

Features

- Hardware codec
- Driven by a single 5V power supply
- Built in Current Limit Function
- Easy circuit design
- Few external components
- High reliability
- Available in SOP16 package

Applications

- Telephony equipment
- Security equipment
- Audio and video devices
- Air-conditioning equipment
- Wide rang of other equipment and devices

General Description

The XL1193 conforms to the HBS(Home Bus) specification, support hardware codec, and has functions for the reception and transmission of data. AMI is adopted for the waveforms of signals handled by the transmission and reception units, designed for connection to twisted-pair lines. The IC can be driven by a single 5V power supply, and incorporates an output transistor to reduce the number of external components required.

XL1193 is a special hardware encoding and decoding chip for DC carrier communication. It supports DC carrier and nonpolar connection. It has flexible bus topology and strong anti-interference ability. It can communicate while power line carrier power supply. The maximum communication distance can reach 1000m. It has built-in protection module, simple peripheral circuit and high reliability.

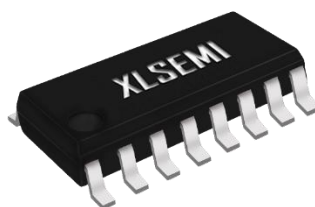


Figure1. Package Type of XL1193

Pin Configurations

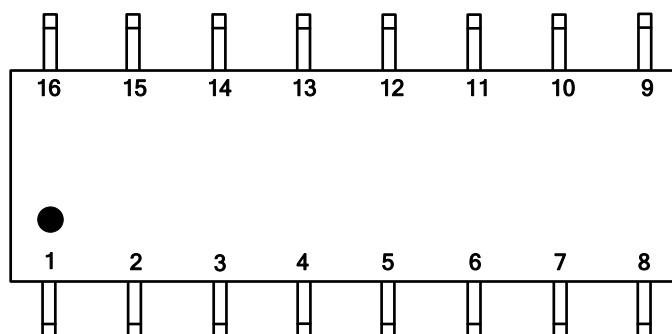


Figure2. Pin Configuration of XL1193 (Top View)

Table 1 Pin Description

Pin Number	Pin Name	Pin Number	Pin Name
1	DATA OUT(A)	9	OUT(A)
2	DATA OUT(B)	10	OUT(B)
3	Boost capacitor pin	11	VCC
4	Boost capacitor pin	12	NC
5	RESET	13	GND
6	DATA IN	14	NC
7	PWM	15	IN(2)
8	NC	16	IN(1)

Function Block

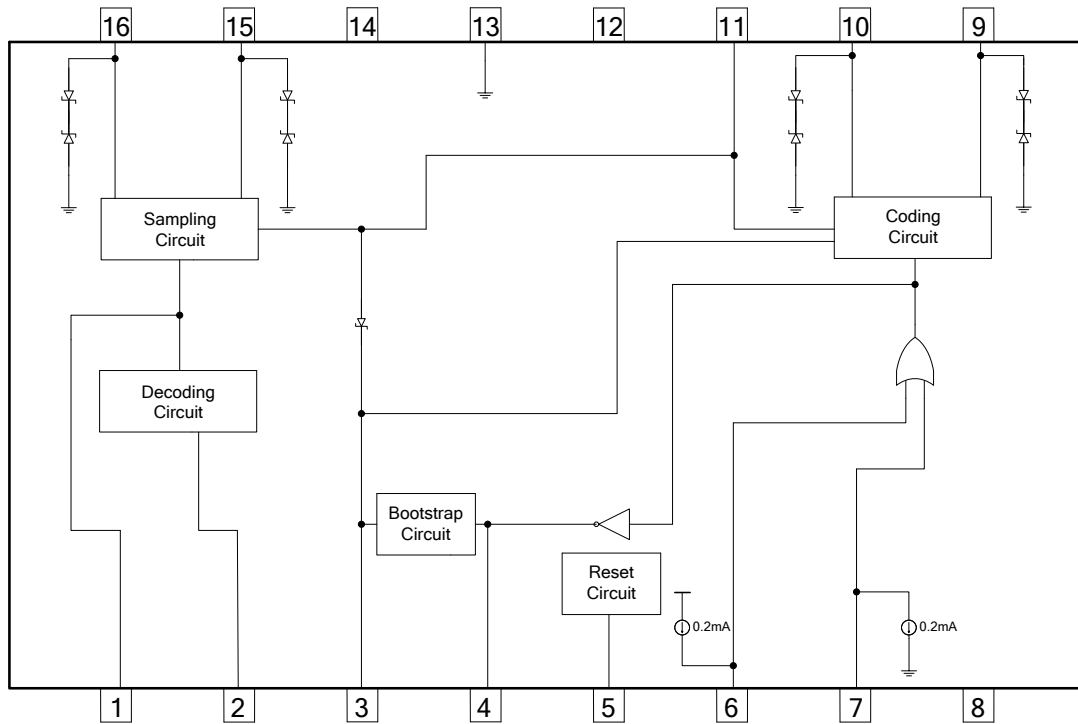


Figure3. Function Block Diagram of XL1193

Typical Application Circuit

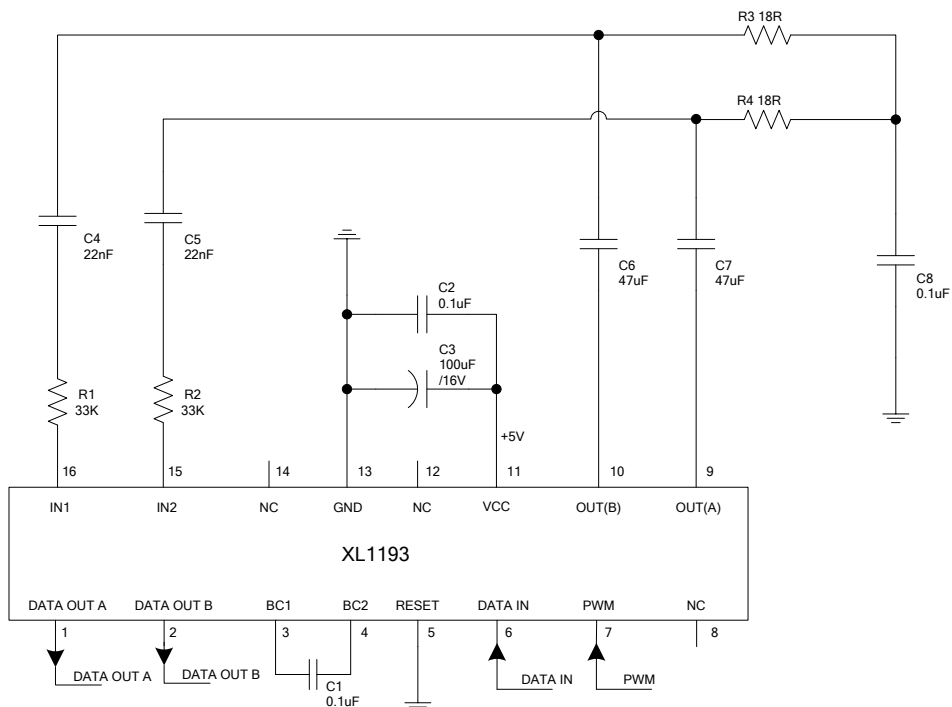


Figure4. XL1193 Typical Application Circuit

HBS-Compatible Driver and Receiver Monolithic IC

XL1193

Ordering Information

Order Information	Marking ID	Package Type	Packing Type Supplied As
XL1193	XL1193	SOP16	2500 Units on Tape & Reel

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Value	Unit
Operating power supply voltage (VCC)	V _{CCOP1}	4.5 ~ 5.5	V
Recommended power supply voltage range	V _{CCOP2}	4.75 ~ 5.25	V
Power supply voltage (VCC)	V _{CCmax.}	-0.3 ~ 7	V
Pin3 voltage	V _{PIN3}	-0.3 ~ 10	V
Other pins voltage	V	-0.3 ~ VCC	V
Power Dissipation	P _D	450	mW
Operating Junction Temperature	T _J	-40 ~ 125	°C
Storage Temperature	T _{STG}	-40 ~ 125	°C
Lead Temperature (Soldering, 10 sec)	T _{LEAD}	260	°C
ESD (HBM)		>8000	V

Note1:Stresses greater than those listed under Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Note2:Pins 9,10,15 and 16 have built-in bus burr voltage absorption circuit, so they can absorb positive and negative burr voltage, and the burr absorption clamping voltage is designed to be positive and negative 8.2V.

HBS-Compatible Driver and Receiver Monolithic IC

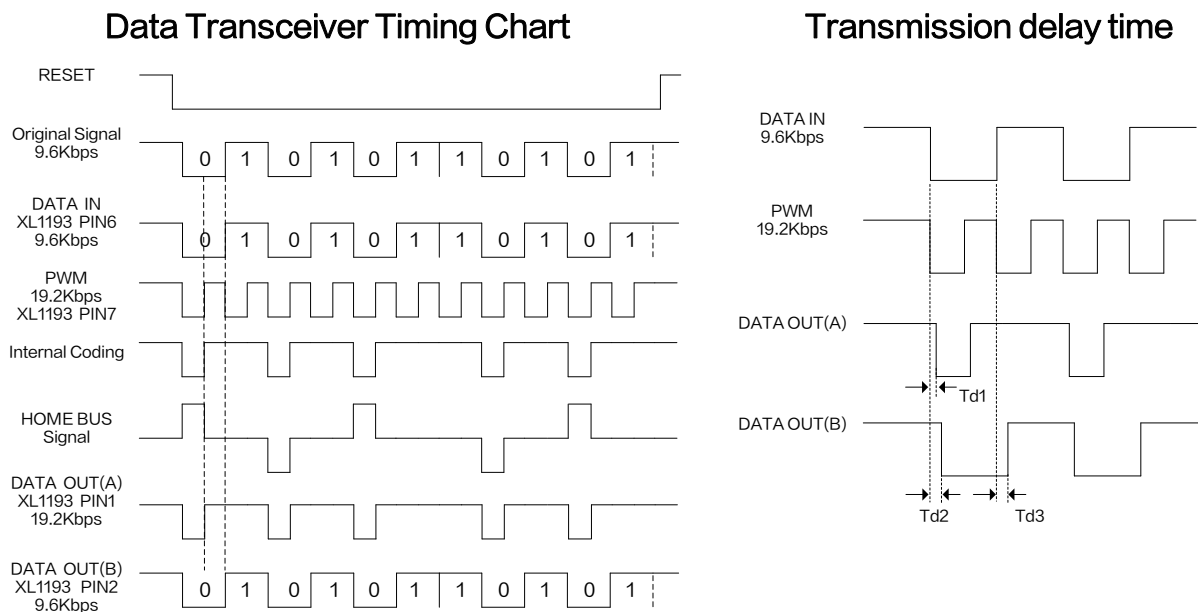
XL1193

XL1193 Electrical Characteristics

VCC=5V, GND=0V, T_a = 25°C; F_{PIN6}=9.6Kbps(Duty=50%), F_{PIN7}=19.2Kbps(Duty=50%), PIN5=0V, R_L=36Ω (unless otherwise specified).

Parameters	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Power supply current 1	ICCO	PIN5=5V		9		mA
Power supply current 2	ICCON1	PIN7=0V		73		mA
Power supply current 3	ICCON2			42		mA
Transmission output voltage	V _{TO}	Both pins 9 and 10	3.8	4.2	4.6	V _{P-P}
Transmission waveform symmetry	V _{TR}	V _{TO1} /V _{TO2}	0.75	1.0	1.25	
Reception Sensitivity	V _{RS}		0.65	0.75	0.85	V _{P-P}
Noise resistance	V _{RN}	Level at which no errors are output	0.55			V _{P-P}
Input impedance	R _{IN}	Both pins 15 and 16	25	36	46	KΩ
Transmission delay time 1	T _{d1}	cf. transmit/receive waveform diagrams		1.6		uS
Transmission delay time 2	T _{d2}	cf. transmit/receive waveform diagrams		3.6		uS
Transmission delay time 3	T _{d3}	cf. transmit/receive waveform diagrams		2.4		uS
Reception output H voltage	V _{ROH}		4.5			V
Reception output L voltage	V _{ROL}				0.5	V
H level input voltage 1	V _{LIH}	PIN6	2.4			V
L level input voltage 1	V _{LIL}	PIN6			0.6	V
H level input current 1	I _{LIH}	V _{DATA IN} =2.4V			10	uA
L level input current 1	I _{LIL}	V _{DATA IN} =0.4V			-400	uA
H level input voltage 2	V _{LIH}	PIN7	2.4			V
L level input voltage 2	V _{LIL}	PIN7			0.6	V
H level input current 2	I _{LIH}	V _{PWM} =2.4V			400	uA
L level input current 2	I _{LIL}	V _{PWM} =0.4V			400	uA
Bootstrap output H voltage	V _{BR}		7.5	8.0		V

Timing Chart



Note 1: The peripheral components in the block diagram are the constants for Data Rates 9.6Kbps. If the data rates is low, larger values should be chosen for the coupling capacitors between the receive and transmit pins and the bus line and for the capacitor connecting pins 3 and 4.

Note 2: The Pin 7 of the chip can access the Data Rates 19.2Kbps square wave signal, Realize Pin6 signal (Data Rates 9.6Kbps) and Pin7 signal synchronization (the Pin 6 data signal is synchronized at the falling edge of the Pin 7 square wave signal) to ensure that the hardware coding is correct.

Note 3: Pin1 of the chip outputs the demodulated 19.2Kbps signal, and Pin2 outputs the decoded 9.6Kbps signal (equivalent to doubling the low-level time of Pin1 output signal).

Note 4: The current limit function is built into this IC. There is a possibility that IC generates heat when the output terminal is short. However, The characteristic changes depending on the substrate condition. Please evaluate IC in the set.

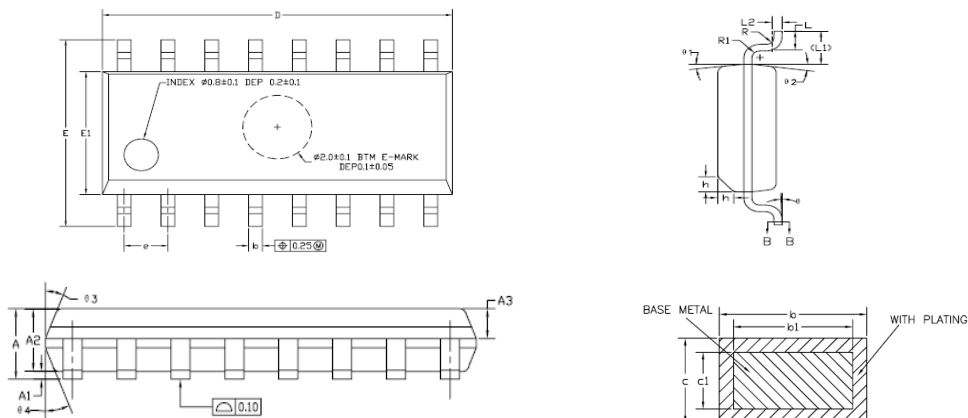
Note 5: The ceramic capacitor should be placed closer the VCC and GND pins to eliminate noise . Increase the grounding vias to decrease the Parasitic parameter.

HBS-Compatible Driver and Receiver Monolithic IC

XL1193

Package Information

SOP16 Mechanical Dimensions



Symbol	Dimensions In Millimeters(SOP16)			Dimensions In Inches (SOP16)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	1.35	1.60	1.75	0.053	0.063	0.069
A1	0.10	0.15	0.25	0.004	0.006	0.010
A2	1.25	1.45	1.65	0.049	0.057	0.065
A3	0.55	0.65	0.75	0.022	0.026	0.030
b	0.36	-	0.51	0.014	-	0.020
b1	0.35	0.40	0.45	0.014	0.016	0.018
c	0.17	-	0.25	0.007	-	0.010
c1	0.17	0.20	0.23	0.007	0.008	0.009
D	9.80	9.90	10.00	0.386	0.390	0.394
E	5.80	6.00	6.20	0.228	0.236	0.244
E1	3.80	3.90	4.00	0.150	0.154	0.157
e	1.27(BSC)			0.050(BSC)		
L	0.45	0.60	0.80	0.018	0.024	0.031
L1	1.04REF			0.041(BSC)		
L2	0.25BSC			0.010(BSC)		
R	0.07	-	-	0.003	-	-
R1	0.07	-	-	0.003	-	-
h	0.30	0.40	0.50	0.012	0.016	0.020
θ	0°	-	8°	0°	-	8°
θ1	6°	8°	10°	6°	8°	10°
θ2	6°	8°	10°	6°	8°	10°
θ3	5°	7°	9°	5°	7°	9°
θ4	5°	7°	9°	5°	7°	9°

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