

BST664

1. Product Overview

Military- grade BST664 is a 4- channel 12 -bit voltage output DAC monolithic integrated circuit chip. Each DAC channel has a double-buffered input latch structure and data readback function. All DAC read and write operations are completed through the same processor connected to the IO. These I/O ports provide 4, 8 or 12 bits of parallel data and are connected to the processor through a simple variable bit width interface. A reset to zero control pin allows the user to reset all DAC outputs to zero, regardless of the input latch state. Any or all DACs can be set to a transparent state to respond directly to input data from the output. The analog section of the BST664 includes 4 DAC unit, 4 output amplifiers, 1 control amplifier and switch. Each DAC unit is a variable R-2R type. The output current comes from each DAC connected to a resistor and output amplifier applied on the board. The output range of each DAC is programmable via a digital I/O pin and can be set to unipolar or bipolar range and referenced to a single or double reference voltage. All DACs operate receiving a same external reference.

BST664 is available in three versions: JLCC44 (CQFJ44) package version BST664MJLCC44, bipolar CDIP28 package version BST664MCDIP28, military-grade programmable CQFJ44 package version BST664MCQFJ44.

2. Product Features

- BST664 Features four complete voltage output DACs.
- BST664 With data register readback function.
- The BST664 has a “reset to zero” deactivate enable function.
- BST664 can perform multiplication operations and double buffer latches.
- Three types of packaging are available - CQFJ44, CDIP28, JLCC44.

3. Functional Block Diagram

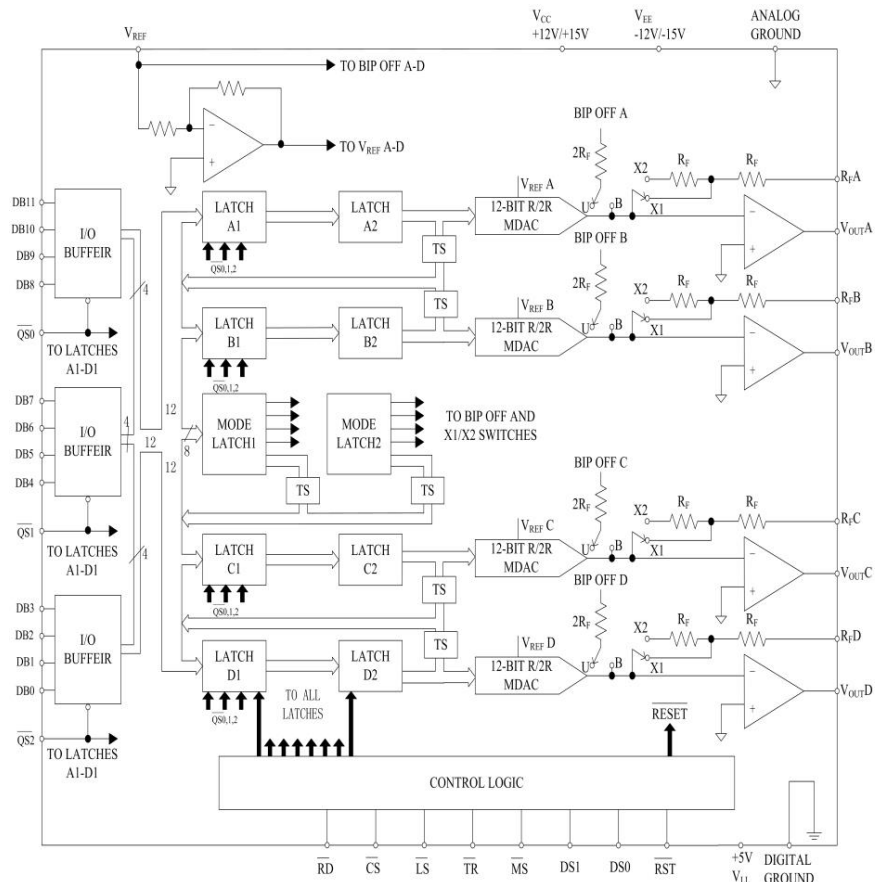


Figure 1. Functional Block Diagram (44-pin Version)

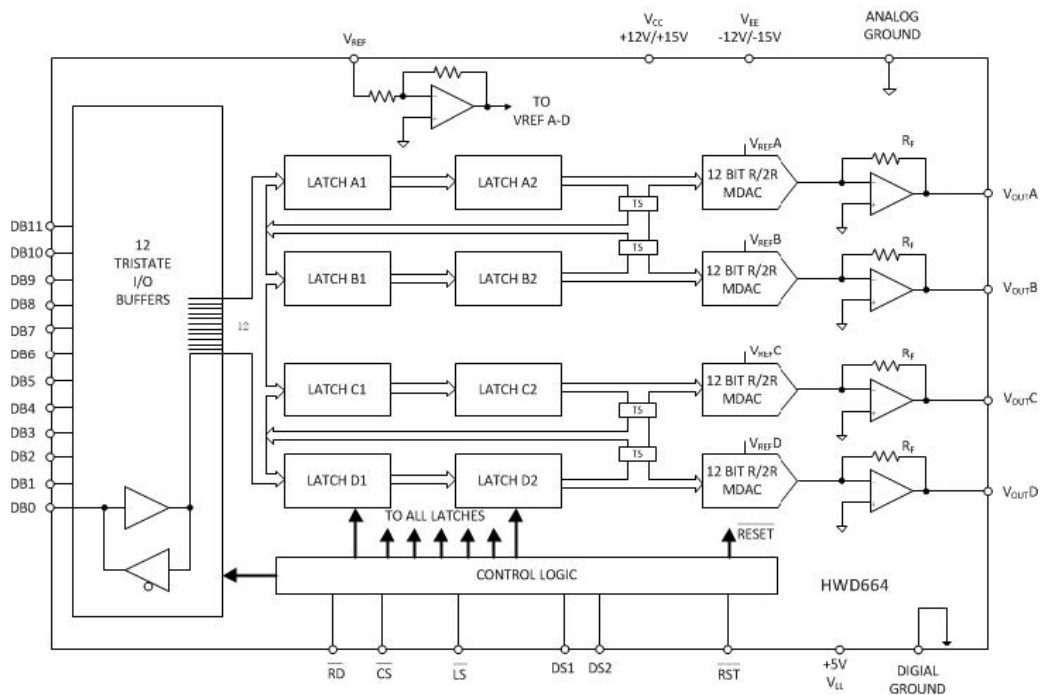


Figure 2. Functional Block Diagram (28-pin Version)

4. Electrical Parameters

Table 1.1. BST664MCDIP28 Electrical properties

Characteristic	Symbol	Condition - 55°C ≤ T _A ≤ 125 °C V _{CC} = 15V, V _{EE} = -15V V _{LL} = 5V, V _{REF} = 10V Unless otherwise specified	Limit value		Unit
			Minimum	Maximum	
Resolution	RES		—	12	Bits
Relative error	RA			±3	LSB
Differential Nonlinearity	DNL		—	±1	LSB
Gain Error	AE				
Turn on all bits	—	±15	LSB		
Bipolar Zero Error	V _{OS}	100000000000	—	±10	LSB
Reference input impedance	R _{IN}		1.3	—	KΩ
Reference voltage range	V _{REF}		V _{EE} +2	V _{CC} - 2	V
Output Current	I _O		—	5	mA
Circuit short circuit current	I _{SC}		—	40	mA
Supply Current	I _{LL}	V _{CC} = 16.5V, V _{EE} = -16.5V V _{IH} = 2V; V _{IL} = 0.8V	—	6	mA
		V _{CC} = 16.5V, V _{EE} = -16.5V V _{IH} = V _{LL} , V _{IL} = 0V	—	1	
	I _C	Turn on all bits	—	15	
	I _E	Turn on all bits	—	19	
Digital input high level voltage	V _I		2.0	—	V
Digital input low level voltage	V _{IL}		—	0.8	V
Digital input high level current	I _I	V _{IN} = V _{LL} , data input terminal	—	±10	μA
		V _{IN} = V _{LL} : / CS/DS0//DS1//RST//LS	—	±10	
Digital input low level current	I _{IL}	V _{IN} = DGND Data Entry	—	±10	μA
		V _{IN} = DGND / CS/DS0//DS1//RST//LS	—	±10	
Digital output low level voltage	V _{OL}		—	0.4	V
Digital output high level voltage	V		2.4	—	V
Power supply gain sensitivity	PSGS	11.4V ≤ V _{CC} ≤ 16.5V		±150	ppm/%
		-16.5V ≤ V _{EE} ≤ -11.4V		±150	
		4.5V ≤ V _{LL} ≤ 5.5V		±150	
Output Settling Time	ts	bits off → bits on	—	12	μs
Functional testing		f = 1 × (1 ± 1%) kHz Functional testing of the circuit	—	—	

Table 1.2. BST664MCDIP28 Electrical properties

Characteristic	Symbol	Condition Unless otherwise specified - 55°C ≤ T _A ≤ 125°C V _{CC} = 15V, V _{EE} = -15V V _{LL} = 5V, V _{REF} = 10V	Limit value		Unit
			Minimum	Maximum	
Resolution	RES		—	12	Bits
Relative error	RA		—	±3	LSB
Differential Nonlinearity	DNL		—	±1	LSB
Gain Error	AE				
Turn on all bits	—	±15	LSB		
Unipolar offset error	V _{OS}	Turn off all bits	—	±10	LSB
Reference input impedance	R _{IN}		1.3	—	KΩ
Output Current	I _O		—	5	mA
Circuit short circuit current	I _{SC}		—	40	mA
Supply Current	I _{LL}	V _{CC} = 16.5V, V _{EE} = - 16.5V V _{IH} = V _{LL} , V _{IL} = 0V	—	1	mA
	I _C		—	15	
	I _E		—	19	
Digital input high level voltage	V _I		2.0	—	V
Digital input low level voltage	V _{IL}		—	0.8	V
Digital input high level current	I _I	V IN = V LL , data input terminal	—	±10	μA
		V IN =V LL : / CS/DS0//DS1//RST// LS	—	±10	
Digital input low level current	I _{IL}	V IN = DGND Data Entry	—	±10	μA
		V IN = DGND/ CS/DS0//DS1//RST//LS	—	±10	

Table 1.3. BST664MJLCC44 Electrical properties

Characteristic	Symbol	Condition - 55°C ≤ T _A ≤ 125 °C V _{CC} = 15V, V _{EE} = -15V V _{LL} = 5V, V _{REF} = 10V Unless otherwise specified	Limit value		Unit
			Minimum	Maximum	
Resolution	RES		—	12	Bits
Relative error	RA			±2	LSB
				±3	
Differential Nonlinearity	DNL		—	±2	LSB
Gain Temperature Coefficient	Δ A E		—	±10	ppm/°C
Unipolar offset error	V _{OS}	Turn off all bits	—	±10	LSB
Unipolar offset temperature coefficient	Δ V _{OS}		—	±10	ppm/°C
Reference input impedance ^a	R _{IN}		1.3	—	KΩ
Reference voltage ^{rangea}	V _{REF}		V _{EE} + 2	V _{CC} - 2	V
Unipolar output voltage ^a	V _O		0	V _{CC} - 2	V
Output ^{current}	I _O		5	—	mA
Circuit short circuit current ^a	I _{SC}		—	40	mA
Supply Current	I _{LL}	V _{CC} = 16.5V, V _{EE} = - 16.5V, V _{IH} = 2V, V _{IL} = 0.8V	—	6	mA
		V _{CC} = 16.5V, V _{EE} = - 16.5V, V _{IH} = V _{LL} , V _{IL} = 0V	—	1	
	I _C	Turn on all bits	—	15	
	I _E	Turn on all bits	—	19	
Power consumption	P _D		—	525	mW
Gain matching error	mA _E		—	±20	LSB
Unipolar offset matching error	mV _{OS}		—	±15	LSB
Digital input high level voltage	V _I		2	—	V
Digital input low level voltage	V _{IL}		—	0.8	V
Digital input high level current	I _I	V _{IN} = V _{LL} , data input terminal	—	±10	μA
		V _{IN} = V _{LL} : / CS/DS0//DS1//RST//LS	—	±10	
Digital input low level current	I _{IL}	V _{IN} = DGND Data Entry	—	±10	μA
		V _{IN} = DGND / CS/DS0//DS1//RST//LS	—	±10	
Digital output low level voltage	V _{OL}		—	0.4	V
Digital output high level voltage	V		2.4	—	V
Power supply gain sensitivity	PSG S	11.4V ≤ V _{CC} ≤ 16.5V	±150	—	ppm/%
		-16.5V ≤ V _{EE} ≤ - 11.4V	±150	—	
		4.5V ≤ V _{LL} ≤ 5.5V	±150	—	

5. Ordering Information

Table 2. Product Ordering Information

Model	Quality Grade	Package Name	Package
BST664MJLCC44	B class	JLCC44	ceramics
BST664MCDIP28	B class	CDIP28	ceramics
BST664MCQFJ44	B class	CQFJ44	ceramics