SPECIFICATION SHEET

SMD ESD PROTECTION ARRAY CASE SOT-26 ESD05 SERIES

SPECIFICATION SHEET NO.	S0417- ESD0504TL0SV05	
ORIGINAL MFG/PART NO.	MDD Diodes/ESD0504TL/SOT26504TLSV05	
NEXTGEN PART CODE	ESD0504TL0SV05	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 Array, ESD05 Series, 6 Pads Case SOT-26, Ultra -Low Capacitance, Unidirectional Type Reverse Working Voltage: 5.0V, Clamping Voltage 10VC Max.@1.0A Operating Junction Temp. Range -55°C ~+125°C Package in Tape/Reel, 3,000pcs/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 Mandy Xu — Ruby Zhang — Jack Zhang
Effective Date: Apr. 17, 2025

CUSTOMER APPROVE
Date:

DESCRIPTION

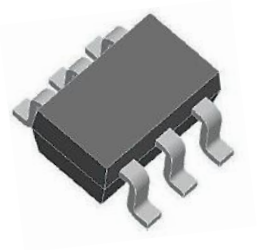


Image shown is a representation only. Exact specifications should be obtained from the product dimension.

ESD0504TL is an ultra-low capacitance Transient Voltage Suppressor (TVS) designed to protection For high-speed data interfaces. With typical capacitance of 0.20pF (I/O to I/O) only, ESD0504TL 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 (±15kV air, ±8kV 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. ESD0504TL uses ultra-small SOT-26 package. Each ESD0504TL device can protect four high-speed data line one Vcc line. The combined features of ultra-low capacitance, small size and high ESD robustness make ESD0504TL ideal for high-speed data ports and high-frequency lines (e.g., HDMI & DVI) applications, The low clamping voltage of the ESD0504TL guarantee a minimum stress on the protected IC.

MAIN FEATURE

- Peak Power Dissipation 60W (8/20μs)
- Transient protection for high-speed data lines
- IEC61000-4-2 (ESD) ±25kV (air), ±20kV (contact)
- IEC61000-4-4 (EFT) 40A (5/50ns) Cable Discharge Event (CDE)
- Package optimized for high-speed lines
- Protects four data line and one Vcc line
- Low Capacitance: 0.20pF (I/O to I/O)
- Low clamping voltage and Low leakage current
- Each I/O pin can withstand over 1000 ESD strikes for ±8KV contact discharge
- 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
- High Definition Multi Interface (HDMI)
- MDDI Ports
- USB 2.0/3.0 Power and 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 ESD0504TL0SV05 For RFQ and Order.

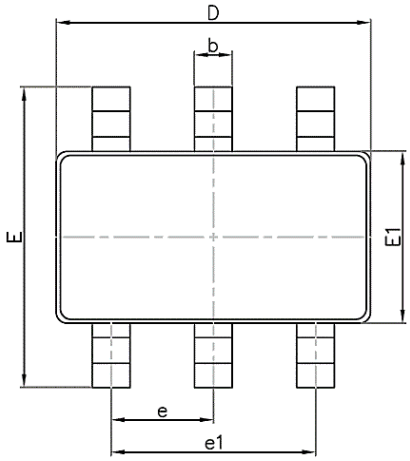
PART CODE GUIDE

RFQ
Request For Quotation

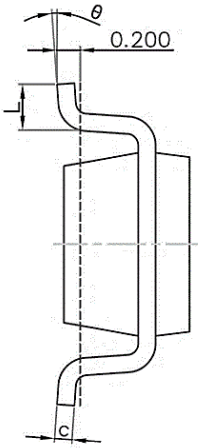
CODE	NAME	KEY SPECIFICATION OPTION
ESD05	Product Series Code	SMD Plastic-Encapsulate ESD Protection Array, 6 Pads Case SOT-26, Ultra Low Capacitance
04TL	Parameters Code	Letter or Digits (A~Z, a~z or 1~9)
0S	Internal Control Code	Letter or Digits (A~Z, a~z or 1~9)
V05	Marking Code	Marking "V05"
XX	Special/Custom Parameters Code	Letter or Digits (A~Z, a~z or 1~9) for Special Parametric; Blank: N/A

DIMENSION- Unit: mm, Case SOT-26 Outline

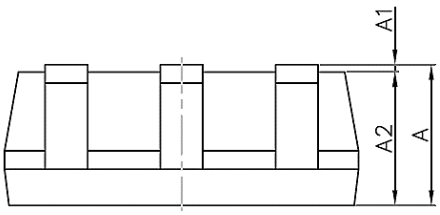
Top View



Side View

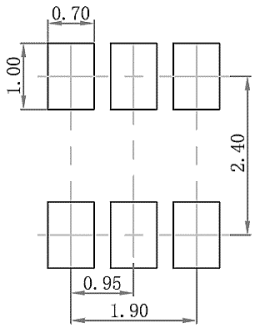


Side View

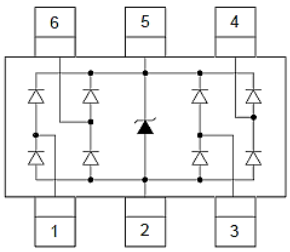


SYMBOL	DIMENSION (MM)		DIMENSION (INCH)	
	MIN.	MAX.	MIN.	MAX.
A	1.050	1.25	0.041	0.049
A1	0.000	0.1000	0.000	0.004
A2	1.050	1.150	0.041	0.035
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950 REF.		0.037 REF.	
e1	1.800	2.00	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0 °	8 °	0 °	8 °

Recommend Pad Layout (unit : Inch/mm)



Circuit Diagram



I/O Pins: Pin 1, 3, 4, 6. Vcc: Pin 5.GND: Pin 2

MECHANICAL CHARACTERISTICS

CASE	FLAMMABILITY RATING	TERMINALS	MARKING
JEDEC SOT-26 molded plastic body	UL 94V-0	High temperature soldering guaranteed: 260℃/10s	V05

ABSOLUTE MAX. RATING & CHARACTERISTICS - T_A=25°C unless otherwise specified, For Reference Only

PARAMETER	SYMBOLS	VALUE	UNITS
ESD per IEC 61000-4-2 (Air)	V_{ESD}	±25	KV
ESD per IEC 61000-4-2 (Contact)	V_{ESD}	±20	KV
Peak Pulse Power @8/20μs	P_{PP}	60	W
Operating Temperature Range	T_{OPT}	-55 ~+ 125	°C
Storage Temperature Range	T_{STG}	-55 ~ +150	°C
Lead Solder Temperature- Max. (10 s Duration)	T_L	260 /10s	°C

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

PARAMETER	TEST CONDITION	SYMBOLS	VALUE			UNITS
			MIN.	TYP.	MAX.	
Reverse Working Voltage	Any I/O pin to Ground	V_{RWM}			5.0	V
Reverse Breakdown Voltage	I_T = 1.0mA Any I/O pin to GND	V_{BR}	6.0		9.0	V
Reverse Leakage Current	V_{RWM} = 5.0V Any I/O pin to GND	I_R			1.0	µA
Clamping Voltage	I_{PP} = 1A, t_p = 8/20µs Any I/O pin to GND	V_C			10	V
	I_{PP} = 4A, t_p = 8/20µs Any I/O pin to GND				15	V
	I_{PP} = 8A, tp = 8/20µs Vcc pin to GND				15	
Parasitic Capacitance	V_R = 0 V, f = 1.0MHz Between I/O and I/O	C_{ESD}		0.20	0.30	pF
	V_R = 0 V, f = 1.0MHz Between I/O and GND			0.45	0.50	
	V_R = 0 V, f = 1.0MHz Between Vcc and GND			0.80		

Note: I/O pins are Pin 1,3,4,6; Pin 5: V cc; Pin 2: GND

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

Fig 1 Power Derating Curve

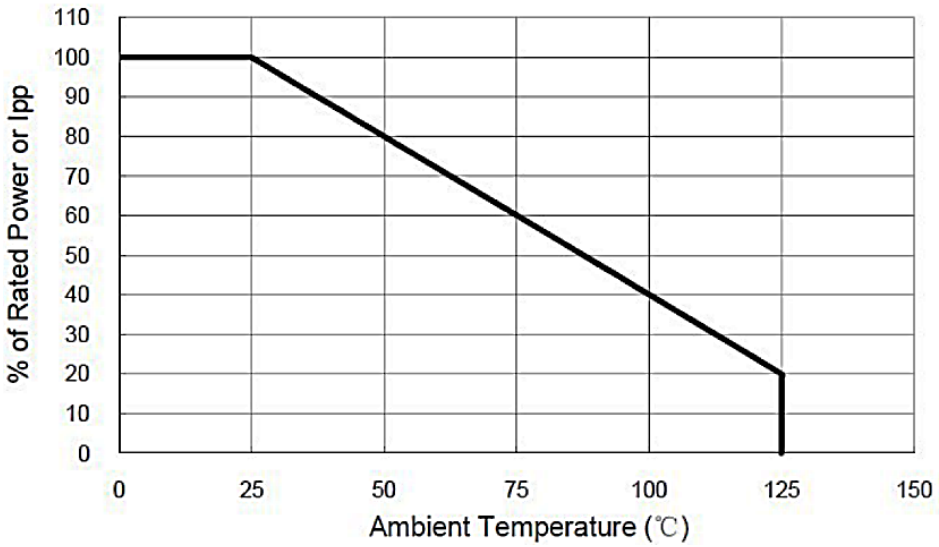
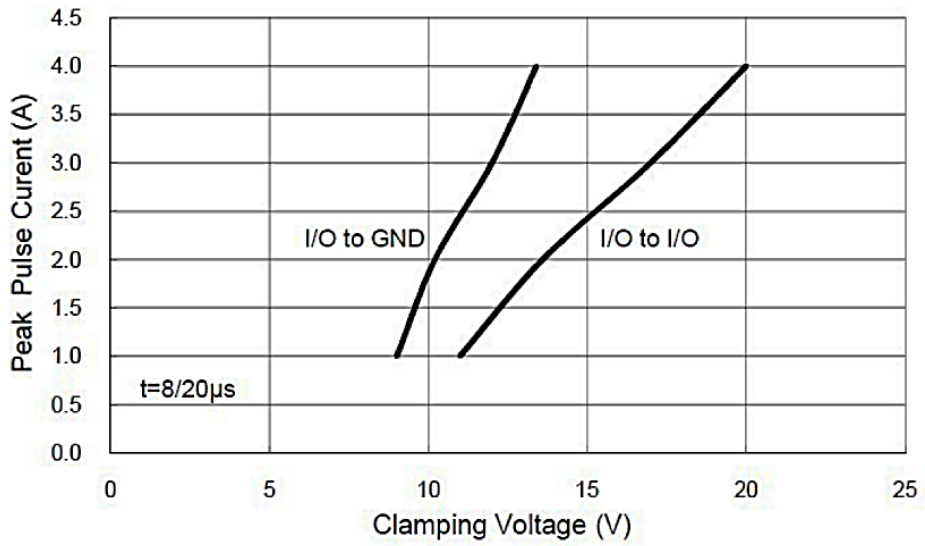


Fig 2 Clamping Voltage vs Peak Pulse Current



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

Fig 3 Voltage Sweeping of I/O to I/O

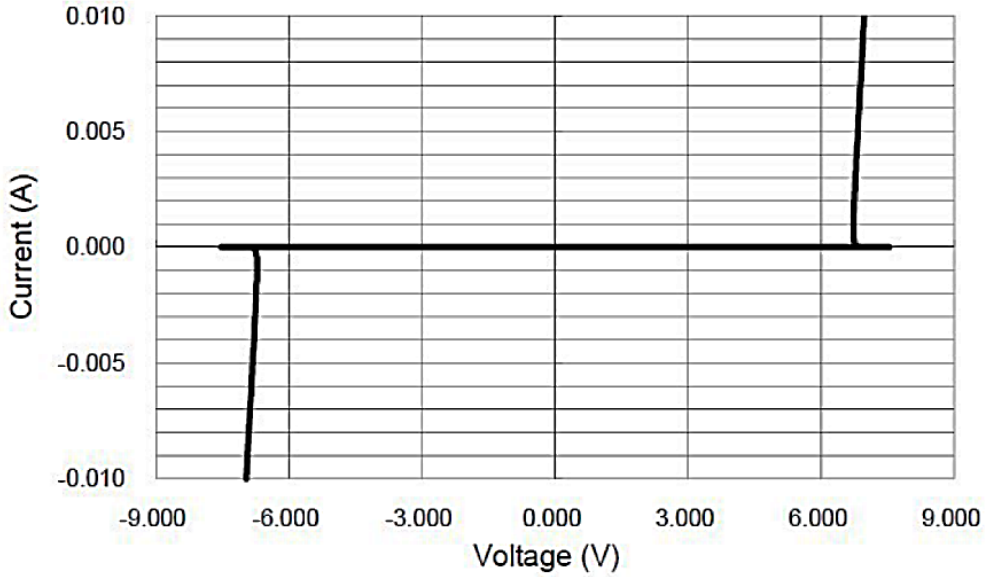
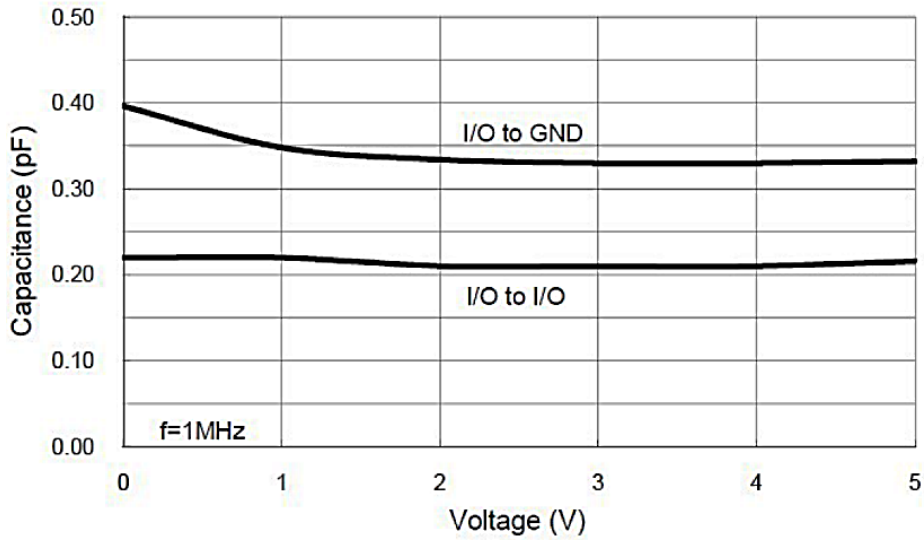


Fig 4 Voltage vs Capacitance



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

Fig 5 ESD Clamping of I/O to GND (+8kV Contact per IEC 61000-4-2)

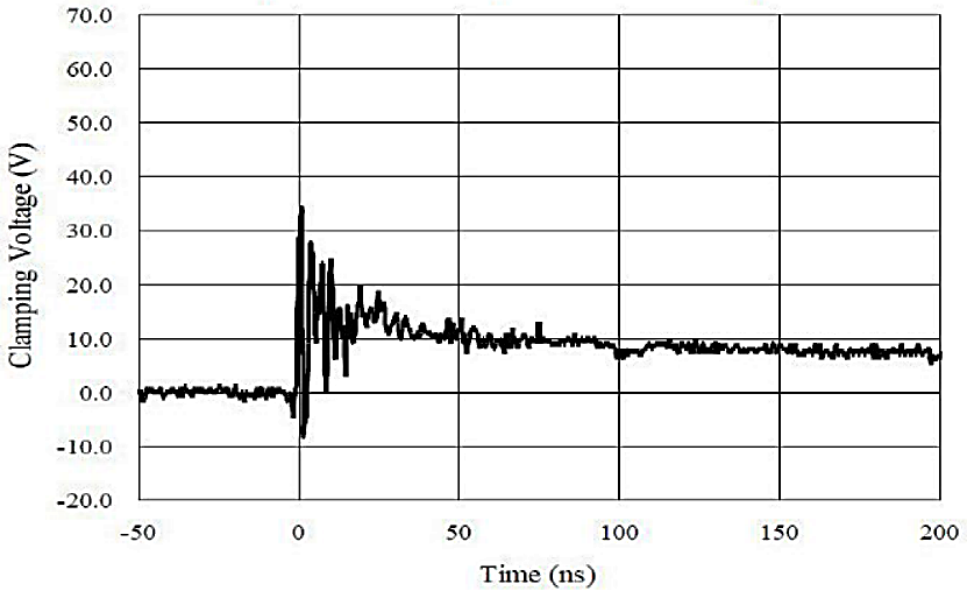
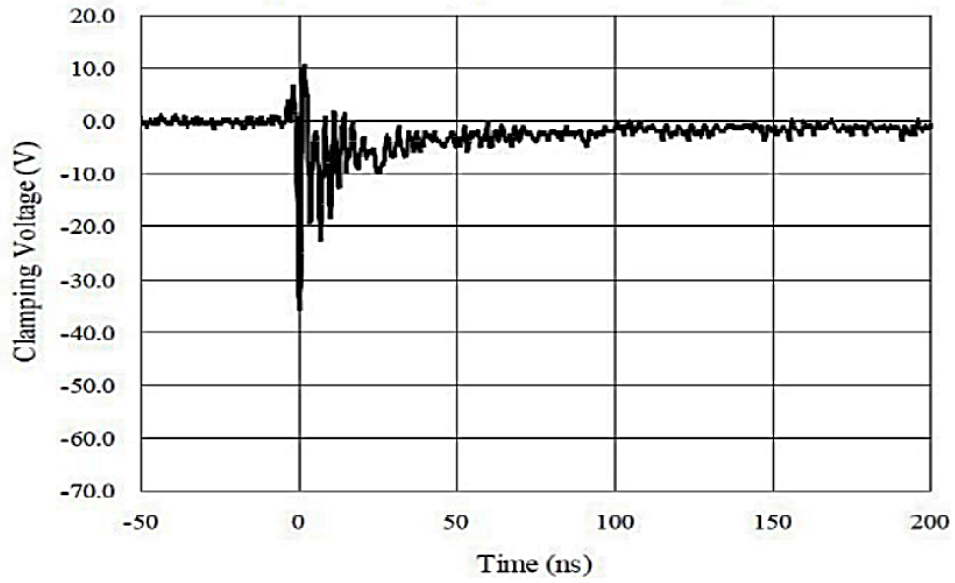
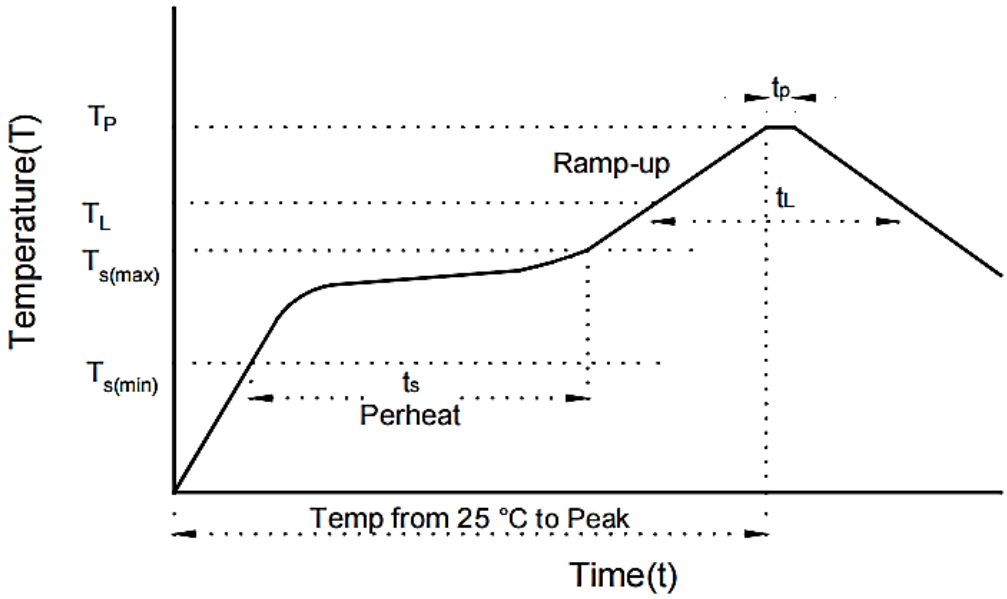


Fig 6 ESD Clamping of I/O to GND (-8kV Contact per IEC 61000-4-2)

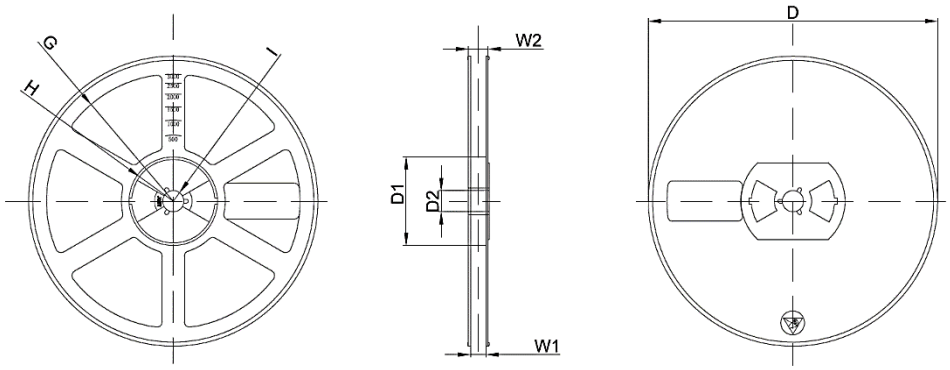


RECOMMENDED SOLDERING PARAMETERS – FOR REFERENCE ONLY

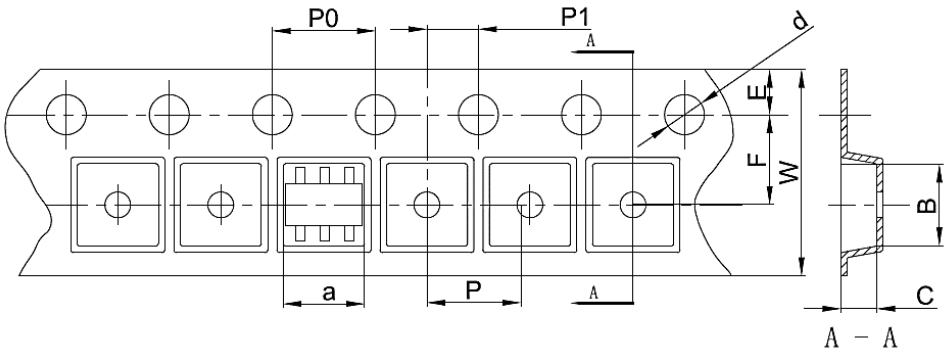


PROFILE FEATURE		PB-FREE ASSEMBLY
Average Ramp-up Rate (T_L Max to T_p)		3°C/second Max
Preheat	Temperature Min (T_s Min.)	150°C
	Temperature Max (T_s Max.)	200°C
	Time (t_s Min. to t_s Max.)	60 ~ 180 seconds
Time maintained above	Temperature (T_L)	217°C
	Time (t_L)	60 ~ 150 seconds
Peak/Classification 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.

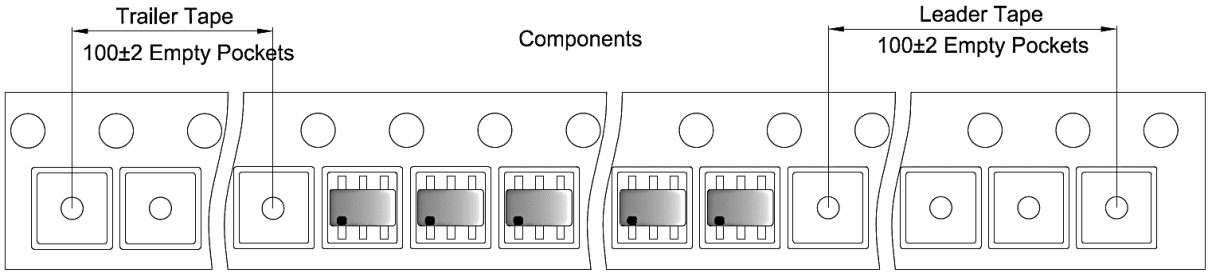
TAPE/REEL - Unit: mm, All Devices are packed in accordance with EIA standard RS-481-A and specifications



D	D 1	D 2	G	H	I	W 1	W 2
Ø180.00	60.0	13.0	R78.0	R25.60	R6.5	9.5	13.10



a	B	C	d	E	F	P 0	P	P 1	W
3.17	3.23	1.37	Ø1.55	1.75	3.50	4.00	4.00	2.00	8.00



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 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 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.
4. NextGen Component, Inc (*NextGen*) reserves the right to make changes to this document and its products and specifications at any time without notice. Customers should obtain and confirm the latest product information and specifications before final design, purchase or use.
5. *NextGen* makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, not does *NextGen* assume any liability for application assistance or customer product design.
6. *NextGen* does not warrant or accept any liability with products which are purchased or used for any unintended or unauthorized application. No license is granted by implication or otherwise under any intellectual property rights of NextGen.
7. *NextGen* products are not authorized for use as critical components in life support devices or systems without express written approval by *NextGen.*
8. *NextGen* requires that customers first obtain an RMA (Returned Merchandise Authorization) number prior to returning any products. Returns must be made within 30 days of the date of invoice, be in the original packaging, unused and like-new condition. At the time of quoting or purchasing, a product may say that it is Non-Cancelable/ Non-Returnable (NCNR). These products are not returnable and not refundable.