

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

Outline

This IC conforms to the HBS (Home Bus) specification (Electronic Industries Association of Japan), and has functions for the reception and transmission of data. It incorporates power supply circuitry which employs an efficient switching regulator, and so can draw power directly 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. Telephone equipment, security devices, audio or video equipment, air-conditioning equipment, and a wide range of other devices can be connected to a bus line to enable mutual communications.

Features

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

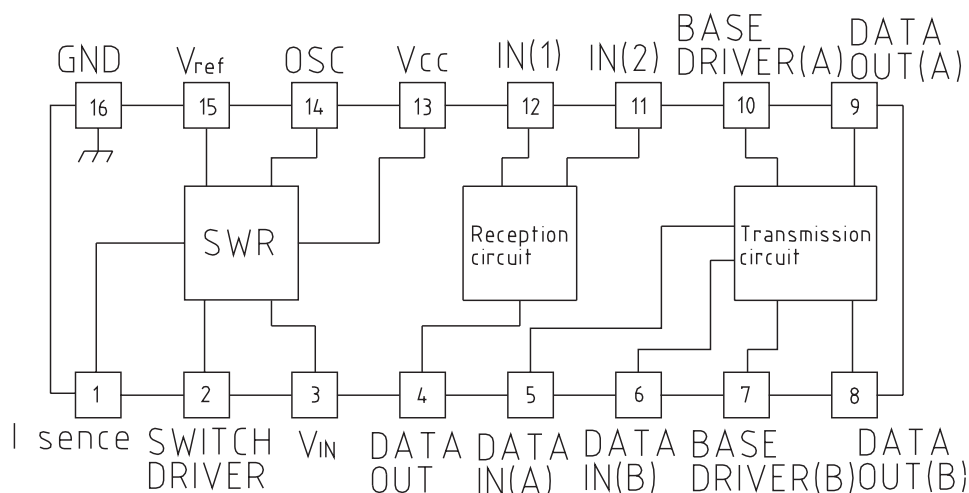
Applications

1. Telephony equipment
2. Security equipment
3. Audio and video devices
4. Air-conditioning equipment
5. Wide range of other equipment and devices

Package

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

Block diagram



Absolute Maximum Ratings (Ta=25°C)

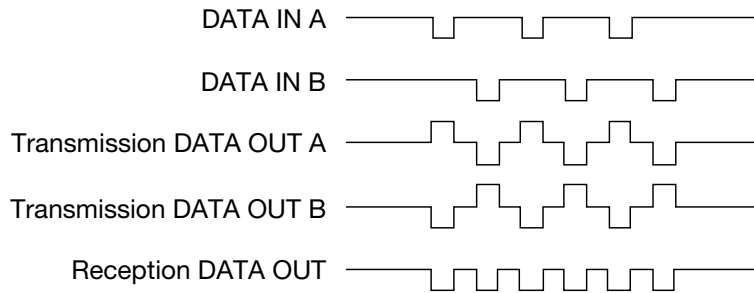
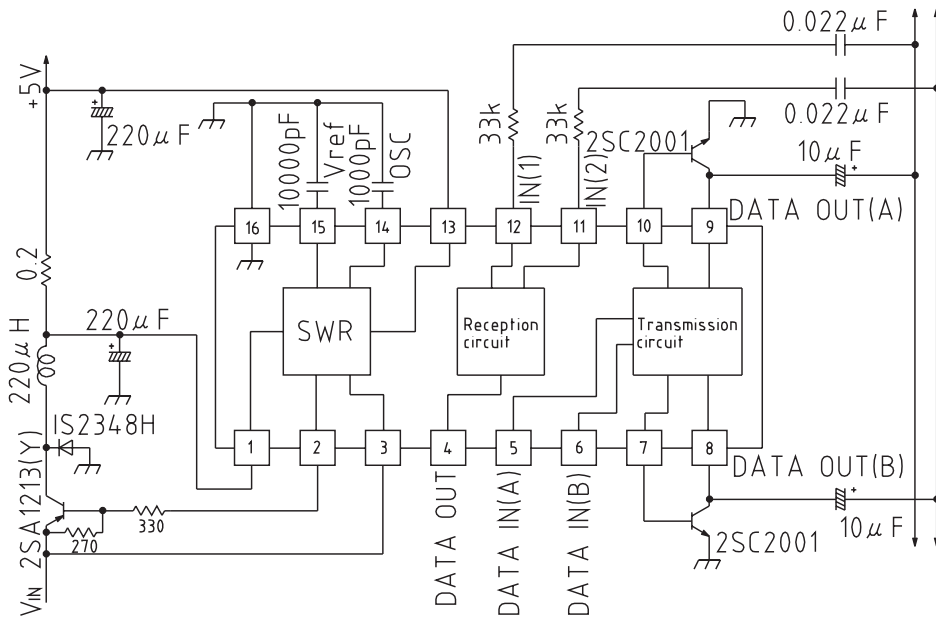
| Item | Symbol | Ratings | Units |
|--------------------------------|----------------------|----------|-------|
| Storage temperature | T _{STG} | -40~+125 | °C |
| Operating temperature | T _{OPR} | -20~+75 | °C |
| Power supply current | V _{CC} max. | -0.3~+46 | V |
| Operating power supply voltage | 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 _{CC1} =15~45V, I _L =0~250mA | 4.75 | 5.00 | 5.25 | V |
| | Output voltage | V _{O2} | V _{CC1} =13~45V, I _L =0~250mA | 4.70 | 5.00 | 5.25 | V |
| | Output voltage | V _{O2} | V _{CC1} =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 _{CCO} | 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 |

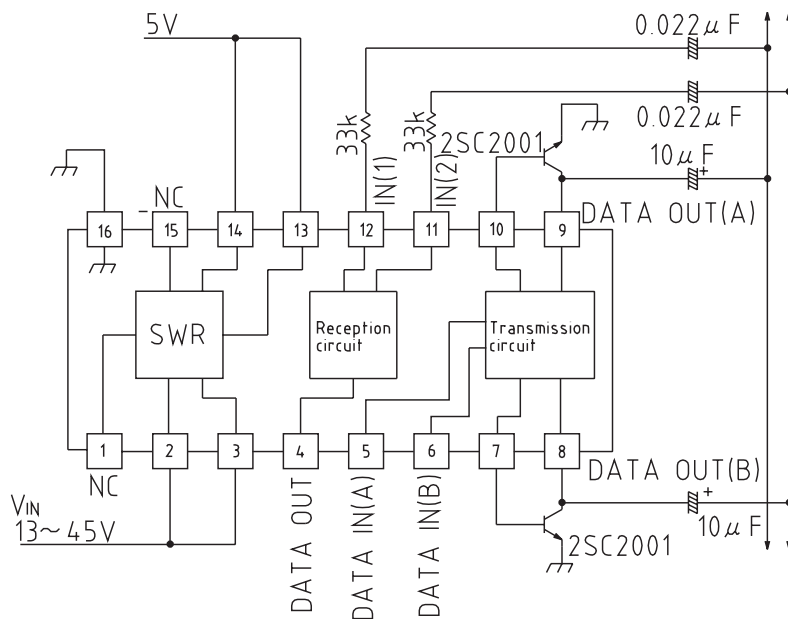
When a negative voltage is applied to pins 8 and 9, there should be no abnormal operation of internal circuits between 0 and 6V. However, if a negative voltage exceeding -6V is applied, thyristor operation may result, so it is recommended that an external clamping diode be added.

Application Circuits

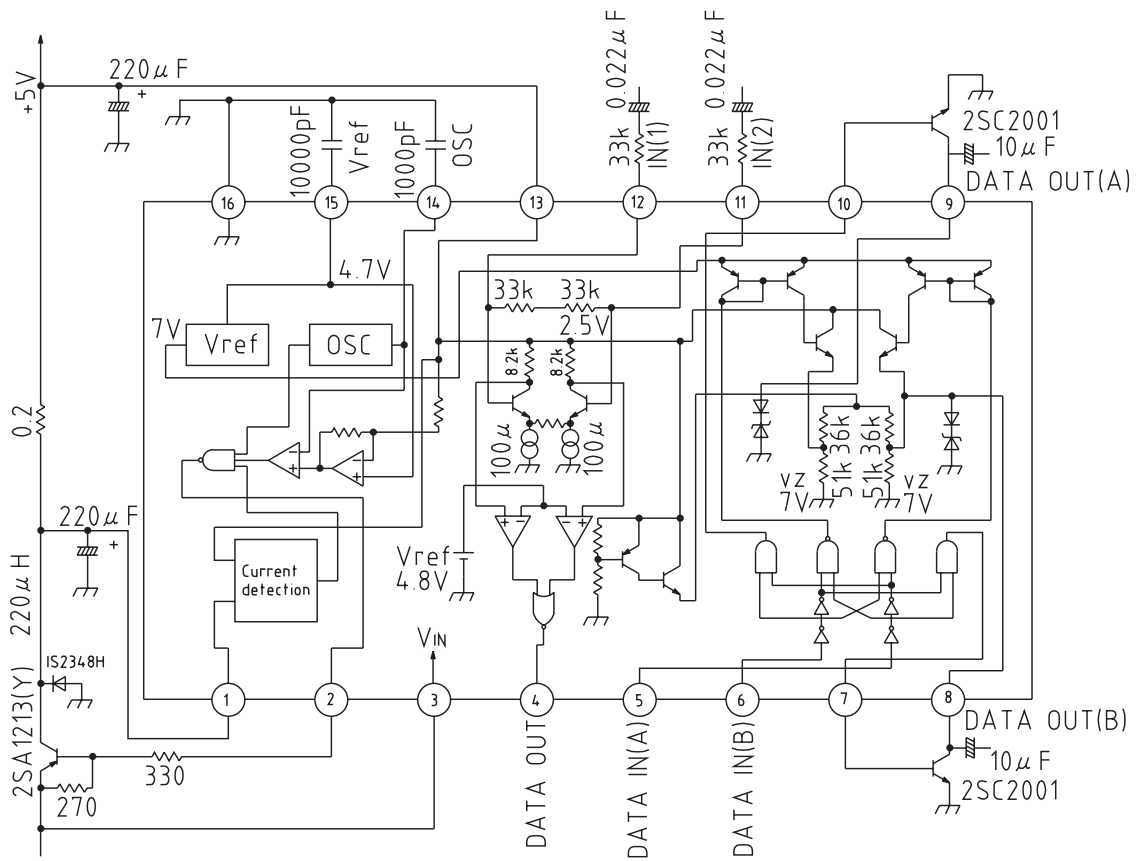


Additional Application Circuits (SWR circuit not used)

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.

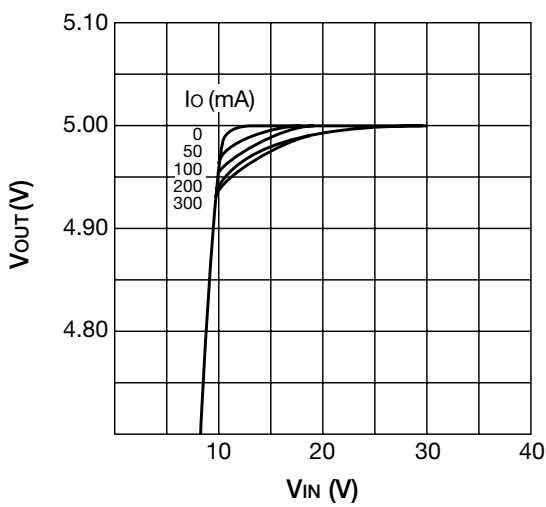


Circuit Diagram



Characteristics

V_{OUT} vs. V_{IN}



V_{OUT} vs. I_o

