

# 3-channel, 8-bit D / A converter

## BU3616K

The BU3616K, a CMOS IC, is a high-speed, low-power-consumption 3-channel 8-bit D / A converter. Its internal reference voltage source eliminates the need for an external reference voltage source.

### ●Applications

Video CDs, CD-V, CD karaoke

### ●Features

- 1) 8-bit resolution.
- 2) Current output.
- 3) Low power consumption (typically 75mW).
- 4) High-speed operation.
- 5) Internal reference voltage circuit.
- 6) TTL input.

### ●Absolute maximum ratings (Ta = 25°C)

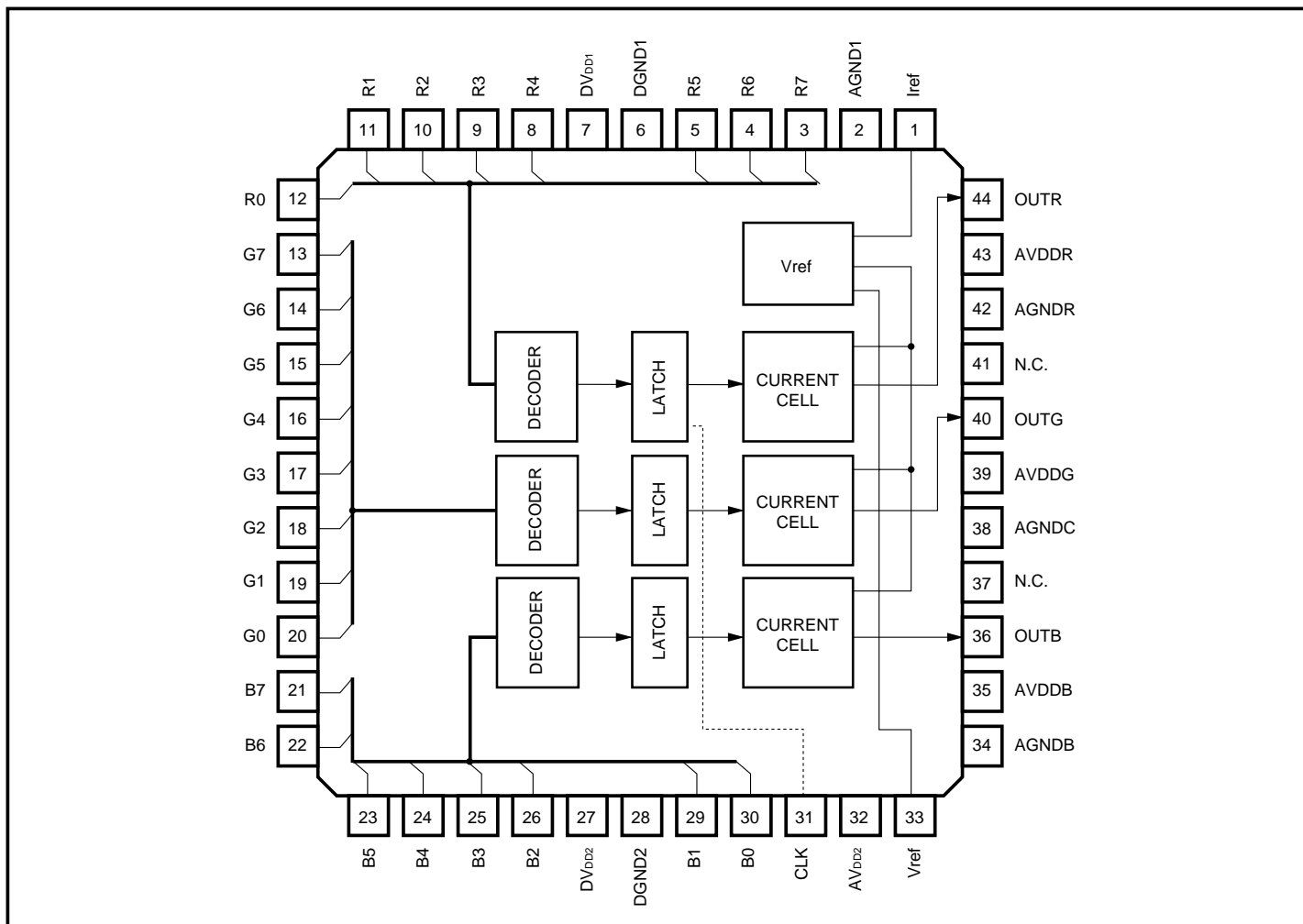
Parameter	Symbol	Limits	Unit
Power supply voltage	DV <sub>DD</sub>	- 0.5 ~ + 7.0	V
Analog power supply voltage	AV <sub>DD</sub>	DV <sub>DD</sub> - 0.3 ~ DV <sub>DD</sub> + 0.3	V
Input voltage	V <sub>IN</sub>	- 0.5 ~ DV <sub>DD</sub> + 0.5	V
Output voltage	V <sub>OUT</sub>	- 0.5 ~ DV <sub>DD</sub> + 0.5	V
Storage temperature	T <sub>stg</sub>	- 55 ~ + 125	°C
Power dissipation*1	P <sub>d</sub>	500	mW

\*1 Reduced by 5.0mW for each increase in Ta of 1°C over 25°C.

### ●Recommended operating conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Power supply voltage	DV <sub>DD</sub>	4.5	5.0	5.5	V	
Analog power supply voltage	AV <sub>DD</sub>	4.5	5.0	5.5	V	
Transfer clock width	TCK	58.8	—	—	ns	
Transfer clock width, low level	TCKL	15	—	—	ns	
RGB setup time	TS	5	—	—	ns	
RGB hold time	TH	10	—	—	ns	
Input voltage, low level	V <sub>IL</sub>	—	—	0.8	V	
Input voltage, high level	V <sub>IH</sub>	2.2	—	—	V	
Operating temperature	T <sub>OPR</sub>	- 10	—	70	°C	

●Block diagram



●Electrical characteristics (unless otherwise noted,  $T_a = 25^\circ\text{C}$ ,  $DV_{DD} = 5.0\text{V}$ ,  $AV_{DD} = 5.0\text{V}$ ,  $R_{REF} = 6.8\text{k}\Omega$ ,  $R_L = 470\Omega$ ,  $F_{CK} = 15\text{MHz}$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Current dissipation	$I_{CC}$	—	15	30	mA	
Differential linearity error	ED	- 0.5	—	0.5	LSB	$DV_{DD} = 5.0\text{V}$ $AV_{DD} = 5.0\text{V}$
Linearity error	EL	- 1.0	—	1.0	LSB	$R_{REF} = 6.8\text{k}\Omega$ $R_L = 470\Omega$
Full-scale voltage	FS	1.29	1.44	1.58	V	$F_{CK} = 15\text{MHz}$
RGB output voltage ratio	$F_{SCR}$	0	0.5	5.0	%	
Output delay time	$T_D$	—	30	—	ns	$C_L = 15\text{pF}$
Settling time	$T_{SET}$	—	40	—	ns	$C_L = 15\text{pF}$

## ●Pin descriptions

Pin No.	I / O	Pin name	Function
1	—	Iref	Output current adjustment resistor connection, Vref output
2	—	AGND 1	Analog ground 1
3	I	R7	RED data input (bit 7, MSB)
4	I	R6	RED data input (bit 6)
5	I	R5	RED data input (bit 5)
6	—	DGND1	Digital ground 1
7	—	DV <sub>DD</sub> 1	Digital power supply 1
8	I	R4	RED data input (bit 4)
9	I	R3	RED data input (bit 3)
10	I	R2	RED data input (bit 2)
11	I	R1	RED data input (bit 1)
12	I	R0	RED data input (bit 0, LSB)
13	I	G7	GREEN data input (bit 7, MSB)
14	I	G6	GREEN data input (bit 6)
15	I	G5	GREEN data input (bit 5)
16	I	G4	GREEN data input (bit 4)
17	I	G3	GREEN data input (bit 3)
18	I	G2	GREEN data input (bit 2)
19	I	G1	GREEN data input (bit 1)
20	I	G0	GREEN data input (bit 0, LSB)
21	I	B7	BLUE data input (bit 7, MSB)
22	I	B6	BLUE data input (bit 6)
23	I	B5	BLUE data input (bit 5)
24	I	B4	BLUE data input (bit 4)
25	I	B3	BLUE data input (bit 3)
26	I	B2	BLUE data input (bit 2)
27	—	DV <sub>DD</sub> 2	Digital power supply 2
28	—	DGND2	Digital ground 2
29	I	B1	BLUE data input (bit 1)
30	I	B0	BLUE data input (bit 0, LSB)
31	I	CLK	System lock
32	—	AV <sub>DD</sub> 2	Analog power supply 2
33	O	Vref	Attached capacitance-adding pin (C = 0.1 μF)
34	—	AGNDB	Analog ground B
35	—	AV <sub>DD</sub> B	Analog power supply B
36	O	OUTB	BLUE output
37	—	N.C.	—

Pin No.	I / O	Pin name	Function
38	—	AGNDG	Analog ground G
39	—	AVDDG	Analog power supply G
40	O	OUTG	GREEN output
41	—	N.C.	—
42	—	AGNDR	Analog ground R
43	—	AVDDR	Analog power supply R
44	O	OUTR	RED output

● Input / output circuits

Pin No.	Pin name	Equivalent circuit
3 ~ 5 8 ~ 26 29 ~ 31	R0 ~ R7, G0 ~ G7 B0 ~ B7, CLK	
36, 40, 44	OUTR, OUTG OUTB	
1, 33	Iref, Vref	

●Application example

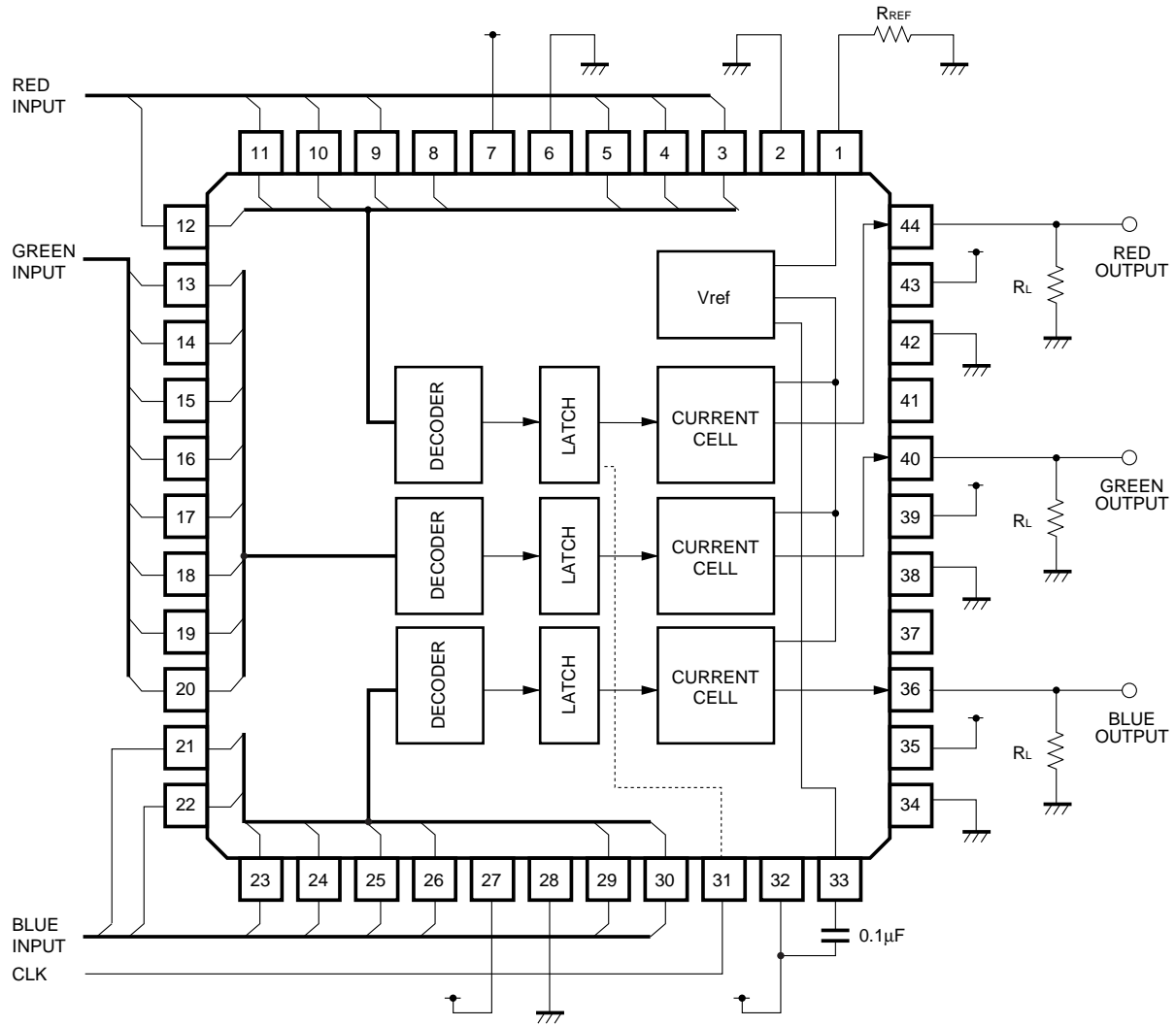
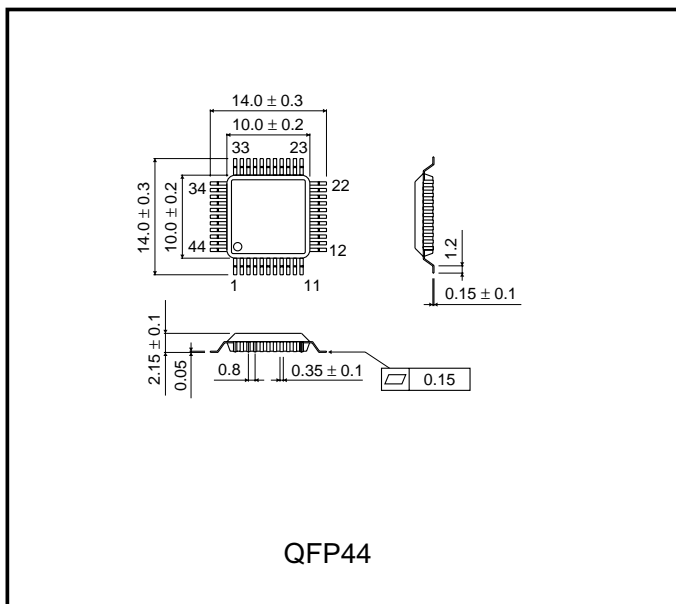


Fig.1

●External dimensions (Units: mm)



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