ÿÿ® T31

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ÿÿ: 1.0 ÿ
ÿ: 2019 ÿ 8 ÿ

北京君正集成电路股份有限公司
Ingenic Semiconductor Co., Ltd.

ÿÿT31

ÿÿÿÿÿÿÿ

release history

Date	revision	Change
April 2019	1.1	language

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ÿÿ
86-551-68998701ÿÿÿ
Httpÿ//www.ingenic.com

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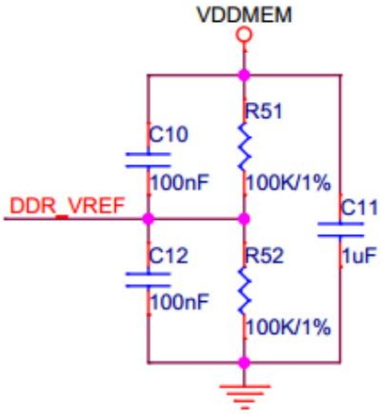
1. The first step in the development of the disease

GDR

1) ZQ: 240ÿ 1%.

2) VREF ÿÿÿÿÿ VDDMEM ÿÿÿÿÿÿÿÿÿÿ 100K 1%ÿÿÿÿÿ 100nFÿ



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1).

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2) ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ PIN ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ

3) T31 ÿÿÿÿÿ

symbol	Description	Min	Typical	Max	Unit	
VDDMEM	VDDQ voltage for DDR PHY in T31L/N/X	1.7		1.8	1.9 V	
DDRVDD	VDDQ and VDD voltage for DDR2 in T31 L/N/X	1.7		1.8	1.9 V	
VDDMEM	VDDQ voltage for DDR PHY in T31Z	1,425	1.5		1,575 V	
DDRVDD	VDDQ and VDD voltage for DDR3 in T31Z	1,425	1.5		1,575 V	
VDDMEM	VDDQ voltage for DDR PHY in T31A	1.283	1.35		1.45 V	
DDRVDD	VDDQ and VDD voltage for DDR3 in T31A	1.283	1.35		1.45 V	
DDRPLL_VCCA	DDR PHY PLL power supplies voltage	1.62	1.8		1.98 V	
DDRPLL_VCCD	DDR PHY PLL power supplies voltage	0.72	0.8		0.88 V	
VDDIO0	IO digital power for GPIO power Domain 0	1.62	1.8		1.98 V	
VDDIO1	IO digital power for GPIO power Domain 1	1.5	3.3		3.63 V	
VDDIO2	IO digital power for GPIO power Domain 2	1.5	3.3		3.63 V	

VDD	VDD core voltage	0.72	0.8	0.96 V	
PLL_VDDHV	APLL, MPLL and VPLL analog voltage	1.62	1.8	1.98 V	
PLL_VDD	APLL, MPLL and VPLL digital voltage	0.72	0.8	0.88 V	
EFUSE_AVD	EFUSE program supplies voltage	1.62	1.8	1.98 V	
VDDIO_OSC	Oscillator supplies voltage	1.62	1.8	1.98 V	
USB_AVD33	USB PHY VCCA3P3 analog voltage	3.0	3.3	3.6 V	
USB_AVD18	USB PHY VCC18 analog voltage	1.62	1.8	1.98 V	
USB_AVD08	USB PHY core voltage	0.72	0.8	0.88 V	
ADC_AVDD	SAR-ADC analog voltage	1.62	1.8	1.98 V	
CODEC_AVDD	CODEC analog voltage	1.62	1.8	1.98 V	
MIPI_AVD08	MIPI PHY 0.8V analog voltage	0.72	0.8	0.88 V	
MIPI_AVD18	MIPI PHY 1.8 analog voltage	1.62	1.8	1.98 V	

VDDCORE ÿÿÿÿÿÿÿÿÿ 1AÿVDDMEM ÿÿÿÿÿÿÿÿÿ 1AÿDDRPLL_VCCAÿ
DDRPLL_VCCDÿPLL_VDDHVÿPLL_VDDÿADC_AVDDÿCODEC_AVDDÿMIPI_AVD08ÿ
MIPI_AVD18 ÿÿÿÿÿ1kÿ@100MHzÿÿÿÿÿÿÿÿÿÿÿÿÿ

T31 for BOOT

BOOT_SEL1	BOOT_SEL0	Boot From
0	0	MMC/SD boot @ MSC0 (MMC/SD use GPIO Port B. MSC1 use GPIO Port C)
0	1	SFC boot @ CS4 (SPI boot @ SSI0)

Select SFC boot and SD boot.

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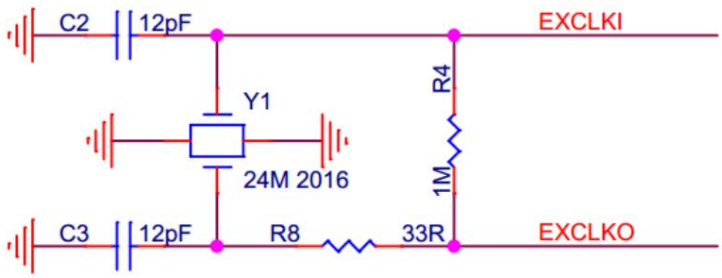
T31 ÿÿÿÿÿÿ 24MHz ÿÿÿÿÿÿÿÿÿ 30ppm ÿÿÿÿÿÿÿ



JTAG debugging

T31 JTAG ÿÿÿÿ IEEE1149.1 ÿÿÿPC ÿÿÿÿÿÿÿÿ ICE ÿÿÿÿTCKÿTRST ÿÿÿ
ÿ JTAG ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿTDIÿTMSÿTDO ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ
ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ 10K ÿÿÿÿÿÿÿÿÿÿ JTAGÿÿÿÿÿÿÿ
ÿÿ GPIO ÿÿÿÿÿÿÿÿÿ

DVP/MIPI report

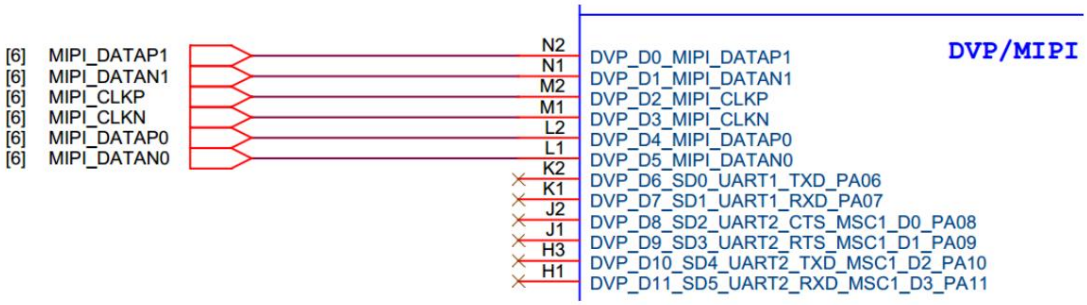
T31 ÿÿ 12 ÿÿ DVP ÿÿÿÿÿÿ GPIO ÿ PA ÿ PA00~PA22ÿÿÿÿÿÿÿÿÿÿÿ
sensor:

1) ÿ sensor ÿ 10 ÿ DATA ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ DVP00 ÿ DVP09ÿ

2) ÿ sensor ÿ 12 ÿ DATA ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ DVP00 ÿ DVP11ÿ 3) ÿ sensor ÿ 12 ÿ DATA ÿ

T31 ÿ DVP ÿÿÿÿÿÿ VDDIO0ÿÿÿ IO ÿÿ 1.8Vÿÿÿ PA ÿ IO ÿÿÿÿ VDDIO1ÿDVP
ÿÿÿ GPIO ÿÿÿÿÿÿÿT31 ÿÿÿÿ GPIO ÿÿÿÿÿÿÿÿ
ÿÿÿÿÿÿÿÿÿÿÿ CMOS Sensor ÿ IO ÿÿÿÿÿÿÿÿÿÿÿÿÿ DVP ÿÿÿÿÿÿ

MIPI ÿÿÿÿÿ DVP ÿÿ DVP00 ÿ DVP05ÿÿÿ 2lane ÿ MIPI-CSIÿÿÿÿÿÿÿÿ



USB OTG

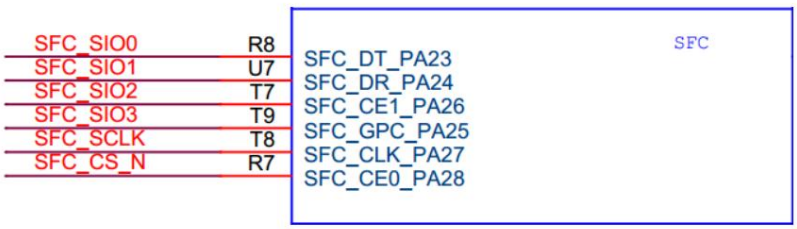
T31 USB ÿÿÿÿ OTG ÿÿÿÿÿÿÿÿ OTG ÿÿÿUSB_ID pin ÿÿÿÿÿÿÿ ÿÿÿÿÿ HOST ÿÿ DEVICEÿ
ÿÿÿID pin ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿVBUS pin ÿÿÿÿÿÿ

MAC operating system

T31 MAC ÿÿÿÿ 10/100M ÿ RMII ÿÿÿRMII ÿÿÿÿÿÿ 50Mhz ÿÿÿÿÿ T31 ÿ A15 ÿÿÿÿÿÿMDIOÿÿÿÿÿÿÿÿ
MDCKÿTXCKÿTXD0ÿTXD1 ÿ RXCKÿRXD0ÿRXD1 ÿÿ ÿÿÿÿÿÿÿ 33 ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ

SFC software

T31 ÿ SFC ÿÿÿÿÿ PA23~PA28ÿÿÿÿÿÿ SPI NOR FLASHÿÿÿÿÿÿÿÿ



MSC School

T31 ÿÿÿÿ MSC ÿÿÿÿÿÿ TF ÿÿÿÿ PB ÿÿ MSC0ÿÿÿÿ SDIO WIFI ÿÿÿ
ÿÿÿÿ PC ÿ MSC1 ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ MSC1.

audio recording

T31 ÿÿ CODEC ÿÿÿÿÿÿ 1 ÿÿÿÿÿÿ 1 ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ T31 ÿÿÿÿ I2S ÿÿÿÿÿÿ GPIO PB ÿÿÿPCÿÿ
ÿÿ I2S ÿÿÿÿÿ audio codec.

ADC report

T31 ÿÿ 3 ÿ 10 ÿÿÿÿ ADC ÿÿÿÿÿÿÿÿ ADC_VREFÿÿÿÿÿ 0-1.8V ÿÿÿÿÿÿ ÿÿÿ

EFUSE Plugin

ÿÿÿÿÿÿÿÿÿÿÿ 1.8V+/-10%ÿÿÿÿ EFUSE_AVD ÿÿÿÿÿÿÿÿÿÿÿÿÿ 1sÿ ÿÿÿÿÿEFUSE_AVD ÿÿÿÿ 0V ÿÿÿÿ 0 ÿÿÿÿÿÿÿÿÿÿÿÿÿÿ EFUSE_AVD ÿÿ ÿÿÿÿ.

LCD monitor

T31 ÿÿ 8bit SLCD ÿÿÿÿÿÿÿÿÿ IO ÿÿÿ PB ÿ GPIO ÿÿ

2.PCB test bench test bench

PCB board

T31 ÿ 0.65 pitch ÿ 223 ÿÿÿ BGA ÿÿÿPCB ÿÿÿÿÿÿÿÿ 4ÿÿÿÿÿÿÿÿÿÿÿ ÿÿÿÿ GND ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿTop ÿÿÿÿÿÿÿÿ TOP-GND-VCC-BOTTOMÿTOP ÿÿÿ L2ÿBOTTOM ÿÿÿ L3ÿÿÿÿÿÿÿÿÿ

ÿ		ÿÿ
TOP	==================================	1Oz
	PP	3(mil)
L2	==================================	1Oz
	Core	The most popular sports club in the world
L3	==================================	1Oz
	PP	3(mil)
BOT	==================================	1Oz

Chinese New Year celebration

1) SMT is a professional computer program.

2) CPU and CMOS sensor.

3) ÿÿÿÿÿÿÿÿÿ

ÿÿÿÿÿÿÿÿÿ ÿ ÿÿÿÿÿÿÿÿÿ

1) ÿÿÿÿÿÿ 8mil ÿÿÿ16mil ÿÿÿ

2) ÿÿÿÿÿÿÿ 12mil ÿÿÿ24mil ÿÿÿ

3) CPU and DDR ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ 30milÿ

DDR and German Empire

ÿ CPU ÿ DDR ÿÿÿÿÿÿÿÿÿÿÿÿ PIN ÿÿÿÿÿÿÿÿÿÿ,ÿÿÿÿÿÿÿÿÿÿ ÿÿÿ,ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿVDDMEMÿDDRVDD ÿÿÿÿÿÿÿÿÿÿÿ ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ

ÿÿÿÿÿÿÿÿÿÿÿ PCBÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ ÿÿÿ ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ GNDÿÿÿÿÿÿ

ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ

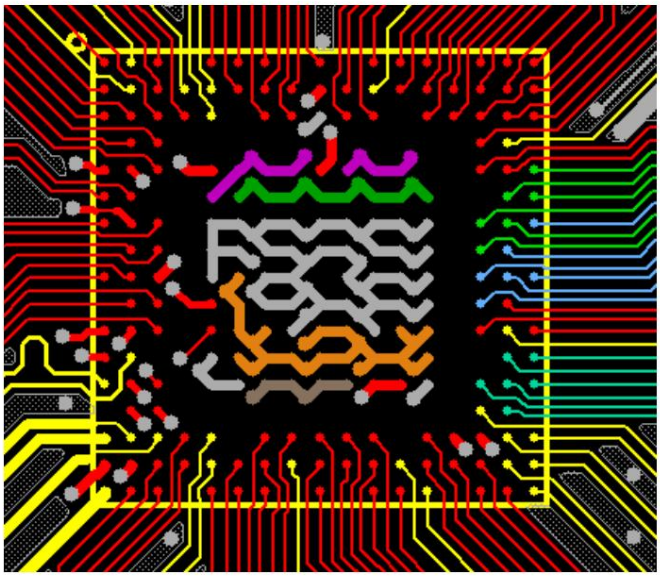
VREFÿDDRÿÿbufferÿÿÿÿVREFÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ20milÿ ÿ

ÿÿÿÿÿÿ

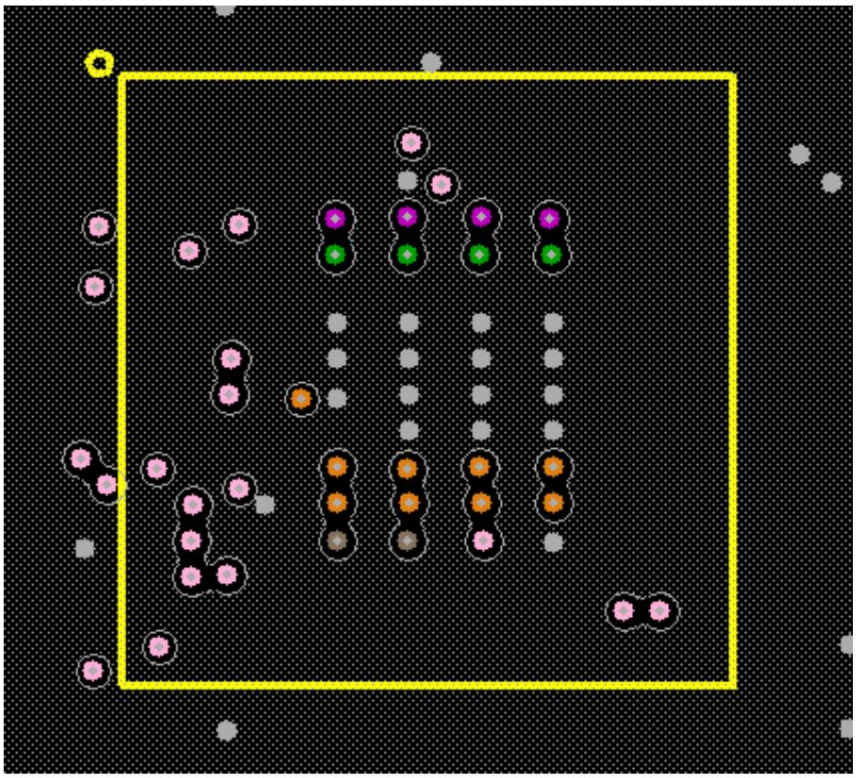
1) ÿÿÿÿÿÿÿÿÿÿÿÿÿ 2milÿÿÿÿÿÿÿÿÿÿ
4milÿ

ÿÿÿÿÿ

1) ÿÿÿÿÿÿÿÿÿ 1OZÿ
2) CPU:



3) ÿÿÿÿÿÿÿÿÿCPU ÿÿÿÿÿÿÿÿÿÿÿÿÿÿ CPU ÿÿÿÿÿÿ



4).

ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ

5)PCBÿÿÿÿÿCPU ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ 20mmÿÿÿÿÿÿÿÿÿÿÿÿ ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ,ÿÿÿÿÿ ÿCPU ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ

ÿÿÿÿÿÿÿ

1) ÿÿÿÿÿÿÿÿÿ CPU ÿÿÿ 2) ÿÿÿÿÿÿÿ

ÿÿÿÿÿÿ DC/DCÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ

DC/DC ÿ PIN ÿÿÿÿÿÿÿÿÿÿÿ CPU ÿÿÿÿÿÿÿÿÿÿÿ

3) CPU VDDÿVDDMEMÿDDRVDDÿDDRPLL_VCCAÿDDRPLL_VCCD ÿÿÿÿÿÿÿÿ

ÿÿÿÿÿ CPU PIN ÿÿÿÿÿÿ

4) VDDÿVDDMEMÿDDRVDD ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ 5)ÿÿÿÿÿÿÿÿÿÿÿÿÿ

ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ

6) CPU version: 1 ÿÿÿ:

PLL_VDDHV, PLL_VDD, DDRPLL_VCCA, DDRPLL_VCCD, VDD, VDDMEM, DDRVDD, VREF.

ÿ 2 ÿÿÿÿMIPI_AVD08ÿMIPI_AVD18ÿCODEC_AVDDÿVDDIO_OSCÿUSB_AVD33ÿ USB_AVD18ÿ USB_AVD10ÿ

Number 3: VDDIO0, VDDIO1, VDDIO2, ADC_AVDD.

7) CPU ÿÿÿ 8) ÿÿÿÿÿÿÿ

ÿÿÿÿÿÿÿÿÿÿÿ

Japanese food

ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ 3Wÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ ÿÿÿ

USB flash drive

ÿÿÿÿÿÿÿÿÿÿÿÿUSB2.0 ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ USB 2.0 ÿ ÿ 480MHz ÿÿÿÿÿÿÿÿ PCB ÿÿÿÿÿÿÿÿÿÿÿ 1)ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ

ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ±

5mil ÿÿÿ

2) ÿÿÿÿÿÿÿ 90ÿ±10%ÿÿÿÿÿÿÿÿ 3)ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ

ÿÿÿÿÿÿÿÿÿÿÿÿÿ 4) ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ 5)ÿÿÿÿÿÿÿÿÿÿÿÿ

ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ 135 ÿÿÿÿÿÿÿÿ

ÿÿÿÿÿÿÿÿÿÿÿÿ

6) ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ50milÿÿÿÿÿÿÿÿÿÿÿ

ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ 20mil ÿÿÿÿ

DVP report

ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ±300mil ÿÿÿDVP_MCLKÿDVP_PCLKÿDVP_HSYNCÿ

DVP_VSYNC ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ 3W ÿÿÿÿÿÿÿÿÿÿÿÿ

MIPI software

ÿÿÿÿÿÿÿÿÿÿÿÿÿÿ±5mil ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ±100mil ÿÿÿÿÿÿÿÿ 100ÿ ±10%ÿÿÿ“3W”ÿÿÿ

ÿÿÿÿÿ

ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿMICP/MICN ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ

MAC OS

ÿÿ GMAC ÿÿÿÿÿÿÿÿÿÿ PCB ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ 1)ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ 2) ÿÿÿÿ
ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ±200mil ÿÿÿÿ 3)ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ 4) ÿÿÿÿÿÿ
ÿÿÿÿÿ“3W”ÿÿÿÿ 5)ÿÿÿÿÿÿÿÿÿÿÿÿ 33ÿ ÿÿÿÿÿÿÿÿÿÿÿÿÿÿ

PHY ÿÿ MDI_TPÿMDI_TNÿMDI_RPÿMDI_RN ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ±5mil ÿÿÿÿÿÿÿÿÿÿÿÿ100ÿ±10%ÿ