

## Reference Voltage and Driver IC for LCD

### Description

The CXD3519TQ is suitable IC for applying reference voltage for gamma correction which is necessary for TFT liquid crystal display. This IC has a built-in 9 channels of rail-to-rail buffer circuit which enables 2-input switch and a common driver circuit.

### Features

- Built-in 9 channels of rail-to-rail buffer circuit
- Built-in common driver circuit
- Current consumption: 3.6mA (typ.)
- Package: 48-pin TQFP

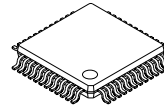
### Structure

CMOS IC

### Applications

Small liquid crystal monitor

48 pin TQFP (Plastic)



### Absolute Maximum Ratings (Ta = 25°C)

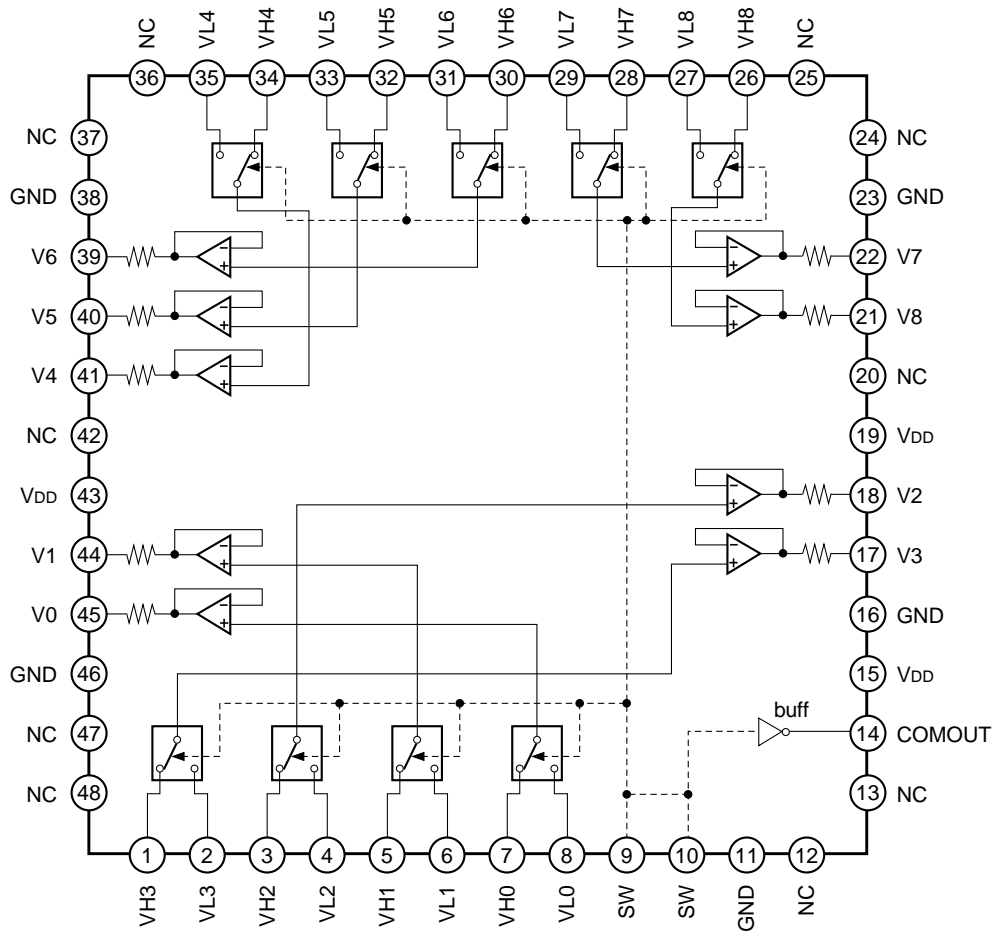
- Supply voltage  $V_{DD}$   $V_{SS} - 0.3$  to  $+6.0$  V
- Input pin voltage  $V_I$   $V_{SS} - 0.3$  to  $V_{DD} + 0.3$  V
- Storage temperature  $T_{stg}$   $-55$  to  $+150$  °C
- Allowable power dissipation ( $T_a \leq 85^\circ\text{C}$ )  
 $P_D$  220 mW

### Operating Conditions

- Supply voltage  $V_{DD}$  4.5 to 5.5 (5.0 typ.) V
- Operating temperature  
 $T_{opr}$   $-35$  to  $+85$  °C

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Block Diagram



Pin Description

Pin No.	Symbol	Pin voltage	Equivalent circuit	Description	
1	VH3	0.5 to 4.0V (max.: 2.0Vp-p)		DC input when SW is high.	
2	VL3			DC input when SW is low.	
3	VH2	DC input when SW is high.			
4	VL2	DC input when SW is low.			
5	VH1	DC input when SW is high.			
6	VL1	DC input when SW is low.			
7	VH0	DC input when SW is high.			
8	VL0	DC input when SW is low.			
26	VH8	DC input when SW is high.			
27	VL8	DC input when SW is low.			
28	VH7	DC input when SW is high.			
29	VL7	DC input when SW is low.			
30	VH6	DC input when SW is high.			
31	VL6	DC input when SW is low.			
32	VH5	DC input when SW is high.			
33	VL5	DC input when SW is low.			
34	VH4	DC input when SW is high.			
35	VL4	DC input when SW is low.			
45	V0	0.2 to 4.8V			V0 output.
44	V1				V1 output.
18	V2		V2 output.		
39	V6		V6 output.		
22	V7		V7 output.		
21	V8		V8 output.		
17	V3		V3 output.		
41	V4	0.5 to 4.0V	V4 output.		
40	V5	V5 output.			
9	SW			<p>Input switch. For V0 to V8 output, VL is output for low; VH for high. For COMOUT output, VDD level is output for low; GND level for high. Also, Pins 9 and 10 are connected internally. Input the same signal, or input one signal and leave the other signal open.</p>	
10	SW				

Pin No.	Symbol	Pin voltage	Equivalent circuit	Description
14	COMOUT			COM output.
15	V <sub>DD</sub>	5.0V		5V power supply.
19	V <sub>DD</sub>	5.0V		5V power supply.
43	V <sub>DD</sub>	5.0V		5V power supply.
11	GND			GND.
16	GND			GND.
23	GND			GND.
38	GND			GND.
46	GND			GND.
12	NC			No connected.
13	NC			No connected.
20	NC			No connected.
24	NC			No connected.
25	NC			No connected.
36	NC			No connected.
37	NC			No connected.
42	NC			No connected.
47	NC			No connected.
48	NC			No connected.

**Note)**

- GND  
Make sure that Pins 11, 16, 23, 38 and 46 are connected to GND potential, and do not release them.
- Decoupling capacitor  
Locate decoupling capacitor connected between power supply and GND as near IC pin as possible.
- Design V<sub>H</sub> and V<sub>L</sub> input pins not to have capacity.

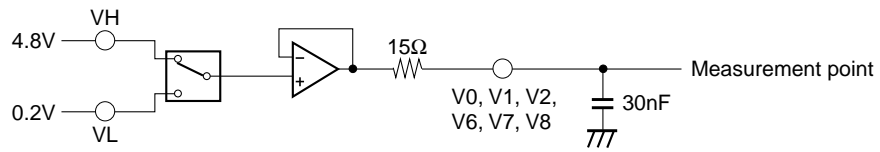
## Electrical Characteristics

(Ta = 25°C, V<sub>DD</sub> = 5V)

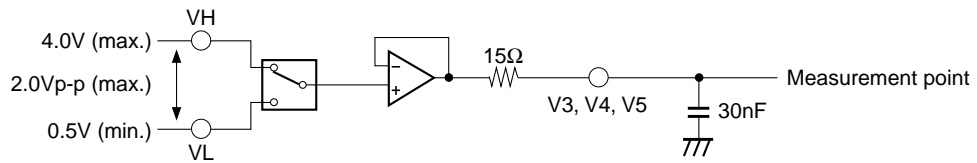
No.	Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
1	Current consumption	I <sub>CC</sub>	Input voltage = 2.5V, No load	—	3.6	6.0	mA
2	VH, VL input current high	I <sub>IH</sub>	Input voltage = 4.8V	-0.1	—	0.1	μA
3	VH, VL input current low	I <sub>IL</sub>	Input voltage = 0.2V	-0.1	—	0.1	μA
4	SW input current high	I <sub>ISH</sub>	Input voltage = 5V	-10	—	10	μA
5	SW input current low	I <sub>ISL</sub>	Input voltage = 0V	-10	—	10	μA
6	VREF voltage gain	AV	Input voltage = 0.2 to 4.8V	0.985	—	—	V/V
7	SW input voltage high	V <sub>IH</sub>		2.0	—	—	V
8	SW input voltage low	V <sub>IL</sub>		—	—	0.8	V
9	VREF output voltage high	V <sub>OH</sub>	I <sub>SOURCE</sub> = 10mA	V <sub>DD</sub> - 1.0	—	—	V
10	VREF output voltage low	V <sub>OL</sub>	I <sub>SINK</sub> = 10mA	—	—	GND + 1.0	V
11	COMOUT output voltage high	V <sub>COH</sub>	I <sub>SOURCE</sub> = 10mA	V <sub>DD</sub> - 0.1	—	—	V
12	COMOUT output voltage low	V <sub>COL</sub>	I <sub>SINK</sub> = 10mA	—	—	GND + 0.1	V
13	VREF offset voltage	V <sub>OFF</sub>		—	—	20	mV
14	VREF (V0, 1, 2, 6, 7, 8) load regulation 1	ΔV <sub>O1</sub>	Input voltage = 0.2 to 4.8V I <sub>SOURCE</sub> = 10mA I <sub>SINK</sub> = 10mA	—	±5	±10	mV
15	VREF (V3, 4, 5) load regulation 2	ΔV <sub>O2</sub>	Input voltage = 0.5 to 4.0V I <sub>SOURCE</sub> = 10mA I <sub>SINK</sub> = 10mA	—	±7	±14	mV
16	Setting time 1	ts1	Measurement circuits 1, 2	—	—	10	μs
		ts2					
17	Setting time 2	ts3	Measurement circuit 3	—	—	6	μs
		ts4					
18	Output impedance	R <sub>imp</sub>	V0 - V8	—	15	—	Ω

Measurement Circuits

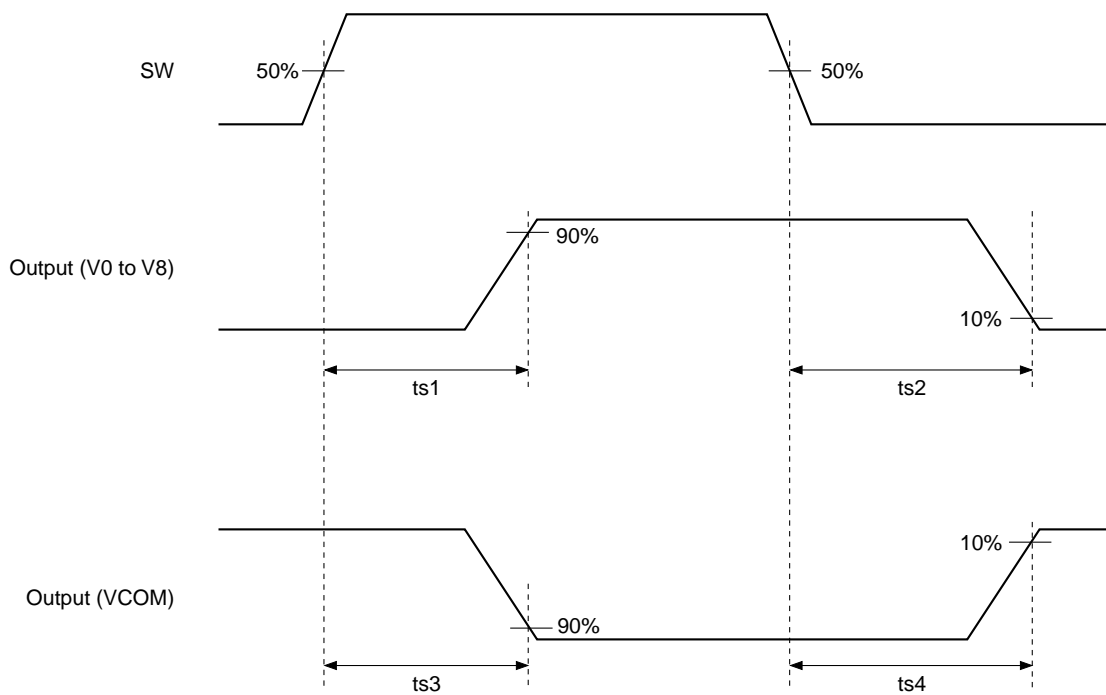
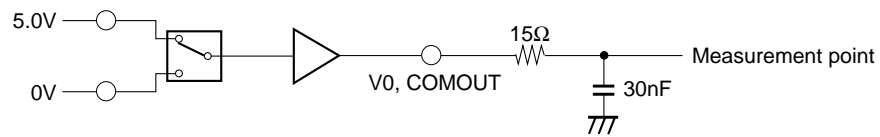
Measurement circuit 1



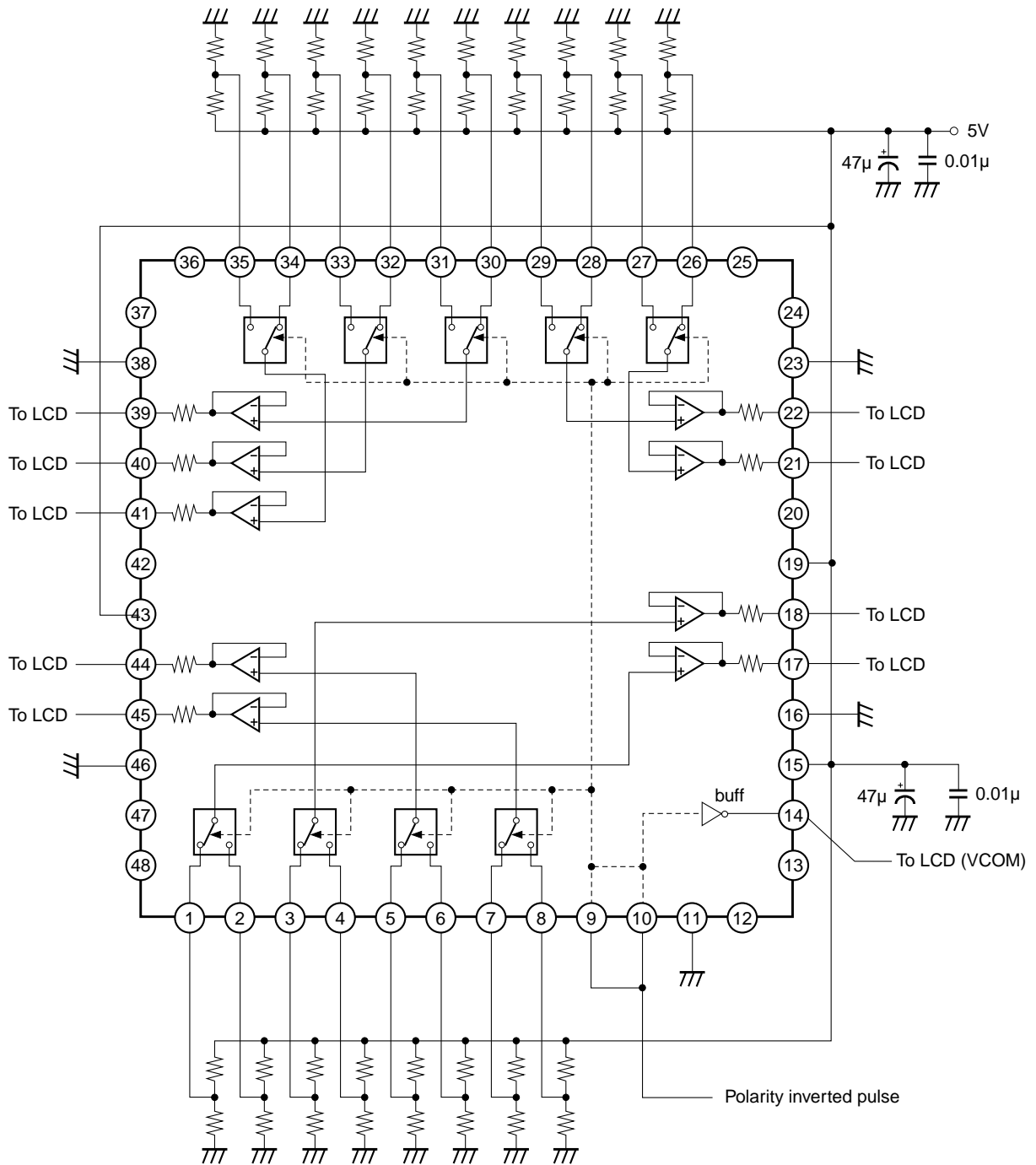
Measurement circuit 2



Measurement circuit 3



Application Circuit

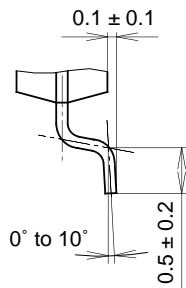
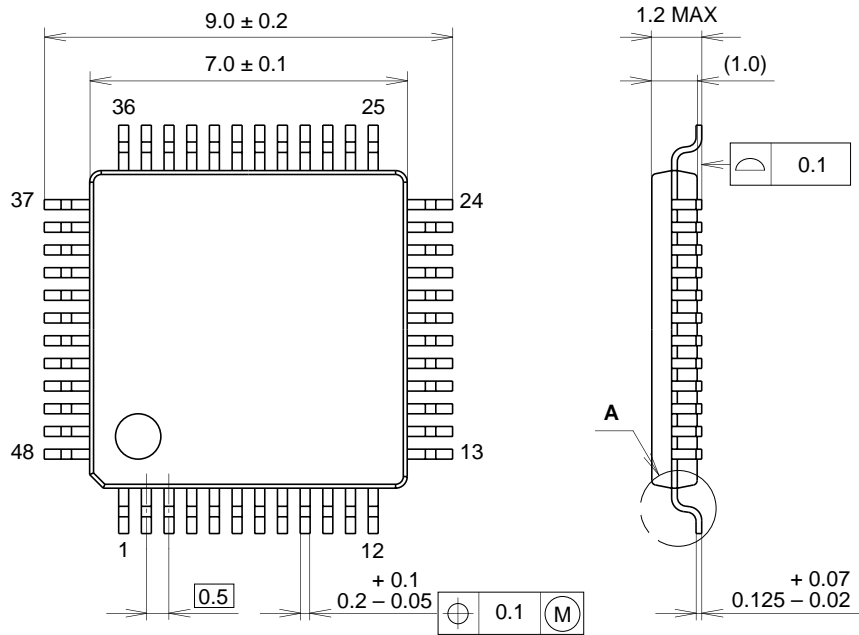


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Package Outline

Unit: mm

48PIN TQFP (PLASTIC)



DETAIL A

PACKAGE STRUCTURE

PACKAGE MATERIAL	EPOXY RESIN
TERMINAL TREATMENT	SOLDER PLATING
TERMINAL MATERIAL	COPPER ALLOY
PACKAGE MASS	0.15g

SONY CODE	TQFP-48P-L061
EIAJ CODE	P-TQFP48-7X7-0.5
JEDEC CODE	—

LEAD SPECIFICATIONS

ITEM	SPEC.
LEAD MATERIAL	COPPER ALLOY
LEAD TREATMENT	Sn-Pb 10%
LEAD TREATMENT THICKNESS	5-18µm

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