T62M0001A

Digital Sound Processor With 64K SRAM

Features

- Low Noise (-90dBV typical)
- Low Distortion (0.17% typical)
- Built –in 64 K SRAM
- Sleep Mode Function
- Two Control Modes Selection:
  - Easy Mode Using Parallel Data
  - u-COM Mode Using Serial Data
- Auto-Mute Function
- Built-in Automatic Reset Circuit
- Pin Compatible with M65831

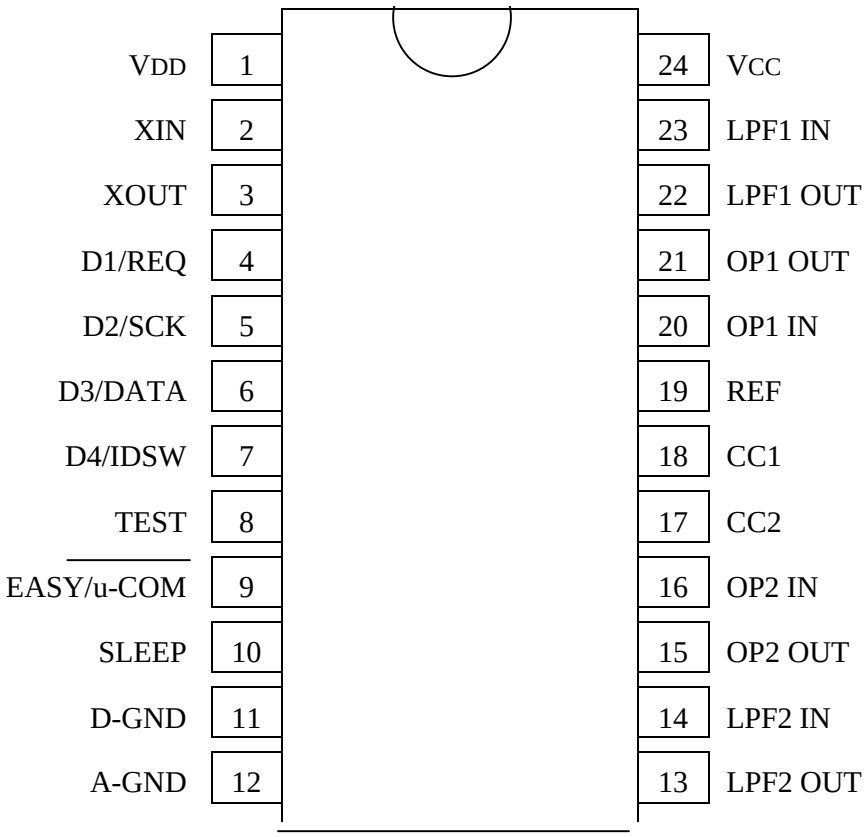
Description

T62M0001 is a digital echo/surround processor IC utilizing CMOS technology. Analog signal to T62M0001 is digitized by a built-in A/D converter and then stored in the internal memory. After an adjustable delay time, data in the memory is read and converted back to analog signal via the other D/A converter. With the built-in 64K SRAM, T62M0001 can create very high performance echo/surround sound effect and meet the application of A/V system such as CD player VCD,DVD ….etc.

Part Number Examples

Part NO.	Pkg	Description
T62M0001A-D	24-SOP	24-SOP
T62M0001A-K	24-DIP	600mil-24-DIP

Pin Configuration



24 PINS DIP/SOP

Pin Description

Symbol	I/O	Function	Pin no.
V_{DD}	P	Digital supply voltage	1
XIN	I	Oscillator input	2
XOUT	O	Oscillator output	3
D1/REQ	I	Easy mode : inputs D1 data **u**-COM mode :inputs request data	4
D2/SCK	I	Easy mode : inputs D2 data **u**-COM mode : inputs shift clock	5
D3/DATA	I	Easy mode : inputs D3 data **u**-COM mode : inputs serial data	6
D4/IDSW	I	Easy mode : inputs D4 data **u**-COM mode : controls ID code	7
TEST	I	L = normal mode	8
$\overline{\text{EASY}}$/**u**-COM	I	H = easy mode L = **u**-COM mode	9
SLEEP	I	H = sleep mode L = normal mode	10
D-GND	G	Digital ground	11

Symbol	I/O	Function	Pin no.
A-GND	G	Analog ground	12
LPF2 OUT	O	Low pass filter 2 output	13
LPF2 IN	I	Low pass filter 2 input	14
OP2 OUT	O	Integrator 2 output	15
OP2 IN	I	Integrator 2 input	16
CC2	-	Current control 2	17
CC1	-	Current control 1	18
REF	-	Analog reference voltage (= 1/2 V_{CC})	19
OP1 IN	I	Integrator 1 input	20
OP1 OUT	I	Integrator 1 output	21
LPF1 OUT	-	Low pass filter 1 output	22
LPF1 IN	O	Low pass filter 1 input	23
V_{CC}	P	Analog supply voltage	24

P : supply voltage G : ground

I : input pin O : output pin

Function description

1.Easy mode (parallel data input)

When the pin EASY/$\overline{m-COM}$ = “High”, then in the easy mode.

D4	D3	D2	D1	fs	Td
L	L	L	L	Fck/3	12.3
L	L	L	H	Fck/3	24.6
L	L	H	L	Fck/3	36.9
L	L	H	H	Fck/3	49.2
L	H	L	L	Fck/3	61.4
L	H	L	H	Fck/3	73.7
L	H	H	L	Fck/3	86.0
L	H	H	H	Fck/3	98.3
H	L	L	L	Fck/6	110.6
H	L	L	H	Fck/6	122.9
H	L	H	L	Fck/6	135.2
H	L	H	H	Fck/6	147.5
H	H	L	L	Fck/6	159.7
H	H	L	H	Fck/6	172.0
H	H	H	L	Fck/6	184.3
H	H	H	H	Fck/6	196.6

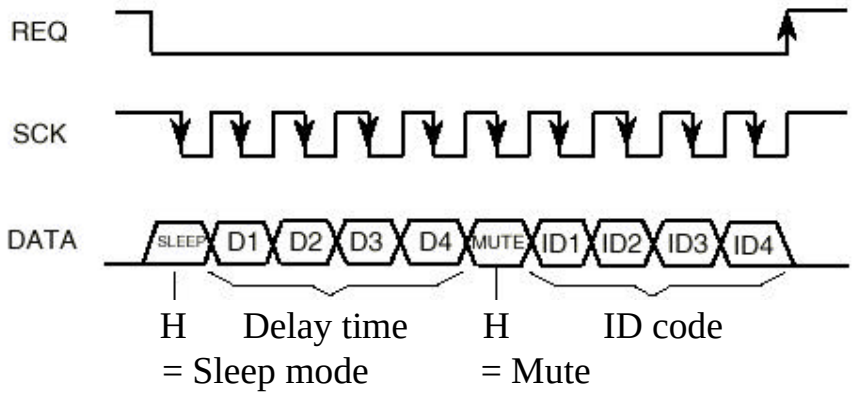
Note : f s : sampling frequency (Hz) ; Fck : oscillator frequency(example Fck=2MHz)

Td : delay time (msec)

2.u-COM mode (serial data input)

When the pin EASY/$\overline{u-COM}$ = "Low" , then in the u-COM mode.

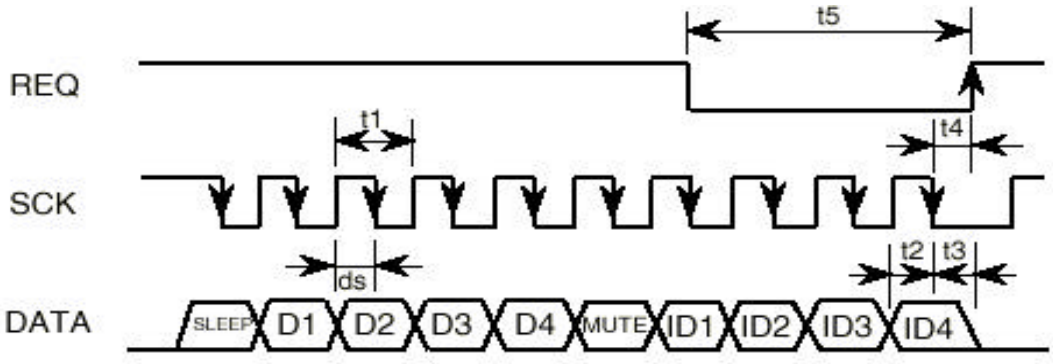
The timing is shown as the diagram below:



This timing chart shows that delay time is set by serial data from u-COM.

DATA signal is latched at the falling edge of SCK signal, the last ten datas are set at the rising edge of REQ signal when ID codes are satisfied.

ID1, ID3	=	Low
ID2	=	High
ID4	=	Equal to IDSW



REQ, SCK, DATA input timing

Symbol	Parameter	Limits			Unit
		Min.	Typ.	Max.	
t1	SCK pulse width	250	-	-	ns
ds	SCK pulse duty	-	50	-	%
t2	DATA setup time	100	t1/2	-	ns
t3	DATA hold time	100	t1/2	-	ns
t4	REQ hold time	100	-	-	ns
t5	REQ pulse width	250	-	-	ns

3.Mute

(1) Easy mode

Automatic mute upon changing delay time, cancelling SLEEP mode and power on.

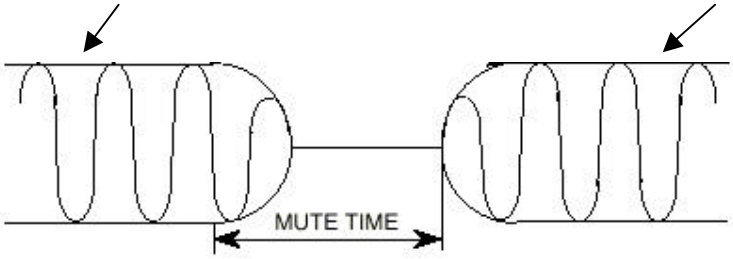
(2) u-COM

MUTE=H : mute.

MUTE=L : automatic mute.

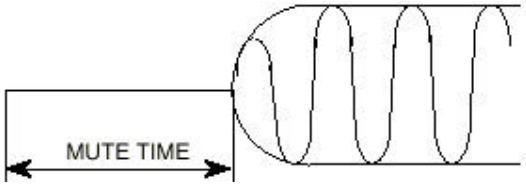
Automatic mute :

Delay signal before change mode Delay signal after change mode



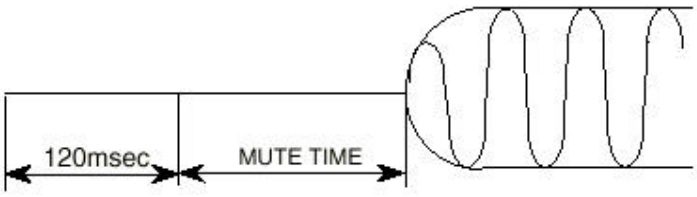
(a) Upon changing delay time

Delay signal



(b) Upon cancel sleep mode

Delay signal



Power on

(c) Upon power on

4.SLEEP mode

SLEEP data is :

H=clock and RAM stop to reduce circuit current (SLEEP mode)

L=normal operation

5.System reset

Automatically reset power-on. The reset time is about 120 m second.

Delay time is set at 147.5 m second.

Absolute maximum rating (Ta=25ºC,unless otherwise noted)

symbol	paramatic	ratings	unit
Vcc	Supply voltage	6	V
Icc	Circuit current	100	mA
Pd	Power dissipation	1.7	W
Topr	Operating temperature	-20~75	ºC
Tstg	Storage temperature	-25~125	ºC

Recommended operating conditions

symbol	parameter	rating			unit
		Min.	Typ.	Max.	
V_{CC}	Supply voltage	4.5	5	5.5	V
V_{DD}	Supply voltage	4.5	5	5.5	V
V_{CC}-V_{DD}	Difference voltage	-0.3	0	0.3	V
fck	Clock frequency	1	2	3	MHz
V_{IH}	“H” input voltage	$0.7V_{DD}$	-	-	V
V_{IL}	“L” input voltage	-	-	$0.3V_{DD}$	V

Electrical characteristics

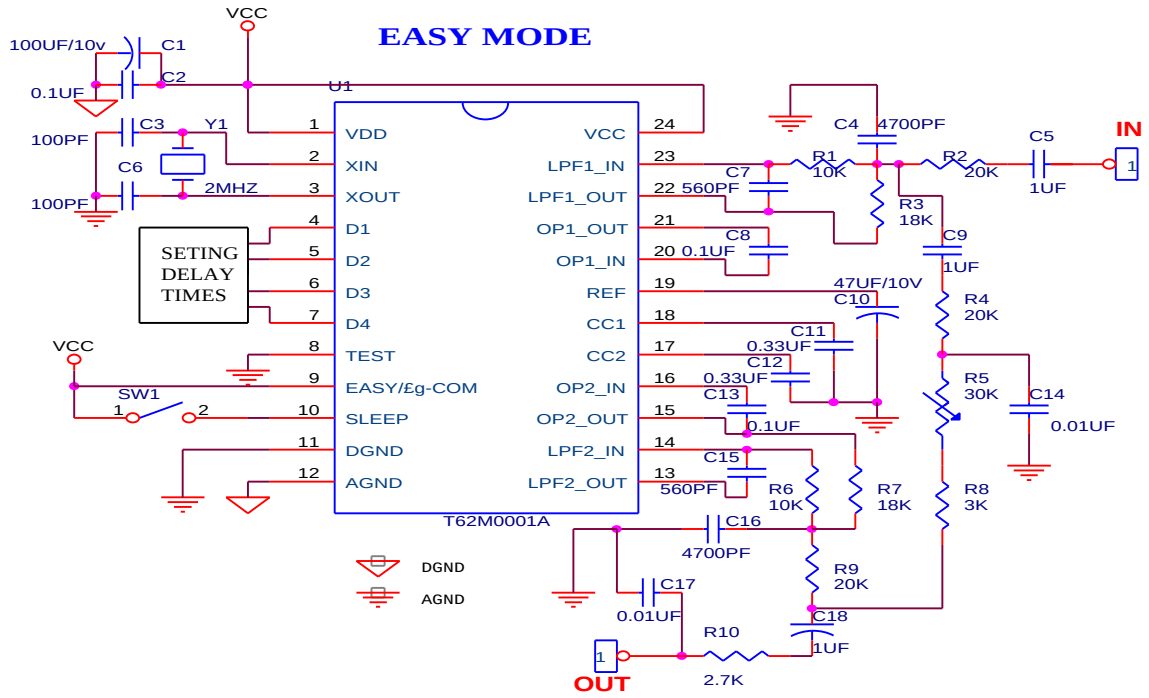
(Vcc=5.0V,fin=1KHz,Vi=100mVrms,f_{ck}=2MHz,Ta=25^{o}C, unless otherwise noted)

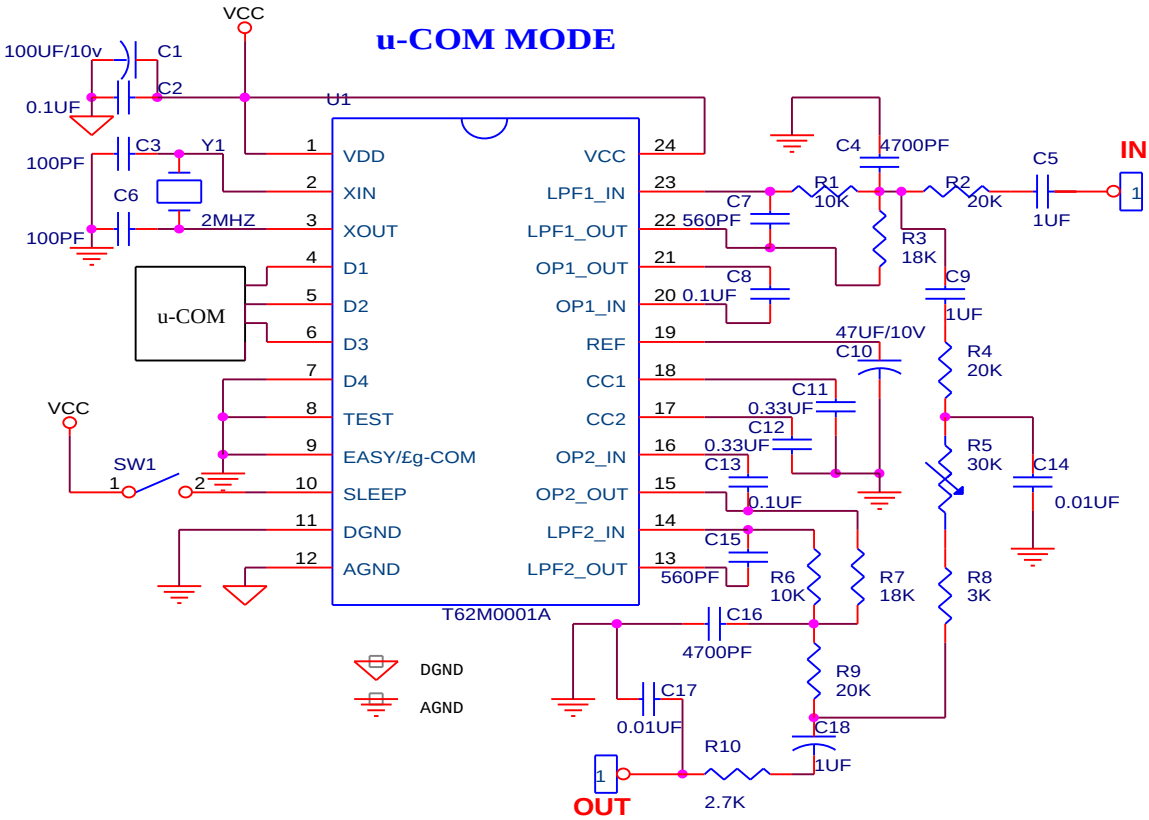
symbol	Parameter	Test condition		Min.	Typ.	Max.	unit
Icc	Circit current	No signal		-	13	20	mA
Gv	Voltage gain	R_L=47KΩ		-	-0.5	2.5	dB
Iccs	Circit current (Sleep Mode)	Sleep Mode		-	7	10	mA
Vomax	Max. output voltage	THD=10%		1.3	1.6	-	Vrms
THD	Output distorton	30KHz L.P.F.	fs=666KHz	-	0.17	0.6	%
			fs=333KHz	-	0.4	1.0	%
TMUTE	Mute time	Upon changing delay time		508	528	548	ms
		Upon canceling sleep mode		508	528	548	ms
No	Output noise voltage	DIN-AUDIO(fs=666KHz)		-	-90	-80	dBV

DC electrical characteristics

symbol	parameter	limits			unit
		Min.	Typ.	Max.	
Vcc	Supply voltage	4.5	5	5.5	V
Icc	Circuit current	-	13	20	mA
V_{IH}	“H” input voltage	$0.7V_{DD}$	-	-	V
V_{IL}	“L” input voltage	-	-	$0.3V_{DD}$	V

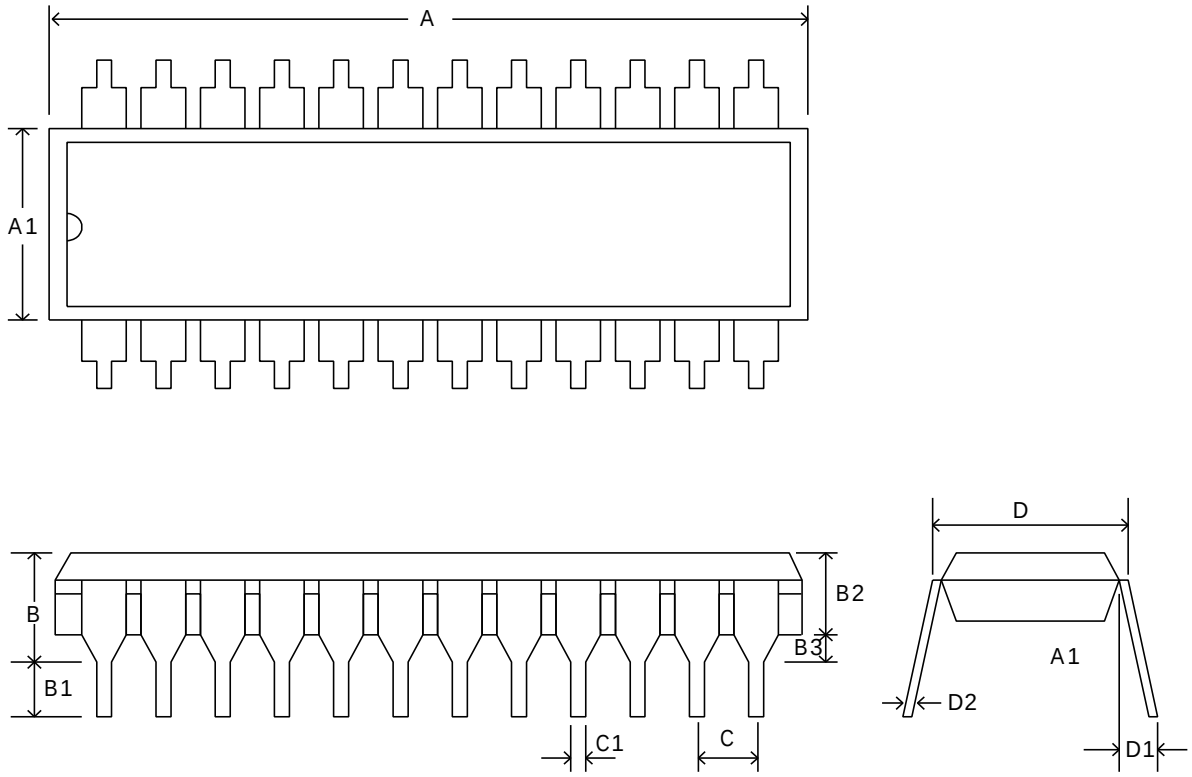
Application circuit





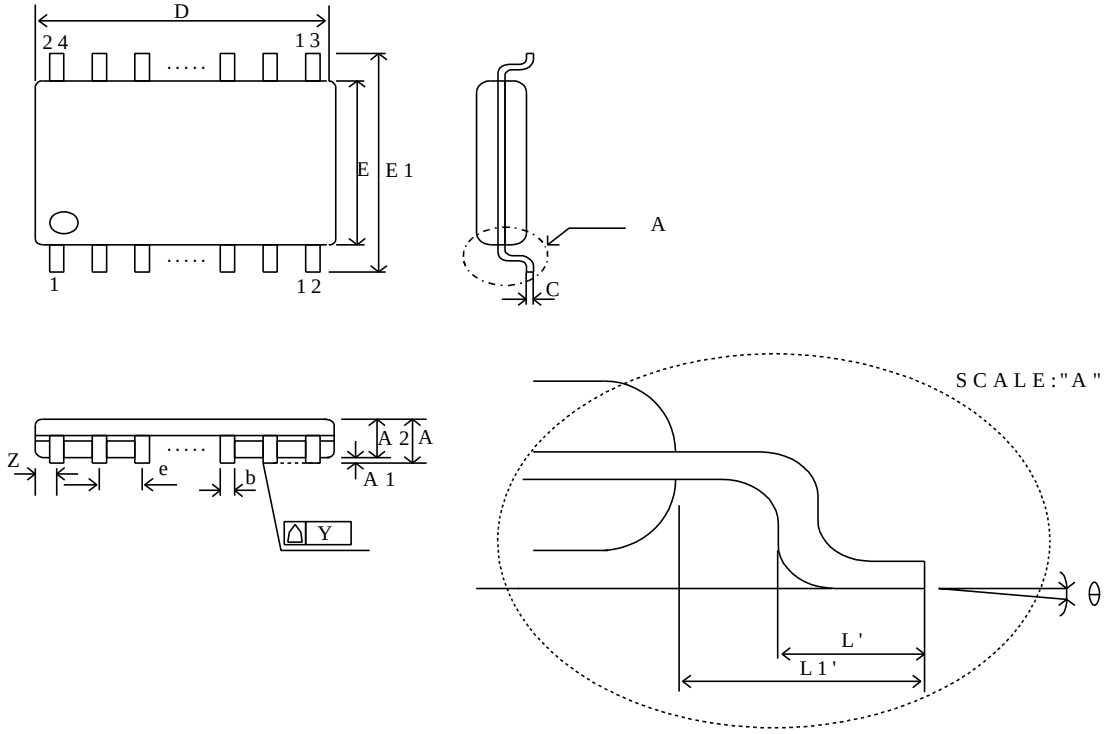
IC package

T62M0001A(24-DIP)



Symbol	Dimension in mm			Dimension in inch		
	min.	typ.	max	min.	typ.	max.
A	-	32.26	-	-	1.270	-
A1	13.21	-	14.22	0.520	-	0.560
B	-	-	5.08	-	-	0.20
B1	3.18	-	-	0.125	-	-
B2	-	-	4.57	-	-	0.180
B3	0.51	-	-	0.020	-	-
C	2.24	2.54	2.84	0.088	0.100	0.112
C1	4.06	4.57	5.08	0.16	0.18	0.20
D	14.99	-	15.49	0.59	-	0.61
D1	-	0~15°	-	-	0~15°	-
D2	-	0.25	-	-	0.01	-

T62M0001A(24-SOP)



Symbol	Dimension in mm			Dimension in inch		
	min.	typ.	max	min.	typ.	max.
A	-	-	2.4	-	-	0.0945
A1	0.05	-	-	0.002	-	-
A2	-	2.0	-	-	0.0787	-
b	0.35	0.4	0.5	0.0138	0.0157	0.0197
C	0.13	0.15	0.2	0.0051	0.0059	0.0079
D	14.8	15.0	15.2	0.5827	0.5906	0.5984
E	8.2	8.4	8.6	0.3228	0.3307	0.3386
e	-	1.27	-	-	0.05	-
E1	11.63	11.93	12.23	0.4579	0.4697	0.4815
L	0.3	0.5	0.7	0.0118	0.0197	0.0276
L1	-	1.7650	-	-	0.0448	-
Y	-	-	0.15	-	-	0.0059
θ	0°	-	10°	0°	-	10°