芯伯乐®
XINBOLE

Product Specification

XBLW CD4026

CMOS Decode Counters/Dividers

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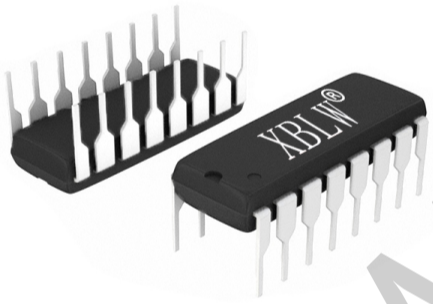
Description

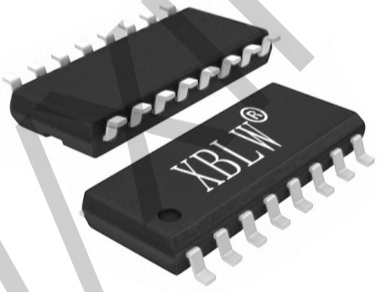
The CD4026 is a CMOS decade.counter/divider.

Features

- Supply voltage range:3V to 15V
- Temperature range:-40℃ to +125℃
- Packaging information: DIP16/SOP16/TSSOP16



DIP-16



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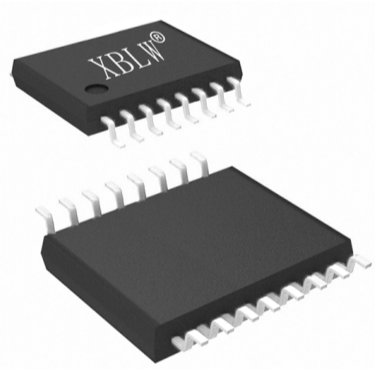


TSSOP-16

Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW CD4026BE	DIP-16	CD4026BE	Tube	1000Pcs/Box
XBLW CD4026BDTR	SOP-16	CD4026B	Tape	2500Pcs/Reel
XBLW CD4026BTDTR	TSSOP-16	CD4026B	Tape	3000Pcs/Reel

Block Diagram

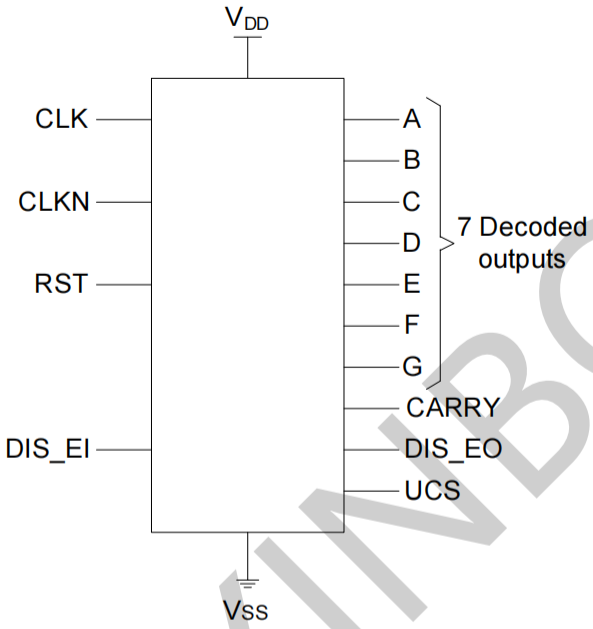
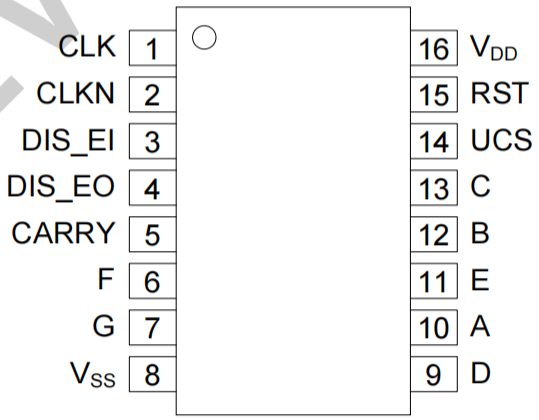


Figure 1. Functional diagram

Pin Configurations



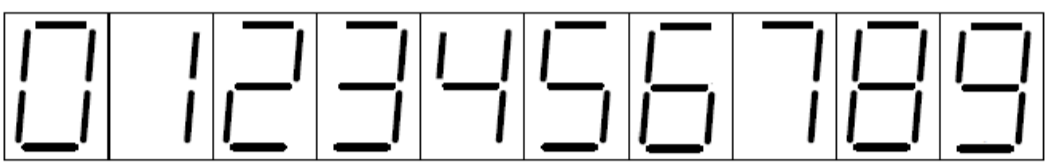
Pin Description

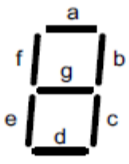
Pin No.	Pin Name	Description
1	CLK	clock input
2	CLKN	clock inhibit input
3	DIS_EI	display enable input
4	DIS_EO	display enable output
5	CARRY	carry output
6	F	segment output
7	G	segment output
8	V_{SS}	ground supply voltage
9	D	segment output
10	A	segment output
11	E	segment output
12	B	segment output
13	C	segment output
14	UCS	ungated C segment output
15	RST	reset
16	V_{DD}	supply voltage

Function Table

Inputs				Outputs										
CLK	CLKN	DIS_EI	RST	a	b	c	d	e	f	g	DIS_EO	CARRY	UCS	Display
X	X	H	H	H	H	H	H	H	H	L	H	H	H	0
X	X	L	X	L	L	L	L	L	L	L	L	H	H	blank
↑	L	H	L	H	H	H	H	H	H	L	H	H	H	0
↑	L	H	L	L	H	H	L	L	L	L	H	H	H	1
↑	L	H	L	H	H	L	H	H	L	H	H	H	L	2
↑	L	H	L	H	H	H	H	L	L	H	H	H	H	3
↑	L	H	L	L	H	H	L	L	H	H	H	H	H	4
↑	L	H	L	H	L	H	H	L	H	H	H	L	H	5
↑	L	H	L	H	L	H	H	H	H	H	H	L	H	6
↑	L	H	L	H	H	H	L	L	L	L	H	L	H	7
↑	L	H	L	H	H	H	H	H	H	H	H	L	H	8
↑	L	H	L	H	H	H	H	L	H	H	H	L	H	9
H	↓	H	L	H	H	H	H	H	H	L	H	H	H	0
H	↓	H	L	L	H	H	L	L	L	L	H	H	H	1
H	↓	H	L	H	H	L	H	H	L	H	H	H	L	2
H	↓	H	L	H	H	H	H	L	L	H	H	H	H	3
H	↓	H	L	L	H	H	L	L	H	H	H	H	H	4
H	↓	H	L	H	L	H	H	L	H	H	H	L	H	5
H	↓	H	L	H	L	H	H	H	H	H	H	L	H	6
H	↓	H	L	H	H	H	L	L	L	L	H	L	H	7
H	↓	H	L	H	H	H	H	H	H	H	H	L	H	8
H	↓	H	L	H	H	H	H	L	H	H	H	L	H	9
X	H	H	L	NC							H	NC	NC	NC
L	X	H	L	NC							H	NC	NC	NC

Note: H=HIGH voltage level; L=LOW voltage level. X=don't care.NC=no change.





Electrical Parameter

Absolute Maximum Ratings

(Voltages are referenced to V_{SS} (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Max.	Unit
supply voltage	V_{DD}	-		-0.5	+18	V
input voltage	V_I	all inputs		-0.5	V_{DD}+0.5	V
DC input current	I_{IK}	anyone input		-	±10	mA
storage temperature	T_{stg}	-		-65	+150	℃
soldering temperature	T_L	10s	DIP	245		℃
			SOP/TSSOP	260		

Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	V_{DD}	-	3	-	15	V
ambient temperature	T_{amb}	in free air	-40	-	+125	℃

Electrical Characteristics

DC Characteristics 1

(T_{amb}=-40°C to +85°C, voltages are referenced to V_{SS} (ground=0V), unless otherwise specified.)

Parameter	Symbol	V_{DD}	Conditions	Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	5V	-	3.5	-	-	V
		10V	-	7	-	-	V
		15V	-	11	-	-	V
LOW-level input voltage	V_{IL}	5V	-	-	-	1.5	V
		10V	-	-	-	3	V
		15V	-	-	-	4	V
HIGH-level output voltage	V_{OH}	5V	$\|I_O\|$<1uA	4.95	-	-	V
		10V	$\|I_O\|$<1uA	9.95	-	-	V
		15V	$\|I_O\|$<1uA	14.95	-	-	V
LOW-level output voltage	V_{OL}	5V	$\|I_O\|$<1uA	-	-	0.05	V
		10V	$\|I_O\|$<1uA	-	-	0.05	V
		15V	$\|I_O\|$<1uA	-	-	0.05	V
HIGH-level output current	I_{OH}	5V	V_O=4.6V	-	-	-0.34	mA
		5V	V_O=2.5V	-	-	-1.3	mA
		10V	V_O=9.5V	-	-	-0.55	mA
		15V	V_O=13.5V	-	-	-1.65	mA
LOW-level output current	I_{OL}	5V	V_O=0.4V	0.34	-	-	mA
		10V	V_O=0.5V	0.46	-	-	mA
		15V	V_O=1.5V	1.4	-	-	mA
input leakage current	I_I	15V	V_I=15V or GND	-	-	±2	uA
supply current	I_{DD}	5V	V_I=5V or GND; I_O=0A	-	-	7.5	uA
		10V	V_I=10V or GND; I_O=0A	-	-	15	uA
		15V	V_I=15V or GND; I_O=0A	-	-	30	uA

DC Characteristics 2

(T_{amb}=-40℃ to +125℃, voltages are referenced to V_{SS} (ground=0V), unless otherwise specified.)

Parameter	Symbol	V_{DD}	Conditions	Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	5V	-	3.5	-	-	V
		10V	-	7	-	-	V
		15V	-	11	-	-	V
LOW-level input voltage	V_{IL}	5V	-	-	-	1.5	V
		10V	-	-	-	3	V
		15V	-	-	-	4	V
HIGH-level output voltage	V_{OH}	5V	$\|I_O\|$<1uA	4.95	-	-	V
		10V	$\|I_O\|$<1uA	9.95	-	-	V
		15V	$\|I_O\|$<1uA	14.95	-	-	V
LOW-level output voltage	V_{OL}	5V	$\|I_O\|$<1uA	-	-	0.05	V
		10V	$\|I_O\|$<1uA	-	-	0.05	V
		15V	$\|I_O\|$<1uA	-	-	0.05	V
HIGH-level output current	I_{OH}	5V	V_O=4.6V	-	-	-0.3	mA
		5V	V_O=2.5V	-	-	-1.15	mA
		10V	V_O=9.5V	-	-	-0.45	mA
		15V	V_O=13.5V	-	-	-1.4	mA
LOW-level output current	I_{OL}	5V	V_O=0.4V	0.29	-	-	mA
		10V	V_O=0.5V	0.38	-	-	mA
		15V	V_O=1.5V	1.2	-	-	mA
input leakage current	I_I	15V	V_I=15V or GND	-	-	±4	uA
supply current	I_{DD}	5V	V_I=5V or GND; I_O=0A	-	-	7.5	uA
		10V	V_I=10V or GND; I_O=0A	-	-	15	uA
		15V	V_I=15V or GND; I_O=0A	-	-	30	uA

AC Characteristics 1

(T_{amb}=-40°C to +85°C, V_{SS}=0V, unless otherwise specified.)

Parameter	Symbol	V_{DD}	Conditions	Min.	Typ.	Max.	Unit
clocked operation propagation delay time	t_{PHL}, t_{PLH}	5V	carry-out line	-	250	500	ns
		10V	C_L=50pF, R_L=200kΩ see Figure 4	-	100	200	ns
		15V		-	75	150	ns
		5V	Decode outline	-	350	700	ns
		10V	C_L=50pF, R_L=200kΩ see Figure 4	-	125	250	ns
		15V		-	90	180	ns
reset operation propagation delay time	t_{PHL}, t_{PLH}	5V	carry-out line	-	275	550	ns
		10V	C_L=50pF, R_L=200kΩ see Figure 4	-	120	240	ns
		15V		-	80	160	ns
	t_{PLH}	5V	Decode outline	-	300	600	ns
		10V	C_L=50pF, R_L=200kΩ see Figure 4	-	125	250	ns
		15V		-	90	180	ns
transition time	t_{THL}, t_{TLH}	5V	C_L=50pF, R_L=200kΩ see Figure 4	-	100	200	ns
		10V		-	50	100	ns
		15V		-	25	50	ns
Minimum clock pulse width;HIGH	t_{WCPH}	5V	-	-	110	220	ns
		10V	-	-	50	100	ns
		15V	-	-	40	80	ns
Minimum MR pulse width;HIGH	t_{WMRH}	5V	-	-	100	120	ns
		10V	-	-	50	100	ns
		15V	-	-	25	50	ns
Maximum clock pulse frequency	fmax	5V	-	5	2.5	-	MHZ
		10V	-	10	5.5	-	MHZ
		15V	-	15	8	-	MHZ

AC Characteristics 2

(T_{amb}=-40°C to +125°C, V_{SS}=0V, unless otherwise specified)

Parameter	Symbol	V_{DD}	Conditions	Min.	Typ.	Max.	Unit
clocked operation propagation delay time	t_{PHL}, t_{PLH}	5V	carry-out line	-	-	600	ns
		10V	C_L=50pF, R_L=200kΩ	-	-	240	ns
		15V	see Figure 4	-	-	180	ns
		5V	Decode outline	-	-	840	ns
		10V	C_L=50pF, R_L=200kΩ	-	-	300	ns
		15V	see Figure 4	-	-	216	ns
reset operation propagatio delay time	t_{PHL}, t_{PLH}	5V	carry-out line	-	-	660	ns
		10V	C_L=50pF, R_L=200kΩ	-	-	288	ns
		15V	see Figure 4	-	-	192	ns
	t_{PLH}	5V	Decode outline	-	-	720	ns
		10V	C_L=50pF, R_L=200kΩ	-	-	300	ns
		15V	see Figure 4	-	-	216	ns
transition time	t_{THL}, t_{TLH}	5V	C_L=50pF, R_L=200kΩ see Figure 4	-	-	240	ns
		10V		-	-	120	ns
		15V		-	-	60	ns
Minimum clock pulse width;HIGH	t_{WCPH}	5V	-	-	-	264	ns
		10V	-	-	-	120	ns
		15V	-	-	-	96	ns
Minimum MR pulse width;HIGH	t_{WMRH}	5V	-	-	-	144	ns
		10V	-	-	-	120	ns
		15V	-	-	-	60	ns
Maximum clock pulse frequency	fmax	5V	-	4	-	-	MHZ
		10V	-	8	-	-	MHZ
		15V	-	12	-	-	MHZ

Testing Circuit

AC Testing Circuit

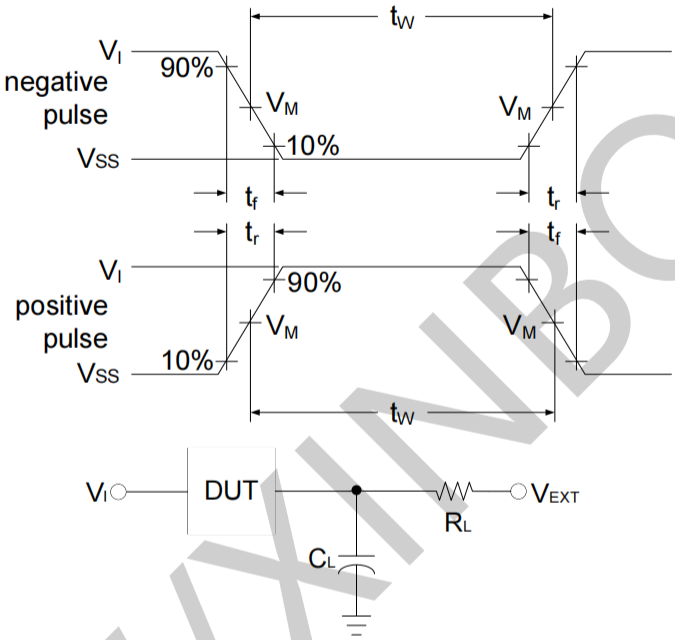


Figure 3. Load circuit

C_L includes probe and jig capacitance.

Test Data

Supply voltage	Input		Load		VEXT		
V_{DD}	V_I	$t_r = t_f$	C_L	R_L	t_{PLH}/t_{PHL}	t_{PLZ}/t_{PZL}	t_{PHZ}/t_{PZH}
5V to 15V	V_{DD}	≤ 20ns	50pF	200kΩ	Open	V_{DD}	V_{SS}

AC Testing Waveforms

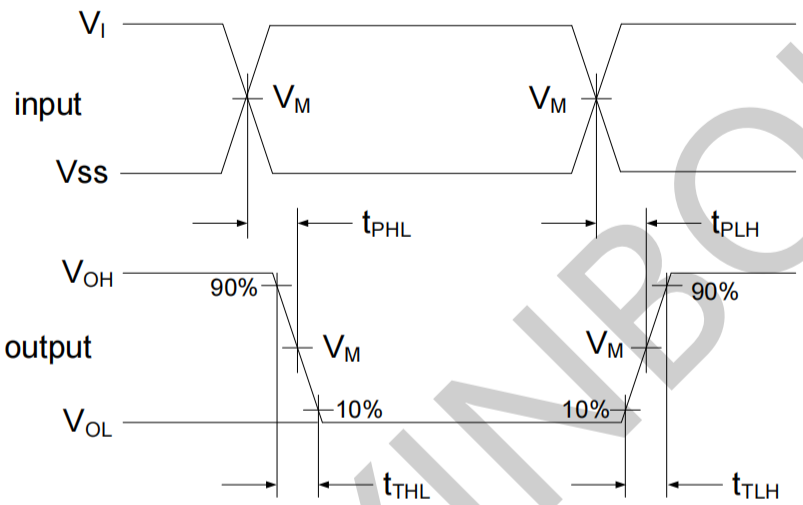


Figure 4. Propagation delay, output transition time

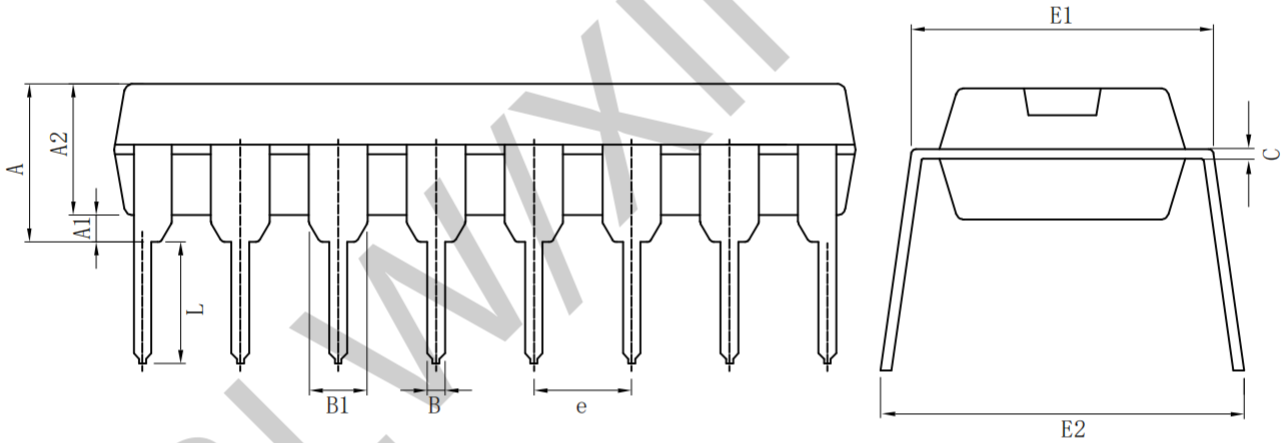
Measurement Points

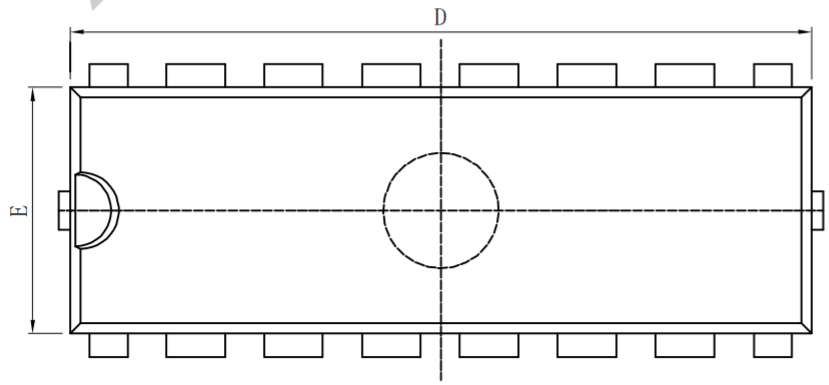
Supply voltage	Input	Output		
V_{DD}	V_M	V_M	V_X	V_Y
5V to 15V	$0.5\times V_{DD}$	$0.5\times V_{DD}$	$0.1\times V_{DD}$	$0.9\times V_{DD}$

Package Information

· DIP-16

Size / Symbol	Dimensions In Millimeters		Size / Symbol	Dimensions In Inches	
	Min(mm)	Max(mm)		Min(in)	Max(in)
A	3.710	4.310	A	0.146	0.170
A1	0.510		A1	0.020	
A2	3.200	3.600	A2	0.126	0.142
B	0.380	0.570	B	0.015	0.022
B1	1.524(BSC)		B1	0.060(BSC)	
C	0.204	0.360	C	0.008	0.014
D	18.80	19.20	D	0.740	0.756
E	6.200	6.600	E	0.244	0.260
E1	7.320	7.920	E1	0.288	0.312
e	2.540(BSC)		e	0.100(BSC)	
L	3.000	3.600	L	0.118	0.142
E2	8.400	9.000	E2	0.331	0.354





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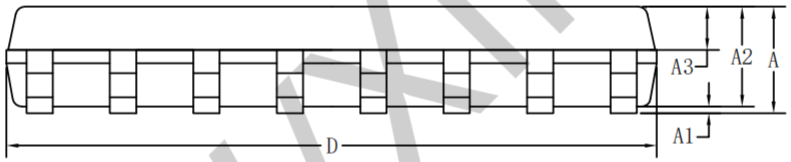
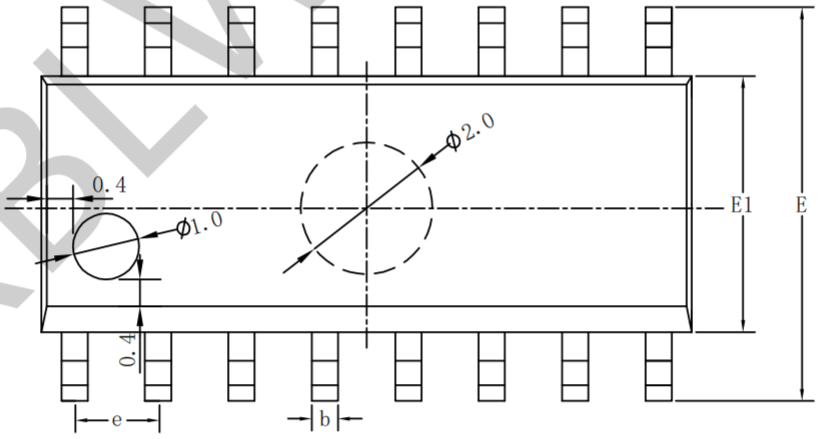
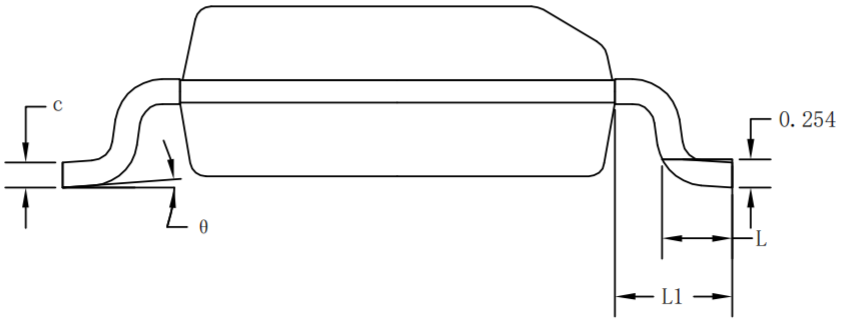
Size / Symbol	Dimensions In Millimeters			Size / Symbol	Dimensions In Inches		
	Min(mm)	Nom(mm)	Max(mm)		Min(in)	Nom(in)	Max(in)
A	1.500	1.600	1.700	A	0.059	0.063	0.067
A1	0.100	0.150	0.250	A1	0.004	0.006	0.010
A2	1.400	1.450	1.500	A2	0.055	0.057	0.059
A3	0.600	0.650	0.700	A3	0.024	0.026	0.028
b	0.300	0.400	0.500	b	0.012	0.016	0.020
c	0.150	0.200	0.250	c	0.006	0.008	0.010
D	9.800	9.900	10.00	D	0.386	0.390	0.394
E	5.800	6.000	6.200	E	0.228	0.236	0.244
E1	3.850	3.900	3.950	E1	0.152	0.154	0.156
e		1.27(BSC)		e		0.050(BSC)	
L	0.500	0.600	0.700	L	0.020	0.024	0.028
L1		1.05(BSC)		L1		0.041(BSC)	
θ	0°	4°	8°	θ	0°	4°	8°







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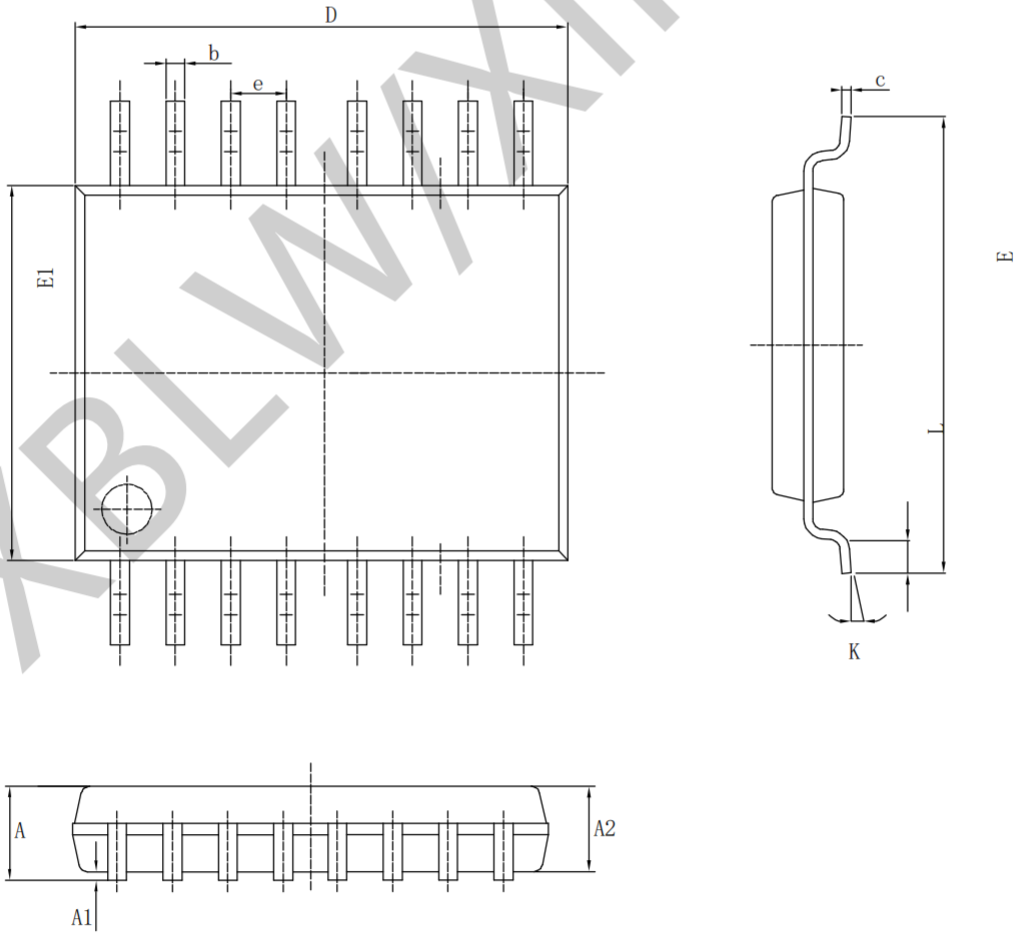
Size / Symbol	Dimensions In Millimeters		Size / Symbol	Dimensions In Inches	
	Min(mm)	Max(mm)		Min(in)	Max(in)
A		1.200	A		0.047
A1	0.050	0.150	A1	0.002	0.006
A2	0.800	1.050	A2	0.031	0.041
b	0.190	0.300	b	0.007	0.012
c	0.090	0.200	c	0.004	0.0089
D	4.900	5.100	D	0.193	0.201
E	6.200	6.600	E	0.244	0.260
E1	4.300	4.480	E1	0.169	0.176
e	0.65(BSC)		e	0.0256(BSC)	
K	0°	8°	K	0°	8°
L	0.450	0.750	L	0.018	0.030



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