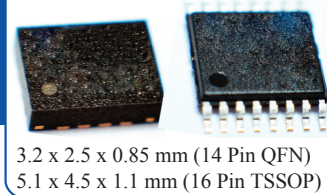


# CRYSTAL-LESS PCI EXPRESS DUAL OUTPUT ULTRA MINIATURE PURE SILICON™ SMD CLOCK GENERATOR



AB-557-03 Series

Moisture Sensitivity Level  
MSL 1 – 14 QFN  
MSL 3 – 16 TSSOP



RoHS/RoHS II compliant

## FEATURES:

- Meets PCIe Gen1, Gen2, & Gen3 specs.
- High Performance MEMS Technology by Discera
- Available Mixed Output Formats: HCSL, LVPECL, LVDS or LVCMOS
- Wide Temperature Range: -40° to 105° C
- Wide Supply Range: 2.25V to 3.6 V
- Low Power Consumption
- Excellent Shock & Vibration Immunity

## APPLICATIONS:

- Solid State Storage
- Storage Area Networks
- Passive Optical Networks
- Ethernet: 1G, 10GBASE-T/KR/LR/SR, and FCoE
- TV and other Consumer Electronics
- Industrial and Medical
- Scanner, Printer

## STANDARD SPECIFICATIONS:

| Parameters  |                | Minimum   | Typical | Maximum           | Units | Notes  |
|---|----------------|---|---------|-------------------|-------|--|
| Frequency   | $f_0$          | 2.3   | 100     | 460 <sup>*1</sup> | MHz   |  |
| Operating Temperature                                 |                | -20   |         | +70               | °C    | See options  |
| Storage Temperature                                   |                | -55   |         | +150              | °C    |  |
| Overall Freq. Stability <sup>*2</sup>                 | $\Delta f$     | -100  |         | +100              | ppm   | See options  |
| Supply Voltage  | $V_{DD}$       | +2.25   |         | +3.6              | V     |  |
| Supply Current- Enabled                               | $I_{DD}$       |   | 60      |                   | mA    | $R_L=50\Omega$ ,<br>$F_{01}=F_{02}=100.00\text{MHz}$           |
| Supply Current- Disabled                              | $I_{DD}$       |   | 21      | 23                | mA    |  |
| Startup Time  | $t_{su}$       |   |         | 5                 | ms    |  |
| Enable Time   | $t_{EN}$       |   |         | 20                | ns    |  |
| Disable Time  | $t_{DA}$       |   |         | 5                 | ns    |  |
| Tri-state Function (Standby/Disable)                  |                | "1" ( $V_{IH} \geq 0.75 * V_{DD}$ ) or Open: Oscillation<br>"0" ( $V_{IL} < 0.25 * V_{DD}$ ) : Hi Z |         |                   | V     | 40k $\Omega$ pull-up resistor embedded                         |
| Aging   |                | -5.0  |         | +5.0              | ppm   | First year   |
| Output Offset Voltage                                 | $V_{OH}$       | 0.725   |         |                   | V     | $R_L=50 \Omega$  |
|   | $V_{OL}$       |   |         | 0.10              |       |  |
| Peak to Peak Output Swing                             |                |   | 750     |                   | mV    | Single-Ended   |
| Rise Time   | $t_r$          | 200   |         | 400               | ps    | $R_L=50 \Omega$ , $C_L=2\text{pF}$                             |
| Fall Time   | $t_f$          | 200   |         | 400               | ps    | 20% to 80%   |
| Duty Cycle  | SYM            | 48  |         | 52                | %     | Differential   |
| Period Jitter   | $J_{PER}$      |   | 2.5     |                   | pSRMS | $F_{01}=F_{02}=100.00\text{MHz}$                               |
| Integrated Phase Noise<br>(Common Clock Architecture) | $R_J$          |   | 0.540   |                   | pSRMS | PCIe Gen 1.1<br>$T_J = D_J + 14.069 \times R_J$<br>(BER 10-12) |
|   | $D_J$          |   | 0.832   | 41.9              | pSP-P |  |
|   | $T_J$          |   | 8.536   | 86.0              |       |  |
|   | $J_{RMS-CCHF}$ |   | 0.458   | 3.1               | pSRMS | PCIe Gen 2.1<br>1.5 MHz to Nyquist                             |
|   | $J_{RMS-CCLF}$ |   | 0.030   | 3.0               |       | PCIe Gen 2.1<br>10kHz to 1.5 MHz                               |
|   | $J_{RMS-CC}$   |   | 0.165   | 1.0               |       | PCIe Gen 3.0   |
| Integrated Phase Noise<br>(Data Clock Architecture)   | $J_{RMS-DCHF}$ |   | 0.561   | 4.0               | pSRMS | PCIe Gen 2.1<br>1.5 MHz to Nyquist                             |
|   | $J_{RMS-DCLF}$ |   | 1.778   | 7.5               |       | PCIe Gen 2.1<br>10kHz to 1.5 MHz                               |
|   | $J_{RMS-DC}$   |   | 0.147   | 1.0               |       | PCIe Gen 3.0   |

\*1. For frequency other than 100MHz, please contact ABRACON or consider using ASEMDxx series

2. Frequency stability includes frequency variations due to initial tolerance, temp. and power supply voltage

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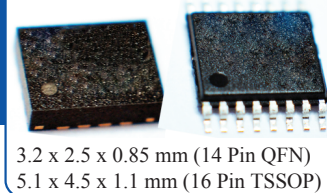


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Revised: 04.12.13

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AB-557-03 Series

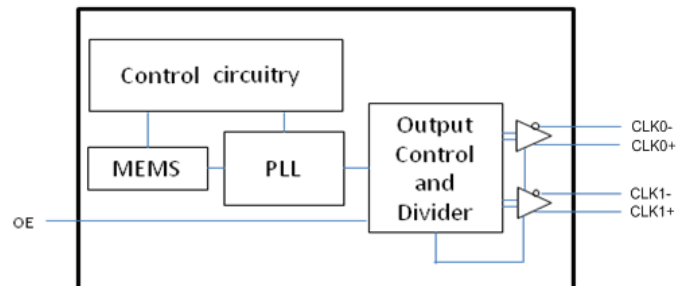


RoHS/RoHS II compliant

## Absolute Maximum Ratings

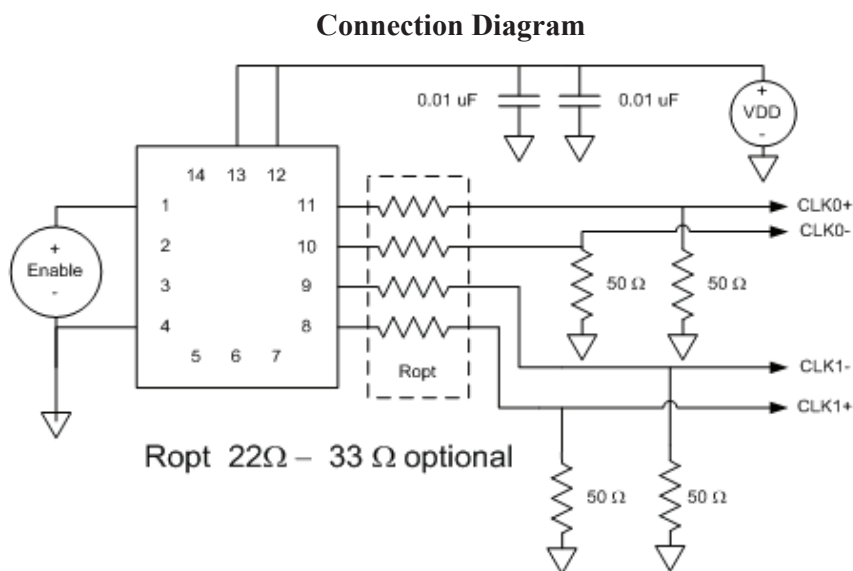
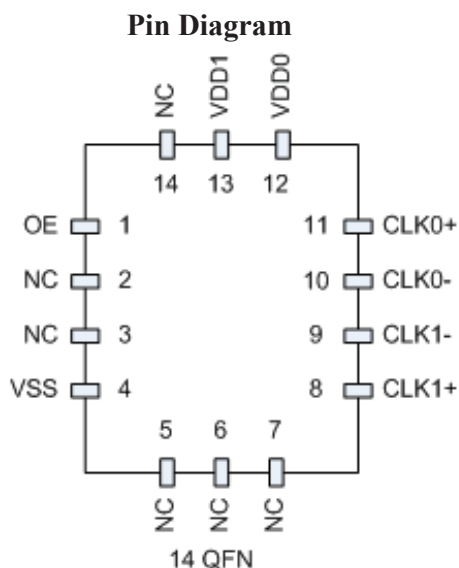
| Item            | Minimum | Maximum              | Unit | Condition |
|-----------------|---------|----------------------|------|-----------|
| Supply Voltage  | -0.3    | +4.0                 | V    |           |
| Input Voltage   | -0.3    | V <sub>dd</sub> +0.3 | V    |           |
| Junction Temp.  |         | +150                 | °C   |           |
| Storage Temp.   | -55     | +150                 | °C   |           |
| Soldering Temp. |         | +260                 | °C   | 40sec max |
| ESD             |         |                      |      |           |
| HBM             |         | 4,000                | V    |           |
| MM              |         | 400                  |      |           |
| CDM             |         | 1,500                |      |           |

## Block Diagram:



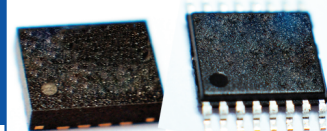
## PIN LAYOUT:

### 14 Pin QFN:



| Pin No. | Pin Name | Pin Type | Description                                    |
|---------|----------|----------|--|
| 1       | OE       | I        | Output Enable; active high                     |
| 2       | NC       | NA       | Ground Connected or Leave Unconnected          |
| 3       | NC       | NA       | Ground Connected or Leave Unconnected          |
| 4       | VSS      | Power    | Ground   |
| 5       | NC       | NA       | Ground Connected or Leave Unconnected          |
| 6       | NC       | NA       | Ground Connected or Leave Unconnected          |
| 7       | NC       | NA       | Ground Connected or Leave Unconnected          |
| 8       | CLK1+    | O        | True output of differential pair               |
| 9       | CLK1-    | O        | Complement output of differential pair         |
| 10      | CLK0-    | O        | Complement output of differential pair         |
| 11      | CLK0+    | O        | True output of differential pair               |
| 12      | VDD0     | Power    | Power Supply for Output 0 (CLK+/- 0)           |
| 13      | VDD1     | Power    | Power Supply for Core and Output 1 (CLK +/- 1) |
| 14      | NC       | NA       | Ground Connected or Leave Unconnected          |

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3.2 x 2.5 x 0.85 mm (14 Pin QFN)  
5.1 x 4.5 x 1.1 mm (16 Pin TSSOP)

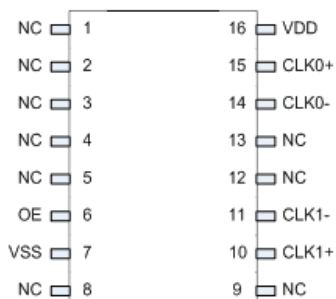
AB-557-03 Series



RoHS/RoHS II compliant

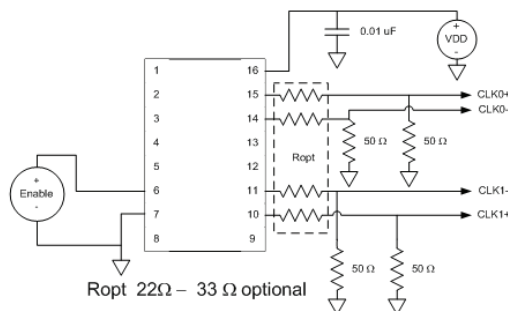
## 16 Pin TSSOP:

Pin Diagram



16-pin TSSOP

Connection Diagram



| Pin No. | Pin Name | Pin Type | Description                            |
|---------|----------|----------|--|
| 1       | NC       | NA       | Leave Unconnected                      |
| 2       | NC       | NA       | Leave Unconnected                      |
| 3       | NC       | NA       | Leave Unconnected                      |
| 4       | NC       | NA       | Leave Unconnected                      |
| 5       | NC       | NA       | Leave Unconnected                      |
| 6       | OE       | I        | Output Enable; active high             |
| 7       | VSS      | Power    | Ground                                 |
| 8       | NC       | NA       | Leave Unconnected                      |
| 9       | NC       | NA       | Leave Unconnected                      |
| 10      | CLK1+    | O        | True output of differential pair       |
| 11      | CLK1-    | O        | Complement output of differential pair |
| 12      | NC       | NA       | Leave Unconnected                      |
| 13      | NC       | NA       | Leave Unconnected                      |
| 14      | CLK0-    | O        | Complement output of differential pair |
| 15      | CLK0+    | O        | True output of differential pair       |
| 16      | VDD      | Power    | Power Supply                           |

## PART IDENTIFICATION:

AB-557-03-□□ - □ - □ - □ - □

| Output Format, Clk1 |
|---------------------|
| C: LVCMOS           |
| LP: LVPECL          |
| LV: LVDS            |
| HC: HCSL            |

| Output Format, Clk0 |
|---------------------|
| C: LVCMOS           |
| LP: LVPECL          |
| LV: LVDS            |
| HC: HCSL            |

| Package Type |
|--------------|
| F: 14-QFN    |
| S: 16-TSSOP  |

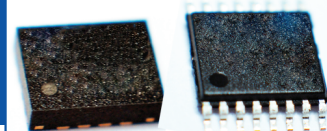
| Operating Temp.   |
|-------------------|
| E: -20°C ~ +70°C  |
| L: -40°C ~ +85°C  |
| X: -40°C ~ +105°C |

| Overall Freq. Stability |
|-------------------------|
| Blank: ±100ppm          |
| C: ±50ppm               |

| Packaging                    |
|------------------------------|
| Blank: Bulk                  |
| T: Tape & Reel(1kpcs / reel) |
| T3: Tape & Reel(3kpcs/reel)  |

Note: For frequency other than 100MHz, please contact ABRACON or consider using ASEMDxx series

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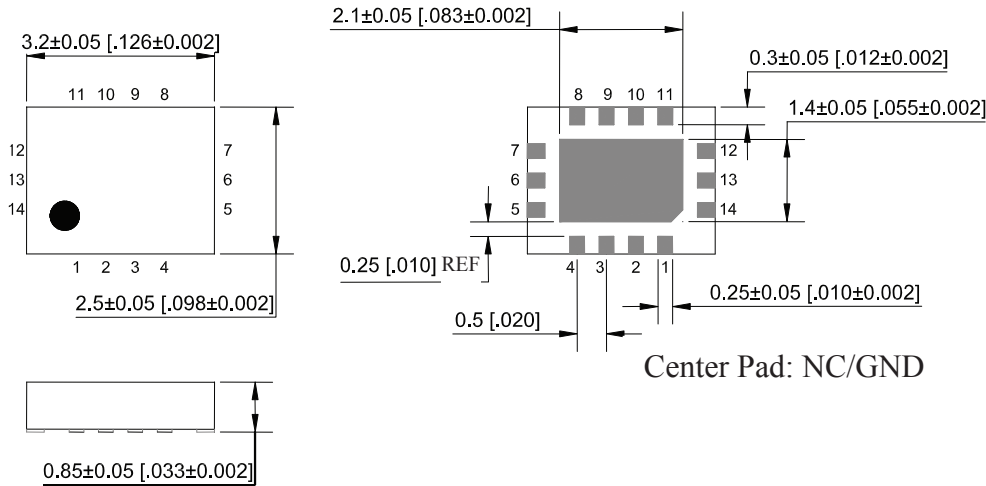
AB-557-03 Series



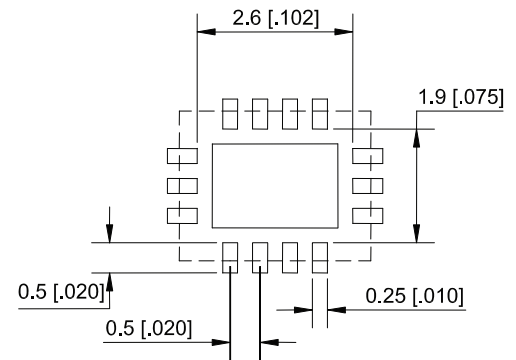
RoHS/RoHS II compliant

## OUTLINE DRAWING:

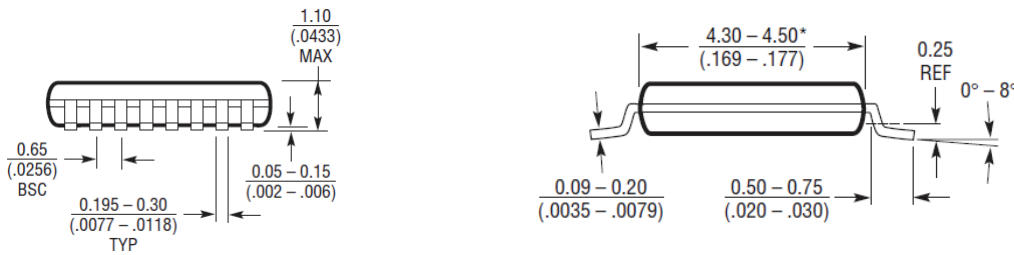
### 14 Pin QFN:



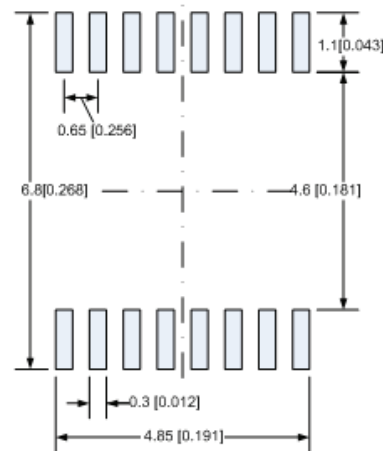
### Recommended Solder Pad Layout



### 16 Pin TSSOP:



### Recommended Solder Pad Layout



\* Dimensions do not include mold flash. Mold flash shall not exceed 0.150mm (.006 inches) per side.

Dimensions: mm (inches)

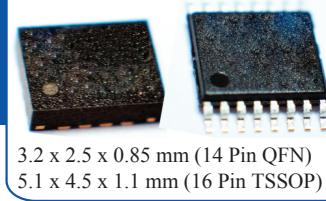
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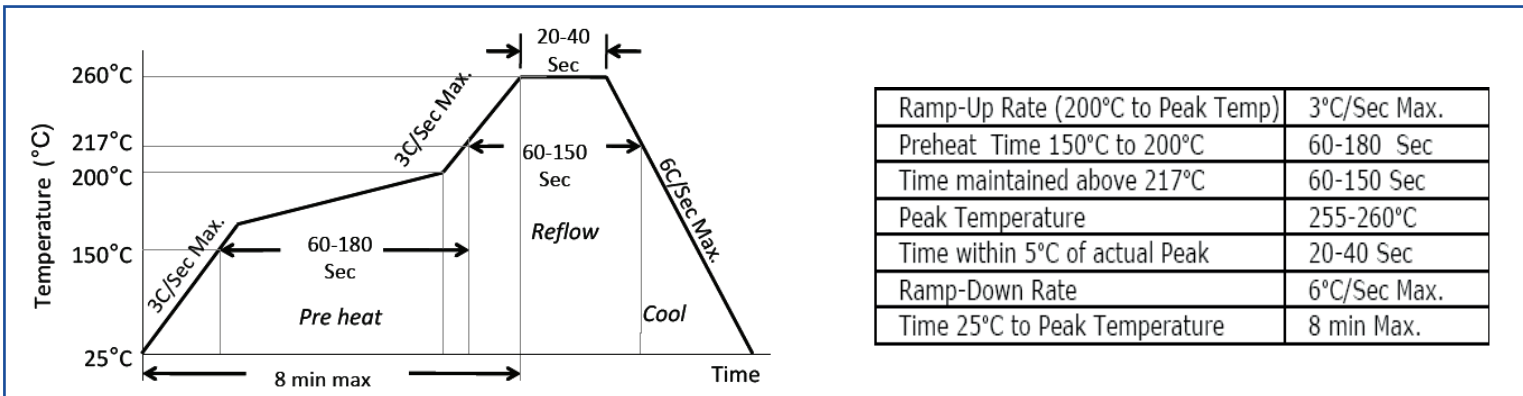
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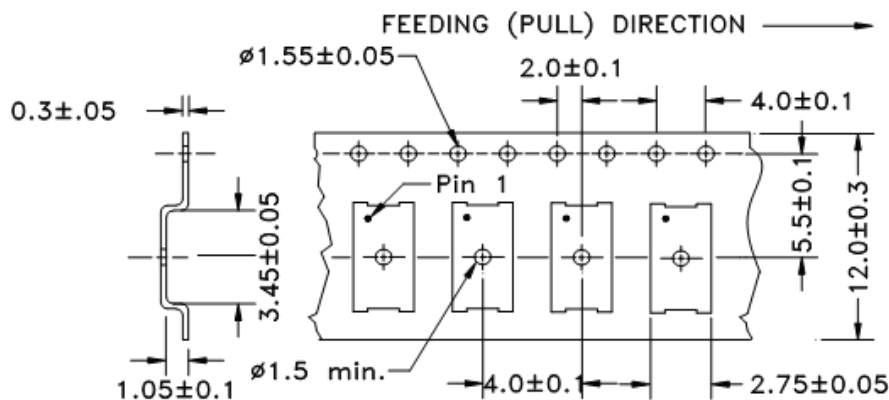
## REFLOW PROFILE:



## TAPE & REEL:

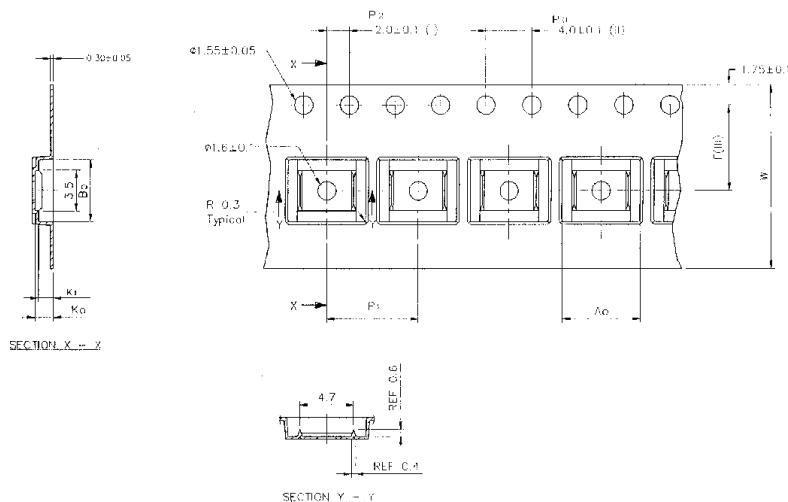
### 14 Pin QFN Tape Drawing:

T= 1,000pcs/reel  
T3= 3,000pcs/reel



### 16 Pin TSSOP Tape Drawing

T= 1,000pcs/reel  
T3= 3,000pcs/reel



| A0       | B0       | K0       | K1       | F        | P1       | W         |
|----------|----------|----------|----------|----------|----------|-----------|
| 6.80±0.1 | 5.40±0.1 | 1.60±0.1 | 1.30±0.1 | 5.50±0.1 | 8.00±0.1 | 12.00±0.3 |

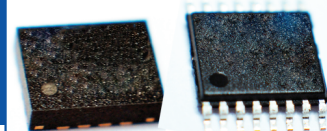
Dimensions: mm

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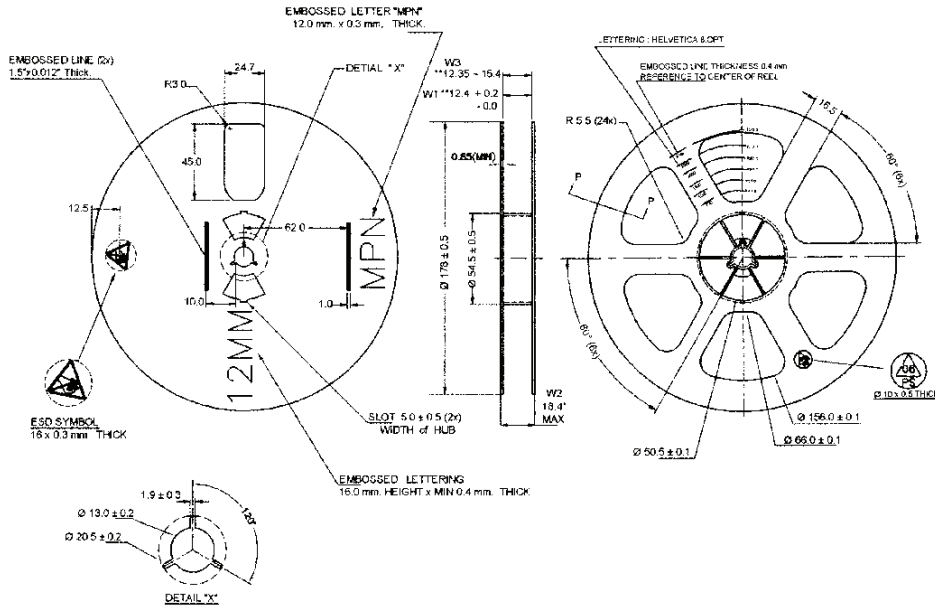


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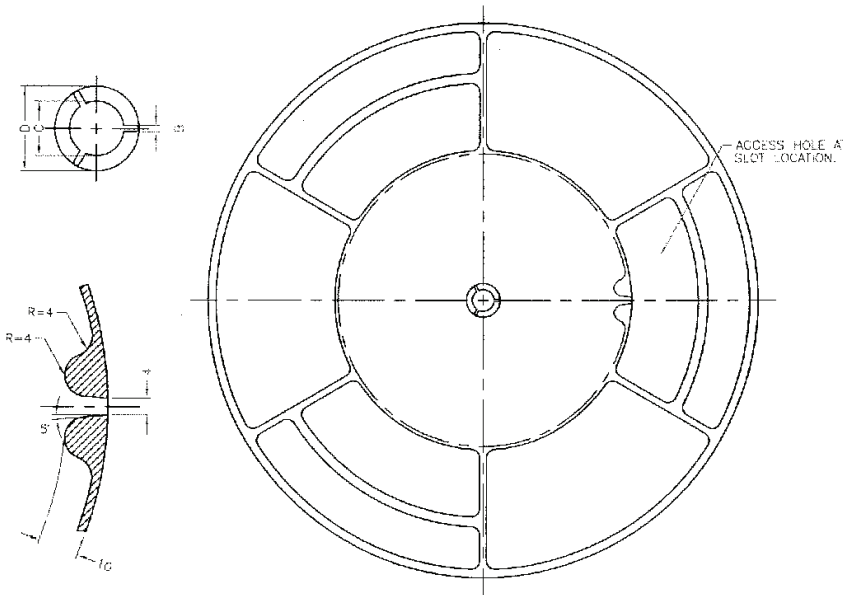
3.2 x 2.5 x 0.85 mm (14 Pin QFN)  
5.1 x 4.5 x 1.1 mm (16 Pin TSSOP)

## 7" Reel Drawing (1000pcs/reel)



Dimensions: mm

## 13" Reel Drawing (3000pcs/reel)



| A         | N             | W1        | W2        | W3                       | D         | B       | C             | Tape Width |
|-----------|---------------|-----------|-----------|--------------------------|-----------|---------|---------------|------------|
| 330 (13") | 178 (7") max. | 12.4+2/-0 | 18.4 max. | 12.35 min.<br>15.40 max. | 20.2 min. | 1.5 min | 13.0+0.5/-0.2 | 12         |

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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.