CA0013BM

BUS Driver / Receiver for Car

Notes: Any information in this document may be changed without prior notice. Please contact us for latest updates.

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1. Device description

CA0013BM is a BUS driver/receiver IC for cars. The IC enables data communications by connecting an operation panel and components with bus cables.
For logic input, the IC supports both 3.3V and 5V microcomputer outputs.
The output is open collector, and can be connected to either 3.3V or 5V microcomputer input by adding pull-up resistor.
BUS terminal is durable against failure by electric surge.
This IC is Lead free.

2. Functions and features

●Data signal input : Two-input OR logic（H: Driver ON, L: Driver off）
●Data signal output : One-output (H: Voltage between BUS+ and BUS- ≧ 110m V,
L: Voltage between BUS+ and BUS- ≦ 30m V)
●Maximum number of bus connections : 20
※Maximum capacity between bus lines (BUS+ and BUS-): C=8000pF.
※Be sure to insert a resistance of 60Ω between the bus lines before using.
●Because the leak current between BUS+ and BUS- is small (not over 1μA) when power is turned off, it doesn't interfere with communications of other systems.
●Wide operating voltage range in the receiver mode: 0 to 4.5V.
●Built-in standby function : Low consumption current in standby mode（Not over 1μA）
(H: Standby OFF, L: standby ON)
●Built-in output protection circuit : Operative when voltage between BUS+ and BUS- ≧9V.
●Supply voltage : +5V single power supply
●Package : 8pin SOP

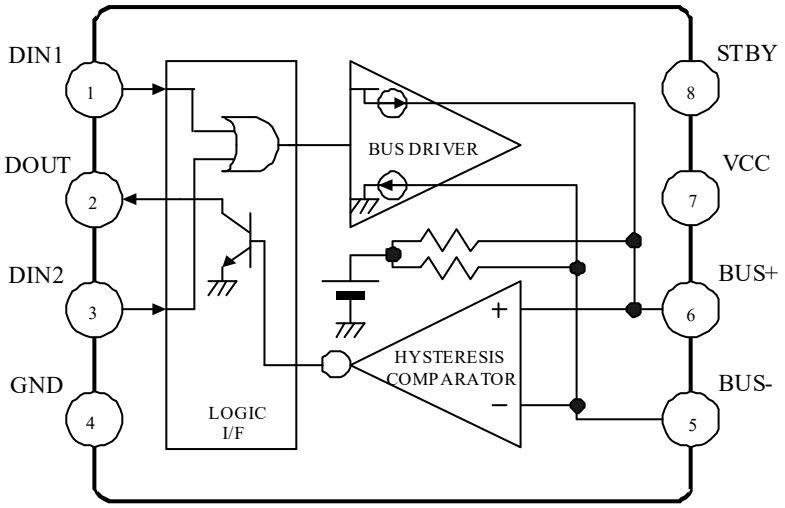
3. Maximum ratings

Item	Symbol	Rating	Unit
Supply voltage	VCC	7	V
Logic input voltage	VI	GND-0.3~Vcc+0.3	V
BUS input voltage	VBI	18	V
Allowable loss	Pd	300 (Ta=25℃) 120 (Ta=85℃)	mW
Operating temperature	Topr	-40～+85	℃
Storage temperature	Tstg	-50～+125	℃

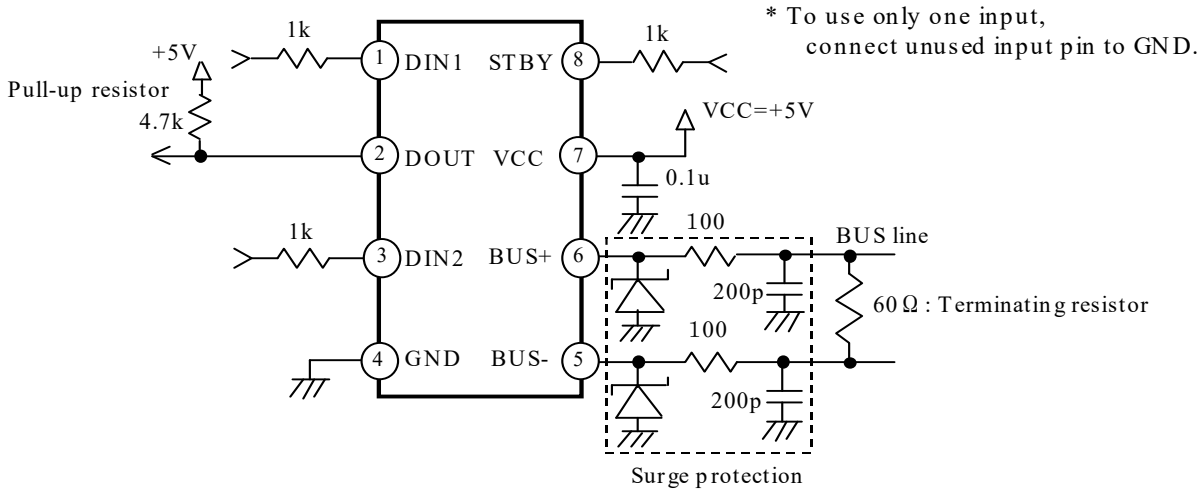
4. Recommended operating conditions

Item	Symbol	Rating	Unit
Supply voltage	VCC	5±0.5	V

5. Block diagram



6. Example of external parts connection



7. Functions of the terminals

PIN	Symbol	I/O	Function
1	DIN1	I	Logic input terminal 1
2	DOUT	O	Logic output terminal
3	DIN2	I	Logic input terminal 2
4	GND	-	Ground terminal
5	BUS-	I/O	Bus input/output terminal (Negative side)
6	BUS+	I/O	Bus input/output terminal (Positive side)
7	VCC	-	Power supply terminal
8	STBY	I	Stand-by terminal (Low:ON, High:OFF)

8. Electric characteristics

(Measurement condition: VCC=5V, Ta=25℃,
60Ω of resistance is connected between 5 pin and 6 pin. 2pin connected to 5V via 4.7kΩ pull-up resistor and connected to GND via 20pF capacitor.)

8-1. Driver part

No	Item	Symbol	Min	Typ	Max	Unit
1	High level input voltage	VIHS1	2.1	-	5.0	V
2	Low level input voltage	VILS1	0	-	1.65	V
3	High level input current	IIHS1	-	8	30	uA
4	Low level input current	IILS1	-	-	1	uA
5	High level input voltage	VIHS2	2.1	-	5.0	V
6	Low level input voltage	VILS2	0	-	1.65	V
7	High level input current	IIHS2	-	8	30	uA
8	Low level input current	IILS2	-	-	1	uA
9	High level output voltage	VOHD+	1.5	2.6	3.5	V
10		VOHD-	1.5	2.4	3.5	V
11	High level output current	IOH	3.1	3.7	4.5	mA
12	Low level output current	IOL	-	-	1	uA
13	Reference operating voltage	VOP+	2.3	2.5	2.7	V
14		VOP-	2.3	2.5	2.7	V
15	Driver output resistance	RO	5	10	15	kΩ

8-2. Receiver part

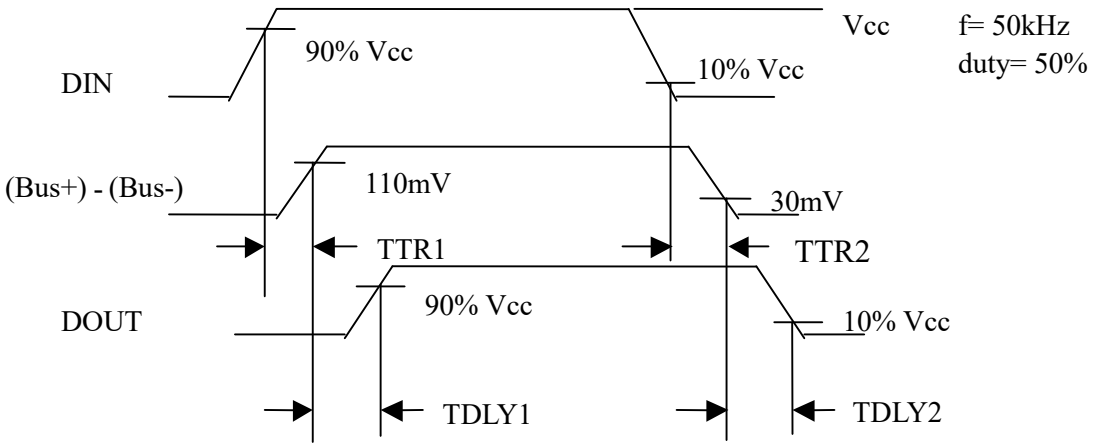
No	Item	Symbol	Min	Typ	Max	Unit
1	High level input voltage	VIH1	-	80	110	mV
2		VIH2	-	80	110	mV
3	Low level input voltage	VIL1	30	50	-	mV
4		VIL2	30	50	-	mV
5	Input hysteresis voltage	VIHYS1	15	30	45	mV
6		VIHYS2	15	30	45	mV
7	High level common-mode input voltage	VIHCOM	4.5	-	-	V
8	Low level common-mode input voltage	VILCOM	5	-	-	V
9	Receiver input resistance	RI	25	35	45	kΩ
10	High level output leak current	IOH1	-	-	1	uA
11		IOH2	-	-	1	uA
12		IOH3	-	-	1	uA
13	Low level output voltage	VOL1	-	0.25	0.6	V
14		VOL2	-	0.04	0.3	V

8-3. Other part

No	Item	Symbol	Min	Typ	Max	Unit
1	Current consumption 1	ICCH	4.9	7.3	9.1	mA
2	Current consumption 2	ICCL	1.4	1.9	2.6	mA
3	Driver transition time (L→H)	TTR1	-	30	300	ns
4	Driver transition time (H→L)	TTR2	-	180	300	ns
5	Receiver delay time (L→H)	TDLY1	500	700	1200	ns
6	Receiver delay time (H→L)	TDLY2	150	300	600	ns
7	Output leak current in power off state	IOLEAK	-	-	1	uA
8	Current consumption in standby mode	ICCstby	-	-	1	uA
9	Output leak current in standby mode	IstbyL	-	-	1	uA
10	Standby high level input voltage	VstbH	2.1	-	5.0	V
11	Standby low level input voltage	VstbL	0	-	0.7	V
12	Standby high level input current	IstbH	50	80	150	uA
13	Standby low level input current	IstbL	-	-	1	uA
14	Output protection circuit operating voltage	VOPRT	7.5	8.5	9	V

9.Timing chart

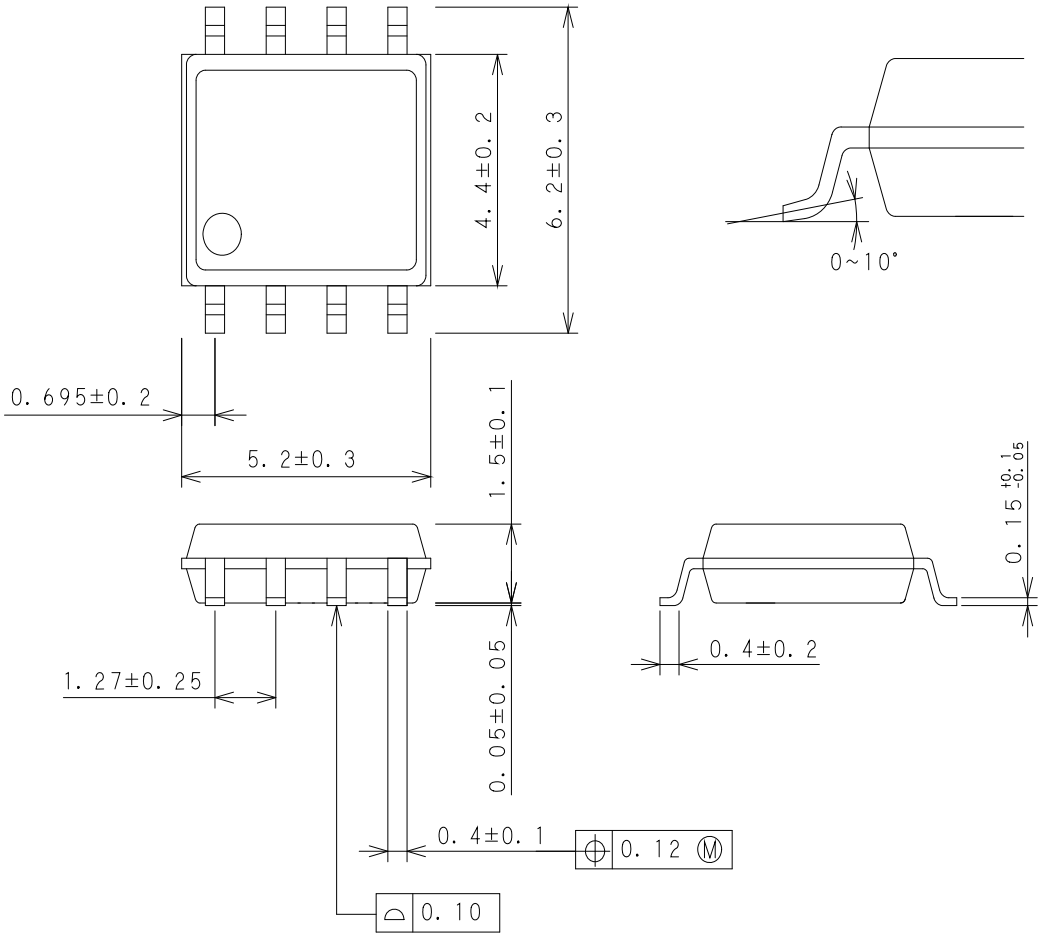
DIN1(DIN2) input waveform



Driver transition time : TTR1, TTR2
Receiver delay time : TDLY1, TDLY2

10. External dimensions drawing

Unit：mm



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