Ordering number : ENA0191

SANYO Semiconductors
DATA SHEET

LA2360M — Monolithic Linear IC CAN Transceiver

Overview

The LA2360M is a CAN (Controller Area Network) transceiver.

Functions

[Transmitter block]
- Low-pass filter (EMI prevention)
- Output driver

[Receiver block]
- ATT
- Comparator

Features

- Conforms to the ISO 11898 standard
- Transmission rate: 1 Mbps

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		6.0	V
Maximum applied voltage	Vap		V_{CC}	V
Maximum applied voltage (pins 6 and 7)	Vap (6, 7)		-8 to +18	V
Allowable power dissipation	Pd max	*: Mounted on a circuit board, Ta ≤ 85°C	440	mW
Operating temperature	Topg		-40 to +85	°C
Storage temperature	Tstg		-55 to +150	°C

*: Circuit board: 39.8×50.0×1.6mm^3 glass epoxy

Notice: Please contact our company, when using the LA2360M in the body system or the power-train system.

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Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		5.0	V
Operating supply voltage range	V_{CC} op		4.5 to 5.5	V

Operating Characteristics at Ta = 25°C, V_{CC} = 5.0V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Overall						
Current drain	I_{CC}	Dominant; V_1 = 1V, R_8 = 0Ω	30		70	mA
		Recessive; V_1 = 4V, R_8 = 47kΩ			14	mA
		Recessive; V_1 = 4V, R_8 = 0kΩ			18	mA
		Standby; $V_8 = V_{CC}$, $I_1 = I_4 = I_5$ = 0mA	30	50	70	μA
DC transmitter block						
High-level input voltage	V_{1IH}	Output -recessive	$0.7V_{CC}$		V_{CC}+0.3	V
Low-level input voltage	V_{1IL}	Output -dominant	-0.3		$0.3V_{CC}$	V
High-level input current	I_{1IH}	V_1 = 4V	-200		+30	μA
Low-level input current	I_{1IL}	V_1 = 1V	-600		-100	μA
CAN_H output voltage	V_7	V_1 = 1V	2.75		4.5	V
CAN_L output voltage	V_6	V_1 = 1V	0.5		2.25	V
Recessive state bus voltage	$V_{6, 7}$	V_1 = 4V	2.0		3.0	V
Pins 6 and 7 output voltage difference	$\Delta V_{6, 7}$	V_1 = 1V	1.5		3.0	V
		V_1 = 4V; With no 62Ω resistor	-500		+50	mV
Current when pin 7 grounded	I_{SC7}	V_1 = 1V, V7 = -8V; V_{CC} = 5V			-120	mA
Current when pin 6 shorted to V_{CC}	I_{SC6}	V_1 = 1V, V_6 = 18V			160	mA
DC receiver block						
Differential input voltage (recessive)	V_{diff} (r)	Output -recessive	-1.0		0.2	V
		Output –recessive, 0V < (V_6, V_7) < 12V	-1.0		0.1	V
Differential input voltage (dominant)	V_{diff} (d)	Output –dominant	0.9		5.0	V
		Output –dominant, 0V < (V_6, V_7) < 12V	1.0		5.0	V
High-level output voltage (pin 4)	V_{4OH}	I_4 = -100μA	$0.8V_{CC}$		V_{CC}	V
Low-level output voltage (pin 4)	V_{4OL}	I_4 = +100μA	0		$0.2V_{CC}$	V
Input hysteresis voltage	V_{diff} (hys)		50	80	150	mV
DC standby/slope control block						
High-speed mode input voltage	V_8				$0.3V_{CC}$	V
High-speed mode input current	I_8	V_8 = 0V			-500	μA
Standby mode input voltage	V_{stb}		$0.75V_{CC}$			V
Slope control mode current	I_{slope}	8pin = 47kΩ	-200		-10	μA
Slope control mode voltage	V_{slope}	8pin = 47kΩ	$0.4V_{CC}$		$0.6V_{CC}$	V

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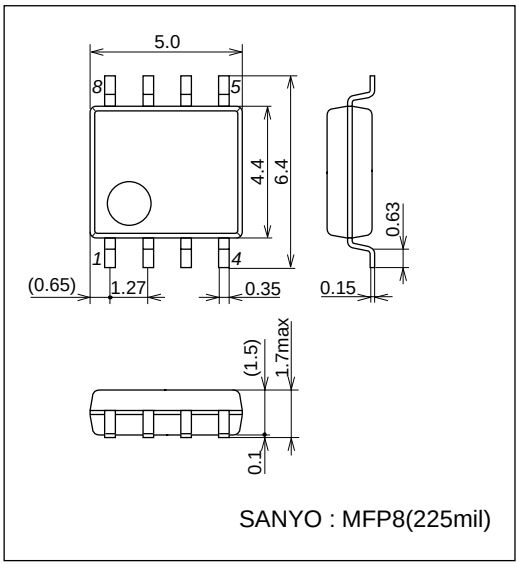
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
DC reference block						
Output reference voltage	V_{ref}	V_8 = 1V; -50µA < I5 < 50µA	$0.45V_{CC}$		$0.55V_{CC}$	V
		V_8 = 4V; -5µA < I5 < 5µA	$0.4V_{CC}$		$0.6V_{CC}$	V
AC transmitter block						
Pins 6 and 7 differential output pulse width	t_{width} (diff)	V_8 = 1V, V_1 = 1MHz	0.45		0.55	µs
		V_8 = 1V, V_1 = 100kHz	4.5		5.5	µs
Rise delay time	t_{on}TXD	V_8 = 1V, V_1 = 1MHz		40	65	ns
		V_8 = 1V, V_1 = 100kHz		40	65	ns
Fall delay time	t_{off}TXD	V_8 = 1V, V_1 = 1MHz		40	65	ns
		V_8 = 1V, V_1 = 100kHz		40	65	ns
AC receiver block (overall) (See note 1.)						
Rise delay time	t_{on}RXD	V_8 = 1V, V_1 = 1MHz		110	160	ns
		V_8 = 1V, V_1 = 100kHz		110	160	ns
		R_8 = 47kΩ, V_1 = 100kHz		360	500	ns
		R_8 = 24kΩ, V_1 = 100kHz		320	500	ns
Fall delay time	t_{off}RXD	V_8 = 1V, V_1 = 1MHz		90	160	ns
		V_8 = 1V, V_1 = 100kHz		90	160	ns
		R_8 = 47kΩ, V_1 = 100kHz		600	800	ns
		R_8 = 24kΩ, V_1 = 100kHz		500	800	ns
Pin 8 wakeup time from standby mode	t_{wake}	V_8 = 4V → 1V, V_8 = 100kHz			20	µs
Receiver output response time to a bus level change	t_dRXDL	V_1 = 4.0V, V_8 = 4.0V [BUS] recessive → dominant			3	µs

Note 1. With an input signal to the transmitter, in automatic send/receive mode

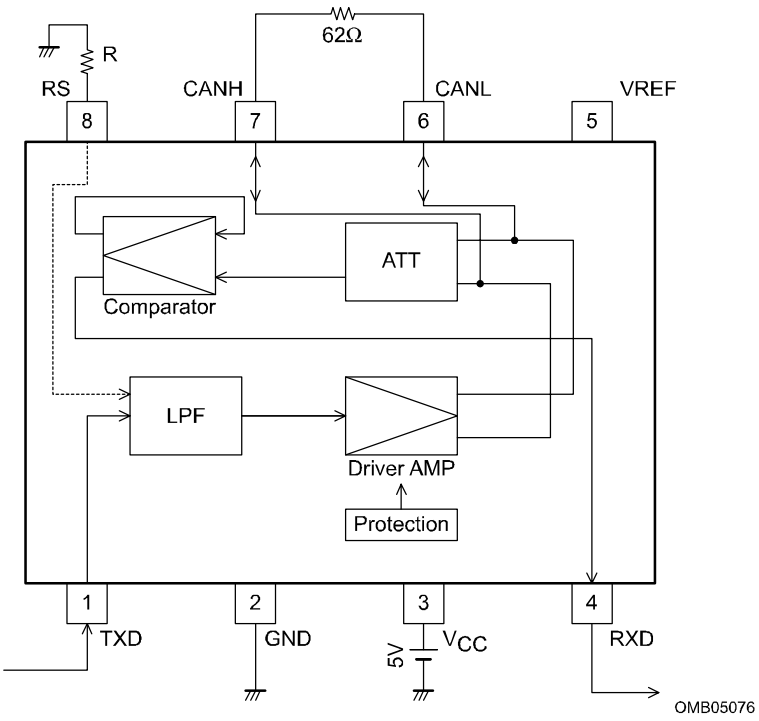
Package Dimension

unit:mm

3032D



Block Diagram



Pin Functions

Pin No.	Pin	I/O	Function	Description
1	TXD	I	Transmission signal input	Input from the CAN microcontroller
2	GND	P	GND	System ground
3	V_{CC}	P	Power supply	5V
4	RXD	O	Reception signal output	Output to the CAN microcontroller
5	VREF	O	Reference voltage output	2.5V
6	CANL	I/O	Transmission signal output (L)	Input and output of send and receive signals to the bus
7	CANH	I/O	Transmission signal output (H)	Input and output of send and receive signals to the bus
8	RS	I	Mode switching resistor	Slope control Controls standby mode