Descriptions

Industrial Bus

RoHS

3 Years Warranty

CE Report EN62368-1

UKCA Report BS EN62368-1

Features

- Two-port isolation test voltage(2.5kVDC)
- High baud rate of up to 5Mbps
- Operating ambient temperature range: -40℃ to +105℃
- Complies with ISO 11898-5 physical layer standard
- Bus timeout protection
- Applicable to 24V or 12V systems
- Compact size, standard DIP8 package
- The bus supports maximum 110 nodes
- ESD bus protection

Applications

- Industrial control
- Power
- Communication

Selection Guide

Certification	Part No.	Power Supply Input (VDC)	Baud Rate (bps)	Static Current (mA)(Typ.)	Maximum Operating Current (mA)	Maximum Bus Voltage (VDC)	Number of Nodes
EN/BS EN	TCANFDL301DM	3.3	40k-5Mbps	30	60	±58	110
	TCANFDL501DM	5		26	60		
--	TCANFDL331M	3.3		18	75		
	TCANFDL531M	5		18	75		

Specifications

Product feature	Item		Operating Conditions	Min.	Typ.	Max.	Unit
Absolute Limits	Input Surge Voltage (1sec.max.)		3.3V series	-0.7	--	5	VDC
			5.0V series	-0.7	--	7	
	Pin Soldering Resistance Temperature (only TCANFDL5(3)01DM)		Soldering spot is 1.5mm away from the case, 10 seconds max.	--	--	300	℃
	Reflow Soldering Temperature (only TCANFDL5(3)31M)		Peak temp. ≤245℃, maximum duration ≤60s at 217℃. Please also refer to IPC/JEDEC J-STD-020D.1.				
3.3V Series input Specifications	Item		Symbol	Min.	Typ.	Max.	Unit
	Power Supply Input Voltage		VCC	3.15	3.3	3.45	VDC
	TXD Logic Level	High-level	VIH	0.7VCC	--	VCC	
		Low-level	VIL	0	--	0.8	
	RXD Logic Level	High-level	VOH	VCC-0.4	3.1	--	
		Low-level	VOL	--	0.2	0.4	
	TXD Drive Current		IT	2	--	--	mA
	RXD Output Current		IR	--	--	10	
	Serial Interface		Standard CANFD controller interface for 3.3V				
5V Series Input Specifications	Power Supply Input Voltage		VCC	4.75	5	5.25	VDC
	TXD Logic Level	High-level	VIH	0.7VCC	--	VCC	
		Low-level	VIL	0	--	0.8	
	RXD Logic Level	High-level	VOH	VCC-0.4	4.8	--	
		Low-level	VOL	0	0.2	0.4	
	TXD Drive Current		IT	2	--	--	mA
	RXD Output Current		IR	--	--	10	
	Serial Interface		Standard CANFD controller interface for both 5.0V.				
Transmission Specifications	Baud Rate (only TCANFDL5(3)01DM)		fBIT	40	1000	5000	kbps
	Data Delay	TXD Transmitter Delay(only TCANFDL5(3)01DM)	tT	--	55	115	ns
		TXD Transmitter Delay(only TCANFDL5(3)31M)		--	55	130	
		RXD Receiver Delay	tR	--	65	135	
		Cycle Delay(only TCANFDL5(3)01DM)	tPRO (TXD-RXD)	--	100	250	
		Cycle Delay(only TCANFDL5(3)31M)		--	120	250	

	Dominant Timeout	TCANFDL5(3)01DM	Tto (dom)TXD	--	1.25	--	ms
		TCANFDL5(3)31M		--	1.25	5	
Output Specifications	Dominant Level (Logic 0)	CANH	V(OD)CANH	2.75	3.5	4.5	VDC
		CANL	V(OD)CANL	0.5	1.5	2.25	
	Recessive Level (Logic 1)	CANH	V(OR)CANH	2	2.5	3	
		CANL	V(OR)CANL	2	2.5	3	
	Differential Level	Dominant Level (Logic 0)	Vdiff(d)	1.5	2	3	
		Recessive Level (Logic 1)	Vdiff(r)	-0.05	0	0.05	
	Bus Pin Maximum Withstand Voltage		VX	-58	--	+58	
	Bus Transient Voltage		Vtrt , Meet ISO7637-3 standard	-150	--	+100	
	Bus Pin Leakage Current		(VCC=0V, VCANFDH/L=5V)	-5	--	5	uA
	Load Resistance Differential	TCANFDL5(3)01DM	RL	--	60	--	Ω
		TCANFDL5(3)31M		45	60	65	
	Input Impedance Differential	TCANFDL5(3)01DM	Rdiff	10	--	100	kΩ
		TCANFDL5(3)31M		19	30	52	
	CAN Bus Interface		Meets ISO/DIS 11898 standard Twisted-pair output				
General Specifications	Isolation Test		Electric strength test for 1 min., leakage current <1mA	2.5kVDC			
	Insulation Resistance	TCANFDL5(3)01DM	At 500VDC	100MΩ			
		TCANFDL5(3)31M		1000MΩ (input-output)			
	Operating Temperature		-40℃ to +105℃				
	Transportation and Storage Temperature		-50℃ to +125℃				
	Operating Humidity		Non-condensing	10% - 90%			
	Case Temperature Rise		Ta=25℃, Free air convection				
	Safety Class		CLASS III				
	Application Environment		The presence of dust, severe vibration, shock and corrosive gas may cause damage to the product				
Mechanical Specifications	Case Material		Black flame-retardant heat-proof plastic (UL94 V-0)				
	Dimensions	TCANFDL5(3)01DM	12.70 x 10.16 x 7.70 mm				
		TCANFDL5(3)31M	17.00 x 12.14 x 9.45mm				
	Weight	TCANFDL5(3)01DM	2g(Typ.)				
		TCANFDL5(3)31M	2.8g(Typ.)				
	Cooling Method		Free air convection				

Electromagnetic Compatibility (EMC)

Emission	CE (only TCANFDL5(3)31M)		CISPR32/EN55032 CLASS A (see Fig.3)	
Immunity	ESD	TCANFDL5(3)01DM	IEC/EN 61000-4-2 Contact ±4kV/Air ±8kV (without external components, signal port)	Perf. Criteria A
		TCANFDL5(3)31M		Perf. Criteria B
	RS		IEC/EN 61000-4-3 10V/m (without external components)	Perf. Criteria A
	EFT		IEC/EN 61000-4-4 ±2kV (without external components, signal port)	Perf. Criteria B
	Surge	TCANFDL5(3)01DM	IEC/EN 61000-4-5 ±2kV (line to ground)(without external components, signal port)	Perf. Criteria A
		TCANFDL5(3)31M		Perf. Criteria B
	CS		IEC/EN 61000-4-6 3Vr.m.s (without external components)	Perf. Criteria A

Application Precautions

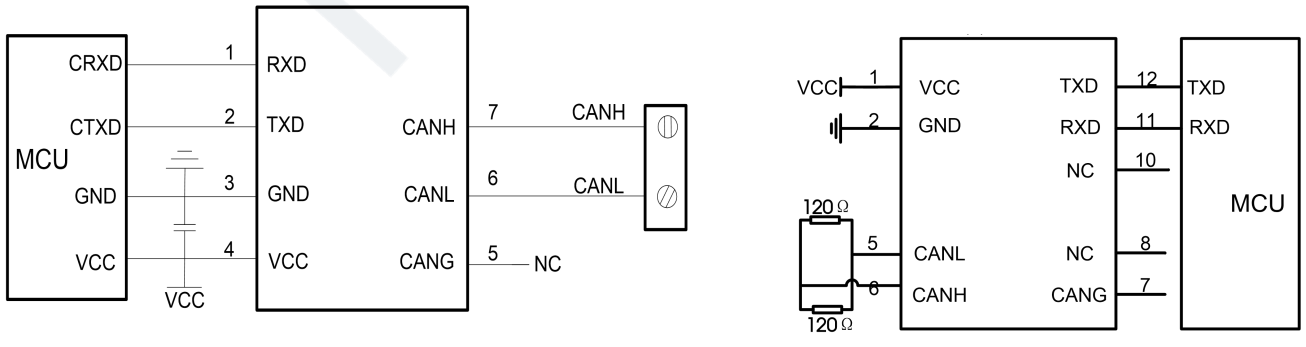
1.Carefully read and follow the instructions before use; contact our technical support if you have any question;
2.Do not use the product in hazardous areas;
3.use only DC power supply source for this product. 220V AC power supply is prohibited;
4.It is strictly forbidden to disassemble the product privately in order to avoid product failure or malfunction.
5. Hot-swap is not supported.
6. If the external input of TXD is insufficient, the pull-up resistor should be added according to the situation.

After-sales service

1.Factory inspection and quality control are strictly enforced before shipping any product; please contact your local representative or our technical support if you experience any abnormal operation or possible failure of the module;
2.The products have a 3-year warranty period, from the date of shipment. The product will be repaired or exchanged free of charge within the warranty period for any quality problem that occurs under normal use.

Design Reference

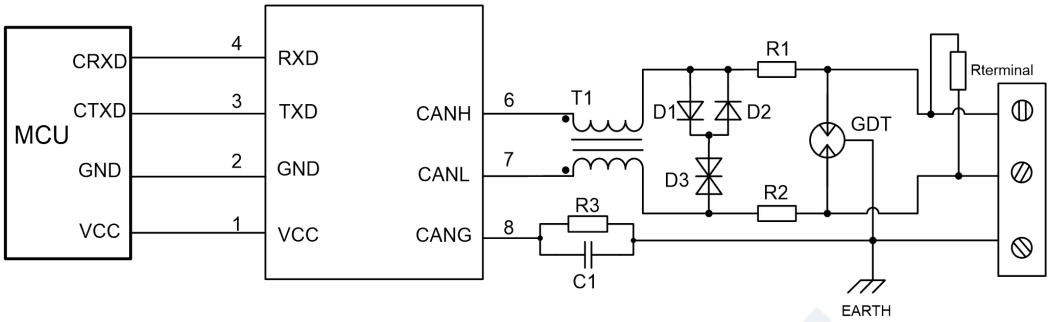
1、Typical application circuit



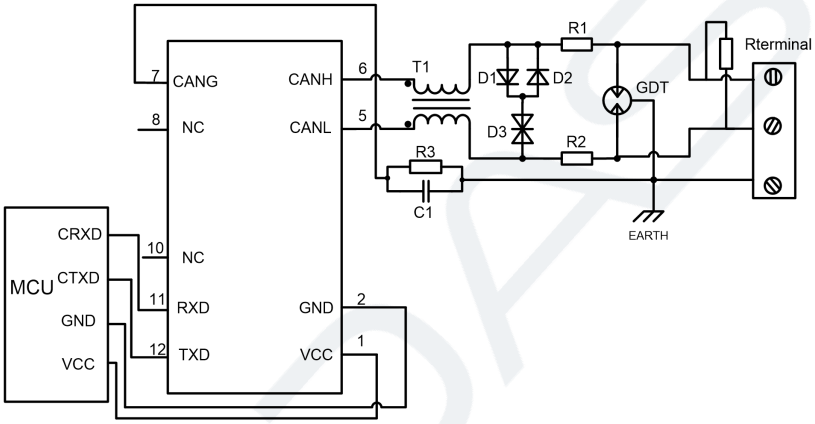
TCANFDL5(3)01DM TCANFDL5(3)31M

Fig. 1

2、Recommended port protection circuit



TCANFDL5(3)01DM



TCANFDL5(3)31M

Fig.2

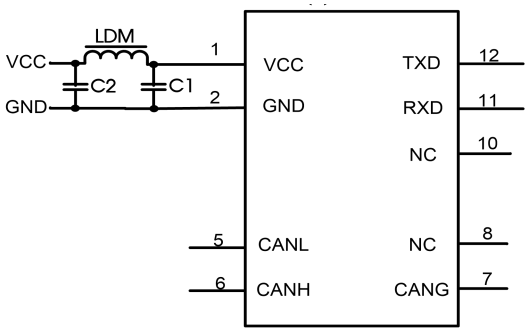
Note: Ground shield of twisted wire pair reliably.

Recommended components and values:

Component	Recommended part, value	Component	Recommended part, value
R3	1MΩ，1206	R1, R2	2.7Ω/2W
C1	1nF, 2kV	D1, D2	1N4007
T1	ACM2520-301-2P	D3	SMBJ30CA
GDT	B3D090L	Rterminal	120Ω

When the module is used in applications with harsh environment, it can be susceptible to large energy like lightning strike, etc. in which case, it is essential to add an adequate protection circuit to the CANFD signal ports to protect the system from failure and maintain a reliable bus communication. Figure 2 provides a recommended protection circuit design for high-energy lightning surges, with a degree of protection related to the selected protection device. Parameter description lists a set of recommended circuit parameters, which can be adjusted according to the actual application situation. Also, when using the shielded cable, the reliable single-point grounding of the shield must be achieved.

Note: The recommended components that will change the Specifications of Bus Pin Maximum Withstand Voltage by D3 and its values is a general guideline only. It must be verified for the actual user's application. We recommended using PTC's for R1 and R2 and to use fast recovery diodes for D1 and D2.

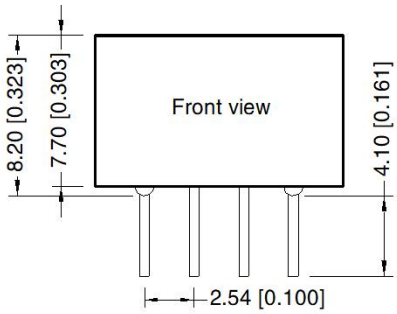


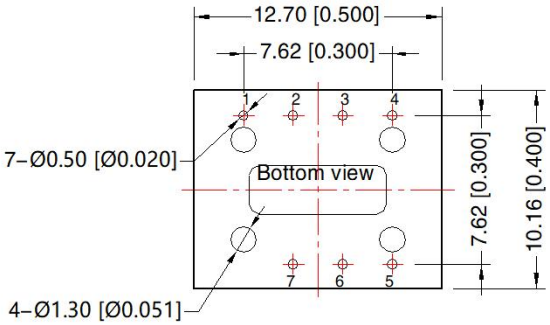
TCANFDL5(3)31M

Component	Recommended part, value
C1, C2	1uF/16V
LDM	CD43-12uH

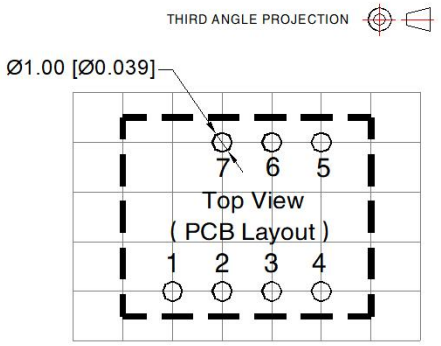
Fig.3

TCANFDL5(3)01DM Dimensions and Recommended Layout





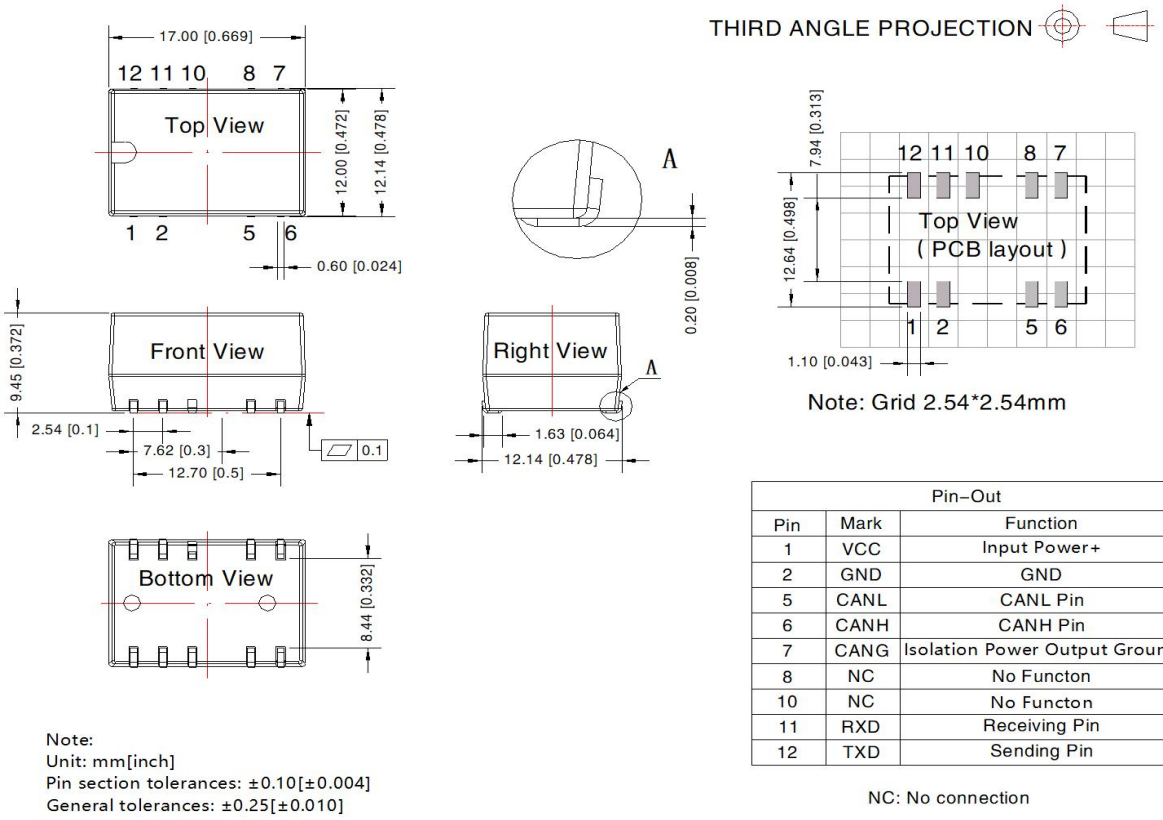
Note:
Unit: mm[inch]
PIN1/2/3/4/5/6/7: Ø 0.5mm
Pin section tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.25[± 0.010]



Note:Grid 2.54*2.54mm

Pin–Out		
Pin	Function	Mark
1	RXD	Receiving Pin
2	TXD	Send Pin
3	GND	GND
4	VCC	Input Power+
5	CANG	Isolation Power Output CANG
6	CANL	CANL Pin
7	CANH	CANH Pin

TCANFDL5(3)31M Dimensions and Recommended Layout

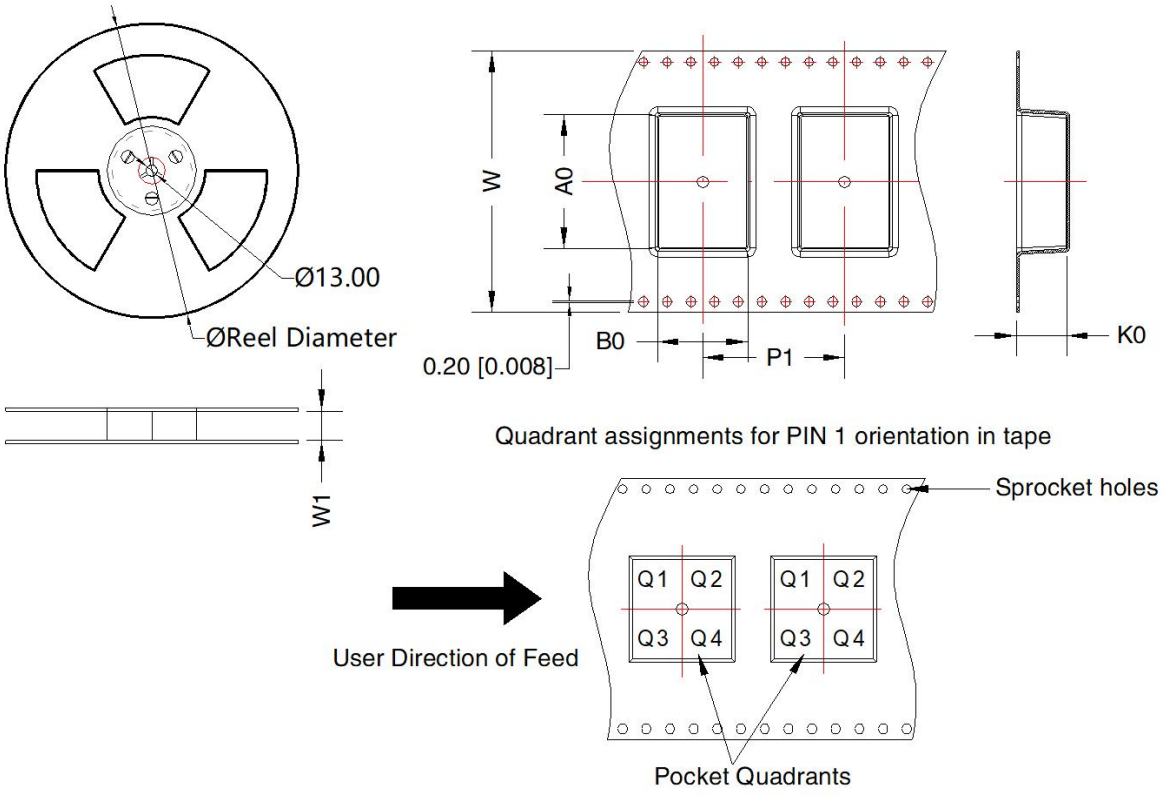


Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.25[±0.010]

Pin-Out		
Pin	Mark	Function
1	VCC	Input Power+
2	GND	GND
5	CANL	CANL Pin
6	CANH	CANH Pin
7	CANG	Isolation Power Output Ground
8	NC	No Functon
10	NC	No Functon
11	RXD	Receiving Pin
12	TXD	Sending Pin

NC: No connection

TCANFDL5(3)31M Package diagram:



Device	Package Type	Pin	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TCANFDLx31M	SMD	9	300	330.0	32.5	17.72	12.92	10.5	20.0	32.0	Q1

Notes:

1. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
2. All index testing methods in this datasheet are based on company corporate standards;
3. The above are the performance indicators of the product models listed in this datasheet. Some indicators of non-standard models will exceed the above requirements;
4. Products are related to laws and regulations: see "Features" and "EMC";
5. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.