eKM8025

USB and PS/2 Mouse Controller

Product Specification

DOC. VERSION 1.2

ELAN MICROELECTRONICS CORP.

September 2008

Trademark Acknowledgments:
IBM is a registered trademark and PS/2 is a trademark of IBM.
Windows is a trademark of Microsoft Corporation.
ELAN and ELAN logo are trademarks of ELAN Microelectronics Corporation.

The contents of this specification are subject to change without further notice. ELAN Microelectronics assumes no responsibility concerning the accuracy, adequacy, or completeness of this specification. ELAN Microelectronics makes no commitment to update, or to keep current the information and material contained in this specification. Such information and material may change to conform to each confirmed order.

In no event shall ELAN Microelectronics be made responsible for any claims attributed to errors, omissions, or other inaccuracies in the information or material contained in this specification. ELAN Microelectronics shall not be liable for direct, indirect, special incidental, or consequential damages arising from the use of such information or material.

The software (if any) described in this specification is furnished under a license or nondisclosure agreement, and may be used or copied only in accordance with the terms of such agreement.

ELAN Microelectronics products are not intended for use in life support appliances, devices, or systems. Use of ELAN Microelectronics product in such applications is not supported and is prohibited.
NO PART OF THIS SPECIFICATION MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS WITHOUT THE EXPRESSED WRITTEN PERMISSION OF ELAN MICROELECTRONICS.

ELAN MICROELECTRONICS CORPORATION

Headquarters:
No. 12, Innovation Road 1
Hsinchu Science Park
Hsinchu, TAIWAN 308
Tel: +886 3 563-9977
Fax: +886 3 563-9966
http://www.emc.com.tw

Hong Kong:
Elan (HK) Microelectronics Corporation, Ltd.
Flat A, 19F., World Tech Centre
95 How Ming Street, Kwun Tong
Kowloon, HONG KONG
Tel: +852 2723-3376
Fax: +852 2723-7780

USA:
Elan Information Technology Group (U.S.A.)
PO Box 601
Cupertino, CA 95015
U.S.A.
Tel: +1 408 366-8225
Fax: +1 408 366-8225

Shenzhen:
Elan Microelectronics Shenzhen, Ltd.
3F, SSMEC Bldg., Gaoxin S. Ave. I
Shenzhen Hi-tech Industrial Park
(South Area), Shenzhen
CHINA 518057
Tel: +86 755 2601-0565
Fax: +86 755 2601-0500
elan-sz@elanic.com.cn

Shanghai:
Elan Microelectronics Shanghai, Ltd.
#23, Zone 115, Lane 572, Bibo Rd.
Zhangjiang Hi-Tech Park
Shanghai, CHINA 201203
Tel: +86 21 5080-3866
Fax: +86 21 5080-4600
elan-sh@elanic.com.cn

Contents

APPENDIX

Specification Revision History

Doc. Version	Revision Description	Date
1.0	Initial released version	2006/11/03
1.1	Modified the Cap. of the resonator value.	2007/03/30
1.2	Added Appendix – Package Outline Dimension	2008/09/04

1 General Description

The eKM8025 is a Mouse Controller designed to control both USB and PS/2 Mouse device with XY Quadrature.

This Mouse Controller can auto detect USB or PS/2 mode, and supports three axes X,Y, Z, and five buttons L, R, M, P, N under both USB and PS/2 modes.

2 Features

- Universal Serial Bus Specification, version 1.1
- USB HID Specification, version 1.11
- Auto-detecting PS/2 port or USB port
- Compatible with Microsoft 3D PS/2 mouse
- Supports 3D (X, Y, Z) 5-Key (L, R, M, P, N) input
- Supports Z/2 Z-axis input type
- Supports Agilent HDNS2000, ADNS2051, OM01, OM02, PixArt PAN101BOI/BSI Optical Mouse Sensor
- 800 DPI simulation by firmware (for eKM8025BBP / eKM8025BCP / eKM8025BBM / eKM8025BCM only)
- Applications:
  - 3D, 3 Buttons USB and PS/2 Combo Mouse
  - 3D, 5 Buttons USB and PS/2 Combo Mouse
- Package:

  [400 dpi]
  - 18-pin PDIP (300 mil) eKM8025ABP 3D 3K
  - 18-pin SOP (300 mil) eKM8025ABM 3D 3K
  - 20-pin PDIP (300 mil) eKM8025ACP 3D 5K
  - 20-pin SOP (300 mil) eKM8025ACM 3D 5K

  [800 dpi simulation by firmware]
  - 18-pin PDIP (300 mil) eKM8025BBP 3D 3K
  - 18-pin SOP (300 mil) eKM8025BBM 3D 3K
  - 20-pin PDIP (300 mil) eKM8025BCP 3D 5K
  - 20-pin SOP (300 mil) eKM8025BCM 3D 5K

3 Pin Assignment

- **18-Pin eKM8025AB /eKM8025BB for 3D, 3-Key**

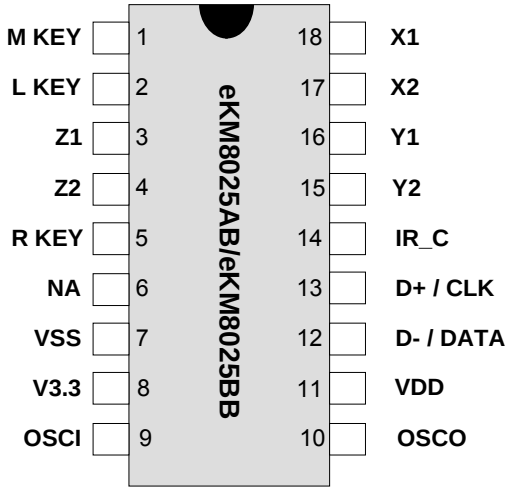


Figure 3-a eKM8025AB / eKM8025BB (18-pin)

- **eKM8025AC/eKM8025BC (20-Pin) for 3D, 5-Key**

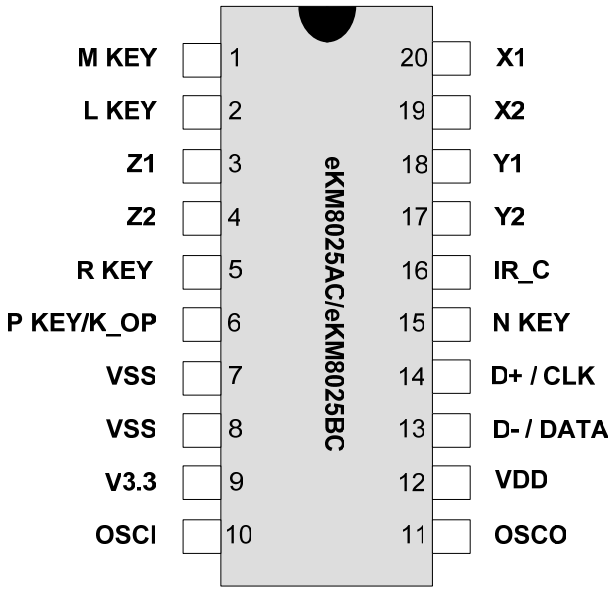


Figure 3-b eKM8025AC/eKM8025BC (20-pin)

4 Pin Description

18-pin eKM8025AB/BB for 3D, 3-Key

Pin No.	Symbol	I/O	Function
1	M	I	Middle Key Input
2	L	I	Left Key Input
3	Z1	I	Z axis Input 1
4	Z2	I	Z axis Input 2
5	R	I/O	Right Key Input
6	K_OP	I	This pin should be connected to V3.3 (Pin 8)
7	VSS	–	GND
8	V3.3V	O	3.3V DC voltage output from internal regulator. This pin has to be tied to a 4.7µF capacitor.
9	OSCI	I	6 MHz ceramic resonator input.
10	OSCO	I/O	Return path for 6 MHz ceramic resonator.
11	VDD	–	5V Power Input
12	D- / DATA	I/O	USB D- or PS/2 Data I/O
13	D+ / CLK	I/O	USB D+ or PS/2 CLK I/O
14	IR_C	O	IR (Sensor power) Control Pin 1
15	Y2	I	Y axis Input 2
16	Y1	I	Y axis Input 1
17	X2	I	X axis Input 2
18	X1	I	X axis Input 1

20-pin eKM8025AC/BC for 3D, 5-Key

Pin No.	Symbol	I/O	Function
1	M	I	Middle Key Input
2	L	I	Left Key Input
3	Z1	I	Z axis Input 1
4	Z2	I	Z axis Input 2
5	R	I/O	Right Key Input
6	K_OP	I	This pin should be connected to GND with 1MΩ resistance.
6	P	I	Pre Key Input
7, 8	VSS	–	GND
9	V3.3V	O	3.3V DC voltage output from internal regulator. This pin has to be tied to a 4.7μF capacitor.
10	OSCI	I	6MHz ceramic resonator input.
11	OSCO	I/O	Return path for 6-MHz ceramic resonator.
12	VDD	-	5V Power Input
13	D- / DATA	I/O	USB D- or PS/2 Data I/O
14	D+ / CLK	I/O	USB D+ or PS/2 CLK I/O
15	N	I	Next Key Input
16	IR_C	O	IR (Sensor power) Control Pin 1
17	Y2	I	Y axis Input 2
18	Y1	I	Y axis Input 1
19	X2	I	X axis Input 2
20	X1	I	X axis Input 1

5 Function Description

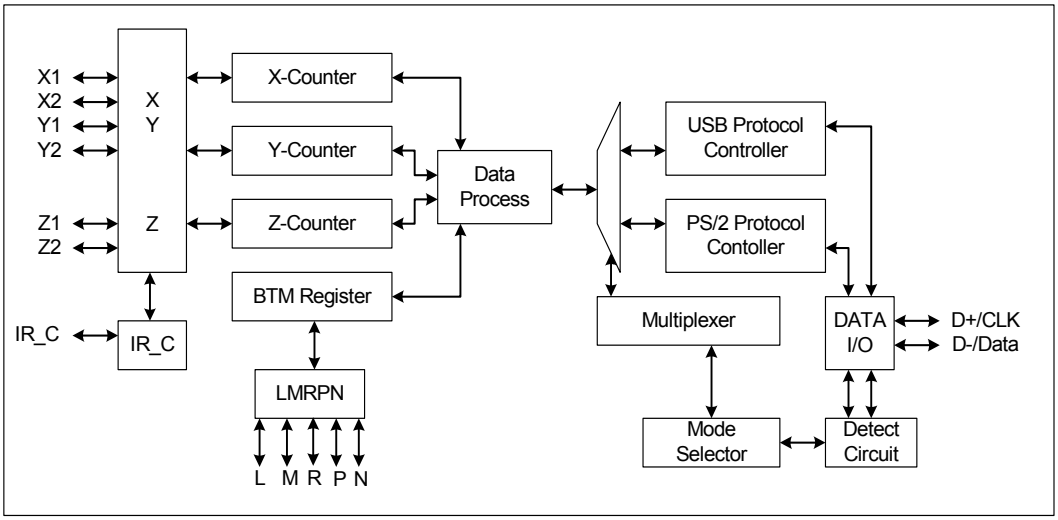


Figure 5-1 eKM8025 Functional Block Diagram

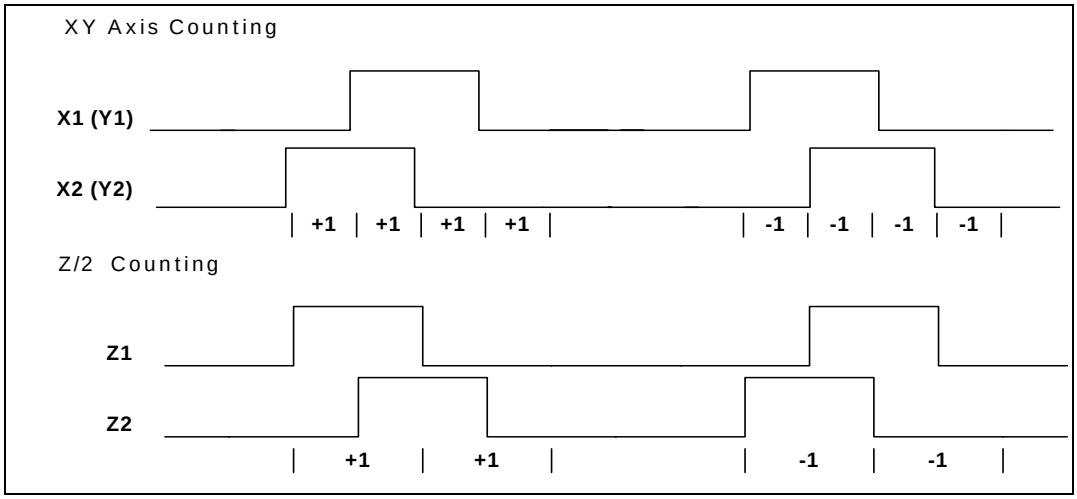


Figure 5-2 Quadrature Signal Timing Diagram

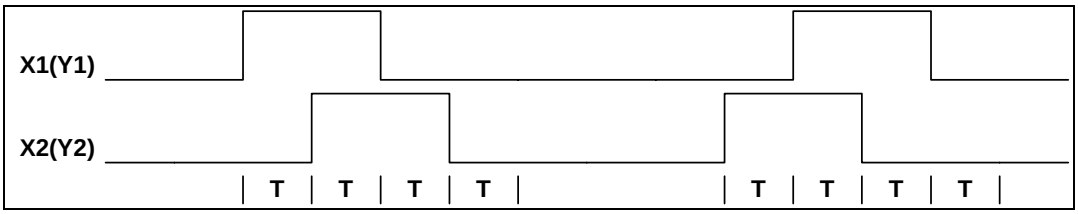


Figure 5-3 Quadrature Output Crossed Width Limit

NOTE

For X (Y) Axis, T > 40 µs

For Z Axis, T > 1ms

■ PS/2 Function Description

- PS/2 Mouse Commands Description

Hex Code	Command	eKM8025 Echo Code
FF	Reset	FA,AA,00
FE	Resend	XX, (XX,XX)
F6	Set Default	FA
F5	Disable	FA
F4	Enable	FA
F3, XX	Set Sampling Rate	FA, FA
F2	Read Device Type	FA,00
F0	Set Remote Mode	FA
EE	Set Wrap Mode	FA
EC	Reset Wrap Mode	FA
EB	Read Data	FA,XX,XX,XX
EA	Set Stream Mode	FA
E9	Status Request	FA,XX,XX,XX
E8	Set Resolution	FA,FA
E7	Set Autospeed	FA
E6	Reset Autospeed	FA

- Microsoft PS/2 Scrolling Mouse

(A) Entering procedure: Except in WRAP mode, while the eKM8025 received the following consecutive commands:

i. F3 C8 – set sampling rate 200/sec

ii. F3 64 – set sampling rate 100/sec

iii. F3 50 – set sampling rate 80/sec

(B) Entering procedure: after eKM8025 enters scrolling mouse mode (Mouse ID = 03), while the eKM8025 received the following consecutive commands, the eKM8025 will enter 5-button mode Mouse ID: 04).

i. F3 C8 – set sampling rate 200/sec

ii. F3 C8 – set sampling rate 200/sec

iii. F3 50 – set sampling rate 80/sec

(C) Operating in PS/2 scrolling mode:

a. All of the commands in legacy mode will still be valid.

b. The ID code of read device type command (F2) will change from "00" to "03".

c. Data report will be four bytes format:

【3D 3-Button Data Format】

Byte	Bit	Description
1	0	Left button status; 1 = pressed
	1	Right button status; 1 = pressed
	2	Middle button status; 1 = pressed
	3	Reserve to 1
	4	X data sign; 1 = negative
	5	Y data sign; 1 = negative
	6	X data overflow; 1 = overflow
	7	Y data overflow; 1 = overflow
2	0-7	X data (D0-D7)
3	0-7	Y data (D0-D7)
4	0-7	Z data (D0-D7)

(D) Operating in 3D 5K mode:

a. All of the commands in legacy mode will still be valid.

b. The ID code of the read device type command (F2) will change from "03" to "04".

c. Data report will be four bytes format:

【3D, 5-Button Data Format】

Byte	Bit	Description
1	0	Left button status; 1 = pressed
	1	Right button status; 1 = pressed
	2	Middle button status; 1 = pressed
	3	Reserve to 1
	4	X data sign; 1 = negative
	5	Y data sign; 1 = negative
	6	X data overflow; 1 = overflow
	7	Y data overflow; 1 = overflow
2	0-7	X data (D0-D7)
3	0-7	Y data (D0-D7)
4	0-3	Z data (D0-D3)
4	4	P KEY status; 1 = pressed
4	5	N KEY status; 1 = pressed
4	6, 7	Reserve to 0

(E) Exiting Microsoft scrolling mode & 3D, 5-K mode:

There are two ways to exit:

a. Power off

b. Reset command (FF)

- Z-axis Input Function

(A) The Z0-Z7 limit value is 7

(B) Z-axis counter accumulates the Z1, Z2 phase changed by movement. This mode includes noise immunity.

(C) Z/2 : 2 dots per count. The wheel should stay at Z1=0, Z2=0 or Z1=1, Z2=1 Phase

6 USB Function Description

6.1 Device Descriptor

Offset	Field	Size	Description	Value
0	bLength	1	The size of this descriptor is 18 bytes.	0x12
1	bDescriptorType	1	Device Descriptor Type	0x01
2	bcdUSB	2	Device complies with the USB specification Version 1.10.	0x0110
4	bDeviceCalss	1	Each interface specifies its own class information.	0x00
5	bDeviceSubClass	1	Each interface specifies its own sub class information.	0x00
6	bDeviceProtocol	1	No protocols on the device basis	0x00
7	bMaxPacketSize0	1	Maximum packet size for endpoint zero is 8	0x08
8	idVendor	2	The Vendor ID is 0x04F3	0x04F3
10	idProduct	2	The Product ID is 0x0211(3D3K)/0x0212 (3D 5K)	0x0211/ 0x0212
12	bcdDevice	2	The device release number is 24.00 (eKM8025A) / 25.00 (eKM8025B)	0x2400/0 x2500
14	iManufacturer	1	The device does not have the string[*1] descriptor describing the manufacturer.	0x00
15	iProduct	1	The index of the string[*1] descriptor describing the product is “2”.	0x02
16	iSerialNumber	1	The device does not have the string[*1] descriptor that describes the serial number.	0x00
17	bNumConfigurations	1	The device uses “1” as possible configuration.	0x01

[*1] *Product String: “PS/2+USB Mouse”*

6.2 Configuration Descriptor

Offset	Field	Size	Description	Value
0	bLength	1	The size of this descriptor is 9 bytes.	0x09
1	bDescritorType	1	Configuration Descriptor Type	0x02
2	wTotalLength	2	The total length of data for this configuration is 34. This includes the combined length of all the descriptors returned.	0x0022
4	bNumInterfaces	1	This configuration supports “1” interface.	0x01
5	bConfigurationValue	1	The value “1” should be used to select this configuration.	0x01
6	iConfiguration	1	The device does not have the string descriptor describing this configuration	0x00
7	bmAttributes	1	Configuration characteristics: • Bit 7: Reserved (set to one) **1** • Bit 6: Self-powered **0** • Bit 5: Remote Wakeup **1**	0xA0
8	MaxPower	1	Maximum power consumption of the device under this configuration is 100 mA	0x32

6.3 Interface Descriptor

Offset	Field	Size	Description	Value
0	bLength	1	The size of this descriptor is 9 bytes.	0x09
1	bDescriptorType	1	Interface Descriptor Type	0x04
2	bInterfaceNumber	1	The number of this interface is “0”.	0x00
3	bAlternateSetting	1	The value used to select alternate setting for this interface is “0”.	0x00
4	bNumEndpoints	1	The number of endpoints used by this interface is “1” (excluding endpoint zero)	0x01
5	bInterfaceClass	1	The interface implements HID class.	0x03
6	bInterfaceSubClass	1	The subclass code is 0x01.	0x01
7	bInterfaceProtocol	1	The protocol code is 0x02.	0x02
8	iInterface	1	The device does not have the string descriptor describing this interface.	0x00

6.4 Human Interface Device (HID) Descriptor

Offset	Field	Size	Description	Value
0	bLength	1	The size of this descriptor is 9 bytes.	0x09
1	bDescriptorType	1	HID Descriptor Type	0x21
2	bcdHID	2	Device compliant to the HID specification version 1.11	0x0111
4	bCountryCode	1	The country code is 0x00.	0x00
5	bNumDescriptors	1	The number of class descriptors is “1”.	0x01
6	bDescriptorType	1	The class descriptor is Report descriptor.	0x22
7	wDescriptorlength	2	The total size of the class descriptor is 34.	0x0034

6.5 Endpoint Descriptor

Offset	Field	Size	Description	Value
0	bLength	1	The size of this descriptor is 7 bytes.	0x07
1	bDescriptorType	1	Endpoint Descriptor Type	0x05
2	bEndpointAddress	1	This is an IN endpoint with address (endpoint number) 1	0x81
3	bmAttributes	1	Types of attributes: • Transfer: Nterrupt • Sync: No Sync • Usage: Data EP	0x03
4	wMaxPackerSize	2	Maximum packet size value for this endpoint is 0x4 (Bits 12-11: Addtl. Transactions/frame)	0x0004
6	bInterval	1	bInterval: 10. The polling interval value is bInterval or 2**(bInterval-1)	0x0A

6.6 Report Descriptor

0x05	0x01	Usage Page (Generic Desktop Control)
0x09	0x02	Usage (Mouse)
0xA1	0x01	Collection (Application)
0x05	0x09	Usage Page (Button)
0x19	0x01	Usage Minimum (1)
0x29	0x03 / 0x05*2	Usage Maximum (3) / (5) *2
0x15	0x00	Logical Minimum (0)
0x25	0x01	Logical Maximum (1)
0x95	0x03 / 0x05*2	Report Count (3) / (5) *2
0x75	0x01	Report Size (1)
0x81	0x02	Input (Data, Variable, Absolute)
0x95	0x01	Report Count (1)
0x75	0x05 / 0x03*2	Report Size (5) / (3) *2
0x81	0x03	Input (Constant)
0x05	0x01	Usage Page (Generic Desktop Control)
0x09	0x01	Usage (Pointer)
0xA1	0x00	Collection (Physical)
0x09	0x30	Usage (X)
0x09	0x31	Usage (Y)
0x09	0x38	Usage (Wheel)
0x15	0x81	Logical Minimum (-127)
0x25	0x7F	Logical Maximum (127)
0x75	0x08	Report Size (8)
0x95	0x03	Report Count (3)
0x81	0x06	Input (Data, Variable, Relative)
0xC0	–	End Collection
0xC0	–	End Collection

*2 [3D, 3-Key mode] / [3D, 5-Key mode]

6.7 USB Mouse Report Data Type

Byte 1	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
	0	0	0	N[*3]	P[*3]	M	R	L
Byte 2	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit3**	**Bit 2**	**Bit 1**	**Bit 0**
	X-Movement Data							
Byte 3	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
	Y-Movement Data							
Byte 4	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
	Z-Movement Data							

[*3] 3D, 3-K Mode , P = N = 0

7 Absolute Maximum Rating

Symbol	Min.	Max.	Unit
Temperature under bias	0	70	ºC
Storage temperature	–65	150	ºC
Input voltage	–0.5	6.0	V
Output voltage	–0.5	6.0	V

8 Electrical Characteristic

Test Condition: T = 25ºC, VDD=5.0V, VSS=0V

Parameters	Sym.	Min.	Typ.	Max.	Unit	Remarks
Operating voltage	VDD	4.5	5.0	5.5	V	–
Operating Current (normal operation)	IOP	–	–	10	mA	–
Operating Current (suspend)	Isuspend	–	–	200	µA	–
Operating Current (Sleep mode)	Isleep	–	–	100	µA	–
Output voltage of 3.3V regulator	Vreg	3.0	3.3	3.6	V	–
X1, X2, Y1, Y2, input impedance	Rpi	–30%	29	+30%	KΩ	–
IR_C sink current (VOL = 0.4V)	Isink	8	10	12	mA	–
L, M, R, input high voltage	VIH	2.0	–	–	V	–
L, M, R, input low voltage	VIL	–	–	0.8	V	–
L, M, R, internal pull high resistor	Rmi	–30%	170	+30%	KΩ	–
L, M, R, debounce time	Tb	17	–	–	ms	See Figure 8-1a below
Z-axis debounce time	Tz	700	–	–	µs	See Figure 8-1b below

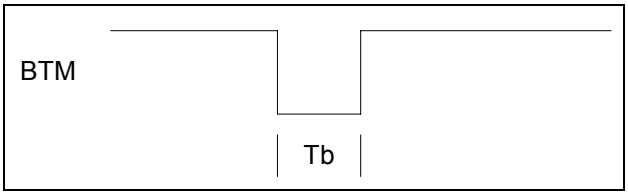


Figure 8-1a L, M, R, Debounce Time Timing Diagram

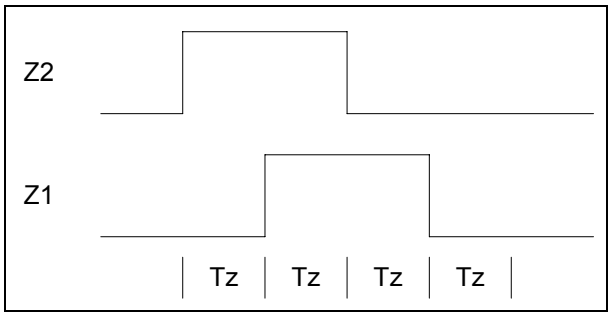


Figure 8-1b Z-Axis Debounce Time Timing Diagram

9 Pad List Information

9.1 eKM8025xB Pin/Pad Diagram

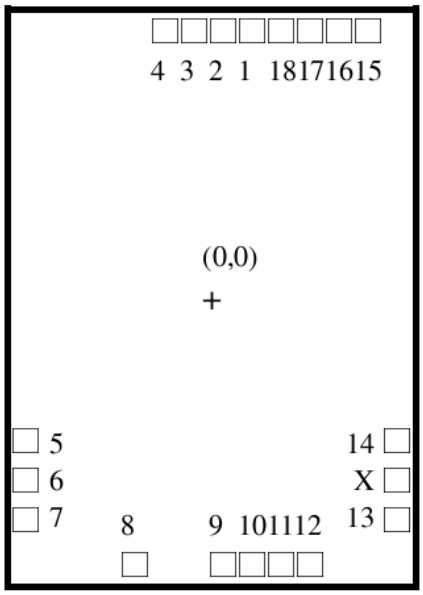


Figure 9-1 eKM8025xB Pad Diagram

9.2 eKM8025xB Pin Pad Coordinate

Chip Size：1520 × 2580 μM		
Pad Number	**Pad Name**	**Pad Coordinate (X, Y)**
1	M_KEY	196.5, 1176.7
2	L_KEY	91.5, 1176.7
3	Z1	-13.5, 1176.7
4	Z2	-118.5, 1176.7
5	R_KEY	-652.7, -785
6	K_OP	-652.7, -890
7	VSS	-652.7, -997.5
8	V3.3	-304.45, -1182.6
9	OSCI	44.3, -1182.6
10	OSCO	149.3, -1182.6
11	VDD	256.9, -1182.6
12	D_MNS	364.4, -1182.6
13	D_PLUS	647.3, -1015.8
	NC	647.3, -901.6
14	IR_C	647.3, -796.6
15	Y2	616.5, 1176.7
16	Y1	511.5, 1176.7
17	X2	406.5, 1176.7
18	X1	301.5, 1176.7

9.3 KM8025xC Pin/Pad Diagram

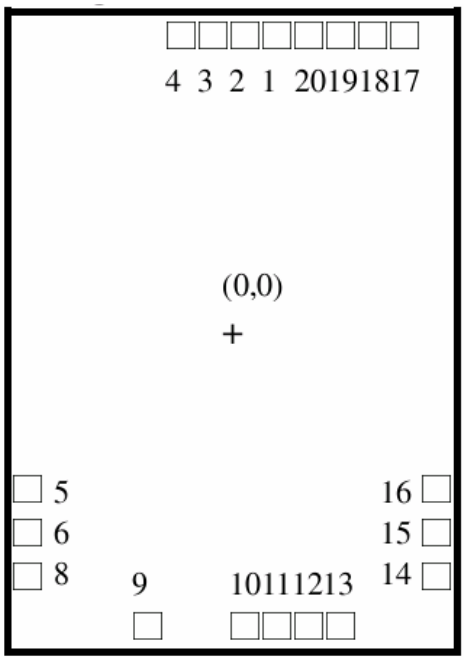


Figure 9-2 eKM8025xC Pad Diagram

9.4 eKM8025xC Pin/Pad Coordinate

Chip Size : 1520*2580 UM		
Pad Number	**Pad Name**	**Pad Coordinate (X, Y)**
1	M_KEY	196.5, 1176.7
2	L_KEY	91.5, 1176.7
3	Z1	-13.5, 1176.7
4	Z2	-118.5, 1176.7
5	R_KEY	-652.7, -785
6	P_KEY/K_OP	-652.7, -890
7		
8	VSS	-652.7, -997.5
9	V3.3	-304.45, -1182.6
10	OSCI	44.3, -1182.6
11	OSCO	149.3, -1182.6
12	VDD	256.9, -1182.6
13	D_MNS	364.4, -1182.6
14	D_PLUS	647.3, -1015.8
15	N_KEY	647.3, -901.6
16	IR_C	647.3, -796.6
17	Y2	616.5, 1176.7
18	Y1	511.5, 1176.7
19	X2	406.5, 1176.7
20	X1	301.5, 1176.7

10 Application Circuit

10.1 Notice Diagram

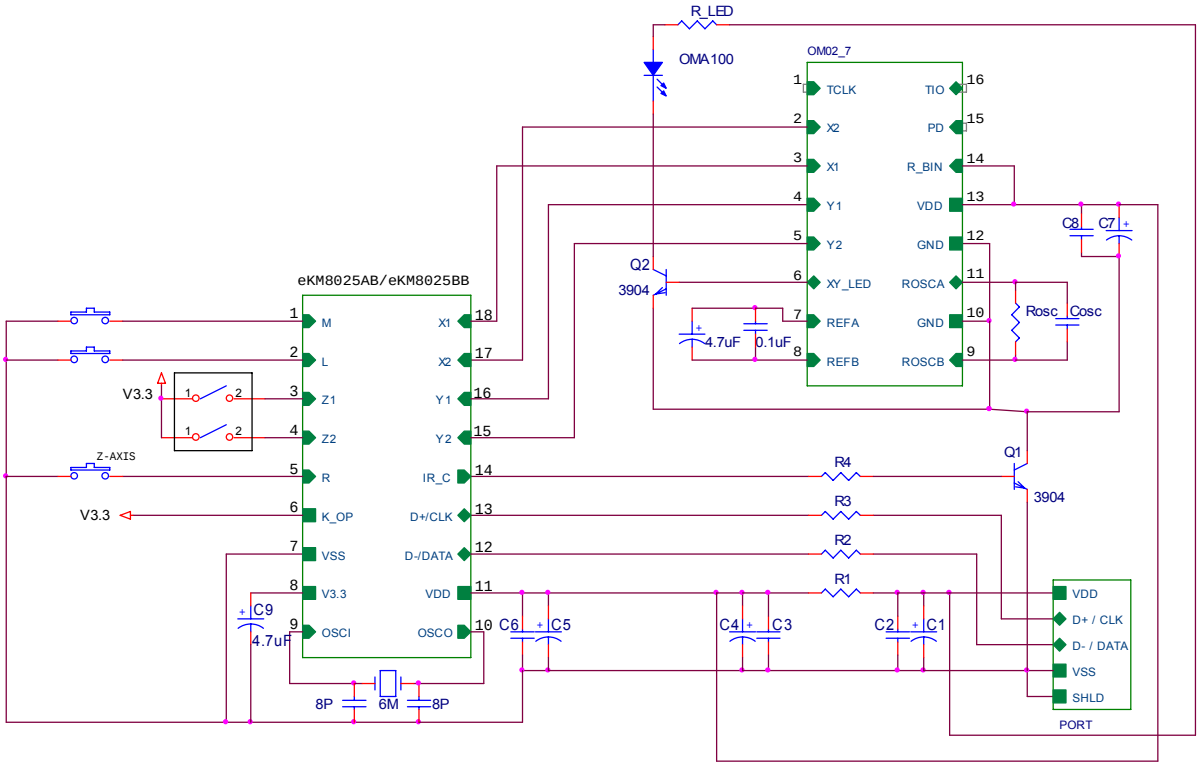


Figure 10 eKM8025 Notice Diagram

10.2 Components in Details

Type	R1	R2	R3	R4	C1	C2	C3
Normal Application	10Ω	-	-	1.5KΩ	10μF	0.1μF (104)	-
Eft better Improvement		33Ω	33Ω				0.1μF (104)
Type	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	**Cosc**
Normal Application	-	10μF	0.1μF (104)	100μF	0.1μF (104)	4.7μF	-
Eft better Improvement	10μF						1nF (102)

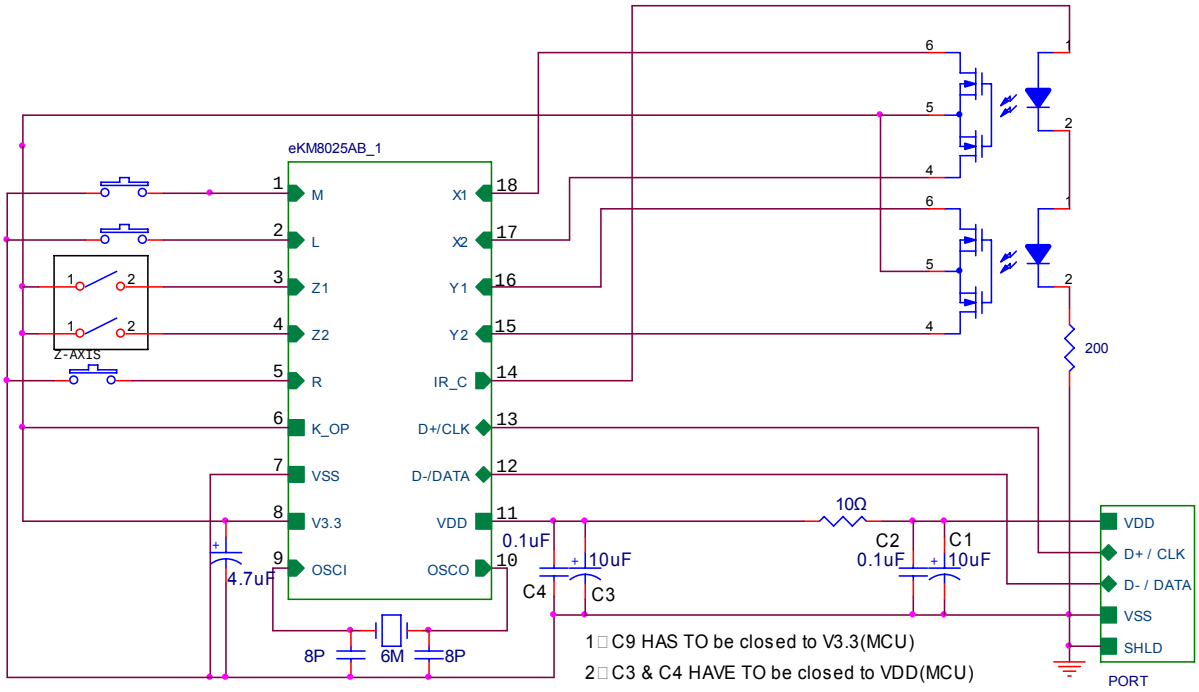
** C5 and C6 have to be closed to MCU (VDD)

** C7 and C8 have to be closed to Sensor (VDD).

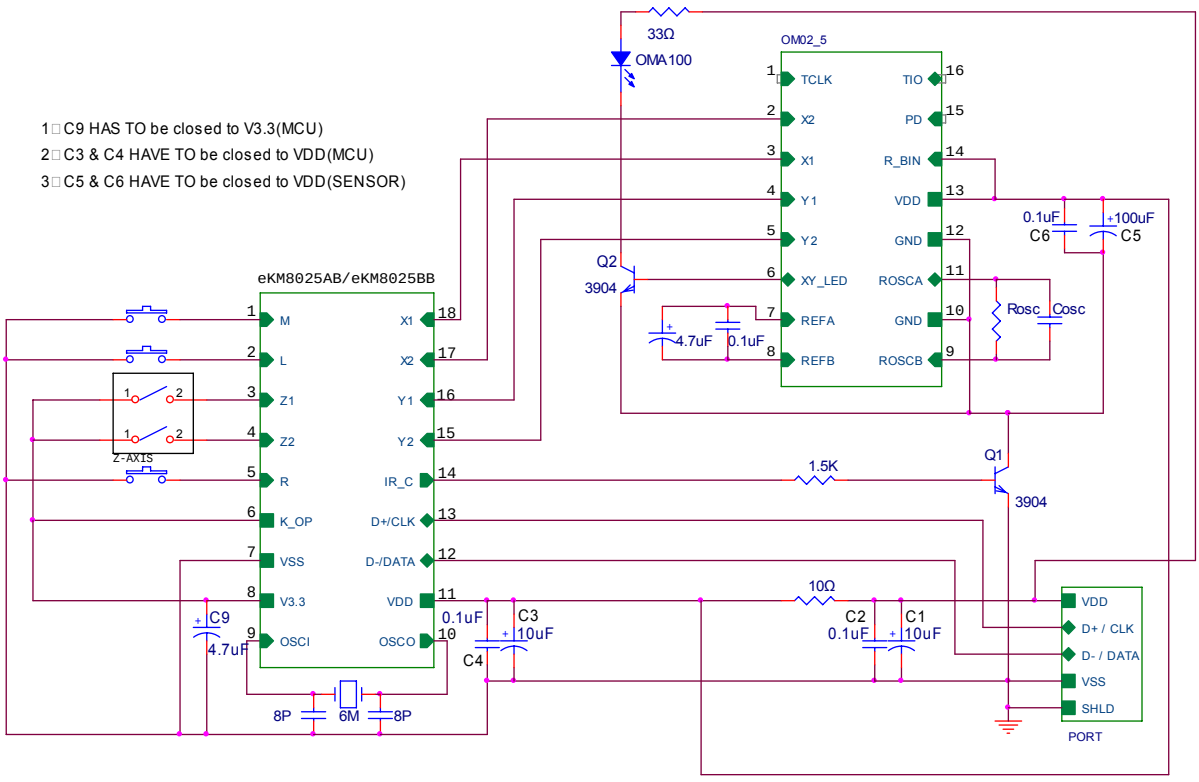
** C9 has to be closed to MCU (V3.3)

** It is NOT recommended to use the eKM8025B (800 DPI) for Ball Type.

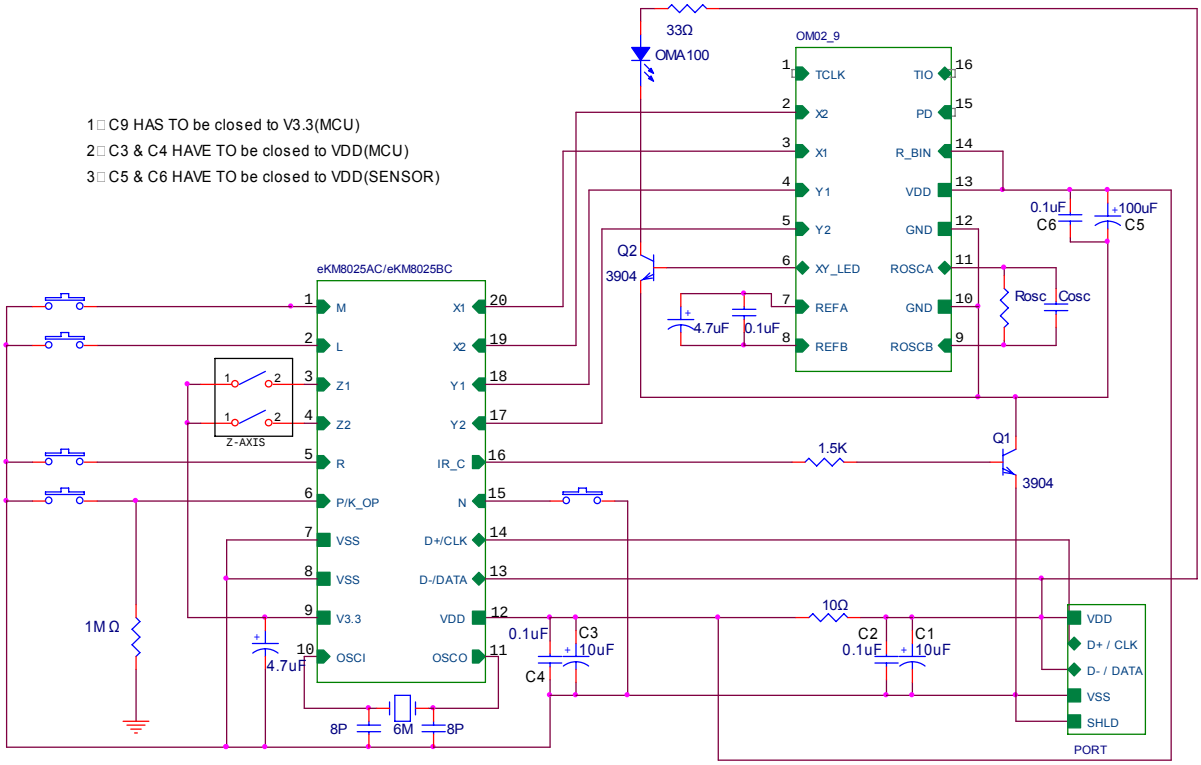
■ eKM8025AB – Mechanical Z/2 3D 3-Key Application For Ball Type



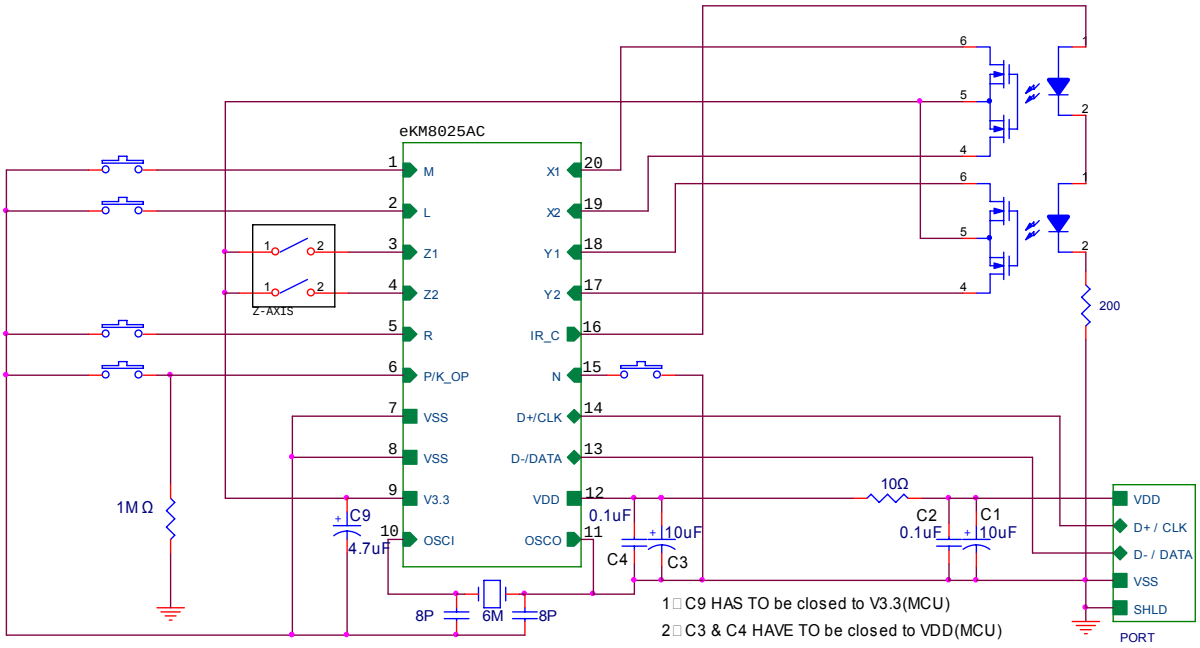
■ eKM8025AB//eKM8025BB – Mechanical Z/2, 3D 3-Key Application For OM02



■ eKM8025AC/eKM8025BC – Mechanical 3D, 5-Key Application For OM02



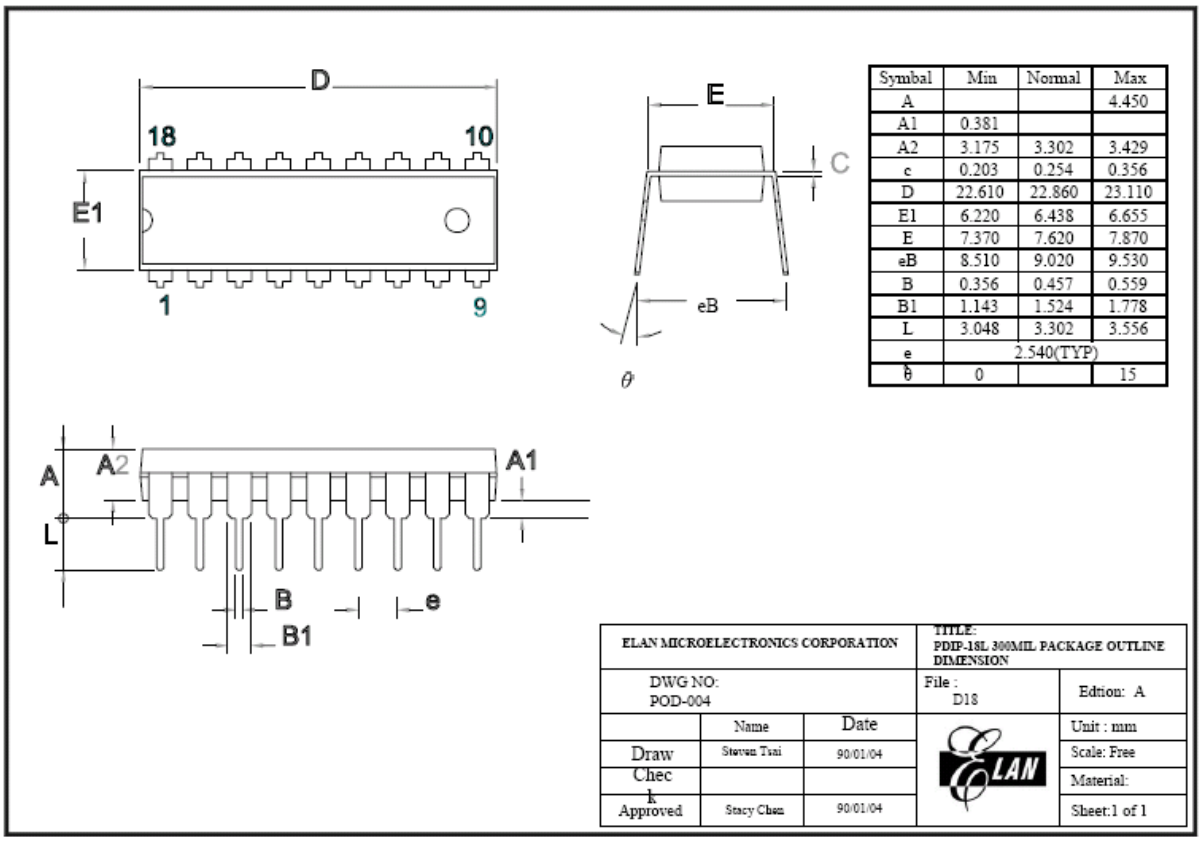
■ eKM8025AC – Mechanical 3D, 5-Key Application For Ball Type



APPENDIX

A Package Outline Dimension

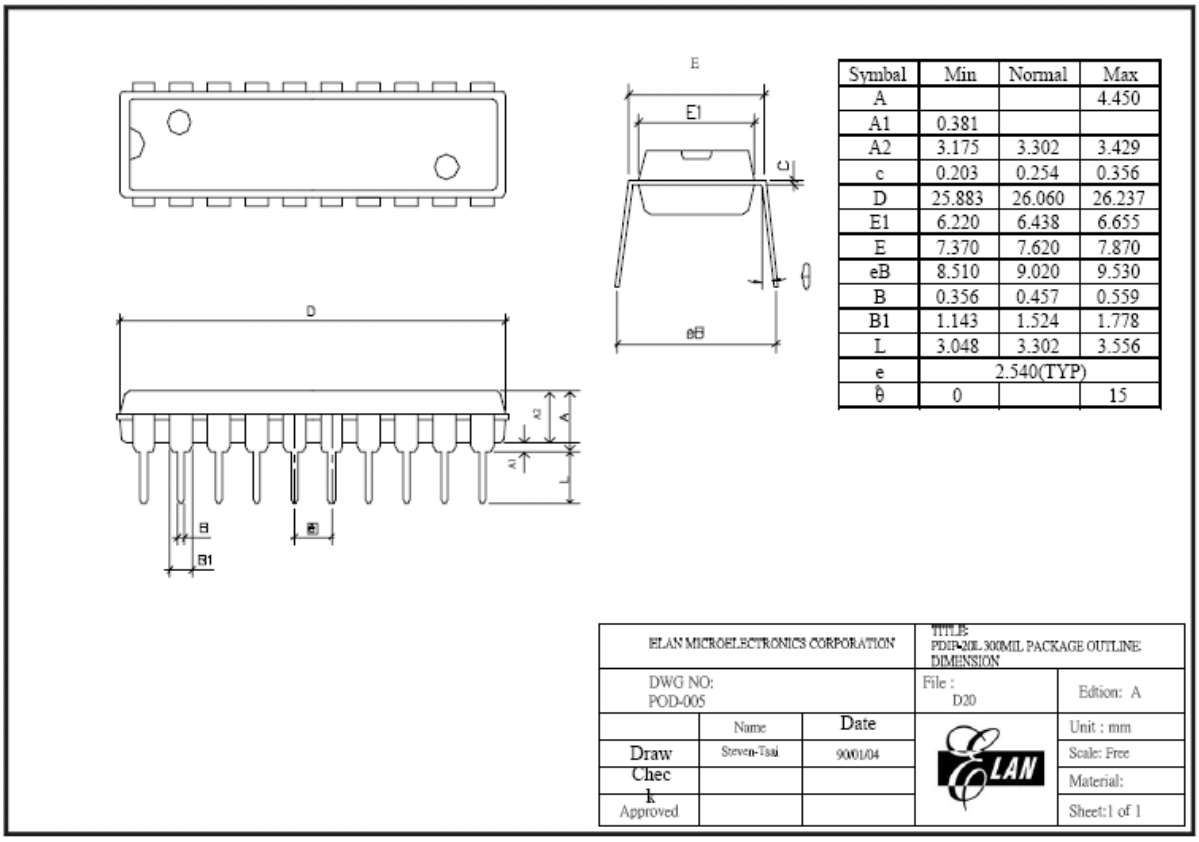
A.1 DIP-18L



Symbal	Min	Normal	Max
A			4.450
A1	0.381		
A2	3.175	3.302	3.429
c	0.203	0.254	0.356
D	22.610	22.860	23.110
E1	6.220	6.438	6.655
E	7.370	7.620	7.870
eB	8.510	9.020	9.530
B	0.356	0.457	0.559
B1	1.143	1.524	1.778
L	3.048	3.302	3.556
e	2.540(TYP)		
θ	0		15

ELAN MICROELECTRONICS CORPORATION			TITLE: PDIP-18L 300MIL PACKAGE OUTLINE DIMENSION	
DWG NO: POD-004			File : D18	Edtion: A
	Name	Date		Unit : mm
Draw	Steven Tsai	90/01/04		Scale: Free
Chec k				Material:
Approved	Stacy Chen	90/01/04		Sheet:1 of 1

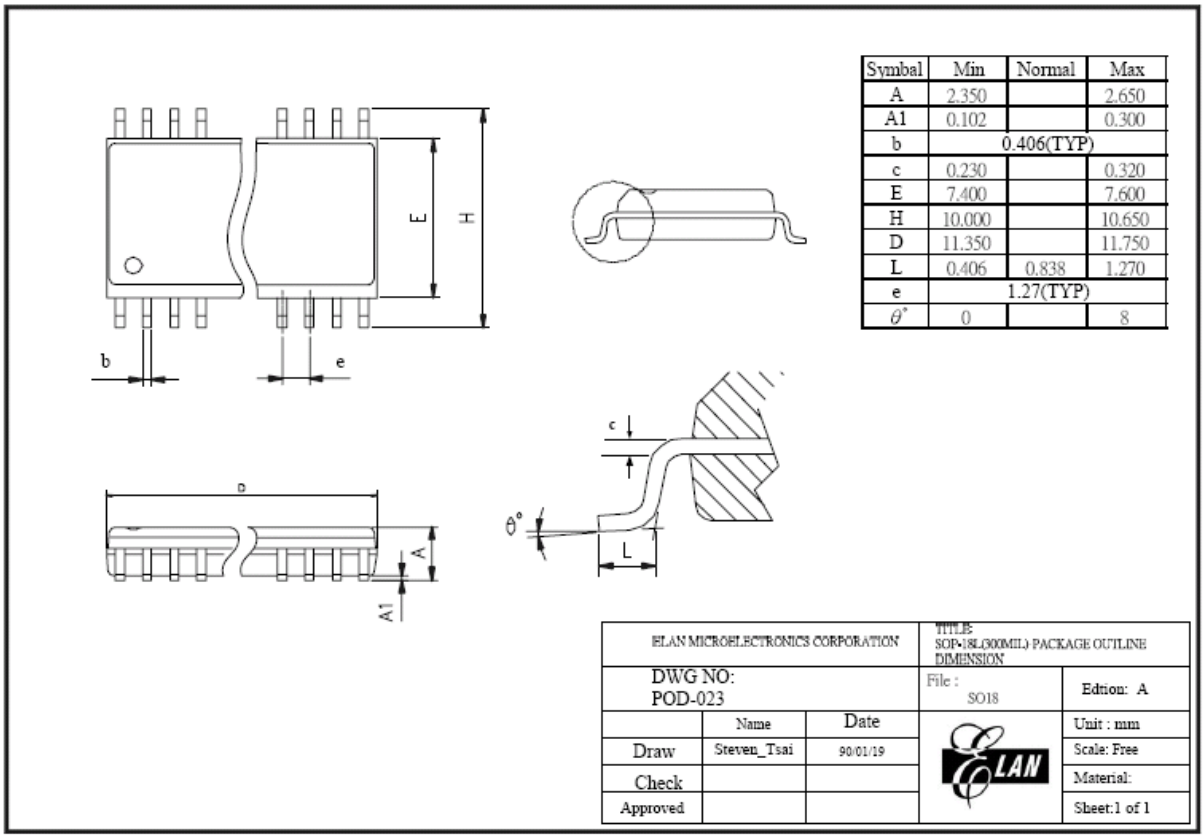
A.2 DIP-20L



Symbal	Min	Normal	Max
A			4.450
A1	0.381		
A2	3.175	3.302	3.429
c	0.203	0.254	0.356
D	25.883	26.060	26.237
E1	6.220	6.438	6.655
E	7.370	7.620	7.870
eB	8.510	9.020	9.530
B	0.356	0.457	0.559
B1	1.143	1.524	1.778
L	3.048	3.302	3.556
e	2.540(TYP)		
θ	0		15

ELAN MICROELECTRONICS CORPORATION			TITLE: PDIP-20L 300MIL PACKAGE OUTLINE DIMENSION	
DWG NO: POD-005			File : D20	Edition: A
	Name	Date		Unit : mm
Draw	Steven-Tsai	9001/04		Scale: Free
Chec k				Material:
Approved				Sheet:1 of 1

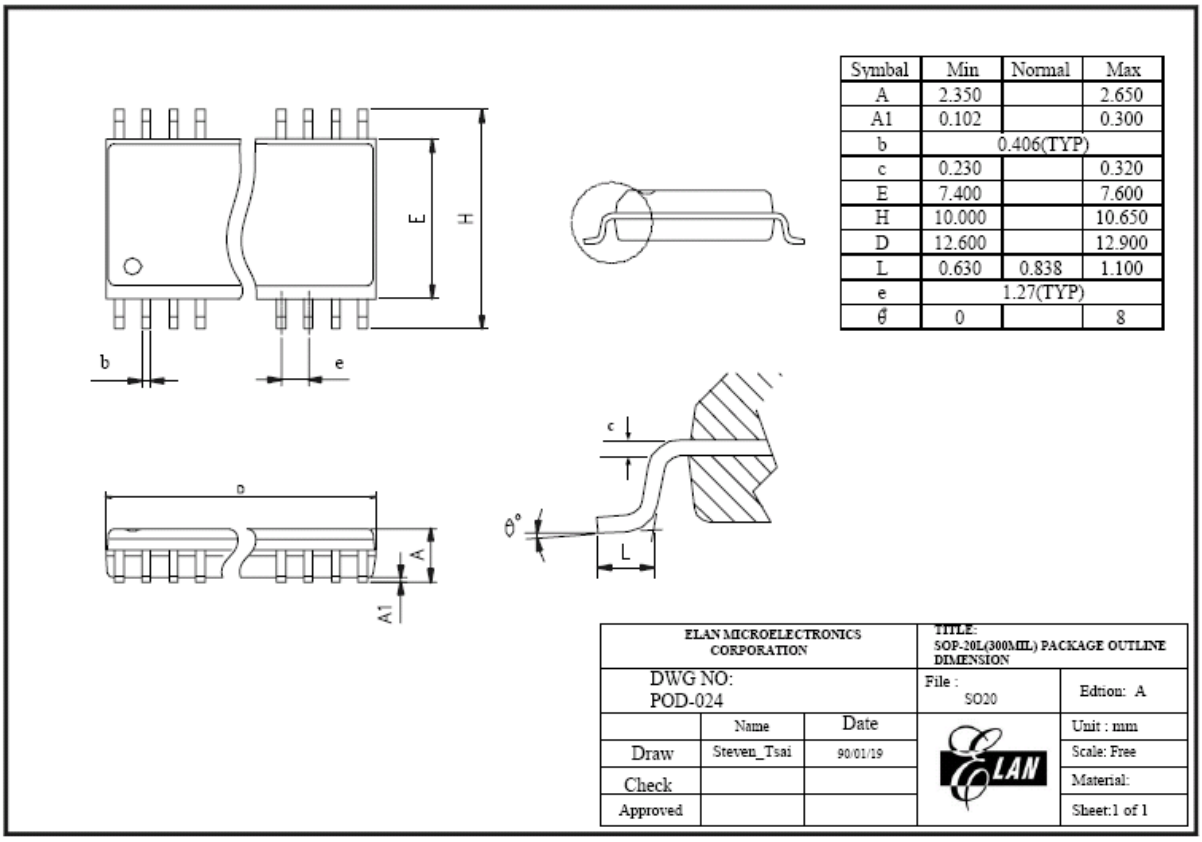
A.3 SOP-18L



Symbal	Min	Normal	Max
A	2.350		2.650
A1	0.102		0.300
b		0.406(TYP)	
c	0.230		0.320
E	7.400		7.600
H	10.000		10.650
D	11.350		11.750
L	0.406	0.838	1.270
e		1.27(TYP)	
θ°	0		8

ELAN MICROELECTRONICS CORPORATION			TITLE: SOP-18L(300MIL) PACKAGE OUTLINE DIMENSION	
DWG NO: POD-023			File : SO18	Edtion: A
	Name	Date		Unit : mm
Draw	Steven_Tsai	90/01/19		Scale: Free
Check				Material:
Approved				Sheet:1 of 1

A.4 SOP-20L



Symbal	Min	Normal	Max
A	2.350		2.650
A1	0.102		0.300
b		0.406(TYP)	
c	0.230		0.320
E	7.400		7.600
H	10.000		10.650
D	12.600		12.900
L	0.630	0.838	1.100
e		1.27(TYP)	
θ	0		8

ELAN MICROELECTRONICS CORPORATION			TITLE: SOP-20L(300MIL) PACKAGE OUTLINE DIMENSION	
DWG NO: POD-024			File : SO20	Edition: A
	Name	Date		Unit : mm
Draw	Steven_Tsai	90/01/19		Scale: Free
Check				Material:
Approved				Sheet:1 of 1