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)

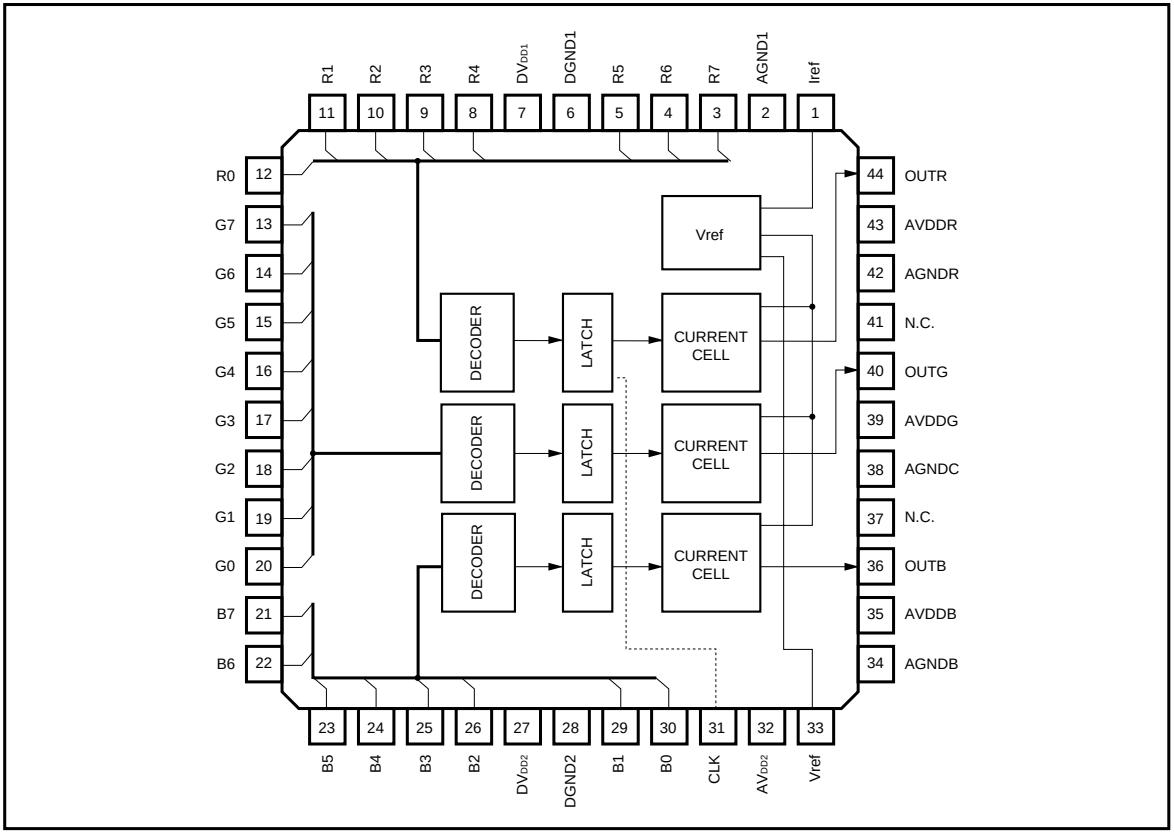
Parameter	Symbol	Limits	Unit
Power supply voltage	DV_{DD}	– 0.5 ~ + 7.0	V
Analog power supply voltage	AV_{DD}	DV_{DD} – 0.3 ~ DV_{DD} + 0.3	V
Input voltage	V_{IN}	– 0.5 ~ DV_{DD} + 0.5	V
Output voltage	V_{OUT}	– 0.5 ~ DV_{DD} + 0.5	V
Storage temperature	Tstg	– 55 ~ + 125	°C
Power dissipation*1	P_D	500	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_{DD}	4.5	5.0	5.5	V	
Analog power supply voltage	AV_{DD}	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_{IL}	—	—	0.8	V	
Input voltage, high level	V_{IH}	2.2	—	—	V	
Operating temperature	T_{OPR}	– 10	—	70	°C	

●Block diagram



●Electrical characteristics (unless otherwise noted, Ta = 25°C, DV_{DD} = 5.0V, AV_{DD} = 5.0V, R_{REF} = 6.8kΩ, R_L = 470Ω, F_{CK} = 15MHz)

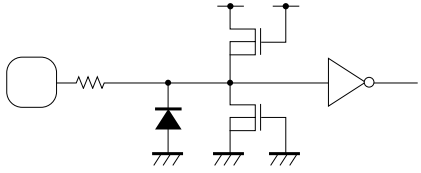
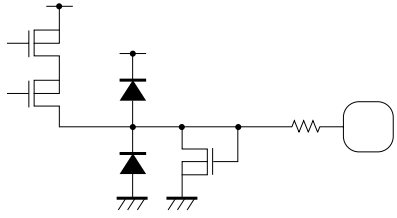
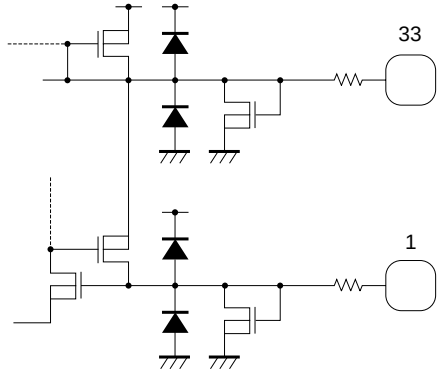
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Current dissipation	I_{CC}	—	15	30	mA	
Differential linearity error	ED	– 0.5	—	0.5	LSB	DV_{DD} = 5.0V AV_{DD} = 5.0V
Linearity error	EL	– 1.0	—	1.0	LSB	R_{REF} = 6.8kΩ R_L = 470Ω
Full-scale voltage	FS	1.29	1.44	1.58	V	F_{CK} = 15MHz
RGB output voltage ratio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

●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	—	$DV_{DD}1$	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	—	$DV_{DD}2$	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	—	$AV_{DD}2$	Analog power supply 2
33	O	Vref	Attached capacitance-adding pin (C = 0.1 μF)
34	—	AGNDB	Analog ground B
35	—	AVDDB	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

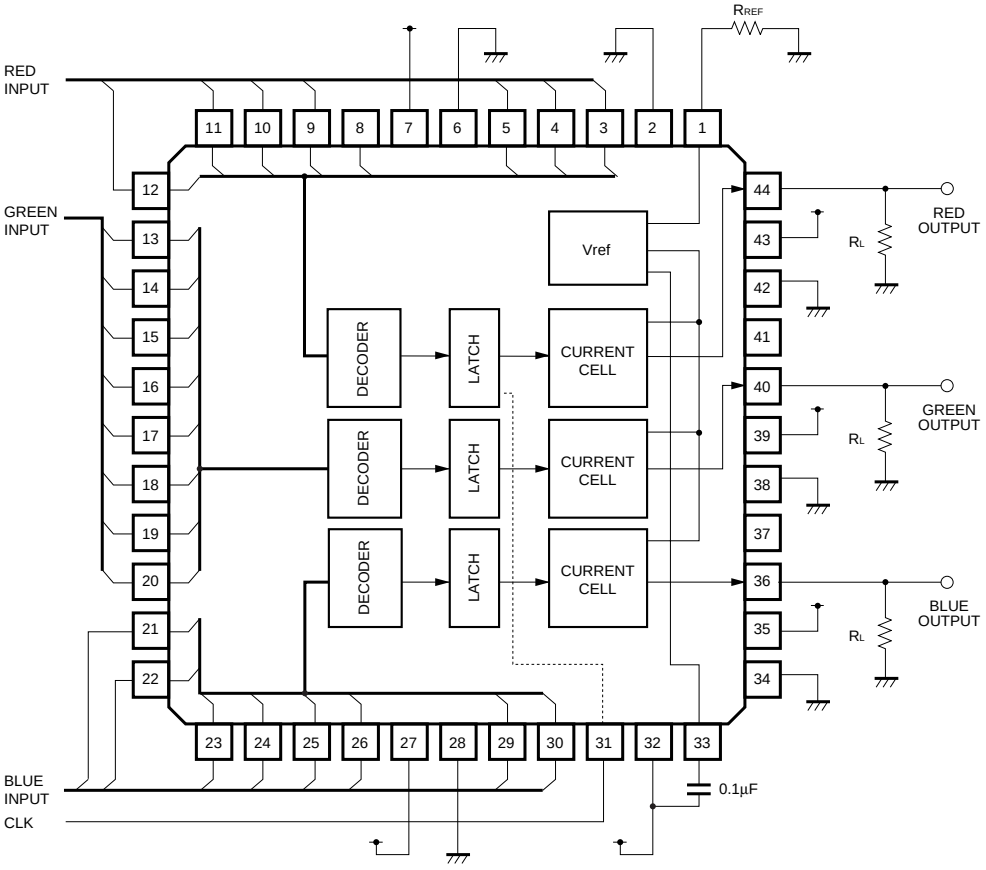
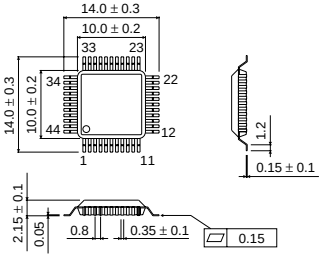


Fig.1

●External dimensions (Units: mm)



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