

LKT4101

8-BIT ENCRYPTION MICROCONTROLLER

DATA SHEET

Revision 0

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FEATURES

CPU

- 80X51 industry standard
- Accelerated architecture with 16 bit CPU performance level
- Up to 40 MHz internal CPU clock

Memory Allocation

- 52K-Bytes for user data area
- 2048 bytes RAM (256B Local RAM + 1792B XRAM)

Flash Operations

- Min. 100,000 erase/write cycles
- Min. 10 years data retention

Data Security

- Hardware Random Number Generator FIPS140-2
- Unique chip identification number
- Notification of tampering
- IC operates under regulated voltage and internal clock
- Combined HW/SW DPA/SPA resistance mechanisms
- Under / Over voltage sensors (Vcc)
- Dynamic RAM data encryption
- Security optimized layout

MPU (Memory Protection Unit)

- Individual protection attributes up to 8 separate regions

Serial I/O Interface (UART)

- Asynchronous half-duplex serial interface which conforms to ISO 7816-3
- One hardware UART supporting T=0 and T=1

Parity/CRC calculator

- Parity calculator for 8/16/32 bit
- CRC-16/32 calculator

Clock Controller

- External Clock
- Internal RC clock

Reset

- Power-on reset and external reset
- Power-on reset flag

Operating Characteristics

- Single power supply: 3.0V- 5.0V \pm 10%
- Operating frequency: 1 to 5MHz (External clock @class A/B.)
- Operating temperature: -25°C - $+85^{\circ}\text{C}$
- > 4 kV ESD Protection HBM

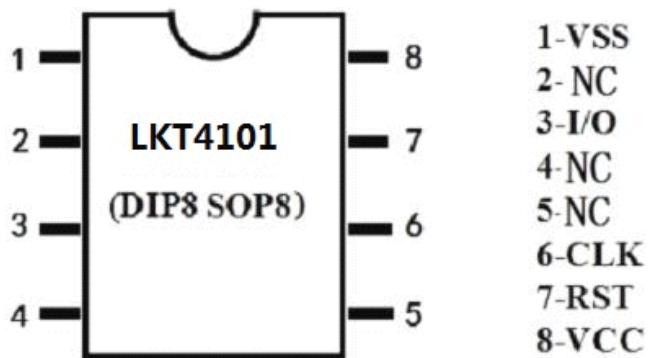
Operating Current

- Idle and Stop mode selectable modes
- NVM update operation with CPU in idle mode
- IO Transmission and Reception with CPU in idle mode
- Max Idle current / Clock stopped: 100 μA

PIN ASSIGNMENTS

Table 1. LKT4101 Pin Descriptions

Pin Number	Pin Name	Function Description	Pin Type
C1	Vss	Ground	---
C2	NC	No connection	---
C3	I/O	Serial data input and output pin	Input/output
C4	NC	No connection	---
C5	NC	No connection	---
C6	CLK	External clock input	input
C7	RST	System reset input	input
C8	Vcc	Power input	----



Technical Data

Absolute Maximum Ratings

Parameter	Symbol	Limit Values			Unit
		min	typical	max	
Supply Operating Volt	V_{cc}	-0.3		6	V
Voltage at remaining pin	V_{pin}	$V_{ss} - 0.3$		$V_{cc} + 0.3$	V
Power dissipation	P_{tot}			+60	mW
Storage temperature	I_{cci}	-40		+125	°C

DC Characteristics

Parameter	Symbol	Limit Values			Unit
		min	typical	max	
Operating temperature	T_A	-25		+85	°C
Supply Voltage Class A,B	V_{cc}	2.7	3 / 5	5.5	V
Supply Current Class B	I_{cc}			6 (Note 1)	mA
Supply Current idle	I_{cci}			200 (Note 2)	μA
Supply Current stopped	I_{ccs}			100 (Note 3)	μA

Note 1: The supply current refers to clock frequency of 5 Mhz

Note 2: The supply current at 3.3V and a clock frequency of 1 Mhz, at +25 °C

Note 3: The supply current at 3.3V and +25 °C

IO pin:

Parameter	Symbol	Conditions	min	max	Unit
H input voltage	V_{IH}	$I_{IHmax} = \pm 20 \mu A$	$0.7 * V_{cc}$	V_{cc}	V
L input voltage	V_{IL}	$I_{ILmax} = \pm 20 \mu A$	-0.3	0.8	V
H output voltage (Note 1)	V_{OH}	$I_{OHmax} = +20 \mu A$	$0.7 * V_{cc}$	V_{cc}	V
L output voltage	V_{OL}	$I_{OLmax} = -1 mA$	0	0.4	V
Rise Fall Time	t_r, t_f	$C_{IN} = C_{OUT} = 30 pF$		1	μS

NOTE 1: Assumes 20KΩ Pull up resistor on interface device

Clock (CLK)

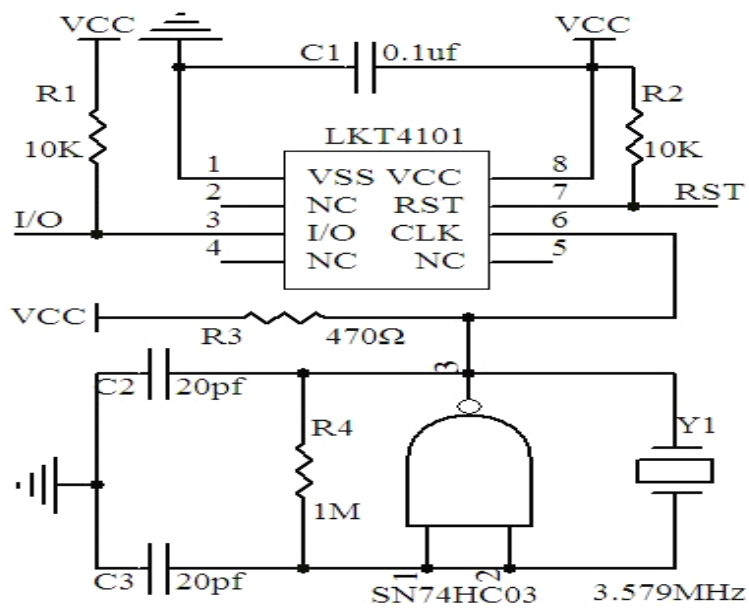
Parameter	Symbol	Condition	Min	Max	Unit
H output voltage	V_{OH}	$I_{OHmax} = +20 \mu A$	$V_{cc} - 0.7$	V_{cc}	V
L output voltage	V_{OL}	$I_{OLmax} = -20 \mu A$	0	0.5	V
Rise Fall Time	t_r, t_f	$C_{IN} = C_{OUT} = 30 pF$		9% CLK period	

Reset(RST)

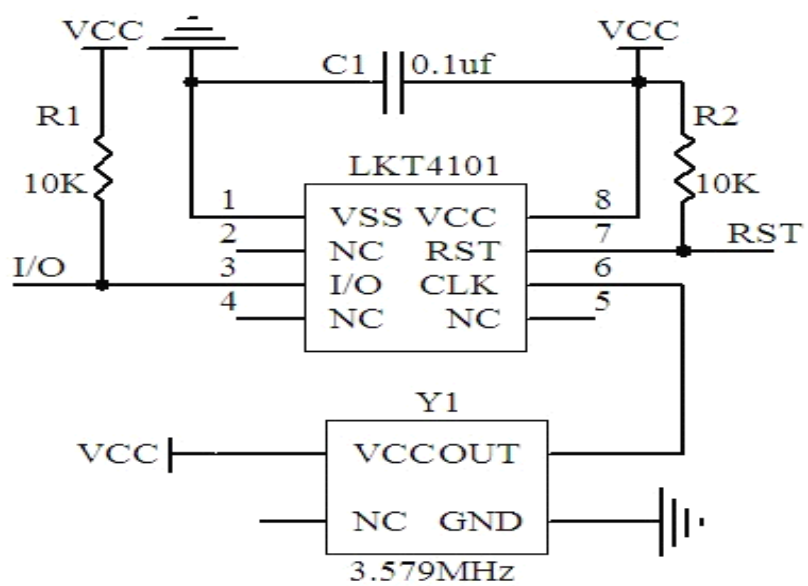
Parameter	Symbol	Condition	Min	Max	Unit
H output voltage	V_{OH}	$I_{OHmax} = +20 \mu A$	$V_{cc} - 0.7$	V_{cc}	V
L output voltage	V_{OL}	$I_{OLmax} = -20 \mu A$	0	0.6	V
Rise Fall Time	t_r, t_f	$C_{IN} = C_{OUT} = 30 pF$		400	μs

Typical Application Circuits

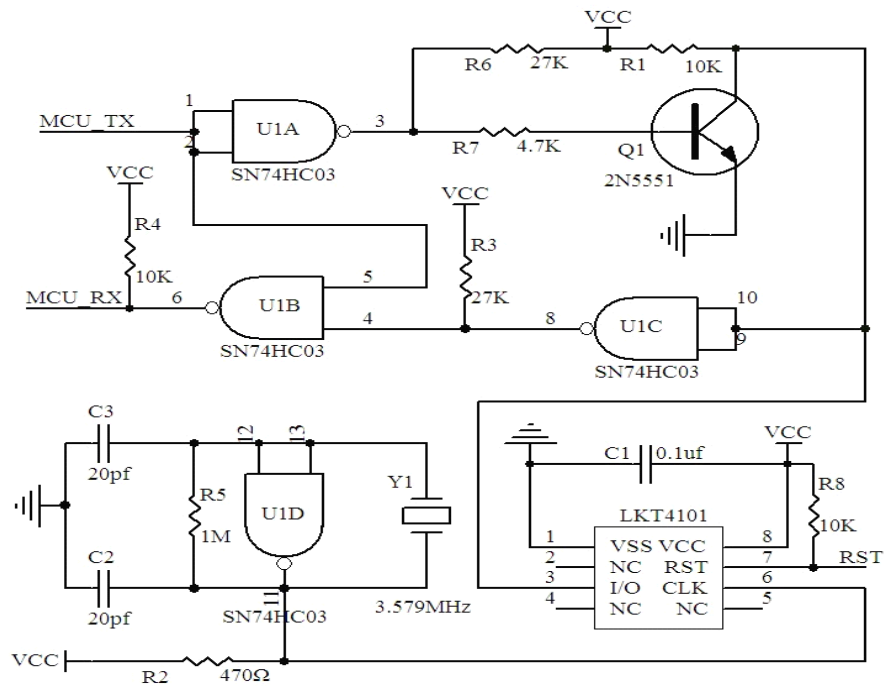
I/O simulation uart serial communication (Passive crystal)



I/O simulation uart serial communication (Active crystal)



5. Using the uart interface (Passive crystal)



LKT4101 sop8 package specification

