FICER Technology Co., Ltd.
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SKU: 01ZPC03-xxx

GPON ONU B+ 2x10 SFF Transceiver, Simplex Pigtail SC/APC Tx1310nm DFB 1.244G / Rx1490nm 2.488G S-TIA, SMF 20KM, DDM, C-Temp

Part Number: FSF2-CA-PG3-20Bx-Pxx



Overview

FSF2-CA-PG3-20Bx-Pxx is a 2x10 SFF package style transceiver with Pigtail SC/APC connector, compliant with the industrial standard specification. The high performance uncooled 1310nm DFB transmitter and high sensitivity 1490nm S-TIA receiver provide superior performance for GPON ONU B+ application up to 20km optical links.

Applications

- GPON ONU for P2MP Application
- FTTx Application

Features

- Compliant with ITU-T G.984.5 GPON Class B+
- Compliant with SFF MSA-2000 and SFF-8472
- Industry Standard 2x10 SFF Footprint
- 1310nm DFB 1.244 Gbps Burst mode transmitter
- 1490nm S-TIA 2.488 Gbps Continuous mode receiver
- Simplex Pigtail with SC/APC connector
- LVTTL Transmitter Burst On (optional high active or low active)
- Transmitter state indication (optional Tx_SD)
- LVPECL differential data inputs and CML data outputs
- Single +3.3V power supply
- Link distance 20km over SM fiber
- Operating Temperature 0~+70°C
- Maximum Power consumption 1W
- RoHS Compliant

Laser Safety

- This is a Class 1 Laser Product complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.
- Caution: Use of control or adjustments or performance of procedure other than those specified herein may result in hazardous radiation exposure.

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Absolute Maximum Ratings

Parameters	Symbol	Min.	Max.	Unit
Storage Temperature	T_{ST}	-40	+85	°C
Relative Humidity	RH	5	85	%
Supply Voltage	V_{CC}	-0.5	+3.6	V

Recommended Operating Conditions

Parameters	Symbol	Min.	Typ.	Max.	Unit
Case Operating Temperature	T_{OP}	0	-	+70	°C
Supply Voltage	V_{CC}	+3.13	+3.3	+3.47	V
Supply Current	I_{CC}			300	mA
Power Consumption	P			1	W
Lead Soldering Limits	Tsold			260/10	°C/Sec

Transmitter Electro-optical Characteristics

V_{CC}= 3.13V~3.47V, T_{OP} = 0 °C to +70 °C

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Line Rate			1.244		Gb/s	
Optical Launch Power	Po	+0.5		+5	dBm	1
Optical Center Wavelength	λc	1260	1310	1360	nm	
Spectral Width (-20dB)	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Extinction Ratio	ER	10			dB	
Transmitter Reflectance				-12	dB	
Tx Burst ON Time	Ton			12.8	ns	
Tx Burst OFF Time	Toff			12.8	ns	
Rise/Fall Time (20~80%)	Tr / Tf			250	ps	
Average Launch Power of Tx OFF	Poff			-45	dBm	
Optical Eye Mask		ITU-T G.984.5				
Differential Data Input Swing	V_{IN}	200		1600	mV	
Tx Disable Input Voltage-Low (Tx ON)	$TDISV_L$	0		0.8	V	
Tx Disable Input Voltage-High (Tx OFF)	$TDISV_H$	2.0		Vcc	V	

Note1: The optical power is launched into a 9/125μm single mode fiber.

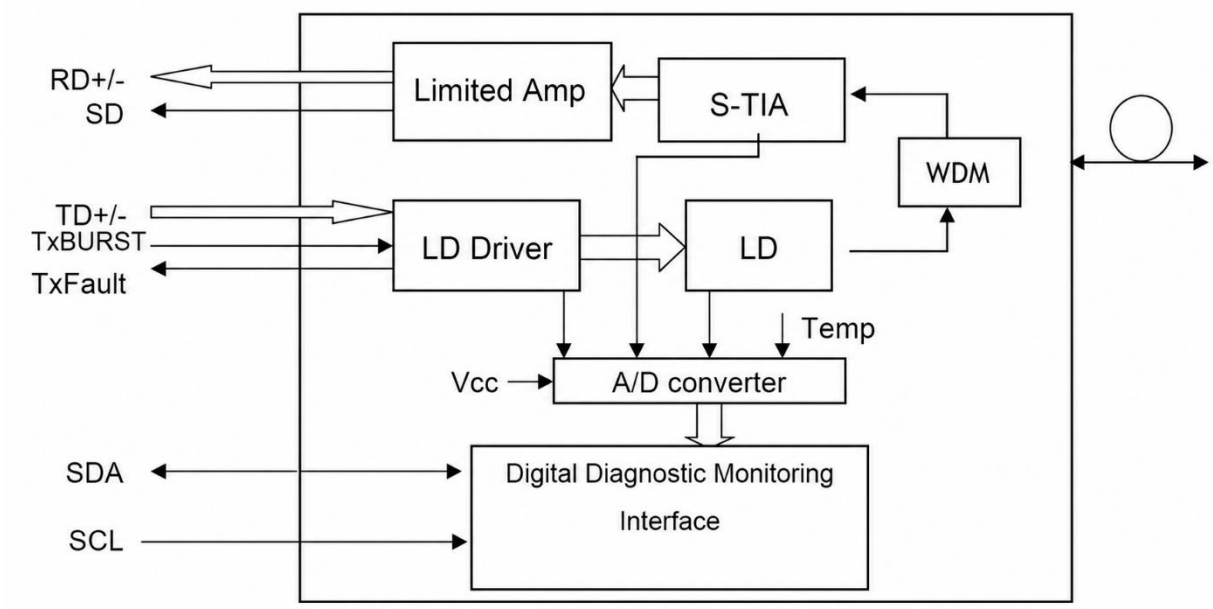
Receiver Electro-optical Characteristics

V_{CC}= 3.13V~3.47V, T_{OP} = 0 °C to +70 °C

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Line Rate	DR		2.488		Gb/s	
Receiver Sensitivity	SEN			-28	dBm	1
Maximum Receive Power	P_{RX-MAX}	-3			dBm	1
Optical Center Wavelength	λc	1480	1490	1500	nm	
Signal Detect De-Assert	SD_D	-45			dBm	
Signal Detect Assert	SD_A			-28	dBm	
Signal Detect LOS Hysteresis	SD_{HY}	0.5		6	dB	
Receiver Reflectance				-12	dB	
RSSI Range		-28		-8	dBm	
RSSI Accuracy		-3		+3	dB	
Differential Data Output Swing	V_{OUT}	400		1000	mV	
Signal Detect Output Voltage Low	$LOSV_L$	0		0.4	V	
Signal Detect Output Voltage High	$LOSV_H$	2.4		Vcc	V	

Note1: Measured with a PRBS 2^{23}-1 test pattern @2.488Gbps BER<10^{-12}, ER=9dB.

Transceiver Block Diagram



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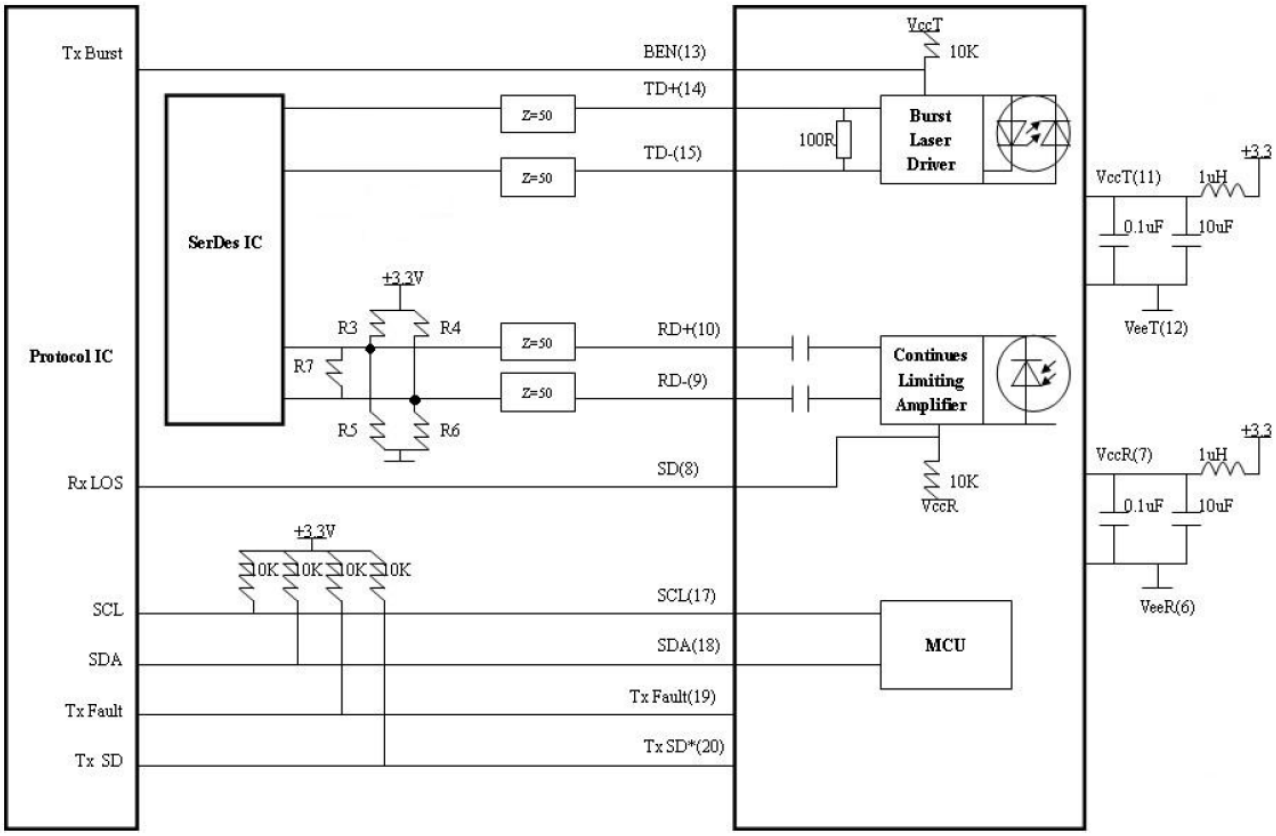
Pin Assignment



Pin Description

Pin	Name	Function / Description
1	NC	No Connection
2	NC	No Connection
3	NC	No Connection
4	NC	No Connection
5	NC	No Connection
6	VEER	Receiver Ground
7	VCCR	Receiver Power Supply
8	SD	Signal Detect Output. H--Normal Operation; L--Los of Signal
9	RD-	Receiver Data Out Bar
10	RD+	Receiver Data Out
11	VCCT	Transmitter Power Supply
12	VEET	Transmitter Ground
13	Tx_Burst	Active Low for transmitter or Active High for Transmitter (Option)
14	TD+	Transmitter Data In
15	TD-	Transmitter Data In Bar
16	VEET	Transmitter Ground
17	SCL	2-wire Serial Interface Clock (SCL: Serial Clock Signal)
18	SDA	2-wire Serial Interface Data Line (SDA: Serial Data Signal)
19	Tx_Fault	Transmitter Fault Indication (LVTTL Output level, High=TX Fault)
20	Tx_SD	Tx Signal Detect, active high when transmitter on *(optional)

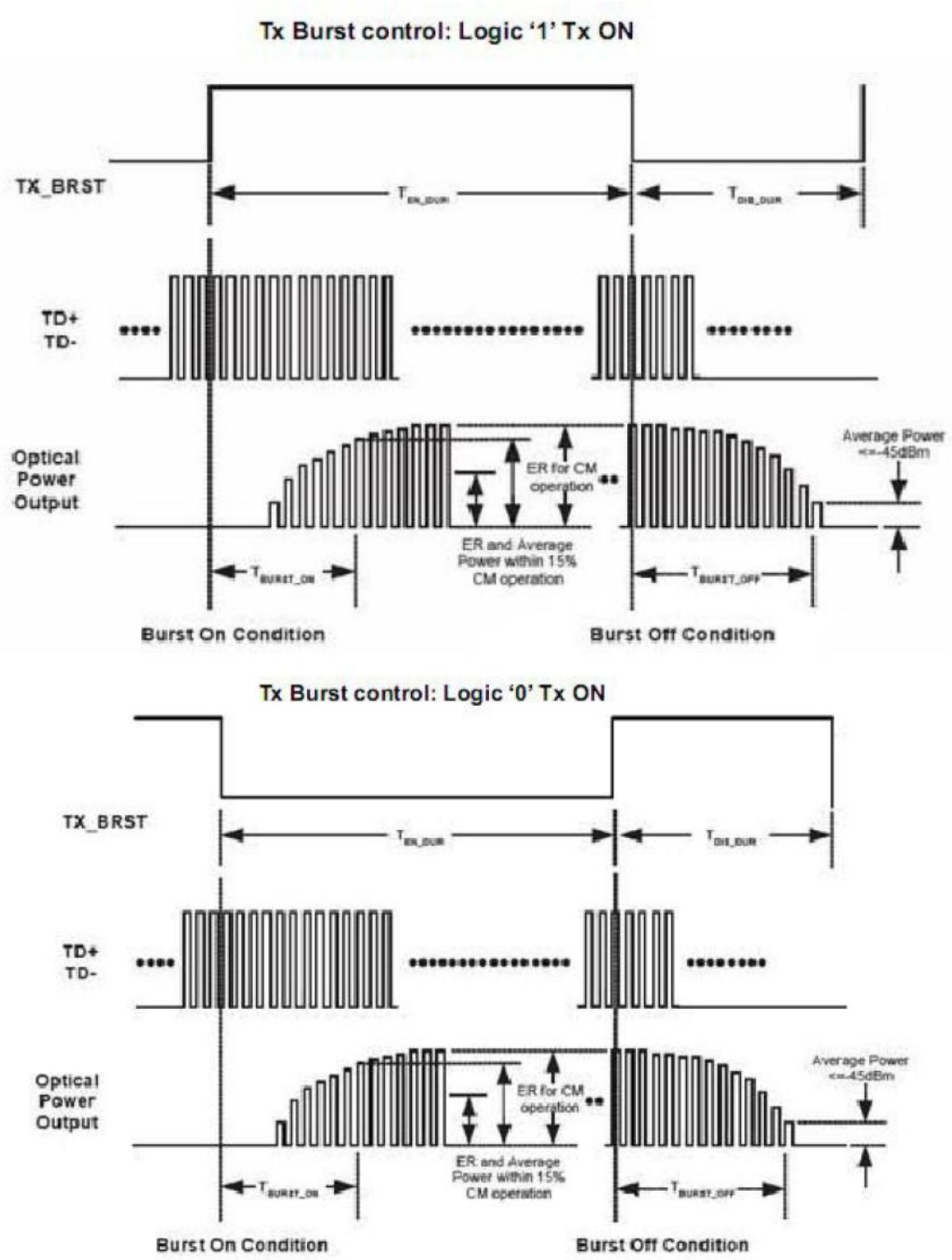
Recommended Circuit



Note1: Tx：DC coupled internally, Rx：AC coupled internally
Note2: Input stage in SerDes IC with internal bias to Vcc-1.3V：
R3=R4=R5=R6=N.C, R7=100Ω
Input stage in SerDes IC without internal bias to Vcc-1.3V：
R3=R4=82Ω,R5=R6=130Ω,R7=N.C.

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Burst Mode Sequence Definition



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Digital Diagnostic Functions

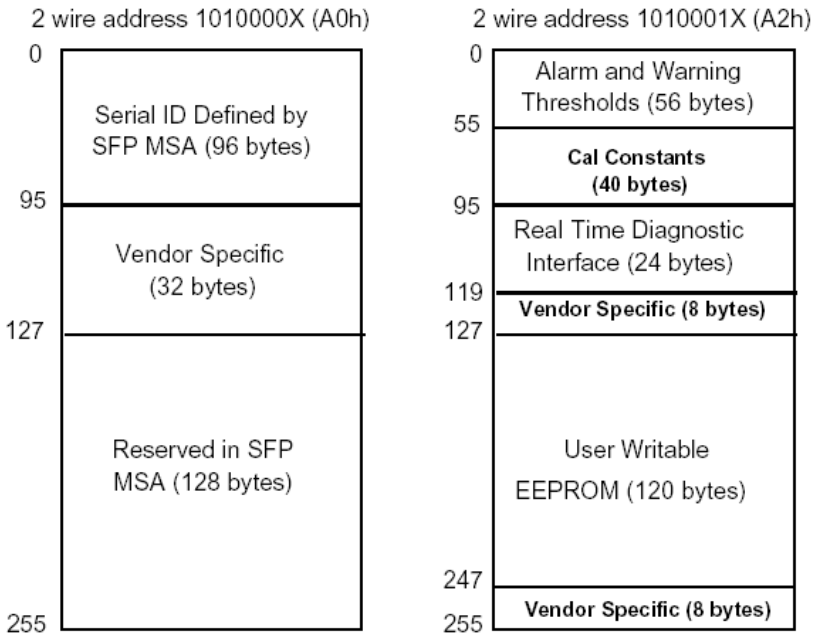
As defined by the SFF-8472, Ficer's 2x10 SFF transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Controller (DDC) inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host. The positive edge clocks data into the SFP+ transceiver into those segments of its memory map that are not write-protected. The negative edge clocks data from the SFP+ transceiver. The serial data signal (SDA pin) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.
For more detailed information including memory map definitions, please see the SFP MSA (SFF-8472) Specification.

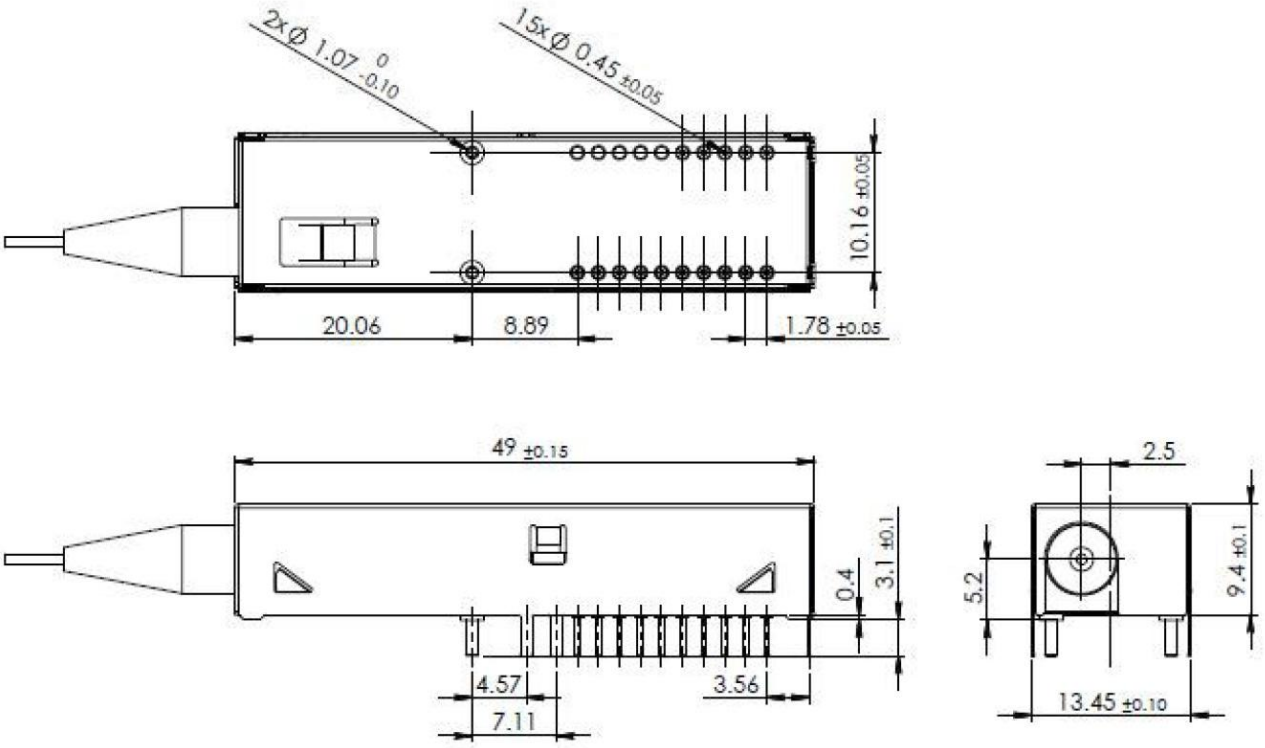
Digital Diagnostic Memory Map



Digital Diagnostic Monitoring Characteristics

Parameter	Accuracy	Unit	Note
Temperature	±3	°C	Internal Calibration
Supply Voltage	±0.1	V	Internal Calibration
Tx Bias Current	±5	mA	Internal Calibration
Tx Output Power	±3	dB	Internal Calibration
Rx Received Optical Power	±3	dB	Internal Calibration

Mechanical Dimensions



(All Dimensions are ±0.20mm Unless Otherwise Specified, Unit: mm)

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Ordering Information

FSF2-CA-PG3-20B□-P□□

Electrical Level Option

H: Tx enabled when Tx_Burst High & No Tx SD
L: Tx enabled when Tx_Burst Low & No Tx SD
T: Tx enabled when Tx_Burst High & with Tx SD
Y: Tx enabled when Tx_Burst Low & with Tx SD

Pigtail Length

30: 30cm	50: 50cm	A0: 1M
23: 23cm	25: 25cm	xx: Customized Definition