

# **1X9 Single Mode Fiber DUAL Transceiver**

## **622Mbps 60~80Km**

RTR1-5D12-4\*\*\*

### **Product Features**

- 1550nm DFB Laser Transmitter
- InGaAs PIN-TIA Photodiode Receiver
- Reach 80Km Transmission Distance on 9/125μm SMF
- DUAL Single Mode Transceiver 1x9 Footprint
- SC, FC or ST Optical Interface are Optional
- Single +3.3V/5V Power Supply
- LVPECL Differential Inputs and Outputs
- LVPECL/LVTTL Signal Detection Output
- Compliant With RoHS and Lead Free
- Metal Enclosure for Lower EMI
- Operating Case Temperature:
  - Standard: 0 to +70°C
  - Extend: -20 to +75°C
  - Industrial: -40 to +85°C

### **Product Applications**

- Ethernet
- ATM/SONET/SDH
- Switch/Router
- Other Optical Transmission Systems

## Performance Specifications

### ➤ Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	
Storage Temperature	Tst	-40	+85	°C	
Operating Temperature	To	RTR1-5D12-4C**	0	+70	°C
		RTR1-5D12-4E**	-20	+75	°C
		RTR1-5D12-4I**	-40	+85	°C
Input Voltage	-	GND	Vcc	V	
Power Supply Voltage	Vcc-Vee	0	+6	V	

**Note:** Stress in excess of maximum absolute ratings can cause permanent damage to the module

### ➤ Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	
Storage Temperature	Tst	-40	-	+85	°C	
Operating Case Temperature	Tc	RTR1-5D12-4C**	0	-	+70	°C
		RTR1-5D12-4E**	-20	-	+75	°C
		RTR1-5D12-4I**	-40	-	+85	°C
Power Supply Voltage	Vcc	3.13	3.3	3.47	V	
Power Supply Voltage	Vcc	4.75	5.0	5.25	V	
Power Supply Current	Icc	-	-	300	mA	
Data Rate	DR	-	622	-	Mbps	

### ➤ Optical Specification

Transmitter							
Parameter		Symbol	Min	Typ	Max	Unit	Note
Center Wavelength	1550nm DFB	$\lambda_c$	1530	1550	1570	nm	-
Spectral Width	DFB	$\Delta\lambda$	-	-	1	nm	-
Side Mode Suppression Ratio		SMSR	30	-	-	dB	DFB Laser
Average Optical Output Power		Po	-2	-	3	dBm	-
Extinction Ratio		ER	9	-	-	dB	-
Optical Rise/Fall Time(20%-80%)		Tr/Tf	-	-	1	ns	-
Output Eye Diagram	Compliant with ITU-T G.957						
Receiver							
Parameter		Symbol	Min	Typ	Max	Unit	Note
Operate Wavelength		-	1260	-	1620	nm	-
Receiver Sensitivity		RSENS	-	-	-28	dBm	1
Receiver Saturation		PRS	-3	-	-	dBm	1
SD Assert		-	-35	-	-	dBm	Alarm: High-level
SD De-Assert		-	-	-	-28	dBm	
SD Hysteresis		-	0.5	-	5	dBm	-

**Note:** 1. Minimum Sensitivity and saturation levels for a 2<sup>23</sup>-1 PRBS test pattern @622Mbps.

## Electrical Specification

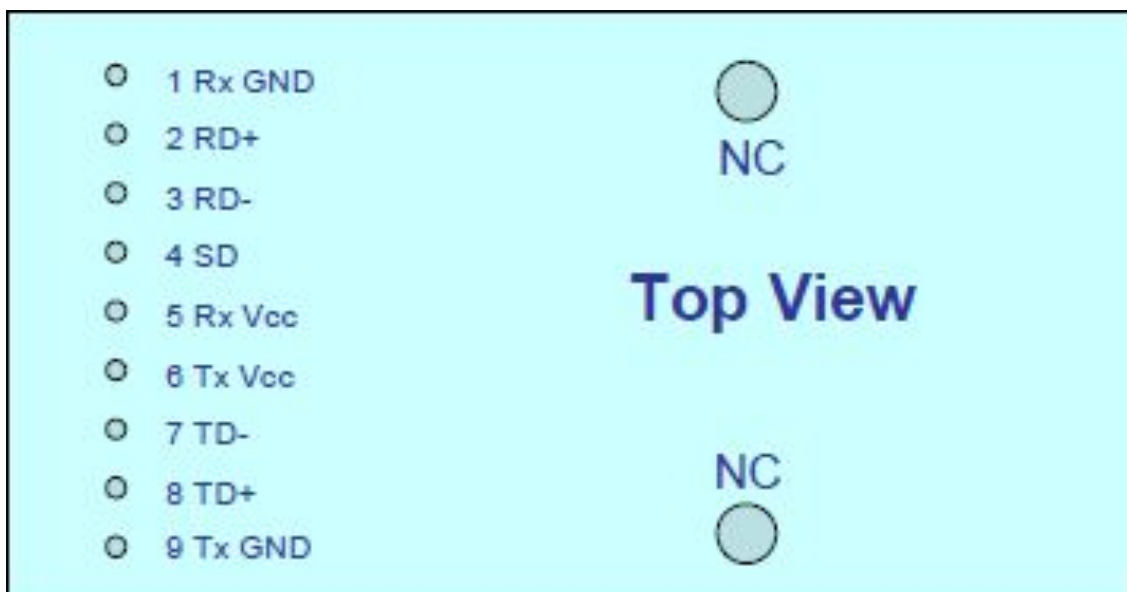
Transmitter						
Parameter	Symbol	Min	Typ	Max	Unit	Note
Power Supply Current	I <sub>CC</sub>	-	70	180	mA	2
Input Differential Impedance	Z <sub>IN</sub>	90	100	110	Ω	-
Single-terminal Input Voltage	V <sub>IH</sub> - V <sub>IL</sub>	300	-	1000	mV	-
Data Input Voltage-Low	V <sub>IL</sub> -V <sub>CC</sub>	-1.81		-1.48	V	-
Data Input Voltage-High	V <sub>IH</sub> -V <sub>CC</sub>	-1.16		-0.88	V	-
Receiver						
Parameter	Symbol	Min	Typ	Max	Unit	Note
Power Supply Current	I <sub>CC</sub>	-	70	150	mA	2
Data Output Voltage-Low	V <sub>OL</sub> -V <sub>CC</sub>	-1.81	-	-1.62	V	3
Data Output Voltage-High	V <sub>OH</sub> -V <sub>CC</sub>	-1.025	-	-0.88	V	3
Signal Detect Output Voltage-Low	V <sub>SDL</sub> -V <sub>CC</sub>	-1.81	-	-1.62	V	PECL/LVPECL
Signal Detect Output Voltage-High	V <sub>SDH</sub> -V <sub>CC</sub>	-1.025	-	-0.88	V	
Signal Detect Output Voltage-Low	V <sub>SDL</sub> -V <sub>CC</sub>	-	-	0.8	V	TTL/LVTTL
Signal Detect Output Voltage-High	V <sub>SDH</sub> -V <sub>CC</sub>	2.0	-	-	V	

Note: 2. The current excludes the output load current.

3. Terminated with 500hm to Vcc-2V.

## Pin Definitions

### PIN Diagram

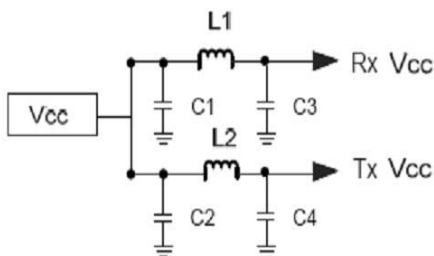
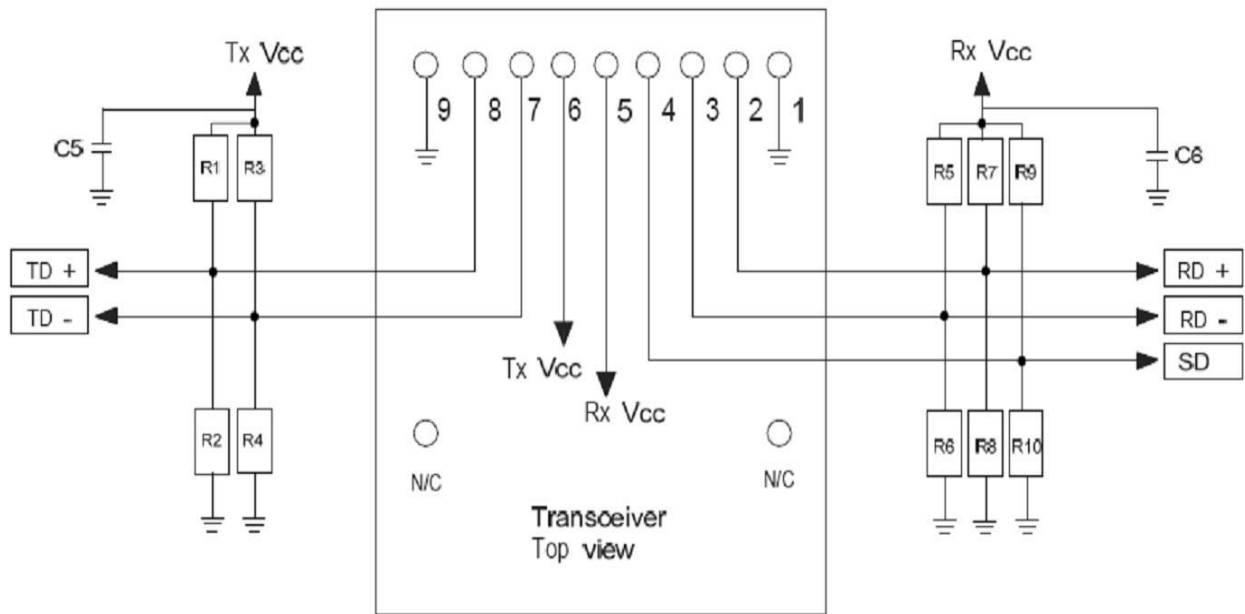


➤ **PIN Description**

PIN	Symbol	Note
1	GNDR	Directly connect this pin to receiver signal ground plane.
2	RD+	See recommended circuit schematic.
3	RD-	See recommended circuit schematic.
4	SD	Active high on this indicates a receiver optical signal.
5	V <sub>ccR</sub>	+3.3V/+5.0V DC power for the receiver section.
6	V <sub>ccT</sub>	+3.3V/+5.0V DC power for the transmitter section.
7	TD-	See recommended circuit schematic.
8	TD+	See recommended circuit schematic.
9	GNDT	Directly connect this pin to transmitter signal ground plane.

**Recommended Circuit**

➤ **PECL Signal Detect**



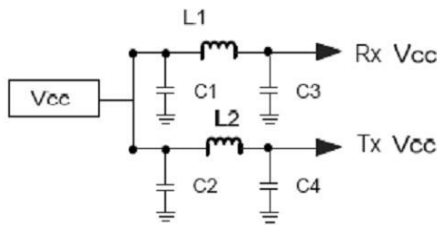
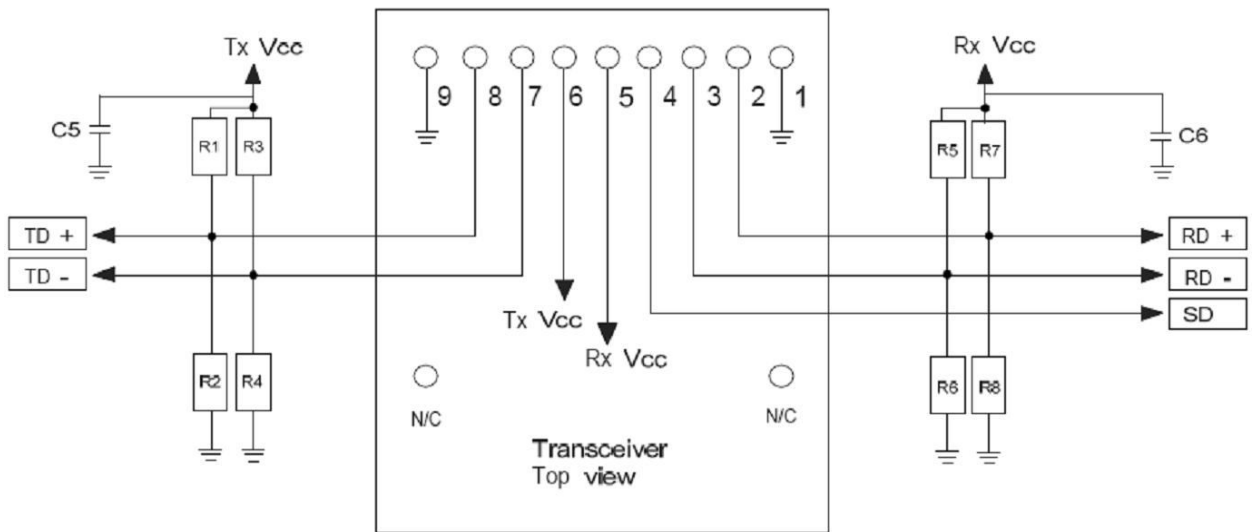
Notes +5V:  
 R1=R3=R5=R7=R9=82Ω  
 R2=R4=R6=R8=R10=130Ω  
 C3=C4=C5=C6=0.1μF  
 C1=C2=10μF  
 L1=L2=1μH

Notes +3.3V:  
 R1=R3=R5=R7=R9=130Ω  
 R2=R4=R6=R8=R10=82Ω  
 C3=C4=C5=C6=0.1μF  
 C1=C2=10μF  
 L1=L2=1μH

**Note: The split-loaded terminations for ECL signals need to be located at the input of devices receiving those ECL signals. The power supply filtering is required for good EMI performance.**

**Use short tracks from the inductors L1/L2 to the module Rx Vcc/Tx Vcc. A GND plane under the module is required for good EMI and sensitivity performance.**

➤ **TTL Signal Detect**

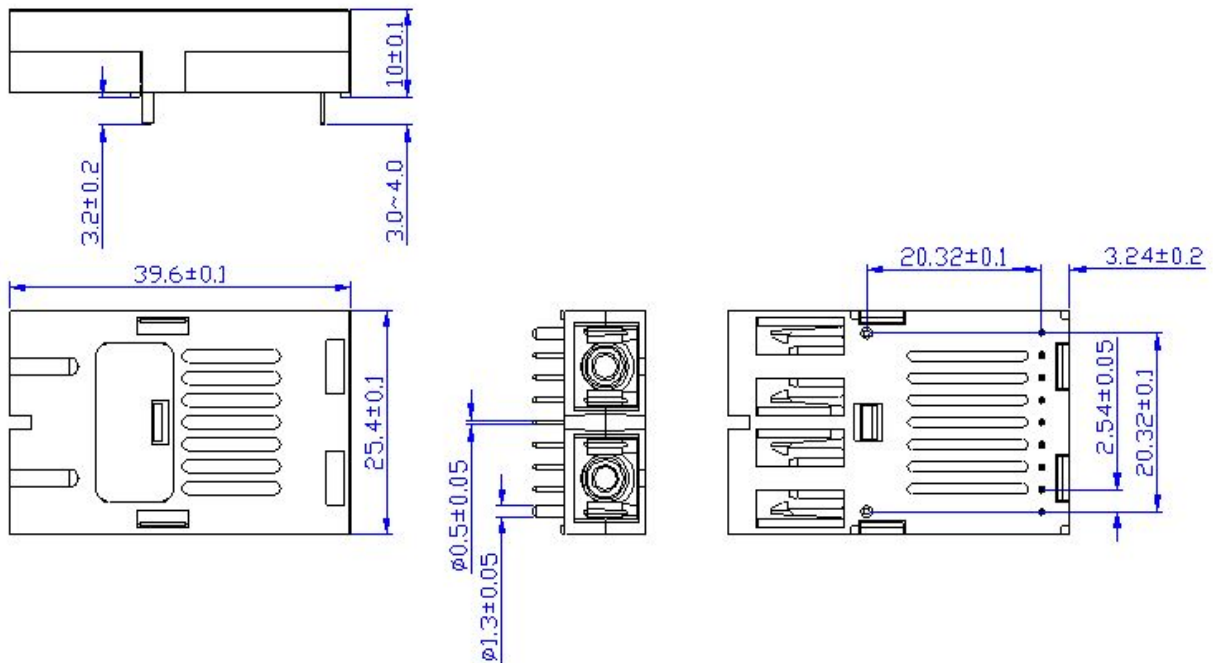


Notes +5V:  
 R1=R3=R5=R7=82Ω  
 R2=R4=R6=R8=130Ω  
 C3=C4=C5=C6=0.1μF  
 C1=C2=10μF  
 L1=L2=1μH

Notes +3.3V:  
 R1=R3=R5=R7=130Ω  
 R2=R4=R6=R8=82Ω  
 C3=C4=C5=C6=0.1μF  
 C1=C2=10μF  
 L1=L2=1μH

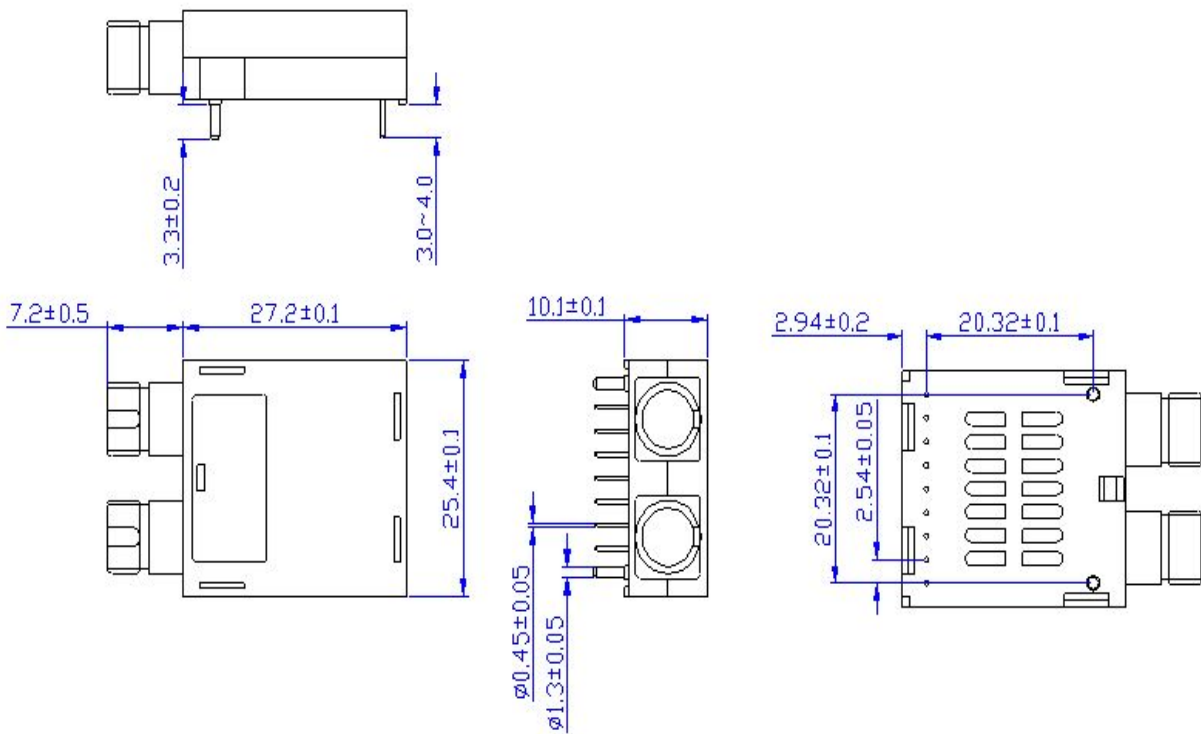
**Package Diagram**

➤ **SC Interface**



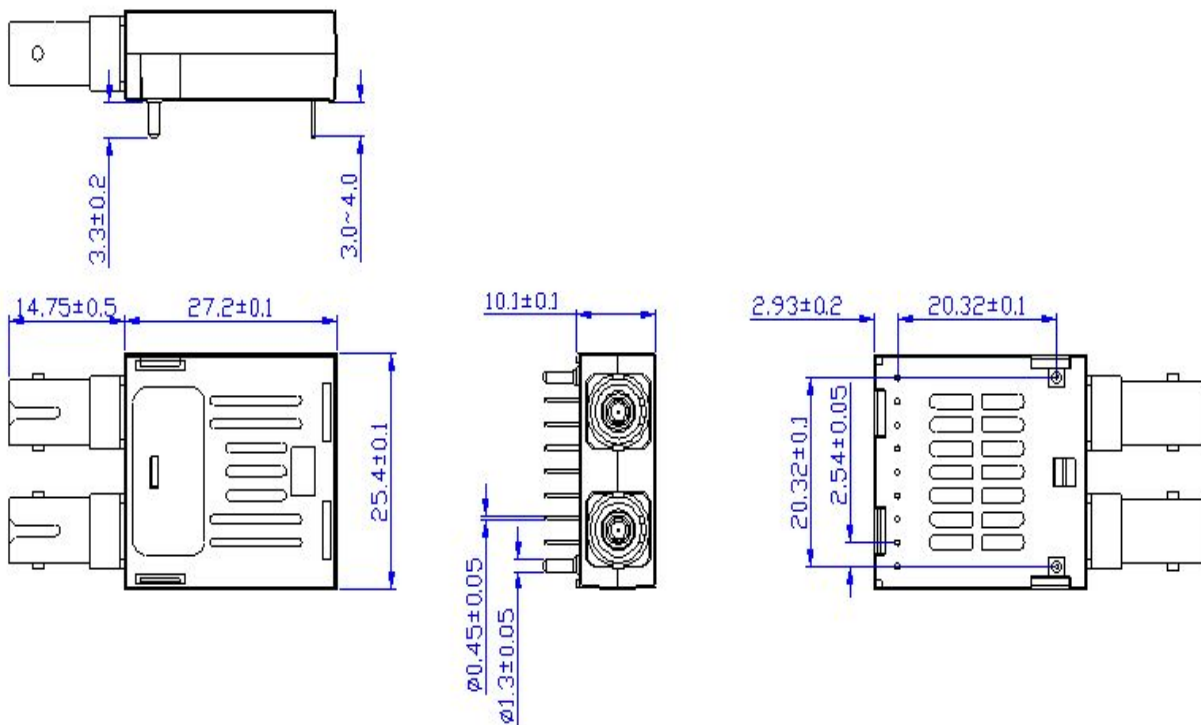
Unit: mm

▶ **FC Interface**



Unit: mm

▶ **ST Interface**



Unit: mm

**Order Information**

R	TR	1	-	5D	12	-	4	*	*	*	*	
REON	1X9	DUAL Fiber Inter- face	-	1550nm DFB	622 Mbps	-	-2~3 dBm	C E I	0~+70 °C -20~+75 °C -40~+85 °C	2=SC/PC 3=SC/APC 4= FC/PC 5=FC/APC 6=ST/PC 7=ST/APC	1=3.3V PECL signal/PECL alarm 2=3.3V PECL signal /TTL alarm 5=5V PECL signal/PECL alarm 6=5V PECL signal /TTL alarm	Customer Information

P/N	Package	Fiber Type	Data Rate (bps/Hz)	Reach	Tx(nm)	Rx	Temperature (°C)	Connector Type	Voltage
RTR1-5D12-4C21	1x9	SM	622M	60~80km	1550 DFB	PIN	0~+70	SC	3.3V
RTR1-5D12-4I21	1x9	SM	622M	60~80km	1550 DFB	PIN	-40~+85	SC	3.3V
RTR1-5D12-4C25	1x9	SM	622M	60~80km	1550 DFB	PIN	0~+70	SC	5V
RTR1-5D12-4I25	1x9	SM	622M	60~80km	1550 DFB	PIN	-40~+85	SC	5V
RTR1-5D12-4C41	1x9	SM	622M	60~80km	1550 DFB	PIN	0~+70	FC	3.3V
RTR1-5D12-4I41	1x9	SM	622M	60~80km	1550 DFB	PIN	-40~+85	FC	3.3V
RTR1-5D12-4C45	1x9	SM	622M	60~80km	1550 DFB	PIN	0~+70	FC	5V
RTR1-5D12-4I45	1x9	SM	622M	60~80km	1550 DFB	PIN	-40~+85	FC	5V
RTR1-5D12-4C61	1x9	SM	622M	60~80km	1550 DFB	PIN	0~+70	ST	3.3V
RTR1-5D12-4I61	1x9	SM	622M	60~80km	1550 DFB	PIN	-40~+85	ST	3.3V
RTR1-5D12-4C65	1x9	SM	622M	60~80km	1550 DFB	PIN	0~+70	ST	5V
RTR1-5D12-4I65	1x9	SM	622M	60~80km	1550 DFB	PIN	-40~+85	ST	5V

**For more information:**

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