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 (Vo1=5 V ±0.25)
8. Few external components

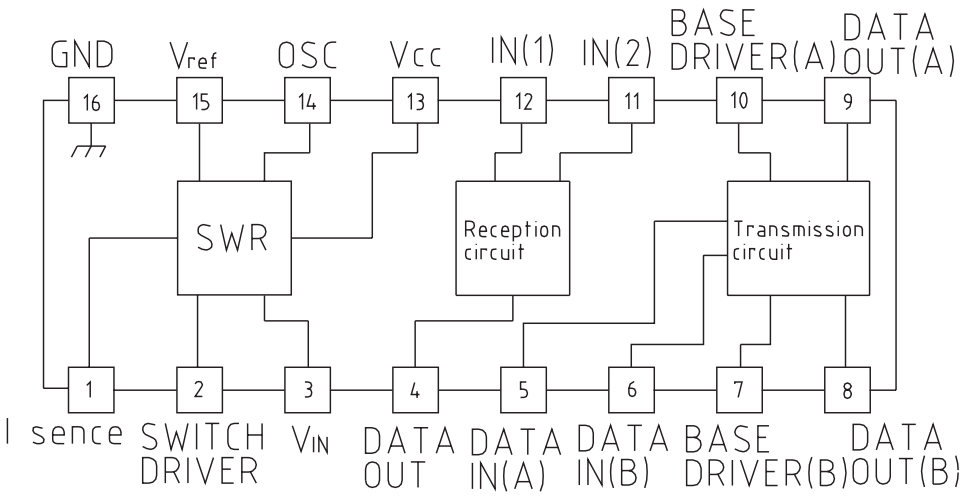
Applications

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 Maximun Ratings (Ta=25℃)

Item	Symbol	Ratings	Units
Storage temperature	T_{STG}	−40~+125	℃
Operating temperature	T_{OPR}	−20~+75	℃
Power supply current	V_{CC} max.	−0.3~+46	V
Operating power supply voltage	V_{CCOP}	13~45	V
Allowable loss	Pd	400	mW

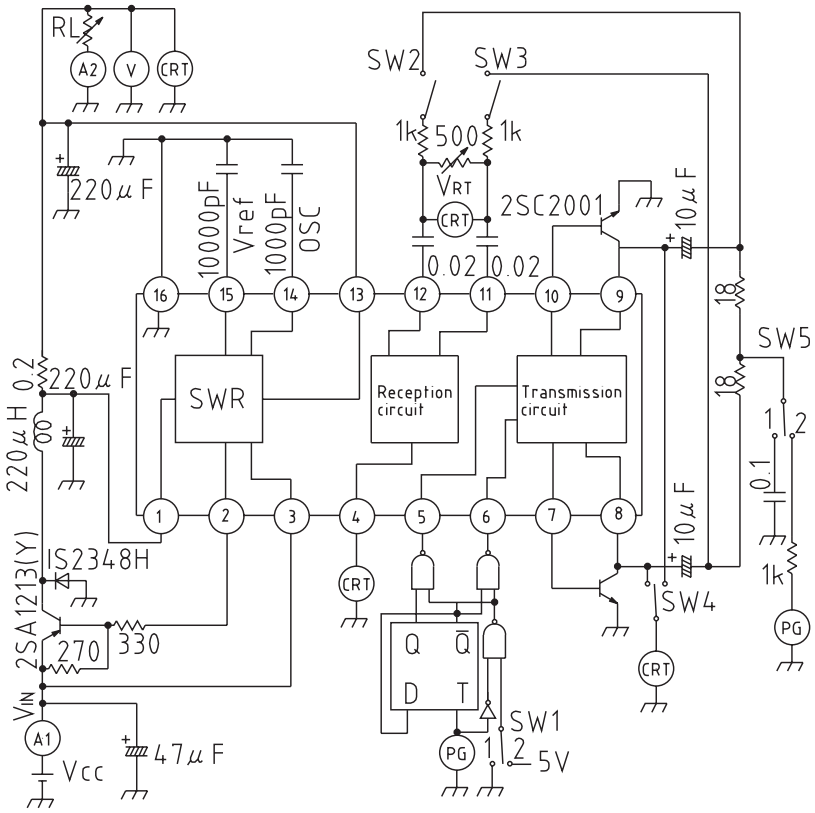
Electrical Characteristics (Except where noted therwise, Ta=25℃, V_{CC}=30V, Ftransmit=10kHz (DUTY=50%))

Item		Symbol	Measurement conditions	Min.	Typ.	Max.	Units
SWR	Output voltage	$V_{O}1$	$V_{CC}1$=15~45V, I_L=0~250mA	4.75	5.00	5.25	V
	Output voltage	$V_{O}2$	$V_{CC}1$=13~45V, I_L=0~250mA	4.70	5.00	5.25	V
	Output voltage	$V_{O}2$	$V_{CC}1$=11~45V, I_L=0~100mA	4.75	5.00	5.25	V
	Output ripple voltage	Vr	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}	$V_{TO}1/V_{TO}2$	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	Td1	cf. transmit/receive waveform diagrams		0.2		μS
	Transmission delay time 2	Td2	cf. transmit/receive waveform diagrams		0.4		μS
	Transmission delay time 3	Td3	cf. transmit/receive waveform diagrams		0.7		μS
	Transmission delay time 4	Td4	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_{LIH}		2.4			V
	L level input voltage	V_{LIL}				0.8	V
	H level input current	I_{LIH}	V_{IN}=2.4V			10	μA
	L level input current	I_{LIL}	V_{IN}=0.4V			300	μA

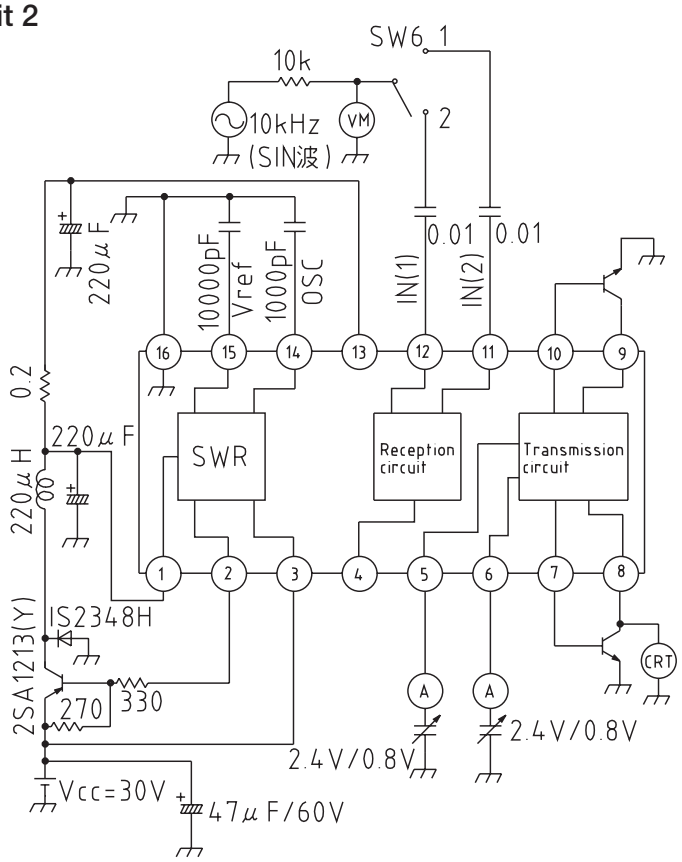
When a negative voltage is applied to pins 8 and 9, there should be no abnormal operation of internal circuits between 0 and 6V. However, if a negative voltage exceeding −6V is applied, thyristor operation may result, so it is recommended that an external clamping diode be added.

Measuring Circuit

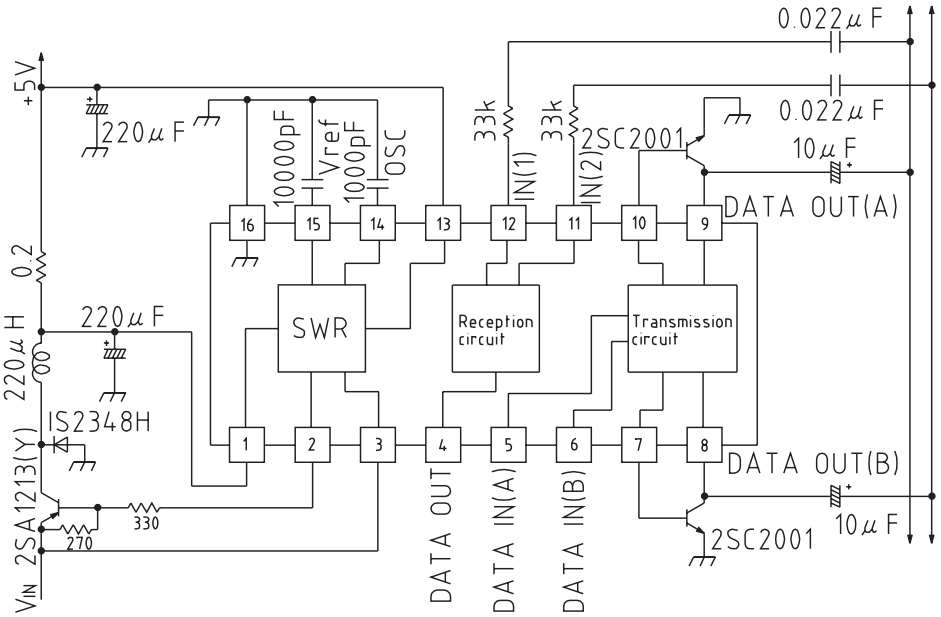
Measurement circuit 1

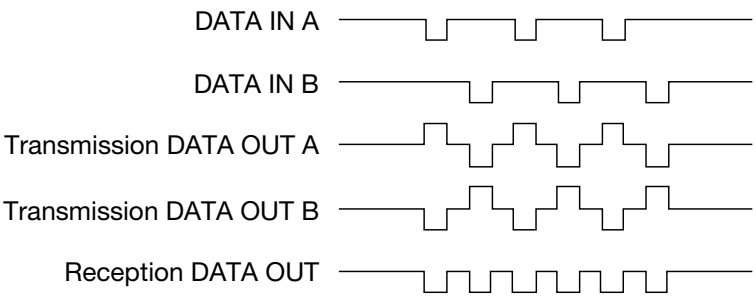


Measurement circuit 2



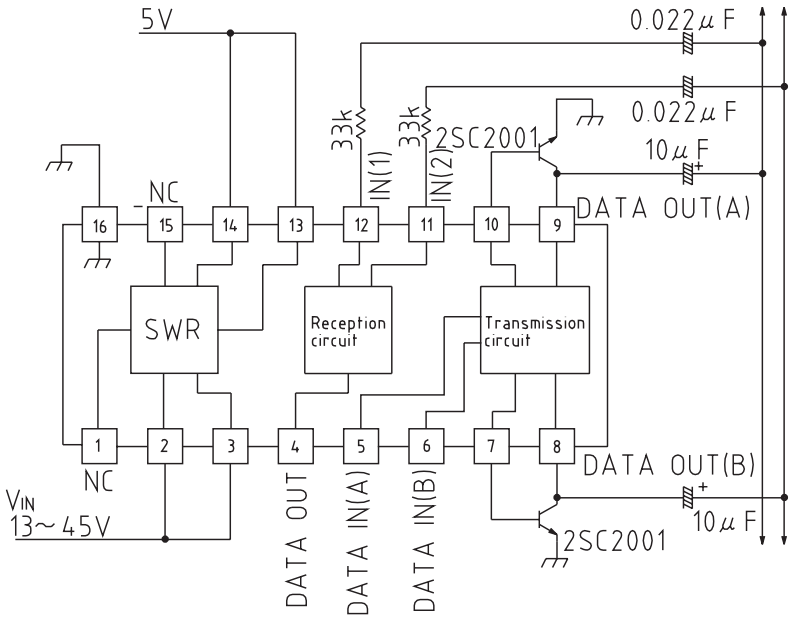
Application Circuits



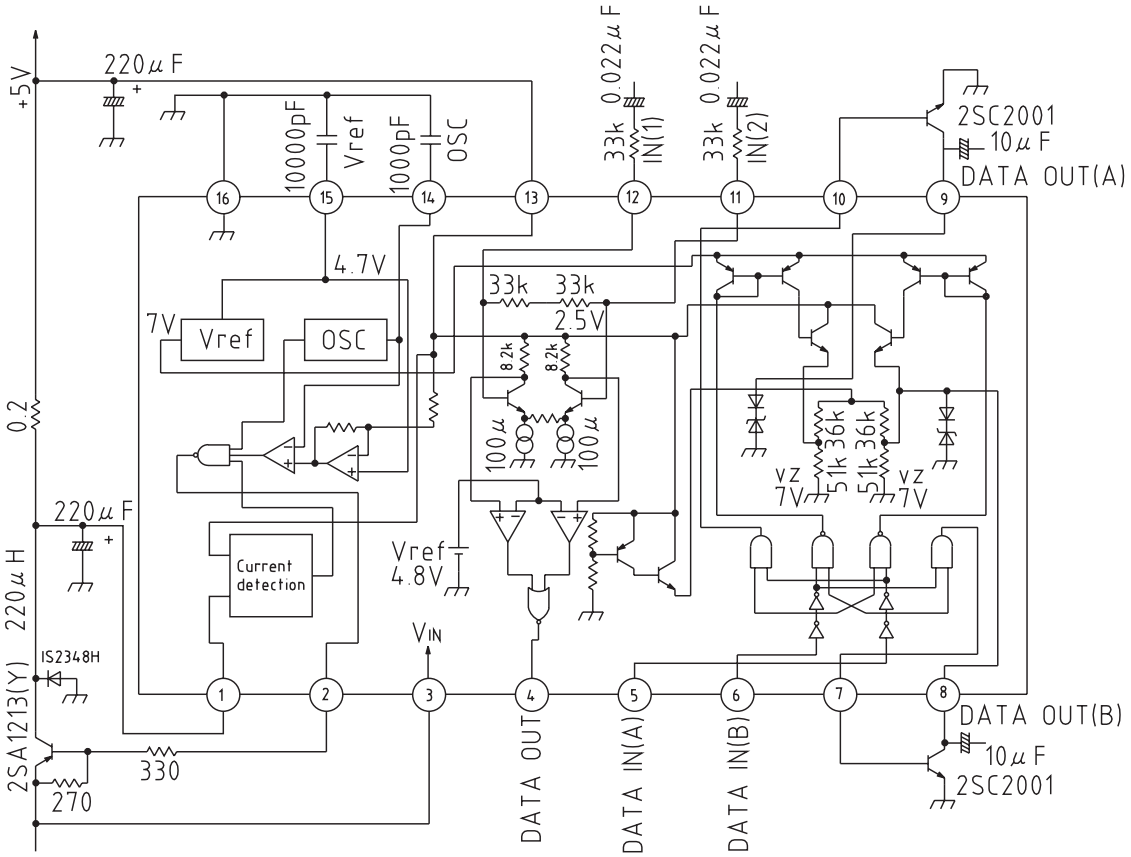


Additional Application Circuits (SWR circuit not used)

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.

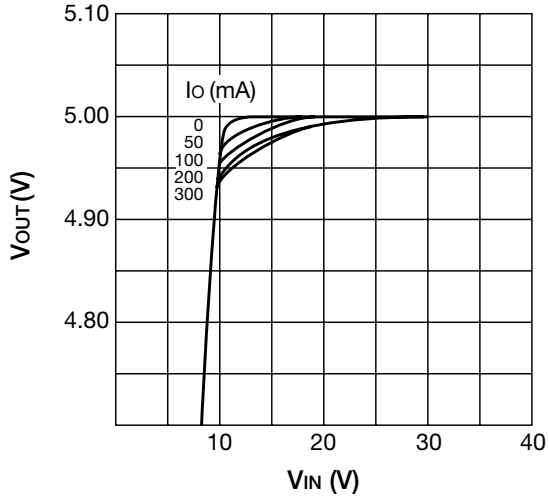


Circuit Diagram

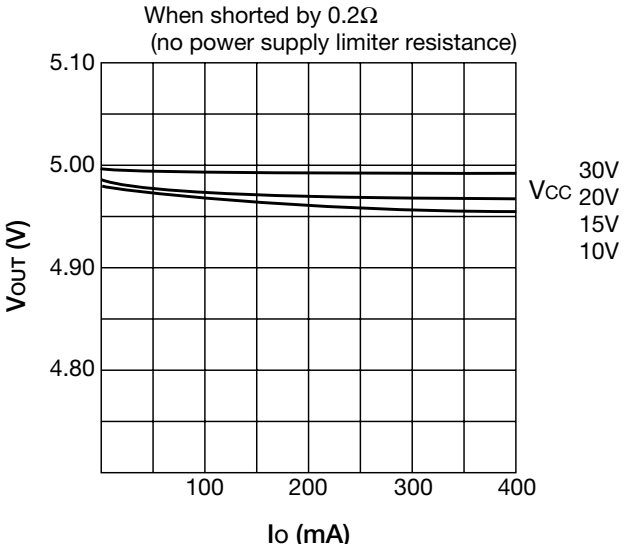


Characteristics

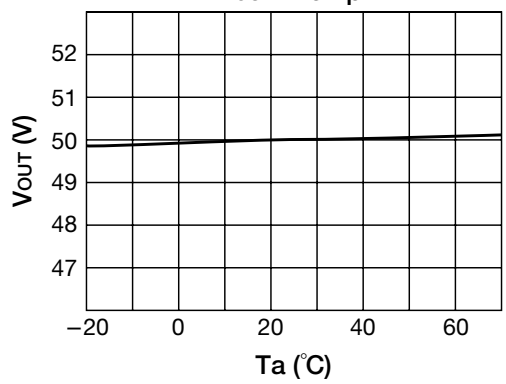
VOUT vs. VIN



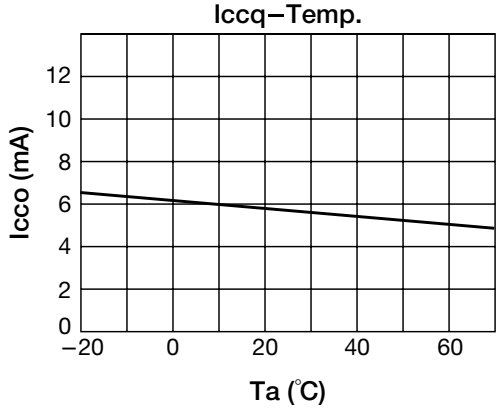
VOUT vs. Io



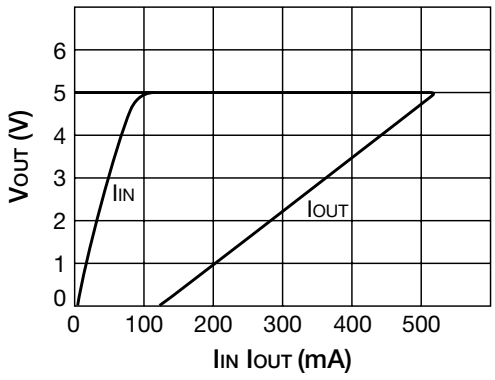
VOUT–Temp.



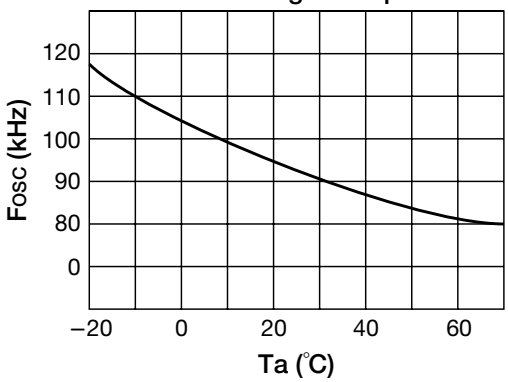
Iccq–Temp.



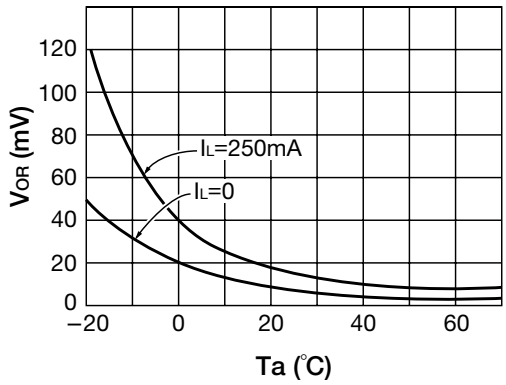
Over Current Protect Charac. Rs–0.2Ω



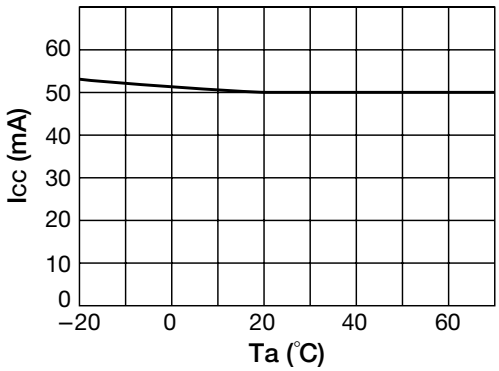
OSC Freg.–Temp.



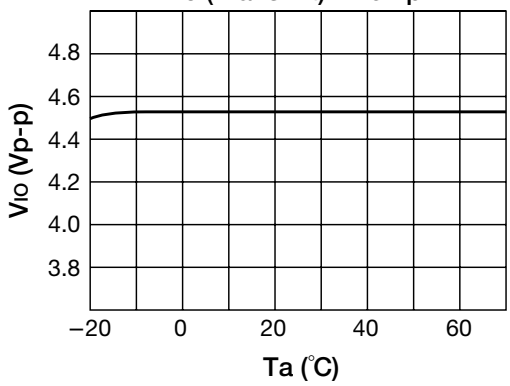
Output ripple-Temperature



Icc (IL.250mA) –Temp.



Vo (Transmit) –Temp.



Sens. (Receiver) –Temp.