

TP5803

Features

MCU features

- Built-in 32-bit ARM microcontroller.
- 32KB embedded flash, 8KB SRAM,
- USB 2.0 FS device controller
- SPI, I2C, Timer, PWM
- USB power supply and LDO output (2.5V~5.5V)

65 channels Touch sensing AFE features

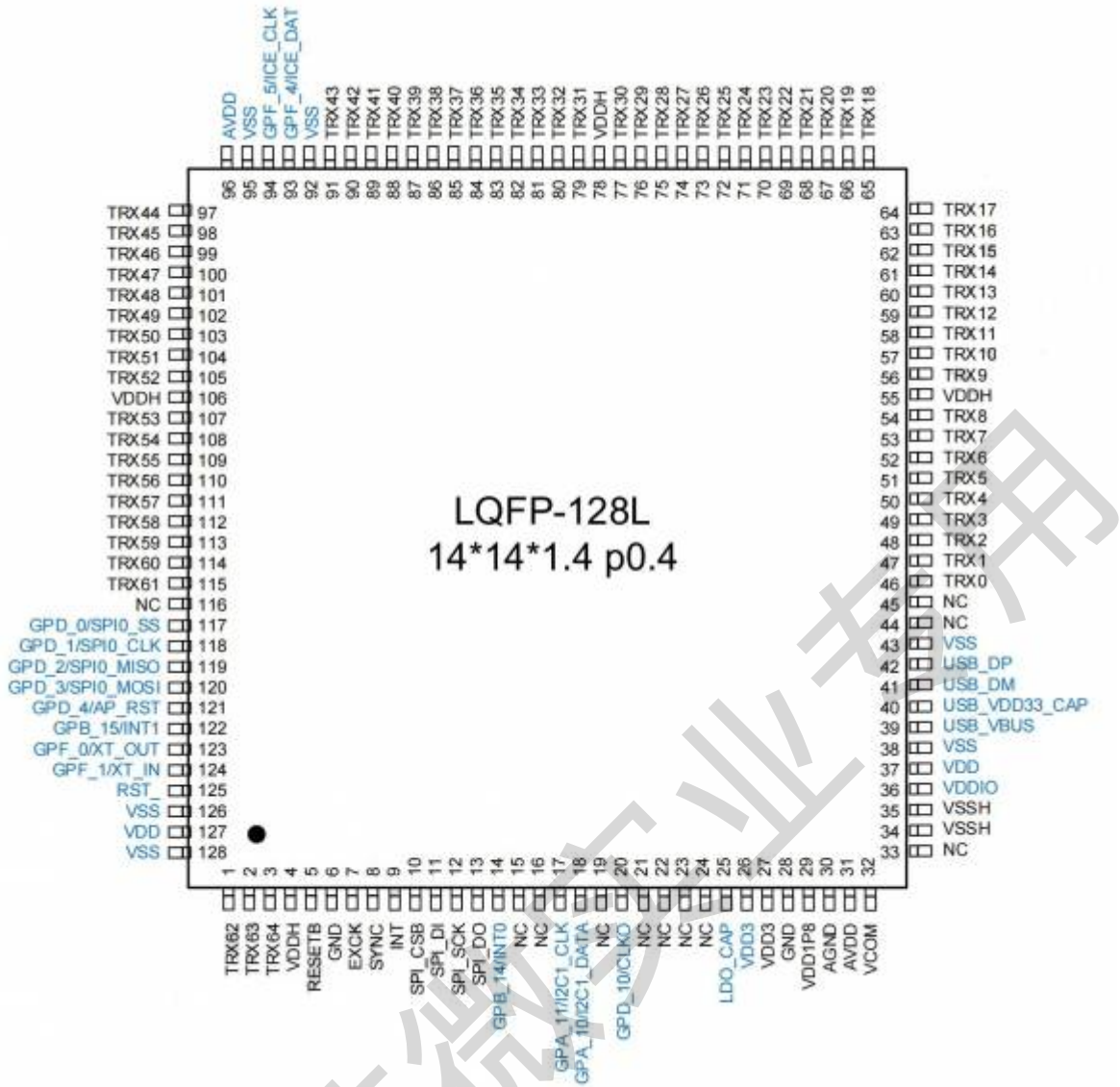
- Maximum 65 configurable Tx/Rx sensing channels
- Build-in RX sensing block for Mutual Capacitive Sensing
- Build-in 10 bits ADCx4 and 8 bits DACx4
- Build-in 4K byte SRAM x 2
- Sampling rate > 100Hz (up to 400Hz base on recipe setting)
- Buffer: 64-bytes for ADC (raw data) and 64-bytes for DAC data
- SPI Interface (50MHz), built-in power-on-reset 1.8 V

65 channels Touch sensing AFE Triple power supply:

- VDD3/GND for Logic & I/O power (3V~3.6V)
- AVDD/AGND for analog circuit power (3V~3.6V)
- VDDH/VSSH for up to 18V TX scanning pulse generation

Single Chip Capacitive Sensing Controller for Large-Size Touch Panels

Pin-out Diagram



Pin Function Description

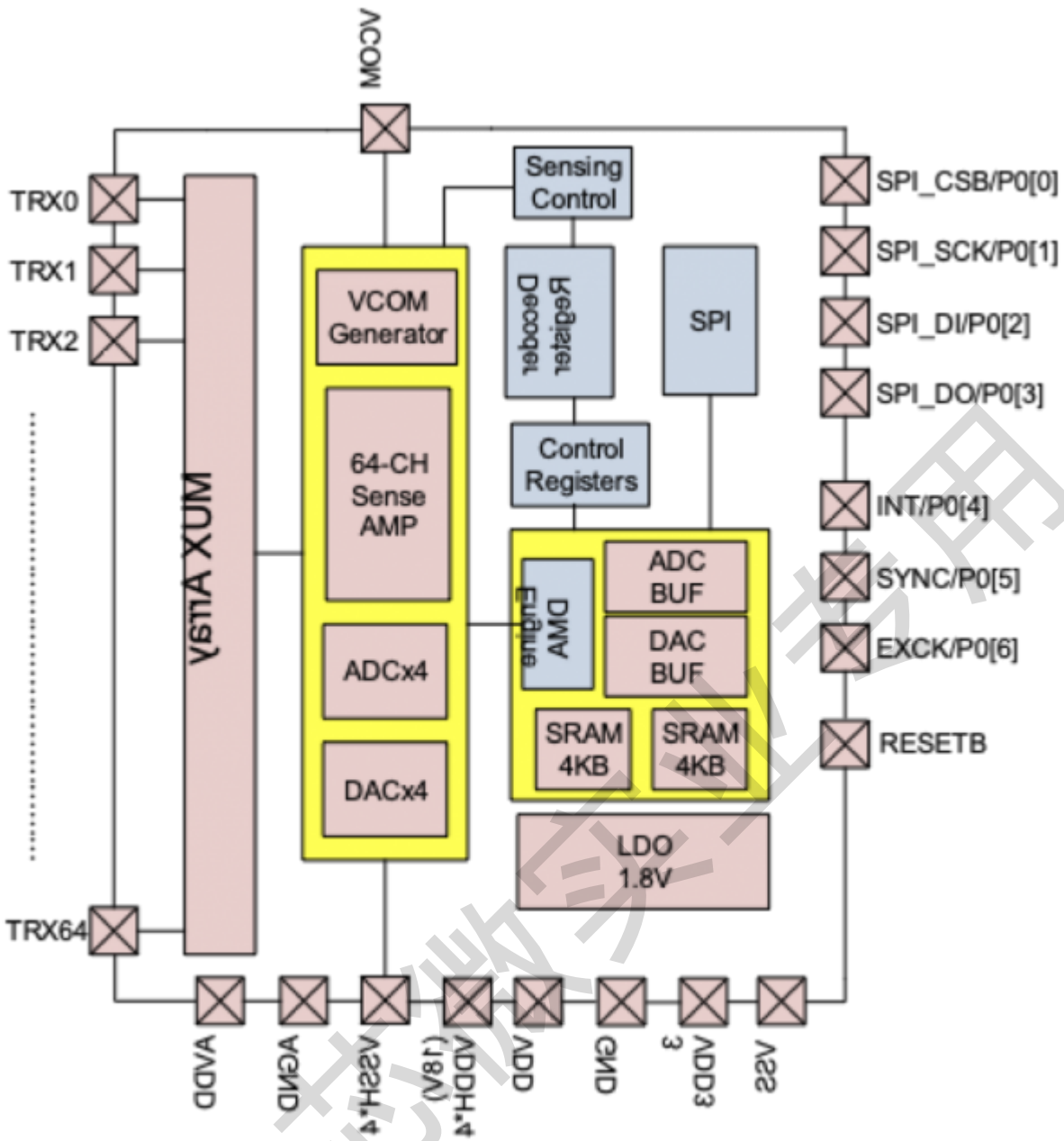
NAME	NUMBER	I/O	DESCRIPTION
TRX62	1	I/O	Capacitive Sensing Channel 62
TRX63	2	I/O	Capacitive Sensing Channel 63
TRX64	3	I/O	Capacitive Sensing Channel 64
VDDH	4	P	High Voltage Power Supply
RESETB	5	I	Low-active external reset (with internal pull up)
GND	6	G	3.3V Ground
EXCK	7	I	External clock input
SYNC	8	I/O	SYNC
INT	9	O	Interrupt
SPI_CSB	10	O	SPI enable (low active)
SPI_DI	11	I	SPI serial data in
SPI_SCK	12	I	SPI clock
SPI_DO	13	O	SPI serial data out
GPB_14	14	I/O	GPIO pin for I2C INT

NC	15	I/O	NC
NC	16	I/O	NC
GPA_11	17	I/O	I2C_1 CLK
GPA_10	18	I/O	I2C_1 DATA
NC	19	I/O	NC
GPD_10	20	I/O	GPIO pin as CLKOUT pin for TP5803
NC	21	I/O	NC
NC	22	I/O	NC
NC	23	I/O	NC
NC	24	I/O	NC
LDO_CAP	25	I/O	LDO Capacitor
VDD_D2	26	P	3.3V Power Supply
VDD3	27	P	3.3V Power Supply
GND	28	G	3.3V Ground
VDD1P8	29	P	1.8V Regulator Output
AGND	30	G	Analog Ground
AVDD_D1	31	P	Analog Power Supply
VCOM	32	A	Reference voltage
NC	33	I/O	NC
VSSH	34	G	High Voltage Ground
VSSH	35	G	High Voltage Ground
VDD	36	P	3.3V Power Supply
VDD	37	P	3.3V Power Supply
VSS	38	G	3.3V Ground
USB_VBUS	39	P	USB Power Supply
USB_VDD33_CAP	40	I/O	USB Power Capacitor
USB_DP	41	I/O	USB Data -
USB_DM	42	I/O	USB Data +
VSS	43	G	3.3V Ground
NC	44	I/O	NC
NC	45	I/O	NC
TRX0	46	I/O	Capacitive Sensing Channel 0
TRX1	47	I/O	Capacitive Sensing Channel 1
TRX2	48	I/O	Capacitive Sensing Channel 2
TRX3	49	I/O	Capacitive Sensing Channel 3
TRX4	50	I/O	Capacitive Sensing Channel 4
TRX5	51	I/O	Capacitive Sensing Channel 5
TRX6	52	I/O	Capacitive Sensing Channel 6
TRX7	53	I/O	Capacitive Sensing Channel 7
TRX8	54	I/O	Capacitive Sensing Channel 8
VDDH	55	P	High Voltage Power Supply
TRX9	56	I/O	Capacitive Sensing Channel 9
TRX10	57	I/O	Capacitive Sensing Channel 10
TRX11	58	I/O	Capacitive Sensing Channel 11
TRX12	59	I/O	Capacitive Sensing Channel 12
TRX13	60	I/O	Capacitive Sensing Channel 13

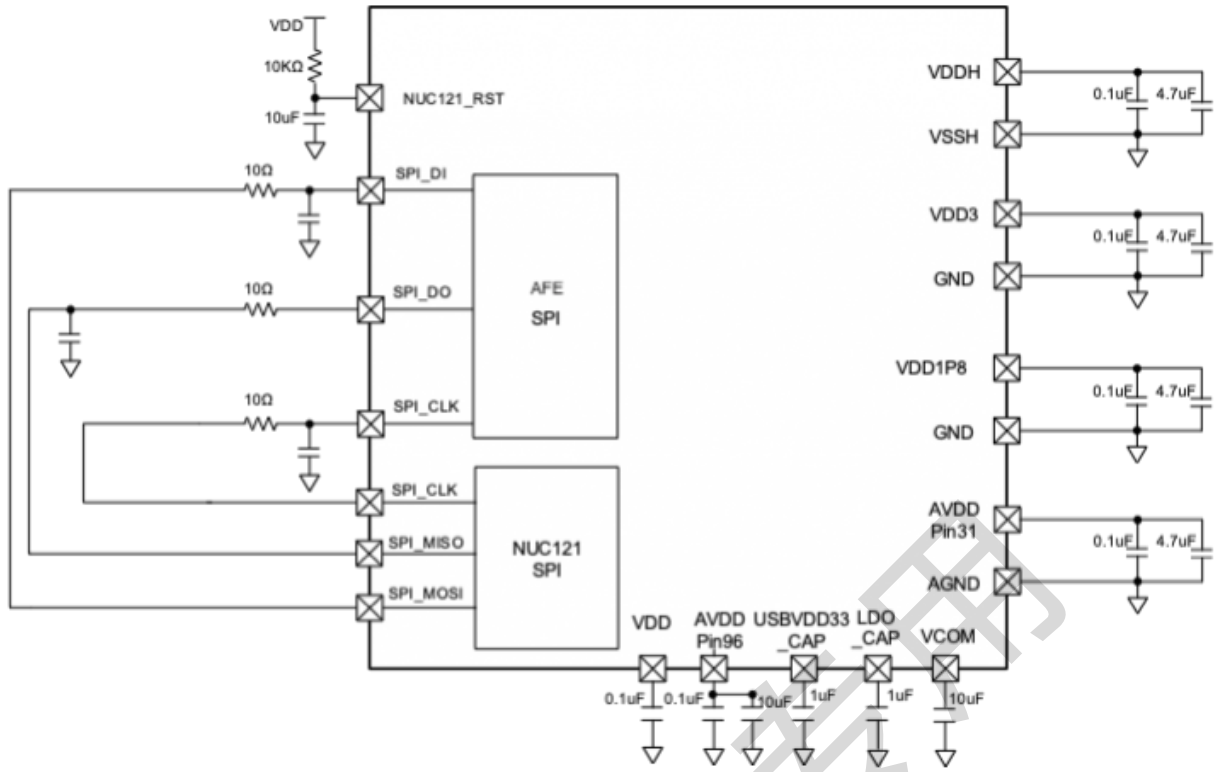
TRX14	61	I/O	Capacitive Sensing Channel 14
TRX15	62	I/O	Capacitive Sensing Channel 15
TRX16	63	I/O	Capacitive Sensing Channel 16
TRX17	64	I/O	Capacitive Sensing Channel 17
TRX18	65	I/O	Capacitive Sensing Channel 18
TRX19	66	I/O	Capacitive Sensing Channel 19
TRX20	67	I/O	Capacitive Sensing Channel 20
TRX21	68	I/O	Capacitive Sensing Channel 21
TRX22	69	I/O	Capacitive Sensing Channel 22
TRX23	70	I/O	Capacitive Sensing Channel 23
TRX24	71	I/O	Capacitive Sensing Channel 24
TRX25	72	I/O	Capacitive Sensing Channel 25
TRX26	73	I/O	Capacitive Sensing Channel 26
TRX27	74	I/O	Capacitive Sensing Channel 27
TRX28	75	I/O	Capacitive Sensing Channel 28
TRX29	76	I/O	Capacitive Sensing Channel 29
TRX30	77	I/O	Capacitive Sensing Channel 30
VDDH	78	P	High Voltage Power Supply
TRX31	79	I/O	Capacitive Sensing Channel 31
TRX32	80	I/O	Capacitive Sensing Channel 32
TRX33	81	I/O	Capacitive Sensing Channel 33
TRX34	82	I/O	Capacitive Sensing Channel 34
TRX35	83	I/O	Capacitive Sensing Channel 35
TRX36	84	I/O	Capacitive Sensing Channel 36
TRX37	85	I/O	Capacitive Sensing Channel 37
TRX38	86	I/O	Capacitive Sensing Channel 38
TRX39	87	I/O	Capacitive Sensing Channel 39
TRX40	88	I/O	Capacitive Sensing Channel 40
TRX41	89	I/O	Capacitive Sensing Channel 41
TRX42	90	I/O	Capacitive Sensing Channel 42
TRX43	91	I/O	Capacitive Sensing Channel 43
VSS	92	G	3.3V Ground
GPF_4	93	I/O	ICE DATA
GPF_5	94	I/O	ICE CLK
VSS	95	G	3.3V Ground
AVDD	96	P	Analog Power Supply
TRX44	97	I/O	Capacitive Sensing Channel 44
TRX45	98	I/O	Capacitive Sensing Channel 45
TRX46	99	I/O	Capacitive Sensing Channel 46
TRX47	100	I/O	Capacitive Sensing Channel 47
TRX48	101	I/O	Capacitive Sensing Channel 48
TRX49	102	I/O	Capacitive Sensing Channel 49
TRX50	103	I/O	Capacitive Sensing Channel 50
TRX51	104	I/O	Capacitive Sensing Channel 51
TRX52	105	I/O	Capacitive Sensing Channel 52

VDDH	106	P	High Voltage Power Supply
TRX53	107	I/O	Capacitive Sensing Channel 53
TRX54	108	I/O	Capacitive Sensing Channel 54
TRX55	109	I/O	Capacitive Sensing Channel 55
TRX56	110	I/O	Capacitive Sensing Channel 56
TRX57	111	I/O	Capacitive Sensing Channel 57
TRX58	112	I/O	Capacitive Sensing Channel 58
TRX59	113	I/O	Capacitive Sensing Channel 59
TRX60	114	I/O	Capacitive Sensing Channel 60
TRX61	115	I/O	Capacitive Sensing Channel 61
NC	116	I/O	NC
GPD_0	117	I/O	SPI0_SS for master
GPD_1	118	I/O	SPI0_CLK for master
GPD_2	119	I/O	SPI0_MISO for master
GPD_3	120	I/O	SPI0_MOSI for master
GPD_4	121	I/O	GPIO pin for TP external RESET pin
GPD_15	122	I/O	GPIO PIN for TP5803 INT control
GPF_0	123	I/O	External Crystal XT_OUT
GPF_1	124	I/O	External Crystal XT_IN
NUC121_RST	125	I/O	ICE and NUC121 External Reset pin
GND	126	G	3.3V Ground
VDD	127	P	3.3V Power Supply
GND	128	G	3.3V Ground

AFE Block Diagram



Application: decoupling capacitors and others



All Green Package(RoHS) LQFP128L-14mm*14mm*1.4mm

Ordering Information

Part name	Package Type	Package Dimension
TP5803	LQFP-128L	14mm * 14mm * 1.4mm

Absolute Maximum Ratings

Characteristic	Symbol	Min	Max	Unit	Note
Supply Voltage	VDD3 / AVDD	-	4.0	V	
Supply High Voltage	VDDH	-	22.0	V	
Electrostatic Discharge (HBM)	VESD_HBM	-5000	5000	V	
Electrostatic Discharge (MM)	VESD_MM	-500	500	V	

Caution: Stresses or exposure above the absolute maximum ratings may cause permanent damages to the device.

Electro-Static Discharge Sensitivity

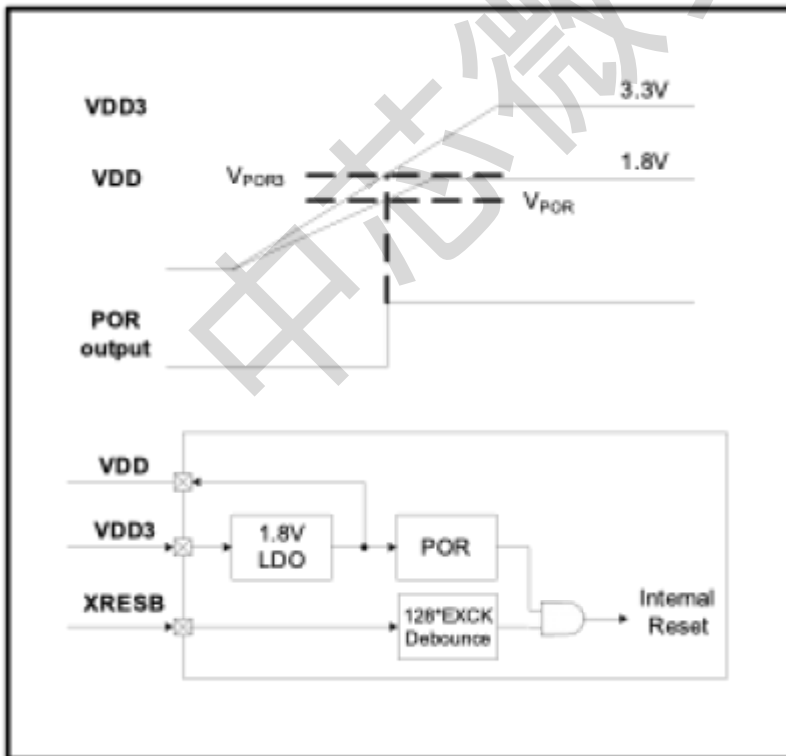
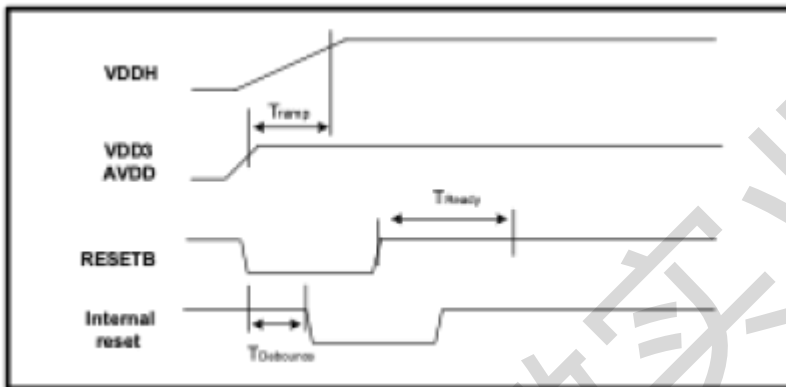
This integrated circuit can be damaged by ESD. It is recommended that all integrated circuits should be handled with proper precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure.

Operating Conditions

Characteristic	Symbol	Min	Max	Unit	Note
Supply Voltage	VDD3 / AVDD	3.0	3.6	V	
Supply High Voltage	VDDH	5	20.0	V	
Operating Temperature	TOPR	-40	85	°C	

Power-on Sequence

Characteristic	Sym	Condition	Min	Max	Unit
VDDH Ramp Up Time	Tramp	From 0.9*VDD3 to 0.9VDDH	50	-	us
Power On Reset voltage	VPOR	POR is low active only at the rising edge of VDD until VPOR	1.18	1.72	V
RESET De-bounce period	TDebounce	From RESETB falling to internal reset falling	EXCK*128		
TP5803 Ready period	TReady	From RESETB rising to TP5803 ready	EXCK*128		



DC Characteristics

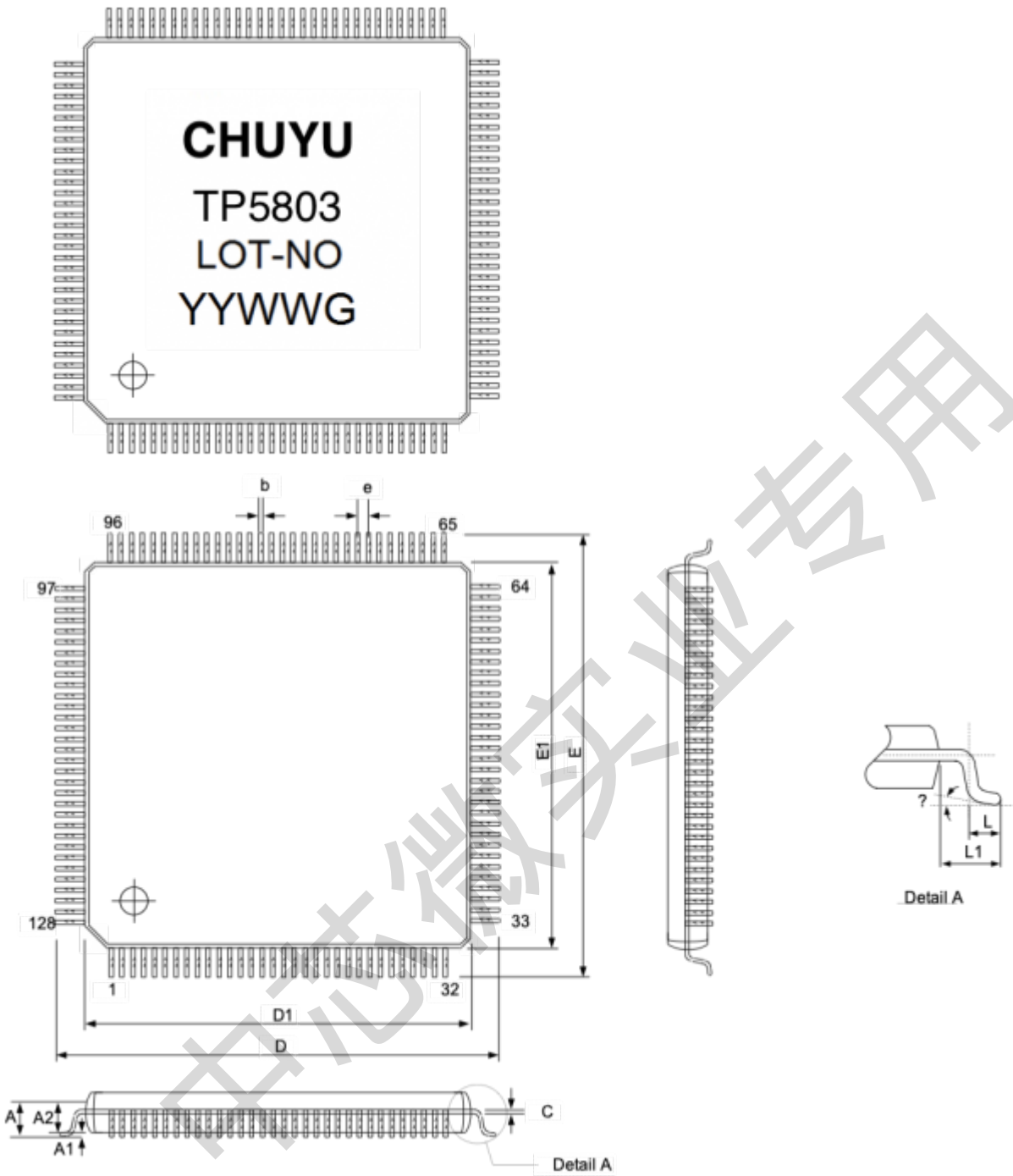
Characteristic	Sym	Condition	Min	Typ	Max	Unit
SYNC Input High Voltage	VIH		0.7*VDD3			V
SYNC Input Low Voltage	VIL				0.3*VDD3	V
Logic Inputs of SCK & SDI & CSB pins (SPI Interface)						
Input High Voltage	VIH		0.7*VDD3			
Input Low Voltage	VIL				0.3*VDD3	
Logic Inputs of EXCK / RESET						
Input High Voltage	VIH		0.7*VDD3			V
Input Low Voltage	VIL				0.3*VDD3	V
Logic Output of INT						
Output High Current	IOH	VDD3=3.3V & VOH=2.4V	-	10	-	mA
Output Low Current	IOL	VDD3=3.3V & VOL=0.4V	-	10	-	mA
Analog Output of VCM						
Output Voltage	VVCM			0.5*AVDD		V
Drive current	IVCM		30	50	70	uA
EXCK Frequency						
EXCK frequency	EXCK				24	MHz
Current Consumption (EXCK=24MHz, SCK=50MHz, AVDD/VDD3 = 3.3V, VDDH=18V, TX output with 8pF loading)						
AVDD current consumption	IAVDD	A2H=0x11h, A3H=0x01h,others sensing control register value are default		20		mA
VDD3 current consumption	IVDD3	A2H=0x11h, A3H=0x01h,others sensing control register value are default		3		mA
VDDH current consumption	IVDDH	A2H=0x11h, A3H=0x01h,others sensing control register value are default		1		mA

VCM stable time (TVCM) is depended on the capacitance size on application board. $TVCM = CVCM * VVCM / IVCM$.

I/O Status and Input pull up Resistor

Pin Name	After reset (POR)	SPI SS Active (Low)	Pull up Resistor
SPI_CS	Input	Input	100K ~ 200K
SPI_CLK(50M)	Input	Input	
SPI_DI	Input	Input	100K ~ 200K
SPI_DO	Input	Output	
INT	Output	Output	
SYNC	Input	Output	100K ~ 200K
EXCK(24M)	Input	Input	
RESETB	Input + schmitt	Input + schmitt	

Package Outline (LQFP-128L, 14mm*14mm*1.4mm, pitch 0.4mm)



SYMBOLS	MIN	NOM	MAX
A	-	-	1.60
A1	0.05	-	0.15
A2	1.35	1.40	1.45
b	0.13	0.16	0.23
c	0.09	-	0.20
D	16.00 BSC		
D1	14.00 BSC		
E	16.00 BSC		
E1	14.00 BSC		

SYMBOLS	MIN	NOM	MAX
e	0.40 BSC		
L	0.45	0.60	0.75
L1	1.00 BSC		
θ	0°	3.5°	7°

limitation

- 芯片存储空间8k只支持到64个通道，而且数据量必须小于等于23*41；
- 使用此芯片设计板卡，需要触宇Review设计原理图。

中芯微实业专用

联系方式



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