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|---|---|---|
| SPECIFICATION SHEET NO. | S0421- ESD05D6CU0S00Y | |
| ORIGINAL MFG/PART NO. | MDD Diodes/ESD05D6CU | |
| NEXTGEN PART CODE | ESD05D6CU0S00Y | Indicate This Code For RFQ /Order |
| DATE | Apr. 21, 2025 | |
| REVISION | A3 | Updated With Most Recent Data |
| DESCRIPTION AND MAIN PARAMETRICS | <p>SMD Plastic-Encapsulate ESD Protection Diodes, ESD05 Series, Case DFN0603, Ultra -Low Capacitance, Unidirectional Type</p> <p>Reverse Working Voltage: 5.0V</p> <p>Clamping Voltage 10.5VC Max.@1A</p> <p>Operating Junction Temp. Range -55°C ~+155°C</p> <p>Package in Tape/Reel, 10,000pcs/Reel</p> <p>RoHS/RoHS III compliant, RoHS Annex III lead Exemption (Exempt per RoHS EU 2015/863) and Halogen Free (HF)</p> | |
| CUSTOMER | | |
| CUSTOMER PART NUMBER | | |
| CROSS REF. PART NUMBER | | |
| MEMO | | |

| | | | |
|-------------------------------|---|--|---|
| VENDOR APPROVE | | | |
| Issued/Checked/Approved |  |  |  |
| Effective Date: Apr. 21, 2025 | | | |

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| CUSTOMER APPROVE |
| |
| Date: |

DESCRIPTION

The ESD05D6CU is designed to protect voltage sensitive components from ESD and transient voltage events. Excellent clamping capability, low leakage, and fast response time, make these parts ideal for ESD protection on designs where board space is at a premium. Because of its small size, it is suited for use in cellular phones, portable devices, digital cameras, power supplies and many other portable applications where board space comes at a premium. Also because of its low capacitance, it is suited for use in high frequency designs such as USB 2.0 high speed, VGA, DVI, SDI and other high-speed line applications. This device has been specifically designed to protect sensitive components which are connected to data and transmission lines from overvoltage caused by ESD (electrostatic discharge), and EFT (electrical fast transients).



Image shown is a representation only. Exact specifications should be obtained from the product dimension.



MAIN FEATURE

- Peak Power Dissipation 35W (8/20 μ s)
- IEC61000-4-2 (ESD) ± 15 kV (Air), ± 8 kV (Contact)
- IEC61000-4-4 (EFT) 40A (5/50ns) Cable Discharge Event (CDE)
- Package optimized for high-speed lines
- Protects one directional I/O line
- Working voltages : 5.0V
- Low Clamping Voltage
- Low Leakage Current
- Low Capacitance 3.0pF (Typical)
- Meet MSL 1 Requirement
- Cross Competitors Parts and More.
- RoHS/RoHS III compliant, RoHS Annex III lead Exemption (Exempt per RoHS EU 2015/863) and Halogen Free (HF)

APPLICATION

- Cell Phone Handsets and Accessories
- Serial and Parallel Ports
- Projection TV and Peripherals
- Notebooks, Desktops, and Servers
- Portable Instrumentation
- High Speed Line :USB1.0/2.0, VGA, DVI, SDI

• ELECTRICAL CHARACTERISTICS

- See Page 5 ~Page 6.
- All Parameters are Subject To NextGen Components' Final Confirmation

HOW TO ORDER

- Please Follow Up Part Code Guide And Indicate NextGen Part Code ESD05D6CU0S00Y For RFQ and Order.

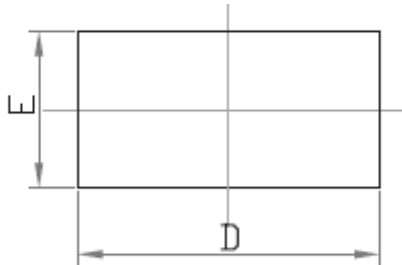
PART CODE GUIDE

RFQ
[Request For Quotation](#)

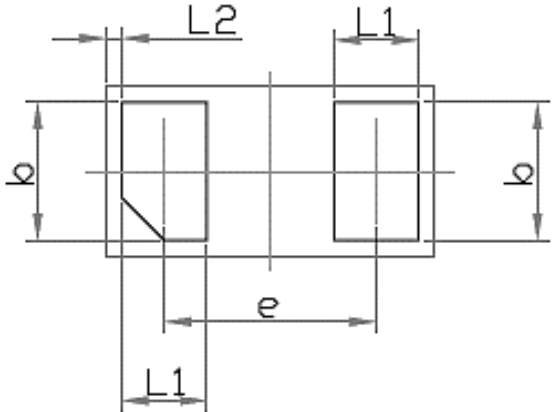
| CODE | NAME | KEY SPECIFICATION OPTION |
|-------|-----------------------------------|---|
| ESD05 | Product Series Code | SMD Plastic-Encapsulate ESD Protection Diode, Case DFN0603, 2 Pads, Ultra Low Capacitance Type |
| D6CU | Parameters Code | Letter or Digits (A~Z, a~z or 0~9) |
| 0S00 | Internal Control Code | Letter or Digits (A~Z, a~z or 0~9) |
| Y | Marking Code | Marking "5BU" |
| XX | Special/Custom Parameters Code | Letter or Digits (A~Z, a~z or 0~9) for Special Parametric; Blank: N/A |

DIMENSION- Unit: mm (inch), Case DFN0603 Outline

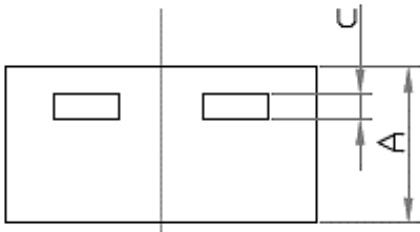
Top View



Bottom View

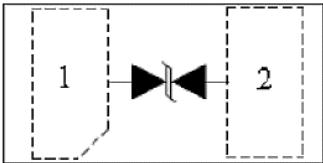


Side View

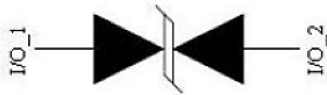


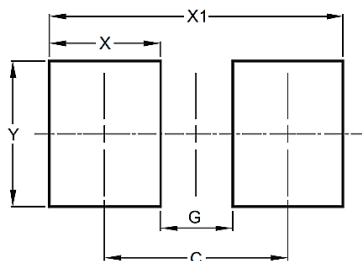
| SYMBOL | DIMENSION (MM) | | DIMENSION (INCH) | |
|--------|----------------|-------|------------------|-------|
| | MIN. | MAX. | MIN. | MAX. |
| A | 0.275 | 0.340 | 0.011 | 0.013 |
| D | 0.570 | 0.670 | 0.022 | 0.026 |
| E | 0.270 | 0.370 | 0.011 | 0.015 |
| b | 0.225 | 0.295 | 0.009 | 0.012 |
| c | 0.050 Ref. | | 0.002 Ref. | |
| e | 0.365 | 0.435 | 0.014 | 0.017 |
| L1 | 0.125 | 0.195 | 0.005 | 0.008 |
| L2 | 0.030 Ref. | | 0.001 Ref. | |

Pin Configuration



Circuit Diagram



Recommend Pad Layout - Tolerance: $\pm 0.05\text{mm}$


| SYMBOL | UNIT (MM) |
|--------|-----------|
| C | 0.40 |
| G | 0.20 |
| X | 0.64 |
| X1 | 1.10 |
| Y | 0.36 |

MECHANICAL CHARACTERISTICS

| CASE | FLAMMABILITY RATING | TERMINALS | MARKING |
|--------------------------------------|---------------------|--|---------|
| JEDEC DFN0603 molded plastic body | UL 94V-0 | Gold plated, solderable per MIL-STD-750, method 2026 | Y |

ABSOLUTE MAX. RATING & CHARACTERISTICS - $T_A=25^{\circ}\text{C}$ unless otherwise specified, For Reference Only

| PARAMETER | SYMBOLS | VALUE | UNITS |
|---|---------|------------|--------------------|
| ESD per IEC 61000-4-2 (Air) | VESD | ± 15 | KV |
| ESD per IEC 61000-4-2 (Contact) | VESD | ± 8 | KV |
| Peak Pulse Power @8/20 μs | PPP | 35 | W |
| Operating Temperature Range | TOPT | -55 ~+ 150 | $^{\circ}\text{C}$ |
| Storage Temperature Range | TSTG | -55 ~ +150 | $^{\circ}\text{C}$ |
| Lead Solder Temperature- Max. (10 s Duration) | TL | 260 /10s | $^{\circ}\text{C}$ |

ELECTRICAL CHARACTERISTICS - TA=25°C unless otherwise specified, For Reference Only

| PARAMETER | TEST CONDITION | SYMBOLS | VALUE | | | UNITS |
|---------------------------|-----------------------|---------|-------|------|------|-------|
| | | | MIN. | TYP. | MAX. | |
| Reverse Working Voltage | | VRWM | | | 5.0 | V |
| Reverse Breakdown Voltage | IT = 1.0mA | VBR | 6.0 | | 9.4 | V |
| Reverse Leakage Current | VRWM = 5.0V | IR | | | 2.0 | μA |
| Clamping Voltage | IPP = 1A, tp = 8/20μs | VC | | | 10.5 | V |
| | IPP = 2A, tp = 8/20μs | | | | 14 | V |
| Junction Capacitance | VR = 0V, f = 1MHz | Cj | | 3.0 | 4.5 | pF |

RATINGS AND CHARACTERISTICS CURVES- For Reference Only, Ta=25°C Unless Otherwise Specified.

Fig 1 8/20μs Waveform per IEC61000-4-5

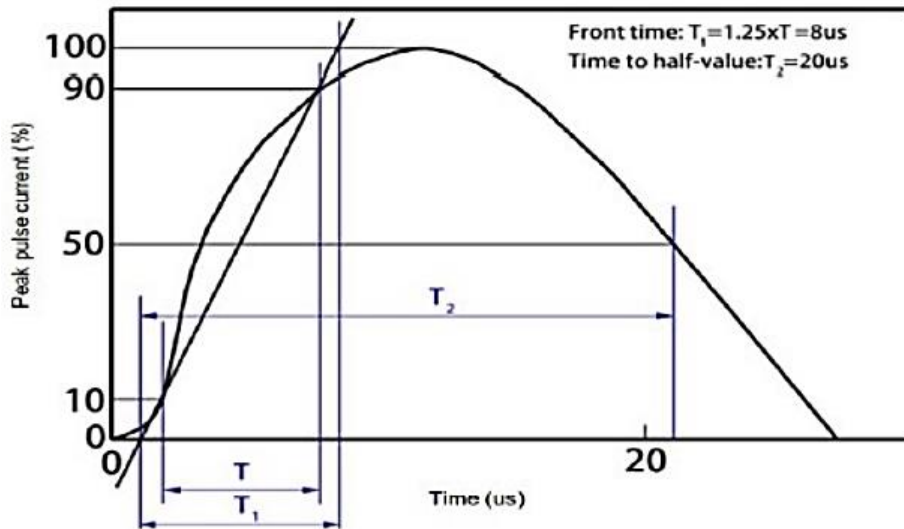
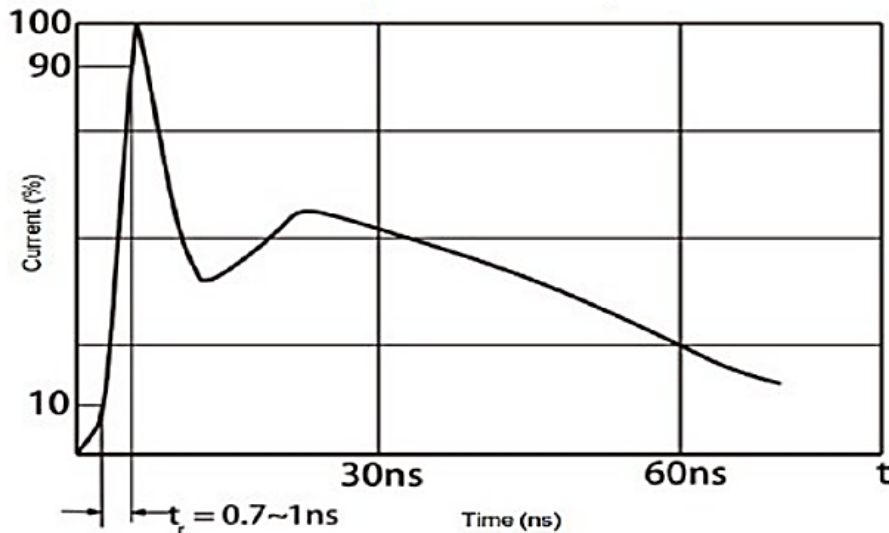


Fig 2 Contact Discharge Current Waveform per IEC 61000-4-2)



RATINGS AND CHARACTERISTICS CURVES- For Reference Only, Ta=25°C Unless Otherwise Specified.

Fig 3 Power Derating Curve

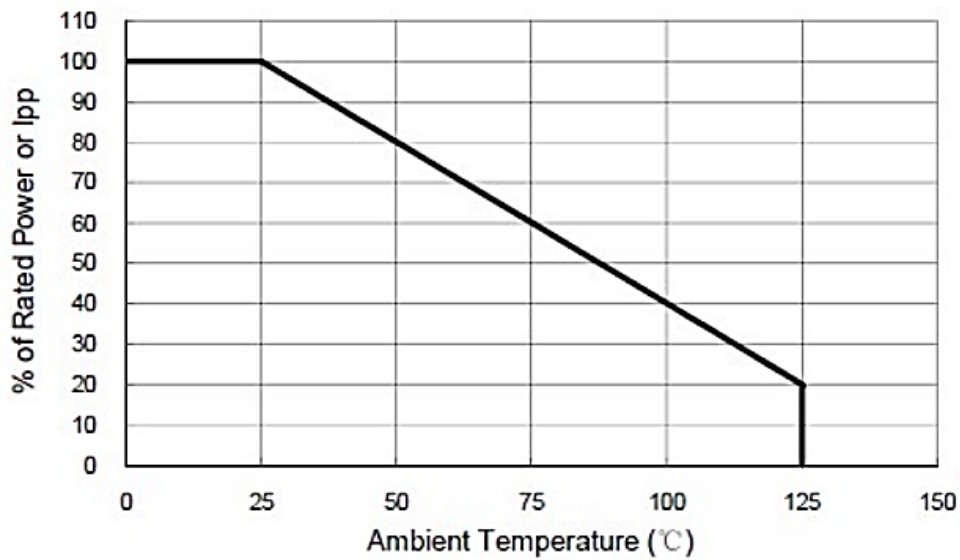
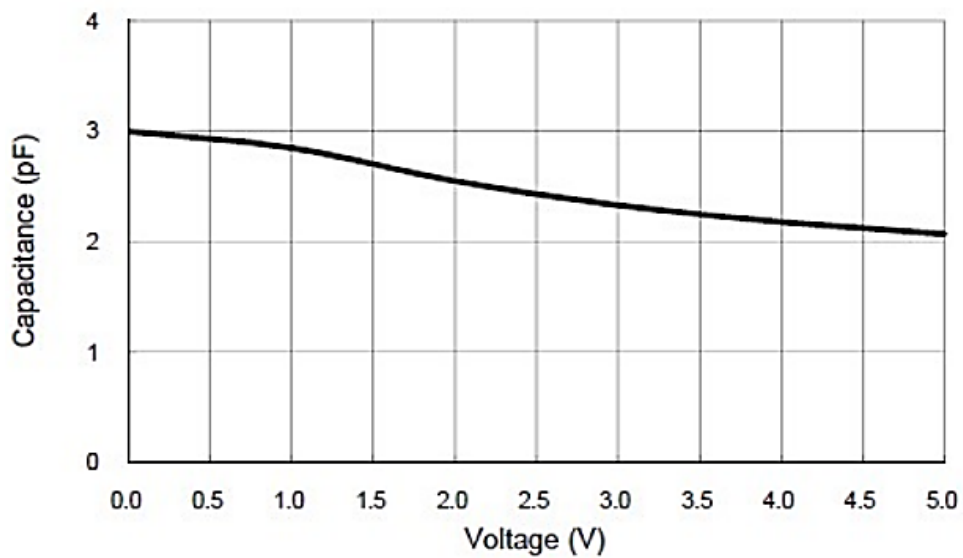


Fig 4 Voltage vs Capacitance



RATINGS AND CHARACTERISTICS CURVES- For Reference Only, Ta=25°C Unless Otherwise Specified.

Fig 5 Voltage Sweeping

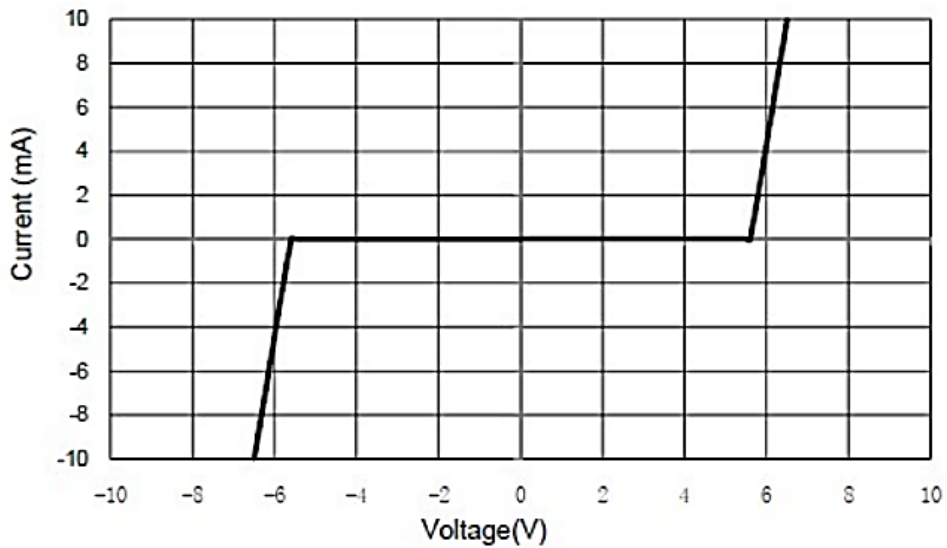
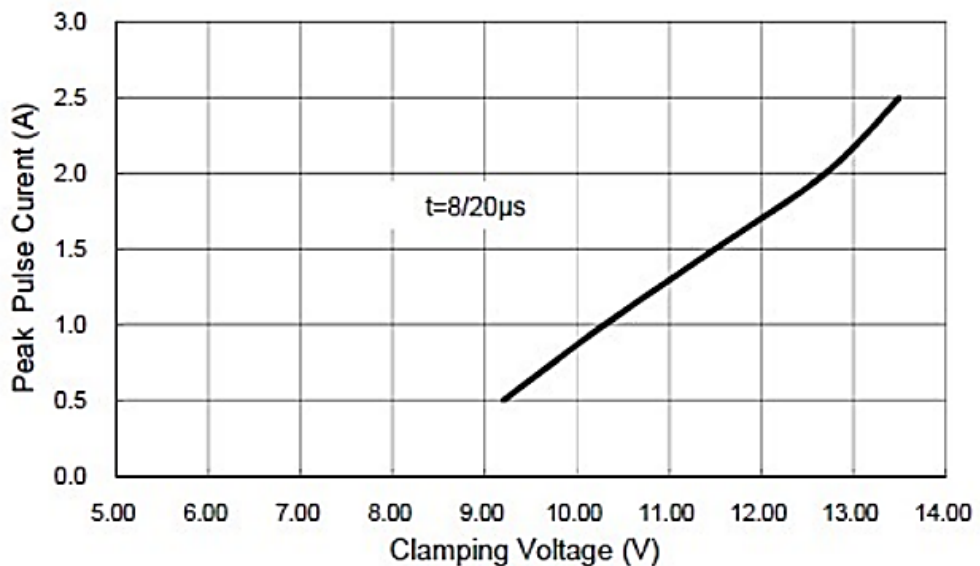
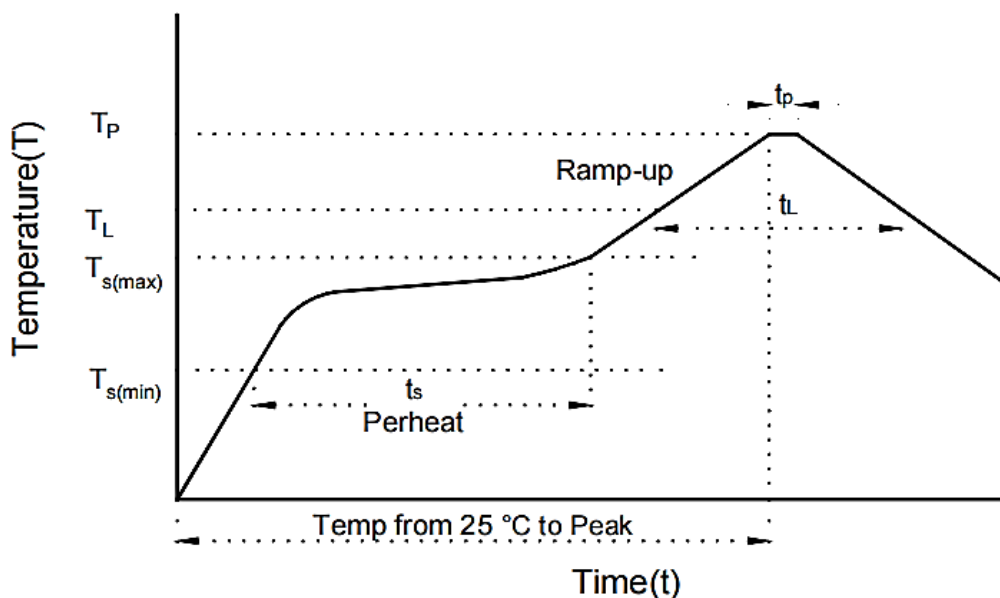


Fig 6 Clamping Voltage vs Peak Pulse Current

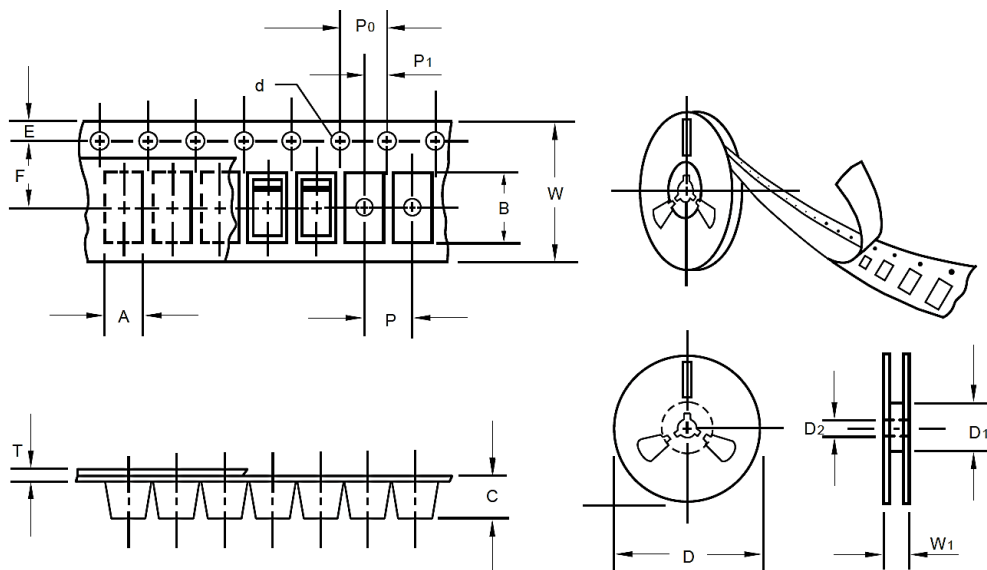


RECOMMENDED SOLDERING PARAMETERS – FOR REFERENCE ONLY



| PROFILE FEATURE | | PB-FREE ASSEMBLY |
|--|----------------------------------|-------------------|
| Average Ramp-up Rate (T_L Max to T_p) | | 3°C/second Max |
| Preheat | Temperature Min (T_s Min.) | 150°C |
| | Temperature Max (T_s Max.) | 200°C |
| | Time (t_s Min. to t_s Max.) | 60 ~ 180 seconds |
| Time maintained above | Temperature (T_L) | 217°C |
| | Time (t_L) | 60 ~ 150 seconds |
| Peak/Classification Temperature (T_p) | | 260 °C |
| Time within 5°C of actual Peak Temperature (t_p) | | 10 seconds Max. |
| Ramp-down Rate | | 6 °C /Second Max. |
| Time 25 °C to Peak Temperature | | 8 Minutes Max. |
| Suggest reflow times | | 3 Times Max. |

TAPE/REEL - Unit: mm, All Devices are packed in accordance with EIA standard RS-481-A and specifications



| ITEM | SYMBOL | TOLERANCE | DFN0603 |
|-------------------------|--------|-----------|---------|
| Carrier width | A | 0.1 | 2.10 |
| Carrier Length | B | 0.1 | 4.00 |
| Carrier Depth | C | 0.1 | 1.60 |
| Sprocket hole | d | 0.05 | 1.55 |
| 7"Reel outside diameter | D | 2 | 178.00 |
| 7"Reel inner diameter | D1 | Min. | 50.00 |
| Feed hole diameter | D2 | 0.5 | 13.00 |
| Sprocket hole position | E | 0.1 | 1.75 |
| Punch hole position | F | 0.1 | 3.50 |
| Punch hole pitch | P | 0.1 | 4.00 |
| Sprocket hole pitch | P0 | 0.1 | 4.00 |
| Embossment center | P1 | 0.1 | 2.00 |
| Overall tape thickness | T | 0.1 | 0.25 |
| Tape width | W | 0.3 | 8.15 |
| Reel width | W1 | 1 | 10.50 |
| Qty. Per Reel (pcs) | 10,000 | | |

IMPORTANT NOTES AND DISCLAIMER

1. **ROHS COMPLIANCE:** The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU RoHS Directive (EU) 2015/863 EC (RoHS3). RoHS Test Report for this product can be obtained at Download Center.
2. **REACH COMPLIANCE:** REACH substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, REACH Test Report for this product can be obtained at Download Center.
3. All Product parametric performance is indicated in the Electrical Characteristics for the listed herein test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.
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