

FIM24704

100G DP-QPSK INTEGRATED RECEIVER

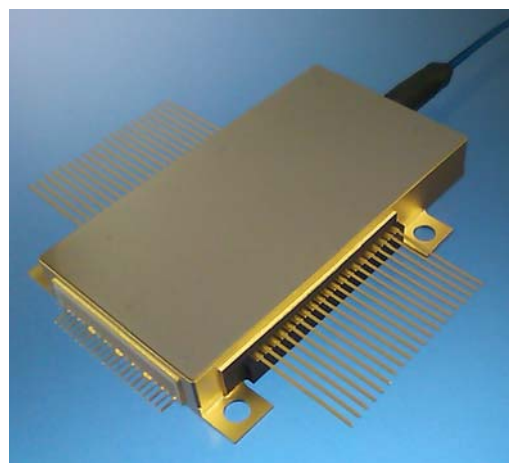
(Rev. D)

Aug 24th, 2011
Spec Confirmation: Standard

1. GENERAL DESCRIPTION

- OIF compliant
- Small Size: 50 mm x 27 mm x 7 mm
- PIN/TIA+AGCA(*1), photo receiver, PBS and Optical 90 degree hybrid in one package
- Power consumption: < 1.3 W
- Co-Planer Waveguide (CPW) and SMT type RF interface

Note1: Auto Gain Control Amplifier



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2. PART NUMBER

FIM24704

3. SPECIFICATIONS

3.1 ABSOLUTE MAXIMUM RATINGS

	Parameter	Condition	Min.	Max.	Unit
1	Storage Temperature	Ambient	-40	85	degC
2	Storage Humidity	No condensation	5	95	%RH
3	Optical Input Power	Peak, Sig or LO	-	17	dBm
4	Photo Diode Reverse Voltage	Signal (*1)	-0.8	7	V
5	Amplifier Supply Voltage	-	-0.5	4.5	V
6	Electro Static Discharge	Human Body Model	(-250)	(250)	V
7	Fiber Bend Radius		15	-	mm

Note 1 : VPD_*** in "APPENDIX 3: PIN FUNCTIONS".

3.2 OPERATING CONDITION

	Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
1	Operating Temperature			-5	-	80	degC
2	Operating Humidity			5		85	%RH
3	Frequency Range (Wavelength Range)			191.35 (1566.72)	-	196.20 (1527.99)	THz (nm)
4	Signal Power: Operating Range	P(s)	Average	-18	-10	0	dBm
5	Local Oscillator Input Power	P(Lo)		3 (*1)	-	16 (*1)	dBm
6	Photodiode Supply Voltage			3.135	3.3	3.465	V
7	Amplifier Supply Voltage	Vcc		3.135	3.3	3.465	V
8	Amplifier Supply Current	Icc	Total of TIAs	-	300	360	mA
9	Gain adjustment voltage	GC		0	-	Vcc	V
10	Output voltage swing adjustment	OA		0.5	-	2	V
11	Output shutdown (*2)	SHD	Enable	0	-	0.8	V
12			Disable	2	-	Vcc	
13	Gain control mode selection (*2)	MC	MGC	0	-	0.8	V
14			AGC	2	-	Vcc	
15	Power consumption			-	-	1.3	W

Note 1 : This is based on OIF recommendation.

Note 2: Digital control

3.3 OPTICAL AND ELECTRICAL SPECIFICATIONS (Target)

	Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
1	Symbol Rate			-	-	32	GBaud
2	Output swing adjustment range		Peak to peak, differential, AC coupled	300	-	900	mVppd
3	Total Harmonic Distortion	THD		-	-	5	%
4	Common Mode Rejection Ratio : DC, Signal to I & Q DC, LO to I & Q 22GHz, Signal to I & Q 22GHz, LO to I & Q	CMRR		-	-	-20 -12 -16 -10	dBe
5	Small signal Bandwidth (3dB)				22		GHz
6	Low Frequency Cutoff		AC coupling			100	kHz
7	Phase Error		Between XI and XQ and between YI and YQ	-5		5	deg.
8	Optical Reflectance		Signal and LO ports Per ITU-T G.959.1	-		-27	dB
9	Output Electrical Return Loss (S22): f < 16 GHz 16 GHz < f < 24 GHz 24 GHz < f < 32 GHz			- - -	- - -	-10 -8 -6	dB dB dB
10	Skew: p, n					2	ps
11	Channel skew		(*2)	-	-	10	ps
12	Channel skew variation		(*3)	-	-	5	ps
13	Peak Detection Voltage			0		1	V
14	Differential Transimpedance Manual Gain Control			300		5000	Ω
15	Maximum Gain Control Bandwidth			-	5	-	MHz
16	Responsivity	Rsig	Signal (*4)	0.05	-	-	A/W
17	Responsivity difference		Signal, between p and n	-	-	1	dB
18	Photodiode Dark Current		Signal	-	0.06	150	nA

Note 1 : Output swing can be controlled by AGC or MGC between the min. value and the max. value. This does not mean output swing can be controlled whole range from the min. value to the max. value.

Note 2 : Time difference between earliest and latest channel. Includes channel skew variation.

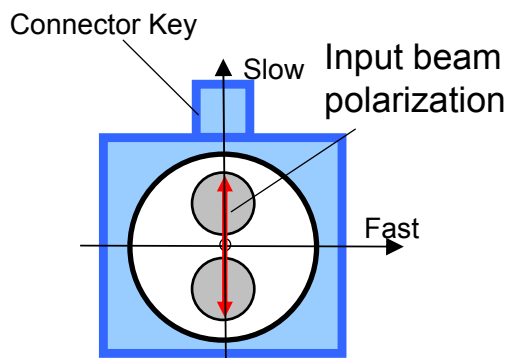
Note 3 : Temporal variation in the skew between any 2 channels due to case temperature, wavelength, input optical power, amplifier gain, and aging. Time for channel defined as mean of p and n.

Note 4 : Including PBS, 90deg hybrid and optical coupling loss. Input polarization is X or Y. Without LO.

3.4 MECHANICAL SPECIFICATIONS

	Parameter		Condition	Spec	Unit
1	Mechanical Dimensions			50 x 27 x 7	mm
2	Fiber	Type		Sig : SMF LO : PMF	-
3		Mode field Dia	SMF28 or its complaint	10	μm
		2nd Coat material	-	Flame-retardant thermoplastic polyester elastomer	-
4		Color	-	Sig: Blue LO: Black	-
5		Diameter	-	0.9	mm
6	Fiber length		-	900 +/-100	mm
7	Optical Connector		-	Sig : LC LO : LC (*1)	-
8	Optical end face		-	SPC	-

Note 1 : Polarization of the LO input to be aligned to the slow-axis. The connector key is adjusted to the direction within +/-5degree from slow-axis.



3.5 DIMENSIONS


Appendix 2 shows the dimensions of the receiver.

3.6 PIN FUNCTIONS

Appendix 3 shows the pin functions of the receiver.

4. MARKING

The following information shall be marked on the receiver.

- (1) Symbol Mark: 
- (2) Part Number: FIM24704
- (3) Serial Number : BBBAAAAA
 BBB: Keyword (3 digits of alphabet)
 AAAAA: Serial Number (5 digits of figures)
- (4) Country of manufacture: MADE IN JAPAN
- (5) Date of manufacture: YY-MM

5. PACKING

Each Receiver shall be individually packaged in a shipping container to prevent damage that may result from pressure, vibration or movement during shipment.

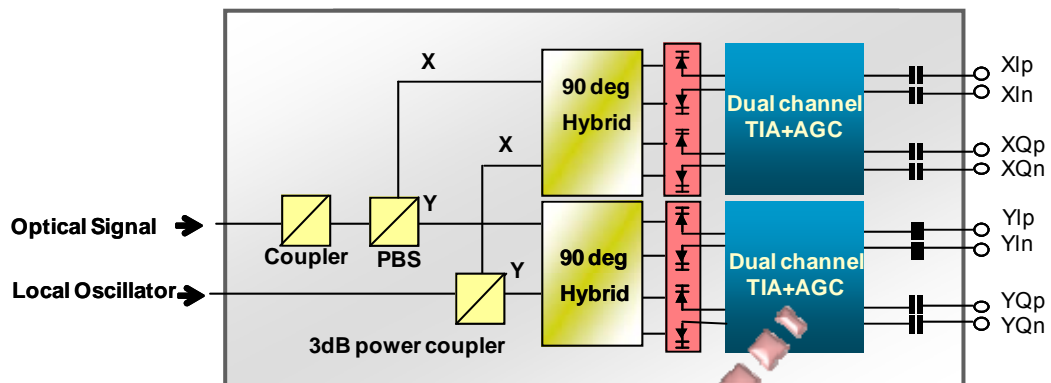
The following information shall be marked on the shipping container.

- (1) Symbol Mark
- (2) Part Number
- (3) Serial Number

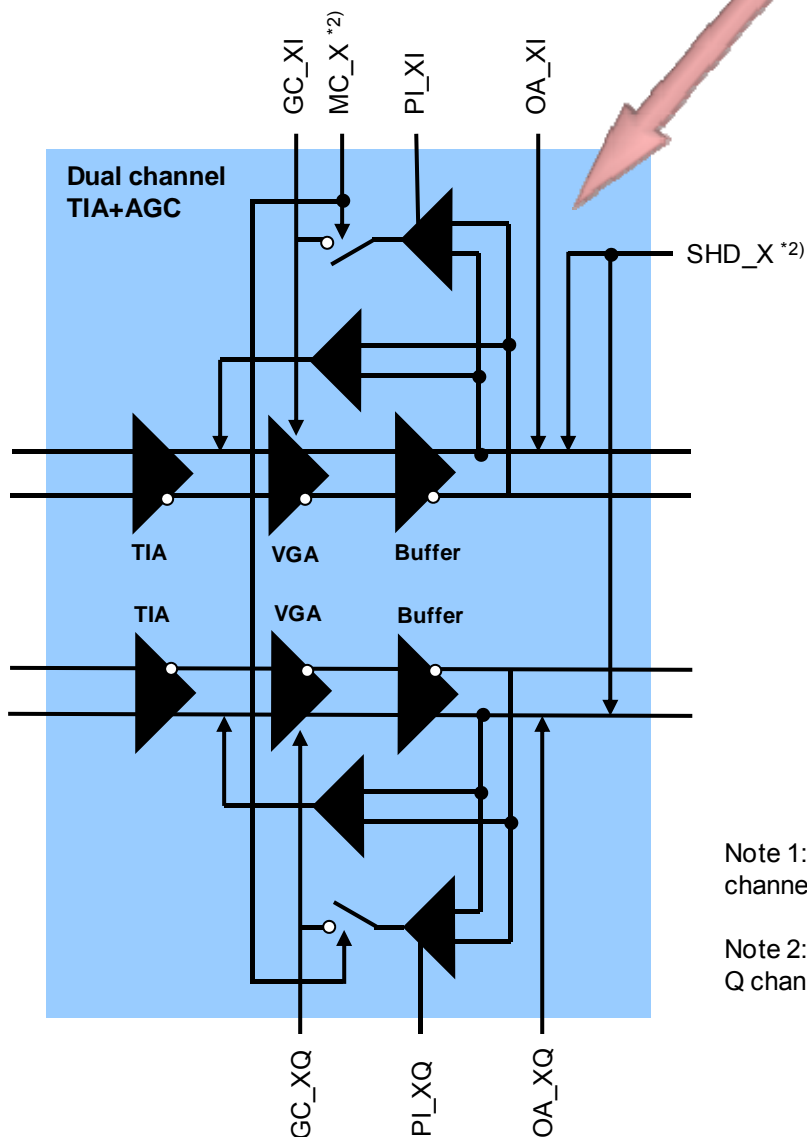
6. HANDLING PRECAUTION

- (1) When handling the Receiver, hold the package part, not the fiber.
- (2) The attached fiber should be handled very carefully, do not twist nor exceed a pull force greater than 500gf, or a handling radius of less than 5mm.
- (3) This receiver is susceptible to damage as a result of electrostatic discharge (ESD).
Appropriate handling precautions against electrostatic discharge must be taken during handling and testing.
- (4) The receiver includes precision optics. If package of the receiver is deformed by excess load, the receiver may be degraded in its characteristics or damaged.
- (5) In order to prevent the degradation or damage, the receiver should be mounted on flat area (flatness < 15um, surface roughness < 12.5um) larger than package bottom area including package flanges by M2.5 screws with 0.8kgf*cm torque.

APPENDIX 1: BLOCK DIAGRAM



Function diagram of receiver

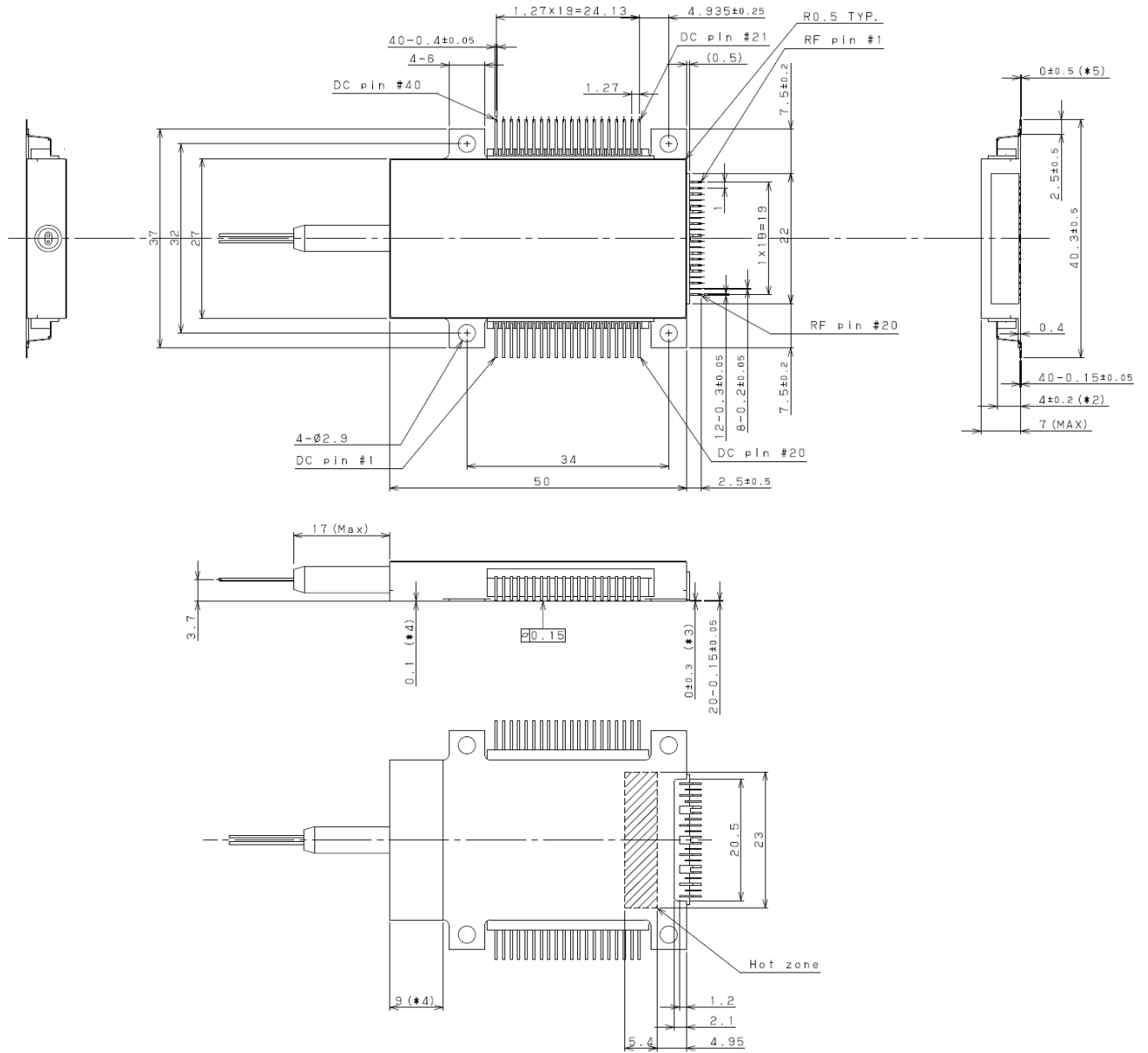


Note 1: This diagram represents X channel. Y channel has same diagram.

Note 2: This function controls both I and Q channel simultaneously.

Function diagram of dual channel TIA

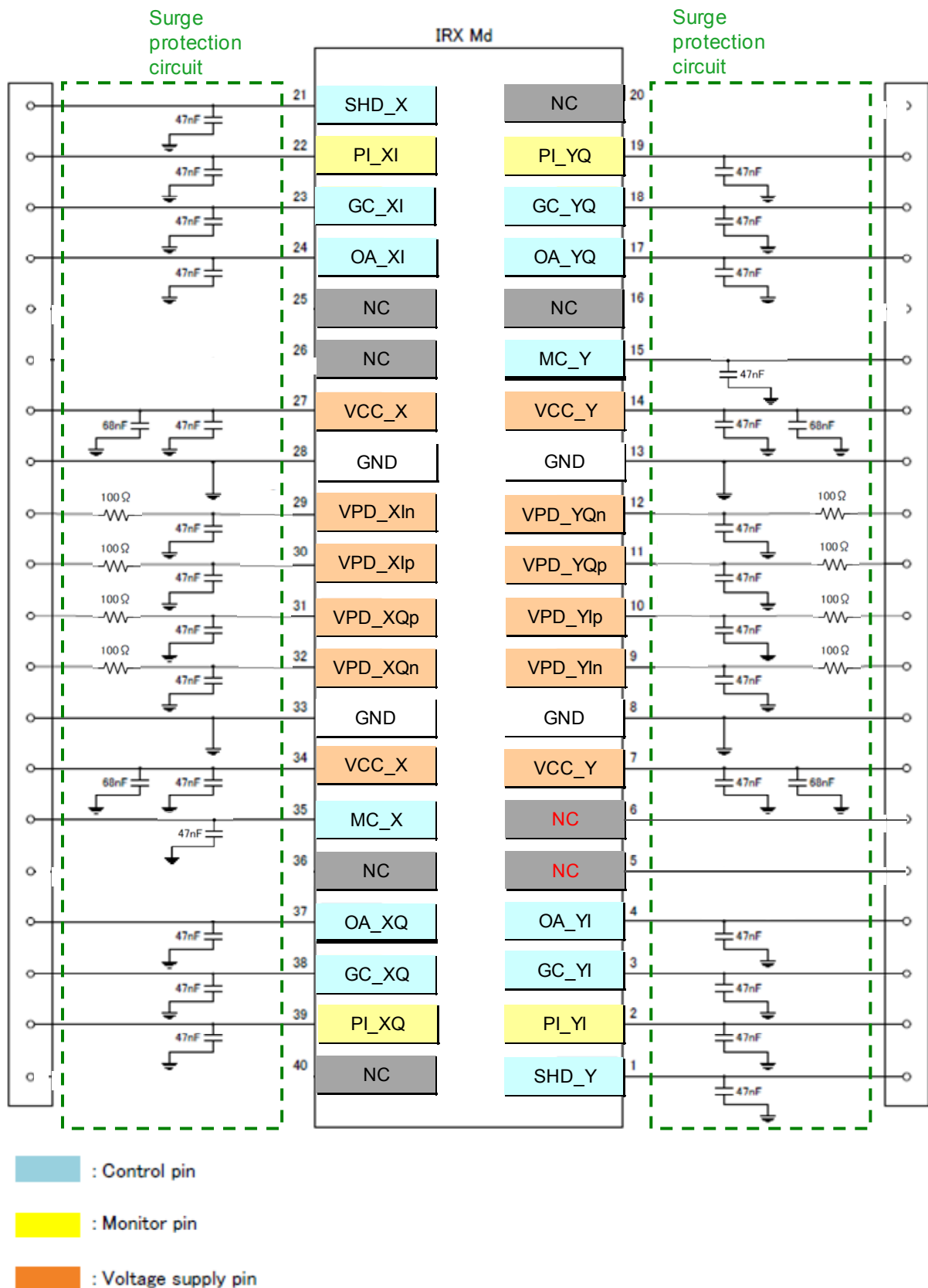
APPENDIX 2: DIMENSIONS



APPENDIX 3: PIN FUNCTIONS

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APPENDIX 4: Pin functions and typical circuit configuration

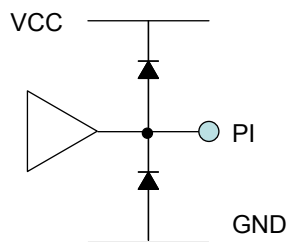
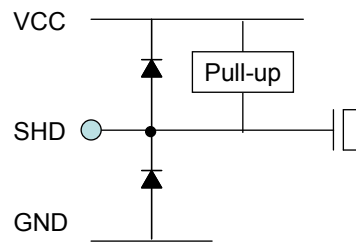
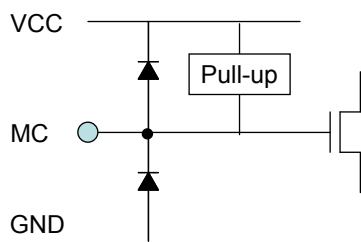
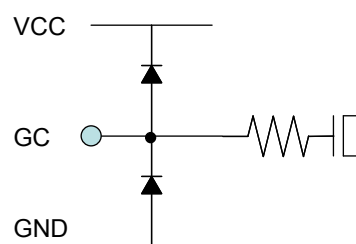
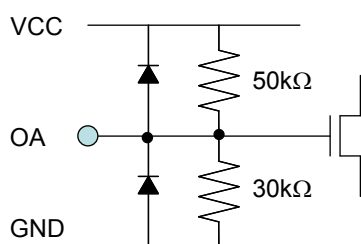


APPENDIX 5: DEFINITION OF SPECIFICATIONS

1. CHANNEL NAME

CHANNEL NAME	DEFINITION
X and Y	Nominally orthogonal polarizations (no absolute polarization state implied)
I and Q	Nominally orthogonal phases (no absolute phase or sign implied).
p and n	Alternate polarities for the differential signals (no absolute polarities or sign implied).

APPENDIX 6: EQUIVALENT CIRCUITS OF CONTROL PINS



CHANGE NOTES FOR SPECIFICATION

Rev.	Date	Description
A	November 26 th /2010	Generated specification
B	May 17 th /2011	Following section was updated. 1. GENERAL DESCRIPTION 3. SPECIFICATIONS 4. MARKING 6. HANDLING PRECAUTION APPENDIX 1: BLOCK DIAGRAM APPENDIX 3: PIN FUNCTIONS APPENDIX 4: Pin functions and typical circuit configuration
C	July 11 th /2011	Eliminated input power monitor function. Following section was updated. 6. HANDLING PRECAUTION APPENDIX 1: BLOCK DIAGRAM APPENDIX 2: DIMENSIONS APPENDIX 3: PIN FUNCTIONS APPENDIX 4: Pin functions and typical circuit configuration
D	Aug 24 th /2011	Change the mechanical dimension according to PLC change Appendix 2: Mechanical Dimension

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