Ordering number : ENN*6955

Monolithic Linear IC

LA2351M

7.5 Mbps Automotive LAN Transceiver

Preliminary

Overview

The LA2351M is a low-noise transceiver for automotive LANs.

Featrues

- Implements 5 Mbps and 7.5 Mbps automotive LANs when used in conjunction with an automotive LAN protocol IC (ARCNET controller TMC20040C Series device).
- Built-in adjustment-free low-pass filter.
- Provides low-noise data communication.

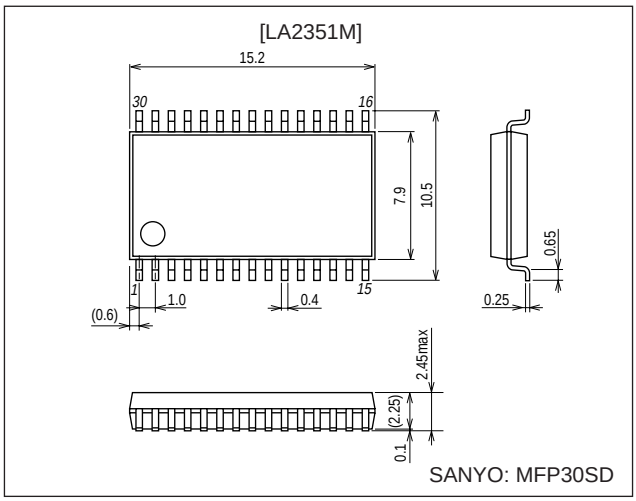
Functions

- Transmitter block
  - — D/A converter (3-bit)
  - — Low-pass filter (for EMI prevention)
  - — Output driver
- Receiver block
  - — Receiver amplifier
  - — Noise removal low-pass filter (for the received signal)
  - — Comparator (used for wave shaping)

Package Dimensions

unit: mm

3073C-MFP30SD



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Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max	With no input signal	7.0	V
Allowable power dissipation	Pd max	Ta ≤ 85°C Mounted on a printed circuit board (46.2 × 25.7 × 1.6 mm³, glass epoxy)	500	mW
Operating temperature	Topr		–40 to +85	°C
Storage temperature	Tstg		–55 to +150	°C

Recommended Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Recommended supply voltage	V_{CC}			5.0		V
Operating supply voltage range	V_{CCOP}		4.75		5.25	V
D/A converter input	V_{ol}	Low-level input		0	0.5	V
	V_{oh}	High-level input	2.4	3.3		V
Transmission control input	Vol	Low-level input			0.5	V
	Voh	High-level input	2.4			V
Low-pass filter input amplitude	Vlpfi		0.45		0.55	Vpp
Output driver input amplitude	Vdrvi		0.45		0.55	Vpp
Receiver amplifier input signal amplitude range (differential)	Vrxi		15		75	mVpp
Comparator input voltage range	Vcpdci		0		3.5	V
Comparator input signal amplitude	Vcpi		0.8		1.2	Vpp

Operating Characteristics at Ta = 25°C, V_{CC} = 5 V

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current	Icco	When not transmitting		50	70	mA
D/A converter output level	Vdao	The deviation with respect to 0.5 V for (111) - (001).	–1	0	1	dB
Low-pass filter						
Output attenuation	Vlpfo(9M)	The attenuation of a 9 MHz signal with respect to a 1 MHz signal.	2.5	3	3.5	dB
Insertion loss	Vlpfo(1M)	f = 1 MHz	–1	0	1	dB
Output driver						
Output attenuation	Vtxo(15M)	The attenuation of a 15 MHz signal with respect to a 1MHz signal.	0	2	3	
Differential amplification	Vtxo(1M)	f = 1 MHz	–1.5	0	1.5	
Receiver amplifier + noise rejection low-pass filter						
Amplification	Vnfo(1M)	f = 1 MHz		25		dB
Frequency characteristics	Vnfo(15M)	The Frequency characteristics of a 15 MHz signal with respect to a 1 MHz signal.		–3		dB
Comparator						
Low-level output amplitude	Vcpdl		0.2	0.4	0.6	V
High-level output amplitude	Vcpdh		3.9	4.2	4.3	V

Pin Functions

Pin No.	Pin	Function	Description	Note
1	$V_{CC}2$	Comparator block power supply	5 V	
2	CPD2	Comparator inverted output	Vol = 0.4 V, Voh = 4.2 V (Maximum voltage: $V_{CC}2$)	
3	CPD1	Comparator noninverted output	Vol = 0.4 V, Voh = 4.2 V (Maximum voltage: $V_{CC}2$)	
4	GND2	Comparator block ground	Dedicated ground for the comparator block	
5	CP1	Comparator input (+)		
6	NFO	Noise rejection filter output		
7	CP2	Comparator input (-)		
8	GND	Ground	System ground	
9	FCC1	Transmission rate setting	Low: 5 Mbps, High: 7.5 Mbps	
10	BIASC	Comparator bias	Connect to ground through a capacitor	
11	FADJ1	Noise rejection low-pass filter cutoff frequency adjustment	Adjusted with a resistor to ground	Standard setting: Open
12	FADJ2	Low-pass filter cutoff frequency adjustment	Adjusted with a resistor to ground	Standard setting: Open
13	GCNT	Receiver amplifier amplification adjustment	Adjusted with a resistor to ground (capacitor coupled ground)	Standard setting: 0 Ω
14	RXI2	Reception signal inverting input		
15	RXI1	Reception signal noninverting input		
16	BIAS2	Bias voltage		
17	BIAS1	Bias voltage		
18	TXO2	Transmission signal noninverted output		
19	TXO1	Transmission signal inverted output		
20	NC2	Unused		
21	NC1	Unused		
22	DRVI	Output driver input		
23	LPFO	Low-pass filter output		
24	$V_{CC}1$	Power supply	+5.0 V ± 5%	
25	/TXEN	Transmit/receive switching	Low: transmit, High: receive (Vol = 0.5 V, Voh = 2.4 V)	
26	LPFI	Low-pass filter input		
27	DAO	D/A converter output	0.5 Vpp ± 1dB	
28	TXI2	D/A converter input (MSB)	Vol = 0.5 V, Voh = 2.4 V	
29	TXI1	D/A converter input	Vol = 0.5 V, Voh = 2.4 V	
30	TXI0	D/A converter input (LSB)	Vol = 0.5 V, Voh = 2.4 V	

Test Circuit