

# IZ5851V

## CMOS 4-BIT SINGLE-CHIP APPLICATION-ORIENTED MICROCOMPUTER WITH LCD DRIVER

(prototype LC5851N SANYO).

### DESCRIPTION

The IZ5851 is a CMOS 4-bit single chip microcomputer that operate on low voltage, very low current and contain LCD drivers.

It also contain a 4 bit parallel processing ALU, a program memory ROM, data memory (RAM),input & output port, Timer, many LCD segments outputs,

a prescaler, and a clock generator. A total of 79 instruction, including the operation and processing instructions executable in 4 bits units, various conditional branch instructions and LCD drivers data transfer instructions, from an easy-to-use and effective instruction system.

### FEATURES

- |  |   |                         |                      |
|--|---|-------------------------|----------------------|
| • Supply voltage<br>(Mask option selectable) | 1.5 or 3 V  | • ROM                   | 1024 × 15 bit        |
| • Current dissipation                        | 5.0 μA Typ<br>(Ag Battery ,32 kHz<br>crystal oscillation) | •RAM                    | 64 × 4 bit           |
| • Output pins for LCD drive                  | 25  | • Cycle Time<br>crystal | 32.768 kHz<br>:244μs |
| • Input port pin                             | 2 ports/8 pins  | • Instruction set       | 79 instructions      |
| • Input/Output port pin                      | 2 ports/8 pins  | • Interrupt function .  |                      |
| • Output port pin                            | 1 ports/4 pins  | .. External source      | 2                    |
| • Control output terminal                    | 2 pins  | .. Internal source      | 2                    |

### ABSOLUTE MAXIMUM RATINGS (V<sub>DD</sub> = 0V, T<sub>a</sub>=25°C)

Item	Symbol	Condition/Terminal	Rating	Unit
Maximum Supply Voltage	V <sub>SS1</sub>		-4.0	V
	V <sub>SS2</sub>		-4.0	V
Maximum input Voltage	V <sub>in1</sub>	S1-4,M1-4,I/OA1-4,I/OB1-4,INT,TESTA,OSCIN,RES,BAK	V <sub>SS1</sub> -0.3	V
Operating Temperature	T <sub>a</sub>		-0 ~ + 55	°C
ESD (HBM)			200	V

### ALLOWABLE OPERATING CONDITIONS (T<sub>a</sub> = 25°C, V<sub>DD</sub> = 0V)

Item	Symbol	Condition/Terminal	min	max	Unit
Supply Voltage	V <sub>SS1</sub>	V <sub>BAK</sub> =V <sub>SS1</sub>	-1.65	-1.3	V
	V <sub>SS2</sub>		-3.3	-2.4	V
Input H-level Voltage	V <sub>ih</sub>	S1-4,M1-4,I/OA1-4,I/OB1-4,INT	-0.2	0	V
Input L-level Voltage	V <sub>il</sub>	S1-4,M1-4,I/OA1-4,I/OB1-4,INT	V <sub>SS1</sub>	V <sub>SS1</sub> +0.2	V
Operating Frequency	f <sub>op</sub>	T <sub>a</sub> = 0 ~ + 55°C	32	33	kHz

## IZ5851V

### **ELECTRICAL CHARACTERISTICS** at Ta=25+-2°C VDD=0V

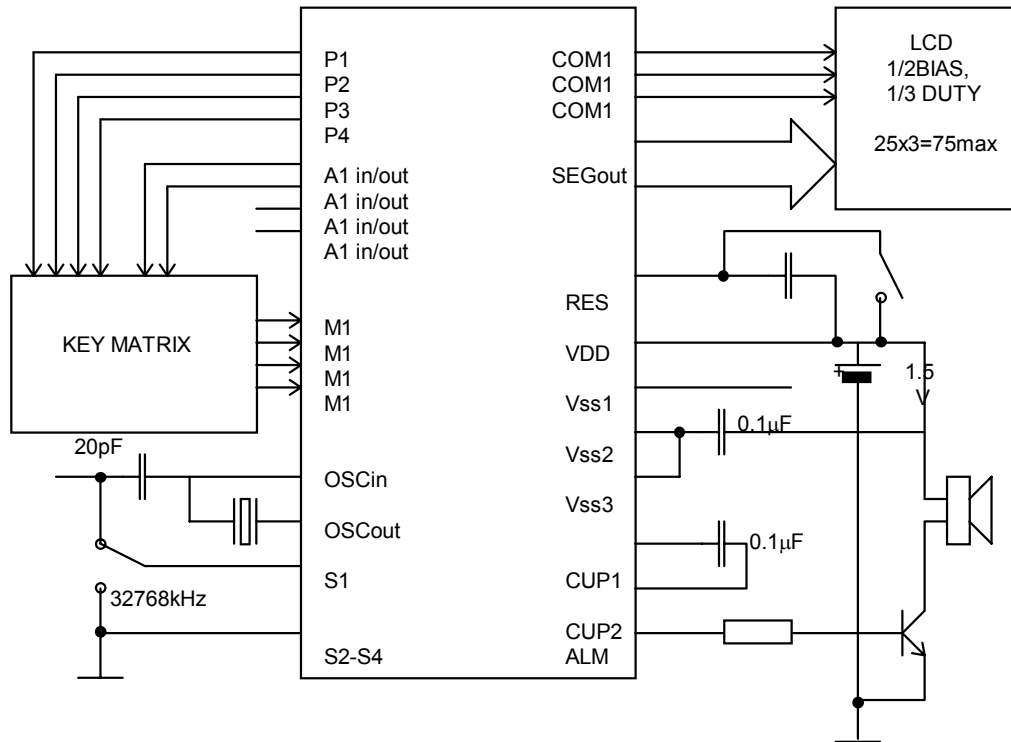
Item	Symbol	Condition/Terminal	min	max	Unit
Input Resistance	Rin1B	Vss1=-1.55V.pull-down resistor	200	2000	KΩ
	Rin2A	Vss1=-1.55V.pull-up resistor Vih=Vss1 INT	200	2000	KΩ
	Rin3	Vss1=-1.55V.pull-down resistor Vih=Vdd for RES	5	50	KΩ
Output H-level Voltage	Voh1	Vss1=-1.35V.ALM.LIGHT Ioh=-250mkA	-0.65		V
Output L-level Voltage	Vol1	Vss1=-1.35V.ALM.LIGHT Iol=250mkA		Vss1+0.65	V
Output H-level Voltage	Voh2	Vss1=-1.55V.I/OA1-4,I/OB1-4,P1-4 Ioh=-20mkA	-0.2		V
Output L-level Voltage	Vol2	Vss1=-1.55V.I/OA1-4,I/OB1-4,P1-4 Iol=20mkA		Vss1+0.2	V
Output H-level Voltage	Voh3	Vss1=-1.55V.all SEGOUTs Ioh=-0.4mkA	-0.2		V
Output L-level Voltage	Vol3	Vss1=-1.55V.all SEGOUTs Iol=0.4mkA		Vss2+0.2	V
Output H-level Voltage	Voh4	Vss1=-1.55V.COM1.COM2.COM3 Ioh=-4mkA	-0.2		V
Output L-level Voltage	Vol4	Vss1=-1.55V.COM1.COM2.COM3 Iol=4mkA		Vss2=0.2	V
Output M-level Voltage	Vom	Vss1=-1.55V.COM1.COM2.COM3 Iol=4mkA,Ioh=-4mkA	Vss1-0.2	Vss1+0.2	V
Output voltage LCD Lighting:1/3Bias Method (doubler)	Vss2	Vss1=-1.35V.fopg=32.768KHz C1=C2=0.1μF		-2.5	V
Supply Current	Idd	Vss1=-1.55V.HALT mode C1=C2=0.1μF,Rs=25 KΩ Cg=20pF,32.768KHz X'tal		10	μA
Oscillation Start Voltage Vss1	Vstt	Cg=20pF Rs=25 KΩ,32.768KHz X'tal		-1,35	V
Oscillation Hold Voltage Vss1	Vhold	Cg=20pF Rs=25K Ω 32.768KHz X'tal	-1,6	-1,3	V
Oscillation Start Time	Tstt	Vss1=-1.35V. Rs= 25K Ω 32.768kHz X'tal		10	sec

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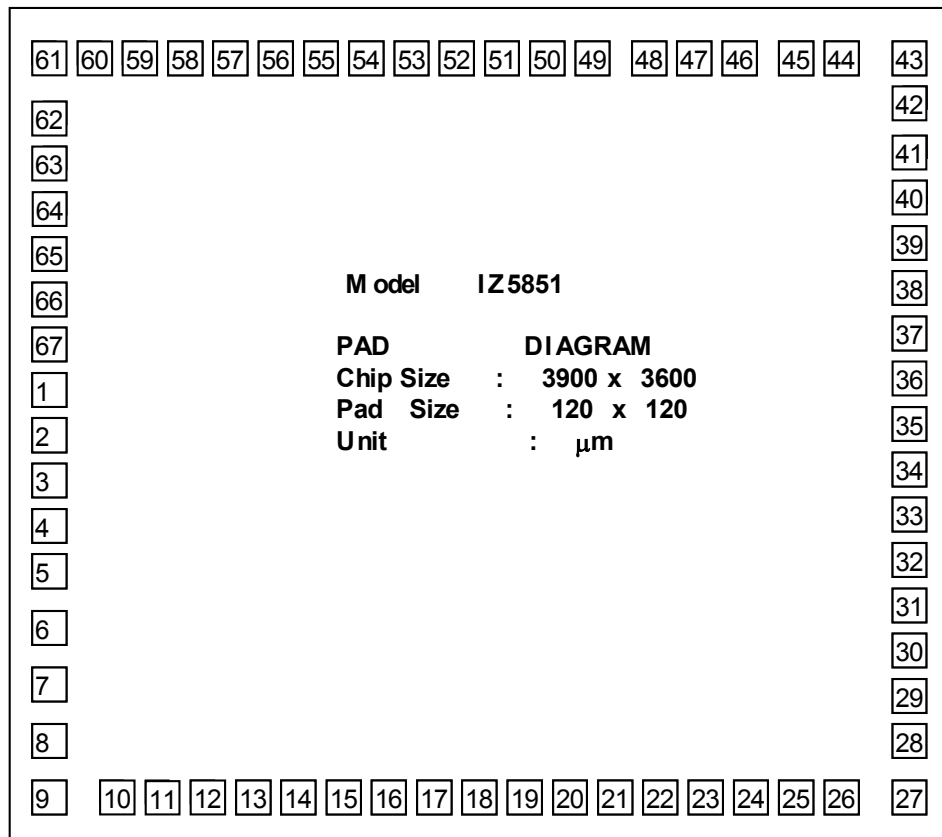
### TERMINAL DESCRIPTION

Terminal Name	Function
OSCIN	Terminals for crystal oscillator
OSCOU	Terminals for crystal oscillator
10P	Used as an oscillation phase compensating
S1 - S4	Input-only port
M1 - M4	Input terminals for writing data in RAM
I/O B1 I/O B2 I/O B3 I/O B4	Input/output port
I/O A1 I/O A2 I/O A3 I/O A4	Input/output port
P1 - P4	Output-only port
INT	Control input port for external interrupt request
BAK	Supply voltage terminal for the logic section of LSI circuit
LIGHT	Suitable for delivering signal to drive high-current driving transistor
ALM	Output-only port
RES	System reset terminal
Vdd	Supply voltage terminal(+)
Vss1	Supply voltage terminal(-)
Vss2 Vss3	Terminals are used as the source supply for the LCD drivers
CUP1 CUP2	Connection terminals for voltage doubler capacitor
COM1 COM2 COM3	Output terminal for common plate of LCD
SEGMENT drivers	Output for LCD
TEST TEST TESTA TEST	Terminal for test (not used by the users)

# IZ5851V



## PAD DIAGRAM



**PAD LOCATION**

PAD N	PAD NAME	X	Y	PAD N	PAD NAME	X	Y	PAD N	PAD NAME	X	Y
1	Vdd	215	1689	24	M2	3045	237	47	SEG8	2810	3360
2	BAK	224	1509	25	M3	3225	237	48	SEG9	2630	3360
3	Vss1	224	1329	26	M4	3405	237	49	SEG10	2450	3360
4	Vss2	224	1149	27	TESTA	3677	237	50	SEG11	2270	3360
5	ALM	224	964	28	TEST	3677	414	51	SEG12	2090	3360
6	LIGHT	224	784	29	CUP1	3677	604	52	SEG13	1910	3360
7	S4	224	595	30	CUP2	3677	779	53	SEG14	1730	3360
8	S3	224	420	31	S2	3677	959	54	SEG15	1550	3600
9	A1	224	237	32	S1	3677	1141	55	SEG16	1370	3360
10	A2	520	237	33	Vdd	3677	1327	56	SEG17	1190	3360
11	A3	714	237	34	OSCIN	3677	1506	57	SEG18	1010	3360
12	A4	880	237	35	10P	3677	1687	58	SEG19	830	3360
13	B1	1074	237	36	OSCOUT	3677	1872	59	SEG20	650	3360
14	B2	1241	237	37	COM1	3677	2055	60	SEG21	470	3360
15	B3	1433	237	38	SEG1	3677	2242	61	SEG22	290	3360
16	B4	1600	237	39	SEG2	3677	2422	62	SEG23	247	2882
17	RES	1784	237	40	SEG3	3677	2602	63	SEG24	229	2628
18	INT	1965	237	41	SEG4	3677	2783	64	SEG25	229	2367
19	P1	2147	237	42	TEST42	3677	3180	65	COM3	224	2235
20	P2	2325	237	43	TEST43	3677	3360	66	COM2	224	2050
21	P3	2505	237	44	SEG5	3350	3360	67	Vss3	224	1865
22	P4	2705	237	45	SEG6	3170	3360				
23	M1	2865	237	46	SEG7	2990	3360				