芯伯乐®
XINBOLE

Product Specification

XBLW SN74LS47

BCD-to-Seven-Segment Common anode
LED Decodes/Drivers

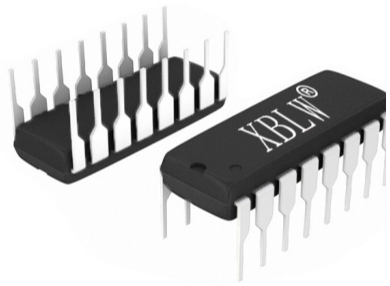
WEB | www.xinboleic.com

Description

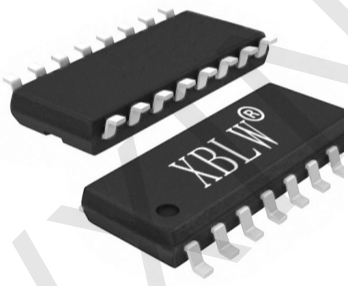
The SN74LS47 feature active-low outputs designed for driving common-anode LEDs or incandescent indicators directly. Display patterns for BCD input counts above 9 are unique symbols to authenticate input conditions.

Features

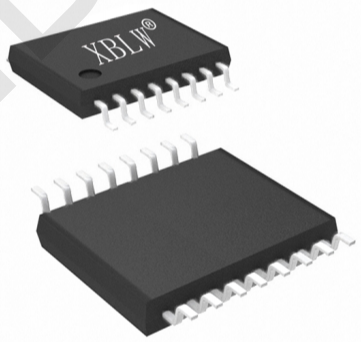
- Supply voltage range:2V to 6V
- Temperature range:-20℃ to +85℃
- Packaging information: DIP-16/SOP-16/TSSOP-16



DIP-16



SOP-16



TSSOP-16

Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW SN74LS47N	DIP-16	74LS47N	Tube	1000Pcs/Box
XBLW SN74LS47DTR	SOP-16	74LS47	Tape	2500Pcs/Reel
XBLW SN74LS47TDTR	TSSOP-16	74LS47	Tape	3000Pcs/Reel

Block Diagram

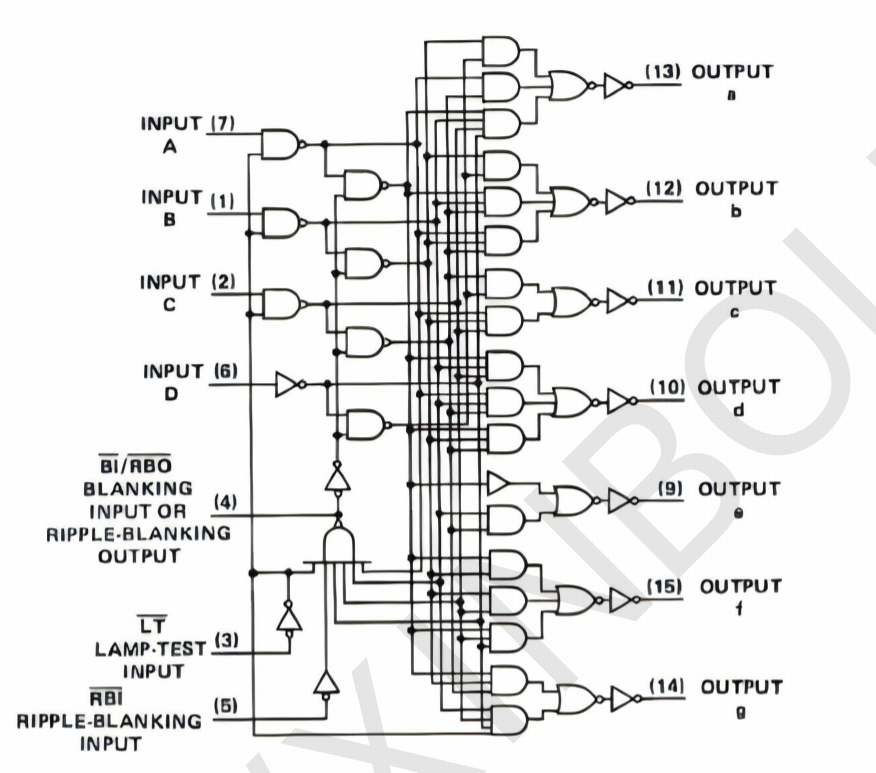
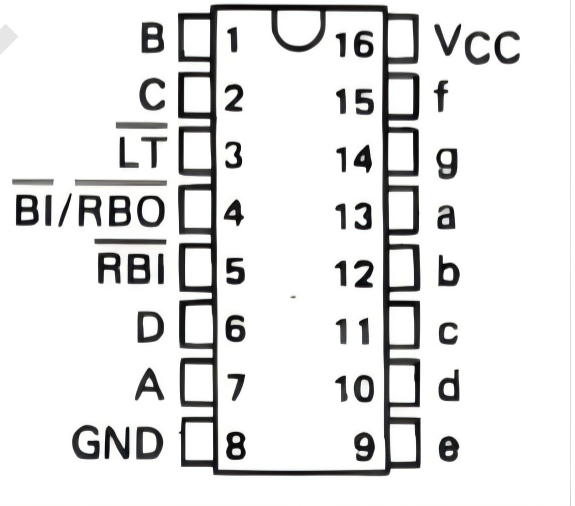


Figure 1.logic symbol

Pin Configurations



Pin Description

Pin No.	Pin Name	Description
1	B	data input
2	C	data input
3	$\overline{LT}$	lamp test
4	$\overline{BI}/\overline{RBO}$	blanking input/ripple blanking output
5	$\overline{RBI}$	ripple blanking input
6	D	data input
7	A	data input
8	GND	ground (0V)
9	e	data output
10	d	data output
11	c	data output
12	b	data output
13	a	data output
14	g	data output
15	f	data output
16	V_{CC}	supply voltage

Function Table

Decimal or function	Input						Output						
	$\overline{LT}$	$RB\overline{I}$	D	C	B	A	$\overline{BI/RBO}$	a	b	c	d	e	f	g
0	H	H	L	L	L	L	H	on	on	on	on	on	on	off
1	H	X	L	L	L	H	H	off	on	on	off	off	off	off
2	H	X	L	L	H	L	H	on	on	off	on	on	off	on
3	H	X	L	L	H	H	H	on	on	on	on	off	off	on
4	H	X	L	H	L	L	H	off	on	on	off	off	on	on
5	H	X	L	H	L	H	H	on	off	on	on	off	on	on
6	H	X	L	H	H	L	H	off	off	on	on	on	on	on
7	H	X	L	H	H	H	H	on	on	on	off	off	off	off
8	H	X	H	L	L	L	H	on	on	on	on	on	on	on
9	H	X	H	L	L	H	H	on	on	on	off	off	on	on
10	H	X	H	L	H	L	H	off	off	off	on	on	off	on
11	H	X	H	L	H	H	H	off	off	on	on	off	off	on
12	H	X	H	H	L	L	H	off	on	off	off	off	on	on
13	H	X	H	H	L	H	H	on	off	off	on	off	on	on
14	H	X	H	H	H	L	H	off	off	off	on	on	on	on
15	H	X	H	H	H	H	H	off	off	off	off	off	off	off
$\overline{BI}$	X	X	X	X	X	X	L	off	off	off	off	off	off	off
$\overline{RBI}$	H	L	L	L	L	L	L	off	off	off	off	off	off	off
LT	L	X	X	X	X	X	H	on	on	on	on	on	on	on

Note:

[1] H=HIGH voltage level; L=LOW voltage level; X=don't care.

[2] The blanking input ($\overline{BI}$) must be open or held at a high logic level when output functions 0 through 15 are desired. The ripple-blanking input ($RB\overline{I}$) must be open or high if blanking ofa decimal zero is not desired. [3] When a low logic level is applied directly to the blanking input ($\overline{BI}$), all segment outputs are off regardless ofthe level of any other input.

[4] When ripple-blanking input (RBI) and inputs A, B, C, D_are at a low level with the lamp test input high, all segment outputs go off and the ripple-blanking output (RBO) goes to a low level (response condition).

[5] When the blanking input/ripple blanking output ($\overline{BI/RBO}$) is open or held high and a low is applied to the lamp test input, all segment outputs are on.

Figure 3. Segment identification

Electrical Parameter

Absolute Maximum Ratings

(Voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Max.	Unit
supply voltage	V_{CC}	-		-0.5	+7	V
supply current	I_{CC}	-		-	50	mA
ground current	I_{GND}	-		-50	-	mA
input clamping current	I_{IK}	V_I < -0.5V or V_I > V_{CC}+0.5V		-	±20	mA
output clamping current	I_{OK}	V_O < -0.5V or V_O > V_{CC}+0.5V		-	±20	mA
output current	I_O	-0.5V < V_O < V_{CC}+0.5V		-	±25	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_{CC}	-	2.0	5.0	6.0	V
input voltage	V_I	-	0	-	V_{CC}	V
output voltage	V_O	-	0	-	V_{CC}	V
ambient temperature	T_{amb}	-	-20	-	+85	℃

Electrical Characteristics

DC Characteristics

(T_{amb}=-20℃ to +85℃, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Vcc	Conditions	Min.	Typ.	Max.	Unit
HIGH-level input voltage	V_{IH}	2.0V	-	1.5	1.2	-	V
		4.5V	-	3.15	2.4	-	V
		6.0V	-	4.2	3.2	-	V
LOW-level input voltage	V_{IL}	2.0V	-	-	0.8	0.5	V
		4.5V	-	-	2.1	1.35	V
		6.0V	-	-	2.8	1.8	V
LOW-level output voltage	V_{OL}	2.0V	I_O=20uA	-	0	0.1	V
		4.5V	I_O=20uA	-	0	0.1	V
		6.0V	I_O=20uA	-	0	0.1	V
		4.5V	I_O=4.0mA	-	0.15	0.33	V
		6.0V	I_O=5.2mA	-	0.16	0.33	V
HIGH-level input current	I_{IH}	6.0V	V_I=V_{CC}	-	-	20	uA
LOW-level input current	I_{IL}(A/B/ C/D)	6.0V	V_I= GND	-	-	-20	uA
	I_{IL} ($\overline{BI}$/ $\overline{RBO}$ / $\overline{RBI}$/$\overline{LT}$)	6.0V	V_I= GND	-	-	-1.2	mA
supply current	I_{CC}	6.0V	V_I=V_{CC} or GND;I_O=0A	-	-	13	mA

AC Characteristics

(T_{amb}=25℃, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Turn-on time	t_{ON}	V_{CC}=5.0V; C_L= 15pF; R_L=665Ω	from A input	-	-	100	ns
			from $\overline{RBI}$ input, outputs (a-f only)	-	-	100	ns
Turn-offtime	t_{OFF}	V_{CC}=5.0V; C_L= 15pF; R_L=665Ω	from A input	-	-	100	ns
			from $\overline{RBI}$ input, outputs (a-f only)	-	-	100	ns

Testing Circuit

AC Testing Circuit

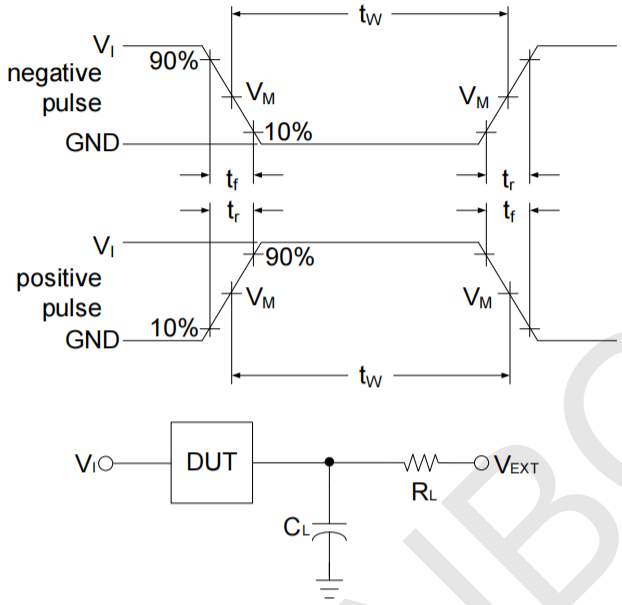


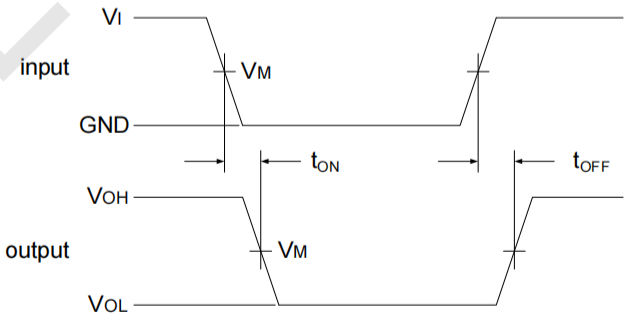
Figure 4. Test circuit for measuring switching times

C_L includes probe and jig capacitance.

Test Data

Type	Input		Load		V_{EXT}
	V_I	$t_r = t_f$	C_L	R_L	t_{ON}/t_{OFF}
SN74LS47	V_{CC}	3.0ns	15pF	665Ω	V_{CC}

AC Testing Waveforms



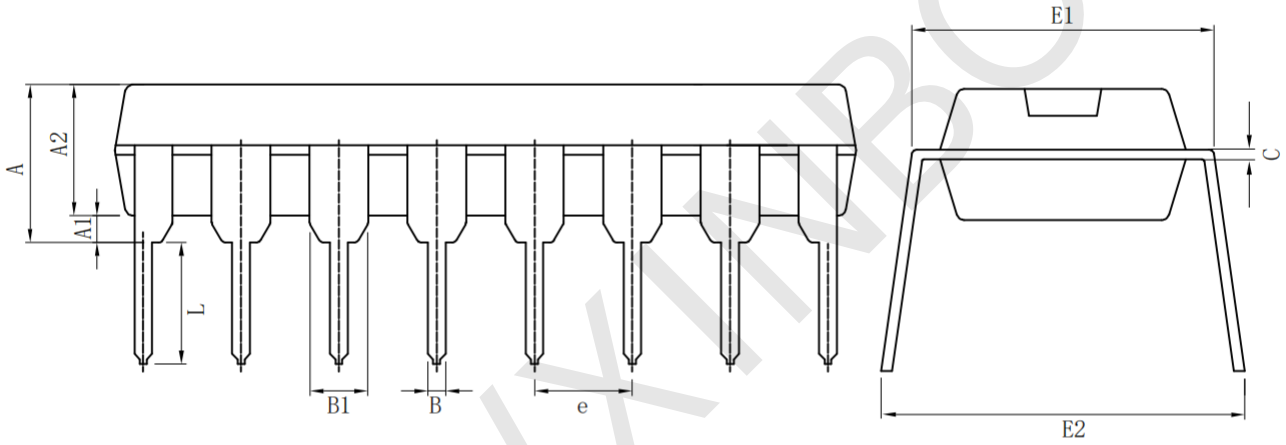
Measurement Points

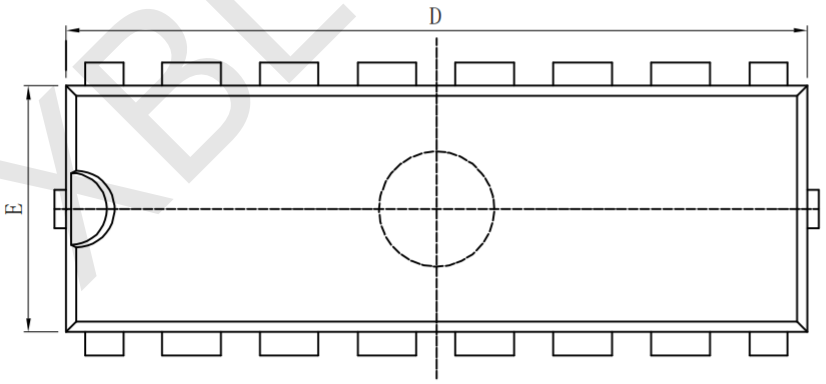
Type	Input	Output
	V_M	V_M
SN74LS47	0.5×V_{CC}	0.5×V_{CC}

Package Information

· DIP-16

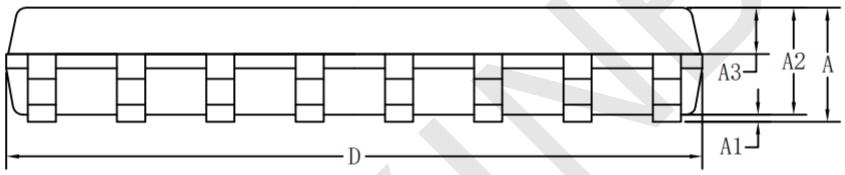
Size / Symbol	Dimensions In Millimeters		Size / Symbol	Dimensions In Inches	
	Min(mm)	Max(mm)		Min(in)	Max(in)
A	3.710	4.310	A	0.146	0.170
A1	0.510		A1	0.020	
A2	3.200	3.600	A2	0.126	0.142
B	0.380	0.570	B	0.015	0.022
B1	1.524(BSC)		B1	0.060(BSC)	
C	0.204	0.360	C	0.008	0.014
D	18.80	19.20	D	0.740	0.756
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

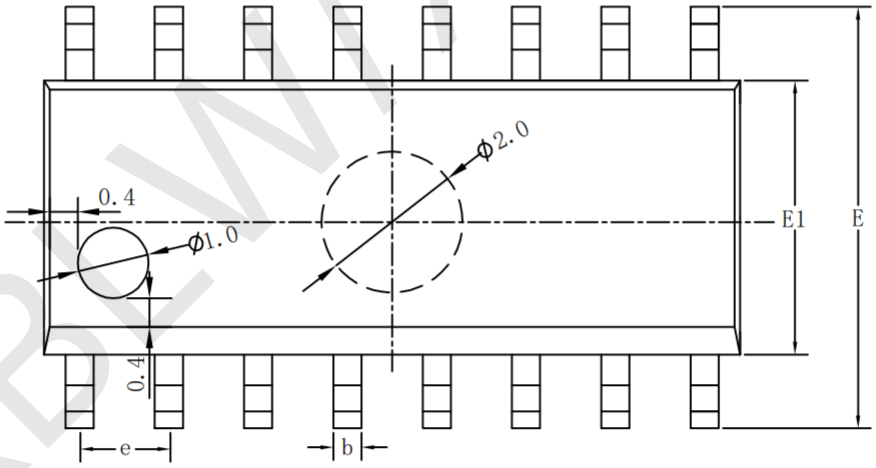


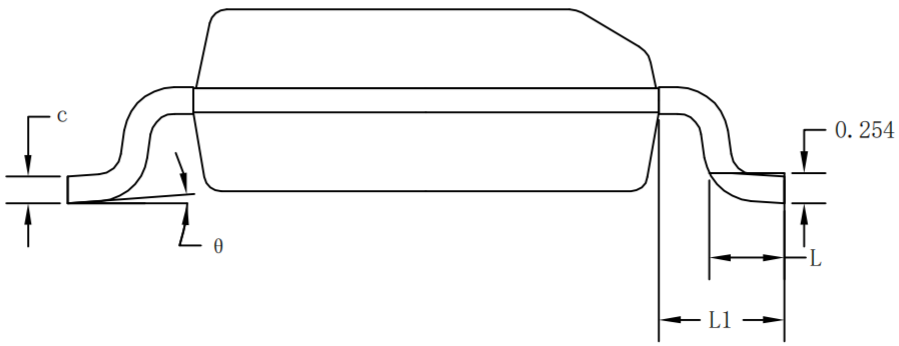


· SOP-16

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°

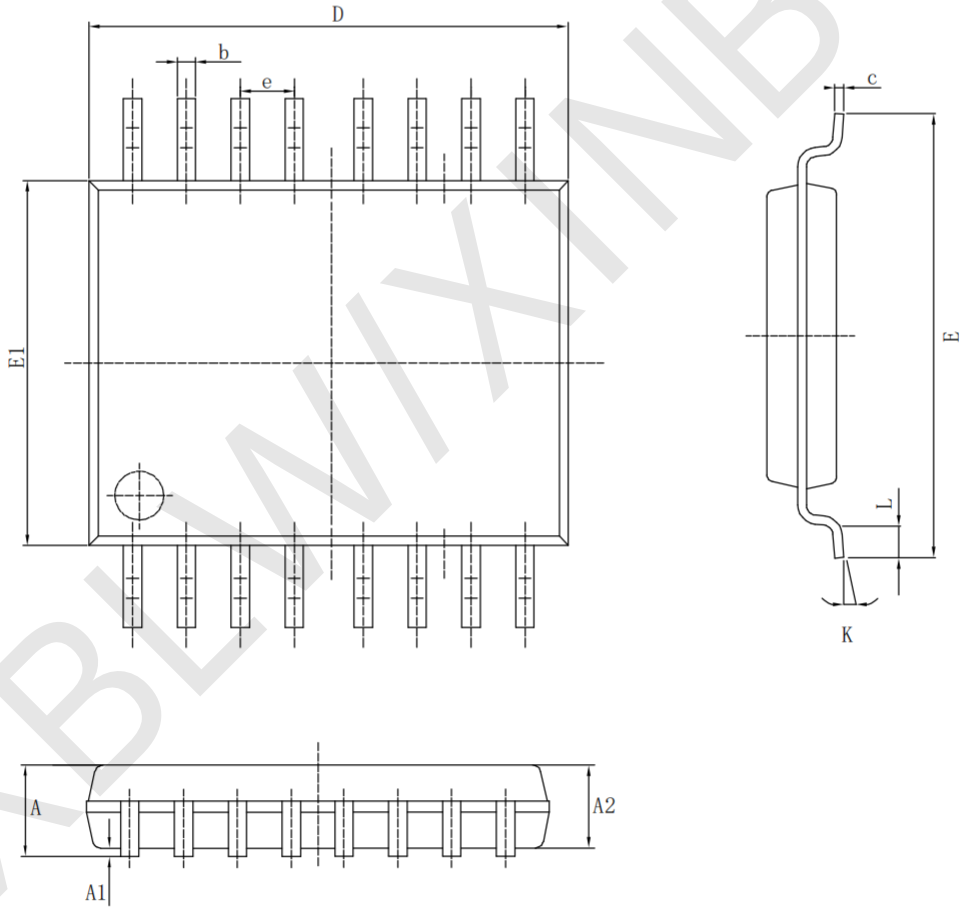






· TSSOP-16

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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