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Multimedia ICs

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 | T _{stg} | - 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.

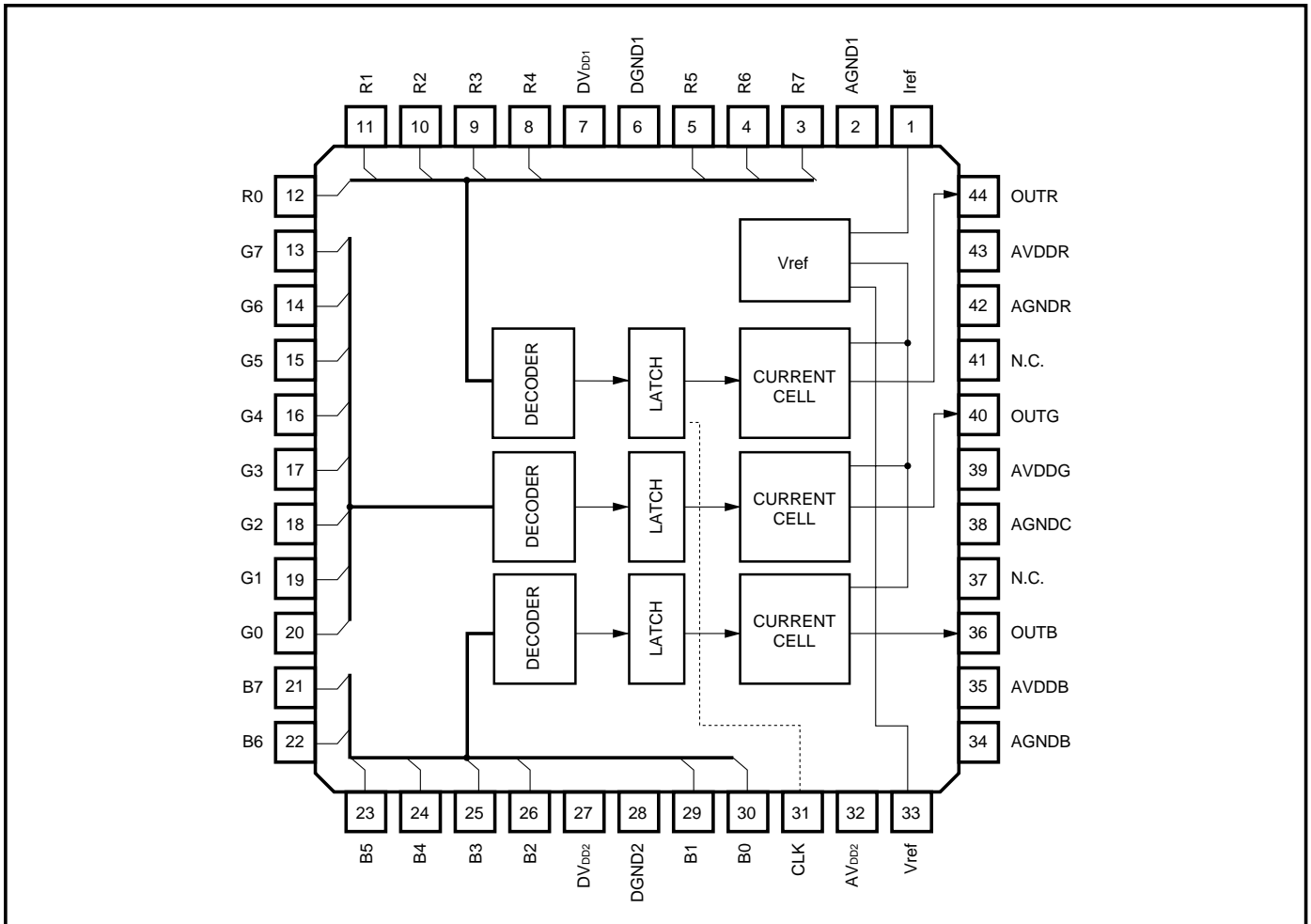
●Recommended operating conditions

| 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 | |

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●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 | $C_L = 15\text{pF}$ |

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●Pin descriptions

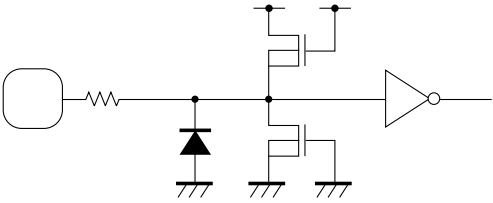
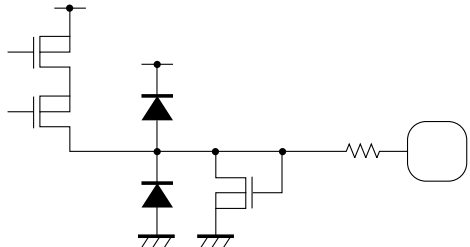
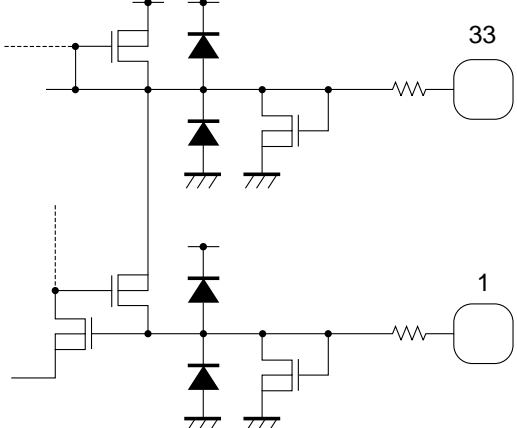
| Pin No. | I / O | Pin name | Function |
|---------|-------|--------------------|--|
| 1 | — | Iref | Output current adjustment resistor connection, Vref output |
| 2 | — | AGND 1 | Analog ground 1 |
| 3 | I | R7 | RED data input (bit 7, MSB) |
| 4 | I | R6 | RED data input (bit 6) |
| 5 | I | R5 | 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 | — | AV _{DD} B | Analog power supply B |
| 36 | O | OUTB | BLUE output |
| 37 | — | N.C. | — |

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| 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

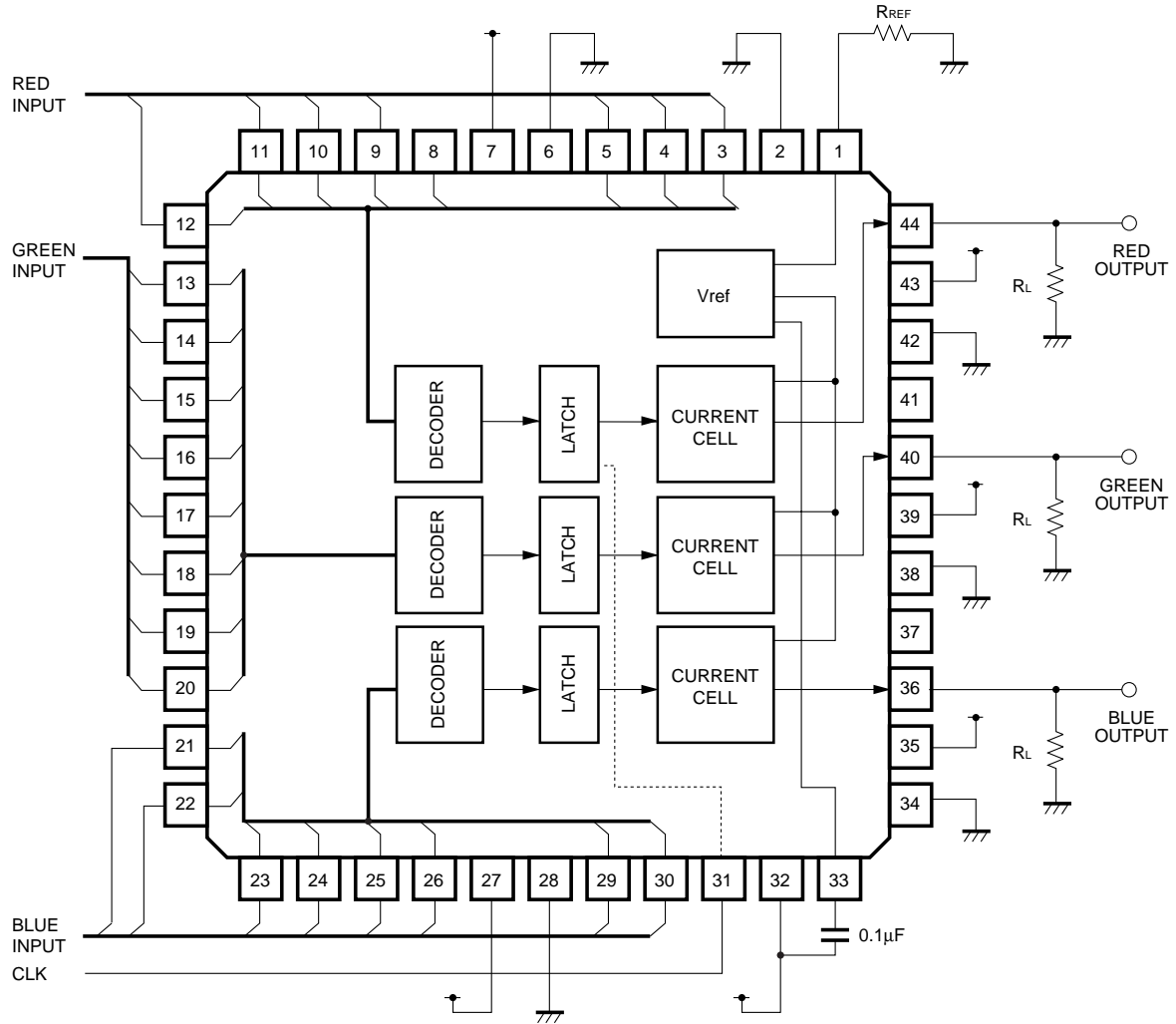
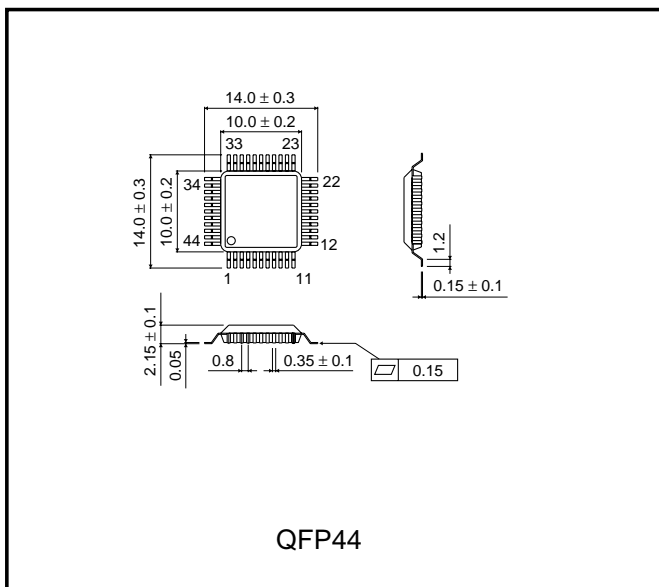


Fig.1

●External dimensions (Units: mm)



Appendix

Notes

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