



产品特性

- 符合 IEEE802.3ae 标准
- 符合 X2 MSA 标准
- 双 SC 光接口
- 1.2V/3.3V/5V 电源供电
- MDIO 管理接口
- 支持带电插拔
- 采用满足 EN 60825-1 标准的 1 类激光器
- 单模光纤传输介质，典型传输距离 40 公里
- 1550nm EML 激光器
- 最高 10.3125Gb/s 传输速率
- 数字诊断功能
- XAUI 电接口
- 低功耗 (<4000mw)
- 70 管脚连接器
- 全双工传输方式
- 符合 RoHS 标准



产品应用

- 10.3GBd 万兆以太网



管脚定义



Signal name	Pin No.	Description
Management and Monitoring Ports		
MDIO	17	Management Data I/O. Requires external 10 - 22 k Ω pull-up to the APS on host;
MDC	18	Management Data Clock Input
PRTAD4	19	Port Address Input bit 4
PRTAD3	20	Port Address Input bit 3
PRTAD2	21	Port Address Input bit 2
PRTAD1	22	Port Address Input bit 1
PRTAD0	23	Port Address Input bit 0
LASI	9	Link Alarm Status Interrupt Output. Open Drain Compatible Output with 10 - 20 k Ω pull-up on host. Logic high = Normal Operation Logic low = Status Flag Triggered
RESET	10	Reset Input. Open Drain Compatible Input with 22 k Ω pull-up to APS internal to transponder. Logic high = Normal Operation Logic low = RESET
Vendor Specific	11,15,16,24	Vendor Specific Pins. Leave unconnected when not used.
TX ON/OFF	12	TX ON/OFF Input. Open Drain Compatible Input with 22 k Ω pull-up to APS internal to transponder. Logic high = Transmitter On Logic low = Transmitter Off
MOD DETECT	14	Pulled low inside transponder through a 1 k Ω resistor to Ground



Signal name	Pin No.	Description
Transmit Functions		
Reserved	68	Reserved For Future Use
Reserved	67	Reserved For Future Use
TX LANE 3-	65	Module XAUI Input Lane 3-
TX LANE 3+	64	Module XAUI Input Lane 3+
TX LANE 2-	62	Module XAUI Input Lane 2-
TX LANE 2+	61	Module XAUI Input Lane 2+
TX LANE 1-	59	Module XAUI Input Lane 1-
TX LANE 1+	58	Module XAUI Input Lane 1+
TX LANE 0-	56	Module XAUI Input Lane 0-
TX LANE 0+	55	Module XAUI Input Lane 0+
Receive Functions		
Reserved	38	Reserved For Future Use
Reserved	39	Reserved For Future Use
RX LANE 0+	41	Module XAUI Output Lane 0+
RX LANE 0-	42	Module XAUI Output Lane 0-
RX LANE 1+	44	Module XAUI Output Lane 1+
RX LANE 1-	45	Module XAUI Output Lane 1-
RX LANE 2+	47	Module XAUI Output Lane 2+
RX LANE 2-	48	Module XAUI Output Lane 2-
RX LANE 3+	50	Module XAUI Output Lane 3+
RX LANE 3-	51	Module XAUI Output Lane 3-

Signal name	Pin No.	Description
DC Power		
GND	1, 2, 3, 33, 34, 35, 36, 37, 40, 43, 46, 49, 52, 53, 54, 57, 60, 63, 66, 69, 70	Ground connection for signal ground on the module
APS	7, 8, 28, 29	Input from Adaptive Power Supply
APS SENSE	27	APS Sense Output. Connected to the APS input inside transponder
APS SET	25	Feedback input from APS Connected to GND through a 1180Ω resistor inside the transponder
3.3 V	5, 6, 30, 31	DC Power Input, +3.3 V DC, Nominal
5.0 V	4, 32	DC Power Input, +5.0 V DC, Nominal
Reserved	26	Reserved
Reserved	13	Reserved



极限工作条件

参数	符号	最小值	最大值	单位	备注
存储环境温度	T_s	-20	85	°C	
工作环境温度	T_A	0	70	°C	
输入电压+5.0V	V_5	0	6	V	
输入电压+3.3V	V_3	0	4	V	
输入电压APS	V_{aps}	0	1.5	V	
静电放电电压	ST_d	---	500	V	
平均接收光灵敏度	$RX_{P_{max}}$	---	1.5	dBm	

推荐工作条件

参数	符号	最小值	正常值	最大值	单位
工作（外壳）温度	T_C	0	---	70	°C
工作电压+5.0V	V_{CC5}	4.75	5.0	5.25	V
工作电流+5.0V	I_{CC5}	---	---	350	mA
工作电压+3.3V	V_{CC3}	3.14	3.3	3.47	V
工作电流+3.3V	I_{CC3}	---	---	300	mA
工作电压APS	V_{CCaps}	1.152	1.2	1.248	V
工作电流APS	I_{CCaps}	---	---	1000	mA



发射端光特性

$V_{CC5}=4.75V$ to $5.25V$, $V_{CC3}=3.14V$ to $3.47V$, $V_{CCaps}=1.152V$ to $1.248V$,
工作环境温度= $0^{\circ}C$ to $70^{\circ}C$



参数	符号	最小值	正常值	最大值	单位	备注
Launch Power	P_{out}	-5	---	4	dBm	Average
Extinction Ratio	ER	8.2	---	---	dB	
Center Wavelength	λ_c	1530	1550	1570	nm	
Relative Intensity Noise	RIN	---	---	-128	dB/Hz	
Side Mode Suppression Ratio	SMSR	30	---	---	dB	
Eye Mask Definition		According to IEEE802.3ae 10GBASE-ER				
Optical Modulation Amplitude(OMA)	OMA	-1.7	---	---	dBm	

接收端光特性

$V_{CC5}=4.75V$ to $5.25V$, $V_{CC3}=3.14V$ to $3.47V$, $V_{CCaps}=1.152V$ to $1.248V$, 工作环境温度= $0^{\circ}C$ to $70^{\circ}C$

参数	符号	最小值	正常值	最大值	单位	备注
Optical Input Power	P_{IN}	-16	---	0.5	dBm	Average, Informative
Center Wavelength Range	λ_c	1260	---	1600	nm	
Receive Reflectance	REF_{RX}	---	---	-27	dB	
Receiver Sensitivity in OMA	P_{IN-OMA}	---	---	-14.1	dBm	Informative
Stressed Receiver Sensitivity	P_{IN-S}	---	---	-11.3	dBm	
Receiver electrical 3dB upper cutoff frequency	F_c	---	---	12.3	GHz	
Signal Speed		---	10.3125	---	GBd	



直流电特性

$V_{CC5}=4.75V$ to $5.25V$, $V_{CC3}=3.14V$ to $3.47V$, $V_{CCaps}=1.152V$ to $1.248V$,
 工作环境温度= $0^{\circ}C$ to $70^{\circ}C$

参数	符号	最小值	正常值	最大值	单位	备注
1.2V CMOS (1.8V CMOS Compatible) I/O DC Characteristics(PRTAD;LASI;RESET;TX_ONOFF)						
External Pull-up Resistor for Open Drain	R_{pullup}	10	---	22	K Ω	
Output High Voltage	V_{oh}	1	---	---	V	
Output Low Voltage	V_{ol}	---	---	0.15	V	
Input High Voltage	V_{ih}	0.84	---	1.5	V	
Input Low Voltage	V_{il}	---	---	0.36	V	
Input Pull-down Current	I_{pd}	20	---	120	μA	
XAUI I/O DC Characteristics(TXLANE[0..3];RXLANE[0..3])						
Differential Input Amplitude(pk-pk)	$V_{in\ xaui}$	200	---	2000	mV	
Differential Output Amplitude(pk-pk)	$V_{out\ xaui}$	800	---	1600	mV	
MDIO I/O DC Characteristics(MDIO;MDC)						
Output Low Voltage	V_{OL}	-0.3	---	0.2	V	
Output Low Current	I_{OL}	---	---	20	mA	
Input High Voltage	V_{IH}	0.84	---	1.5	V	
Input Low Voltage	V_{IL}	-0.3	---	0.36	V	
Pull-up Supply Voltage	V_{PU}	1.152	1.2	1.248	V	
Input Capacitance	C_{IN}	---	---	10	pF	
Load Capacitance	C_{LOAD}	---	---	470	pF	
External Pull-up Resistance	R_{LOAD}	200	---	---	Ω	



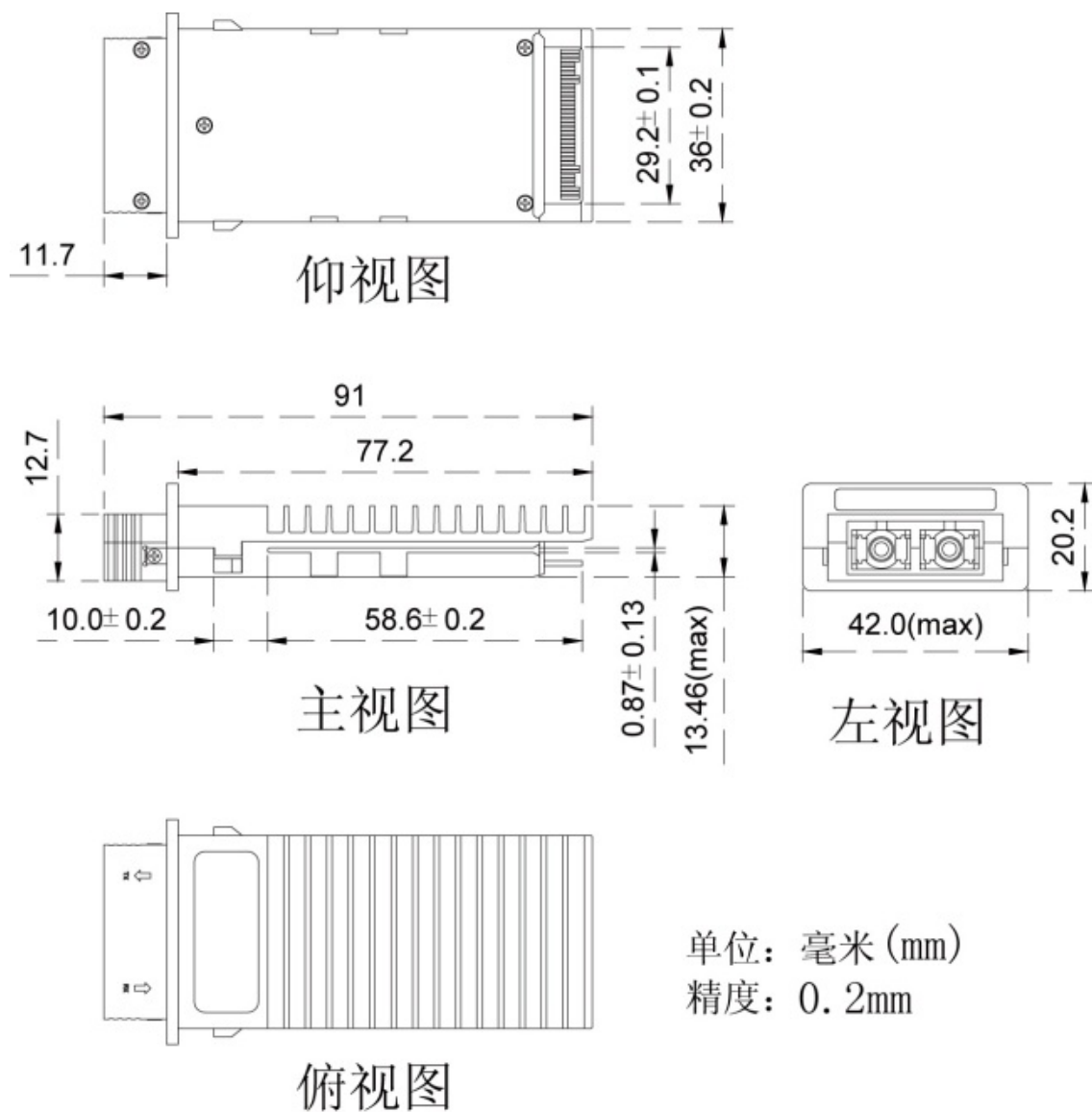
交流电特性

$V_{CC5}=4.75V$ to $5.25V$, $V_{CC3}=3.14V$ to $3.47V$, $V_{CCaps}=1.152V$ to $1.248V$,
工作环境温度= $0^{\circ}C$ to $70^{\circ}C$

参数	符号	最小值	正常值	最大值	单位	备注
XAUI Input AC Characteristics(TXLANE[0..3])						
Baud Rate Tolerance	$R_{TOLXAUI}$	-100	---	100	ppm	
Differential Input Impedance	Z_{INXAUI}	80	100	120	Ω	
Differential Return Loss	[S11]	10	---	---	dB	
Input Differential Skew	t_{SKEWIN}	---	---	75	ps	
Jitter Amplitude Tolerance	$J_{XAUITOL}$	---	---	0.65	UI _{P-P}	
XAUI Output AC Characteristics(RXLANE[0..3])						
Baud Rate Variation	$R_{XAUIVAR}$	-100	---	100	ppm	
XAUI Eye Mask(far-end)		According to IEEE802.3ae 10GBASE-ER				
Output Differential Skew	$t_{SKEWOUT}$	---	---	15	ps	
Output Differential Impedance	$Z_{OUTXAUI}$	80	100	120	Ω	
Differential Output Return Loss	[S22]	10	---	---	dB	
Total Jitter	TJ_{XAUI}	---	---	0.35	UI	
Deterministic Jitter	DJ_{XAUI}	---	---	0.37	UI	
Power-On Reset AC Characteristics						
Power-On Reset and TX_ONOFF Characteristics		According to X2 MSA Issue 3.0 Draft 4.0				
MDIO I/O AC Characteristics(MDIO;MDC)						
MDIO Data Hold Time	t_{HOLD}	10	---	---	ns	
MDIO Data setup Time	t_{SU}	10	---	---	ns	
Delay from MDC Rising Edge to MDIO Data Change	t_{DELAY}	---	---	300	ns	
MDC Clock Rate	f_{MAX}	---	---	2.5	MHz	



模块尺寸



GT4400 光纤模块结构尺寸图



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