STRUCTURE Silicon Monolithic Integrated Circuit

PRODUCTNAME BU7961GUW

FUNCTION Serial Interface for Mobile Devices Application

MSDL3(Mobile Shrink Data Link 3) Serializer LSI

FEATURES
·Maximum transmission rate of highspeed differential interface MSDL3 is 900Mbps.
·Support LCD interface with 24bit parallel RGB video mode.
·Pixel clock frequency is 4~30MHz.

1. Absolute maximum

Parameter	Symbol	Rated values	Unit	Remarks
Power supply voltage for IOVDD	IOVDD	-0.3 ~ +4.5	V	
Power supply voltage for DVDD	DVDD	-0.3 ~ +2.5	V	
Power supply voltage for MSVDD	MSVDD	-0.3 ~ +2.5	V	
Input voltage	VIN	-0.3 ~ IOVDD+0.3	V	I/O terminals of IOVDD line
		-0.3 ~ +3.6	V	XSD terminal
		-0.3 ~ MSVDD+0.3	V	I/O terminals of MSVDD line
Input current	IIN	-10 ~ +10	mA	
Package power dissipation	Pd	300 *	mW	Without board mounted
Preservation temperature	Tstg	-55 ~ +125	°C	

*When it uses by Ta=25°C or higher, reduce by 3.0 mW/°C (for a single package).

2. Operating Condition

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Supply voltage for IOVDD	VIOVDD	1.65	1.80	3.60	V	VDVDD=VMSVDD≤VIOVDD
Supply voltage for DVDD	VDVDD	1.65	1.80	1.95	V	
Supply voltage for MSVDD	VMSVDD	1.65	1.80	1.95	V	
PCLK frequency	fPCLK	4.0	-	30.0	MHz	
Operating temperature range	Topr	-30	25	+85	°C	

3. ELECTRICAL CHARACTERISTICS

3.1 CMOS INOUT CHARACTERISTICS

Ta=25℃, DVDD=MSVDD=1.80V, IOVDD=1.80V, DGND=MSGND=0.00V, unless otherwise noted

Parameter	Symbol	Min	Typ	Max	Unit	Conditions	
'L' input voltage1	VIL1	DGND	-	0.3*IOVDD	V	PCLK, PD[26:0], POL_PCLK, PLL_BW[1:0], LS0, RVS, TEST3 terminals	
'H' input voltage1	VIH1	0.7*IOVDD	-	IOVDD	V		
'L' input voltage2	VIL2	MSGND	-	0.3*MSVDD	V	LS1 terminal	
'H' input voltage2	VIH2	0.7*MSVDD	-	MSVDD	V		
'H' input voltage3	VIH3	0.7*IOVDD	-	3.6	V	XSD terminal	
'L' output voltage1	VOL1	DGND	-	0.3*IOVDD	V	IO=1mA	CKD terminal
'H' output voltage1	VOH1	0.7*IOVDD	-	IOVDD	V	IO=-1mA	
'L' output voltage2	VOL2	MSGND	-	0.3*MSVDD	V	IO=1mA	LS_EN terminal
'H' output voltage2	VOH2	0.7*MSVDD	-	MSVDD	V	IO=-1mA	
PCLK frequency1	fPCLK1	4.0	-	15.0	MHz	LS0=L	PCLK terminal
PCLK frequency2	fPCLK2	8.0	-	30.0	MHz	LS0=H	
PCLK duty cycle	DPCLKI	33	-	67	%	PCLK terminal	
Data setup to PCLK	tDSI	5.0	-	-	ns	PD[26:0] terminals	
Data hold to PCLK	tDHI	5.0	-	-	ns		

3.2 MSDL3 TX CHARACTERISTICS

Ta=25℃, DVDD=MSVDD=1.80V, IOVDD=1.80V, DGND=MSGND=0.00V, unless otherwise noted

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Differential voltage range	Vdiff_tx	100	150	200	mVpp	
Common mode voltage range	Vcm_tx	0.8	0.9	1.0	V	
SubLVDS data rate	DR_tx	120	-	450	Mbps/ch	

3.3 CURRENT COMSUMPTION

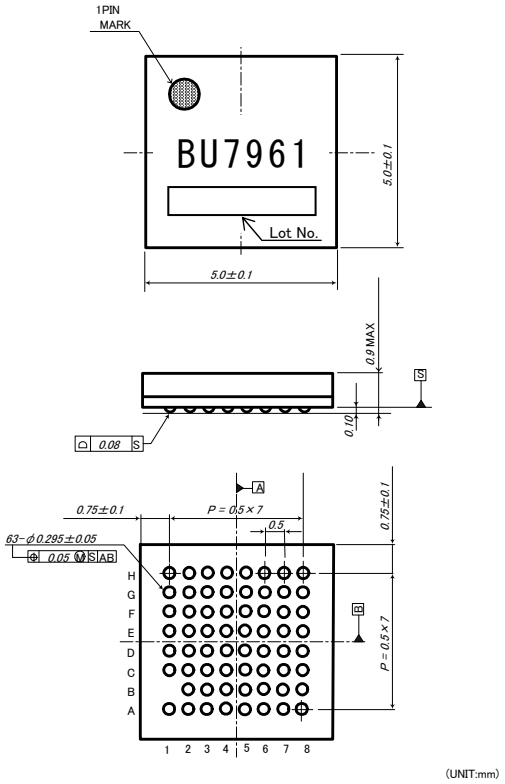
Ta=25℃, DVDD=MSVDD=1.80V, IOVDD=1.80V, DGND=MSGND=0.00V, unless otherwise noted

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
Shutdown current	Iop_sht_tx	-	0.2	10.0	μA	XSD=L, PCLK=L
Standby current	Iop_stb_tx	-	0.2	10.0	μA	XSD=H, PCLK=L
Active current of 1ch27bit format	Iop_act_tx1	-	14.0	18.5	mA	LS[1:0]=LL, PLL_BW[1:0]=HL, fPCLK=15MHz, *1
Active current of 2ch27bit format	Iop_act_tx2	-	19.7	25.7	mA	LS[1:0]=LH, PLL_BW[1:0]=HL, fPCLK=30MHz, *1
Active current of 1ch13bit format	Iop_act_tx3	-	16.3	21.3	mA	LS[1:0]=HH, PLL_BW[1:0]=HL, fPCLK=30MHz, *2

*1 : Total operating current(IDVDD+IMSVDD+IIOVDD) with PD[26:0] inputs toggling 0x2AAAAAA and 0x5555555.

*2 : Total operating current(IDVDD+IMSVDD+IIOVDD) with PD[26:15],PD[2] inputs toggling 0x0AAA and 0x1555.

4. PACKAGE VIEW

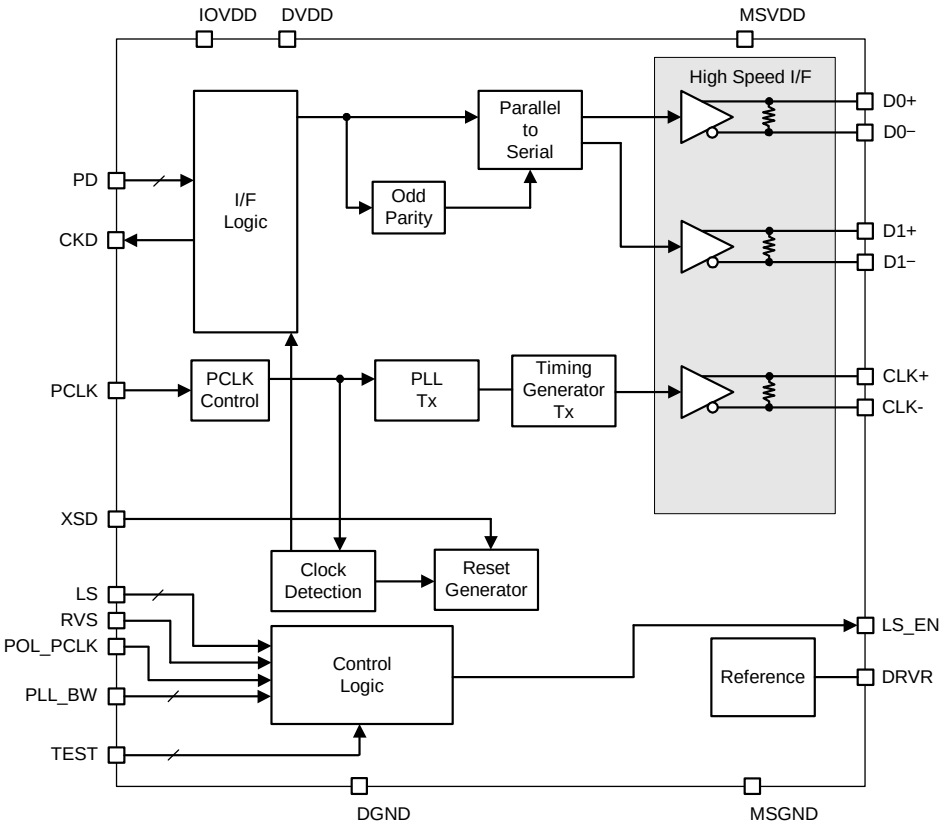


VBGA063W050

5. PIN LIST

Pin No.	Pin name	Pin No.	Pin name	Pin No.	Pin name
A1	TEST0	D1	PD22	G1	CKD
A2	PD18	D2	PD20	G2	RVS
A3	PD16	D3	POL_PCLK	G3	DRVR
A4	PD15	D4	DGND	G4	MSGND
A5	PD13	D5	DGND	G5	MSVDD
A6	PD12	D6	IOVDD	G6	LS1
A7	PD9	D7	PD3	G7	LS_EN
A8	TEST2	D8	PD4	G8	XSD
B1		E1	PD24	H1	TESTA
B2	PCLK	E2	PD23	H2	D1+
B3	PD17	E3	IOVDD	H3	D1-
B4	PD14	E4	DGND	H4	CLK+
B5	PD11	E5	MSGND	H5	CLK-
B6	PD10	E6	PLL_BW0	H6	DO+
B7	PD8	E7	PD0	H7	D0-
B8	PD7	E8	PD2	H8	TEST1
C1	PD21	F1	PD25		
C2	PD19	F2	PD26		
C3	DVDD	F3	MSVDD		
C4	IOVDD	F4	MSGND		
C5	TEST3	F5	MSVDD		
C6	DVDD	F6	LS0		
C7	PD6	F7	PLL_BW1		
C8	PD5	F8	PD1		

6. SYSTEM BLOCK DIAGRAM



7. USAGE PRECAUTIONS

(1) Absolute Maximum Ratings

An excess in the absolute maximum ratings, such as supply voltage, temperature range of operatingconditions, etc., can break down devices, thus making impossible to identify breaking mode such as a short circuit or an open circuit. If any special mode exceeding the absolute maximum ratings is assumed, consideration should be given to take physical safety measures including the use of fuses, etc.

(2) Operating conditions

These conditions represent a range within which characteristics can be provided approximately as expected. The electrical characteristics are guaranteed under the conditions of each parameter.

(3) Reverse connection of power supply connector

The reverse connection of power supply connector can break down ICs. Take protective measures against the breakdown due to the reverse connection, such as mounting an external diode between the power supply and the IC's power supply terminal.

(4) Power supply line

Design PCB pattern to provide low impedance for the wiring between the power supply and the GND lines.In this regard, for the digital block power supply and the analog block power supply, even though these power supplies has the same level of potential, separate the power supply pattern for the digital block from that for the analog block, thus suppressing the diffraction of digital noises to the analog block power supply resulting from impedance common to the wiring patterns. For the GND line, give consideration to design the patterns in a similar manner.

Furthermore, for all power supply terminals to ICs, mount a capacitor between the power supply and the GND terminal. At the same time, in order to use an electrolytic capacitor, thoroughly check to be sure the characteristics of the capacitor to be used present no problem including the occurrence of capacity dropout at a low temperature, thus determining the constant.

(5) GND voltage

Make setting of the potential of the GND terminal so that it will be maintained at the minimum in any operating state. Furthermore, check to be sure no terminals are at a potential lower than the GND voltage including an actual electric transient.

(6) Short circuit between terminals and erroneous mounting

In order to mount ICs on a set PCB, pay thorough attention to the direction and offset of the ICs. Erroneous mounting can break down the ICs. Furthermore, if a short circuit occurs due to foreign matters entering between terminals or between the terminal and the power supply or the GND terminal, the ICs can break down.

(7) Operation in strong electromagnetic field

Be noted that using ICs in the strong electromagnetic field can malfunction them.

(8) Inspection with set PCB

On the inspection with the set PCB, if a capacitor is connected to a low-impedance IC terminal, the IC can suffer stress. Therefore, be sure to discharge from the set PCB by each process. Furthermore, in order to mount or dismount the set PCB to/from the jig for the inspection process, be sure to turn OFF the power supply and then mount the set PCB to the jig. After the completion of the inspection, be sure to turn OFF the power supply and then dismount it from the jig. In addition, for protection against static electricity, establish a ground for the assembly process and pay thorough attention to the transportation and the storage of the set PCB.

(9) Input terminals

In terms of the construction of IC, parasitic elements are inevitably formed in relation to potential. The operation of the parasitic element can cause interference with circuit operation, thus resulting in a malfunction and then breakdown of the input terminal. Therefore, pay thorough attention not to handle the input terminals, such as to apply to the input terminals a voltage lower than the GND respectively, so that any parasitic element will operate. Furthermore, do not apply a voltage to the input terminals when no power supply voltage is applied to the IC. In addition, even if the power supply voltage is applied, apply to the input terminals a voltage lower than the power supply voltage or within the guaranteed value of electrical characteristics.

(10) Ground wiring pattern

If small-signal GND and large-current GND are provided, It will be recommended to separate the large-current GND pattern from the small-signal GND pattern and establish a single ground at the reference point of the set PCB so that resistance to the wiring pattern and voltage fluctuations due to a large current will cause no fluctuations in voltages of the small-signal GND. Pay attention not to cause fluctuations in the GND wiring pattern of external parts as well.

(11) External capacitor

In order to use a ceramic capacitor as the external capacitor, determine the constant with consideration given to a degradation in the nominal capacitance due to DC bias and changes in the capacitance due to temperature, etc.

(12) No Connecting input terminals

In terms of extremely high impedance of CMOS gate, to open the input terminals causes unstable state. And unstable state brings the inside gate voltage of p-channel or n-channel transistor into active. As a result, battery current may increase. And unstable state can also causes unexpected operation of IC. So unless otherwise specified, input terminals not being used should be connected to the power supply or GND line.

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