



QNHCHIP

QN74LVC1G240

Product Specification

QN74LVC1G240

Single inverting Buffer/Driver With 3-State Output



DESCRIPTIONS

This single inverting buffer/driver is designed for 1.65V to 5.5V V_{CC} operation.

The QN74LVC1G240 is a single inverting line driver with a 3-state output. The output is disabled when the output- enable ($\overline{OE}$) input is high.

To ensure the high-impedance state during power up or power down, $\overline{OE}$ should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver. This device is fully specified for partial-power-down applications using I_{off} . The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

The QN74LVC1G240 is available in Green SOT23-5 and SC70-5 packages. It operates over an ambient temperature range of -40°C to $+125^{\circ}\text{C}$.

FEATURES

- **Operating Voltage Range: 1.65V to 5.5V**
- **Low Power Consumption: 0.1 μA (TYP)**
- **Operating Temperature Range: -40°C to $+125^{\circ}\text{C}$**
- **Input Accept Voltage to 5.5V**
- **High Output Drive: $\pm 24\text{mA}$ at $V_{CC}=3.0\text{V}$**
- **I_{off} Supports Partial-Power-Down Mode Operation**
- **Micro Size Packages: SOT23-5, SC70-5**

APPLICATIONS

- **AC Receiver**
- **Blu-ray Players and Home Theaters**
- **Desktops or Notebook PCs**
- **Digital Video Cameras (DVC)**
- **Mobile Phones**
- **Personal Navigation Device (GPS)**
- **Portable Media Player**

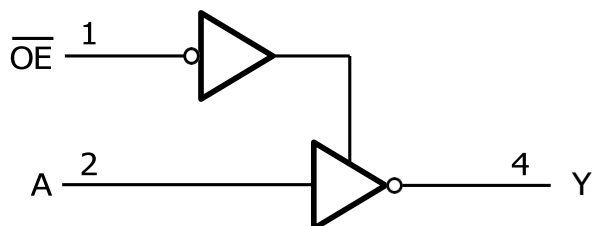
PACKAGE/ORDERING INFORMATION ⁽¹⁾

PRODUCT	ORDERING NUMBER	TEMPERATURE RANGE	PACKAGE LEAD	PACKAGE MARKING ⁽²⁾	MSL ⁽³⁾	PACKAGE OPTION
QN74LVC1G240	QN74LVC1G240DCKR	$-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$	SC70-5 ⁽⁴⁾	CK5	MSL3	Tape and Reel,3000
	QN74LVC1G240DBVR	$-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$	SOT23-5	C40R	MSL3	Tape and Reel,3000

NOTE:

- (1) This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document.
- (2) There may be additional marking, which relates to the lot trace code information (data code and vendor code), the logo or the environmental category on the device.
- (3) MSL, The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications.
- (4) Equivalent to SOT353.

FUNCTIONAL BLOCK DIAGRAM



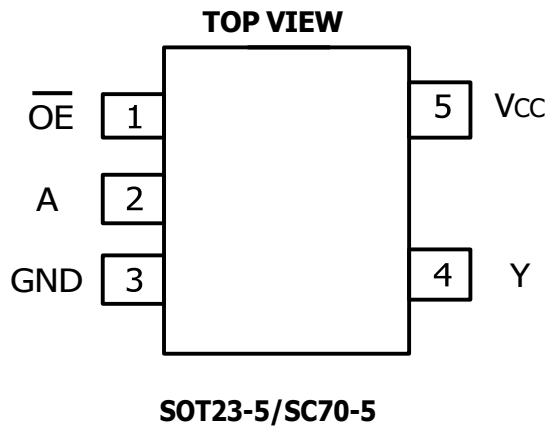
FUNCTION TABLE

INPUT		OUTPUT
$\overline{OE}$	A	Y
L	H	L
L	L	H
H	X	Z

H=High Voltage Level
L=Low Voltage Level
Z=high-impedance OFF-state



PIN CONFIGURATION AND FUNCTIONS (TOP VIEW)



PIN	NAME	I/O	FUNCTION
1	$\overline{OE}$	I	$\overline{OE}$ Enable/Input
2	A	I	Input
3	GND	P	Ground
4	Y	O	Output
5	V _{CC}	P	Power Pin



REVISION HISTORY

Note: Page numbers for previous revisions may differ from page numbers in the current version.

VERSION	Change Date	Change Item
Rev A.1	2026/06/10	Initial version completed



Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted) ^{(1) (2)}

		MIN	MAX	UNIT
V _{CC}	Supply voltage range	-0.5	6.5	V
V _I	Input voltage range ⁽²⁾	-0.5	6.5	V
V _O	Voltage range applied to any output in the high-impedance or power-off state ⁽²⁾	-0.5	6.5	V
V _O	Voltage range applied to any output in the high or low state ⁽²⁾⁽³⁾	-0.5	V _{CC} +0.5	V
I _{IK}	Input clamp current	V _I <0		-50 mA
I _{OK}	Output clamp current	V _O <0		-50 mA
I _O	Continuous output current			±50 mA
	Continuous current through V _{CC} or GND			±100 mA

Package Thermal Impedance

	PARAMETER	MIN	MAX	UNIT
θ _{JA}	Package thermal impedance ⁽⁴⁾	SOT23-5 SC70-5	230 380	°C/W

Temperature

	PARAMETER	MIN	MAX	UNIT
Temperature	Junction temperature, T _J ⁽⁵⁾	-65	150	°C
	Storage temperature, T _{stg}	-65	150	

ESD Ratings

The following ESD information is provided for handling of ESD-sensitive devices in an ESD protected area only.

			ESD SENSITIVITY CAUTION	
	VALUE	UNIT		ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.
Human-Body Model (HBM)	±2000			
Charged-Device Model (CDM)	±1000	V		
Machine Model (MM)	±200			

NOTE:

- (1) Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.
- (3) The value of V_{CC} is provided in the Recommended Operating Conditions table.
- (4) The package thermal impedance is calculated in accordance with JE5D-51.
- (5) The maximum power dissipation is a function of T_{J(MAX)}, R_{θJA}, and T_A. The maximum allowable power dissipation at any ambient temperature is P_D = (T_{J(MAX)} - T_A) / R_{θJA}. All numbers apply for packages soldered directly onto a PCB.



ELECTRICAL CHARACTERISTICS

over recommended operating free-air temperature range (Full=-40°C to +125°C, typical values are at $T_A = +25^\circ\text{C}$, unless otherwise noted.) ⁽¹⁾

Recommended Operating Conditions

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
Supply Voltage	V_{CC}	Operating	1.65	5.5	V
		Data retention only	1.5		
High-Level Input Voltage	V_{IH}	$V_{CC}=1.65\text{V to }1.95\text{V}$	$0.65 \times V_{CC}$		V
		$V_{CC}=2.3\text{V to }2.7\text{V}$	1.7		
		$V_{CC}=3\text{V to }3.6\text{V}$	2		
		$V_{CC}=4.5\text{V to }5.5\text{V}$	$0.7 \times V_{CC}$		
Low-Level Input Voltage	V_{IL}	$V_{CC}=1.65\text{V to }1.95\text{V}$		$0.35 \times V_{CC}$	V
		$V_{CC}=2.3\text{V to }2.7\text{V}$		0.7	
		$V_{CC}=3\text{V to }3.6\text{V}$		0.8	
		$V_{CC}=4.5\text{V to }5.5\text{V}$		$0.3 \times V_{CC}$	
Input Voltage	V_I		0	5.5	V
Output Voltage	V_O		0	V_{CC}	V
Input Transition Rise or Fall	$\Delta t/\Delta v$	$V_{CC}=1.8\text{V} \pm 0.15\text{V}, 2.5\text{V} \pm 0.2\text{V}$		20	ns/V
		$V_{CC}=3.3\text{V} \pm 0.3\text{V}$		10	
		$V_{CC}=5\text{V} \pm 0.5\text{V}$		5	
Operating Temperature	T_A		-40	+125	°C

(1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.



DC Characteristics

PARAMETER	TEST CONDITIONS	V _{CC}	TEMP	MIN ⁽²⁾	TYP ⁽³⁾	MAX ⁽²⁾	UNIT
V _{OH}	I _{OH} = -100 μ A	1.65V to 5.5V		V _{CC} -0.1			V
	I _{OH} = -4 mA	1.65V		1.2			
	I _{OH} = -8 mA	2.3V	Full	1.9			
	I _{OH} = -16 mA	3V		2.4			
	I _{OH} = -24 mA			2.3			
	I _{OH} = -32 mA	4.5V		3.8			
V _{OL}	I _{OL} = 100 μ A	1.65V to 5.5V				0.1	V
	I _{OL} = 4 mA	1.65V				0.45	
	I _{OL} = 8 mA	2.3V	Full			0.3	
	I _{OL} = 16 mA	3V				0.4	
	I _{OL} = 24 mA					0.55	
	I _{OL} = 32 mA	4.5V				0.55	
I _I	A or $\overline{OE}$ input	V _I =5.5V or GND	0V to 5.5V	+25°C Full	± 0.1	± 5	μ A
I _{off}	V _I or V _O =5.5V	0	+25°C Full	± 0.1		± 10	μ A
I _{CC}	V _I =5.5V or GND, I _O =0	1.65V to 5.5V	+25°C Full		0.1	10	μ A
ΔI_{CC}	One input at V _{CC} -0.6V, Other inputs at V _{CC} or GND	3V to 5.5V	Full			500	μ A
Input Capacitance (C _i)	V _I =V _{CC} or GND	3.3V	+25°C		4		pF

(1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

(2) Limits are 100% production tested at 25°C. Limits over the operating temperature range are ensured through correlations using statistical quality control (SQC) method.

(3) Typical values represent the most likely parametric norm as determined at the time of characterization. Actual typical values may vary over time and will also depend on the application and configuration.



Switching Characteristics, $C_L=15\text{pF}$

over recommended operating free-air temperature range (-40°C to 125°C , unless otherwise noted.) ⁽¹⁾

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC}=1.8\text{V}\pm 0.15\text{V}$	$V_{CC}=2.5\text{V}\pm 0.2\text{V}$	$V_{CC}=3.3\text{V}\pm 0.3\text{V}$	$V_{CC}=5\text{V}\pm 0.5\text{V}$	UNIT
			TYP	TYP	TYP	TYP	
t_{pd}	A	Y	6.3	3.9	4.1	2.3	ns

Switching Characteristics, $C_L=30\text{pF}$ or 50pF

over recommended operating free-air temperature range (-40°C to 125°C , unless otherwise noted.) ⁽¹⁾

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC}=1.8\text{V}\pm 0.15\text{V}$	$V_{CC}=2.5\text{V}\pm 0.2\text{V}$	$V_{CC}=3.3\text{V}\pm 0.3\text{V}$	$V_{CC}=5\text{V}\pm 0.5\text{V}$	UNIT
			TYP	TYP	TYP	TYP	
t_{pd}	A	Y	8.8	5.5	4.2	3.1	ns
t_{en}	$\overline{\text{OE}}$	Y	9.7	6.0	5.2	3.5	ns
t_{dis}	$\overline{\text{OE}}$	Y	7.6	4.5	4.6	3.2	ns

Operating Characteristics

$T_A=25^\circ\text{C}$

PARAMETER			TEST CONDITIONS	$V_{CC}=1.8\text{V}$	$V_{CC}=2.5\text{V}$	$V_{CC}=3.3\text{V}$	$V_{CC}=5\text{V}$	UNIT
				TYP	TYP	TYP	TYP	
C_{pd}	Power Dissipation Capacitance	Output Enabled	$f=10\text{MHz}$	18	18	19	21	pF
		Output Disabled		2	2	2	4	

All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.



PARAMETER MEASUREMENT INFORMATION

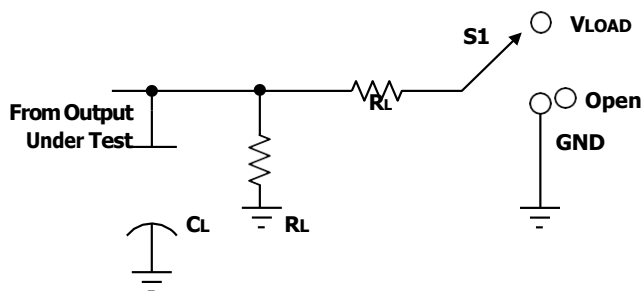
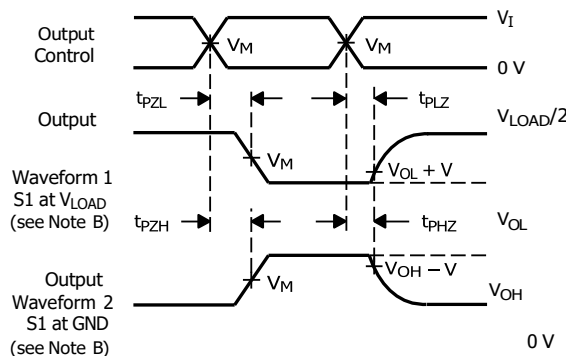
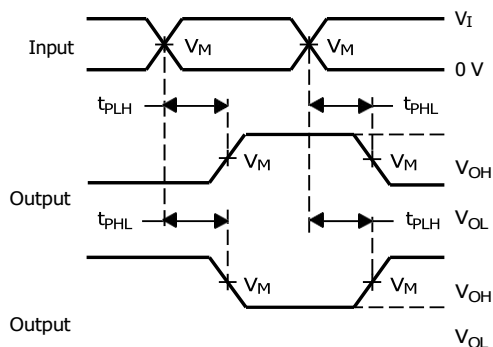
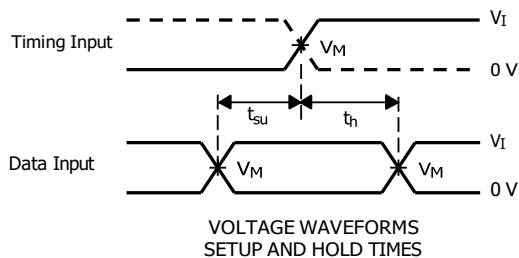
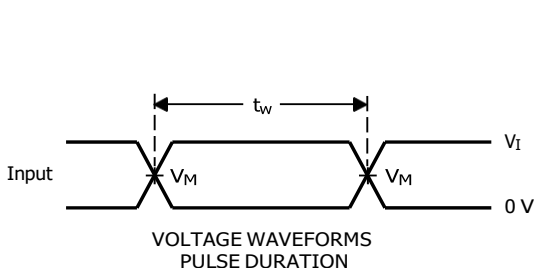


Figure 1. Load Circuit and Voltage Waveforms

Figure 2: Load Current and Voltage Waveforms									
TEST			S1						
t _{PLH} /t _{PHL}			Open						
t _{PIZ} /t _{PZL}			V _{LOAD}						
t _{PH Z} /t _{PZH}			GND						
INPUTS									
V _{CC}	V _I t _r /t _f		V _M	V _{LOAD}	C _L		R _L		V _Δ
1.8V±0.15V	V _{CC}	≤2ns	V _{CC} /2	2 x V _{CC}	15pF	30pF	1MΩ	1kΩ	0.15V
2.5V±0.2V	V _{CC}	≤2ns	V _{CC} /2	2 x V _{CC}	15pF	30pF	1MΩ	500Ω	0.15V
3.3V±0.3V	3V	≤2.5ns	1.5V	6V	15pF	50pF	1MΩ	500Ω	0.3V
5V±0.5V	V _{CC}	≤2.5ns	V _{CC} /2	2 x V _{CC}	15pF	50pF	1MΩ	500Ω	0.3V



VOLTAGE WAVEFORMS PROPAGATION DELAY
TIMES INVERSION AND NONINVERTING OUTPUTS

VOLTAGE WAVEFORMS ENABLE AND DISABLE TIMES
LOW-AND-HIGH-LEVEL ENABLING

NOTES: A. C_L includes probe and jig capacitance.

- B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control.
Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
C. All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, $Z_O = 50 \Omega$.
D. The outputs are measured one at a time, with one transition per measurement.
E. t_{PLZ} and t_{PHZ} are the same as t_{dis} .

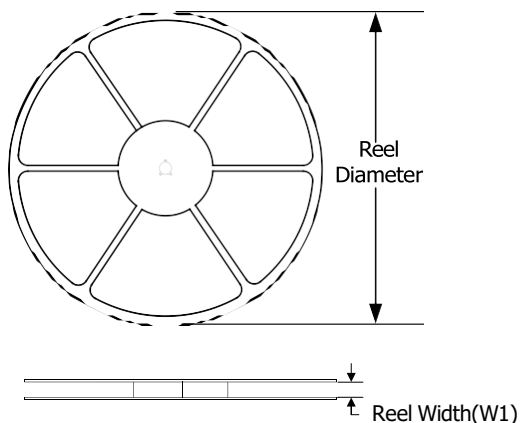


- F. t_{PZL} and t_{PZH} are the same as t_{en} .
- G. t_{PLH} and t_{PHL} are the same as t_{pd}
- H. All parameters and waveforms are not applicable to all devices.

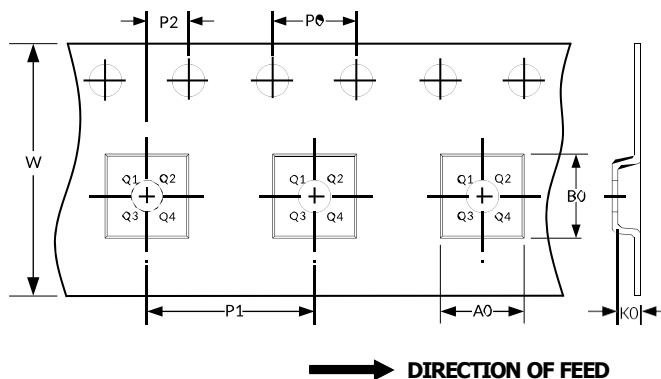


TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSION



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SC70-5	7"	9.5	2.25	2.55	1.20	4.0	4.0	2.0	8.0	Q3
SOT23-5	7"	9.5	3.20	3.20	1.40	4.0	4.0	2.0	8.0	Q3

NOTE:

1. All dimensions are nominal.
2. Plastic or metal protrusions of 0.15mm maximum per side are not included.

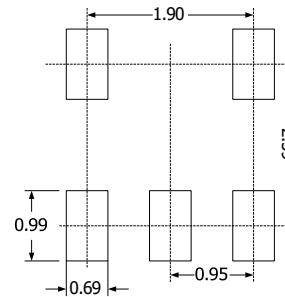
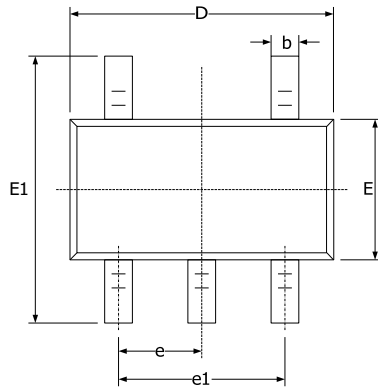


PACKAGE OUTLINE DIMENSIONS

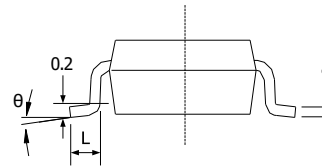
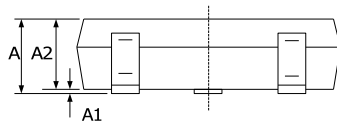
NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.

SOT23-5 ⁽³⁾



RECOMMENDED LAND PATTERN (Unit: mm)



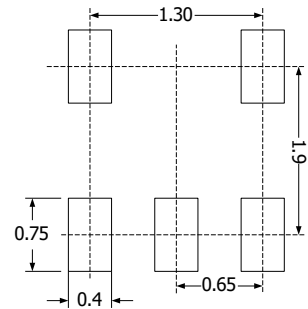
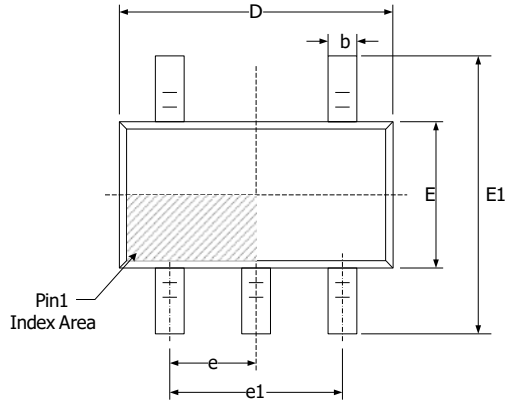
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A ⁽¹⁾	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D ⁽¹⁾	2.820	3.020	0.111	0.119
E ⁽¹⁾	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC) ⁽²⁾		0.037(BSC) ⁽²⁾	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°



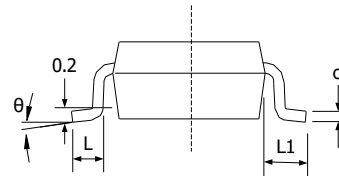
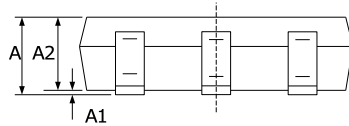
NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.

SC70-5⁽³⁾



RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A ⁽¹⁾	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D ⁽¹⁾	2.000	2.200	0.079	0.087
E ⁽¹⁾	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650(BSC) ⁽²⁾		0.026(BSC) ⁽²⁾	
e1	1.300(BSC) ⁽²⁾		0.051(BSC) ⁽²⁾	
L	0.260	0.460	0.010	0.018
L1	0.525		0.021	
θ	0°	8°	0°	8°