

General Description

The OCP92012 is a four-data-lane, MIPI, D-PHY switch. This single-pole, double-throw (SPDT) switch is optimized for switching between two high-speed or low-power MIPI sources. The OCP92012 is designed for the MIPI specification and allows connection to a CSI or DSI module

Features

Switch Type	SPDT(10X)
Signal Types	MIPI,D-PHY
VCC	1.5 to 5.0 V
Input Signals	0 to 1.3V
RON	6 Ω Typical HS MIPI 6 Ω Typical LP MIPI
ΔR_{ON}	0.1 Ω Typical HS&LP MIPI
RON_FLAT	0.9 Ω Typical HS&LP MIPI
ICCZ	1 μ A Maximum
ICC	32 μ A Maximum
OIRR	-24 dB Typical
XTALK	-30 dB Typical
Bandwidth	3000 MHz Minimum
Channel-to-channel skew	6 ps Typical
CON	1.5 pF
Operating Temperature	-40 to +80°C
Package	WLCSP-36B

Applications

- Smart Phones
- Display

Pin Configuration

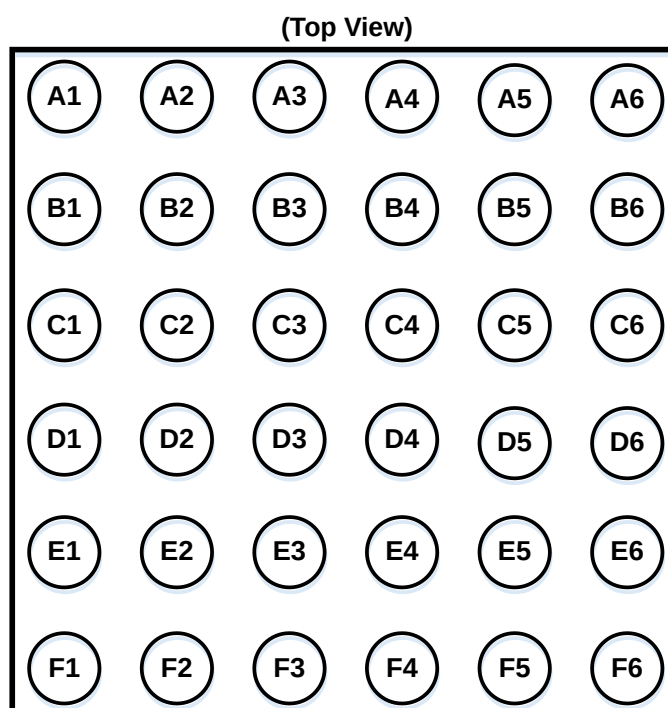


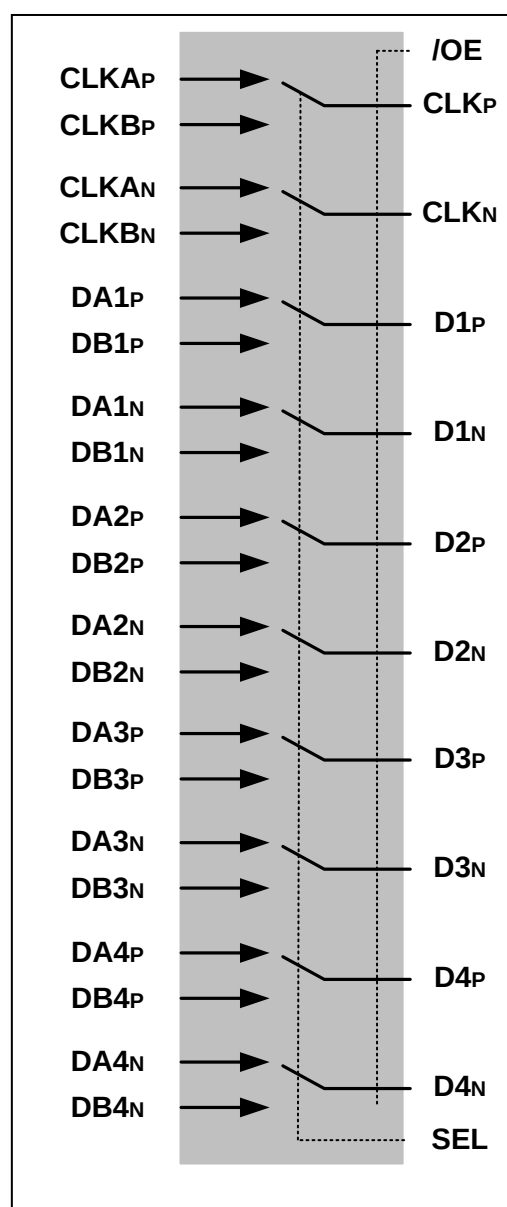
Figure 1, Pin Assignments of OCP92012



Ball	Pin Name	Ball	Pin Name	Ball	Pin Name	Ball	Pin Name	Ball	Pin Name	Ball	Pin Name
A1	Vcc	B1	DB4N	C1	DB3N	D1	DB2N	E1	DB1N	F1	CLKBN
A2	GND	B2	DB4P	C2	DB3P	D2	DB2P	E2	DB1P	F2	CLKBP
A3	DA4N	B3	DA3N	C3	NC	D3	DA2N	E3	DA1N	F3	CLKAN
A4	DA4P	B4	DA3P	C4	NC	D4	DA2P	E4	DA1P	F4	CLKAP
A5	/OE	B5	D4N	C5	D3N	D5	D2N	E5	D1N	F5	CLKN
A6	SEL	B6	D4P	C6	D3P	D6	D2P	E6	D1P	F6	CLKP

Pin Descriptions

Pin Name	Description		
CLK _{P/N}	Common Clock Path		
D1 _{P/N}	Common Data Path1		
D2 _{P/N}	Common Data Path2		
D3 _{P/N}	Common Data Path3		
D4 _{P/N}	Common Data Path4		
CLKA _{P/N}	A-side Clock Path		
DA1 _{P/N}	A-side Data Path1		
DA2 _{P/N}	A-side Data Path2		
DA3 _{P/N}	A-side Data Path3		
DA4 _{P/N}	A-side Data Path4		
CLKB _{P/N}	A-side Data Path4		
DB1 _{P/N}	B-side Data Path1		
DB2 _{P/N}	B-side Data Path2		
DB3 _{P/N}	B-side Data Path3		
DB4 _{P/N}	B-side Data Path4		
SET	Control Pin	SEL=0	CLK _P =CLKA _P , CLK _N =CLKA _N , Dn(P/N)=DAn(P/N)
		SEL=1	CLK _P =CLKB _P , CLK _N =CLKB _N , Dn(P/N)=DBn(P/N)
/OE	Output Enable		
V _{CC}	Power		
GND	Ground		
NC	No connect		



Truth Table

SEL	/OE	Function
LOW	LOW	CLKP=CLKAP,CKLN=CKLAN,Dn(P/N)=DAn(P/N)
HIGH	LOW	CLKP=CLKBP,CKLN=CKLBN,Dn(P/N)=DBn(P/N)
X	HIGH	DAn(P/N),DBn(P/N) Data Ports High Impedance

■ Absolute Maximum Ratings¹ (TA=25°C, unless otherwise noted)

Over operating free-air temperature range (unless otherwise noted)

Parameter	Symbol	Rating	Unit
Supply voltage	V _{CC}	-0.5 to +5.5	V
DC input voltage	V _{CNTRL}	-0.5 to V _{CC}	V
DC switch I/O	V _{SW}	-0.5 to +5.5	V
DC input diode current	I _{IK}	-50	mA
DC output current	I _{OUT}	25	mA
Operating Junction Temperature Range	T _J	-40 to +150	°C
Human Body Mode	HBM	2000	V

■ Recommended Operating Conditions

Parameter	Symbol	Rating	Unit
Supply voltage	V _{CC}	1.5 to 5.0	V
Control Input Voltage	V _{CNTRL}	0 to V _{CC}	V
Switch I/O Voltage (CLK _N ,CLKA _N ,Dn,Dan,DBn)	HS Mode	V _{SW}	0 to 0.3
	LP Mode		0 to 1.3
Ambient temperature	T _A	-40 to 85	°C

■ DC Electrical Characteristics

Typical limits tested at T_A= 25°C. Unless otherwise specified

Symbol	Parameter	Conditions	V _{CC} (V)	Min.	Typ.	Max.	Unit
V _{IK}	Clamp Diode Voltage	I _{IN} =-18mA	1.5	-1.2		-0.6	V
V _{IH}	Input Voltage High		1.5 TO 5	1.3			V
V _{IL}	Input Voltage Low		1.5 TO 5			0.4	V
I _{IN}	Control Input Leakage (SEL,/OE)	V _{SW} =0 to V _{CC}	1.5 TO 5	-0.5		0.5	μA
I _{NO(OFF)} I _{NC(OFF)}	Off Leakage Current of Port (CLKA _N ,DAn,CLKB _N ,DBN)	V _{SW} =0V≤DATA≤1.3V	1.5 TO 5	-0.5		0.5	μA
I _{A(ON)}	On Leakage Current of Common Ports (CLK _N ,Dn)	V _{SW} =0V≤DATA≤1.3V	1.5 TO 5	-0.5		0.5	μA
I _{OFF}	Power-off Leakage Current	V _{SW} =0V or 1.3V	0	-0.5		0.5	μA
I _{OZ}	Off-state Leakage	V _{SW} =0V≤DATA≤1.3V /OE=High	5	-0.5		0.5	μA
R _{ON_MIPL_HS}	Switch On Resistance for HS MIPI Applications	I _{ON} =-8mA,/OE=0V,SEL= V _{CC} or 0V,CLKA,B,DBn or DAn=0.2V	1.5		6		Ω
			2.5		6		Ω
			3.5		6		Ω
			5		6		Ω
R _{ON_MIPL_P}	Switch On Resistance for P MIPI Applications	I _{ON} =-8mA,/OE=0V,SEL= V _{CC} or 0V,CLKA,B,DBn or DAn=1.2V	1.5		6		Ω
			2.5		6		Ω
			3.5		6		Ω



			5		6		Ω
Δ $R_{ON_MIPI_HS}$	On Resistance Matching Between HS MIPI Channels	$I_{ON}=-8mA, /OE=0V, SEL=VCC \text{ or } 0V, CLK_A, B, DBn \text{ or } DAN=0.2V$	1.5		0.1		Ω
			2.5		0.1		Ω
			3.5		0.1		Ω
			5		0.1		Ω
Δ $R_{ON_MIPI_LP}$	On Resistance Matching Between LP MIPI Channels	$I_{ON}=-8mA, /OE=0V, SEL=VCC \text{ or } 0V, CLK_A, B, DBn \text{ or } DAN=1.2V$	1.5		0.1		Ω
			2.5		0.1		Ω
			3.5		0.1		Ω
			5		0.1		Ω
$R_{ON_FLAT_MIPI_HS}$	On Resistance Flatness for HS MIPI Signals	$I_{ON}=-8mA, /OE=0V, SEL=VCC \text{ or } 0V, CLK_A, B, DBn \text{ or } DAN=0.V \text{ to } 0.3V$	1.5		0.9		Ω
			2.5		0.9		Ω
			3.5		0.9		Ω
			5		0.9		Ω
$R_{ON_FLAT_MIPI_LP}$	On Resistance Flatness for LP MIPI Signals	$I_{ON}=-8mA, /OE=0V, SEL=VCC \text{ or } 0V, CLK_A, B, DBn \text{ or } DAN=0.V \text{ to } 0.3V$	1.5		0.9		Ω
			2.5		0.9		Ω
			3.5		0.9		Ω
			5		0.9		Ω
I_{CCZ}	Quiescent Hi-Z supply current	$V_{SET}=VCC \text{ or } 0V, I_{OUT}=0, /OE=VCC$	5			1	μA
I_{CC}	Quiescent supply current	$V_{SET}=VCC \text{ or } 0V, I_{OUT}=0, /OE=0V$	5			30	μA
I_{CCT}	Increase in I_{CC} current Per control voltage and V_{CC}	$V_{SEL}=0 \text{ or } VCC, /OE=1.5V$	5		1		μA

■ AC Electrical Characteristics

Typical limits tested at $T_A=25^\circ C$, $V_{CC}=3.3V$. Unless otherwise specified

Symbol	Parameter	Conditions	Vcc(V)	Min.	Typ.	Max.	Unit
t_{INIT}	Initialization Time V_{CC} to Output	$R_L=50\Omega, C_L=0pF, V_{SW}=0.6V$	1.5 to 5		60		us
t_{EN}	Enable Turn-On Time, $/OE$ to Output	$R_L=50\Omega, C_L=0pF, V_{SW}=0.6V$	1.5 to 5		60	150	us
t_{DIS}	Disable Turn-On Time, $/OE$ to Output	$R_L=50\Omega, C_L=0pF, V_{SW}=0.6V$	1.5 to 5		35	250	ns
t_{ON}	Turn-On Time, SEL to Output	$R_L=50\Omega, C_L=0pF, V_{SW}=0.6V$	1.5 to 5		350	1100	ns
t_{OFF}	Turn-Off Time, SEL to Output	$R_L=50\Omega, C_L=5pF, V_{SW}=0.6V$	1.5 to 5		125	800	ns
t_{BBM}	Break-Before-Make Time	$R_L=50\Omega, C_L=5pF, V_{SW}=0.6V$	1.5 to 5	50			ns
t_{PD}	Propagation Delay	$R_L=50\Omega, C_L=0pF$	1.5 to 5		0.25		ns
O_{IRR}	Off Isolation for MIPI	$R_L=50\Omega, f=1300MHz, /OE=High, V_{SW}=0.2V_{pp}$	1.5 to 5		-24		dB
X_{TALK}	Cross talk for MIPI	$R_L=50\Omega, f=1300MHz, SEL=High, V_{SW}=0.2V_{pp}$	1.5 to 5		-30	-25	dB
		$R_L=50\Omega, f=1300MHz, SEL=Low, V_{SW}=0.2V_{pp}$			-30	-25	dB
BW	Differential Bandwidth	$R_L=50\Omega, C_L=0pF$	1.5 to 5	3.0	4.0		GHz



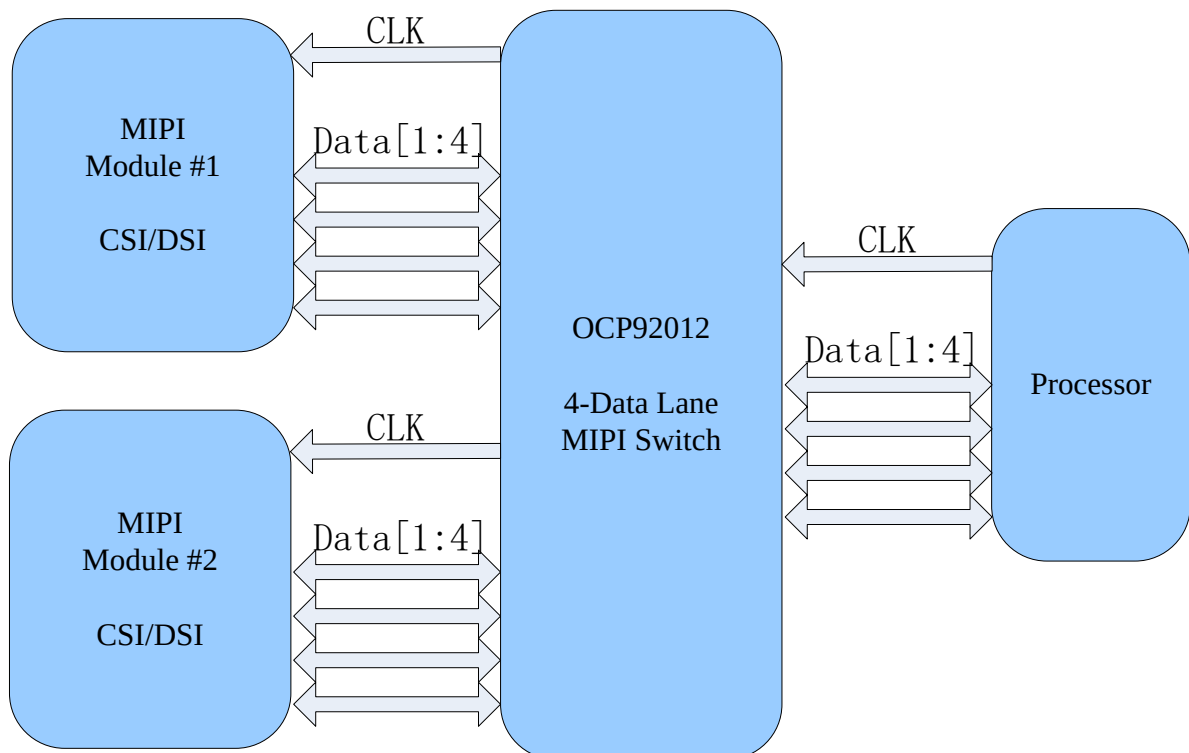
■ High-speed-Related AC Electrical Characteristics

Symbol	Parameter	Conditions	Vcc(V)	Min.	Typ.	Max.	Unit
$t_{SK(P)}$	HS Mode Skew of Opposite Transitions of the same Output	$R_L=50\Omega$, $C_L=5pF$, $V_{SW}=0.3V$	1.5 to 5		6	20	ps

■ Capacitance

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
C_{IN}	Control Pin Input Capacitance	$V_{CC}=0V, f=1MHz$		2.1		pF
C_{ON}	Out On Capacitance	$V_{CC}=3.3V, OE=0V$, $f=1300MHz$ (In HS common value)		1.5		pF
C_{OFF}	Out Off Capacitance	$V_{CC}\&/OE=3.3V$, $f=1300MHz$ (Both sides in HS common value)		0.9		pF

■ Typical Application

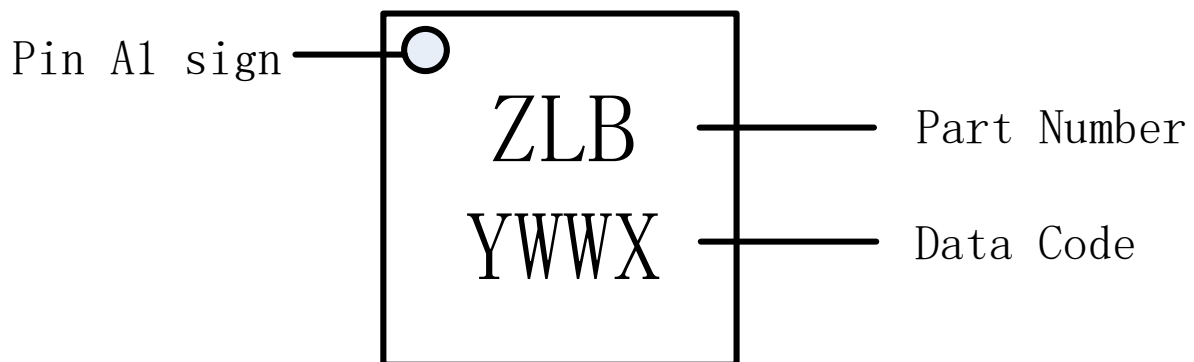


■ Ordering Information

Part Number	Package Type	Package Qty	Temperature	Marking ID	MSL
OCP92012WPAD	WLCSP-36B	7-in reel 3000pcs/reel	-40~85°C	ZLB	Level-1-260C

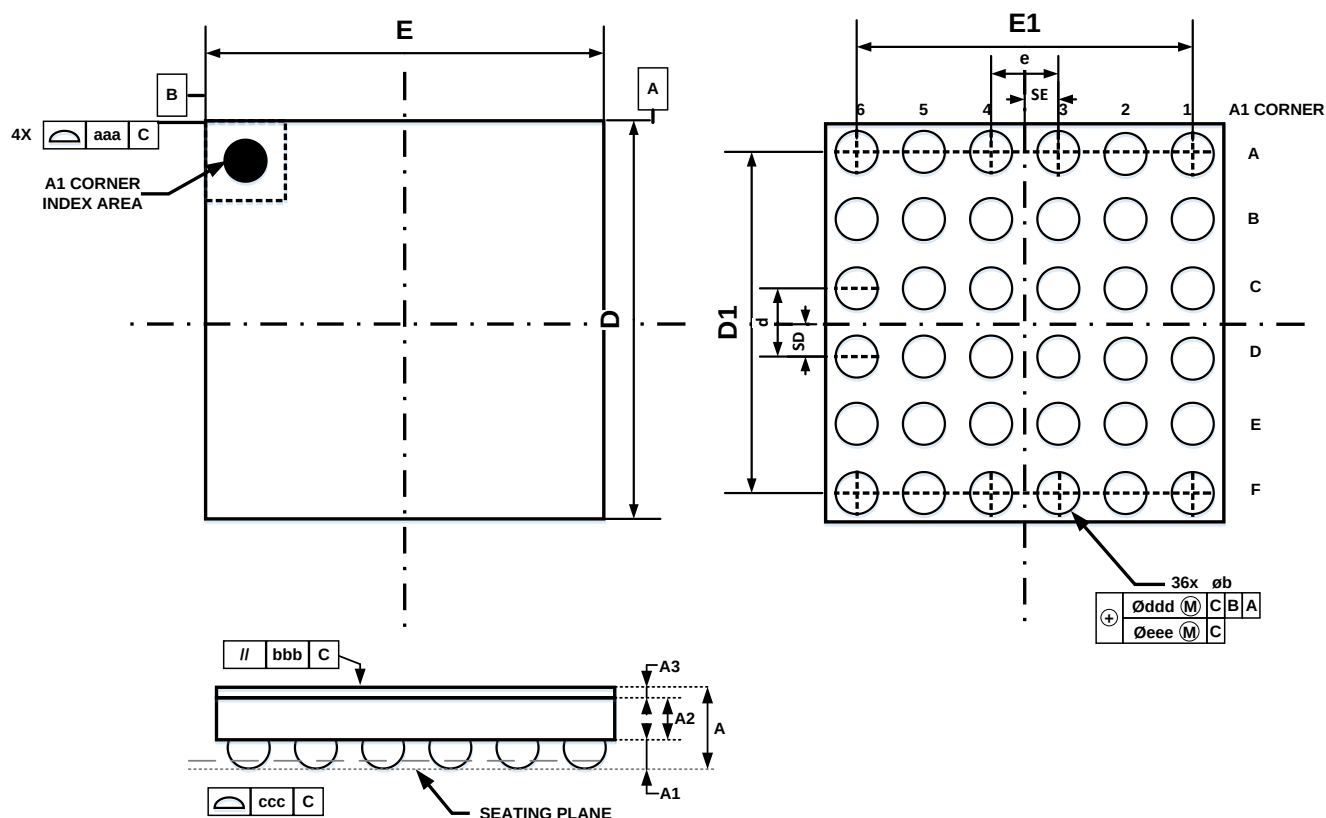
■ Marking Information

WLCSP-36B:



■ Package Information

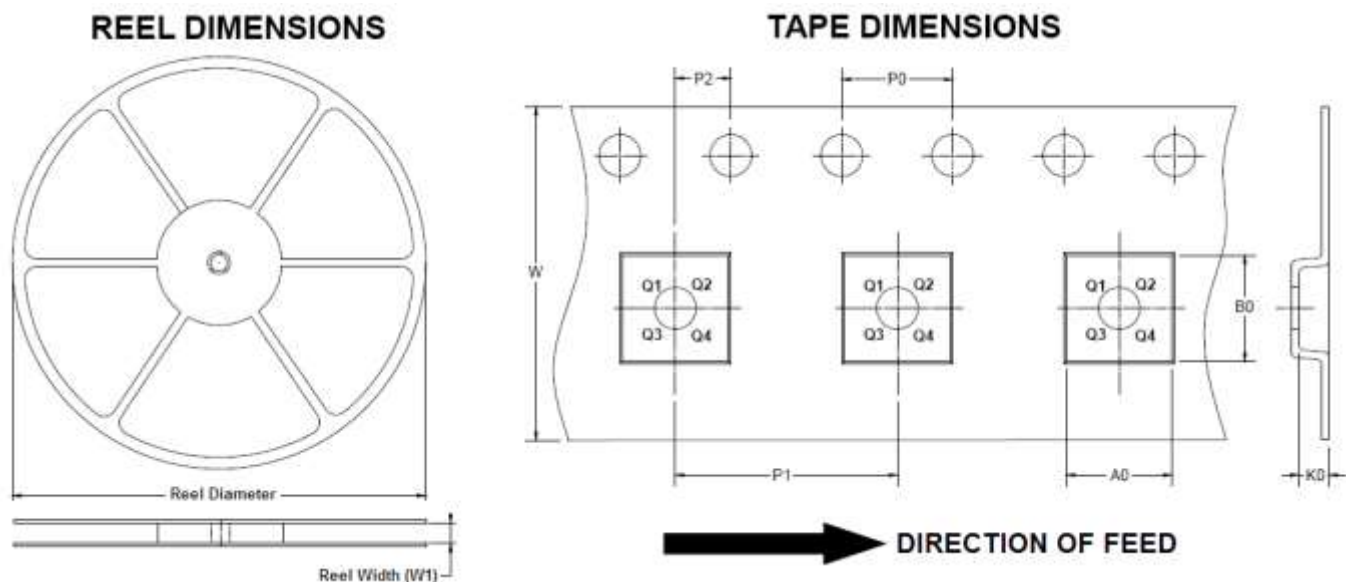
WLCSP-36B:



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.615	0.666	0.717	0.024	0.026	0.028
A1	0.213	0.238	0.263	0.008	0.009	0.010
A2	0.393	0.403	0.413	0.015	0.016	0.016
A3	0.020	0.025	0.030	0.001	0.001	0.001
D	2.346	2.371	2.396	0.093	0.093	0.094
E	2.346	2.371	2.396	0.093	0.093	0.094
D1	1.950	2.000	2.050	0.077	0.079	0.081
E1	1.950	2.000	2.050	0.077	0.079	0.081
b	0.229	0.254	0.279	0.009	0.010	0.011
e	0.400 BSC			0.016 BSC		
d	0.400 BSC			0.016 BSC		
SD	0.200 BSC			0.008 BSC		
SE	0.200 BSC			0.008 BSC		
aaa	0.100 BSC			0.004 BSC		
bbb	0.100 BSC			0.004 BSC		
ccc	0.050 BSC			0.002 BSC		
ddd	0.050 BSC			0.002 BSC		
eee	0.020 BSC			0.001 BSC		



■ Packing Information



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	SPQ (PCS)	Reel Width W1 (mm)	MSL Peak Temp	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
WLCSP-36B	7"	3000	13	LEVEL-1-260C	2.5	2.5	0.84	4	4	2	12	Q1



IMPORTANT NOTICE

Orient-Chip Semiconductor Co., Ltd (OCS) and its subsidiaries reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. These separate provisions won't be provided.

