



## **DW-D03CXX-80CD**

155Mbps CWDM SFP Optical Transceiver, 80km Reach

### **Features**

- ◆ Data-rate of 155Mbps operation
- ◆ 9 CWDM DFB wavelengths laser and PIN photodetector for 80km transmission
- ◆ Compliant with SFP MSA and SFF-8472 with duplex LC receptacle
- ◆ Digital Diagnostic Monitoring:  
Internal Calibration or External Calibration
- ◆ Compatible with RoHS
- ◆ +3.3V single power supply
- ◆ Operating case temperature:  
Standard : 0 to +70°C



### **Applications**

- ◆ Gigabit Ethernet
- ◆ Fiber Channel
- ◆ Switch to Switch interface
- ◆ Switched backplane applications
- ◆ Router/Server interface
- ◆ Other optical transmission systems

### **Product description**

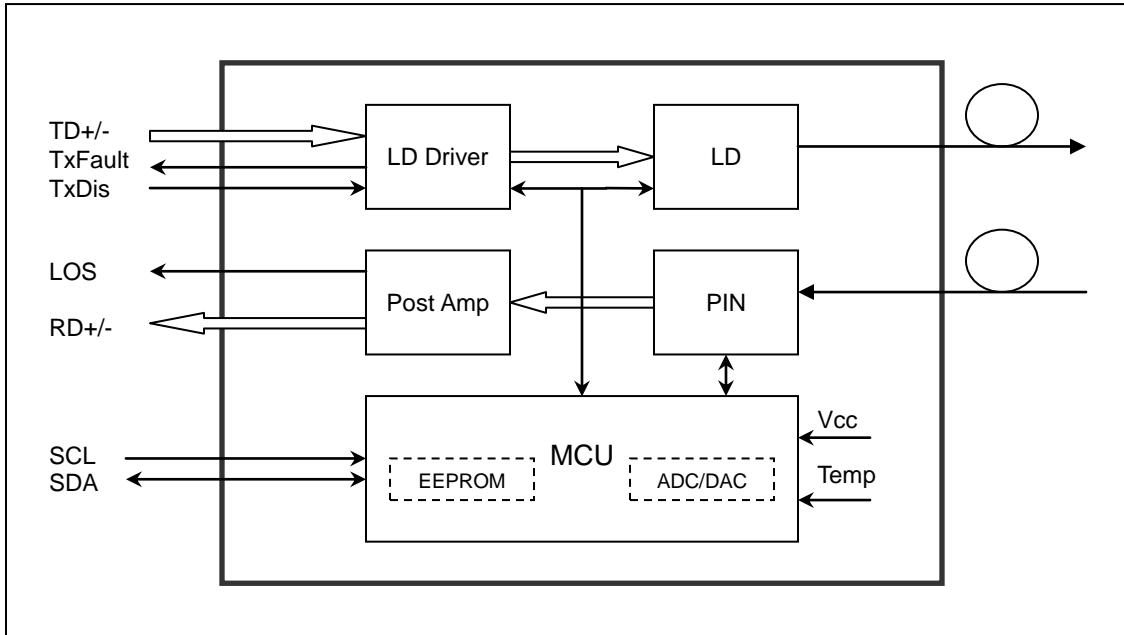
The SFP transceivers are high performance, cost effective modules supporting data-rate of 155Mbps and 40km transmission distance with SMF.

The transceiver consists of three sections: an uncooled CWDM DFB laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.

The transceivers are compatible with SFP Multi-Source Agreement (MSA) and SFF-8472. For further information, please refer to SFP MSA.



### Module Block Diagram



### Absolute Maximum Ratings

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	4.5	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	95	%

### Recommended Operating Conditions

Table 2 - Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Tc	0		+70	°C
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Power Supply Current	Icc			300	mA
Data Rate			155		Mbps



**DW-D03CXX-80CD See table3 below for “xx” values**

**Table3 - $\lambda$ C Wavelength Guide**

$\lambda$ C Wavelength Guide					
Code	$\lambda$ C	Unit	Code	$\lambda$ C	Unit
45	1450	nm	55	1550	nm
47	1470	nm	57	1570	nm
49	1490	nm	59	1590	nm
51	1510	nm	61	1610	nm
53	1530	nm			

**Optical and Electrical Characteristics**

**DW-D03CXX-80CD: (CWDM and PIN, 80km Reach)**

**Table 4 - Optical and Electrical Characteristics**

Parameter	Symbol	Min	Typical	Max	Unit	Notes
<b>Transmitter</b>						
Centre Wavelength	$\lambda$ c	$\lambda$ c-6.5	$\lambda$ c	$\lambda$ c+6.5	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Output Power	P <sub>out</sub>	-6		-1	dBm	1
Extinction Ratio	ER	10			dB	
Jitter Generation (RMS)				0.01	UI	
Jitter Generation (PK-PK)				0.1	UI	
Output Optical Eye	Compliant Telcordia GR-253-CORE and ITU-T G.957					
Optical Rise/Fall Time (20%~80%)	tr/tf			0.26	ns	
Data Input Swing Differential	V <sub>IN</sub>	300		1860	mV	2
Input Differential Impedance	Z <sub>IN</sub>	90	100	110	$\Omega$	
TX Disable	Disable		2.0		V <sub>cc</sub>	V
	Enable		0		0.8	V
TX Fault	Fault		2.0		V <sub>cc</sub>	V



	Normal		0		0.8	V	
<b>Receiver</b>							
Centre Wavelength	$\lambda_c$		1260		1620	nm	
Receiver Sensitivity					-30	dBm	3
Receiver Overload			-3			dBm	3
LOS De-Assert	LOS <sub>D</sub>				-38	dBm	
LOS Assert	LOS <sub>A</sub>		-45			dBm	
LOS Hysteresis			1		4	dB	
Data Output Swing Differential	V <sub>out</sub>		370		1800	mV	4
LOS	High		2.0		V <sub>cc</sub>	V	
	Low		0		0.8	V	

**Notes:**

1. The optical power is launched into SMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS 2<sup>23</sup>-1 test pattern @155Mbps, BER  $\leq 1 \times 10^{-12}$ .
4. Internally AC-coupled.

**Timing and Electrical**

**Table 5 - Timing and Electrical**

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t <sub>on</sub>			1	ms
Tx Disable Assert Time	t <sub>off</sub>			10	$\mu$ s
Time To Initialize, including Reset of Tx Fault	t <sub>init</sub>			300	ms
Tx Fault Assert Time	t <sub>fault</sub>			100	$\mu$ s
Tx Disable To Reset	t <sub>reset</sub>	10			$\mu$ s
LOS Assert Time	t <sub>loss_on</sub>			100	$\mu$ s
LOS De-assert Time	t <sub>loss_off</sub>			100	$\mu$ s
Serial ID Clock Rate	f <sub>serial_clock</sub>			400	KHz



MOD_DEF (0:2)-High	V <sub>H</sub>	2		V <sub>cc</sub>	V
MOD_DEF (0:2)-Low	V <sub>L</sub>			0.8	V

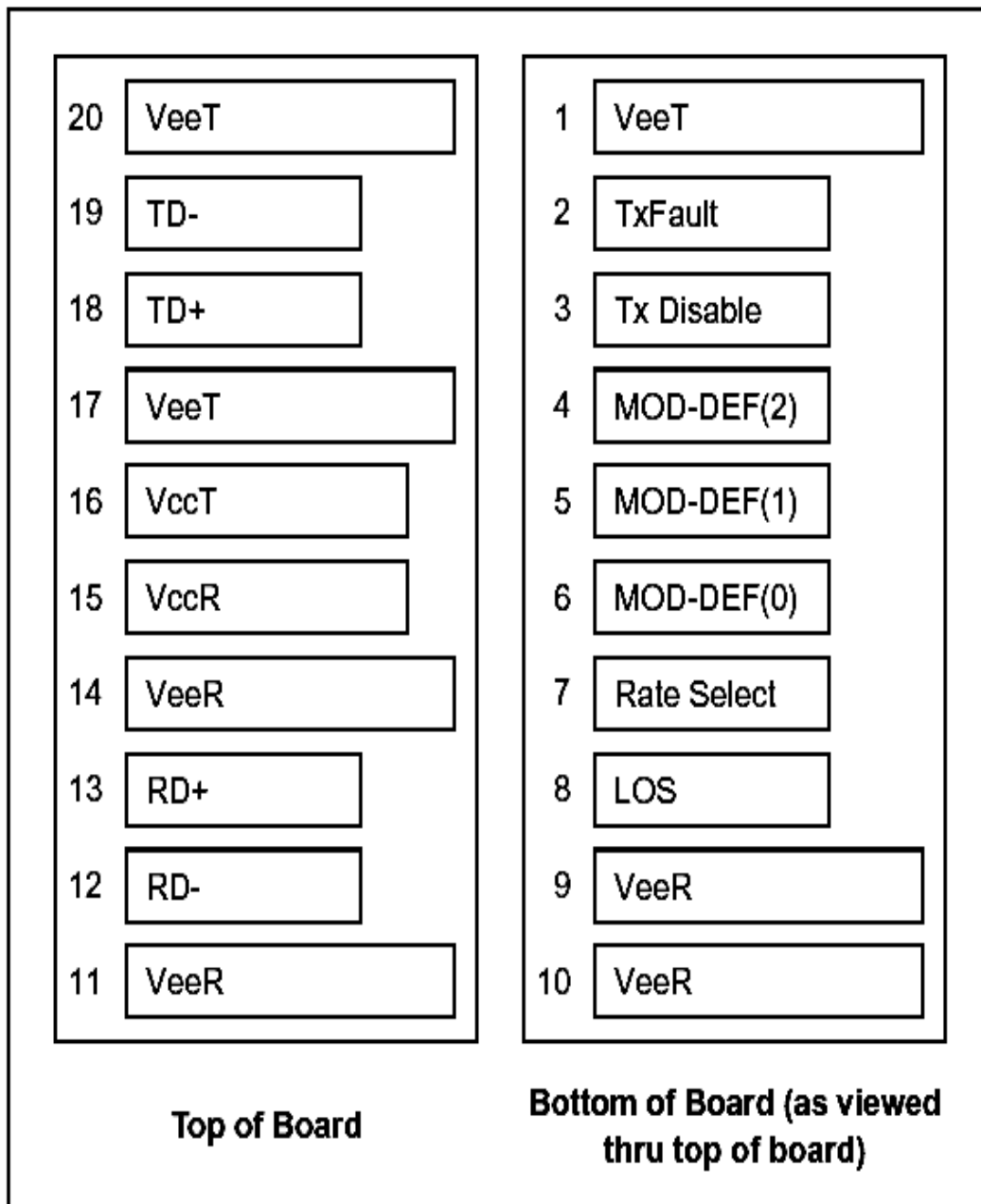
## Diagnostics

**Table 6 – Diagnostics Specification**

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal / External
Voltage	3.0 to 3.6	V	±3%	Internal / External
Bias Current	0 to 100	mA	±10%	Internal / External
TX Power	-5 to 0	dBm	±3dB	Internal / External
RX Power	-33 to -9	dBm	±3dB	Internal / External



Pin Definitions





### Pin Descriptions

Pin	Signal Name	Description	Plug Seq.	Notes
1	V <sub>EET</sub>	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1
3	TX DISABLE	Transmitter Disable	3	Note 2
4	MOD_DEF(2)	SDA Serial Data Signal	3	Note 3
5	MOD_DEF(1)	SCL Serial Clock Signal	3	Note 3
6	MOD_DEF(0)	TTL Low	3	Note 3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	Note 4
9	V <sub>EER</sub>	Receiver ground	1	
10	V <sub>EER</sub>	Receiver ground	1	
11	V <sub>EER</sub>	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 5
13	RD+	Received Data Out	3	Note 5
14	V <sub>EER</sub>	Receiver ground	1	
15	V <sub>CCR</sub>	Receiver Power Supply	2	
16	V <sub>CCT</sub>	Transmitter Power Supply	2	
17	V <sub>EET</sub>	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 6
19	TD-	Inv. Transmit Data In	3	Note 6
20	V <sub>EET</sub>	Transmitter Ground	1	

#### Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

- 1) TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and V<sub>cc</sub>+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
- 2) TX Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7k~10kΩ resistor. Its states are:  
Low (0 to 0.8V): Transmitter on  
(>0.8V, < 2.0V): Undefined  
High (2.0 to 3.465V): Transmitter Disabled  
Open: Transmitter Disabled
- 3) Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7k~10kΩ resistor on the host board. The pull-up voltage shall be V<sub>ccT</sub> or V<sub>ccR</sub>.  
Mod-Def 0 is grounded by the module to indicate that the module is present  
Mod-Def 1 is the clock line of two wire serial interface for serial ID  
Mod-Def 2 is the data line of two wire serial interface for serial ID
- 4) LOS is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor. Pull up voltage between 2.0V and V<sub>cc</sub>+0.3V. Logic 1 indicates loss of signal; Logic 0 indicates normal operation. In the low state, the output will be pulled to less than 0.8V.
- 5) RD-/+ : These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
- 6) TD-/+ : These are the differential transmitter inputs. They are internally AC-coupled differential lines with 100Ω differential

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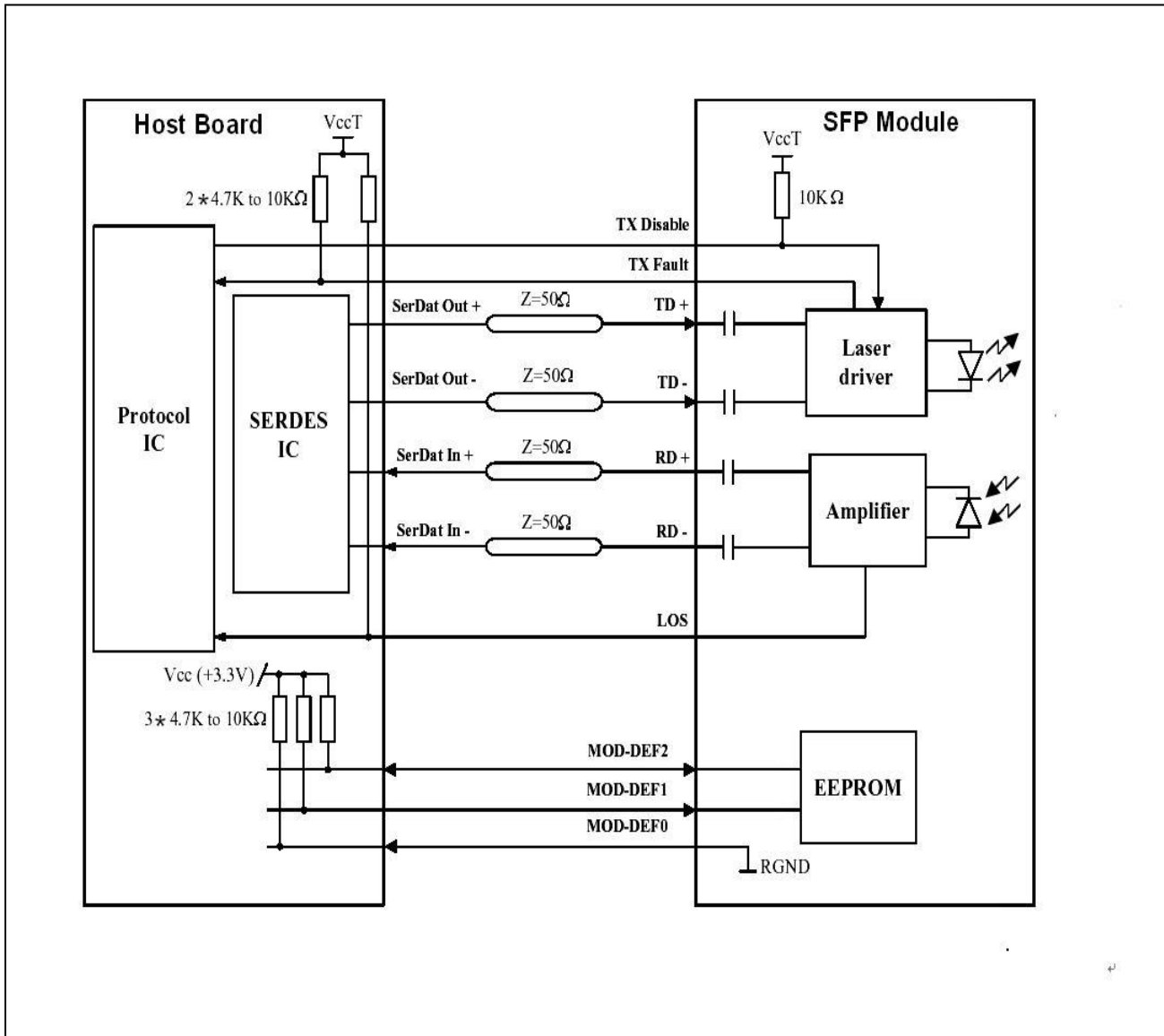
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termination inside the module.

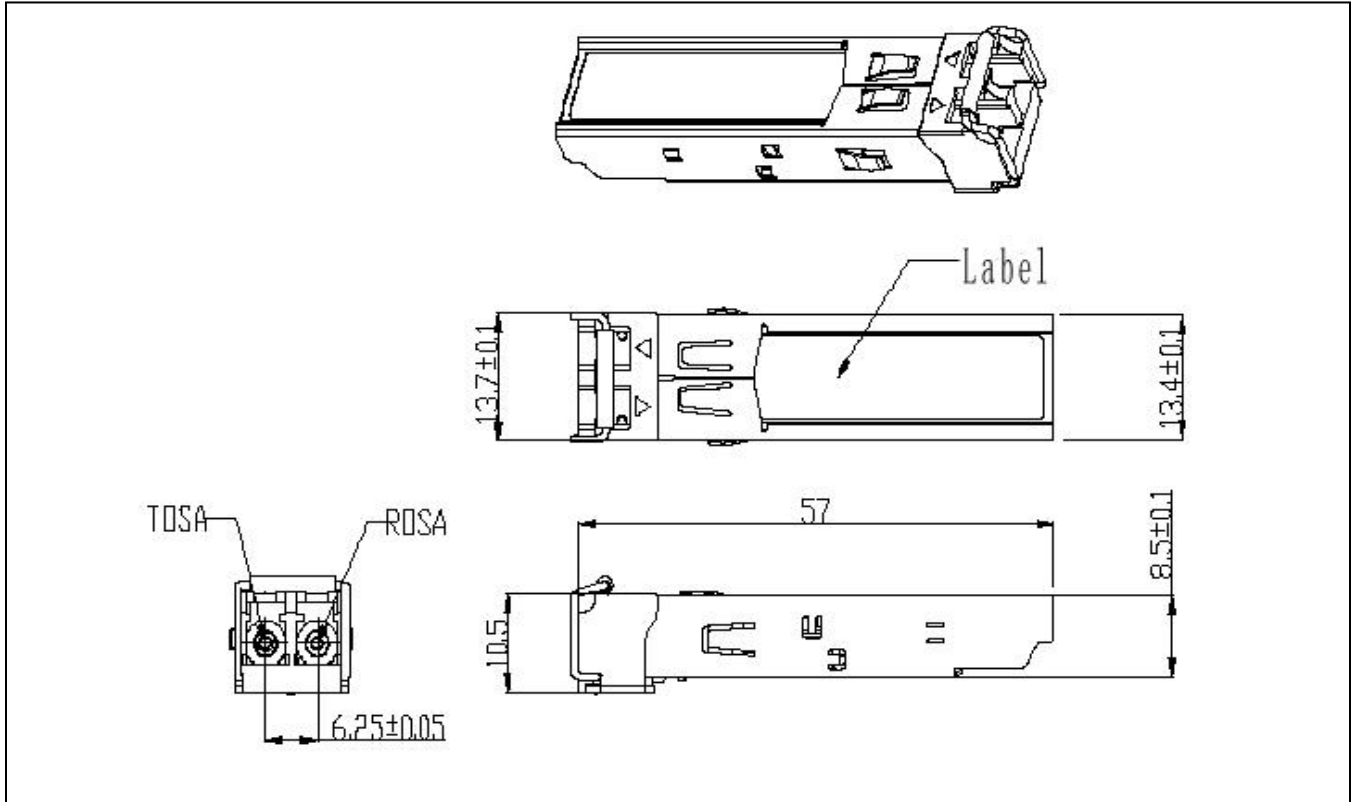
### Recommended Interface Circuit







## Mechanical Dimensions



## Regulatory Compliance

DONGWE SFP transceiver is designed to be Class I Laser safety compliant and is certified per the following standards

Feature	Agency	Standard	Certificate / Comments
Laser Safety	FDA	CDRH 21 CFR 1040 and Laser Notice No. 50	1120294-000
Product Safety	BST	EN 60825-1: 2007 EN 60825-2: 2004 EN 60950-1: 2006	BT0905142002
Environmental protection	SGS	RoHS Directive 2002/95/EC	GZ0902008346/CHEM
EMC	CCIC	EN 55022: 2006+A1: 2007 EN 55024: 1998+A1: 2001+A2: 2003	CTE09050018



### Ordering information

Part Number	Product Description
DW-D03CXX-80CD	CWDM 1450nm~1610nm, 155Mbps, 80km, 0°C ~ +70°C, With Digital Diagnostic Monitoring

### References

1. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 2000.
2. Telcordia GR-253-CORE and ITU-T G.957 Specifications.

### Important Notice

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