



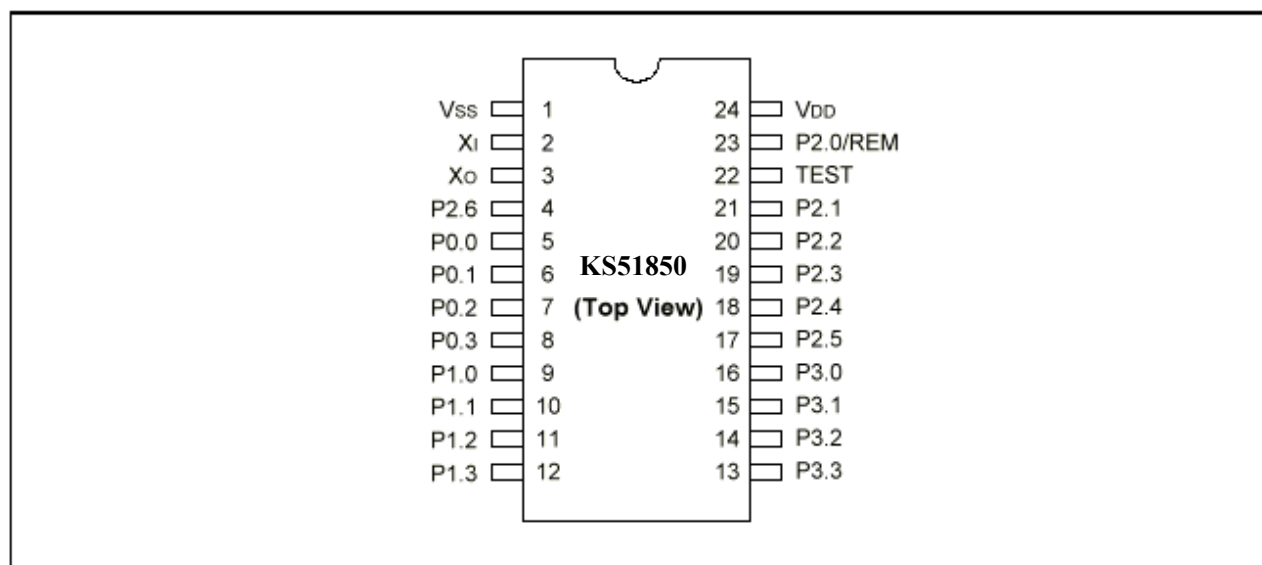
# KS51850 遥控片功能说明

二〇〇二年八月十七日

## 遥控集成电路主要特点

- 具有SANYO、NEC、TOSHIBA和PHILIPS四种发射格式
- 最多64个按键
- 带“F”键
- 带双键（SANYO、TOSHIBA、NEC发射格式）
- 内核采用韩国三星公司的单片机KS51850
- 程序容量           1,024 bytes
- 指令周期           13.2  $\mu$ sec at f<sub>xx</sub> = 455 KHz
- 发射载波频率       37.9KHz
- 工作电压            1.8 V-3.6 V (f<sub>osc</sub> = 455 KHz)
- 功耗                 Halt mode: 1  $\mu$ A (maxium)  
Normal mode: 0.5 mA (typical)
- 片内复位电路
- 工作温度范围       - 20 °C to 85 °C
- 封装形式            24 SOP

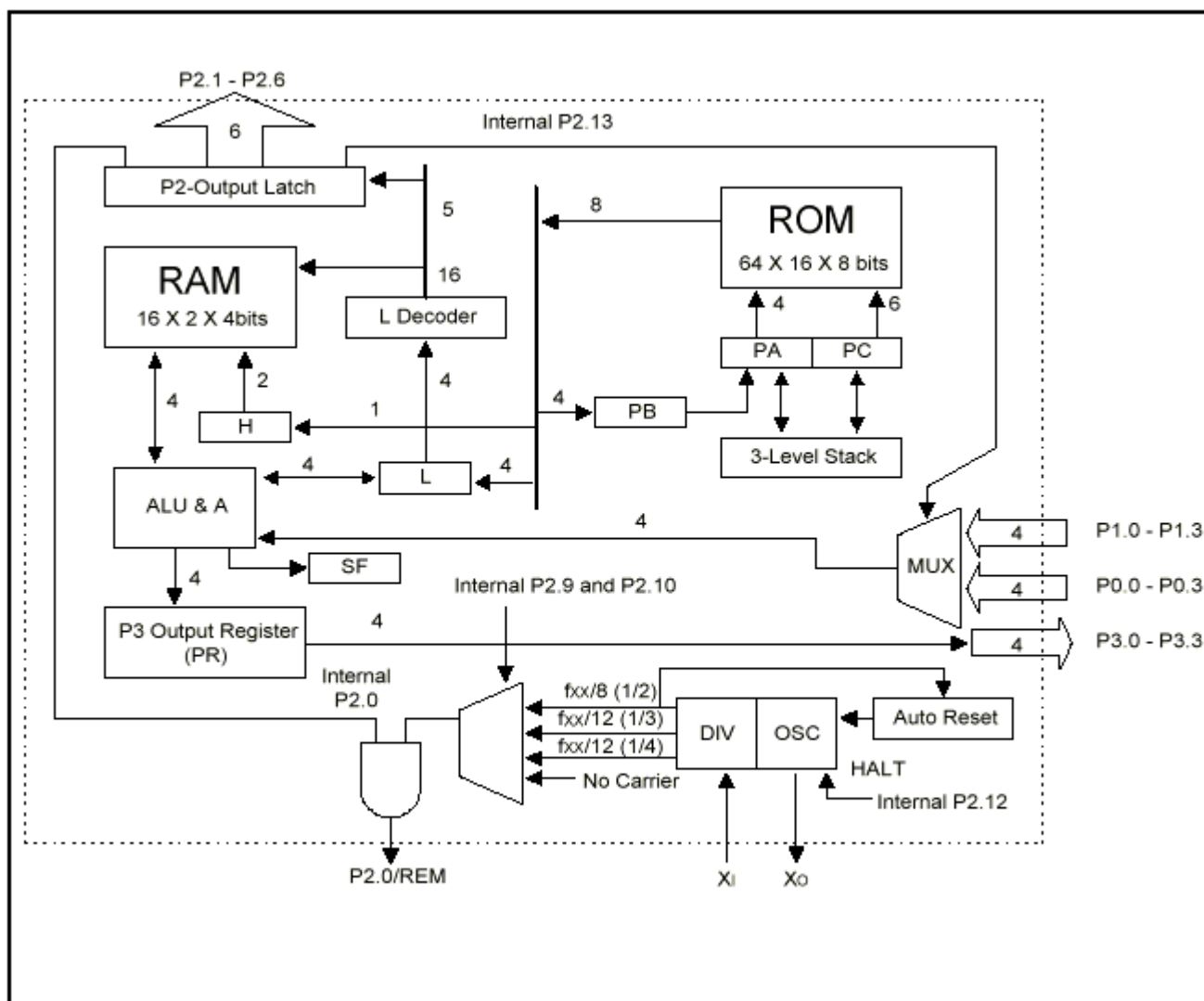
## 管脚排列



## 管脚说明

P2.0/REM	遥控信号输出
P2.1、P2.6	客户码选择输出
P2.2-P2.5	键盘扫描输出
P3.0-P3.3	键盘扫描输出
P1.0-P1.3	键盘扫描输入
P0.0-P0.3	键盘扫描输入
XI,XO	震荡器输入输出
TEST	测试端, 接地
VSS,VDD	电源

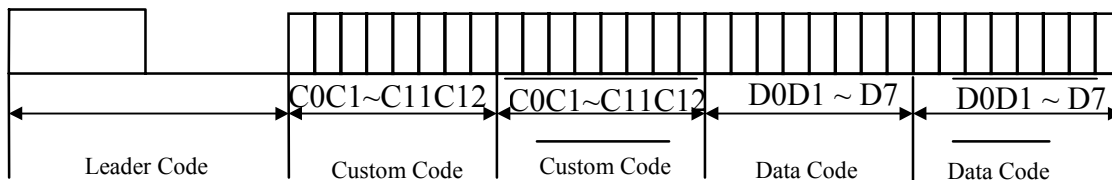
## 单片机内部电路框图



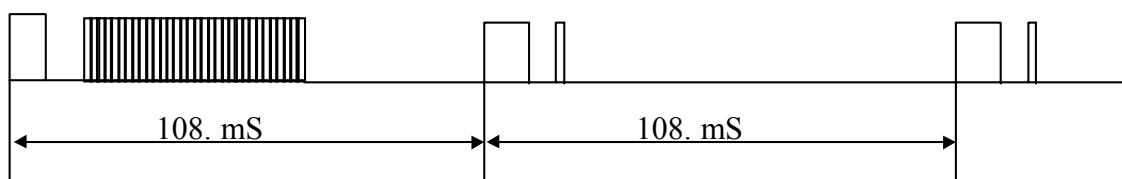


## 遥控数据

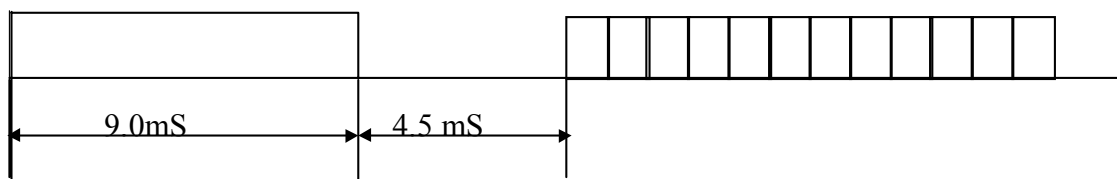
## I、SANYO 码遥控数据输出格式 (fosc=455KHz)



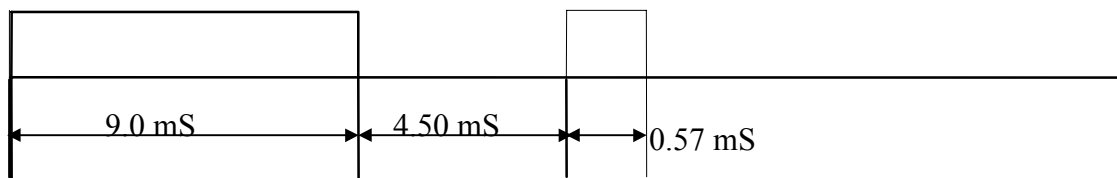
## A. 连续码周期:



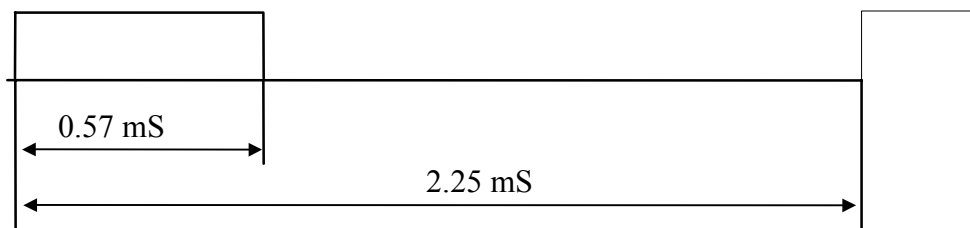
## B. 头码时间:



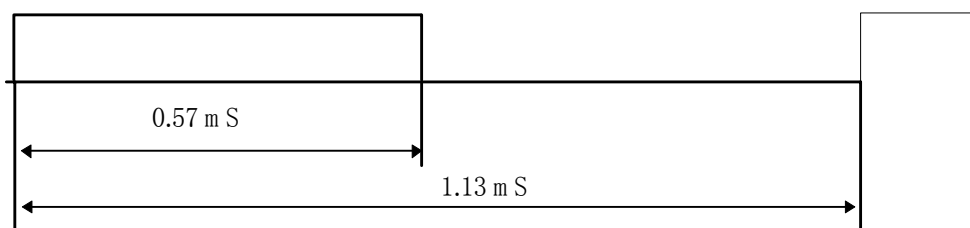
## C. 连续头码时间:



## D. 数据码“1”的时间:



## E. 数据码“0”的时间:





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## 键盘数据编码 (SANYO 格式 011DH 客户码)

功能	按键	客户码	数据码	“F”+数据码	按键	客户码	数据码	“F”+数据码
	K1	011D	00 FF	80 7F	K33	011D	20 DF	A0 5F
	K2	011D	01 FE	81 7E	K34	011D	21 DE	A1 5E
	K3	011D	02 FD	82 7D	K35	011D	02 DD	A2 5D
	K4	011D	03 FC	83 7C	K36	011D	23 DC	A3 5C
	K5	011D	04 FB	84 7B	K37	011D	24 DB	A4 5B
	K6	011D	05 FA	85 7A	K38	011D	25 DA	A5 5A
	K7	011D	06 F9	86 79	K39	011D	26 D9	A6 59
	K8	011D	07 F8	87 78	K40	011D	27 D8	A7 58
	K9	011D	08 F7	88 77	K41	011D	28 D7	A8 57
	K10	011D	09 F6	89 76	K42	011D	29 D6	A9 56
	K11	011D	0A F5	8A 75	K43	011D	2A D5	AA 55
	K12	011D	0B F4	8B 74	K44	011D	2B D4	AB 54
	K13	011D	0C F3	8C 73	K45	011D	2C D3	AC 53
	K14	011D	0D F2	8D 72	K46	011D	2D D2	AD 52
	K15	011D	0E F1	8E 71	K47	011D	2E D1	AE 51
	K16	011D	0F F0	8F 70	K48	011D	2F D0	AF 50
	K17	011D	10 EF	90 6F	K49	011D	30 CF	B0 4F
	K18	011D	11 EE	91 6E	K50	011D	31 CE	B1 4E
	K19	011D	12 ED	92 6D	K51	011D	32 CD	B2 4D
	K20	011D	13 EC	93 6C	K52	011D	33 CC	B3 4C
	K21	011D	14 EB	94 6B	K53	011D	34 CB	B4 4B
	K22	011D	15 EA	95 6A	K54	011D	35 CA	B5 4A
	K23	011D	16 E9	96 69	K55	011D	36 C9	B6 49
	K24	011D	17 E8	97 68	K56	011D	37 C8	B7 48
	K25	011D	18 E7	98 67	K57	011D	38 C7	B8 47
	K26	011D	19 E6	99 66	K58	011D	39 C6	B9 46
	K27	011D	1A E5	9A 65	K59	011D	3A C5	BA 45
	K28	011D	1B E4	9B 64	K60	011D	3B C4	BB 44
	K29	011D	1C E3	9C 63	K61	011D	3C C3	BC 43
	K30	011D	1D E2	9D 62	K62	011D	3D C2	BD 42
	K31	011D	1E E1	9E 61	K63	011D	3E C1	BE 41
	K32	011D	1F E0	9F 60	K64	011D	3F C0	BF 40

客户码选择:

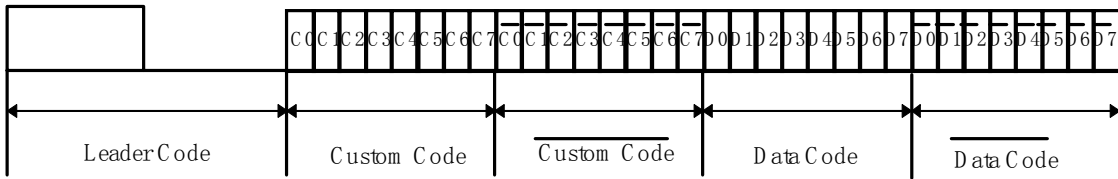
客户码: C12, C11, C10, C9, C8, C7, C6, C5, C4, C3, C2, C1, C0

选择二极管: 0, 0, 0, 0, 1, 0, 0, S5, S4, S3, S2, S1, S0

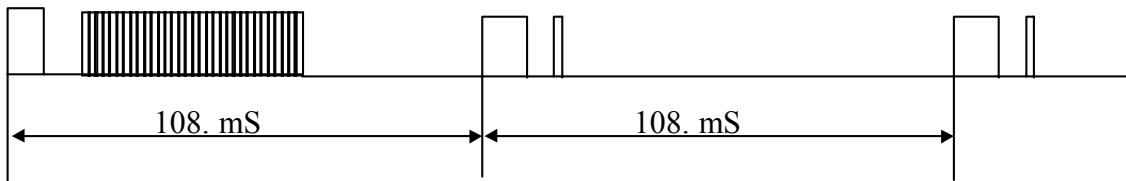
当 PIN21 与 PIN11 连接时, 为特定客户码: 0, 0001, 0001, 1101。



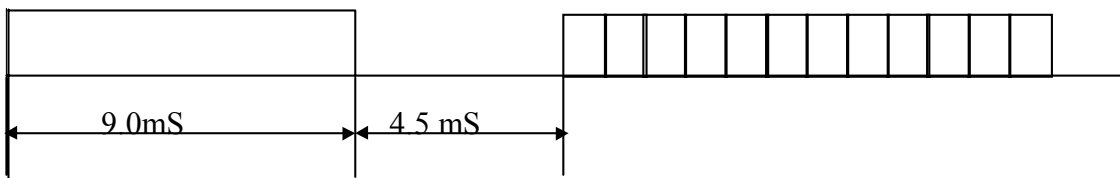
II、NEC 码遥控数据输出格式



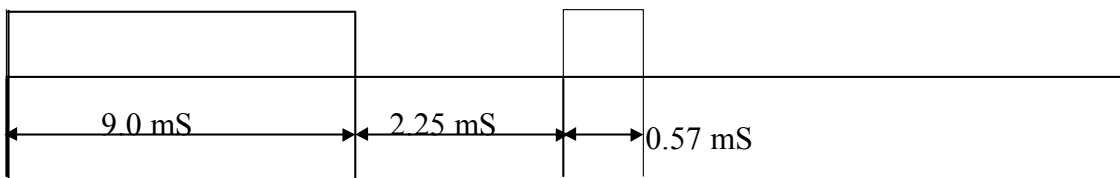
A. 连续码周期:



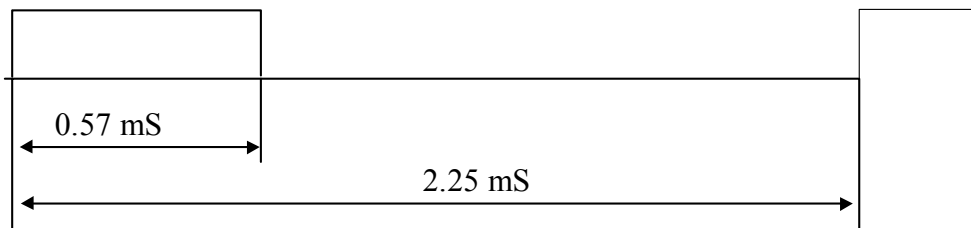
B. 头码时间:



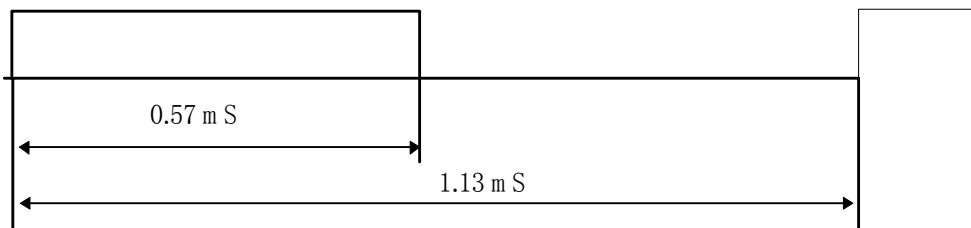
C. 连续头码时间:



D. 数据码 “1” 的时间:



E. 数据码 “0” 的时间:





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## 键盘数据编码 (NEC 格式 00H 客户码)

功能	按键	客户码	数据码	“F”+数据码	按键	客户码	数据码	“F”+数据码
	K1	00FF	00 FF	80 7F	K33	00FF	40 BF	C0 3F
	K2	00FF	01 FE	81 7E	K34	00FF	41 BE	C1 3E
	K3	00FF	02 FD	82 7D	K35	00FF	42 BD	C2 3D
	K4	00FF	03 FC	83 7C	K36	00FF	43 BC	C3 3C
	K5	00FF	04 FB	84 7B	K37	00FF	44 BB	C4 3B
	K6	00FF	05 FA	85 7A	K38	00FF	45 BA	C5 3A
	K7	00FF	06 F9	86 79	K39	00FF	46 B9	C6 39
	K8	00FF	07 F8	87 78	K40	00FF	47 B8	C7 38
	K9	00FF	08 F7	88 77	K41	00FF	48 B7	C8 37
	K10	00FF	09 F6	89 76	K42	00FF	49 B6	C9 36
	K11	00FF	0A F5	8A 75	K43	00FF	4A B5	CA 35
	K12	00FF	0B F4	8B 74	K44	00FF	4B B4	CB 34
	K13	00FF	0C F3	8C 73	K45	00FF	4C B3	CC 33
	K14	00FF	0D F2	8D 72	K46	00FF	4D B2	CD 32
	K15	00FF	0E F1	8E 71	K47	00FF	4E B1	CE 31
	K16	00FF	0F F0	8F 70	K48	00FF	4F B0	CF 30
	K17	00FF	10 EF	90 6F	K49	00FF	50 BF	D0 2F
	K18	00FF	11 EE	91 6E	K50	00FF	51 BE	D1 2E
	K19	00FF	12 ED	92 6D	K51	00FF	52 AD	D2 2D
	K20	00FF	13 EC	93 6C	K52	00FF	53 AC	D3 2C
	K21	00FF	14 EB	94 6B	K53	00FF	54 AB	D4 2B
	K22	00FF	15 EA	95 6A	K54	00FF	55 AA	D5 2A
	K23	00FF	16 E9	96 69	K55	00FF	56 A9	D6 29
	K24	00FF	17 E8	97 68	K56	00FF	57 A8	D7 28
	K25	00FF	18 E7	98 67	K57	00FF	58 A7	D8 27
	K26	00FF	19 E6	99 66	K58	00FF	59 A6	D9 26
	K27	00FF	1A E5	9A 65	K59	00FF	5A A5	DA 25
	K28	00FF	1B E4	9B 64	K60	00FF	5B A4	DB 24
	K29	00FF	1C E3	9C 63	K61	00FF	5C A3	DC 23
	K30	00FF	1D E2	9D 62	K62	00FF	5D A2	DD 22
	K31	00FF	1E E1	9E 61	K63	00FF	5E A1	DE 21
	K32	00FF	1F E0	9F 60	K64	00FF	5F A0	DF 20

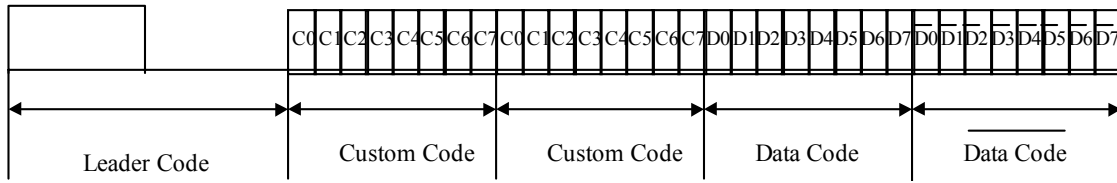
客户码选择:

客户码: C7, C6, C5, C4, C3, C2, C1, C0

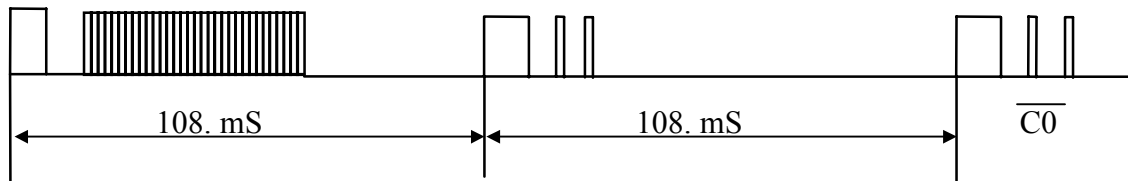
选择二极管: S7, S6, S5, S4, S3, S2, S1, S0



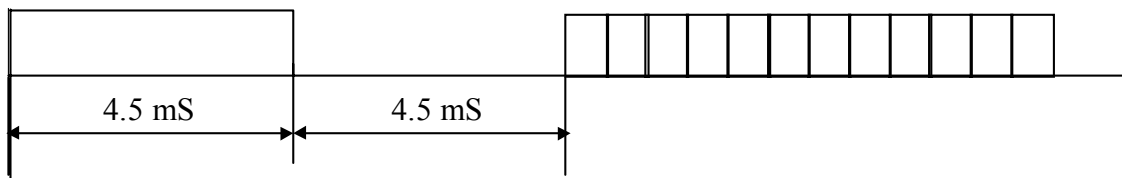
III、TOSHIBA 码遥控数据输出格式



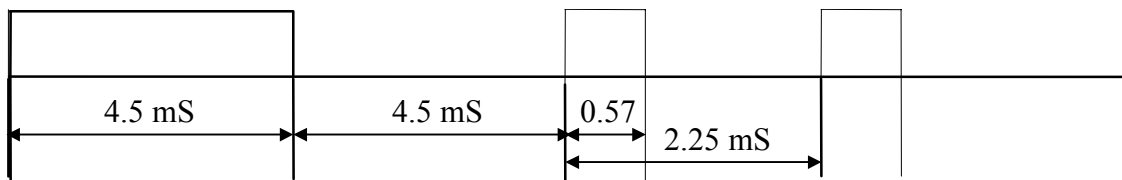
A. 连续码周期:



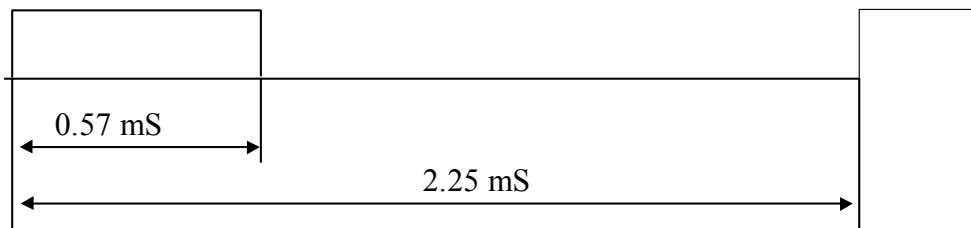
B. 头码时间:



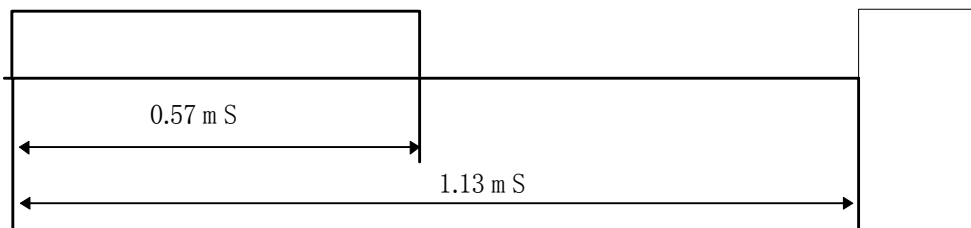
C. 连续头码时间:



D. 数据码 “1” 的时间:



E. 数据码 “0” 的时间:







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## 键盘数据编码 (TOSHIBA 格式 08H 客户码)

功能	按键	客户码	数据码		按键	客户码	数据码	
	K1	0808	00 FF		K33	0808	20 DF	
	K2	0808	01 FE		K34	0808	21 DE	
	K3	0808	02 FD		K35	0808	02 DD	
	K4	0808	03 FC		K36	0808	23 DC	
	K5	0808	04 FB		K37	0808	24 DB	
	K6	0808	05 FA		K38	0808	25 DA	
	K7	0808	06 F9		K39	0808	26 D9	
	K8	0808	07 F8		K40	0808	27 D8	
	K9	0808	08 F7		K41	0808	28 D7	
	K10	0808	09 F6		K42	0808	29 D6	
	K11	0808	0A F5		K43	0808	2A D5	
	K12	0808	0B F4		K44	0808	0B D4	
	K13	0808	0C F3		K45	0808	2C D3	
	K14	0808	0D F2		K46	0808	2D D2	
	K15	0808	0E F1		K47	0808	2E D1	
	K16	0808	0F F0		K48	0808	2F D0	
	K17	0808	10 EF		K49	0808	30 CF	
	K18	0808	11 EE		K50	0808	31 CE	
	K19	0808	12 ED		K51	0808	32 CD	
	K20	0808	13 EC		K52	0808	33 CC	
	K21	0808	14 EB		K53	0808	34 CB	
	K22	0808	15 EA		K54	0808	35 CA	
	K23	0808	16 E9		K55	0808	36 C9	
	K24	0808	17 E8		K56	0808	37 C8	
	K25	0808	18 E7		K57	0808	38 C7	
	K26	0808	19 E6		K58	0808	39 C6	
	K27	0808	1A E5		K59	0808	3A C5	
	K28	0808	1B E4		K60	0808	3B C4	
	K29	0808	1C E3		K61	0808	A0 5F	
	K30	0808	1D E2		K62	0808	A1 5E	
	K31	0808	1E E1		K63	0808	A2 5D	
	K32	0808	1F E0		K64	0808	A3 5C	

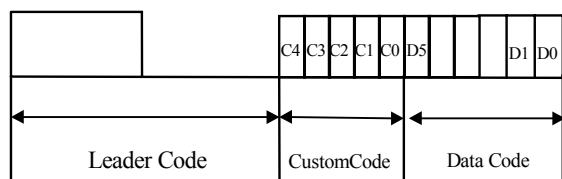
客户码选择:

客户码: C7, C6, C5, C4, C3, C2, C1, C0

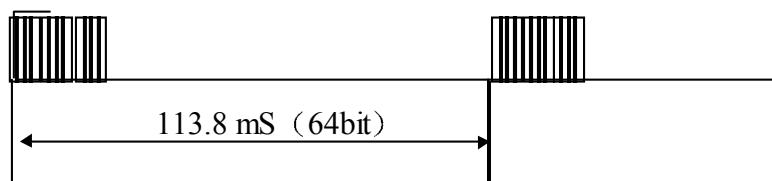
选择二极管: S7, S6, S5, S4, S3, S2, S1, S0



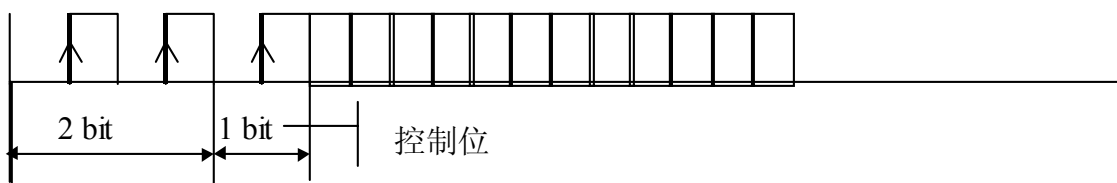
IV、 PHILIPS 码遥控数据输出格式( $f_{osc}=432\text{KHz}$ )



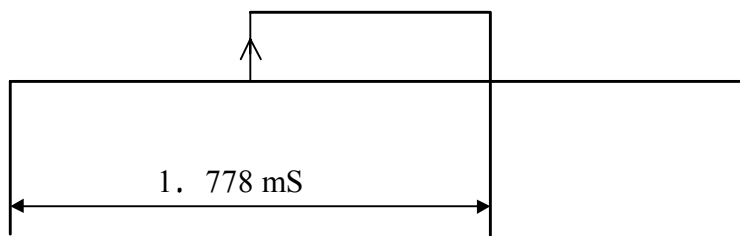
C. 连续码周期:



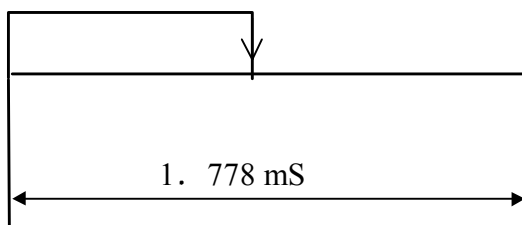
B. 头码时间:



C. 数据码 “1” 的时间:



D. 数据码 “0” 的时间:



\*不同震荡频率下的时间值:

Fosc(KHz)	位长度(mS)	周期(mS)
432	1.778	113.8
455	1.688	108.0



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## 键盘数据编码 (TDA3010, PHILIPS 格式 00H 客户码)

按键	客户码	数据码	按键	客户码	数据码
K1	11x00000	00	K33	11x00000	20
K2	11x00000	01	K34	11x00000	21
K3	11x00000	02	K35	11x00000	22
K4	11x00000	03	K36	11x00000	23
K5	11x00000	04	K37	11x00000	24
K6	11x00000	05	K38	11x00000	25
K7	11x00000	06	K39	11x00000	26
K8	11x00000	07	K40	11x00000	27
K9	11x00000	08	K41	11x00000	28
K10	11x00000	09	K42	11x00000	29
K11	11x00000	0A	K43	11x00000	2A
K12	11x00000	0B	K44	11x00000	2B
K13	11x00000	0C	K45	11x00000	2C
K14	11x00000	0D	K46	11x00000	2D
K15	11x00000	0E	K47	11x00000	2E
K16	11x00000	0F	K48	11x00000	2F
K17	11x00000	10	K49	11x00000	30
K18	11x00000	11	K50	11x00000	31
K19	11x00000	12	K51	11x00000	32
K20	11x00000	13	K52	11x00000	33
K21	11x00000	14	K53	11x00000	34
K22	11x00000	15	K54	11x00000	35
K23	11x00000	16	K55	11x00000	36
K24	11x00000	17	K56	11x00000	37
K25	11x00000	18	K57	11x00000	38
K26	11x00000	19	K58	11x00000	39
K27	11x00000	1A	K59	11x00000	3A
K28	11x00000	1B	K60	11x00000	3B
K29	11x00000	1C	K61	11x00000	3C
K30	11x00000	1D	K62	11x00000	3D
K31	11x00000	1E	K63	11x00000	3E
K32	11x00000	1F	K64	11x00000	3F

注：上述表格中 11x00000 的八位定义如下：

11 为起始位，固定不变；

x 为控制位，每次按键按 0 到 1，或 1 到 0 的顺序翻转一次；

00000 为客户码可以通过二极管选择，变化范围为：

00000B~11111B。

客户码： C4, C3, C2, C1, C0

选择二极管： S4, S3, S2, S1, S0



## 双键确认

1. 当先按下一个键，发送遥控信号，然后按下另一个键，停止发送遥控信号。
2. 双键按下后，有一个键释放，则发射仍在按着的那个键的信号。

## HALT 状态确认

当没有按键按下时，遥控器应处于 HALT 状态；静态电流小于  $1 \mu\text{A}$ 。



## 电气参数

极限工作范围:

Parameters	Symbols	Ratings	Units
Supply Voltage	$V_{DD}$	- 0.3 to 6	V
Input Voltage	$V_I$	- 0.3 to $V_{DD} + 0.3$	V
Output Voltage	$V_O$	- 0.3 to $V_{DD} + 0.3$	V
Soldering Temperature	$T_{SLD}$	260 (10 sec)	°C
Storage Temperature	$T_{STG}$	- 55 to 125	°C

直流工作特性 ( $V_{DD} = 3V$ ,  $T_A = 25^\circ C$ )

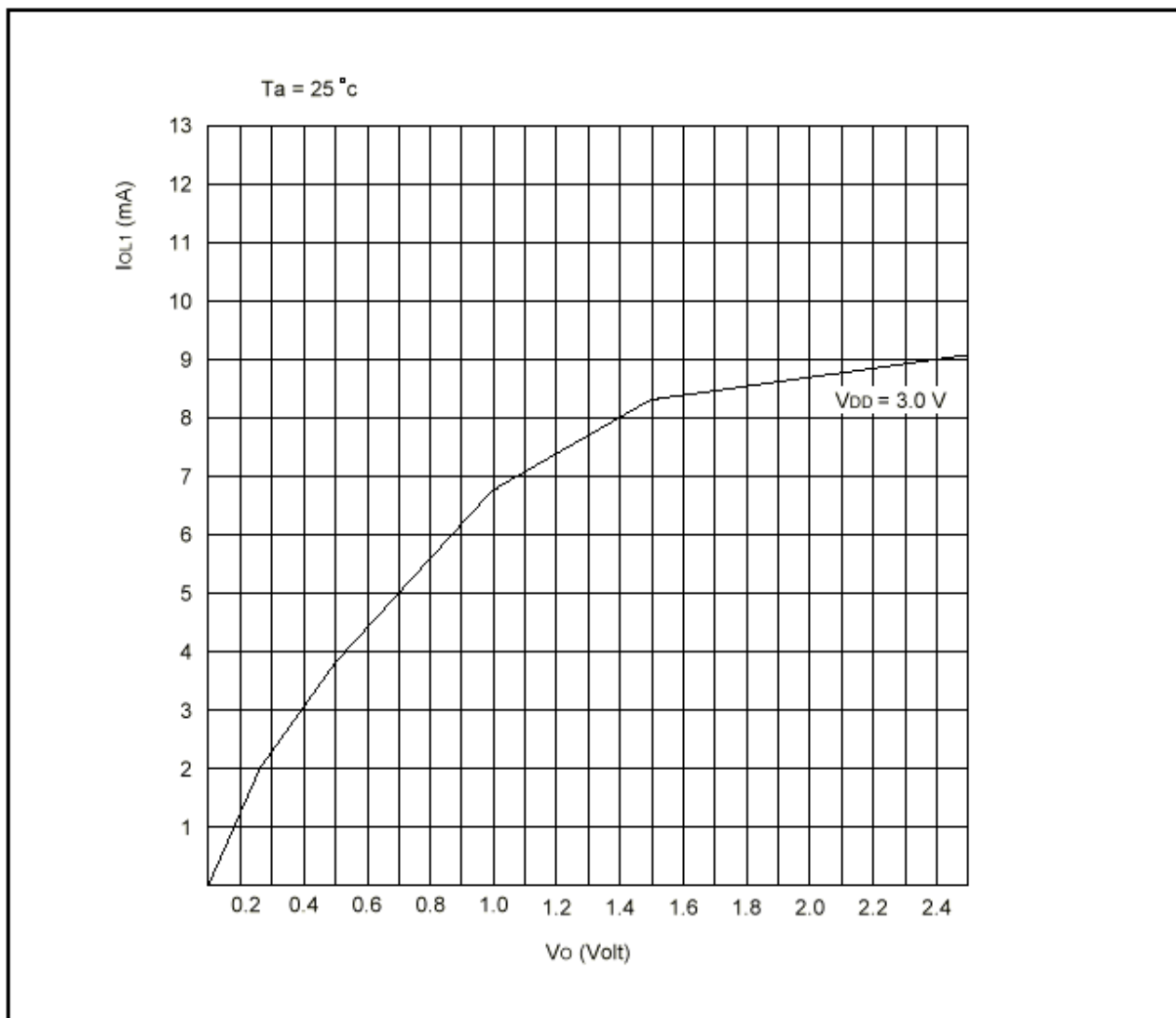
Parameters		Symbols	Test Conditions	Min	Typ	Max	Units
Supply Voltage		$V_{DD}$	$250kHz \leq f_{OSC} \leq 3.9MHz$	1.8	3.0	3.6	V
			$3.9MHz < f_{OSC} \leq 6MHz$	2.2	3.0	3.6	
Operating Temperature		$T_A$	-	-20	-	85	°C
High-Level Input Voltage		$V_{IH1}$	All input pins except $X_{IN}$	$0.7 V_{DD}$	-	$V_{DD}$	V
		$V_{IH2}$	$X_{IN}$	$V_{DD}-0.3$	-	$V_{DD}$	V
Low-Level Input Voltage		$V_{IL1}$	All input pins except $X_{IN}$	0	-	$0.3 V_{DD}$	V
		$V_{IL2}$	$X_{IN}$	0	-	0.3	V
Low-Level Output Current P2.0		$I_{OL1}$	$V_O = 0.4 V$	180	210	240	mA
			$V_O = 0.5 V$	220	260	300	
Low-Level Output Current	P3 Output	$I_{OL2}$	$V_O = 0.4 V$	0.5	1.0	2.0	mA
	P2.1-P2.3			1.5	3.0	4.5	
	P2.4-P2.6			0.5	1.0	2.0	



Parameters	Symbols	Test Conditions	Min	Typ	Max	Units
High-Level Input Leakage Current	$I_{LH1}$	$V_I = V_{DD}$ All input pins except XIN	–	–	3	uA
	$I_{LH2}$	$X_{IN}$	–	3	10	
Low-level Input Leakage Current	$I_{LIL1}$	$X_{IN}$	-0.6	-3	-10	
High-level Output Leakag Current	$I_{LOH}$	$V_O = V_{DD}$ All output pins Port 2,3	–	–	1	uA
Pull-up Resistance of Input Port	R	$V_{DD} = 3\text{ V}$ $V_I = 0\text{ V}$	30	70	150	K $\Omega$
Average Supply Current	$I_{DD}$	$V_{DD} = 3\text{ V}$ Crystal/Resonator Non-divide option $f_{OSC} = 1\text{ MHz}$ Divide-8 option $f_{OSC} = 6\text{ MHz}$	–	0.5	1.0	mA
HALT Current	$I_{DDH}$	$f_{OSC} = 0$	–	–	1.0	uA
Clock Frequency	$f_{xx}$	Crystal/Ceramic	250	–	1000	kHz
Oscillator Frequency	$f_{OSC}$	Crystal/Ceramic Non-divide option	250	–	1000	
		Crystal/Ceramic Divide-8 option	2000	–	6000	

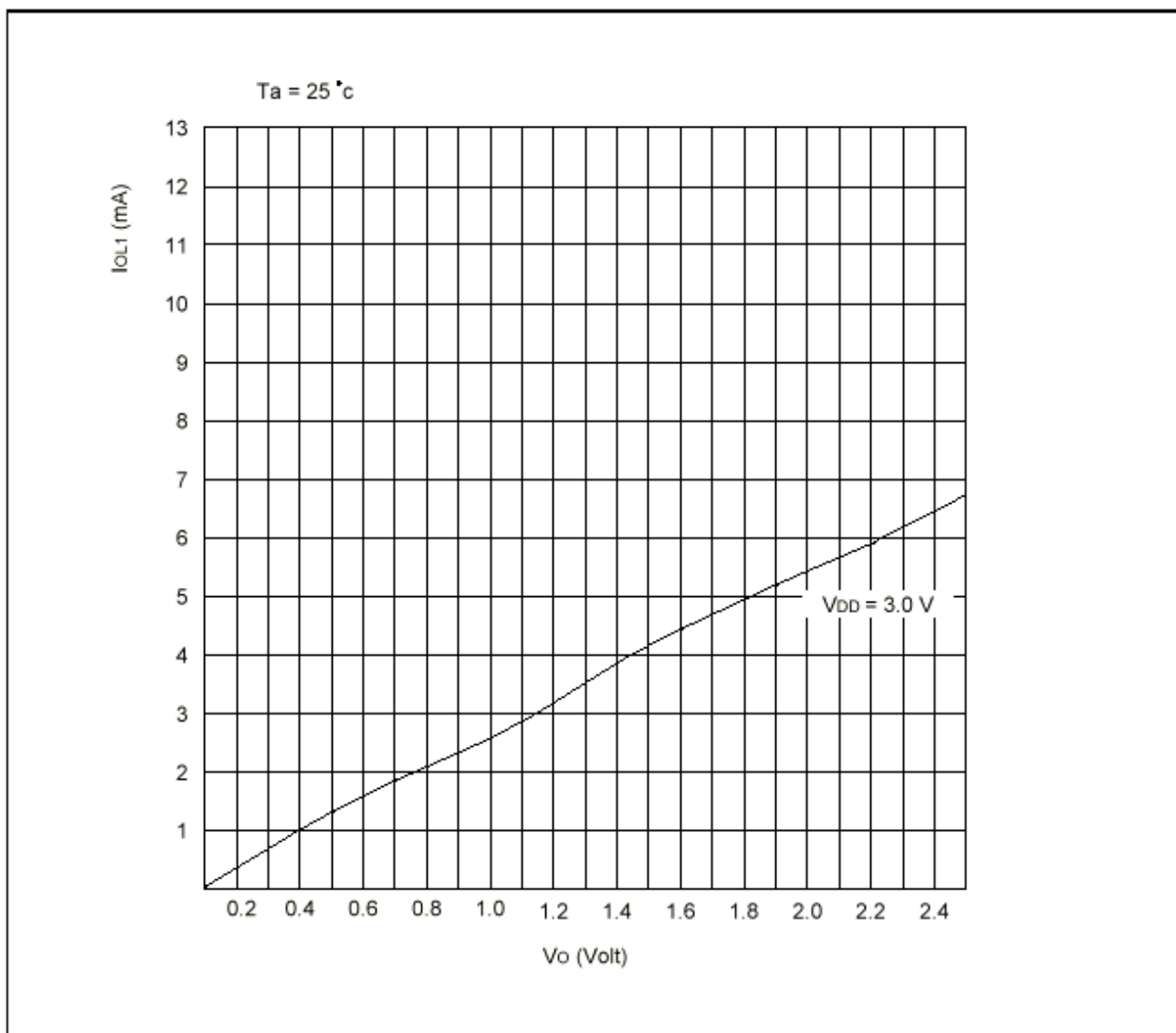


### P2.2-P2.4 输出特性曲线



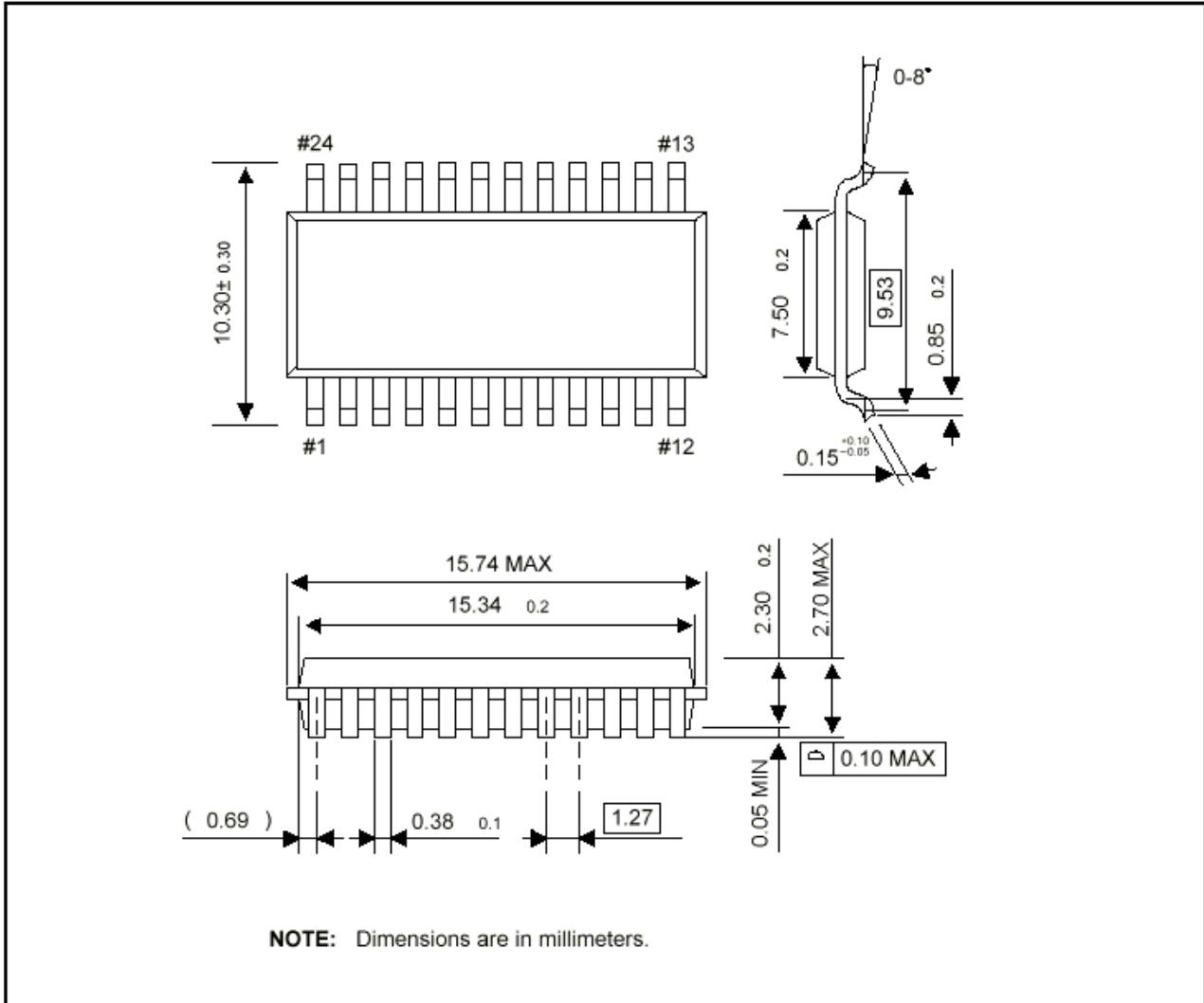


### P3.0-P3.3 输出曲线

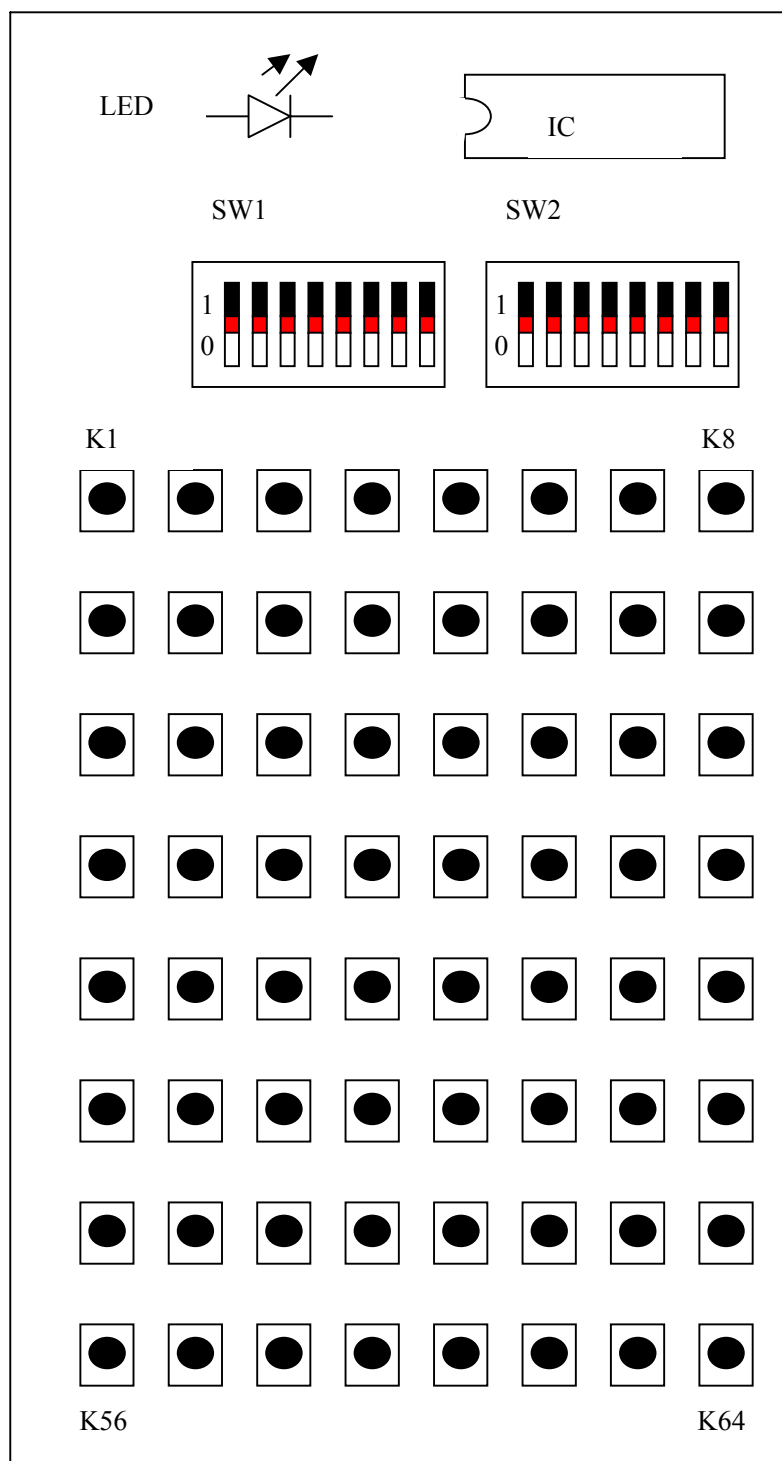




封装型式: 24SOP-375



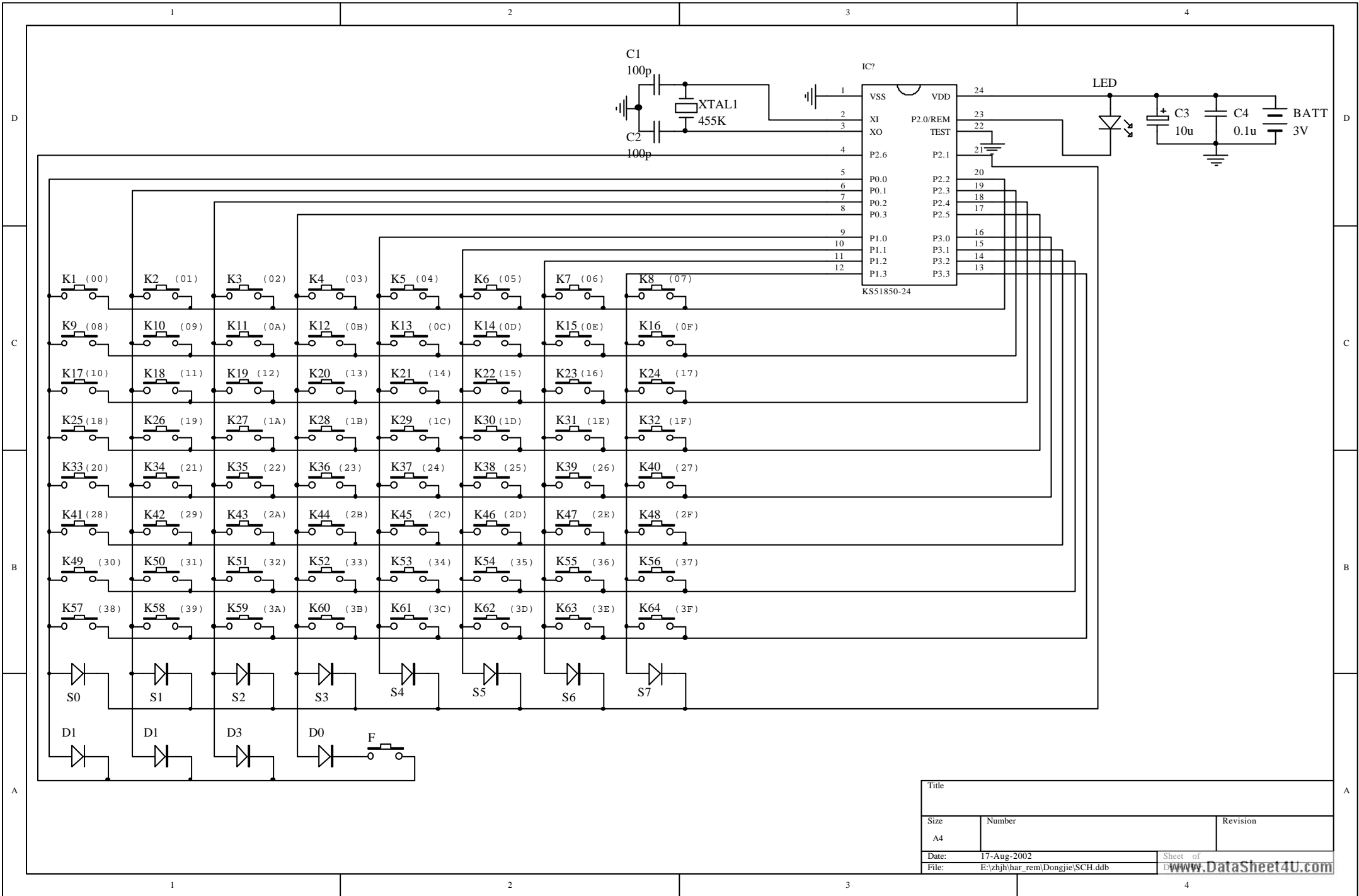
实验板元件位置示意图:



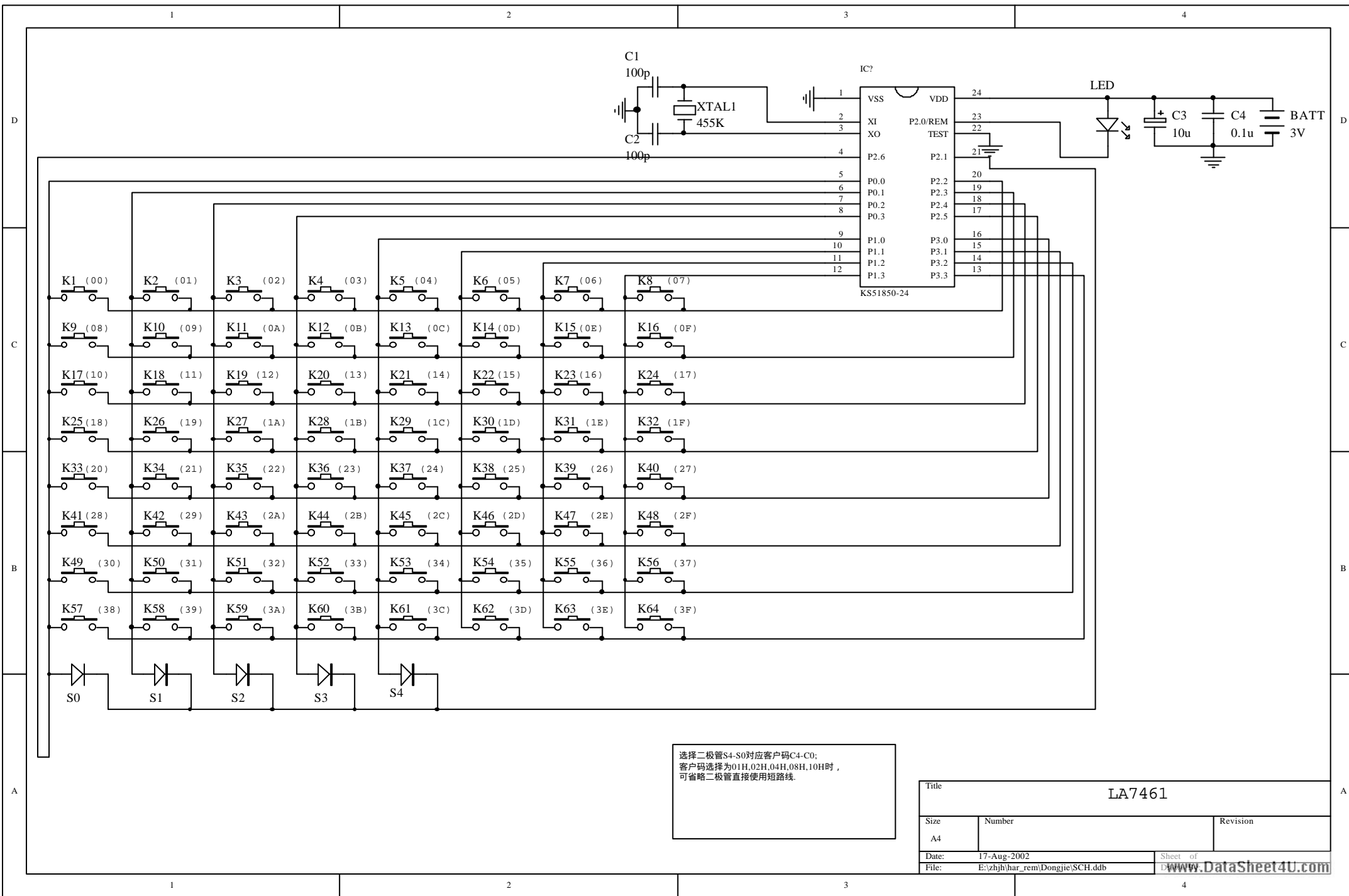
注:

SW1 从左至右对应原理图的 D1D2D3D4 - - - -

SW2 从左至右对应原理图的 S0S1S2S3S4S5S6S7

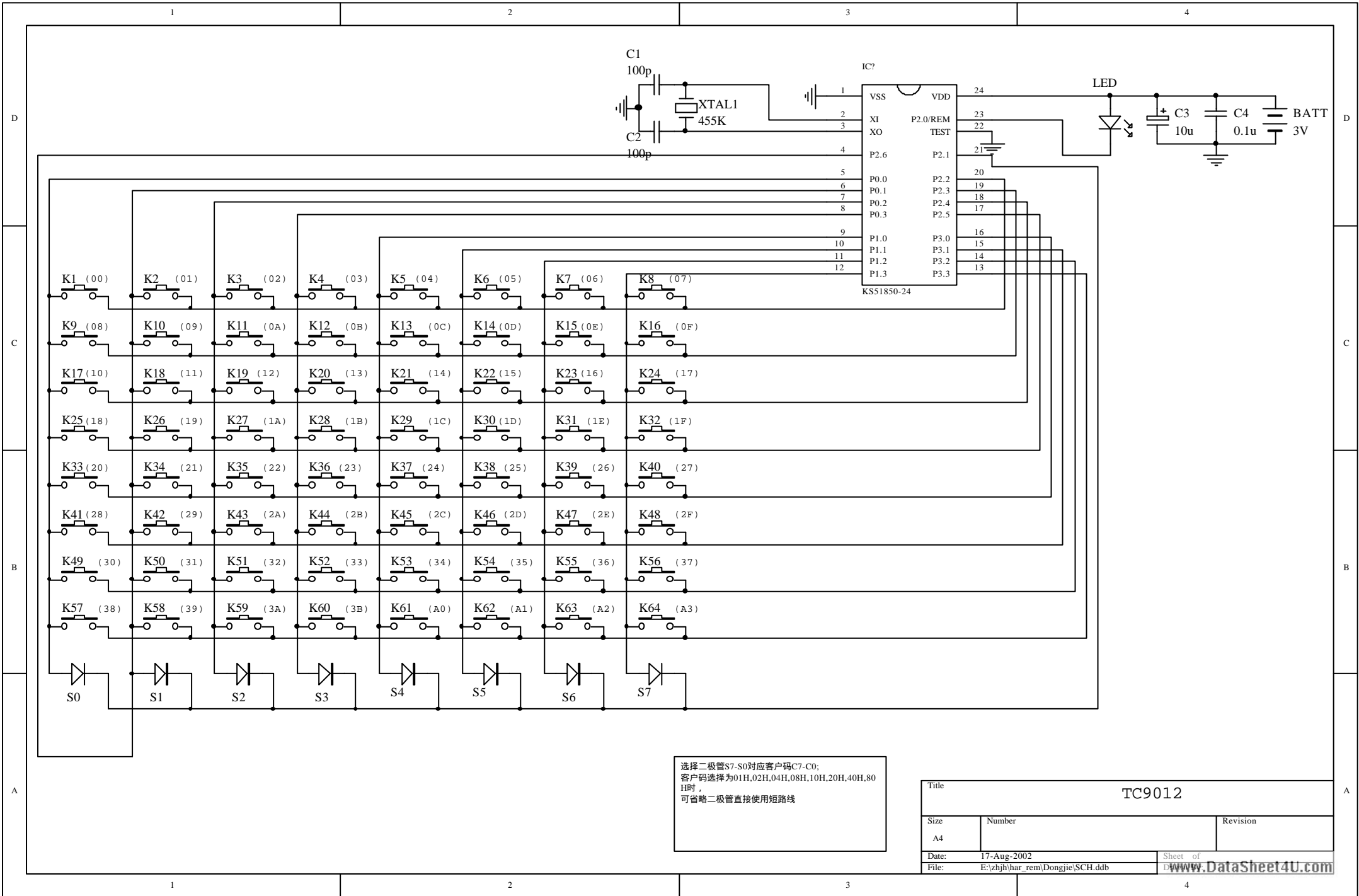


Title		
Size	Number	Revision
A4		
Date:	17-Aug-2002	Sheet of
File:	E:\zhjh\har_rem\ Dongjie\SCH.ddb	www.DataSheet4U.com



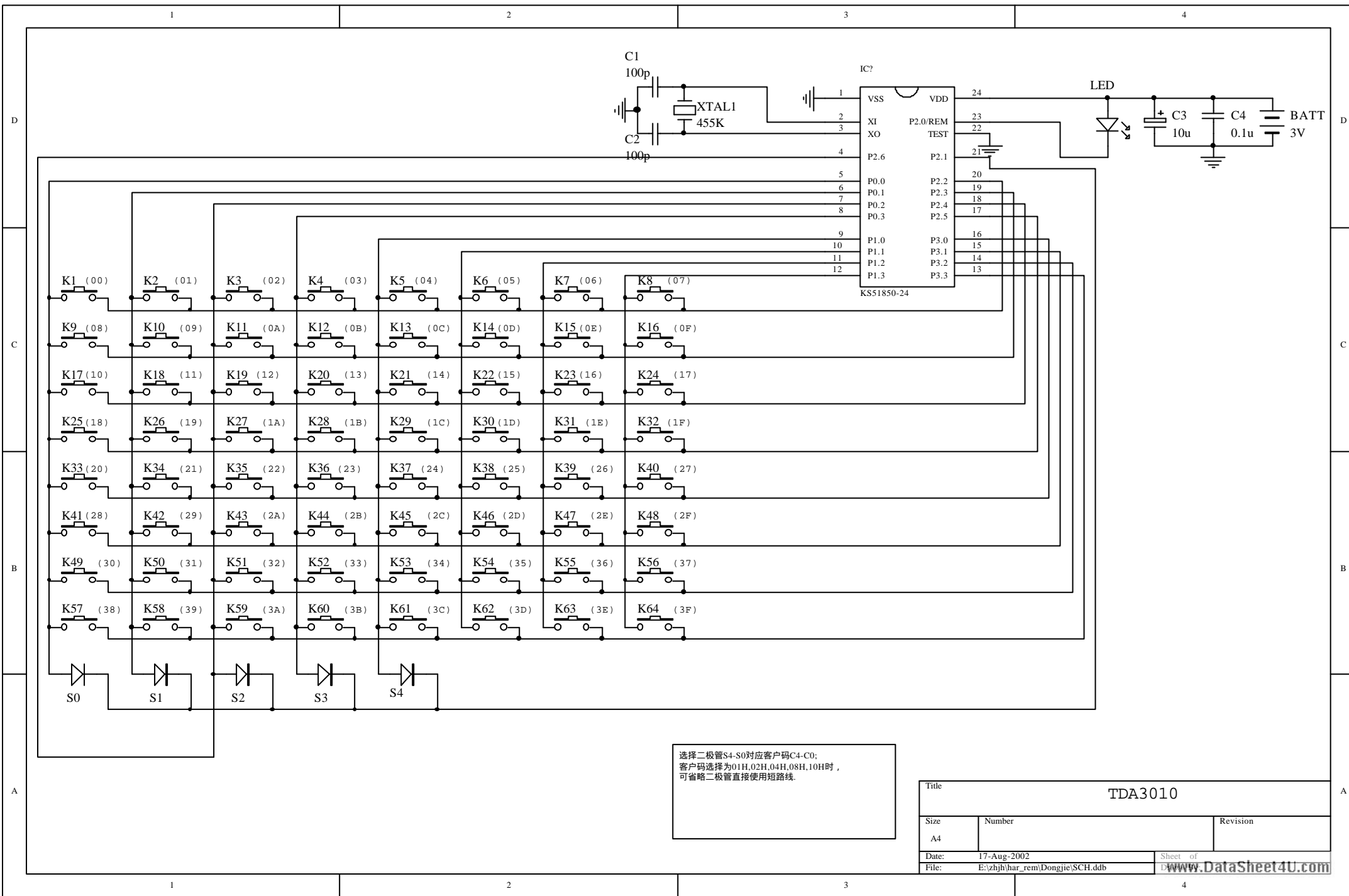
选择二极管S4-S0对应客户码C4-C0;  
 客户码选择为01H,02H,04H,08H,10H时,  
 可省略二极管直接使用短路线。

Title			LA7461		
Size	Number	Revision			
A4					
Date:	17-Aug-2002	Sheet of			
File:	E:\zhjh\har_rem\ Dongjie\SCH.ddb	www.DataSheet4U.com			



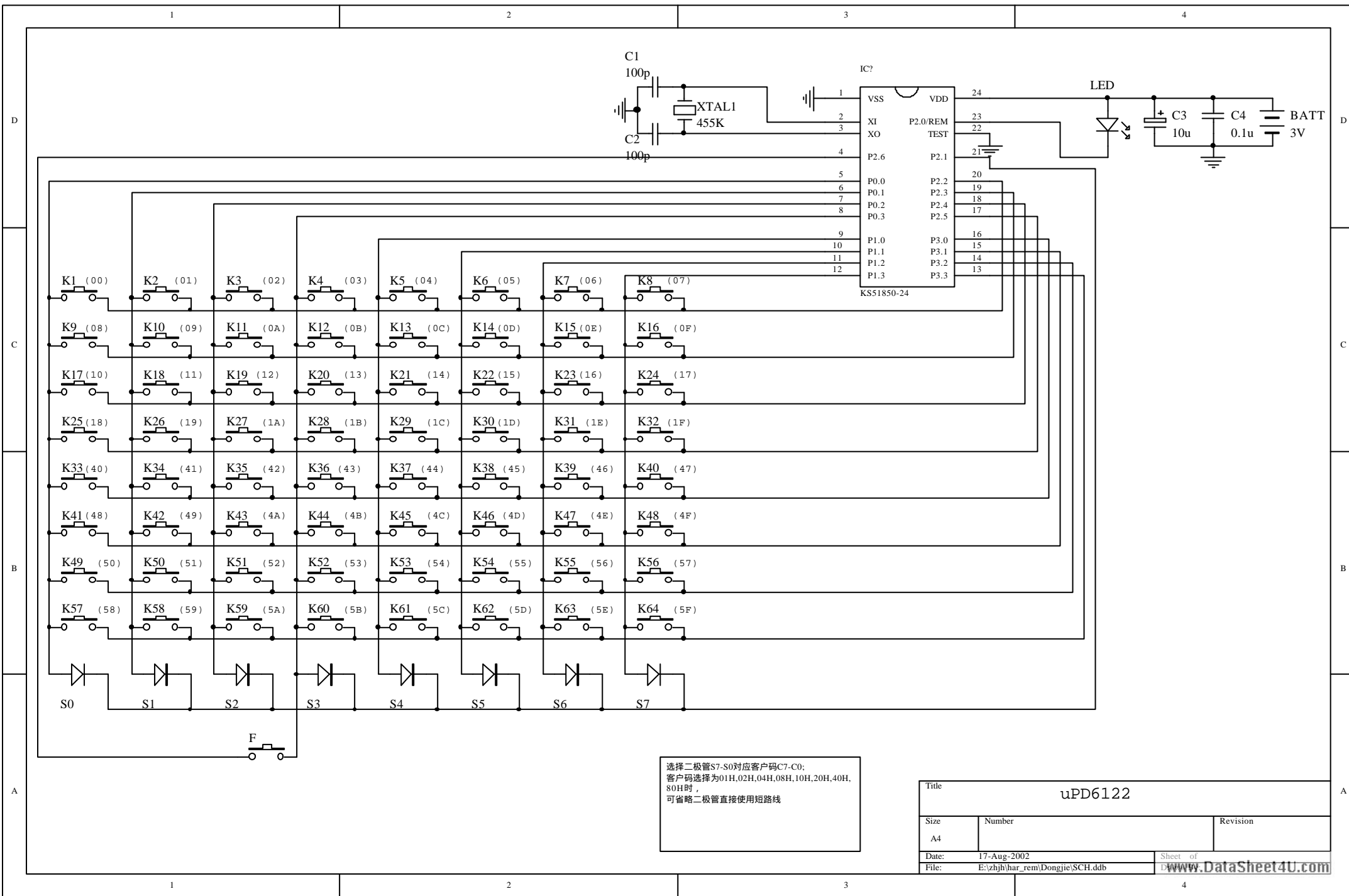
选择二极管S7-S0对应客户码C7-C0:  
 客户码选择为01H,02H,04H,08H,10H,20H,40H,80H时,  
 可省略二极管直接使用短路线

Title			TC9012		
Size	Number		Revision		
A4					
Date:	17-Aug-2002		Sheet of		
File:	E:\zhjh\har_rem\ Dongjie\SCH.ddb		www.DataSheet4U.com		



选择二极管S4-S0对应客户码C4-C0;  
 客户码选择为01H,02H,04H,08H,10H时,  
 可省略二极管直接使用短路线。

Title			TDA3010		
Size	Number	Revision			
A4					
Date:	17-Aug-2002	Sheet of			
File:	E:\zhjh\har_rem\ Dongjie\SCH.ddb	www.DataSheet4U.com			



选择二极管S7-S0对应客户码C7-C0;  
 客户码选择为01H,02H,04H,08H,10H,20H,40H,  
 80H时,  
 可省略二极管直接使用短路线

Title			uPD6122		
Size	Number		Revision		
A4					
Date:	17-Aug-2002		Sheet of		
File:	E:\zhjh\har_rem\ Dongjie\SCH.ddb		www.DataSheet4U.com		