Product Datasheet
RS8304xx
1:4 Clock Buffer

Features

• Four LVCMOS / LVTTL outputs
• LVCMOS / LVTTL clock input
• CLK can accept the input levels: LVCMOS, LVTTL
• Maximum output frequency: 200MHz
• Additive phase jitter, RMS: 60fs (typical) @ 3.3V
• Output skew: 45ps (maximum) @ 3.3V
• Part-to-part skew: 500ps (maximum)
• 3.3V input, outputs may be 3.3V, 2.5V or 1.8V Supply

Applications

• General Clock Distribution

Order Information

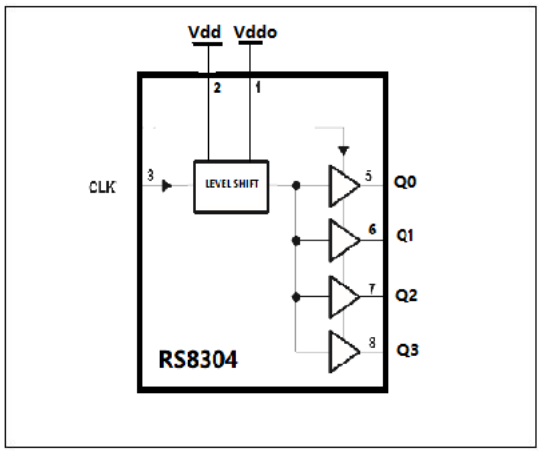
Part Number	Package
RS8304WE	Lead free and Green 8-Pin SOIC
RS8304UE	Lead free and Green 8-Pin MSOP
RS8304TE	Lead free and Green 8-Pin TSSOP

Note---E：Green

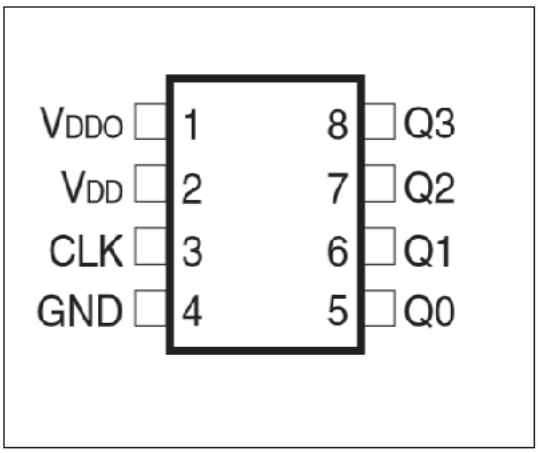
Description

Raystar's RS8304 are low-skew, low- noise, high speed clock buffers and are ideal for computing, networking, and communication applications. The RS8304 is a low skew, 1-to-4 Fanout Buffer from RSM. The RS8304 is characterized at full 3.3V/2.5V for input(VDD), and mixed 3.3V, 2.5V and 1.8V for output operating supply modes (VDDO). Guaranteed output and part-to-part skew characteristics make the RS8304 ideal for those clock distribution applications demanding well defined performance and repeatability.

Block Diagram



Pin Configuration



Pin Description

Pin #	Symbol	Type	Qty	Description
3	CLK	Input	1	Clock input, Pull Down
2	Vd	Power	1	Positive Supply
5,6,7,8	Q0~Q3	Output	4	LVCMOS/LVTTL Level outputs
4	GND	Ground	1	Power Ground
1	Vddo	Power	1	Output Supply 3.3V/2.5V/1.8V Power

Absolute Maximum Ratings (Above which the useful life may be impaired. For user guidelines, not tested)

Supply Voltage (V_{DD})	–0.0V to +6.5V
Input Voltage	–0.5V to V_{DD}+0.5V
Industrial Operating Temperature	–40°C to +85°C
Storage Temperature	–65°C to +150°C
Junction Temperature	150°C
Input ESD MIL-883, method 3015, human body model	2KV

Operating Conditions

Symbol	Description	Min	Max	Unit
V_{DD}	I/O Supply, Analog Core Supply	1.62	3.63	V
T_A	Industrial Ambient Temperature	–40	+85	°C

RS8304 DC Characteristics Over Operating Conditions(T_A = –40~85°C,V_{CC} = 3.3V ±0.3V)

Symbol	Parameter	Conditions	Min	Typ.	Max	Units
V_{IL}	Low Input Voltage			1.65	0.8	V
V_{IH}	High Input Voltage		2.0			
V_{OL}	Low Output Voltage	V_{CC} = 3.0V, I_{OL} = 12mA			0.4	V
V_{OH}	High Output Voltage	V_{CC} = 3.0V, I_{OH} = –12mA	2.4			
C_O	Output Capacitance			6	9	pF
CI	Input Capacitance			3	5	
I_{DD}	Supply Current	C_L = 33pF/33MHz		20		mA
		C_L = 33pF/66MHz		40		
		C_L = 22pF/80MHz		35		
		C_L = 15pF/100MHz		32		
		C_L = 10pF/125MHz		28		
		C_L = 10pF/155MHz		41		
Z_O	Output Impedance			25		Ω
Rpulldown	Pulldown Resister			51		kΩ

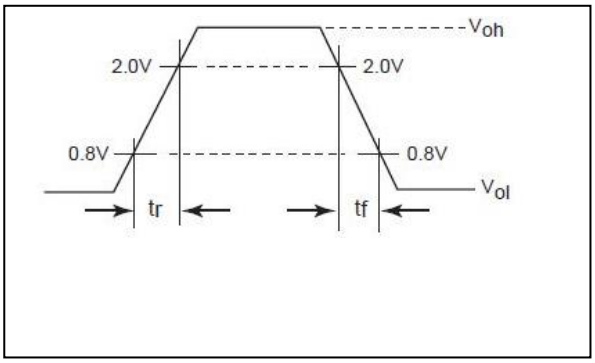
RS8304 AC Characteristics (T_A = –40~85°C, V_{CC} = 3.3V ±0.3V, 33pF/66MHz and 10pF/160MHz)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
F_{IN}	Input frequency		0		200	MHz
T_{PLH}	Low-to-high propagation delay	CLK_IN to Q[0-3] rising edges @ 1.5V	1.0	1.7	3.0	ns
T_{PHL}	High-to-low propagation delay	CLK_IN to Q[0-3] falling edges @ 1.5V	1.0	1.7	3.0	
$T_{SK(O)}$	Output skew	@ 1.5V			150	ps
$T_{SK(P)}$	Pulse skew	@ 1.5V			300	
$T_{SK(T)}$	Package skew (1)	@ 1.5V			500	
T_R,T_F	Rise, Fall time	0.65V~2.65V		0.7	1.4	ns
T_{DC}	Output duty cycle	$t_{DC} = t_H/t_{CY}$, t_H = High Pulse Width,	45		55	%

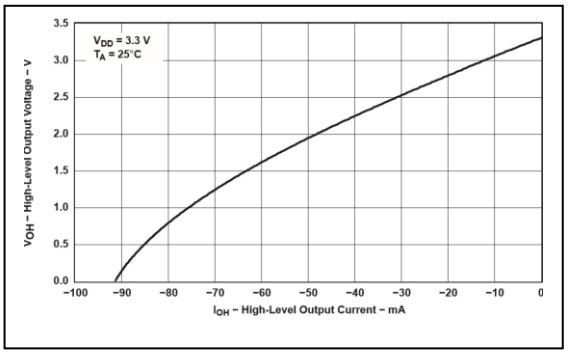
Note:
1. Identical traces, loads, power supply.
2. Maximum Output Skew is 100ps when frequency is below 125MHz with 10pF loading.

Typical Characteristics

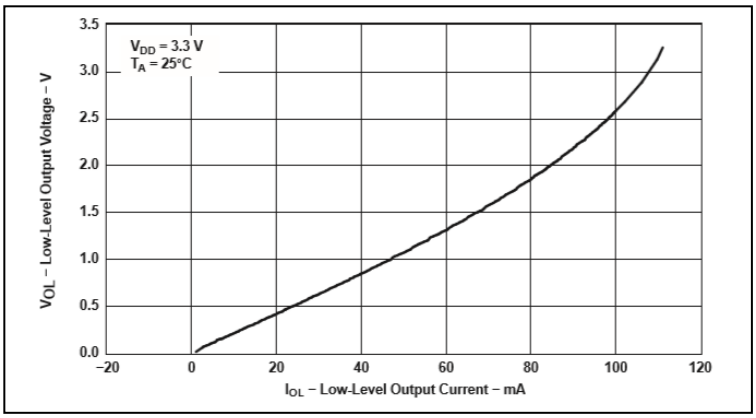
Rise/Fall Time



High-Level Output Voltage VS High-Level Output Current

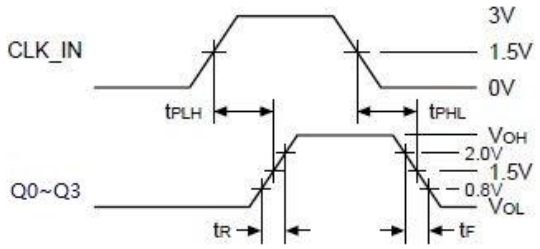


Low-Level Output Voltage vs. Low-Level Output Current

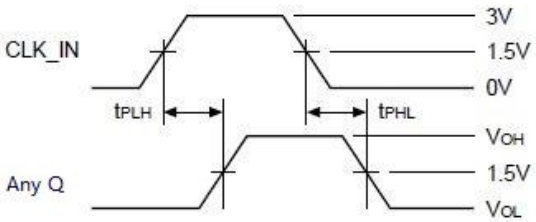


Switching Waveforms

Propagation Delay

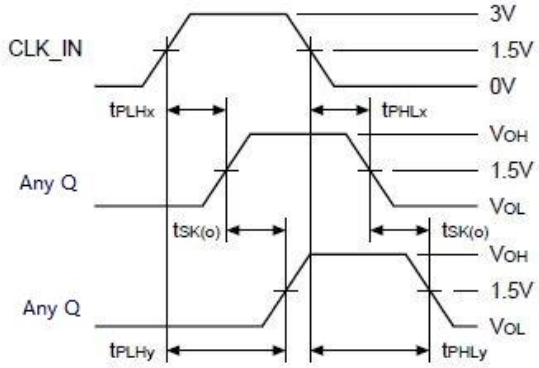


Pulse Skew – $t_{SK(p)}$



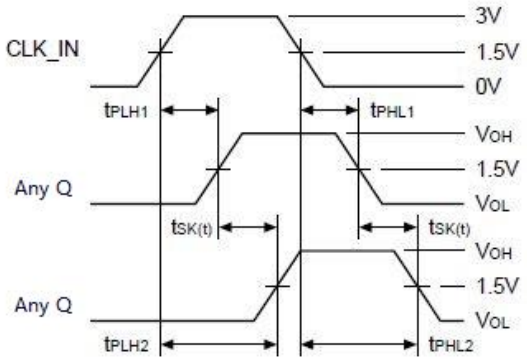
$t_{SK(p)} = |t_{PHL} - t_{PLH}|$

Output Skew – $t_{SK(o)}$



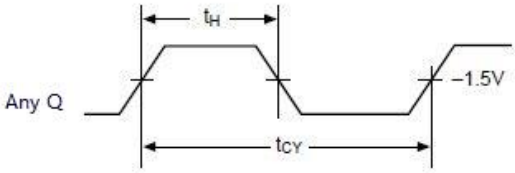
$t_{SK(o)} = |t_{PLHy} - t_{PLHx}|$ or $|t_{PHLy} - t_{PHLx}|$

Package Skew – $t_{SK(t)}$

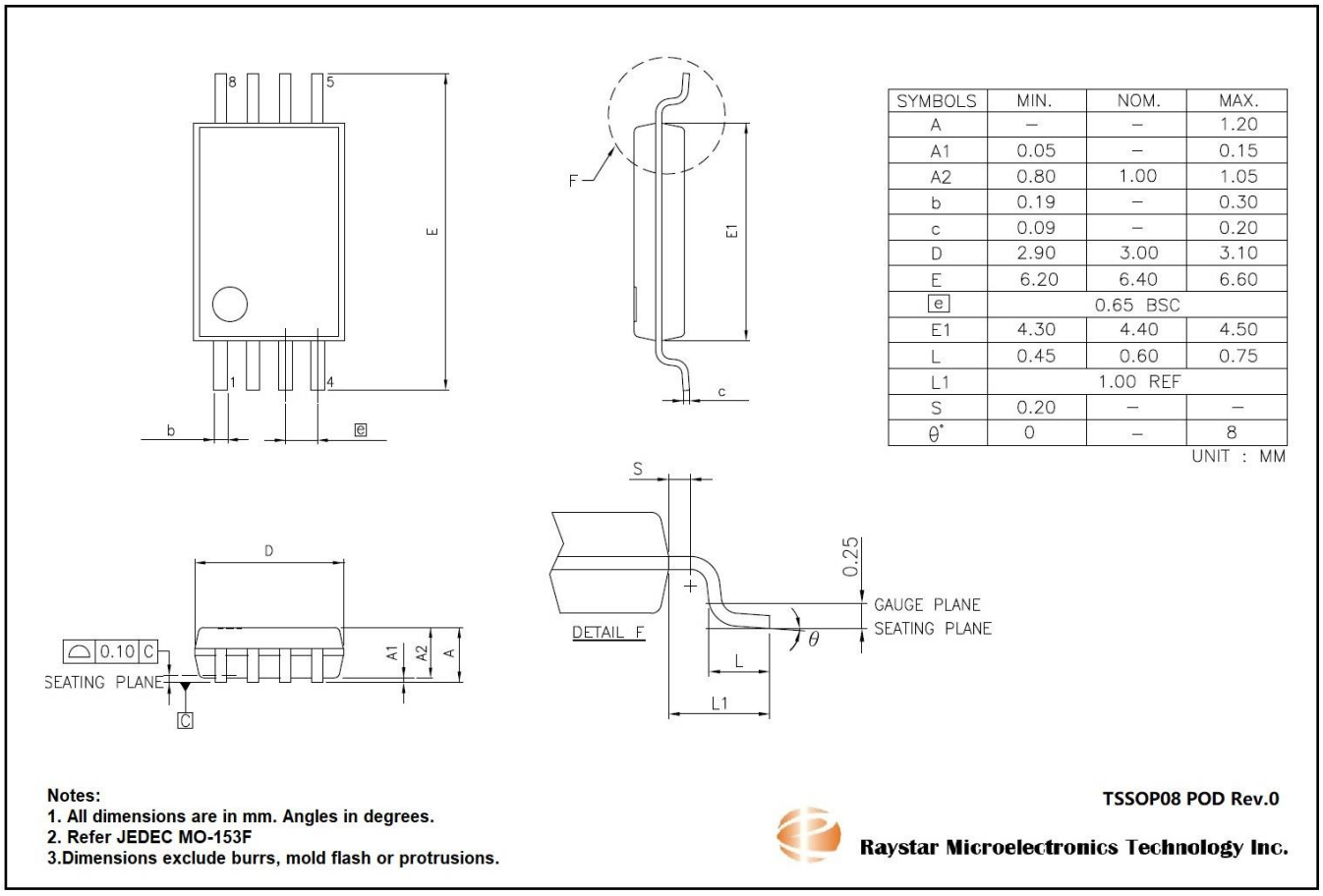


$t_{SK(t)} = |t_{PLH2} - t_{PLH1}|$ or $|t_{PHL2} - t_{PHL1}|$

Output Duty Cycle – t_{DC}



Packaging Mechanical: 8-Pin TSSOP (T)



SYMBOLS	MIN.	NOM.	MAX.
A	–	–	1.20
A1	0.05	–	0.15
A2	0.80	1.00	1.05
b	0.19	–	0.30
c	0.09	–	0.20
D	2.90	3.00	3.10
E	6.20	6.40	6.60
e	0.65 BSC		
E1	4.30	4.40	4.50
L	0.45	0.60	0.75
L1	1.00 REF		
S	0.20	–	–
θ°	0	–	8

UNIT : MM

Notes:
1. All dimensions are in mm. Angles in degrees.
2. Refer JEDEC MO-153F
3.Dimensions exclude burrs, mold flash or protrusions.

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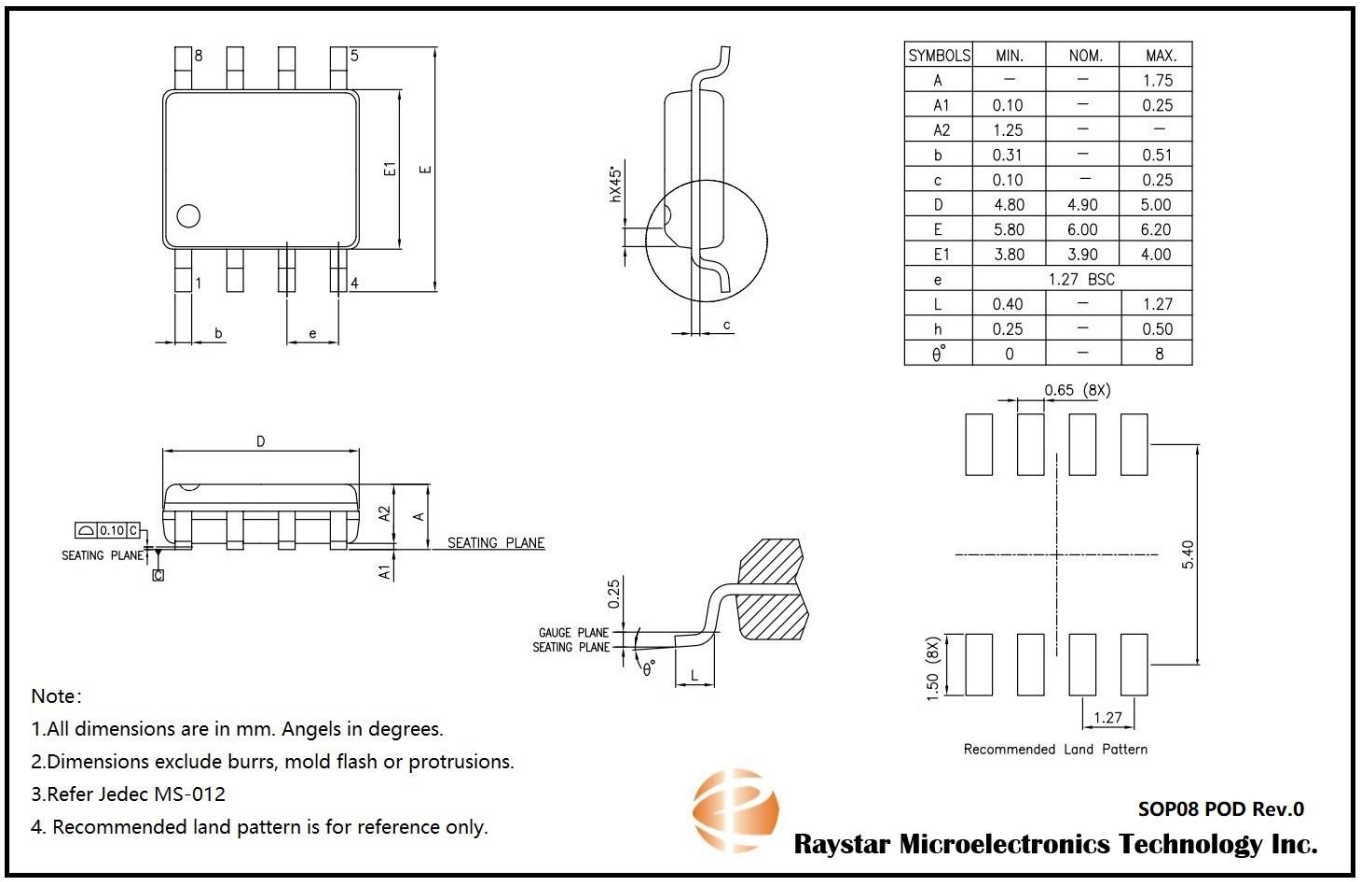
Packaging Mechanical: 8-Pin SOIC (W)



SYMBOLS	MIN.	NOM.	MAX.
A	—	—	1.75
A1	0.10	—	0.25
A2	1.25	—	—
b	0.31	—	0.51
c	0.10	—	0.25
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27 BSC		
L	0.40	—	1.27
h	0.25	—	0.50
θ°	0	—	8

Note:
1.All dimensions are in mm. Angels in degrees.
2.Dimensions exclude burrs, mold flash or protrusions.
3.Refer Jedec MS-012
4. Recommended land pattern is for reference only.

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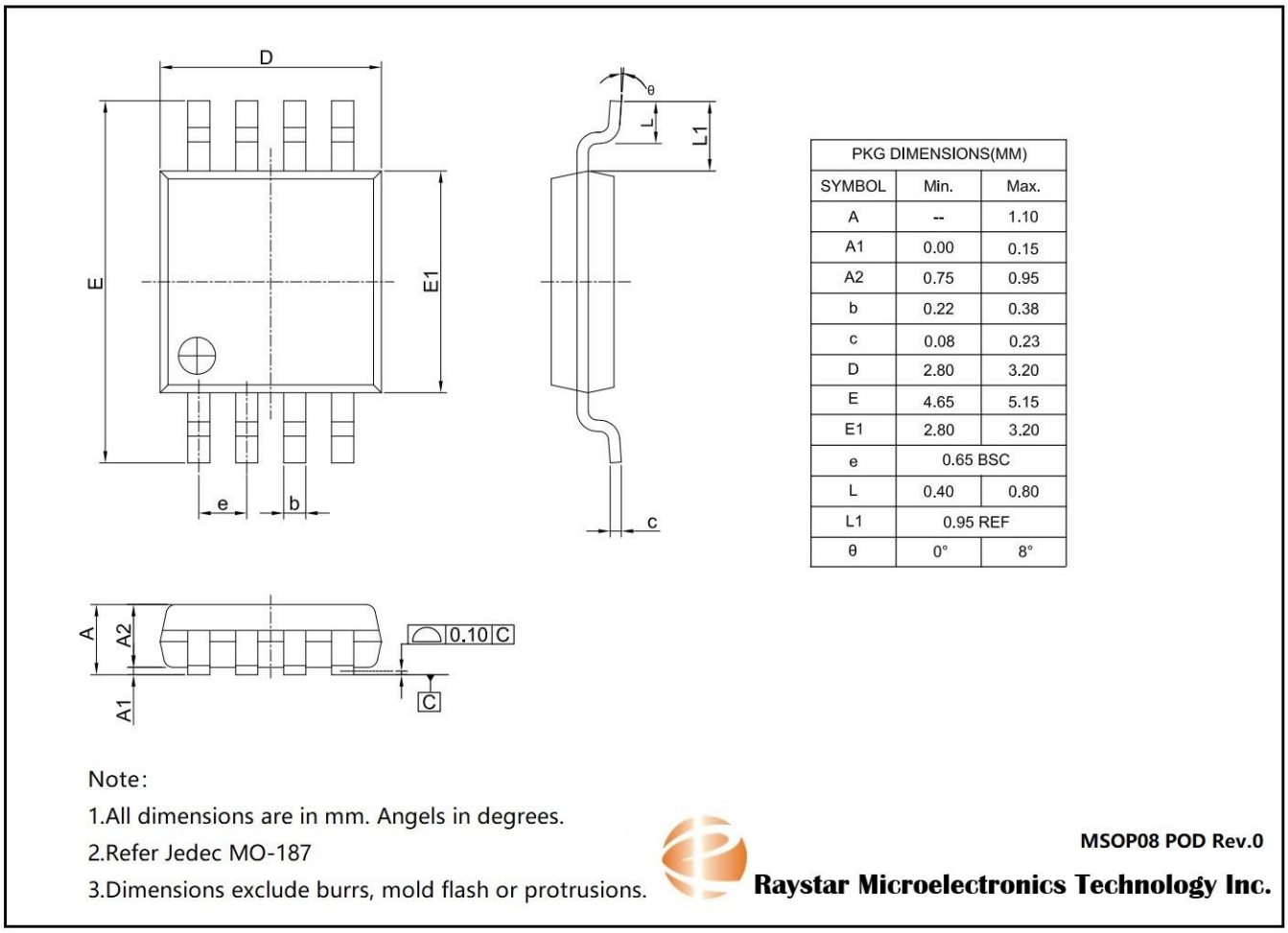
Packaging Mechanical: 8-Pin MSOP (U)



PKG DIMENSIONS(MM)		
SYMBOL	Min.	Max.
A	--	1.10
A1	0.00	0.15
A2	0.75	0.95
b	0.22	0.38
c	0.08	0.23
D	2.80	3.20
E	4.65	5.15
E1	2.80	3.20
e	0.65 BSC	
L	0.40	0.80
L1	0.95 REF	
θ	0°	8°

Note:
1.All dimensions are in mm. Angels in degrees.
2.Refer Jedec MO-187
3.Dimensions exclude burrs, mold flash or protrusions.

MSOP08 POD Rev.0
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History Log：

Rev #	DCN NO.	REVISION HISTORY	DATE
1.1	230018	Updated part name and POD	2023/1/29