

Features

- Precision supply voltage monitor
 - 2.32 V(CBM803Z/CBM809Z/CBM810Z)
 - 2.63 V(CBM803R/CBM809R/CBM810R)
 - 2.93 V(CBM803S/CBM809S/CBM810S)
 - 3.08 V(CBM803T/CBM809T/CBM810T)
 - 4.00 V(CBM803J/CBM809J/CBM810J)
 - 4.38 V(CBM803M/CBM809M/CBM810M)
 - 4.63 V(CBM803L/CBM809L/CBM810L)
 - 17 μ A quiescent current
 - Reset assertion down to 1 V VCC
 - 140 ms minimum power-on reset
 - Open-drain RESET output (CBM803X)
 - Push-pull RESET output (CBM809X)
 - Push-pull RESET output (CBM810X)
- * X=L,M,J,T,S,R,Z

Applications

- Microprocessor systems
- Computers
- Controllers
- Intelligent instruments

General Description

The CBM803X/CBM809X/CBM810X supervisory circuits monitor the power supply voltage in microprocessor systems. They provide a reset output during power-up, power-down, and brownout conditions. On power-up, an internal timer holds reset asserted for 240 ms. This holds the microprocessor in a reset state until conditions have stabilized. The reset output remains operational with VCC as low as 1 V. The CBM803X and CBM809X provide an active low reset signal ($\overline{\text{RESET}}$), whereas the CBM810X provides an active high signal (RESET) output. The CBM809X and CBM810X have push-pull outputs, whereas the CBM803X has an open-drain output, which requires an external pull-up resistor.

Seven reset threshold voltage options are available, suitable for monitoring a variety of supply voltages (see Table 3).

The reset comparator features built-in glitch immunity, making it immune to fast transients on VCC.

The CBM803X/CBM809X/CBM810X consume only 17 μ A, making them suitable for low power, portable equipment. The CBM803X is available in a 3-lead SC70; the CBM809X/CBM810X are available in 3-lead SOT-23 and 3-lead SC70 packages.

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Functional Block Diagrams

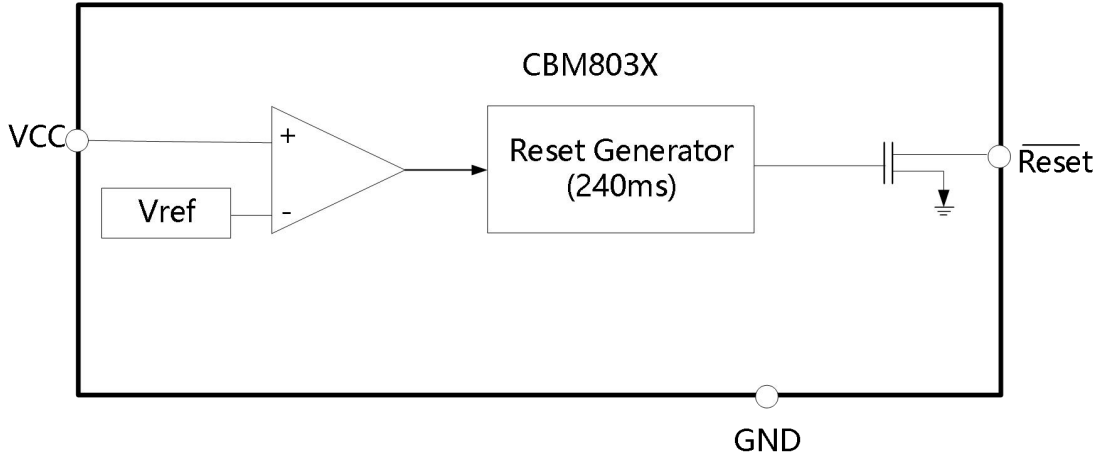
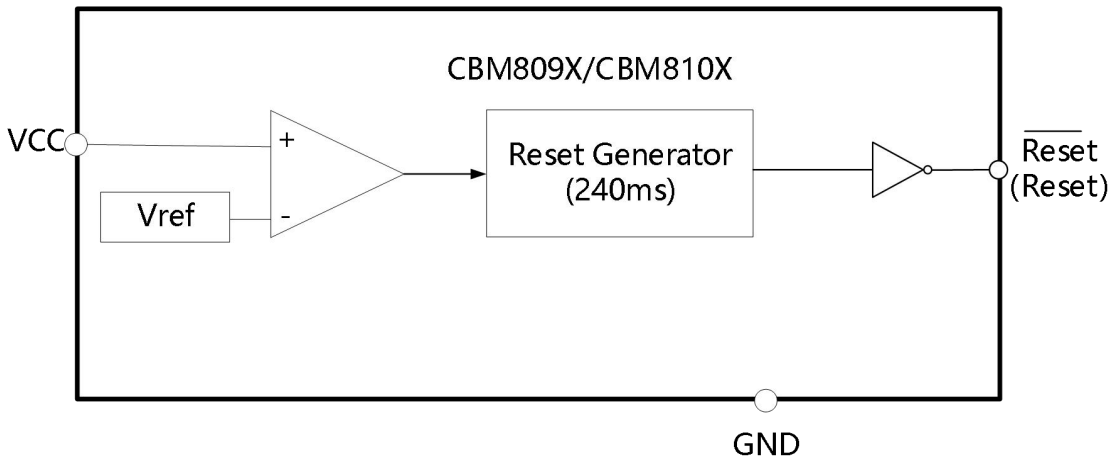


Figure1. CBM803X Series product block diagram



*VREF (reference voltage) = seven monitoring voltage points, see Table 3 for details

Figure2. CBM809X/CBM810X Series product block diagram

Specifications

V_{CC} = full operating range, $T_A = T_{MIN}$ to T_{MAX} , V_{CC} typical = 5 V for L/M/J models, 3.3 V for T/S models, 3 V for R models, and 2.5 V for Z models, unless otherwise noted.

Table 1.

Parameter	Min	Typ	Max	Unit	Test Conditions/Comments
POWER SUPPLY					
V_{CC} Operating Voltage Range	1.0		5.5	V	
Supply Current		24	35	μA	$V_{CC} < 5.5V, CBM8xxL/M/J$
		17	30	μA	$V_{CC} < 3.6V, CBM8xxR/S/T/Z$
LOGIC OUTPUT					
Reset Threshold(V_{RST})	4.56	4.63	4.70	V	CBM803L/CBM809L/CBM810L
	4.31	4.38	4.45	V	CBM803M/CBM809M/CBM810M
	3.93	4.00	4.06	V	CBM803J/CBM809J/CBM810J
	3.04	3.08	3.11	V	CBM803T/CBM809T/CBM810T
	2.89	2.93	2.96	V	CBM803S/CBM809S/CBM810S
	2.59	2.63	2.66	V	CBM803R/CBM809R/CBM810R
	2.28	2.32	2.35	V	CBM803Z/CBM809Z/CBM810Z
Reset Active Timeout Period	140	240	460	ms	
RESET OUTPUT VOLTAGE LOW (CBM803X/CBM809X)					
V_{OL}			0.3	V	$V_{CC} = V_{TH} \text{ min}, I_{SINK} = 1.2 \text{ mA},$ CBM803R/S/T/Z, CBM809R/S/T/Z
			04	V	$V_{CC} = V_{TH} \text{ min}, I_{SINK} = 3.2 \text{ mA},$ CBM803L/M/J, CBM809L/M/J
			0.3	V	$V_{CC} > 1.0 \text{ V}, I_{SINK} = 50 \mu A$
RESET OUTPUT VOLTAGE HIGH(CBM809X)					
V_{OH}	$0.8 V_{CC}$			V	$V_{CC} > V_{TH} \text{ max}, I_{SOURCE} = 500 \mu A,$ CBM809R/S/T/Z
	$V_{CC} - 1.5$			V	$V_{CC} > V_{TH} \text{ max}, I_{SOURCE} = 800 \mu A,$ CBM809L/M/J
RESET OUTPUT VOLTAGE LOW (CBM810X)					
V_{OL}			0.3	V	$V_{CC} = V_{TH} \text{ min}, I_{SINK} = 1.2 \text{ mA},$ CBM810R/S/T/Z

			0.4	V	$V_{CC} = V_{TH} \text{ min, } I_{SINK} = 3.2 \text{ mA,}$ CBM810L/M/J
RESET OUTPUT VOLTAGE HIGH (CBM810X)					
V_{OH}	$0.8V_{CC}$			V	$1.8 \text{ V} < V_{CC} < V_{TH} \text{ min, } I_{SOURCE} = 150 \mu\text{A}$
RESET OPEN-DRAIN OUTPUT (CBM803X)					
Leakage Current			1	μA	$V_{CC} > V_{TH}, \overline{\text{RESET}}$ deasserted

Absolute Maximum Ratings

$T_A = 25^\circ\text{C}$, unless otherwise noted.

Table 2.

Parameter	Ratings
V_{CC}	-0.3 V to +6 V
RESET, $\overline{\text{RESET}}$ (Push-Pull)	-0.3V to $V_{CC}+0.5\text{V}$
RESET (Open-Drain)	-0.3 V to +6.0 V
Input Current(V_{CC})	20mA
Output Current(RESET, $\overline{\text{RESET}}$)	20mA
Rate of Rise, V_{CC}	100 V/ μs
θ_{JA} Thermal Impedance	146°C/W(SC70)
	270°C/W(SOT-23)
Lead Temperature (Soldering, 10 sec)	300°C
Vapor Phase (60 sec)	215°C
Infrared (15 sec)	220°C
Storage Temperature Range	-65°C to +150°C

Table 3.Reset Threshold Options

RESET Model	Threshold(V)
CBM803L/CBM809L/CBM810L	4.63
CBM803M/CBM809M/CBM810M	4.38
CBM809J/CBM810J	4.00
CBM803T/CBM809T/CBM810T	3.08
CBM803S/CBM809S/CBM810S	2.93
CBM803R/CBM809R/CBM810R	2.63
CBM803Z/CBM809Z/CBM810Z	2.32

Pin Configurations And Function Descriptions

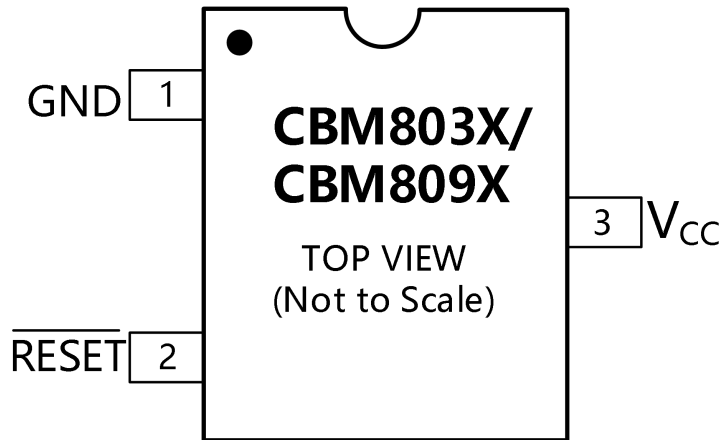


Figure 3. CBM803X/CBM809X

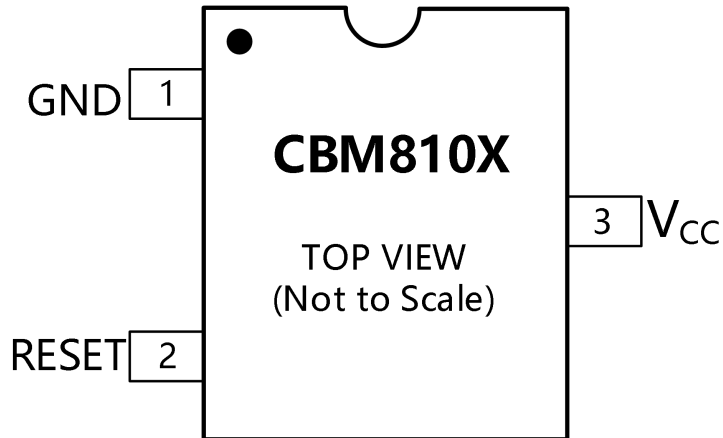


Figure 4. CBM810X

Table4. Pin Function Descriptions

Pin No.		Mnemonic	Description
CBM803X/CBM809X	CBM810X		
1	1	GND	Ground Reference for All Signals; 0 V.
N/A	2	RESET	Active High Logic Output. RESET remains high while V _{CC} is below the reset threshold and remains high for 240ms (typical) after V _{CC} rises above the reset threshold.
2	N/A	$\overline{\text{RESET}}$	Active Low Logic Output. RESET remains low while V _{CC} is below the reset threshold and remains low for 240ms (typical) after V _{CC} rises above the reset threshold.
3	3	V _{CC}	Supply Voltage Being Monitored.

Typical Performance Characteristics

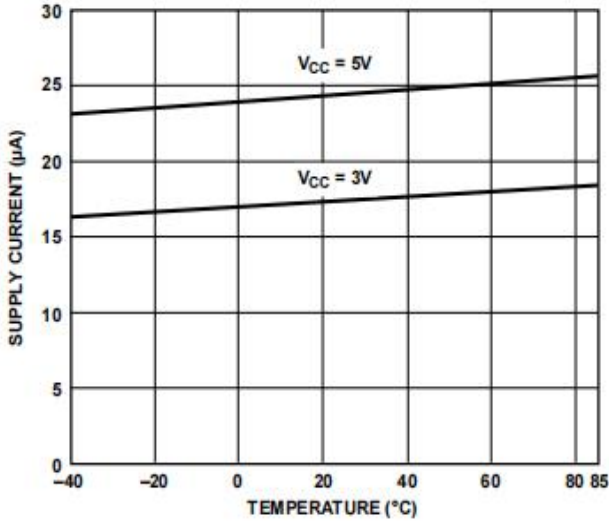


Figure 5. Supply Current vs. Temperature (No Load)

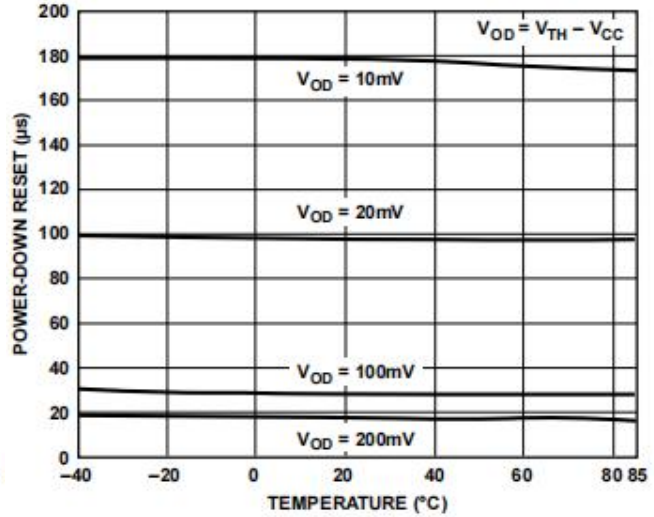


Figure 6. Power-Down Reset Delay vs. Temperature, CBM8xxL/M/J

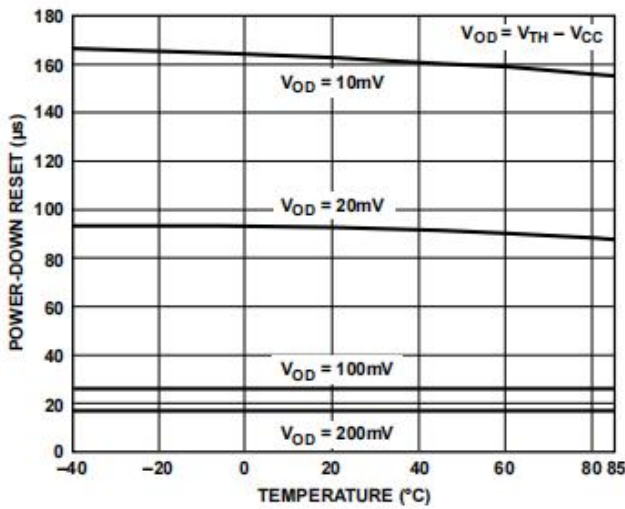


Figure 7. Power-Down Reset Delay vs. Temperature, CBM8xxT/S/R/Z

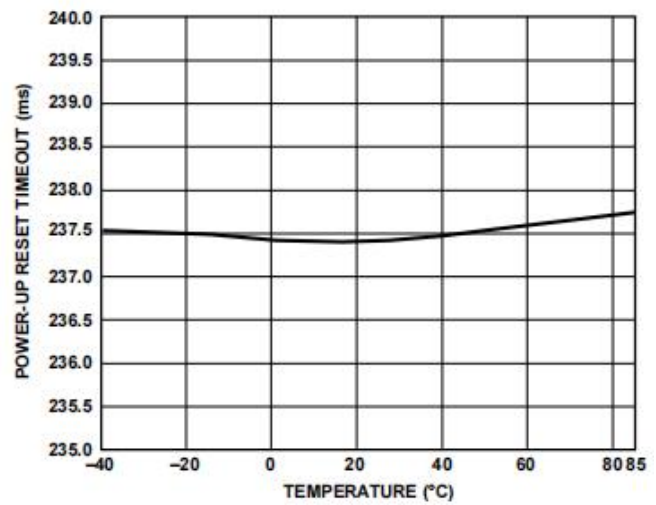


Figure 8. Power-Up Reset Timeout vs. Temperature, CBM8xxR

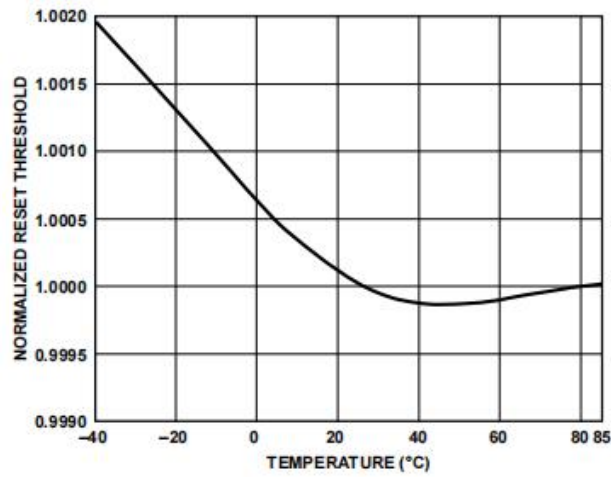


Figure 9. Normalized Reset Voltage Threshold vs. Temperature

Interfacing To Other Devices

The CBM803X/CBM809X/CBM810X series is designed to integrate with as many devices as possible and, therefore, has a standard output dependent on VCC. This enables the parts to be used in both 3 V and 5 V, or any nominal voltage within the minimum and maximum specifications for V_{CC}. This design simplifies interfacing the CBM803X/CBM809X/CBM810X to other devices.

- **Ensuring A Valid Reset Output Down To VCC=0**

When V_{CC} falls below 0.8 V, the CBM803X/CBM809X RESET no longer sinks current. A high impedance CMOS logic input connected to RESET may, therefore, drift to undetermined logic levels. To eliminate this problem, a 100 kΩ resistor should be connected from RESET to ground.

- **Benefits Of An Accurate Reset Threshold**

In other microprocessors, tolerances in supply voltages lead to an overall increase in reset tolerance levels due to the deterioration of the reset circuit' s power supply. In the CBM803X/CBM809X/CBM810X, the possibility of a malfunction during a power failure is greatly reduced because the devices can operate effectively even when there are large degradations

of the supply voltages. Another advantage is the very accurate internal voltage reference circuit of the CBM803X/CBM809X/CBM810X. These benefits combine to produce an exceptionally reliable voltage monitor circuit.

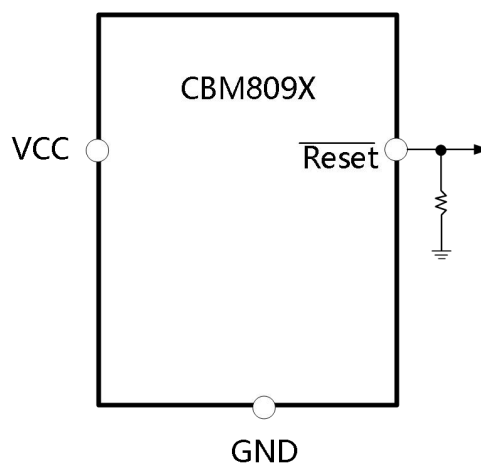
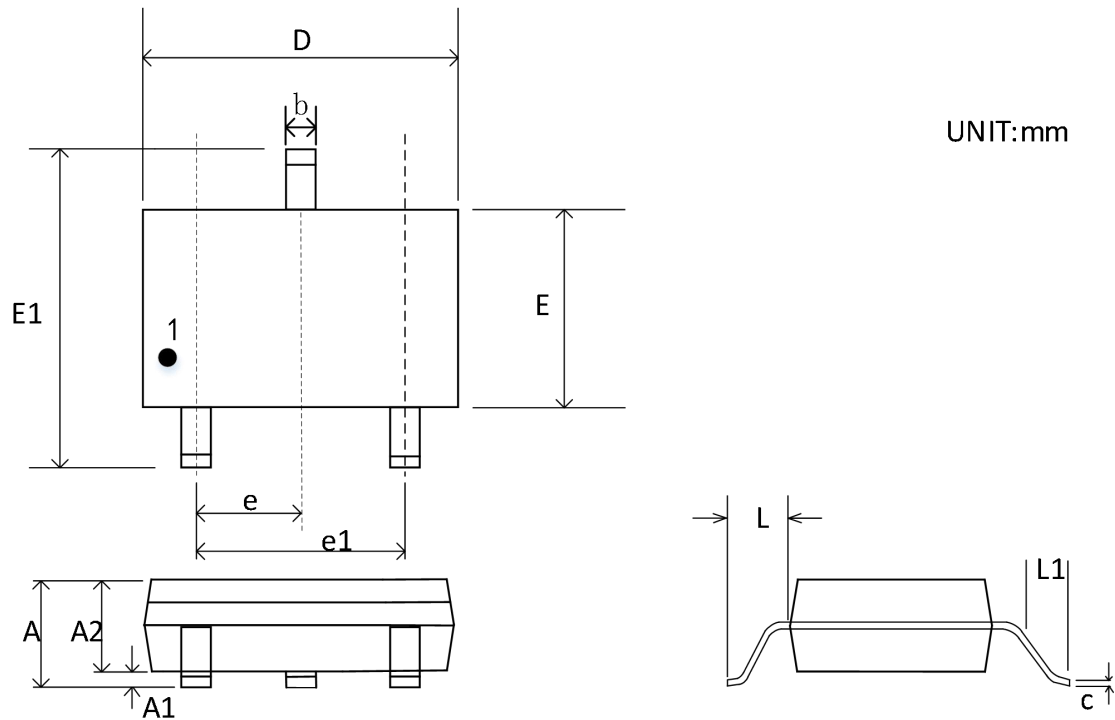


Figure 10. Ensuring a Valid Reset Output Down to VCC = 0 V

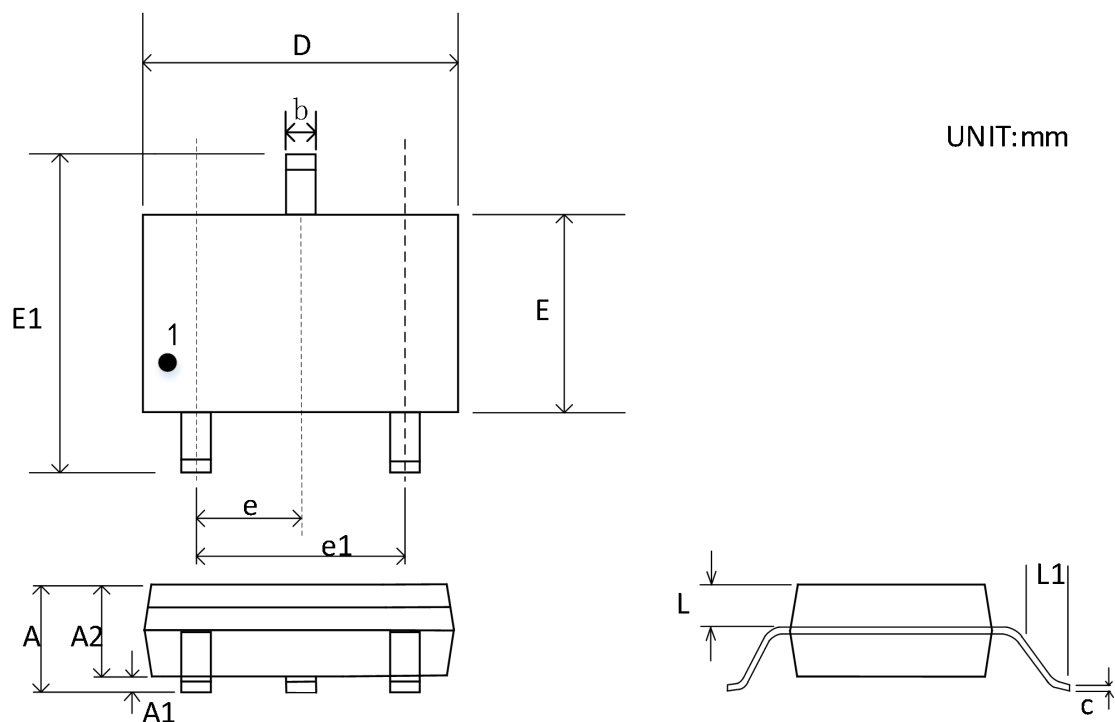
Package Information

SOT23-3



Symbol	Dimensions In Millimeters	
	Min	Max
A	0.89	1.12
A1	0.013	0.10
A2	0.88	1.02
b	0.37	0.51
c	0.085	0.180
D	2.80	3.04
E	1.20	1.40
E1	2.10	2.64
e	0.89	1.03
L	0.54REF	
L1	0.30	0.60

SC70-3



Symbol	Dimensions In Millimeters	
	Min	Max
A	0.80	1.10
A1	0.10MAX	
A2	0.80	1.00
b	0.25	0.40
c	0.10	0.26
D	1.80	2.20
E	1.15	1.35
E1	1.80	2.40
e	0.65BSC	
L	0.10	0.40
L1	0.10	0.30

Package/Ordering Information

PRODUCT	ORDERING NUMBER	TEMPRANGE	PACKAGE	PAKEAGE MARKING	TRANSPOT MEDIA,QUANTILY
CBM803	CBM803LSC3	-40°C~85°C	SC70-3	03L	Tape and Reel, 3000
	CBM803MSC3	-40°C~85°C	SC70-3	03M	Tape and Reel, 3000
	CBM803RSC3	-40°C~85°C	SC70-3	03R	Tape and Reel, 3000
	CBM803SSC3	-40°C~85°C	SC70-3	03S	Tape and Reel, 3000
	CBM803TSC3	-40°C~85°C	SC70-3	03T	Tape and Reel, 3000
	CBM803ZSC3	-40°C~85°C	SC70-3	03Z	Tape and Reel, 3000
CBM809	CBM809JSC3	-40°C~85°C	SC70-3	9JC	Tape and Reel, 3000
	CBM809JST3	-40°C~85°C	SOT23-3	9JS	Tape and Reel, 3000
	CBM809LSC3	-40°C~85°C	SC70-3	9LC	Tape and Reel, 3000
	CBM809LST3	-40°C~85°C	SOT23-3	9LS	Tape and Reel, 3000
	CBM809MSC3	-40°C~85°C	SC70-3	9MC	Tape and Reel, 3000
	CBM809MST3	-40°C~85°C	SOT23-3	9MS	Tape and Reel, 3000
	CBM809RSC3	-40°C~85°C	SC70-3	9RC	Tape and Reel, 3000
	CBM809RST3	-40°C~85°C	SOT23-3	9RS	Tape and Reel, 3000
	CBM809SSC3	-40°C~85°C	SC70-3	9SC	Tape and Reel, 3000
	CBM809SST3	-40°C~85°C	SOT23-3	9SS	Tape and Reel, 3000
	CBM809TSC3	-40°C~85°C	SC70-3	9TC	Tape and Reel, 3000
	CBM809TST3	-40°C~85°C	SOT23-3	9TS	Tape and Reel, 3000
	CBM809ZSC3	-40°C~85°C	SC70-3	9ZC	Tape and Reel, 3000
	CBM809ZST3	-40°C~85°C	SOT23-3	9ZS	Tape and Reel, 3000
CBM810	CBM810JSC3	-40°C~85°C	SC70-3	0JC	Tape and Reel, 3000
	CBM810JST3	-40°C~85°C	SOT23-3	0JS	Tape and Reel, 3000
	CBM810LSC3	-40°C~85°C	SC70-3	0LC	Tape and Reel, 3000
	CBM810LST3	-40°C~85°C	SOT23-3	0LS	Tape and Reel, 3000
	CBM810MSC3	-40°C~85°C	SC70-3	0MC	Tape and Reel, 3000
	CBM810MST3	-40°C~85°C	SOT23-3	0MS	Tape and Reel, 3000
	CBM810RSC3	-40°C~85°C	SC70-3	0RC	Tape and Reel, 3000
	CBM810RST3	-40°C~85°C	SOT23-3	0RS	Tape and Reel, 3000
	CBM810SSC3	-40°C~85°C	SC70-3	0SC	Tape and Reel, 3000
	CBM810SST3	-40°C~85°C	SOT23-3	0SS	Tape and Reel, 3000

	CBM810TSC3	-40°C~85°C	SC70-3	0TC	Tape and Reel, 3000
	CBM810TST3	-40°C~85°C	SOT23-3	0TS	Tape and Reel, 3000
	CBM810ZSC3	-40°C~85°C	SC70-3	0ZC	Tape and Reel, 3000
	CBM810ZST3	-40°C~85°C	SOT23-3	0ZS	Tape and Reel, 3000