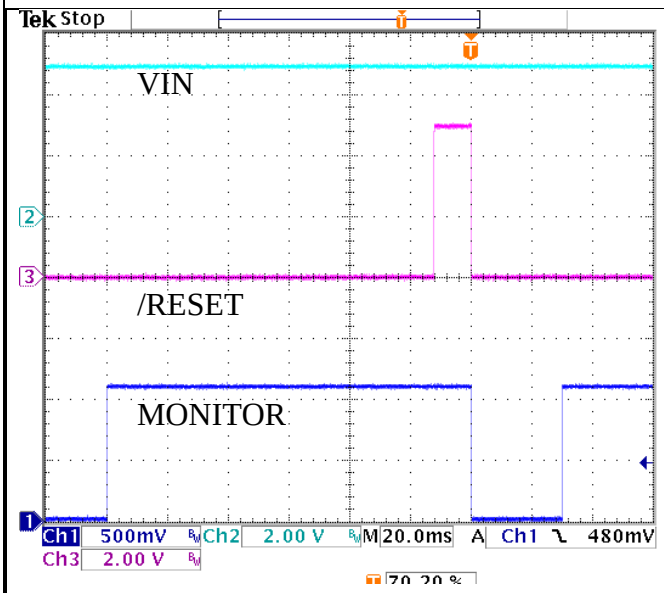


Figure 4 Reset Pulse Width after $V_{MONITOR}$ "GOOD"

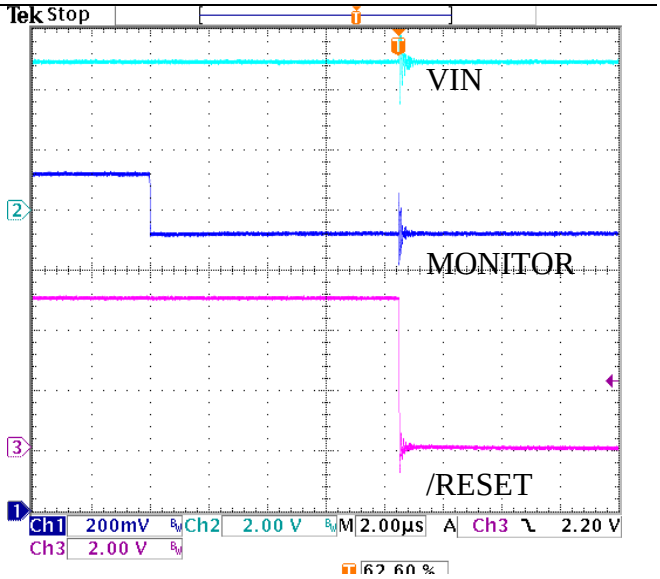


Figure 5 Reset Delay after $V_{MONITOR}$ Falls

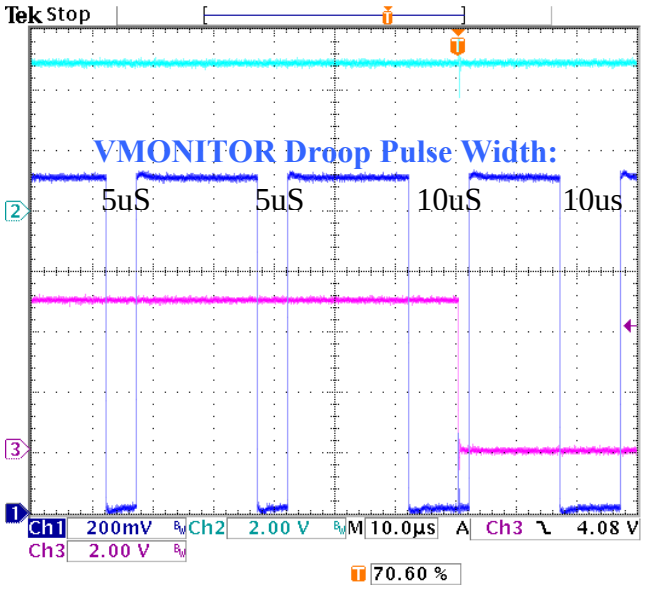


Figure 6 $V_{MONITOR}$ Digital Filter, Reset Logic Ignores Pulse Widths of < 5µS

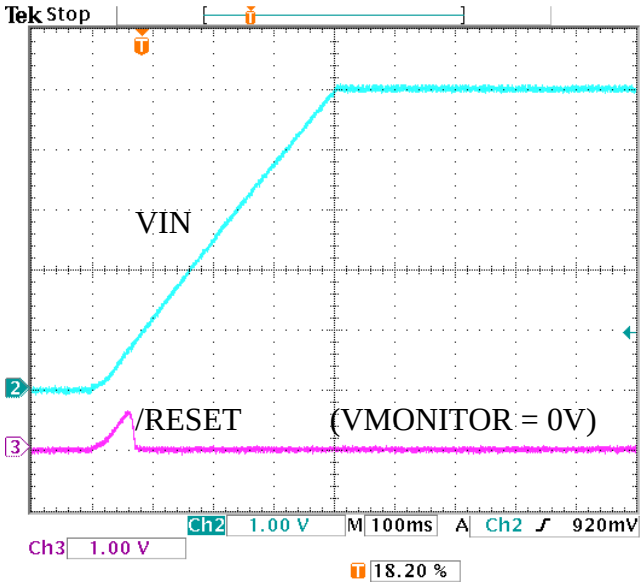


Figure 7 Start-up for VIN

Microsemi
Analog Mixed Signal Group
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570

NOTES

Microsemi
Analog Mixed Signal Group
11861 Western Avenue, Garden Grove, CA. 92841, 714-898-8121, Fax: 714-893-2570