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CSC0103A
USB Optical Mouse Controller

CSC0103A

USB Optical Mouse Controller

Advanced Version

Version : 1.20

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Manual Rev. 1.20: February 27, 2002 with document number R_CSC0103A_120

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Revision History

Revision No.	History	Date
1.00	Initial issue	Jan. 29, 2002
1.10	- Revised the application schematic	Feb. 06, 2002
	- Add the product matrix	
1.20	- Add the DIP-18 package support	Feb. 27, 2002
	- Add Large / small gear Z axis application in Product matrix	



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Features

- Low cost solution for low speed USB mouse peripheral
- Built-in 65C02 8 Bit CPU
 - 6MHz external ceramic resonator
 - 3MHz internal CPU clock
 - 256 bytes RAM
 - 6 Kbytes ROM
 - Internal 3.3V regulator for USB pull-up resistor
- USB specification compliance:
 - Conforms to USB specification, version 1.1
 - Conforms to USB HID specification, version 1.1
 - Supports 1 low speed device address and 3 endpoints
 - 8 bytes FIFO for each endpoint
 - Integrated USB transceiver
 - Build in 3.3V regulator
- Configurable GPIO ports
 - Real world interface without external components
 - 11/10 general purpose I/O pins
 - Port0 is 3 bit I/O with each pin supports high impedance or 20K ohm internal pull up
 - Port1 is 5 bit I/O with 20K ohm pull up resistor
 - Port2 is 3 bit I/O with 20K ohm pull up resistor and maskable interrupt mechanism
 - Dedicated LED pins for direct LED driving capability (20 pins package or dice only)
- Built-in power-on reset & watchdog timer reset
- One 8 bits timer
- **Advanced and cost-down version of CSC0103**
- **20-pin PDIP/SOIC, 18-pin PDIP package and dice**



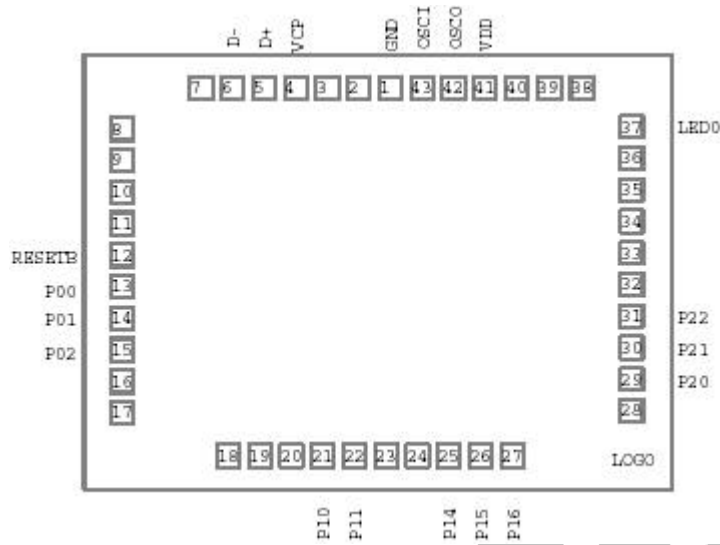
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CSC0103A
USB Optical Motor Controller

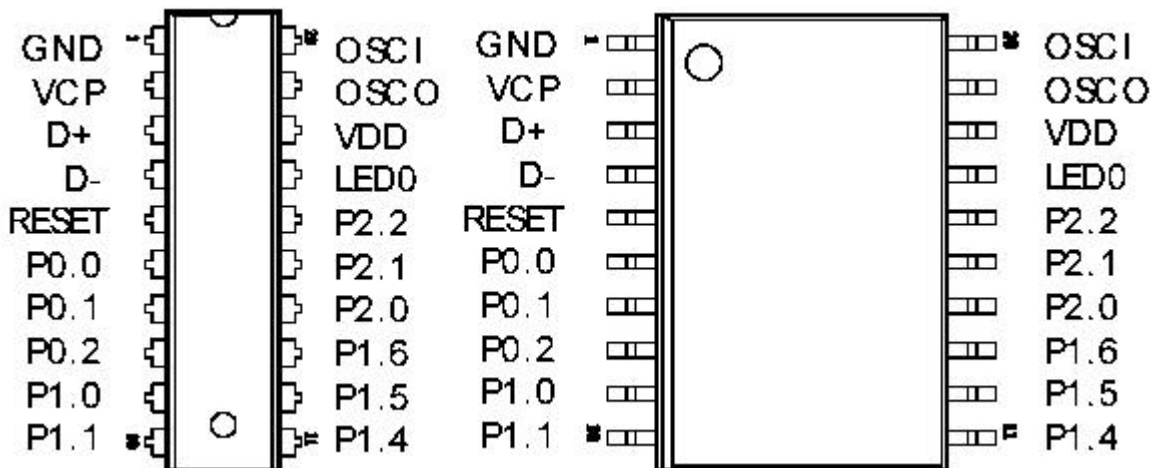
2. Pin Configuration

Dice



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CSC0103A

DIP / SOIC 20 Pins



CSC0103A-D20

CSC0103A-S20

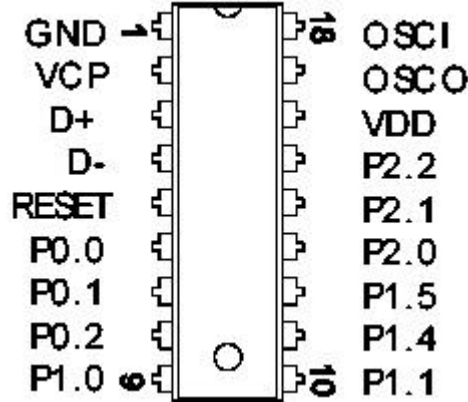


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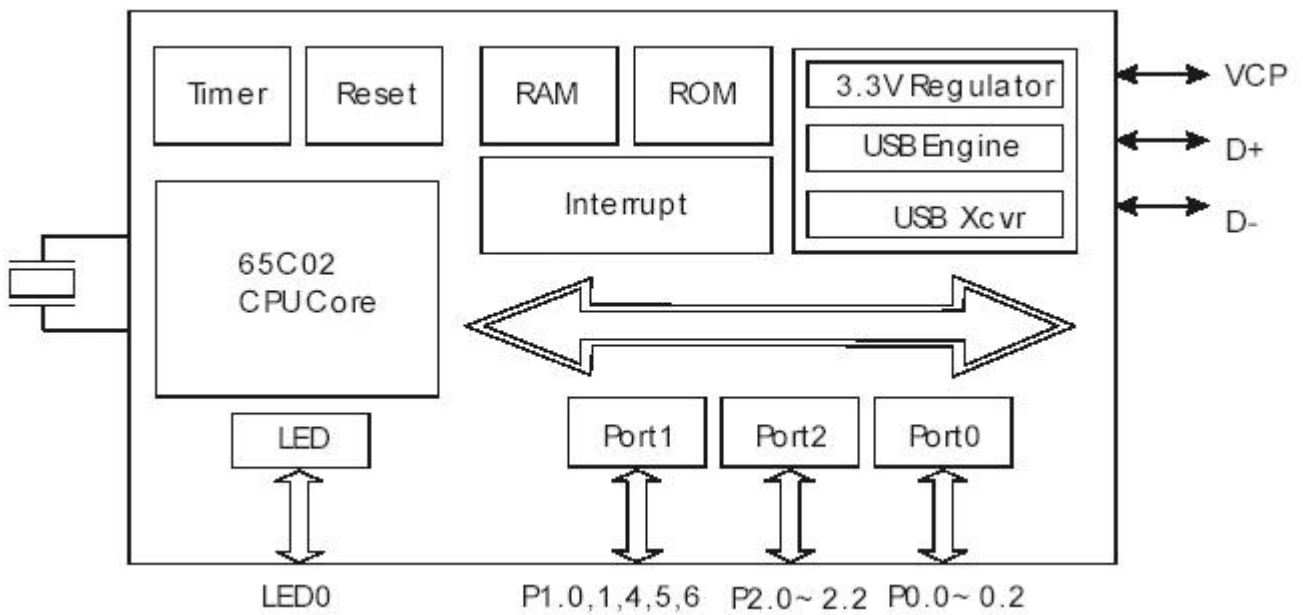
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USB Optical Motor Controller

DIP 18 Pins



- CSC0103A-01D18
- CSC0103A-02D18
- CSC0103A-03D18
- CSC0103A-04D18

3. Block Diagram



4. Pin Assignment

CSC0103A / CSC0103A – D20 / CSC0103A – S20

PIN #	PAD #	NAME	IN/OUT	DESCRIPTION
1	1	GND	P	Ground
2	4	VCP	O	USB Driver 3.3V
3	5	D+	I/O	USB data +
4	6	D-	I/O	USB data -
5	12	RESETB	I	External reset (Pull down resistor internally)
6	13	P00	I/O	Port 0 Bit 0
7	14	P01	I/O	Port 0 Bit 1
8	15	P02	I/O	Port 0 Bit 2
9	21	P10	I/O	Port 1 Bit 0
10	22	P11	I/O	Port 1 Bit 1
11	25	P14	I/O	Port 1 Bit 4
12	26	P15	I/O	Port 1 Bit 5
13	27	P16	I/O	Port 1 Bit 6
14	29	P20	I/O	Port 2 Bit 0
15	30	P21	I/O	Port 2 Bit 1
16	31	P22	I/O	Port 2 Bit 2
17	37	LED0	O	LED Output Bit 0
18	41	VDD	P	Power supply
19	42	OSCO	O	Crystal/Ceramic resonator out
20	43	OSCI	I	Crystal/Ceramic resonator in

CSC0103A – 01D18 / CSC0103A – 02D18 / CSC0103A – 03D18 / CSC0103A – 04D18

PIN #	NAME	IN/OUT	DESCRIPTION
1	GND	P	Ground
2	VCP	O	Power 3.3V
3	D+	I/O	USB data +
4	D-	I/O	USB data -
5	RESETB	IN	External low reset, pull down resistor internally
6	P0.0	I/O	Port 0 Bit 0
7	P0.1	I/O	Port 0 Bit 1
8	P0.2	I/O	Port 0 Bit 2
9	P1.0	I/O	Port 1 Bit 0
10	P1.1	I/O	Port 1 Bit 1
11	P1.4	I/O	Port 1 Bit 4
12	P1.5	I/O	Port 1 Bit 5
13	P2.0	I/O	Port 2 Bit 0



14	P2.1	I/O	Port 2 Bit 1
15	P2.2	I/O	Port 2 Bit 2
16	VDD	P	Power supply
17	OSCO	OUT	Crystal/Ceramic resonator out
18	OSCI	IN	Crystal/Ceramic resonator in

5. Electrical Characteristics

VDD=5V, GND=0V, TA=25 , Fosc=6MHz

Parameters	Symbol	Min	Typ	Max	Unit	Conditions
Operating Voltage	Vdd	4.4	5	5.25	V	
Operating Current	Iop			30	mA	No load
Suspend Current	Isp			500	uA	
Input High Voltage	Vih	2			V	
Input Low Voltage	Vil			0.8	V	
Output High Voltage	Voh	2.4			V	
Output Low Voltage	Vol			0.4	V	
LED Sink Current	I led	6	10	14	mA	
Pull-up Resistance	Rup		20K		Ω	
Schmitt Tigger Input High Voltage	Vstih		1.7	2	V	
Schmitt Tigger Input Low Voltage	Vstil	0.8	1.1		V	

6. Product Matrix

Part Number	Memory		I/Os	Package Type	Operating Range
	ROM Size	RAM Size			
CSC0103A	6K Bytes	256 Bytes	11 + 1 dedicated LED	Dice	Commercial
CSC0103A-D20	6K Bytes	256 Bytes	11 + 1 dedicated LED	20-pin PDIP	Commercial
CSC0103A-S20	6K Bytes	256 Bytes	11 + 1 dedicated LED	20-pin SOIC	Commercial
CSC0103A-01D18	6K Bytes	256 Bytes	10	18-pin PDIP	Commercial
CSC0103A-02D18	6K Bytes	256 Bytes	10	18-pin PDIP	Commercial
CSC0103A-03D18	6K Bytes	256 Bytes	10	18-pin PDIP	Commercial



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CSC0103A
USB Optical Mouse
Controller

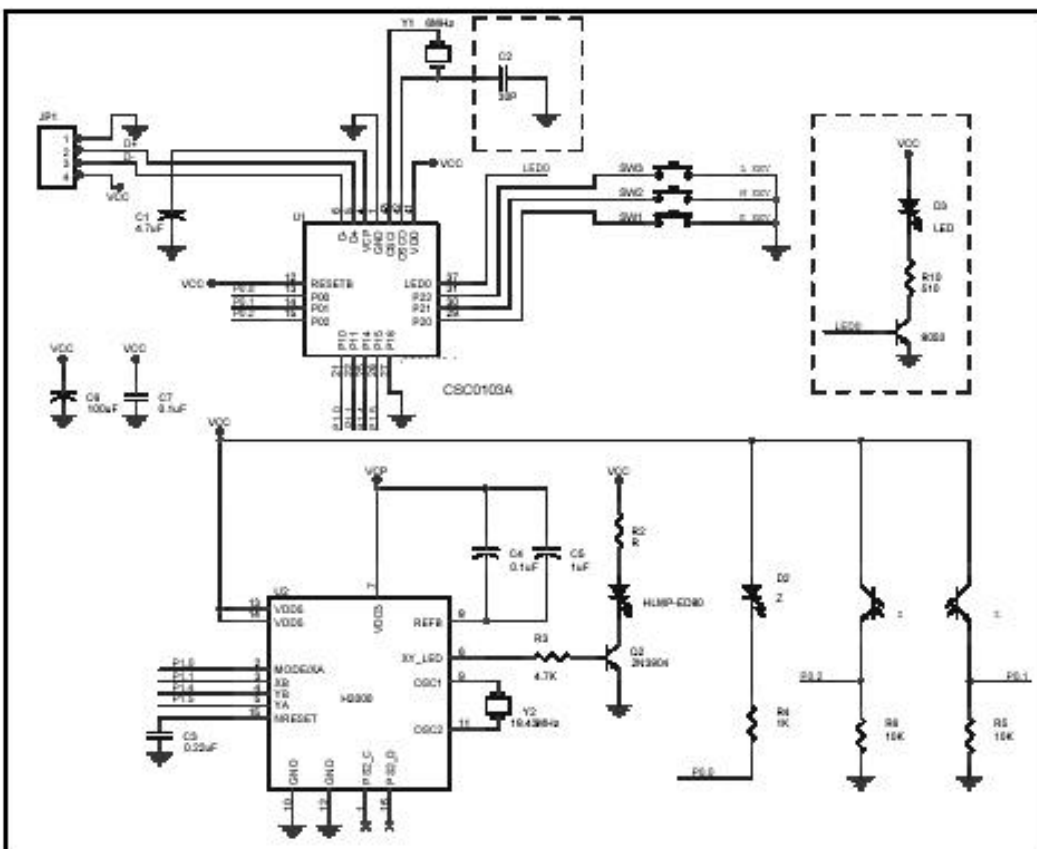
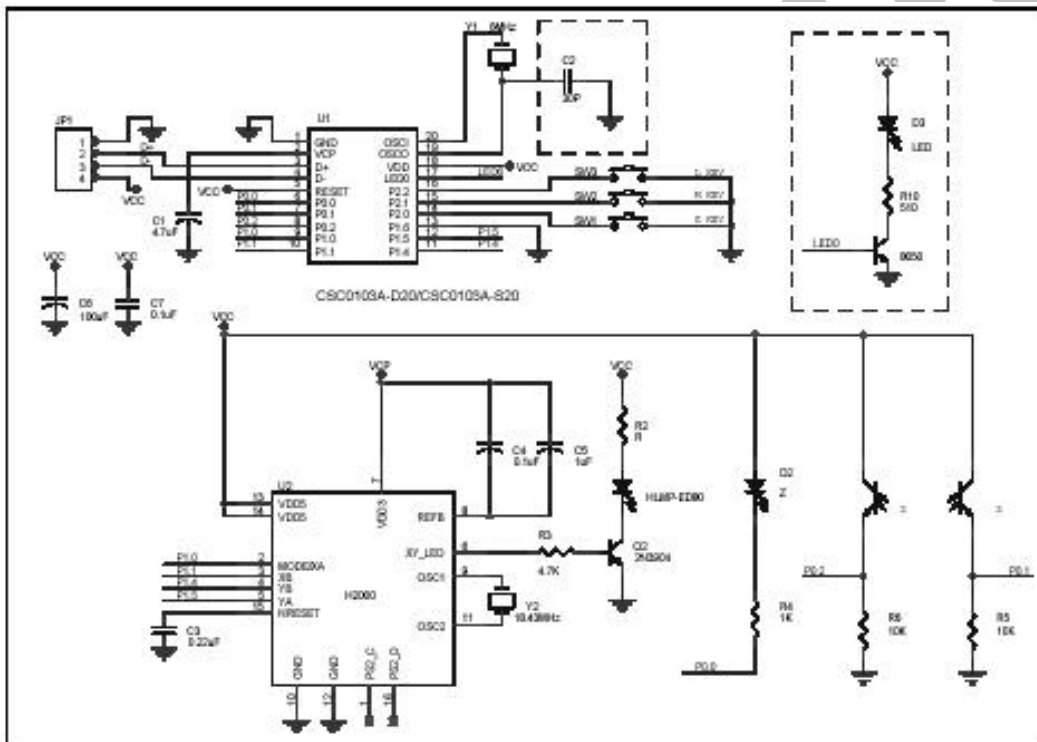
CSC0103A-04D18	6K Bytes	256 Bytes	10	18-pin PDIP	Commercial
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Part Number	Mouse Appokcation
CSC0103A	3 Dimension3 Keys Optical Mouse with Optical / Mechanical Z Axis and LED Output with / without Suspend Mode
CSC0103A-D20	3 Dimension3 Keys Optical Mouse with Optical / Mechanical Z Axis and LED Output with / without Suspend Mode
CSC0103A-S20	3 Dimension3 Keys Optical Mouse with Optical / Mechanical Z Axis and LED Output with / without Suspend Mode
CSC0103A-01D18	3 Dimension 3 Jets Optical Mouse with Optical / Mechanical Large Gear Z Axis with Suspend Mode
CSC0103A-02D18	3 Dimension 3 Jets Optical Mouse with Optical / Mechanical Small Gear Z Axis with Suspend Mode
CSC0103A-03D18	3 Dimension 3 Jets Optical Mouse with Optical / Mechanical Large Gear Z Axis without Suspend Mode
CSC0103A-04D18	3 Dimension 3 Jets Optical Mouse with Optical / Mechanical Small Gear Z Axis without Suspend Mode



7 . Application Schematic

3 Dimension 3 Keys Optical Mouse with Optical Z Axis and LED Output without Suspend Mode

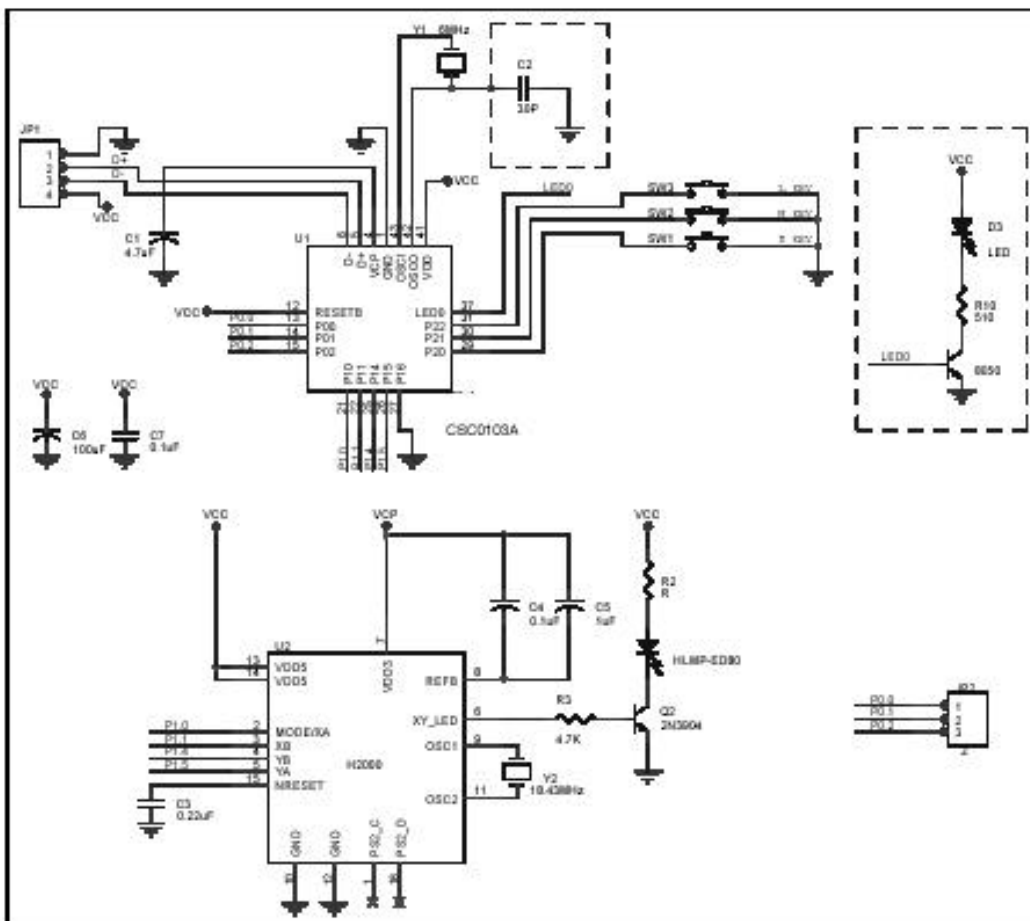
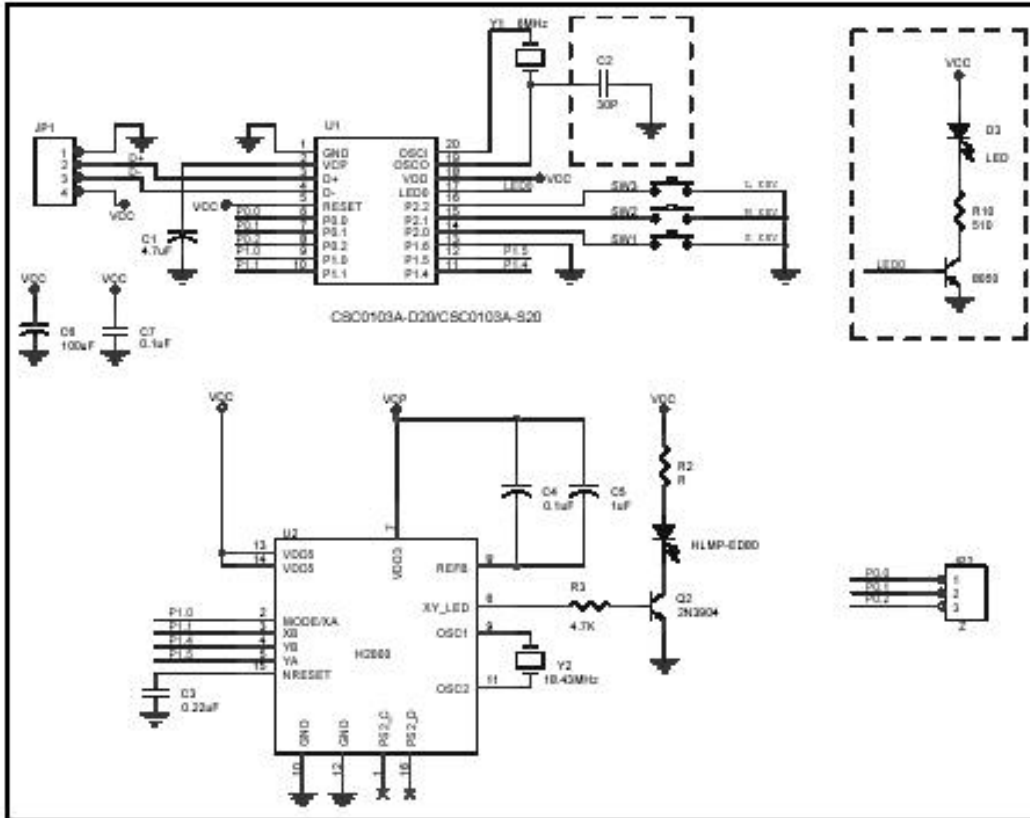


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3 Dimension 3 Keys Optical Mouse with Mechanical Z Axis and LED Output without Suspend Mode

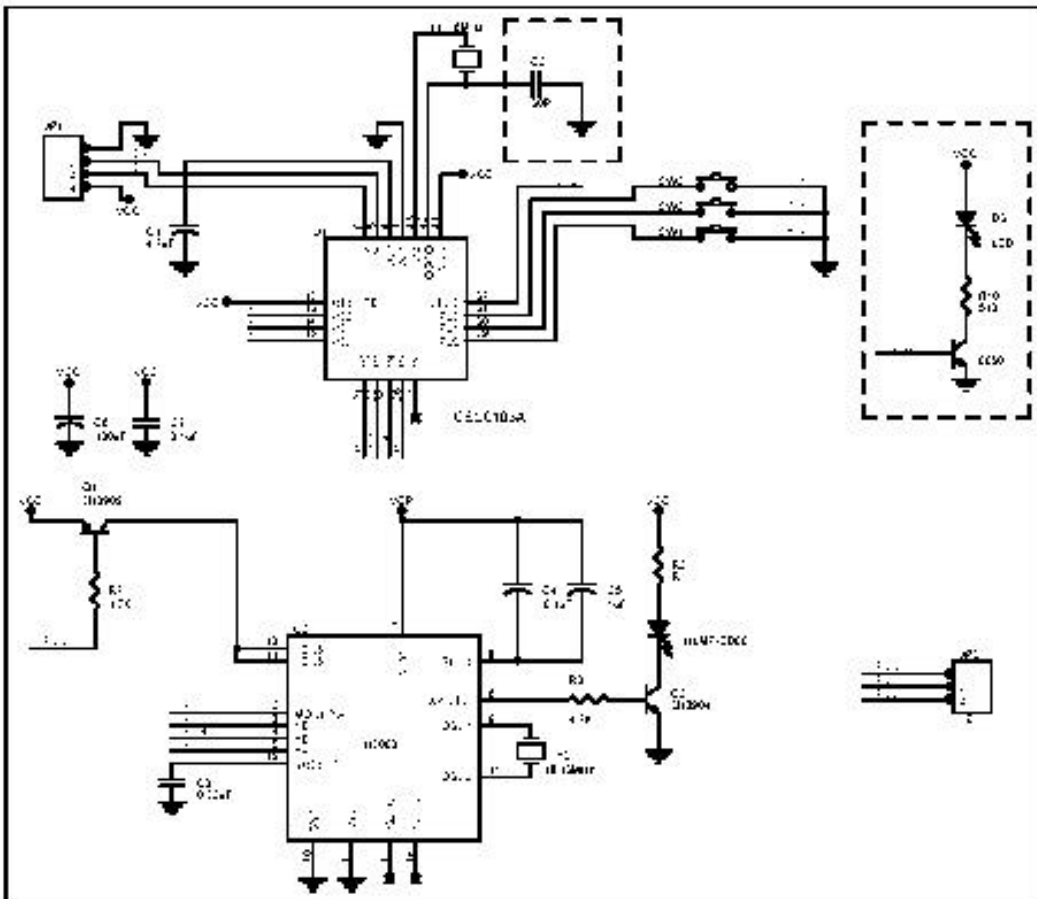
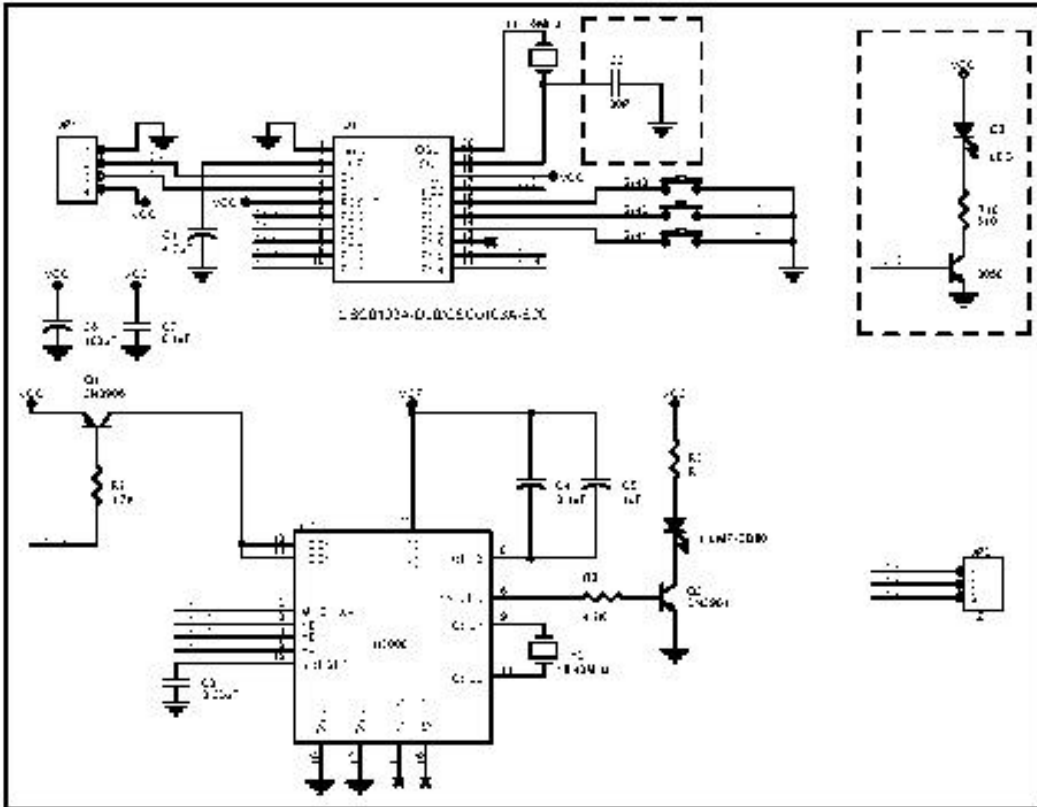


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3 Dimension 3 Keys Optical Mouse with Mechanical Z Axis and LED Output with Suspend Mode

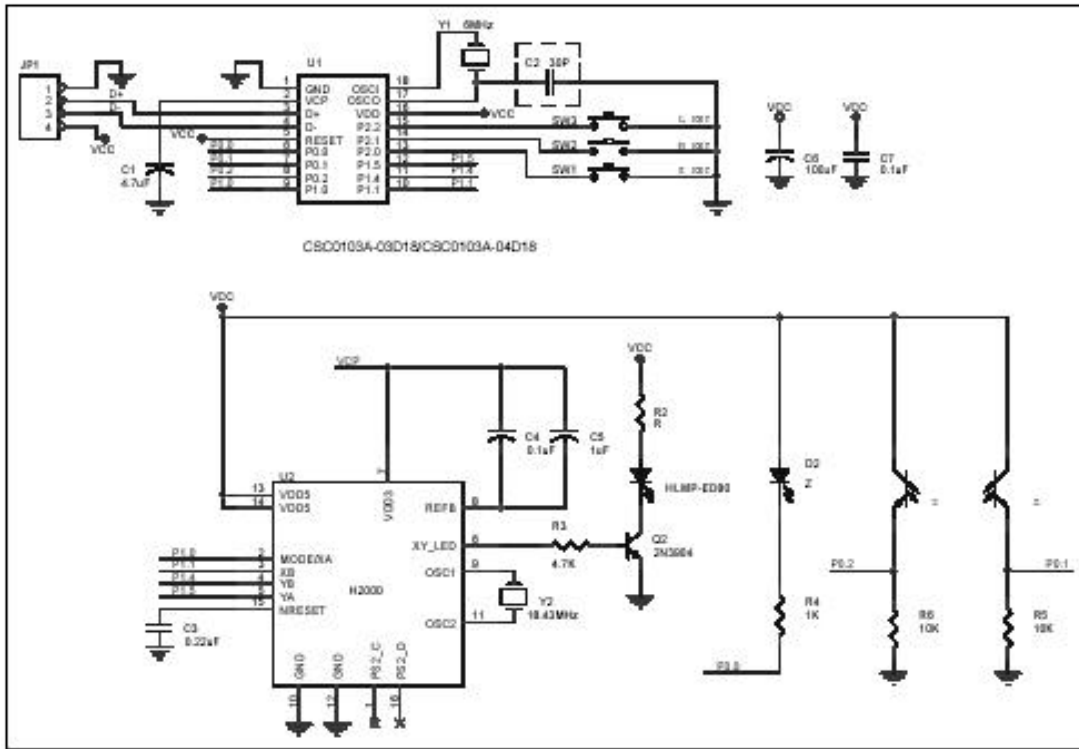


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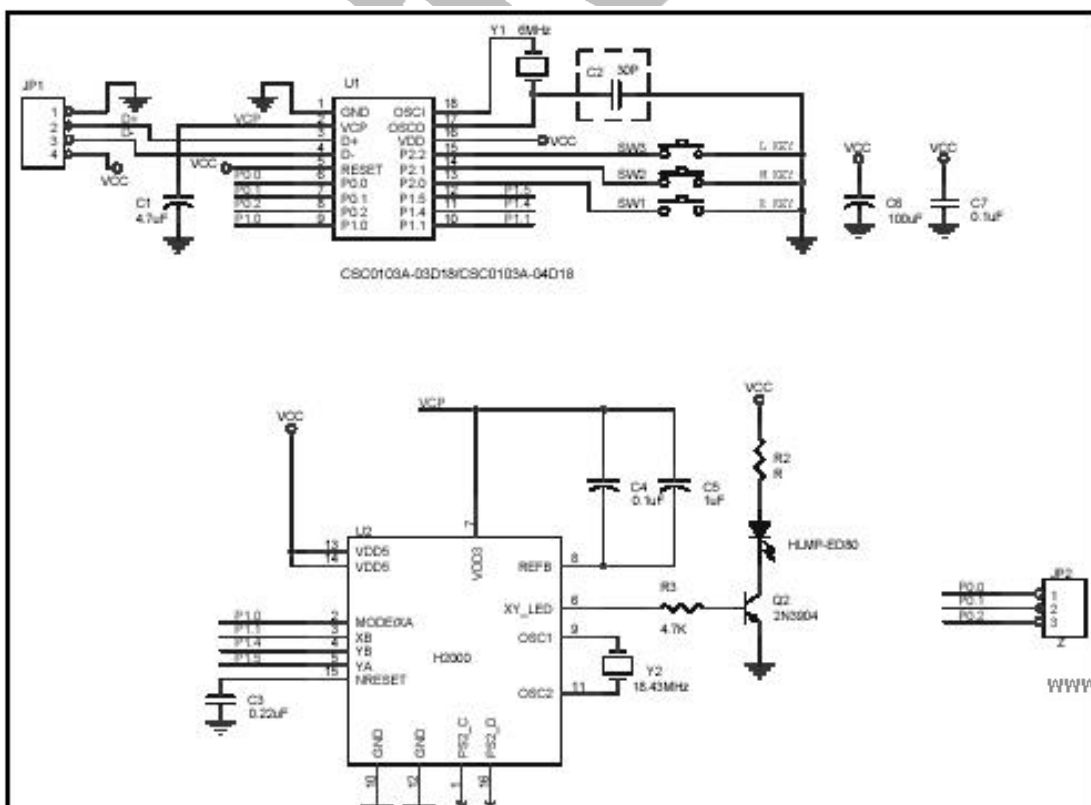
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3 Dimension 3 Keys Optical Mouse with Optical Large / Small Gear Z Axis without Suspend Mode CSC0103A-03D18 for Large Z Axis / CSC0103A-04D18for Small Gear Z Axis



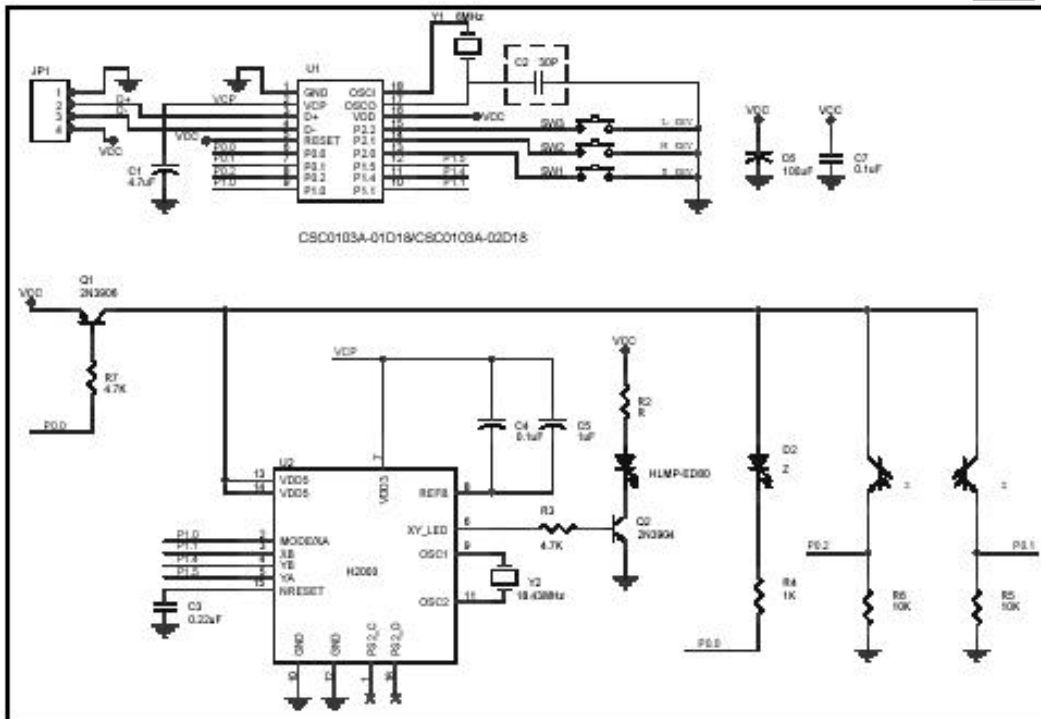
3 Dimension 3 Keys Optical Mouse with Mechanical Large / Small Gear Z Axis without Suspend Mode CSC0103A-03D18 for Large Gear Z Axis / csc0103a-04D18 for Small Gear Z Axis



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3 Dimension 3 Keys Optical Mouse weith Optical Large / Small Gear Z Axis with Suspend Mode
CSC0103A-01D18 for Large Gear Z Axis / CSC0103A-02D18 for Small Gear Z Axis

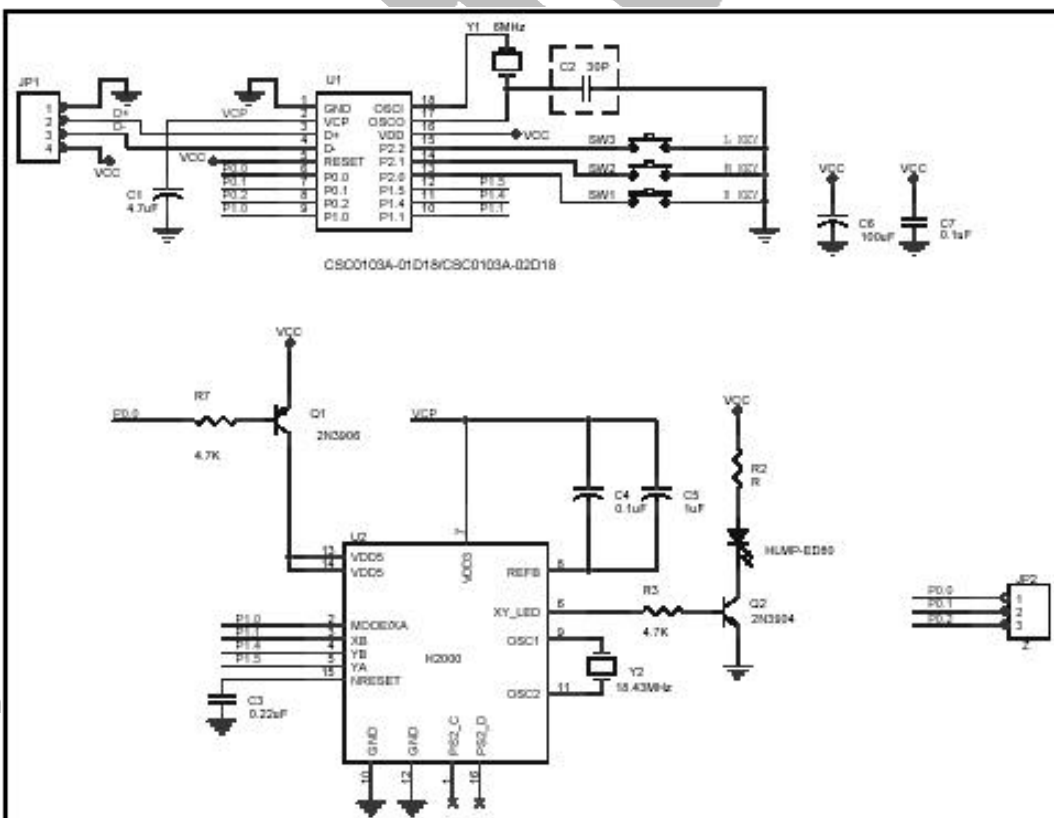


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3 Dimension 3 Keys Optical Mouse with Mechanical Large / Small Gear Z Axis with Suspend Mode

CSC0103A-01D18 for Large Gear Z Axis / CSC0103A-02D18 for Small Gear Z Axis



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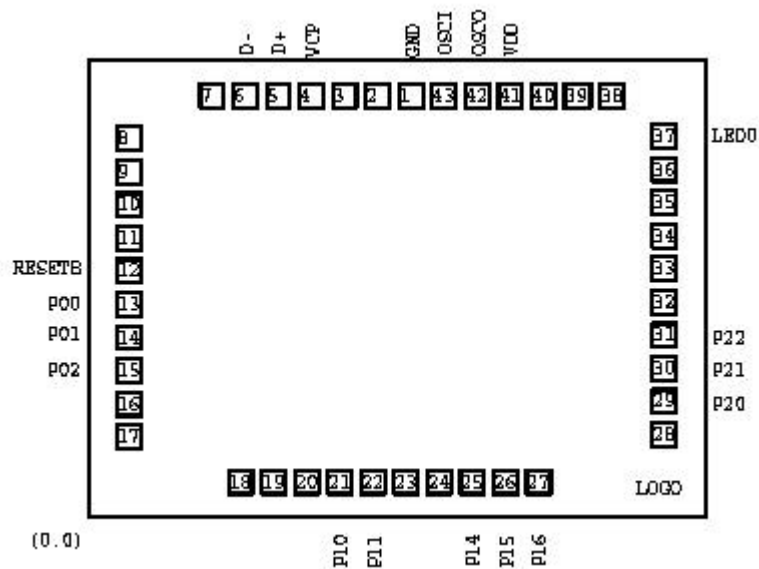


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8. Bonding Diagram



Chip Size : 1830 um × 1820 um

IC substrate should be connected to GND

Pad No	Pad Name	X	Y	Pad No	Pad Name	X	Y
1	GND	885.575	1778	25	P14	1142.025	42
4	VCP	596.95	1778	26	P15	1234.025	42
5	D+	500.725	1778	27	P16	1326.025	42
6	D-	404.525	1778	29	P20	1788	587
12	RESETB	42	951.9	30	P21	1788	679
13	P00	42	859.9	31	P22	1788	771
14	P01	42	767.9	37	LED0	1788	1323
15	P02	42	675.9	41	VDD	1233.025	1778
21	P10	774.025	42	42	OSCO	1137.15	1778
22	P11	866.025	42	43	OSCI	982.125	1778

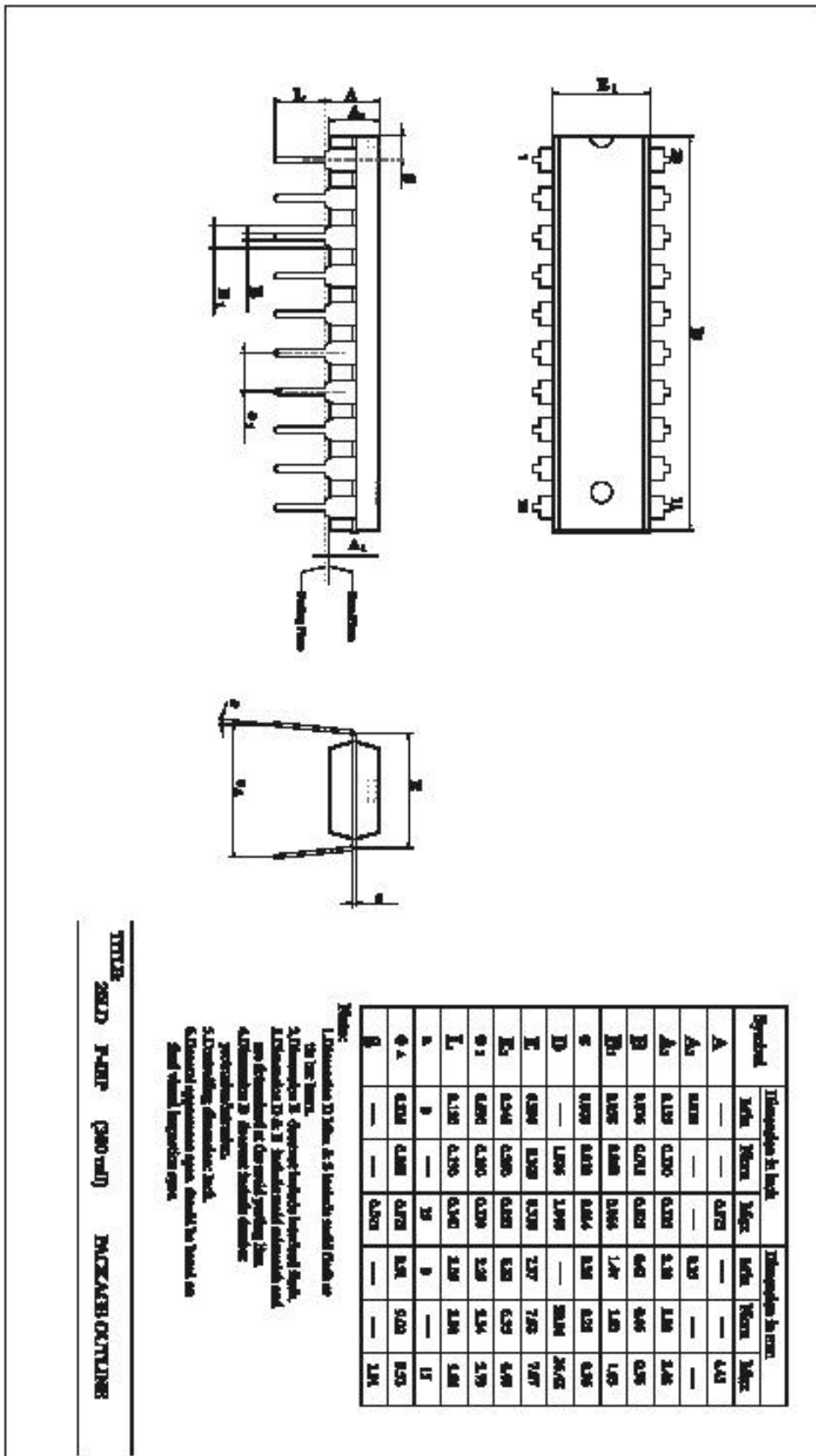


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9. Package Outline
DIP 20 pins



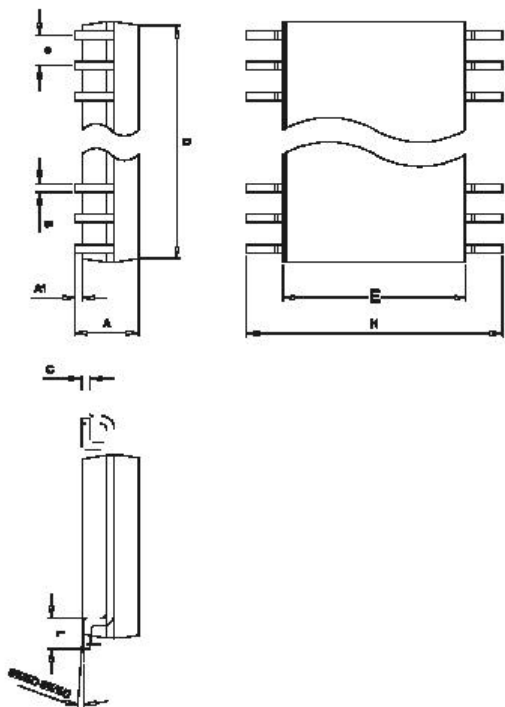


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SOP 20 pins



Symbol	INCHES		MILLIMETERS			
	Min	Max	Min	Max		
A	0.093	0.104	2.350	2.650		
A1	0.004	0.012	0.100	0.300		
B	0.014	0.019	0.350	0.490		
C	0.009	0.013	0.230	0.320		
e	0.050	BSC	1.270	BSC		
E	0.291	0.299	7.400	7.600		
G	0.394	0.419	10.000	10.650		
L	0.016	0.050	0.400	1.270		
D	0.398	0.413	10.100	10.500		16SOIC
D	0.496	0.512	12.600	13.000		20SOIC
						MSO13AA
						MSO13AC

Note :

1. Dimension D Max Include mode flash or the barburts
2. Dimension E does not Include Interlead flash.
3. Dimension D E Include mold mlsmatch and are deternlnd at the mold parting line.
4. Dimension B does not Include dambar protrusion / Intrusion

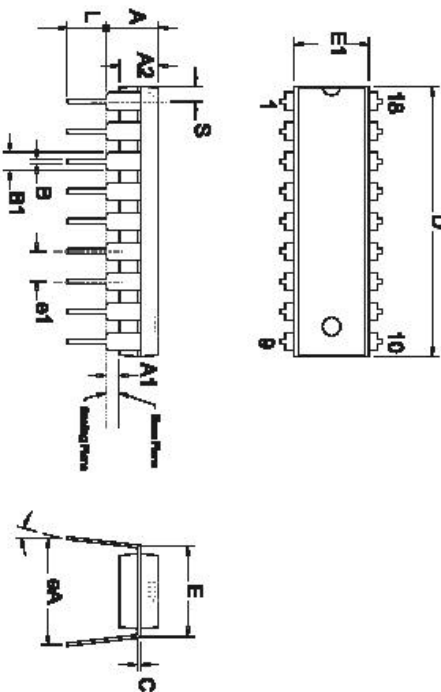


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Controller

DIP 18 pins



Symbol	Dimension Inch			Dimension In mm		
	Min	Nom	Max	Min	Nom	Max
A	—	—	0.175	—	—	4.45
A1	0.010	—	—	0.25	—	—
A2	0.125	0.130	0.135	3.18	3.30	3.43
B	0.016	0.018	0.022	0.41	0.46	0.56
B1	0.058	0.080	0.084	1.47	1.52	1.63
c	0.008	0.010	0.014	0.20	0.25	0.36
D	—	0.900	0.910	—	22.88	23.11
E	0.290	0.300	0.310	7.37	7.82	7.87
E1	0.245	0.250	0.255	6.22	6.36	6.48
e1	0.090	0.100	0.110	2.29	2.54	2.79
L	0.120	0.130	0.140	3.05	3.30	3.56
eA	0	—	15	0	—	15
S	0.335	0.355	0.375	8.51	9.02	9.53
S	—	—	0.055	—	—	1.40

Note :

- 6. Dimension D Max Include mode flash or the barbours
- 7. Dimension E does not Include Interlead flash.
- 8. Dimension D E Include mold mismatch and are determined at the mold parting line.
- 9. Dimension B does not Include dambar protrusion / Intrusion