

芯伯乐®  
X I N B O L E

# Product Specification

## XBLW MAX232

5V Dual channel RS-232 Drivers/Receivers

WEB | [www.xinboleic.com](http://www.xinboleic.com)



## DESCRIPTION

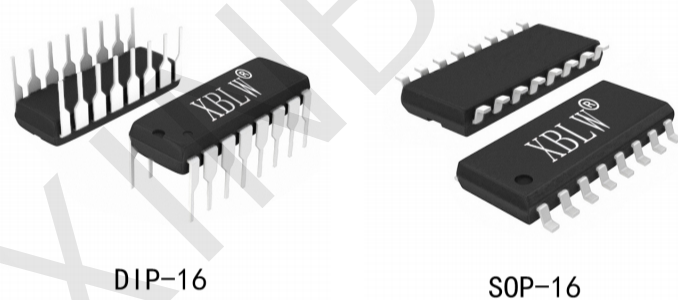
The MAX232 is a dual driver/receiver of RS-232 standard with a single supply voltage and bipolar output voltage of the transmitter formed by a built-in voltage multiplying generator on four 1.0 $\mu$ F external capacitors, designed for use in state-of-the-art high performance computing systems, high-speed electronic devices with high reliability of information exchange between remote objects. Input voltage levels are compatible with standard CMOS and TTL levels.

## FEATURES

- Output voltage levels are compatible with input levels of CMOS and TTL integrated circuits
- Meets All EIA/TIA-232E and V.28/V.24 Specifications
- Supply voltage range from 5.5V
- Low input current: 1.0 $\mu$ A at 25°C
- Output current 30mA
- Available in SOP-16 Package

## APPLICATIONS

- Portable Computers
- Battery-Powered RS-232 Systems
- Interface Translation
- Low-Power Modems
- Terminals



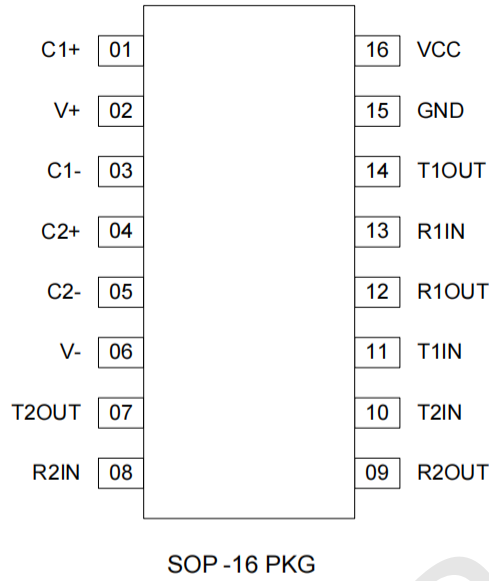
DIP-16

SOP-16

## Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW MAX232N	DIP-16	MAX232N	Tube	1000Pcs/Box
XBLW MAX232EDTR	SOP-16	MAX232E	Tape	2500Pcs/Reel

## PIN CONFIGURATION



## PIN DESCRIPTION

Pin No.	Pin Name	Pin Description
1	C1+	Terminal for Positive Charge-Pump C1 Capacitor
2	V+	Positive Voltage Generated by the Charge-Pump
3	C1-	Terminal for Negative Charge-Pump C1 Capacitor
4	C2+	Terminal for Positive Charge-Pump C2 Capacitor
5	C2-	Terminal for Negative Charge-Pump C2 Capacitor
6	V-	Negative Voltage Generated by the Charge-Pump
7	T2OUT	RS-232 Driver Output (Levels RS-232)
8	R2IN	RS-232 Receiver Input (Levels RS-232)
9	R2OUT	RS-232 Receiver Output (Levels TTL/CMOS)
10	T2IN	RS-232 Driver Input (Levels TTL/CMOS)
11	T1IN	RS-232 Driver Input (Levels TTL/CMOS)
12	R1OUT	RS-232 Receiver Output (Levels TTL/CMOS)
13	R1IN	RS-232 Receiver Input (Levels RS-232)
14	T1OUT	RS-232 Driver Output (Levels RS-232)
15	GND	Ground
16	VCC	Supply Voltage Input

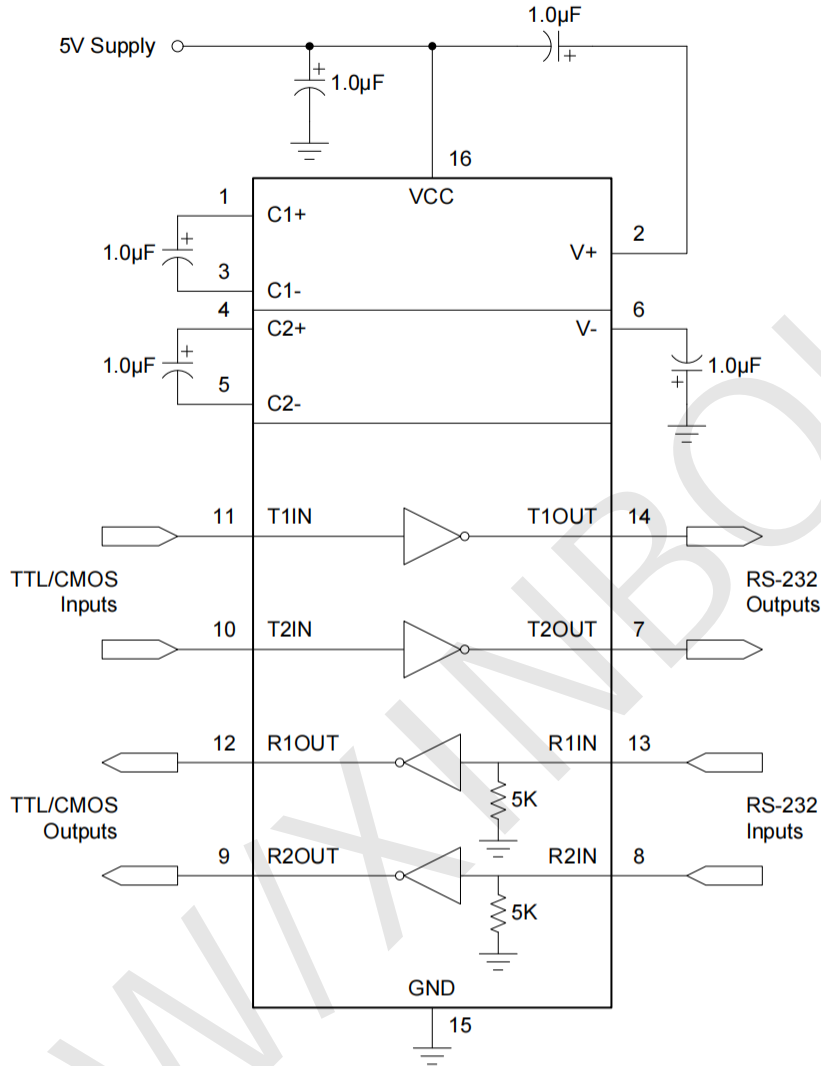
## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	$V_{CC}$	-0.3	6.0	V
Transmitter High Output Voltage	$V_+$	$V_{CC}-0.3$	9.8	V
Transmitter Low Output Voltage	$V_-$	-9.0	0.3	V
Transmitter Input Voltage	$V_{TIN}$	-0.3	$V_++0.3$	V
Receiver Input Voltage	$V_{RIN}$	-20	20	V
Voltage Applied to Transmitter Output	$V_{TOUT}$	$V_- - 0.3$	$V_++0.3$	V
Voltage Applied to Receiver Output	$V_{ROUT}$	-0.3	$V_{CC}+0.3$	V
Storage Temperature Range	$T_{STG}$	-65	150	°C

## RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	$V_{CC}$	4.5	5.5	V
Transmitter Input Voltage	$V_{TIN}$	0	$V_{CC}$	V
Receiver Input Voltage	$V_{RIN}$	-20	20	V
Output Current of Transmitter Short Circuit	$I_{SC}$	-	±60	mA
Ambient Temperature Range	$T_A$	-40	+85	°C

**TYPICAL APPLICATION CIRCUIT**



**FUNCTION TABLE**

INPUT (RIN, TIN)	OUTPUT (ROUT, TOUT)
L (Low Level)	H (High Level)
H (High Level)	L (Low Level)

## ELECTRICAL CHARACTERISTICS

(Limits in standard typeface are for TA=25°C, and the limits in boldface type apply over full operating temperature range.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT	
Supply Current	$I_{CC}$	$V_{CC} = 5.5V, V_{IL} = 0V$	-	-	14.0	mA	
<b>Receiver Parameters</b>							
Hysteresis Voltage	$V_h$	$V_{CC} = 5.0V$	0.2	-	1.0	V	
On (Operation) Voltage	$V_{on}$	$V_O \leq 0.1V, I_{OL} \leq 20\mu A$	-	-	2.4	V	
Off (Dropout) Voltage	$V_{off}$	$V_O \geq V_{CC} - 0.1V$ $I_{OH} \leq -20\mu A$	0.8	-	-	V	
Output Low Voltage	$V_{OL}$	$I_L = 3.2mA, V_{CC} = 4.5V,$ $V_{IH} = 2.4V$	-	-	0.4	V	
Output High Voltage	$V_{OH}$	$I_{OH} = -1.0mA,$ $V_{CC} = 4.5V, V_{IL} = 0.8V$	3.5	-	-	V	
Input Resistance	$R_I$	$V_{CC} = 5.0V$	3.0	-	7.0	k $\Omega$	
<b>Transmitter Parameters</b>							
Output Low Voltage	$V_{OL}$	$V_{CC} = 4.5V, V_{IH} = 2.0V,$ $R_L = 3.0k\Omega$	-	-	-5.2	V	
Output High Voltage	$V_{OH}$	$V_{CC} = 4.5V, V_{IL} = 0.8V,$ $R_L = 3.0k\Omega$	5.2	-	-	V	
Input Low Current	$I_{IL}$	$V_{CC} = 5.5V, V_{IL} = 0V$	-	-	-10.0	$\mu A$	
Input High Current	$I_{IH}$	$V_{CC} = 5.5V, V_{IH} = V_{CC}$	-	-	10.0	$\mu A$	
Speed Of Output Front Charge	SR	$V_{CC} = 5.0V, C_L = 50 - 1000pF,$ $R_L = 3.0 - 7.0k\Omega$	3.0	-	30	V/ $\mu s$	
Output Resistance	$R_O$	$V_{CC} = V_+ = V_- = 0V$ $V_O = \pm 2V$	300	-	-	$\Omega$	
Short Circuit Output Current	$I_{SC}$	$V_{CC} = 5.5V$	$V_I = V_{CC}$	-	-	-60	mA
		$V_O = 0V$	$V_I = 0$	-	-	60	
Speed Of Information Transmission	ST	$V_{CC} = 4.5V, C_L = 1000pF,$ $R_L = 3.0k\Omega, t_w = 7\mu s$ (for extreme, $t_w = 8\mu s$ )	120	-	-	kbit/s	
<b>Dynamic Parameters</b>							
Signal Propagation Delay Time When Switching On (Off)	$t_{PHLR}$ ( $t_{PLHR}$ )	$V_{CC} = 4.5V, C_L = 150pF,$ $V_{IL} = 0V, V_{IH} = 3.0V,$ $t_{LH} = t_{HL} \leq 10ns$	-	-	10.0	$\mu s$	
Signal Propagation Delay Time When Switching On (Off)	$t_{PHLT}$ ( $t_{PLHT}$ )	$V_{CC} = 4.5V, C_L = 2500pF,$ $V_{IL} = 0V, V_{IH} = 3.0V,$ $R_L = 3k\Omega, t_{LH} = t_{HL} \leq 10ns$	-	-	6.0	$\mu s$	

TIMING DIAGRAM

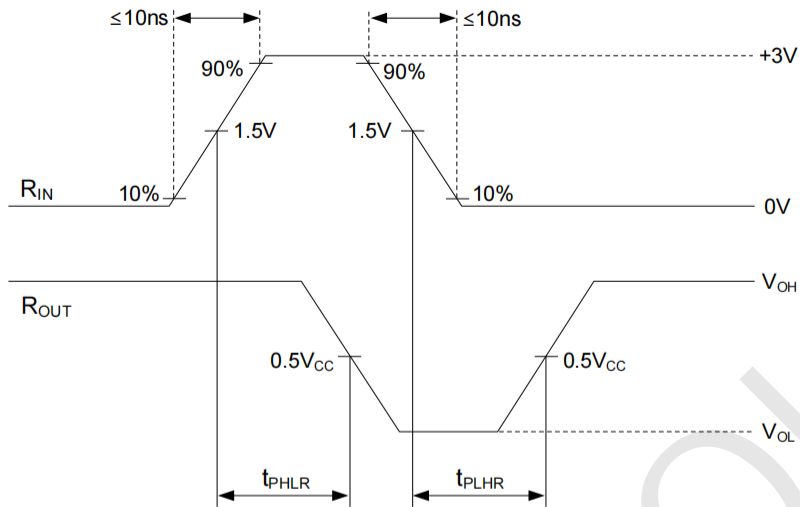


Figure 1.  $t_{PHL}$  and  $t_{PLH}$  waveforms of Receiver

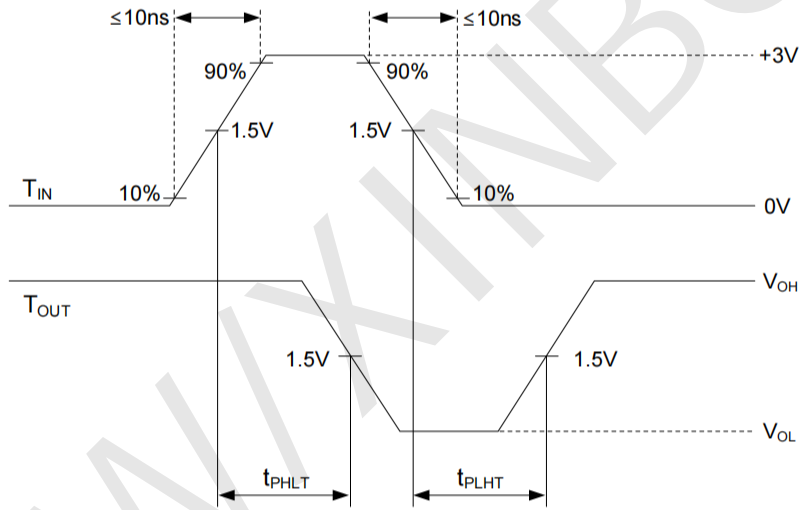


Figure 2.  $t_{PHL}$  and  $t_{PLH}$  waveforms of Transmitter

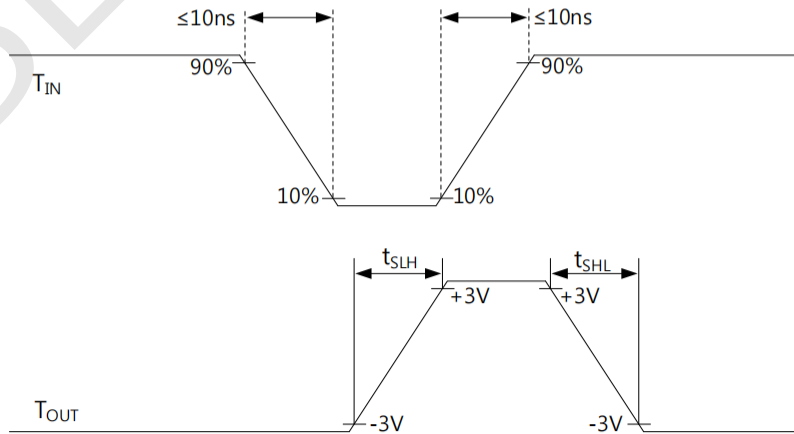
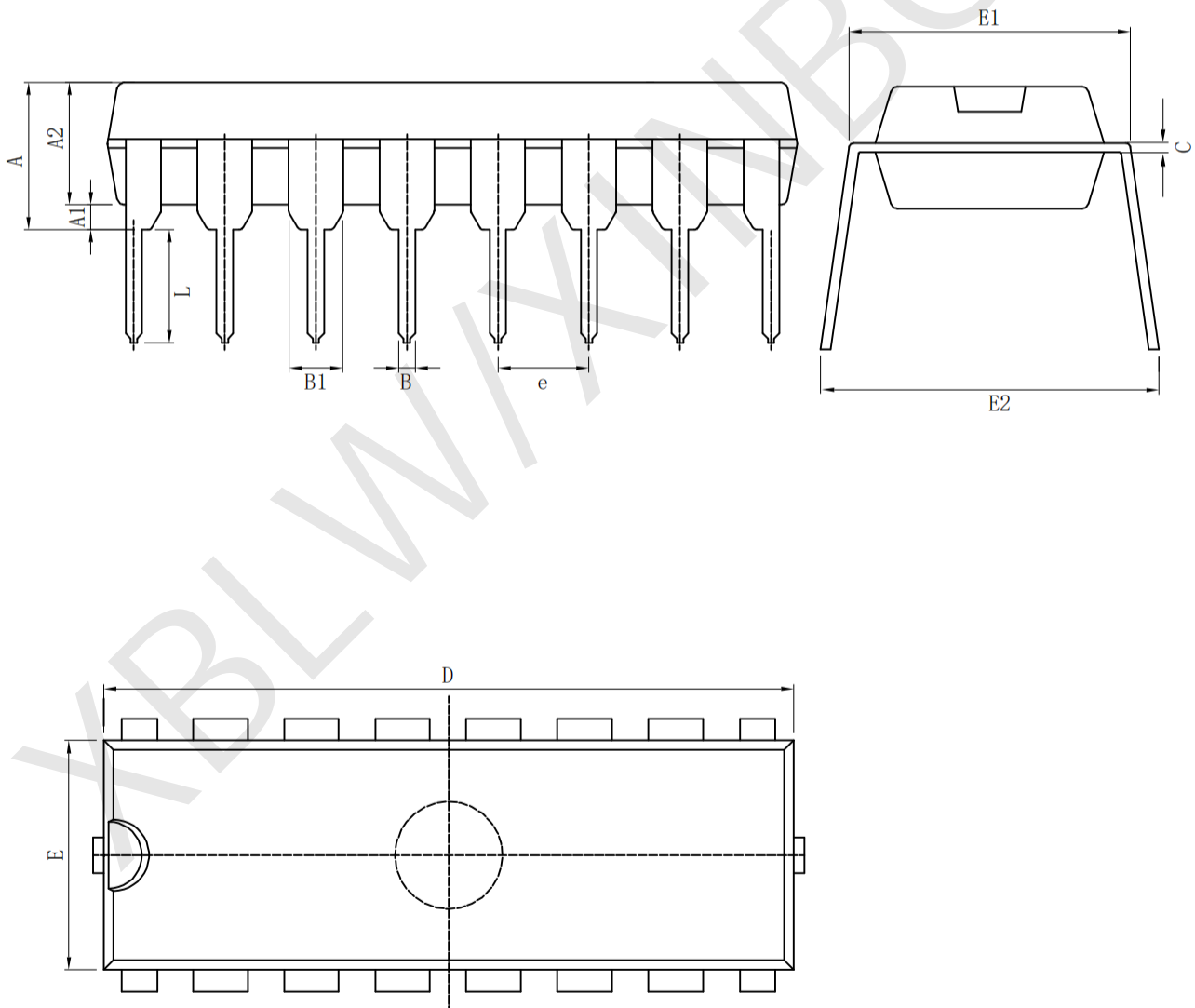


Figure 3.  $t_{SLH}$  and  $t_{SHL}$  waveforms of Transmitter

**Package Information**

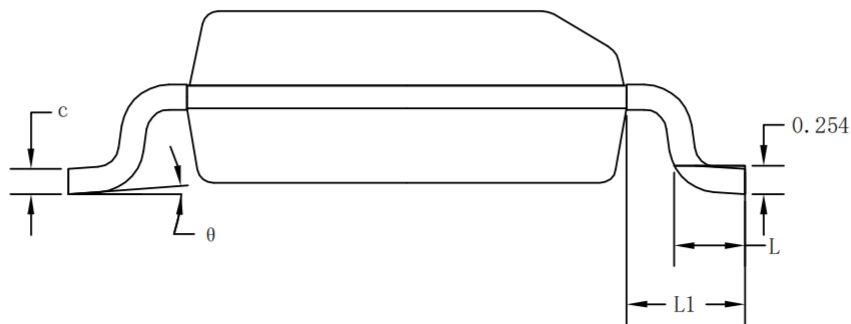
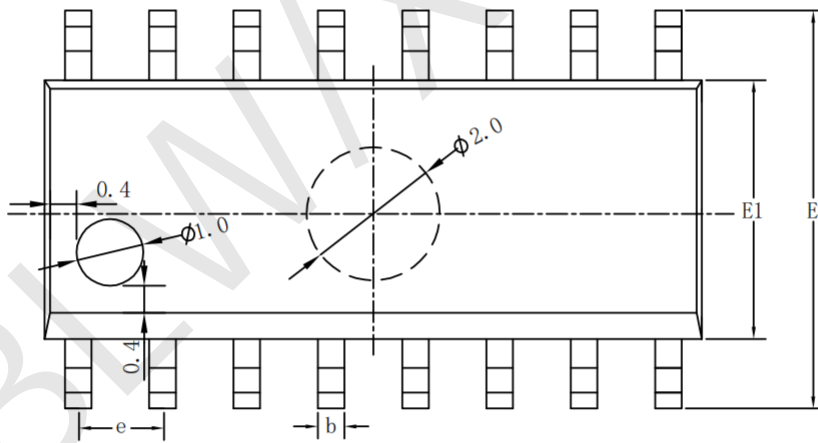
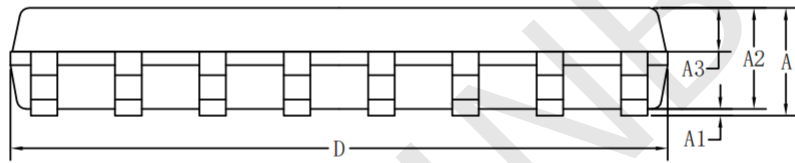
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Symbol	Size	Dimensions In Millimeters		Symbol	Size	Dimensions In Inches	
		Min( mm)	Max( mm)			Min( in)	Max( in)
A		3.710	4.310	A		0.146	0.170
A1		0.510		A1		0.020	
A2		3.200	3.600	A2		0.126	0.142
B		0.380	0.570	B		0.015	0.022
B1		1.524 (BSC)		B1		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

Symbol	Dimensions In Millimeters			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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