



BX300

Ultralow Power Supervisory ICs with Watchdog Timer and Manual Reset

Datasheet

DS-300-00

Version: 2.2

Released Date: 2019/09/18

General Description

The BX300 is a voltage supervisory circuits that monitor power supply voltage levels and code execution integrity in microprocessor-based systems. Apart from providing power-on reset signals, an on-chip watchdog timer can reset the microprocessor if it fails to strobe within a preset timeout period. A reset signal can also be asserted by an external push-button through a manual reset input.

The ultralow power consumption of these devices makes them suitable for power efficiency sensitive systems, such as battery-powered portable devices and energy meters.

There are several monitoring threshold options shown in Table 6. Each device subdivides into sub-models with differences in factory preset voltage monitoring threshold options. In the range of 1.5 V to 4.63 V, seven options are available for the BX300 family. The BX300 can reset on demand through the manual reset input. The watchdog function on the BX300 monitors the heartbeat of the microprocessor through the WDI pin. The BX300 has a watchdog disable input, which allows the user to disable the watchdog function, if required.

The BX300 is available in a 6-ball, 1.46 mm × 0.96 mm WLCSP. The device is specified over the temperature range of -40°C to +85°C.

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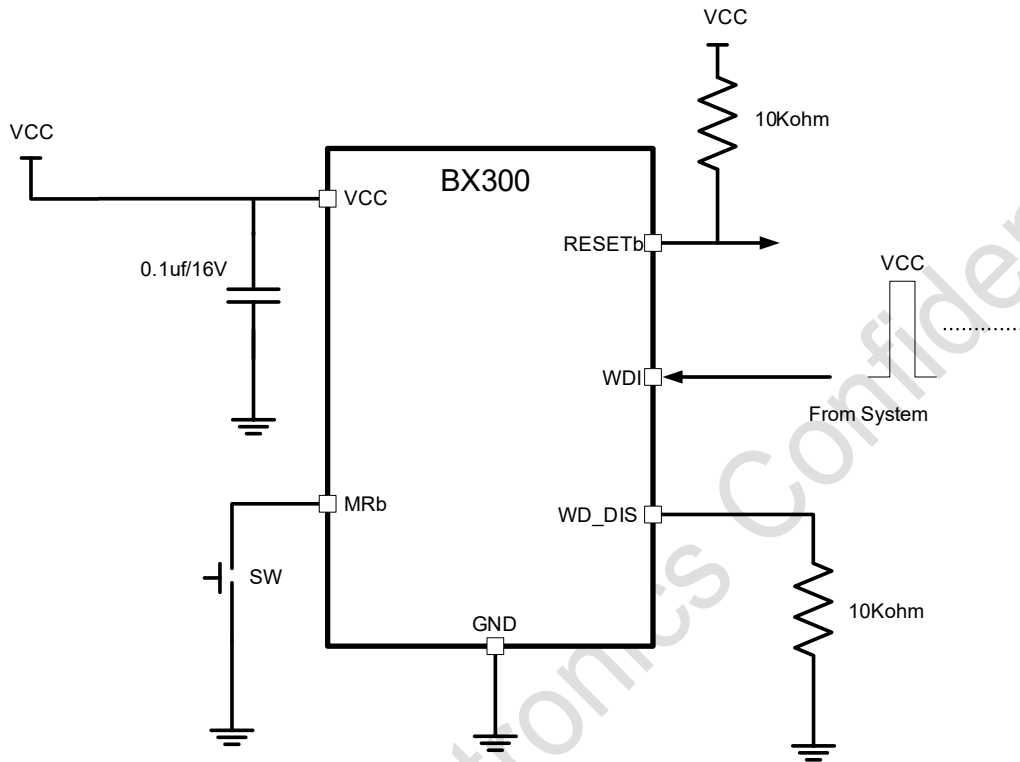
Feature

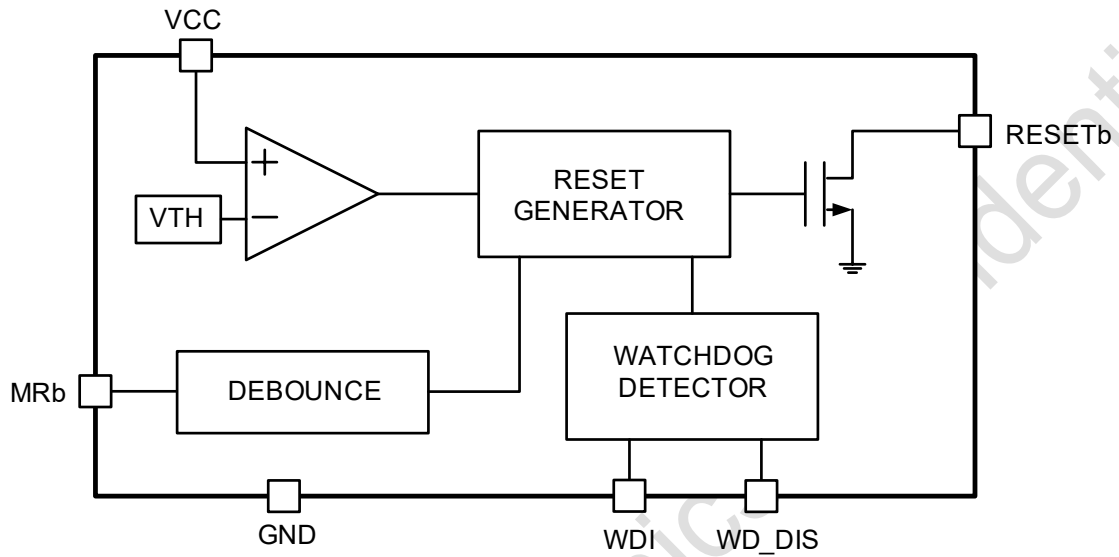
Ultralow power consumption With $I_{CC}=134nA$. (Typical)
Continuous monitoring with no blank time.
Pretrimmed voltage monitoring threshold options.
+/- 1.3% threshold accuracy at typical temperature range.
Manual input reset.
200ms(typical) reset timeout.
Watchdog timer and Watchdog disable input.
Active low, open-drain RESETb output.
Power supply glitch immunity.
Available in 1.46mm x 0.96mm WLCSP.
Operational temperature range :-40°C to +85°C.

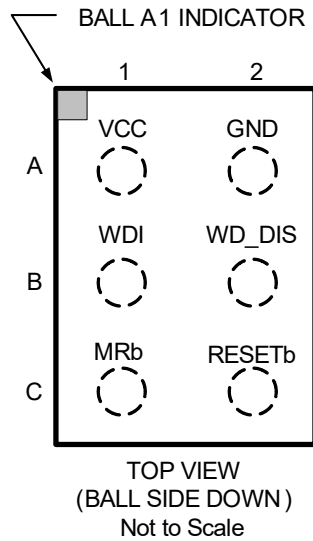
Applications

Portable/battery-operated equipment.
Microprocessor systems.
Energy metering.
Energy harvesting.

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PIN CONFIGURATION AND FUNCTION DESCRIPTION

Table 1.

Pin No.	Pin Function	Pin Description
A1	VCC	Power Supply Input. The voltage on the VCC pin is monitored on the BX300. It is recommended to place a 0.1 μ F decoupling capacitor as close as possible to the device between the VCC pin and the GND pin.
A2	GND	GROUND
B1	WDI	Watchdog Timer Input.
B2	WD_DIS	Watchdog Function Disable Input. Tie this pin high to disable the watchdog function of the device. Connect this pin to ground if it is not used. (Note that pin logic high level must avoid to exceed VCC)
C1	MRb	Manual Reset Input, Active Low.
C2	RESETb	Active Low , open-drain RESETb Output.

ABSOLUTE MAXIMUM RATINGS

(Note: Do not exceed these limits to prevent damage to the device. Exposure to absolute maximum rating conditions for long periods may affect device reliability.)

Table 2.

Parameter	Value	Unit
VCC	-0.3 ~ +6	V
WD_DIS	-0.3 ~ +6	V
RESETb	-0.3 ~ +6	V
MRb	-0.3 ~ Vcc+0.3	V
WDI	-0.3 ~ Vcc+0.3	V
Input/Output Current	10	mA
Storage Temperature Range	-40°C to 150°C	NA

Thermal Resistance

θ_{JA} is specified for a device soldered on an FR4 board with a minimum footprint.

Table 3.

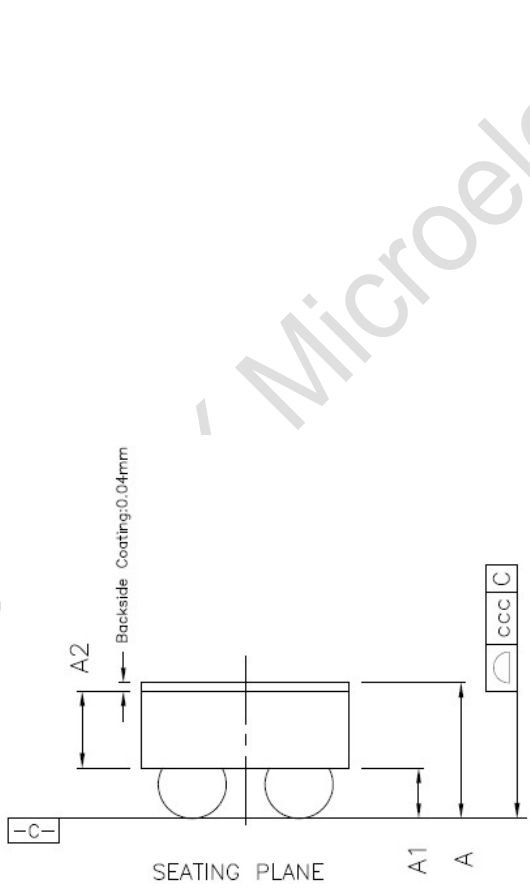
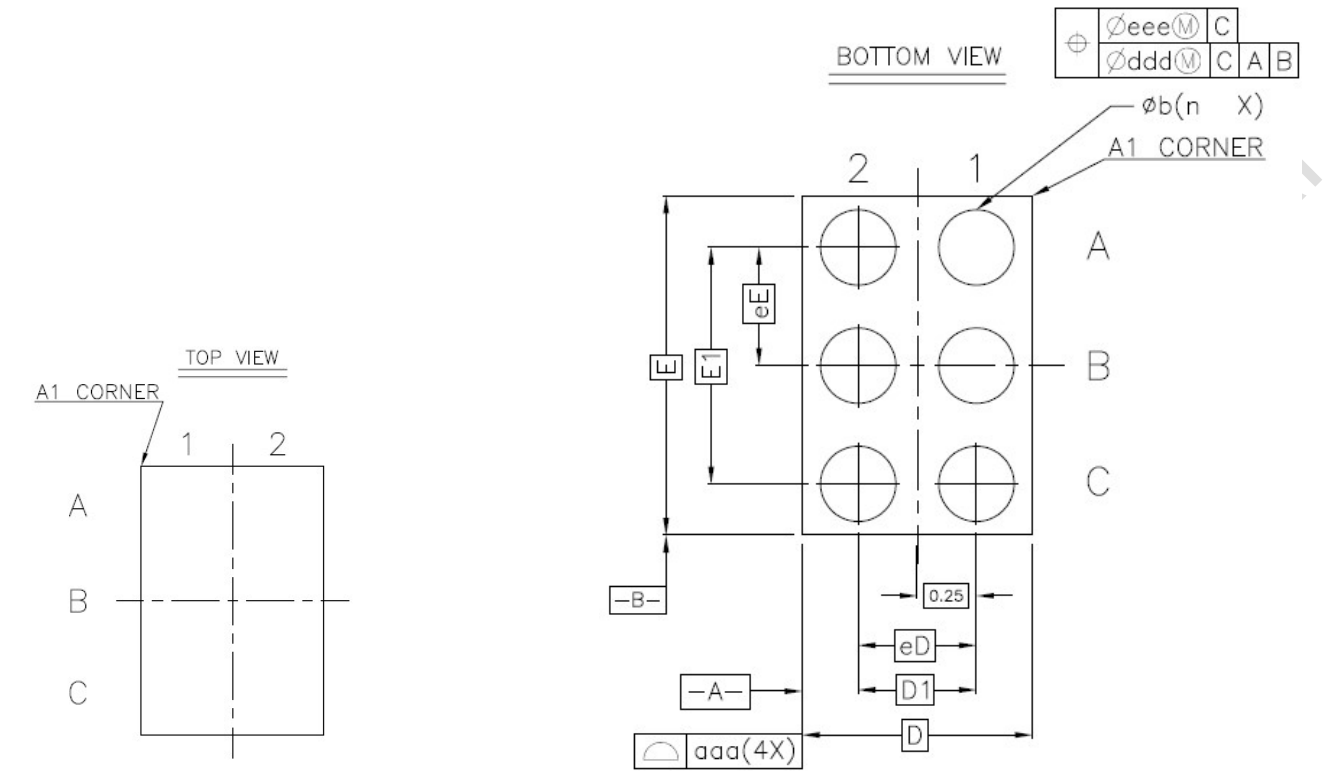
Package Type	θ_{JA}	Unit
6-Ball WLCSP	105.6	$^{\circ}$ C/W

Electrical Characteristics

VCC=2.0 V to 5.5 V , Ta=25°C ,unless otherwise noted. Typical value are at VCC=3.5V.

Table 4.

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
OPERATING VOLTAGE RANGE						
Input Voltage	VCC	Guarantees valid RESETb output	0.9		5.5	V
INPUT CURRENT						
VCC Quiescent Current	I _{CC}	VCC = 2.0 V to 5.5 V, RESETb deasserts, V _{WDI} = VCC	96	134	225	nA
RESETb OUTPUT						
RESETb THRESHOLD VOLTAGE	V _{TH}	Input falling , see table 12	2.596	2.63	2.664	V
RESETb THRESHOLD HYSTERESIS	V _{HYST}	V _{TH} > 1V	--	0.9%*V _{TH}	--	V
RESETb TIMEOUT PERIOD	T _{RP}		170	200	240	ms
Output Voltage Low	V _{RST_OL}	VCC > 4.25V , Isink=6.5mA			0.4	V
		VCC > 2.5V , Isink=6mA			0.4	
		VCC > 1.2V , Isink=4.6mA			0.4	
		VCC > 0.9V , Isink=0.9mA			0.4	
Leakage Current		V _{RESETb} =VCC=5.5V		5		nA
PROPAGATION DELAY						
VCC to RESETb	T _{PD_VCC}	VCC falling with V _{TH} × 10% overdrive		2.5		ms
INPUT GLITCH REJECTION						
VCC Glitch Rejection	T _{GR_VCC}	VCC falling, with V _{TH} × 10% overdrive		58		us
WATCHDOG INPUT , WDI						
Watchdog Timeout Period	T _{WD}	Base period, WD_DIS low Extended period, WD_DIS high	22.3	25.6	30.5	sec
Leakage Current		V _{WDI} =VCC=5.5V			5	nA
Input Threshold High			0.9		--	V
Input Threshold Low					0.4	V
WDI Pulse Width	T _{WPR}		85			ns
	T _{WPF}		300			ns
WDI Glitch Rejection				60		ns
MANUAL RESET INPUT , MRb						
VIL			--	--	0.5	V
VIH			1.5	--	--	V
MRb Minimum Input Pulse Width			1	--	--	us
MRb Glitch Rejection			--	0.4	--	us
MRb to #Reset Delay	T _{D_MR}		--	0.65	--	us
MRb Pull-Up Resistance			500	600	820	KΩ
WATCHDOG TIMEOUT DISABLE INPUT,WD_DIS						
VIL			--	--	0.4	V
VIH			0.9	--	--	V
Leakage Current		V _{WD_DIS} =VCC	--	--	5	nA
Glitch Rejection			--	0.1	--	us



	SYMBOL	COMMON DIMENSIONS		
		MIN.	NOM.	MAX.
Total Thickness	A	0.596	0.636	0.676
Stand Off	A1	0.206	-	0.266
Wafer Thickness	A2	0.36		± 0.025
Body Size	D	0.973		BSC
	E	1.435		BSC
Ball Diameter (Size)		0.300		
Ball/Bump Width	b	0.289	0.319	0.349
Ball/Bump Pitch	eD	0.500		
	eE	0.500		
Ball/Bump Count	n	6		
Edge Ball Center to Center	D1	0.500		BSC
	E1	1.000		BSC
Package Edge Tolerance	aaa	0.030		
Coplanarity (whole wafer)	ccc	0.075		
Ball/Bump Offset (Package)	ddd	0.050		
Ball/Bump Offset (Ball)	eee	0.015		