

SPECIFICATION SHEET NO.	S0417- ESD05D6BU0S5BU	
ORIGINAL MFG/PART NO.	MDD Diodes/ESD05D6BU/DFN06035D6S5BU	
NEXTGEN PART CODE	ESD05D6BU0S5BU	Indicate This Code For RFQ /Order
DATE	Apr. 17, 2025	
REVISION	A3	Updated With Most Recent Data
DESCRIPTION AND MAIN PARAMETRICS	SMD Plastic-Encapsulate ESD Protection Diodes, ESD05 Series, Case DFN0603, Ultra -Low Capacitance, Unidirectional Type Reverse Working Voltage: 5.0V Clamping Voltage 13VC Max.@1A Operating Junction Temp. Range -55°C ~+125°C Package in Tape/Reel, 10,000pcs/Reel RoHS/RoHS III compliant, RoHS Annex III lead Exemption (Exempt per RoHS EU 2015/863) and Halogen Free (HF)	
CUSTOMER		
CUSTOMER PART NUMBER		
CROSS REF. PART NUMBER		
MEMO		

VENDOR APPROVE			
Issued/Checked/Approved			
Effective Date: Apr. 17, 2025			

CUSTOMER APPROVE	
Date:	

DESCRIPTION

ESD05D6BU is a low-capacitance transient voltage Suppressor (TVS) designed to provide electrostatic events discharge (ESD) protection for high-speed data interfaces. With typical capacitance of 0.25pF, ESD05D6BU is designed to protect parasitic-sensitive systems against over-voltage and over-current transient events. It complies with IEC 61000-4-2 (ESD), Level 4 ($\pm 15\text{kV}$ air, $\pm 8\text{kV}$ contact discharge), IEC 61000-4-4 (electrical fast transient - EFT) (40A, 5/50 ns), very fast charged device model (CDM) ESD and cable discharge event (CDE), etc. ESD05D6BU uses ultra-small DFN0603 package. Each ESD05D6BU device can protect one high-speed data line. It offers system designers flexibility to protect single data line where space is a premium concern. The combined features of low capacitance, ultra-small size and high ESD robustness make ESD05D6BU ideal for high-speed data port and high-frequency line applications, such as cellular phones and HD visual devices.



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



MAIN FEATURE

- Peak Power Dissipation 100W (8/20 μs)
- IEC61000-4-2 (ESD) $\pm 30\text{kV}$ (Air), $\pm 20\text{kV}$ (Contact)
- IEC61000-4-4 (EFT) 40A (5/50ns) Cable Discharge Event (CDE)
- Package optimized for high-speed lines
- Protects one data, control line
- Working voltages : 5.0V
- Low Clamping Voltage/Low Leakage Current
- Low Capacitance 0.25pF (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

- Serial ATA
- Desktops, Servers and Notebooks
- Cellular Phone and MDDI Ports
- USB Data Line Protection
- Display Port
- Digital Visual Interfaces (DVI)

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 ESD05D6BU0S5BU For RFQ and Order.

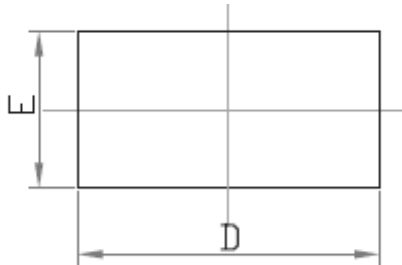
PART CODE GUIDE

RFQ
Request For Quotation

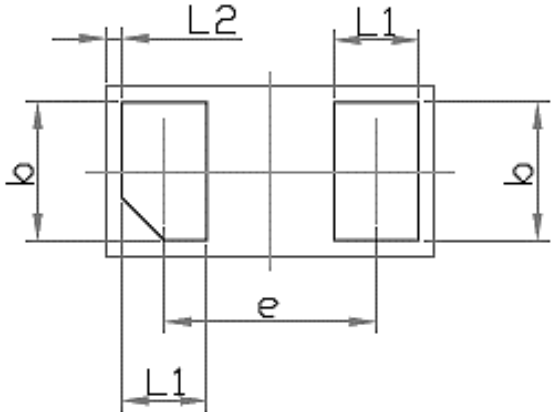
CODE	NAME	KEY SPECIFICATION OPTION
ESD05	Product Series Code	SMD Plastic-Encapsulate ESD Protection Diode, Case DFN0603, 2 Pads, Ultra Low Capacitance Type
D6BU	Parameters Code	Letter or Digits (A~Z, a~z or 0~9)
0S	Internal Control Code	Letter or Digits (A~Z, a~z or 0~9)
5BU	Marking Code	Marking "5BU"
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

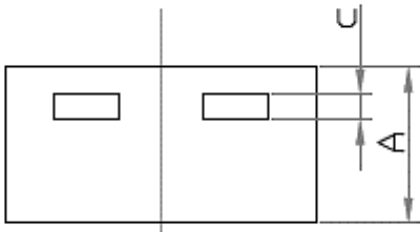
Top View



Bottom View

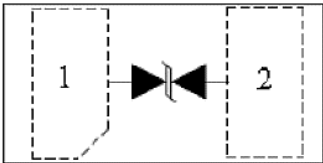


Side View



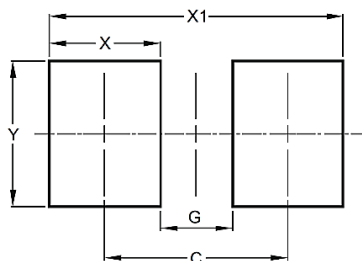
SYMBOL	DIMENSION (MM)		DIMENSION (INCH)	
	MIN.	MAX.	MIN.	MAX.
A	0.275	0.340	0.011	0.013
D	0.570	0.670	0.022	0.026
E	0.270	0.370	0.011	0.015
b	0.225	0.295	0.009	0.012
c	0.050 Ref.		0.002 Ref.	
e	0.365	0.435	0.014	0.017
L1	0.125	0.195	0.005	0.008
L2	0.030 Ref.		0.001 Ref.	

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	5BU

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	± 30	KV
ESD per IEC 61000-4-2 (Contact)	VESD	± 20	KV
Peak Pulse Power @8/20 μs	PPP	100	W
Operating Temperature Range	TOPT	-55 ~+ 125	$^{\circ}\text{C}$
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			V
Reverse Leakage Current	VRWM = 5.0V	IR			100	nA
Clamping Voltage	IPP = 1A, tp = 8/20μs	VC			13	V
	IPP = 4A, tp = 8/20μs				25	V
Junction Capacitance	VR = 0V, f = 1MHz	Cj		0.25		pF

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

Fig 1 Power Derating Curve

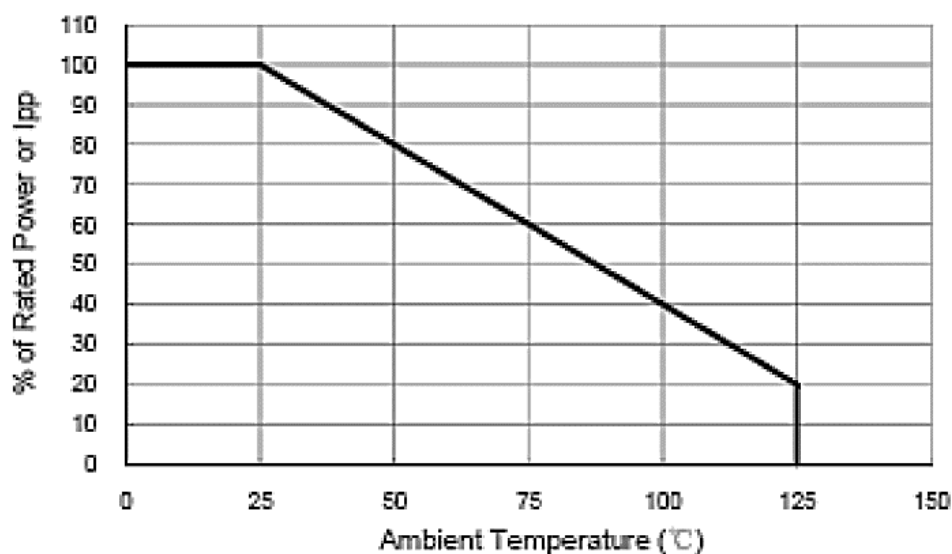
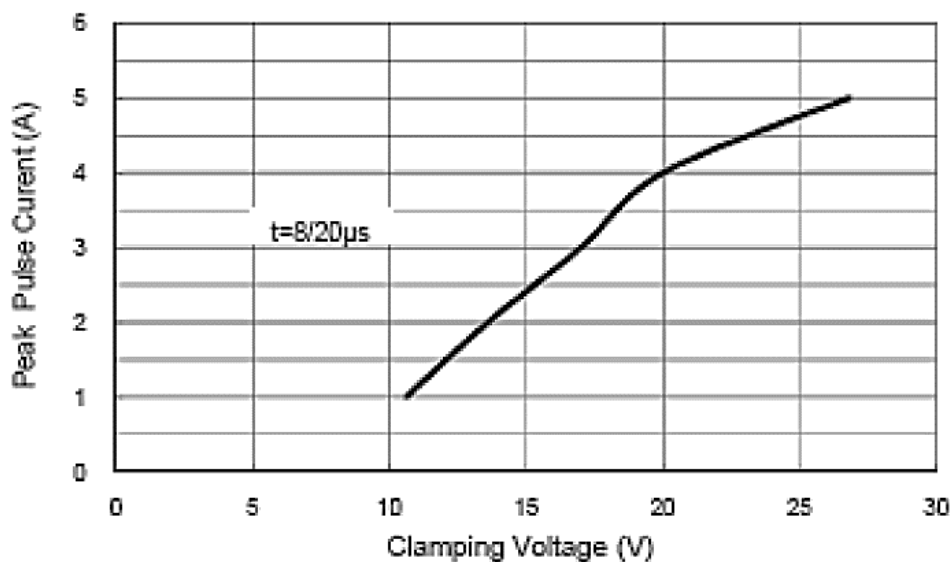


Fig 2 Clamping Voltage vs Peak Pulse Current



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

Fig 3 Voltage Sweeping

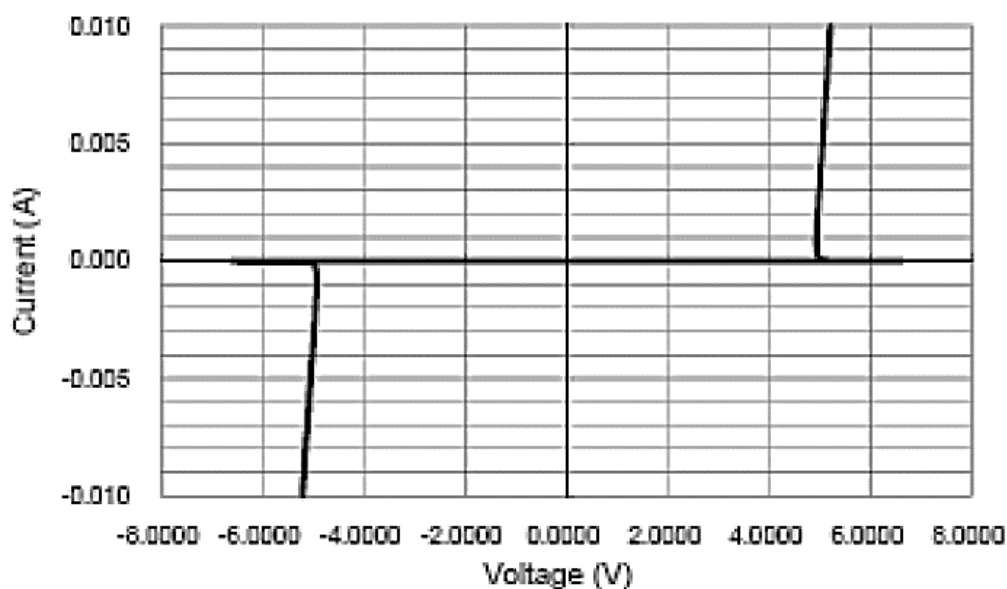
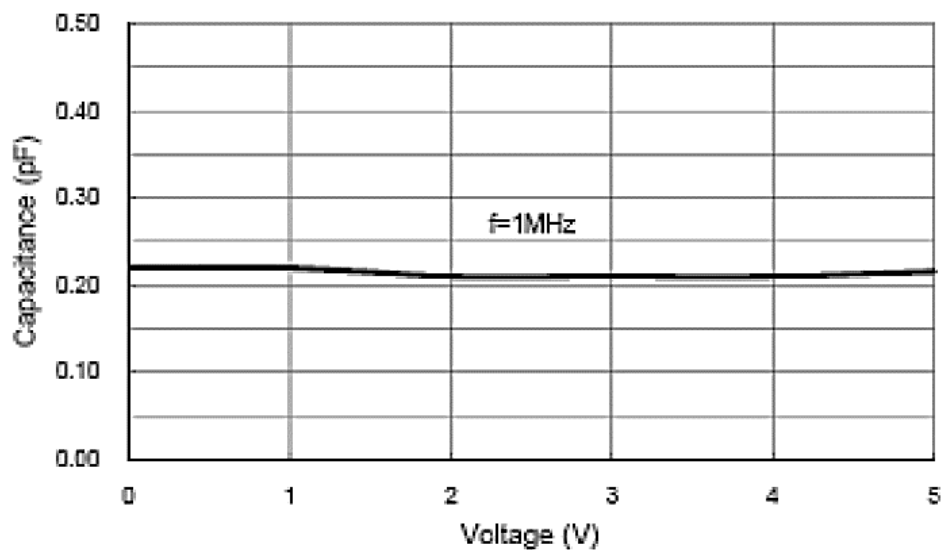
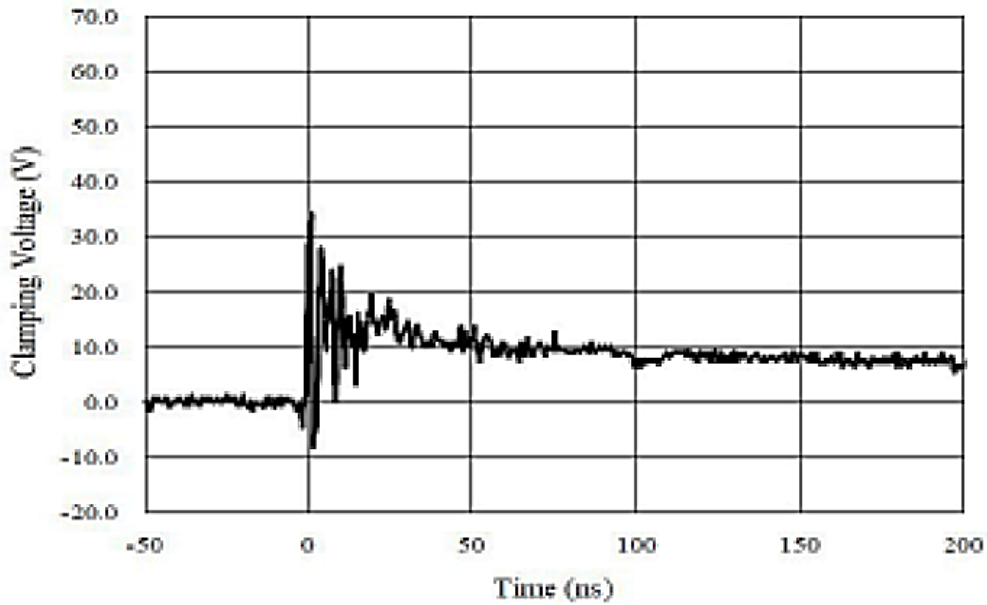


Fig 4 Voltage vs Capacitance

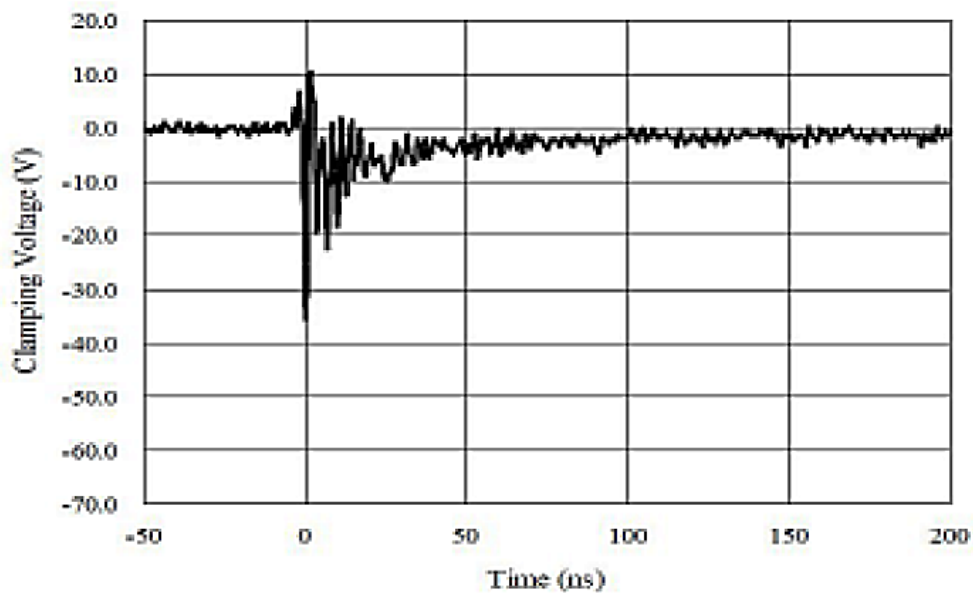


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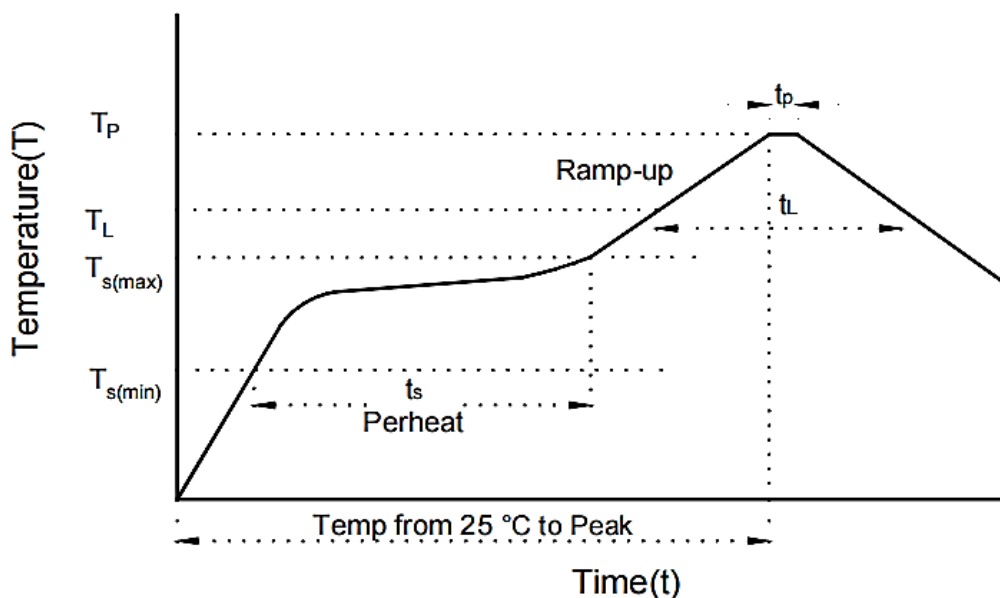
**Fig 5 ESD Clamping
(+8kV Contact per IEC 61000-4-2)**



**Fig 6 ESD Clamping
(-8kV Contact per IEC 61000-4-2)**

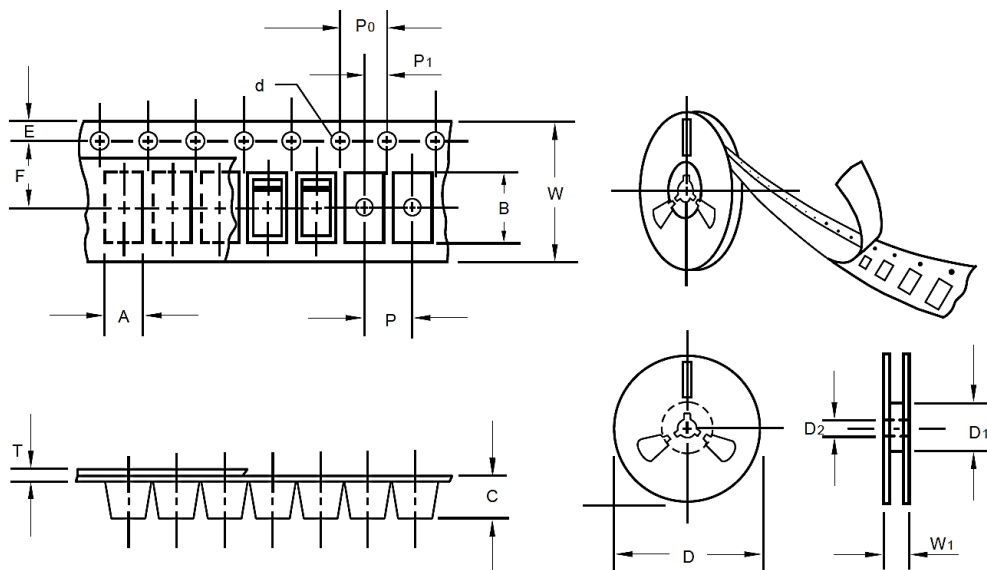


RECOMMENDED SOLDERING PARAMETERS – FOR REFERENCE ONLY



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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