

HBS-Compatible Driver and Receiver with Power Supply Monolithic IC MM1034

Outline

This IC conforms to the HBS (Home Bus) specification, and has functions for reception and transmission of data. It incorporates a power supply circuit which employs a highly efficient switching regulator, allowing a direct power supply from the bus line. AMI is adopted for the waveforms of signals handled by the transmission and reception units, designed for connection to twisted-pair lines.

It connects a wide range of equipment such as telephone equipment, security devices, audio or video equipment, and air-conditioning equipment to a bus line to enable mutual communication between equipment.

Features

1. Space saving
2. High reliability
3. Replaces pulse transformers
4. Low cost
5. Adopts a highly efficient switching regulator
6. Easy circuit design
7. Includes a stable power supply circuit ($V_{o1}=5\text{ V} \pm 0.25$)
8. Few external components

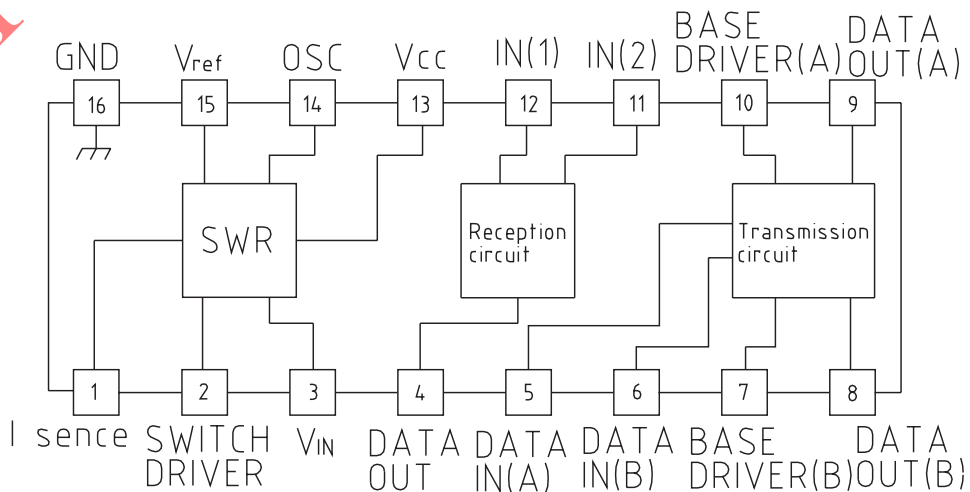
Applications

1. Telephone equipment
2. Security devices
3. Audio and video equipment
4. Air-conditioning equipment
5. A wide range of other equipment and devices

Packages

- DIP-16A (MM1034XD)
- SOP-16A (MM1034XF)

Block diagram



Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Ratings	Units
Storage temperature	T _{STG}	-40~+125	°C
Operating temperature	T _{OPR}	-20~+75	°C
Power supply current	V _{CC} max.	-0.3~+46	V
Operating power supply voltage	V _{CCOP}	13~45	V
Allowable loss	P _d	400	mW

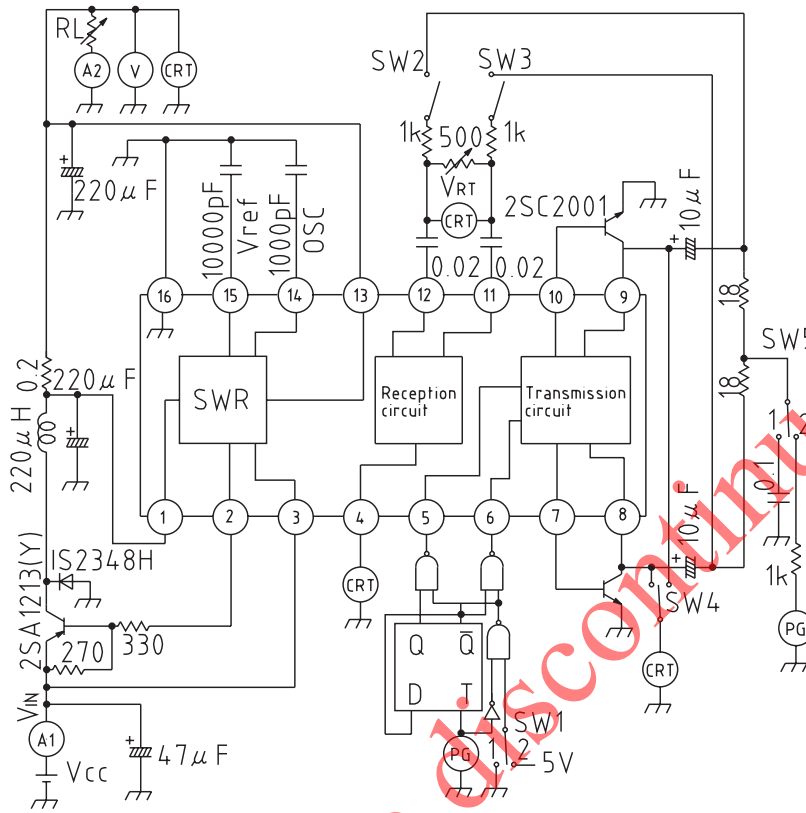
Electrical Characteristics (Except where noted otherwise, Ta=25°C, V_{CC}=30V, F_{transmit}=10kHz (DUTY=50%))

Item		Symbol	Measurement conditions	Min.	Typ.	Max.	Units
SWR	Output voltage	V _{O1}	V _{CC} 1=15~45V, I _L =0~250mA	4.75	5.00	5.25	V
	Output voltage	V _{O2}	V _{CC} 1=13~45V, I _L =0~250mA	4.70	5.00	5.25	V
	Output voltage	V _{O2}	V _{CC} 1=11~45V, I _L =0~100mA	4.75	5.00	5.25	V
	Output ripple voltage	V _r	I _L =250mA, no spikes			50	mV
	Reactive current	I _{CCq}	I _L =0mA, transmit unit off		4	6	mA
	SWR transmission frequency	F _{OSC}			80		kHz
	Power supply current on short-circuit	I _{IS}	R _S =0.2Ω		7.5	12	mA
	Output current on short-circuit	I _{OS}	R _S =0.2Ω	70	110	150	mA
	Transmission output voltage	V _{TO}	Both pins 8 and 9	3.8	4.2	4.6	V _{P-P}
Transmission circuit	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 11 and 12	25	36	46	kΩ
	Transmission delay time 1	T _{d1}	cf. transmit/receive waveform diagrams		0.2		μs
	Transmission delay time 2	T _{d2}	cf. transmit/receive waveform diagrams		0.4		μs
	Transmission delay time 3	T _{d3}	cf. transmit/receive waveform diagrams		0.7		μs
	Transmission delay time 4	T _{d4}	cf. transmit/receive waveform diagrams		1.0		μs
	Reception output H voltage	V _{ROH}		4.5			V
	Reception output L voltage	V _{ROL}				0.5	V
	Transmission waveform LOSS 1	V _{TLS}	V _T =5V applied, power on	4.5			V
Transmission waveform LOSS 2	V _{TLS}	applied, power off	4.5			V	
	H level input voltage	V _{LH}		2.4			V
	L level input voltage	V _{LIL}				0.8	V
	H level input current	I _{LH}	V _{IN} =2.4V			10	μA
	L level input current	I _{LIL}	V _{IN} =0.4V			300	μA

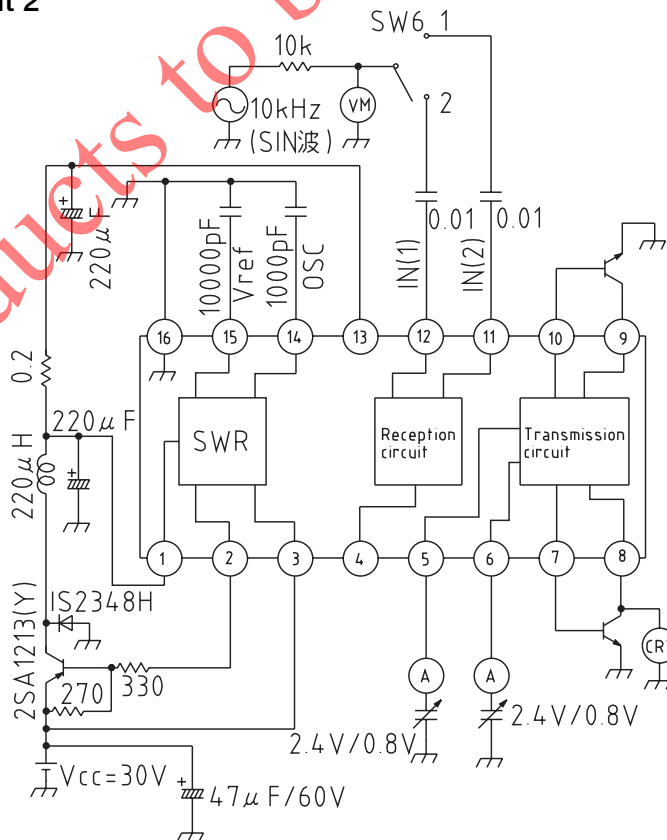
When a negative voltage is applied to pins 8 and 9, there should be no abnormal operation of internal circuits between 0 and 6V. However, if a negative voltage exceeding -6V is applied, thyristor operation may result, so it is recommended that an external clamping diode be added.

Measuring Circuit

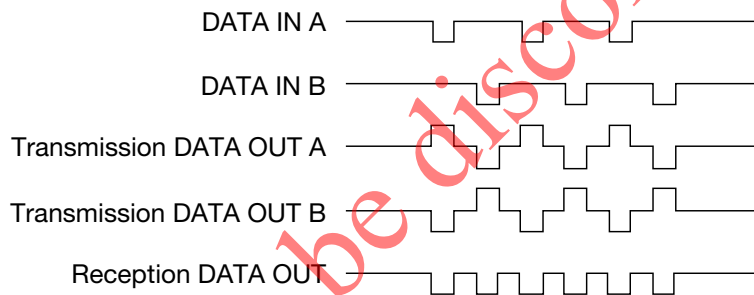
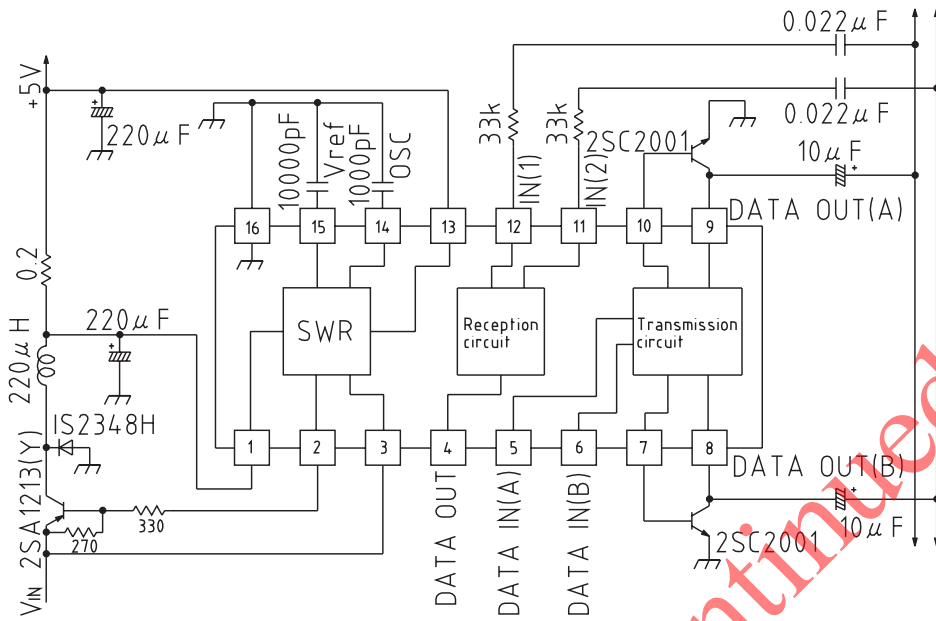
■ Measurement circuit 1



■ Measurement circuit 2

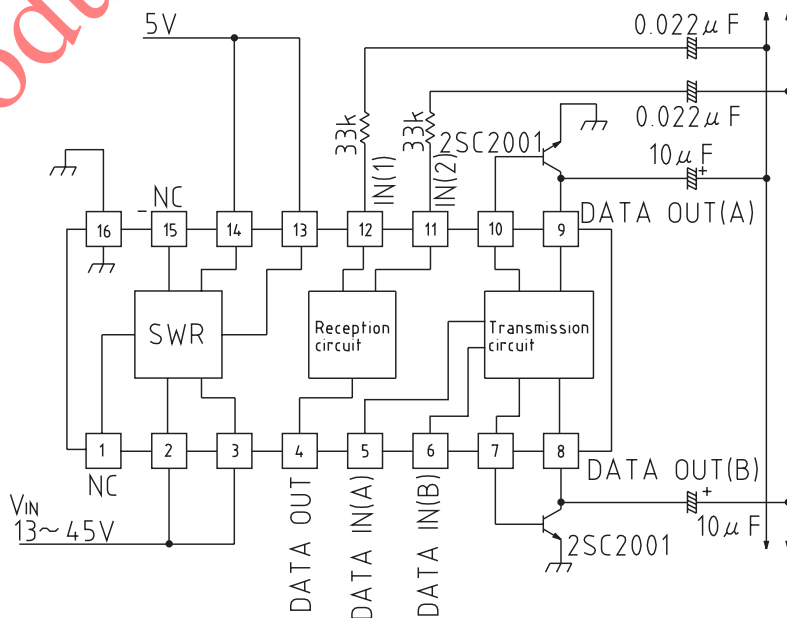


Application Circuits

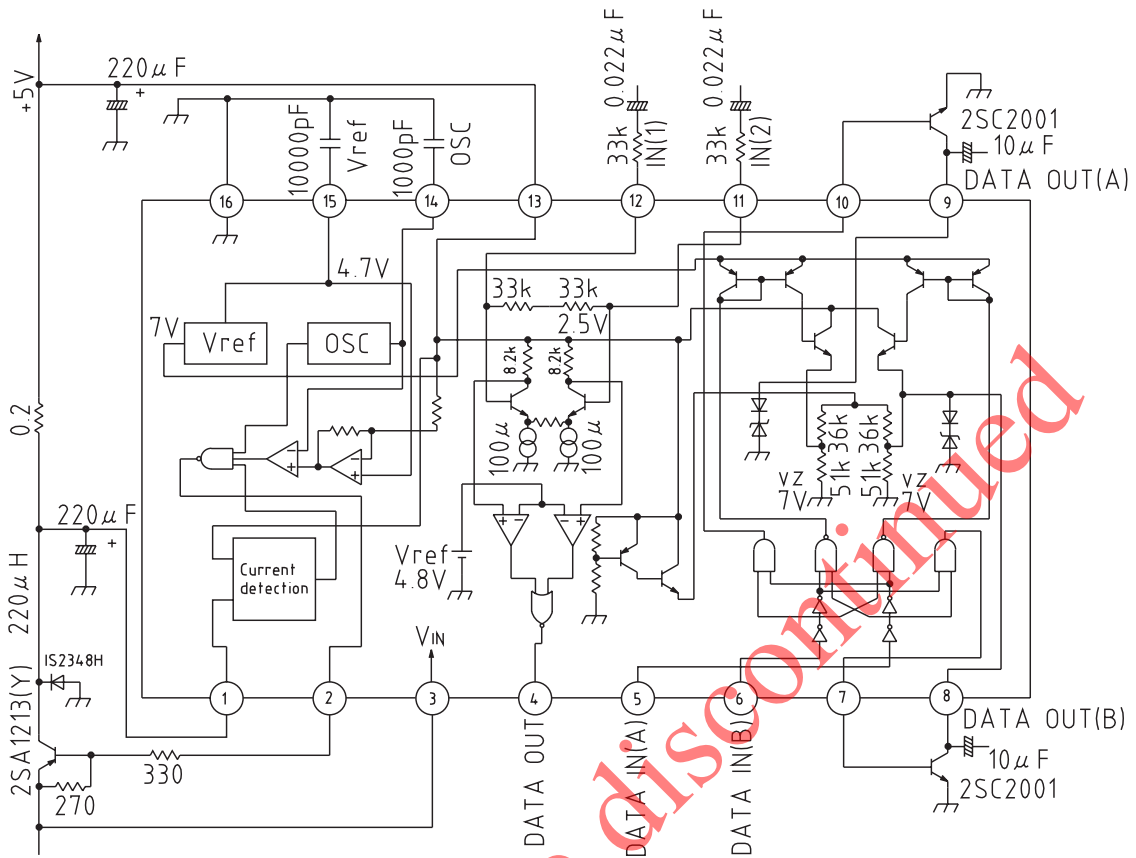


Additional Application Circuits (SWR circuit not used)

Even when a 5V external voltage can be supplied, an addition voltage of 13 to 45V must be applied to pins 2 and 3 in order to obtain an internal biased power supply of 3.4V.

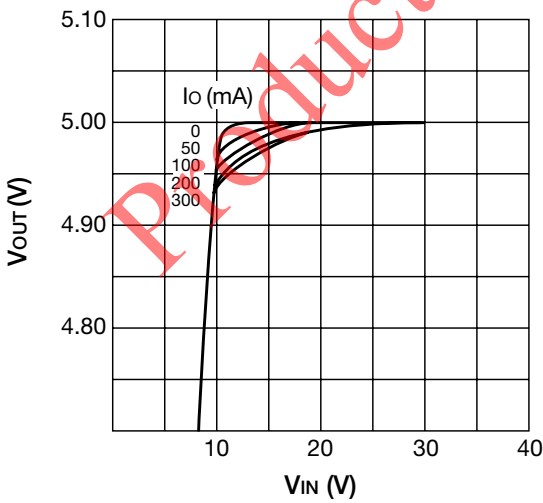


Circuit Diagram



Characteristics

■ V_{OUT} vs. V_{IN}



■ V_{OUT} vs. I_o

