



## Features

- 2.97 to 3.63V operating supply voltage range
- Operating frequency optional:  
74.25MHz,100MHz,125MHz,148.5MHz  
150MHz,156.25MHz,162MHz,200MHz,  
212.5MHz,250MHz,312.5MHz,625MHz
- Operating Temperature Range: -40 to +125°C
- Differential LVDS/LVPECL output
- Standby function
- Power-saving pull-up resistor built-in (Pin OE)
- SMD7050,5032,3225 package

## Applications

- Automotive, and other high reliability electronics
- Infotainment systems, collision detection device

## Electrical Characteristics

**Table 1: Electrical Characteristics – Common to LVPECL and LVDS**

Parameter	Sym.	Min	Typ.	Max	Unit	Condition
Output Frequency Range	F <sub>OUT</sub>	74.25		625	MHz	Refer Features
Frequency Stability	F <sub>STAB</sub>	-10	-	+10	ppm	Inclusive of initial tolerance, operating temperature, rated power supply voltage and load variations. <a href="#">Contact RSM</a> for ±10 ppm.
		-20	-	+20	ppm	
		-25	-	+25	ppm	
		-50	-	+50	ppm	
First Year Aging	F <sub>1y</sub>	-	+/-1	-	ppm	At 25°C
Operating Temperature Range	T <sub>USE</sub>	-20	-	+70	°C	AEC-Q100 Grade 4
		-40	-	+85	°C	AEC-Q100 Grade 3
		-40	-	+105	°C	AEC-Q100 Grade 2
		-40	-	+125	°C	AEC-Q100 Grade 1
Supply Voltage	V <sub>DD</sub>	2.97	3.3	3.63	V	
Input Voltage High	V <sub>IH</sub>	0.7	-	-	V <sub>DD</sub>	
Input Low High	V <sub>IL</sub>	-	-	0.3	V <sub>DD</sub>	
Current consumption1	I <sub>EE1</sub>	-	70	90	mA	OE= H or floating
Current consumption2	I <sub>EE2</sub>	-	50	70	mA	OE=L
Duty Cycle	DC	45	-	55	%	
Rise Time	T <sub>R</sub>	-	0.2	0.4	ns	20 to 80% output swing
Fall Time	T <sub>F</sub>	-	0.2	0.4	ns	80 to 20% output swing
RMS Phase Jitter	Jitter	-	0.3	0.5	ps	100MHz@12K~20M, T <sub>A</sub> =25°C
Start-time	T <sub>STAR</sub>	-	-	3	ms	Measured from the time V <sub>DD</sub> reaches its rated minimum value
OE Enable Time	T <sub>OE</sub>	-	-	5	us	f = 625MHz. Measured from the time OE pin reaches rated V <sub>IH</sub> and V <sub>IL</sub> to the time clock pins reach 90% of swing and high-Z.
OE Disable Time	T <sub>OD</sub>	-	-	200	ns	

Note: All Min and Max limits in the Electrical Characteristics tables are specified over temperature and rated operating voltage with standard output termination show in the termination diagrams. Typical values are at 25°C and nominal supply voltage.



**Table 2: Electrical Characteristics – LVPECL**

3.3V operation ( $V_{DD} = 2.97$  to  $3.63V$ ,  $T_A = -40$  to  $+125^\circ C$ ,  $GND = 0V$ , unless otherwise noted.)

Parameter	Sym.	Min	Typ.	Max	Unit	Condition
HIGH-level output voltage	$V_{OH}$	$V_{DD}-1.4$		$V_{DD}-0.8$	V	
LOW-level output voltage	$V_{OL}$	$V_{DD}-2$		$V_{DD}-1.6$	V	
Output swing	$V_{OPP}$	0.6	-	1	V	

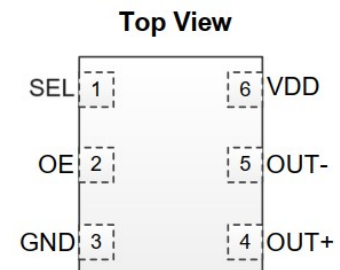
**Table 3: Electrical Characteristics – LVDS**

3.3V operation ( $V_{DD} = 2.97$  to  $3.63V$ ,  $T_A = -40$  to  $+125^\circ C$ ,  $GND = 0V$ , unless otherwise noted.)

Parameter	Sym.	Min	Typ.	Max	Unit	Condition
HIGH-level output voltage	$V_{OH}$	-	1.4	-	V	
LOW-level output voltage	$V_{OL}$	-	1.0	-	V	
Output swing	$V_{OPP}$	-	0.4	-	V	See Figure 4
Differential Output Voltage	$V_{OD}$	250		450	mV	See Figure 4
VOD Magnitude Change	$\Delta V_{OD}$			50	mV	See Figure 4
Offset Voltage	$V_{OS}$	1.125		1.375	V	See Figure 4
VOS Magnitude Change	$\Delta V_{OS}$			50	mV	See Figure 4

## Pad Description

Pin	Type	Description
1	SEL	Efuse control pin. Pull-down resistor built-in. Tri-state pin
2	OE	Output enable pin. Output off when OE=L Power-saving pull-up resistor built-in. Tri-state pin
3	GND	Ground (-).
4	Q	Output pin (true).
5	QB	Output pin (complementary).
6	VDD	Supply voltage.



**Figure 1. Pin Assignments**

Note: A capacitor of value  $0.1 \mu F$  or higher between  $V_{DD}$  and  $GND$  is required. An additional  $10 \mu F$  capacitor between  $V_{DD}$  and  $GND$  is required for the best phase jitter performance

## Absolute Maximum Ratings

Parameter	Min.	Max.	Unit
Storage Temperature	-55	150	$^\circ C$
Supply Voltage range	-0.5	4.0	V
Input voltage range	$GND-0.5$	$V_{DD}+0.5$	V
Output voltage range	$GND-0.5$	$V_{DD}+0.5$	V

**Note:**

Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.



## Waveform Diagrams

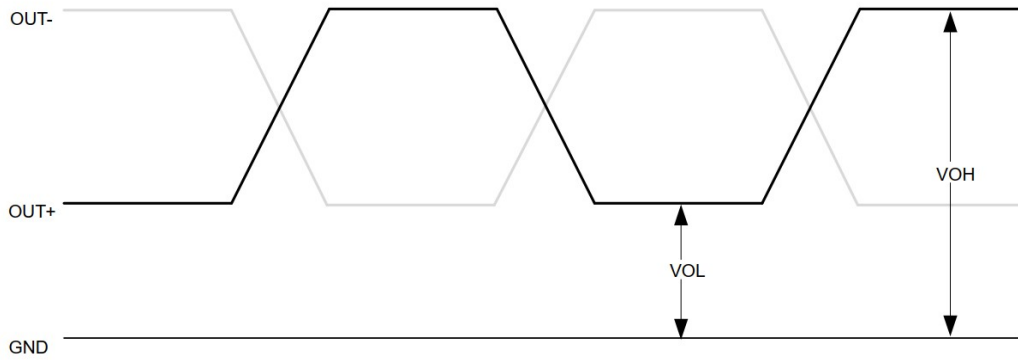


Figure 2: LVPECL Voltage Levels per Differential Pin (OUT+/OUT-)

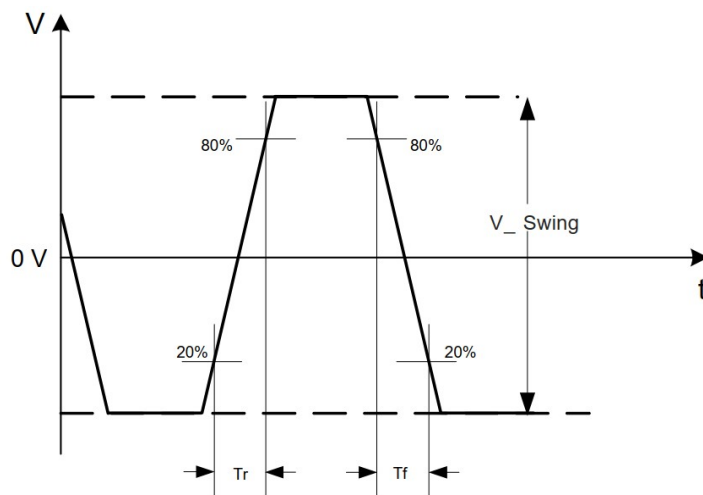


Figure 3: LVPECL Voltage Levels across Differential Pair

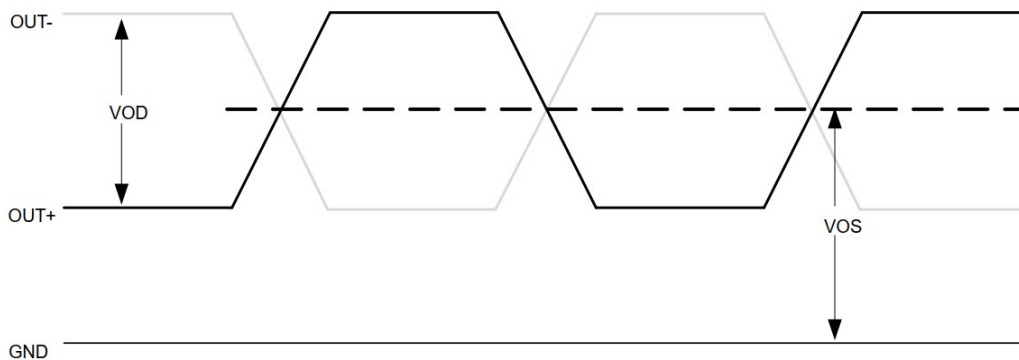


Figure 4: LVDS Voltage Levels per Differential Pin (OUT+/OUT-)



### Waveform Diagrams (Continued)

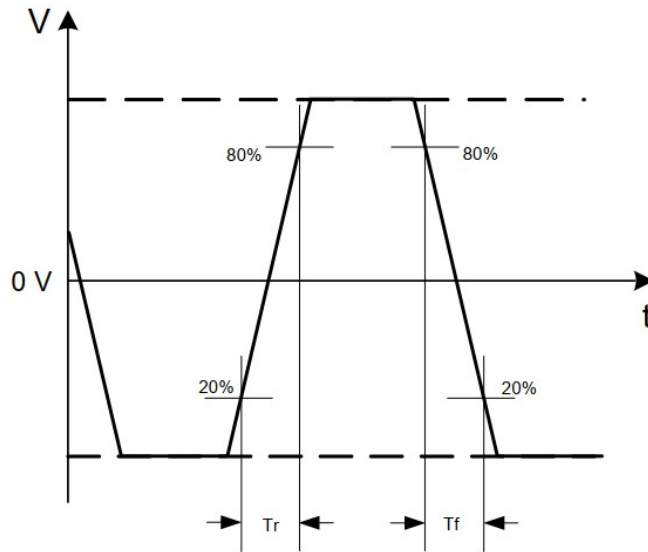


Figure 5: LVDS Differential Waveform

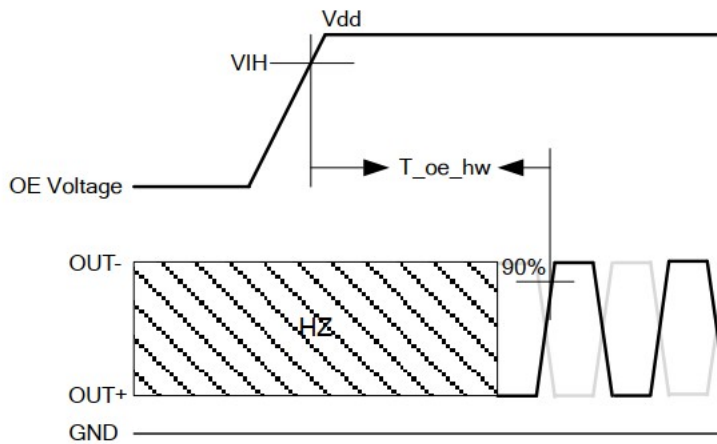


Figure 6: Hardware OE Enable Timing

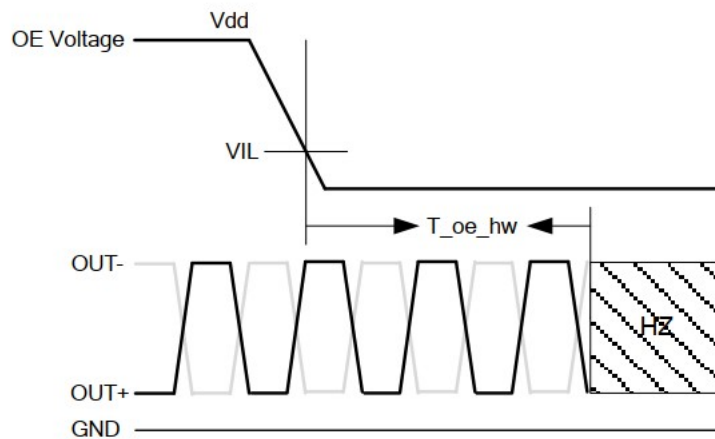


Figure 7: Hardware OE Disable Timing



## Termination Diagrams

### LVPECL

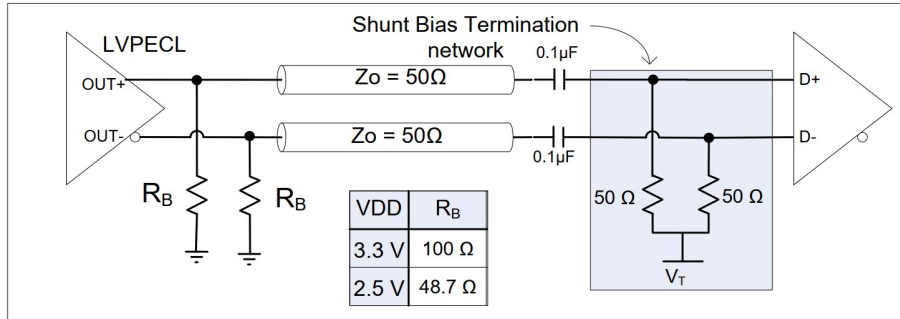


Figure 8: LVPECL with AC-coupled termination

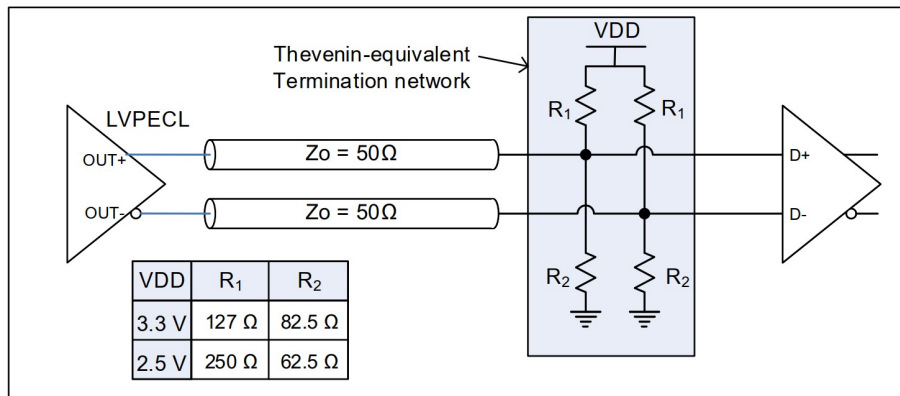


Figure 9: LVPECL DC-coupled load termination with Thevenin equivalent network

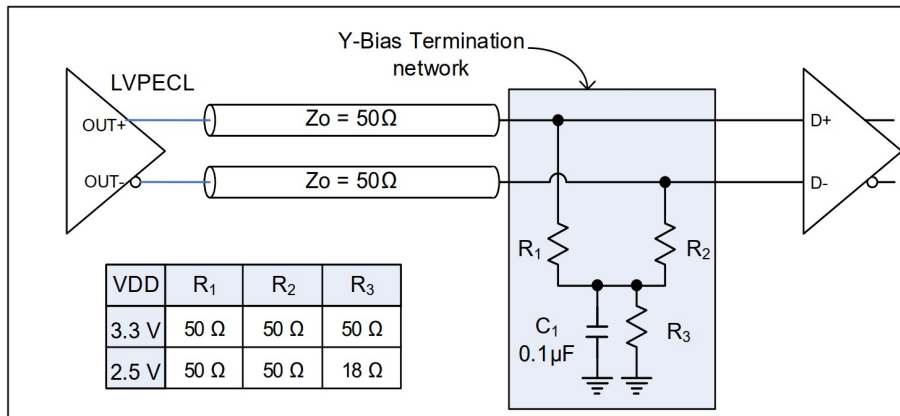


Figure 10: LVPECL with Y-Bias termination

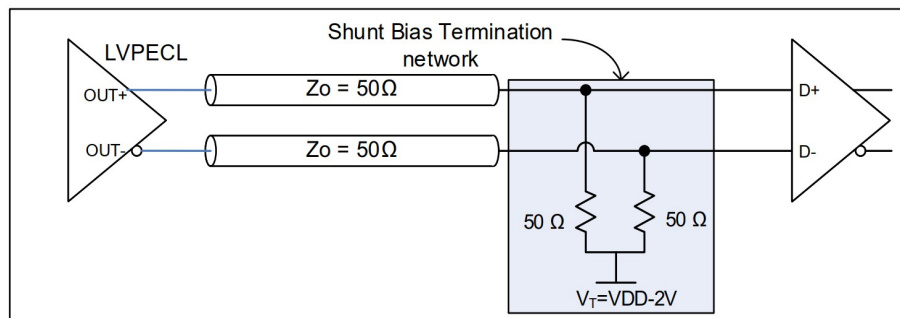


Figure 11: LVPECL with DC-coupled parallel shunt load termination



## Termination Diagrams (Continued)

### LVDS

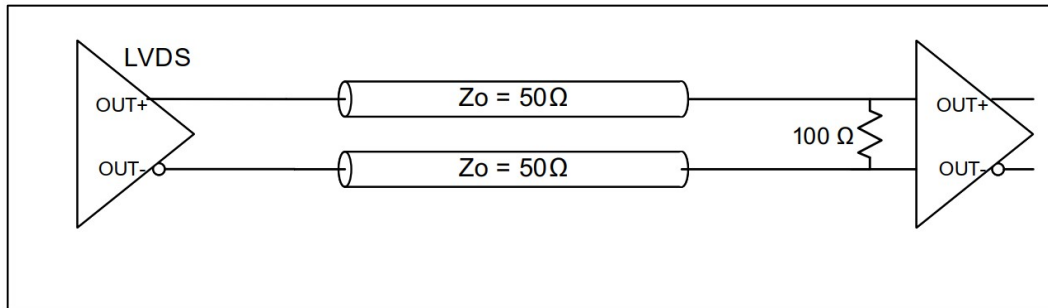


Figure 12: LVDS single DC termination at the load

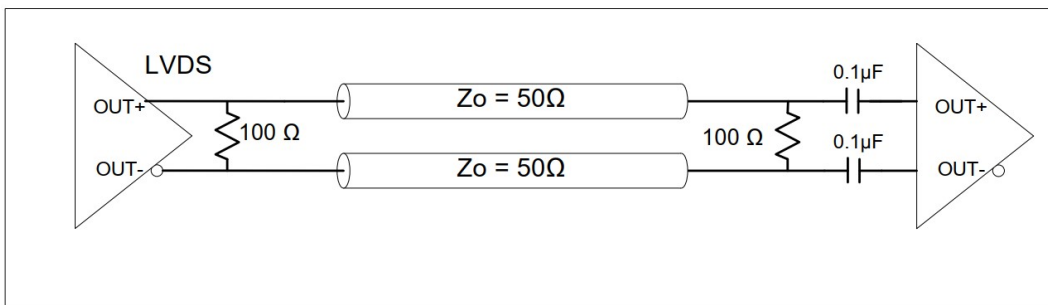


Figure 13: LVDS double AC termination with capacitor close to the load

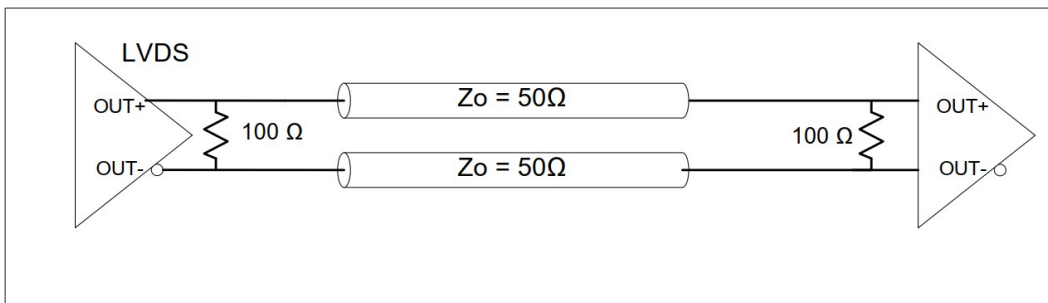
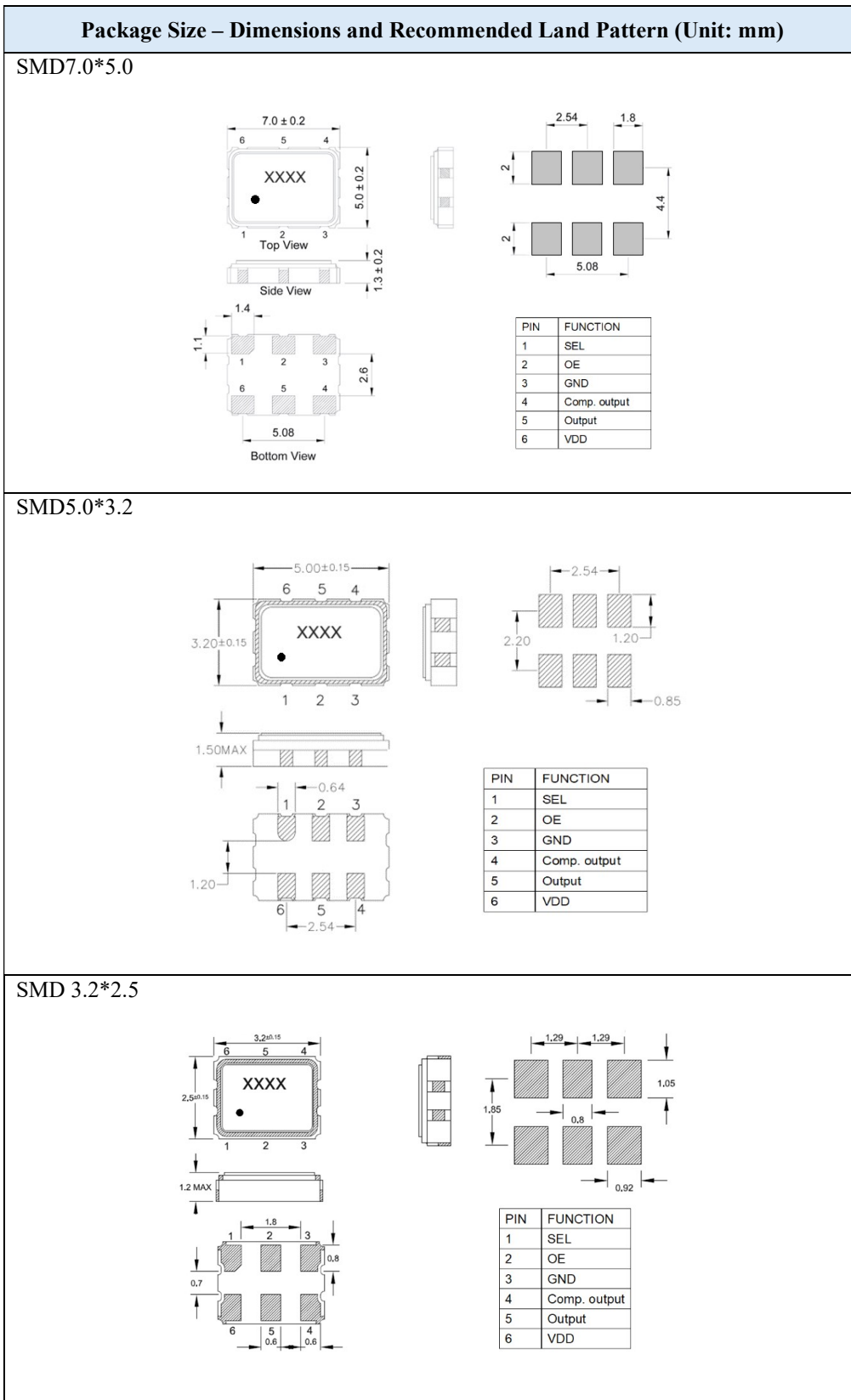


Figure 14: LVDS double DC termination



## Dimensions and Patterns





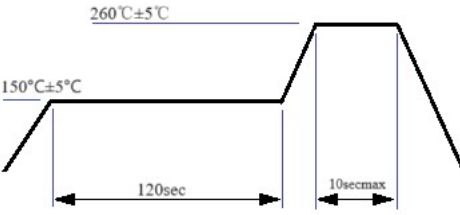
### Reliability Test

NO	ITEM	CONDITIONS	BASIS OF VERDICT
1	老化 AGING	温度:85°C; 时间:1000 小时 Temp:85°C; Times:1000 hours	$\Delta FL \leq \pm 10 \text{ppm}$
2	温度变化 TEMPERATURE SHOCK	高温:65°C(10h,含升温), 低温: 25°C(2h,含降温), 湿度 90%, 循环 10 次,每循环 24h High-temperature:65°C±2°C (10h, include heating), Low- temperature: 25°C±2°C (2h, include cooling), Humidity:85%, For 10 cycles (24h/cycles)	$\Delta FL \leq \pm 10 \text{ppm}$
3	湿热 HUMIDITY	温度:85°C±2°C; 湿度 85%; 时间:1000 小时 Temp:85°C±2°C; Humidity:85%; Times:1000h	$\Delta FL \leq \pm 10 \text{ppm}$
4	寿命 LIFE	温度:85°C;时间:1000 小时, 加额定电压 VDD Temp:85°C; Times:1000 hours, rated VDD	$\Delta FL \leq \pm 10 \text{ppm}$
5	低温 LOW- TEMPERATURE	温度:-40°C±2°C; 时间:1000 小时 Temp: -40°C±2°C; Times:1000h	$\Delta FL \leq \pm 10 \text{ppm}$
6	温度变化 TEMPERATURE SHOCK	-55°C±2°C (5min) $\xleftrightarrow{30\text{min}}$ 125°C±2°C (5min) ;循环 1000 次 -55°C±2°C (5min) $\xleftrightarrow{30\text{min}}$ 125°C±2°C (5min) ;For 1000 cycles	$\Delta FL \leq \pm 10 \text{ppm}$
7	跌落 DROP	100cm 高处自由跌落到 3cm 厚木板上, 3 次 High:100cm; Thickness:3cm; 3times	$\Delta FL \leq \pm 5 \text{ppm}$
8	机械冲击 MECHANICAL SHOCK	峰值 Peak: 100g's 持续时间 duration: 6ms 波形 Waveform: 半正弦波 half sine 变化速度 Velocity change: 12.3 ft / sec 振动方向 Direction:+X,-X,+Y,-Y,+Z,-Z( 各 3 次 3times/direction)	$\Delta FL \leq \pm 5 \text{ppm}$
9	振动 VIBRATION	频率 Frequency:10~2000Hz;加速度幅度 acceleration rate:100m/s <sup>2</sup> 振动方向 Direction: X, Y, Z 振动时间 Duration: 每个方向 30 分钟 30 min/direction. 循环次数 Time: 12 次	$\Delta FL \leq \pm 5 \text{ppm}$



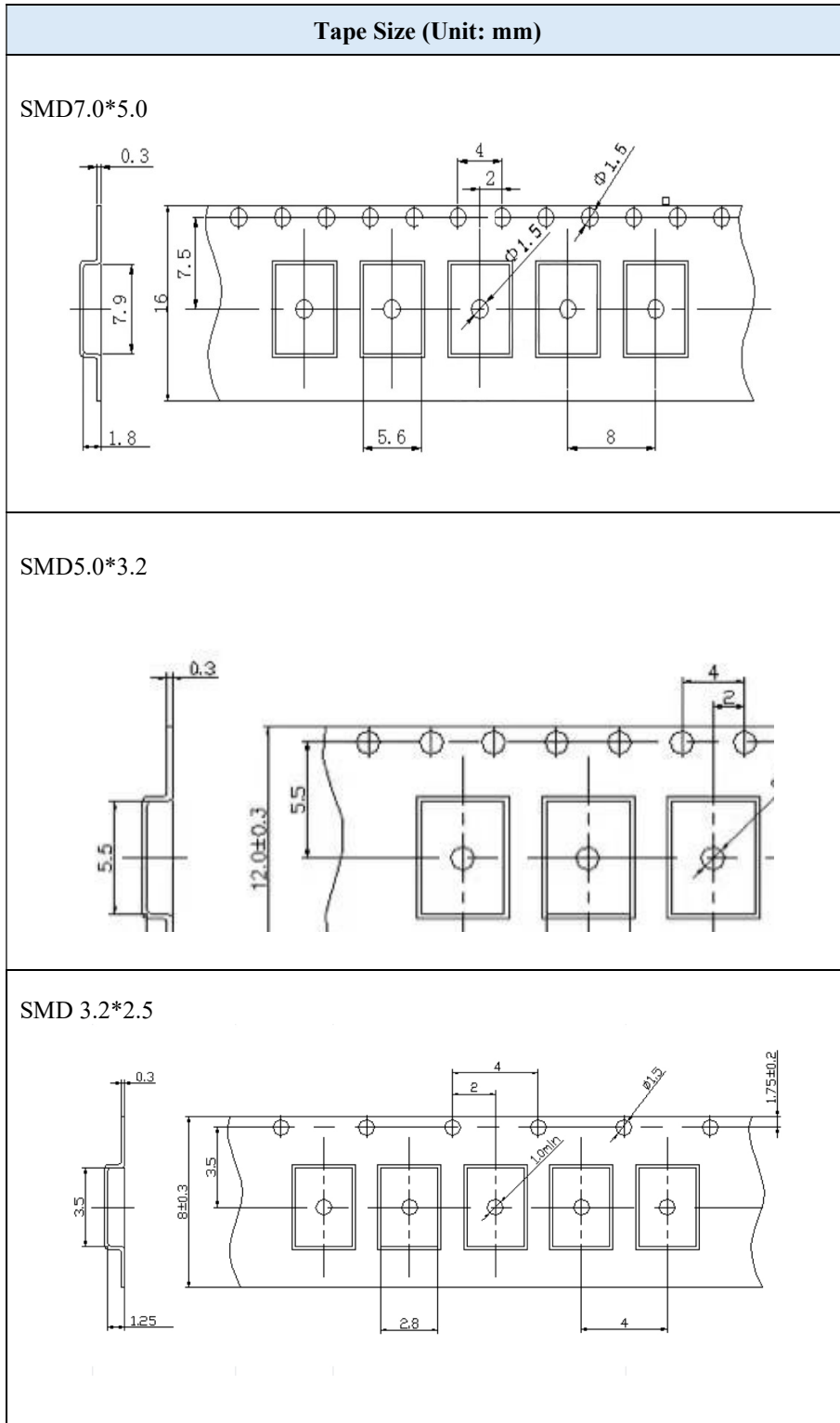


**Reliability Test (Continued)**

序号	项目	条件	合格标准
NO	ITEM	CONDITIONS	BASIS OF VERDICT
10	回流焊 REFLOW	 <p>CYCLE TIME 周期: 200sec Max.</p>	$\Delta FL \leq \pm 5 \text{ppm}$ No rusty
11	焊接 SOLDER	温度: $235^\circ\text{C} \pm 5^\circ\text{C}$ ; 时间: 2 秒 Temp: $235^\circ\text{C} \pm 5^\circ\text{C}$ ; Times: 2s	浸锡率 $\geq 95\%$ the solder immersion surface $\geq 95\%$
12	引出端强度 TERMINAL STRENGTH	1.8kg 的切向推力 (60 秒) 以及 1.8kg 的垂直拉力 (60 秒) 1.8kg of the tangential thrust (60 s) 1.8kg of the vertical tension (60 s)	electrode no rupture

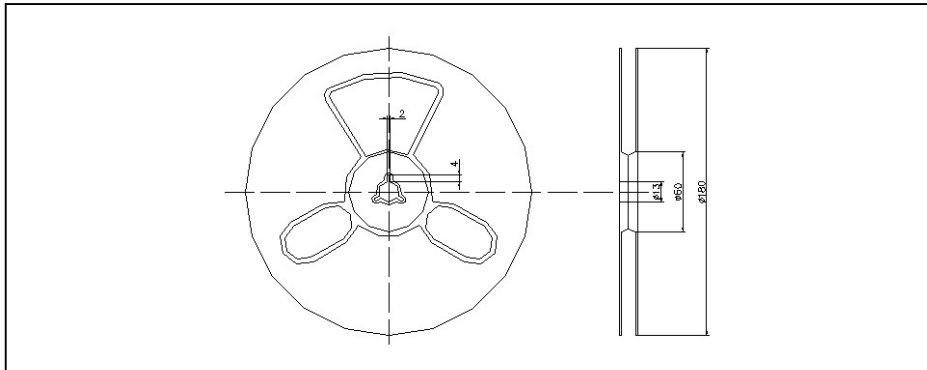


TAPE

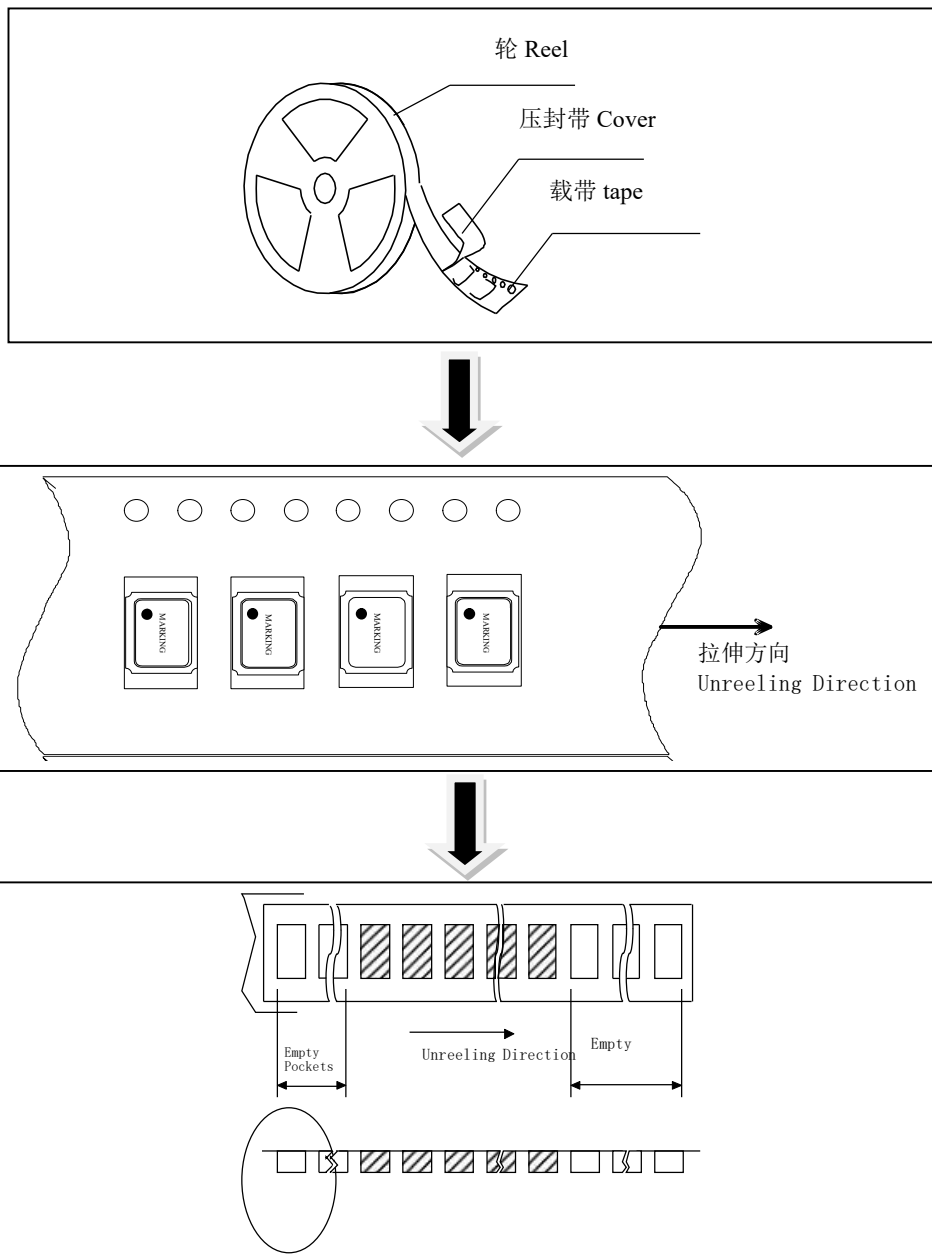




## REEL



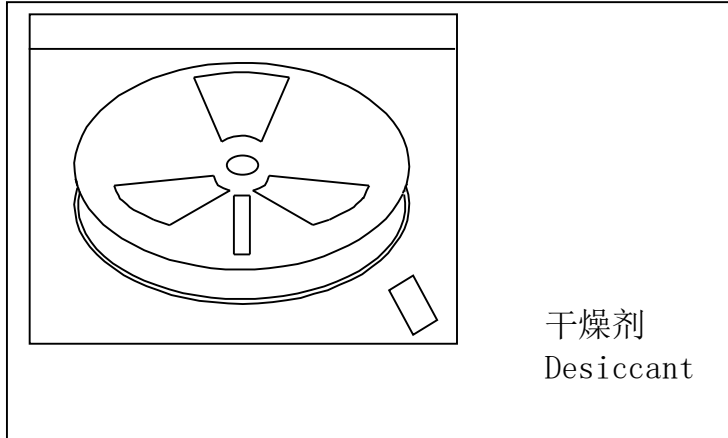
## TAPING METHOD



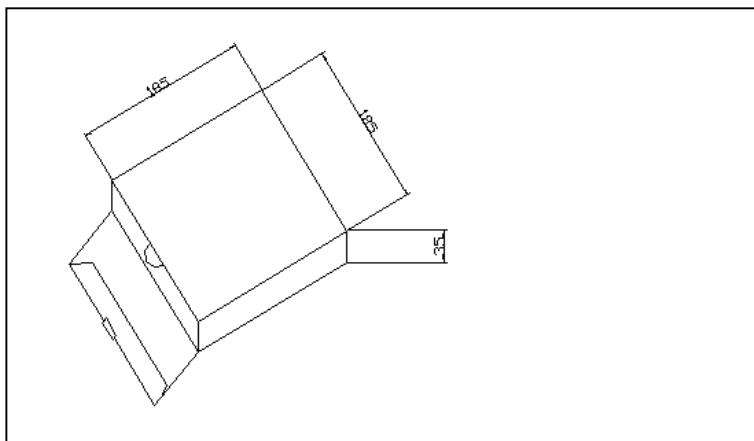


### 包装(PACKAGE)

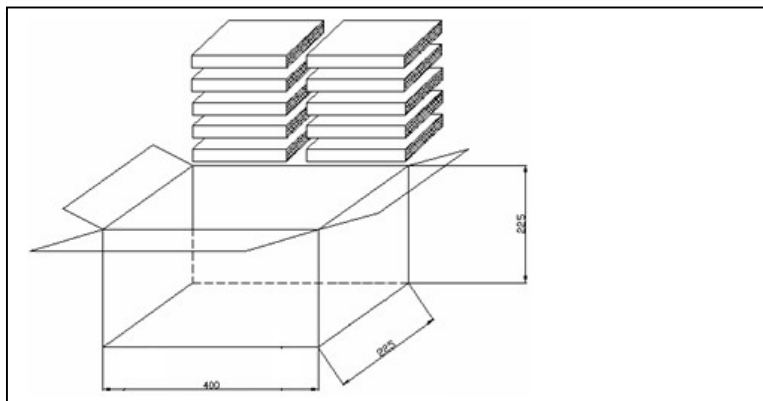
1. 自封袋(Bag) -- 1000 只 = 1 轮 -- 1000pcs = 1 Reel



2.内包装(Inside package) -- 1 轮 = 1 盒 -- 1 Reel = 1 box



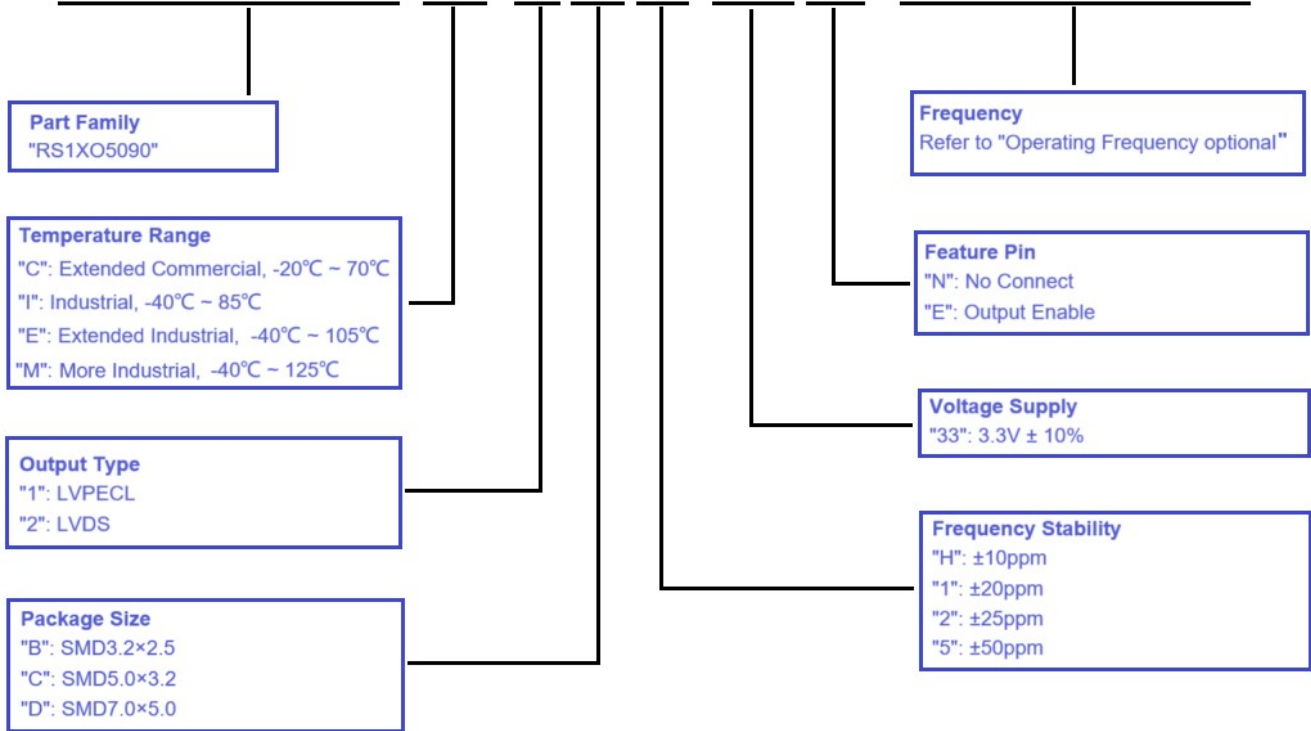
3.外包装(outside Package) -- 10 盒=1 箱 -- 10 box=1 carton





## Ordering Information

**RS1XO5090 M 1 B 5 33 E 156.250000**



## Revision History

Revision	Description	Date
0.9	1. Preliminary version	2024/2/28
1.0	1. Official release	2024/3/27