



Force Sensor LSIs BU21003EKN/BU22003MUV/BU22003GU

● Outline

This force sensor LSI facilitates the creation of an intuitive user interface by using a capacitive sensor. Integrating everything from a voltage-capacitance circuit to a data processor on a single chip makes it easier to mount input devices without placing an excessive load on the host CPU.

● Features

- 1) Sensor block incorporates an ultra-stable CV conversion circuit
- 2) Application-optimized data output minimizes load on host software
- 3) Compatible with two types of serial interfaces : SPI and I²C
- 4) Internal reset and clock circuits eliminate need for external feed

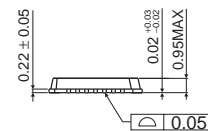
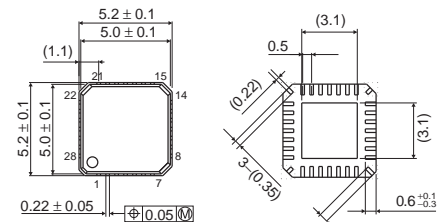
● Applications

Mobile phones, portable gaming devices, ultra-compact notebook PCs, multi-function remote controls, projectors, PDAs, electronic dictionaries, digital cameras, digital camcorders, and the like.

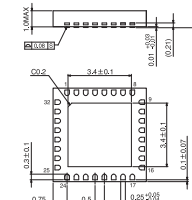
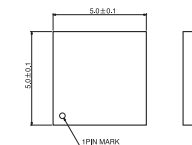
● Specifications

Part No.	Power supply	Interface	Package
BU21003EKN	AVDD, DVDD : 2.5V to 3.3V	SPI / I ² C BUS	HQFN28V
BU22003MUV	AVDD : 2.5V to 3.3V DVDD : 1.7V to 3.3V	SPI / I ² C BUS	VQFN032V5050
BU22003GU	Integrated Level Shifter		VCSP85N2

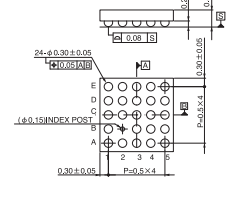
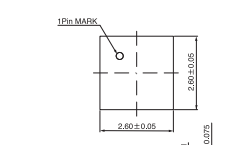
● Dimensions (Unit: mm)



HQFN28V



VQFN032V5050



VCSP85N2

- The specifications for the product described in this document are for reference only. Upon actual use, therefore, please request that specifications to be separately delivered.
- The application circuit examples, information, and various data pertaining to the use of the products presented in this documentation are provided for reference purposes only.
- Please note that ROHM cannot bear any responsibility regarding any problems relating to industrial property rights resulting from their use thereof.

The products listed in this catalog are designed to be used with ordinary electronic equipment or devices (such as audio visual equipment, office-automation equipment, communications devices, electrical appliances and electronic toys).
Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

Current specifications in effect of 1st. April 2007.

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● **Absolute Maximum Ratings** (Ta=25°C)
(BU22003MUV)

Parameter	Symbol	Limits	Unit	Conditions
Supply Voltage	VDD	-0.3 to 4.2	V	GND terminal reference
Input Voltage	VIN	-0.5 to VDD+0.5	V	GND terminal reference
Output Voltage	VOUT	-0.5 to VDD+0.5	V	GND terminal reference
Power Dissipation	Pd	310 *1	mW	With VQFN032V5050 package
Storage Temperature Range	Tstg	-55 to 125	°C	

*1: Reduced by 3.1mW / °C over Ta=25°C

● **Recommended Operating Range** (Ta=25°C unless otherwise noted)
(BU22003MUV)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Analog Supply Voltage	AVDD	2.5	3.0	3.3	V
Digital Supply Voltage	DVDD	1.7	1.8	3.3	V
Input Voltage	VIN	0	-	AVDD/DVDD	V
Output Voltage	VOUT	3.0	3.3	3.6	V
Operating Temperature Range	Topr	-30	-	85	°C
Reference Detection Capacitance	Csns	1	-	30	pF
Differential Detection Capacitance	ΔC	Csns-4Csns	-	Csns+4Csns	pF

● **Electrical Characteristics** (Ta=25°C unless otherwise noted)
(BU22003MUV)

Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions
H Input Voltage	VIH	DVDDx0.7	-	DVDD	V	CMOS input
L Input Voltage	VIL	0	-	DVDDx0.3	V	CMOS input
Raise Input Voltage	VIHs	0.4	-	0.8	V	CMOS Schmitt input (DVDD=1.8V)
Fall Input Voltage	VILs	0.8	-	1.2	V	CMOS Schmitt input (DVDD=1.8V)
H Output Voltage	VOH	DVDD-0.4	-	DVDD	V	CMOS output (Force current=2mA)
L Output Voltage	VOL	VSS	-	0.4	V	CMOS output (Force current=2mA)
Operating Current Consumption	Iop	-	300	500	μA	Normal operation
Standby Current	Ist	-	0	1	μA	Shutdown (sdn=H)
Sensor Sensitivity		10	-	360	mV/pF	ΔVo / ΔC (@gain=1)
Conversion Time		-	-	600	μs	Time for one conversion of all X,Y channels
Reset Release Time		5	-	-	ms	From internal POR to system reset
Oscillation Frequency	Fosc	0.4	0.7	1.5	MHz	Internal oscillator circuit

● **Block Diagram**

(BU21003EKV/BU22003MUV/BU22003GU)

