Low Power Loss Zero-Crossing Detector In SOT23-3

DESCRIPTION

ETA5001 is a special chip for zero-crossing detection circuit by detecting input voltage. When input line voltage is less than threshold, ETA5001 drives the optical coupling chip, providing zero-crossing detection signal to application control system, while the input voltage is greater than the threshold, the output presents high resistance.

ETA5001 has extremely low power consumption, a quiescent current of less than 10 μA, so that most of the electrical energy is used to drive the optocoupler to obtain a wide zero-crossing detection pulse to make it easier to be detected by the system. A schmitt flip-flop is used in IN pin, the high level is 2.5V, the low level is 0.6V, Internal hysteresis also makes ETA5001 easier to filter the glitch on the power line and effectively prevent error zero-crossing detection caused by noise on power line signal.

A rectifier diode is integrated inside ETA5001, rectifying the input voltage to provide power supply for IC and optocoupler with only a capacitor, a zener diode is also integrated at input terminal to limit the maximum volatge, overall solution requires only a few peripheral devices.

ETA5001 is available in SOT23-3.

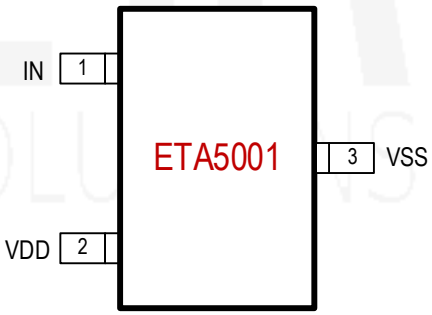
FEATURES

- Low I_Q<10uA
- Effectively Prevent Power Line Noise
- Integrate Rectifier Diode
- Integrate Zener Diode
- Require Less Peripheral Devices

APPLICATIONS

- PLC
- Power Equipment Access
- Domestic Appliance
- RGB Lighting Synchronous Control

PIN CONFIGURATION



SOT23-3

ORDERING INFORMATION

PART No.	PACKAGE	TOP MARK	Pcs/Reel
ETA5001S2D	SOT23-3	FIYW	3000

ABSOLUTE MAXIMUM RATINGS

(Note: Exceeding these limits may damage the device. Exposure to absolute maximum rating conditions for long periods may affect device reliability.)

V_{IN} Voltage .....0V to 7V

Current On V_{DD} (I_{DD}).....0mA to 10mA

V_{DD} Voltage .....-0.5V to 7V

Current On GND (I_{GND}).....10 mA

Operation Temperature.....-40°C to 85°C

Thermal Resistance θ_{JA}

SOT23-3.....300..... °C/W

Storage Temperature.....-55°C to 150°C

Lead Temperature (Soldering 10sec) .....260°C

ESD HBM (Human Body Mode).....2KV

ELECTRICAL CHARACTERISTICS

(V_{IN} = V_{OUT}+1V, unless otherwise specified. Typical values are at TA = 25°C.)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage Range (1)		3	5	5.5	V
Input Voltage Range HYS			1.2		V
Quiescent Current, I_{DD}	VIN=5V			10	μA
Discharge Current, I_{DIS}	VDD=5V, IN=VSS	2	2.4	2.8	mA
Vin detect threshold			167		mV
Output Voltage Delay Time			200		ns

PIN DESCRIPTION

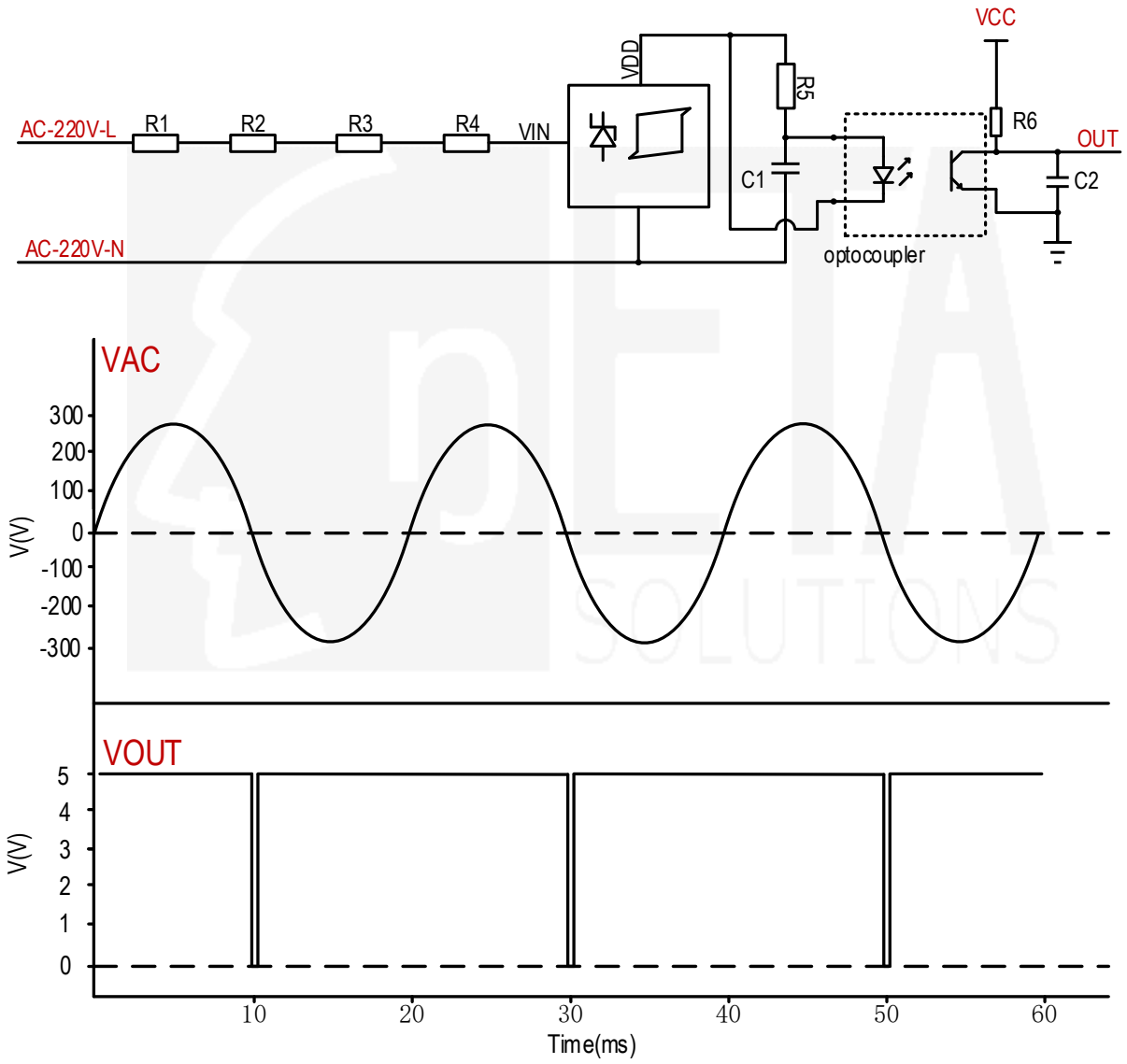
PIN	NAME	DESCRIPTION
1	IN	Input Voltage Detection Pin
2	VDD	Power Supply, Connect to the negative of LED
3	VSS	Ground Pin

Typical Application Circuit

ETA5001 can realize zero-crossing detection of power line by circuit shown in figure 2.C1 is used to storage energy for electrical energy for chips and optocoupler.

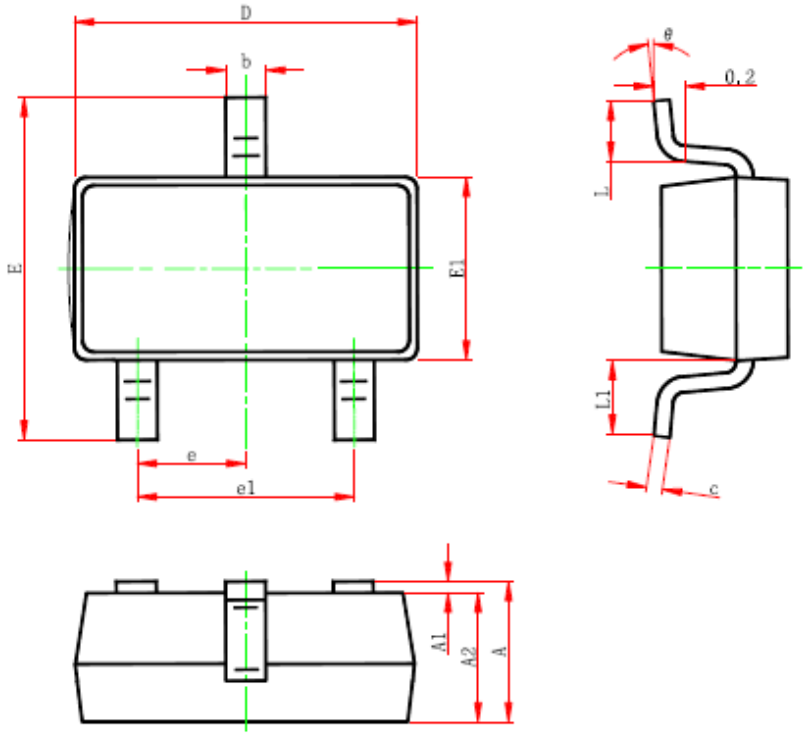
Note: C1, a typical 56 nF, recommendation of no more than 100 nF.R1,R2,R3,R4 can use as typical 750K.R5 use 4.7K.R6 use 10K.C2 use 1nF.

While VIN>Vth, C1 is charged by VIN through integrated rectifier diode, While VIN<Vth, The AC input is near zero-crossing point, VDD discharge path is opened. The energy stored on the C1 is released through the optocoupler light emitting diode, producing zero crossing pulse at output pin.



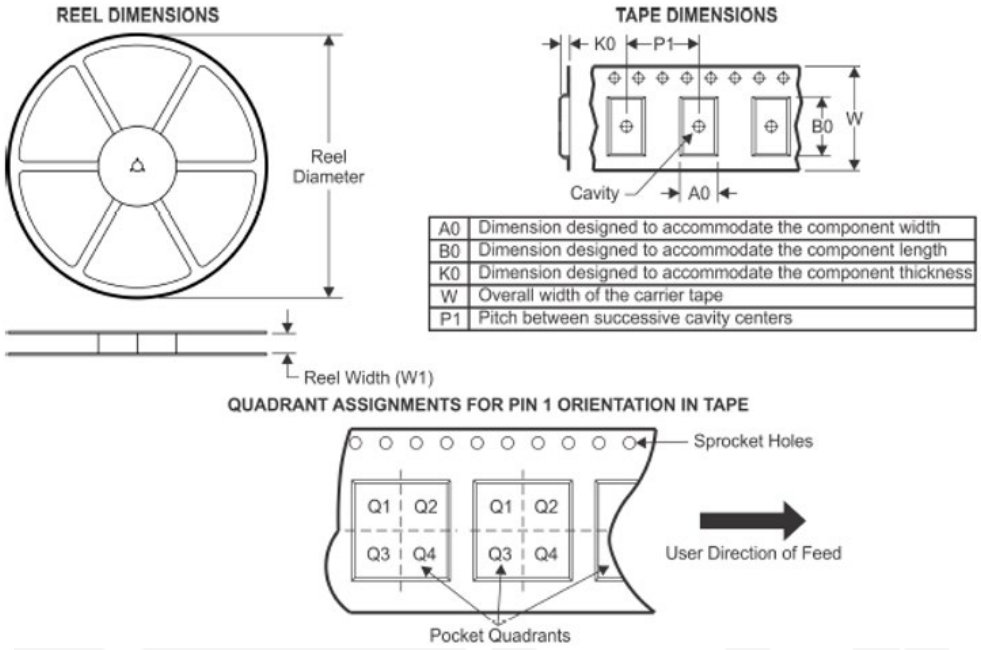
PACKAGE OUTLINE

Package: SOT23-3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
L1	0.600REF.		0.024REF.	
θ	0°	8°	0°	8°

TAPE AND REEL INFORMATION



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

Device	Package Type	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
ETA5001S2D	SOT23-3	3	3000	180	9.5	3.18	3.28	1.32	4	8	Q3