

UT848ZA

4-CHANNEL ▲ TVS ARRAY

TVS ARRAY ▲ SMD type

ESD Protection for high-speed data lines

Protects four I/O lines

Ultra-low capacitance (I/O) to GND ▲ 0.28pF

2.5mm x 1.0mm x 0.5mm ▲ DFN2510-10L package

AEC-Q101 qualified

SPECIFICATION

| Item | Characteristics | |
|--|------------------|-----------------|
| Operating Junction Temperature Range | T _J | -55°C to +125°C |
| Storage Temperature Range | T _S | -55°C to +150°C |
| Peak Pulse Current (8/20μs) | I _{PP} | 6A |
| ESD Rating (Per IEC 61000-4-2 ▲ Contact) | V _{ESD} | ±14kV |
| ESD Rating (Per IEC 61000-4-2 ▲ Air) | V _{ESD} | ±15kV |

DESCRIPTION

The UT848ZA is a Transient Voltage Suppressor (TVS) array designed to protect sensitive high-speed data and transmission lines from high Electrostatic Discharge (ESD) and Cable Discharge Event (CDE).

This TVS array features ultra-low capacitance and low ESD clamping voltage using iPU's proprietary deep snap-back technology.

The small flow-through style package enables simple PCB layout and facilitates necessary matched trace lengths to maintain consistent impedance between high-speed differential lines such as USB 3.0/3.1, V-by-one and eSATA interfaces.

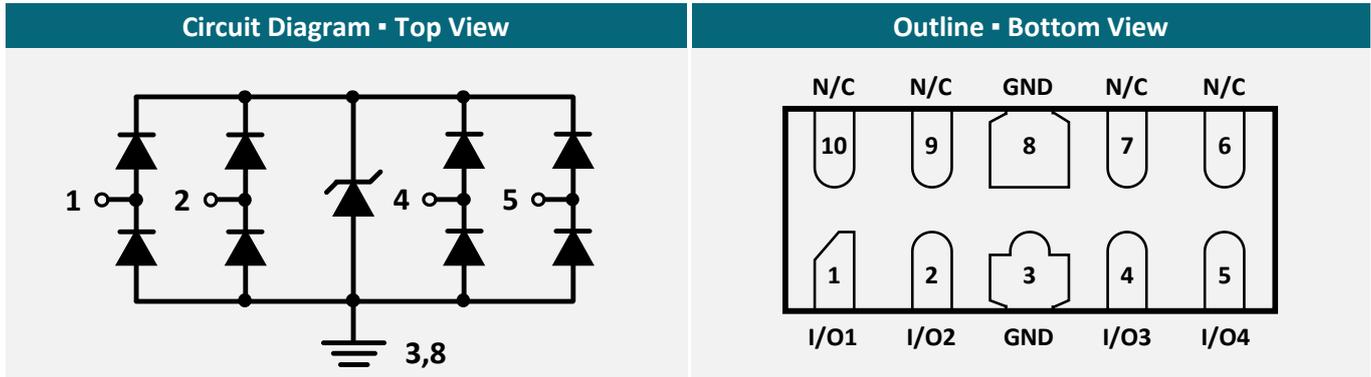
EMC STANDARDS

- ▲ IEC 61000-4-2 (ESD): ±14kV (Contact)
- ▲ IEC 61000-4-2 (ESD): ±15kV (Air)
- ▲ IEC 61000-4-4 (EFT): 40A (5/50ns)
- ▲ IEC 61000-4-5 (Lightning): 6A (8/20μs)

APPLICATIONS

| Automotive | Display Port Interface | Data and I/O Lines Protection | SATA/eSATA Interface | Thunderbolt Interface | USB 2.0, 3.0 and 3.1 |
|------------|------------------------|-------------------------------|----------------------|-----------------------|----------------------|
| | | | | | |

PIN DESCRIPTION



ELECTRICAL CHARACTERISTICS ▲ $T_J = 25^\circ\text{C}$, unless otherwise noted

| Item | Condition | Symbol | Min. | Typ. | Max. | Unit |
|--|--|-----------|------|------|------|---------------|
| Reverse Working Voltage | Any I/O Pin to GND | V_{RWM} | | | 3.3 | V |
| Breakdown Voltage | $I_{BR} = 1\text{mA}$, any I/O Pin to GND | V_{BR} | 6.5 | | 16 | V |
| Forward Voltage | $I_F = 15\text{mA}$, any I/O Pin to GND | V_F | | 1 | | V |
| Reverse Leakage Current | $V_{RWM} = 3.3\text{V}$, any I/O Pin to GND | I_R | | | 1 | μA |
| Surge Clamping Voltage (8/20 μs) | $I_{PP} = 5\text{A}$, any I/O Pin to GND | V_C | | 3.3 | | V |
| TLP Clamping Voltage ^{Note1} | $I_{TLP} = 1\text{A}$, any I/O Pin to GND | V_C | | 2.5 | | V |
| TLP Clamping Voltage ^{Note1} | $I_{TLP} = 16\text{A}$, any I/O Pin to GND | V_C | | 5.5 | | V |
| TLP Dynamic Resistance ^{Note2} | Any I/O Pin to GND | R_{DYN} | | 0.2 | | Ω |
| Junction Capacitance | $V_R = 1.5\text{V}$, $f = 1\text{MHz}$, any I/O Pin to GND | C_J | | 0.28 | 0.33 | pF |
| | $V_R = 1.5\text{V}$, $f = 1\text{MHz}$, between I/O Pins | | | 0.05 | 0.1 | |

Note

- 1: $t_{\text{period}} = 100\text{ns}$, $t_r = 1\text{ns}$
 2: $t_{\text{period}} = 100\text{ns}$, $t_r = 1\text{ns}$

TYPICAL OPERATING CHARACTERISTICS

Fig. 1 • Junction Capacitance (I/O Pin to GND)

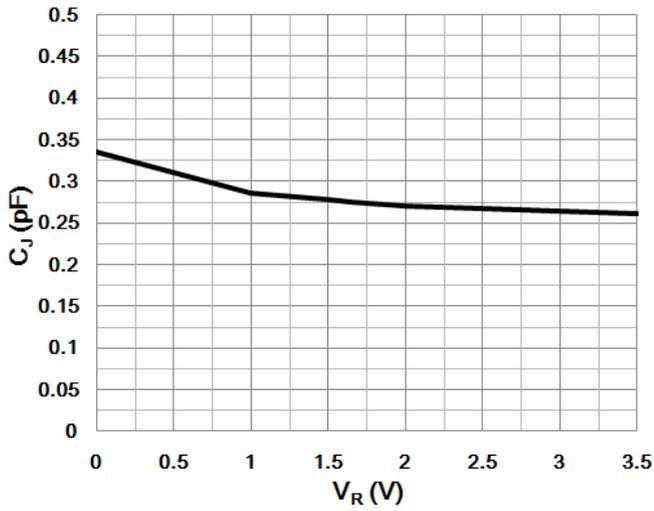


Fig. 2 • TLP Clamping Voltage ($t_{period} = 100ns, t_r = 1ns$)

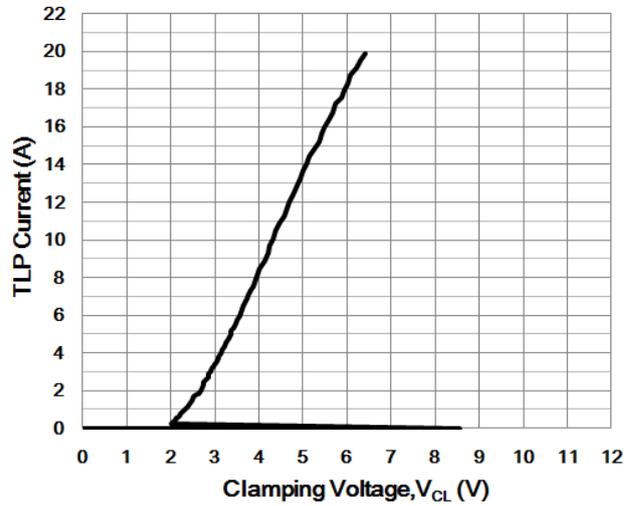


Fig. 3 • Junction Capacitance (I/O Pin to I/O Pin)

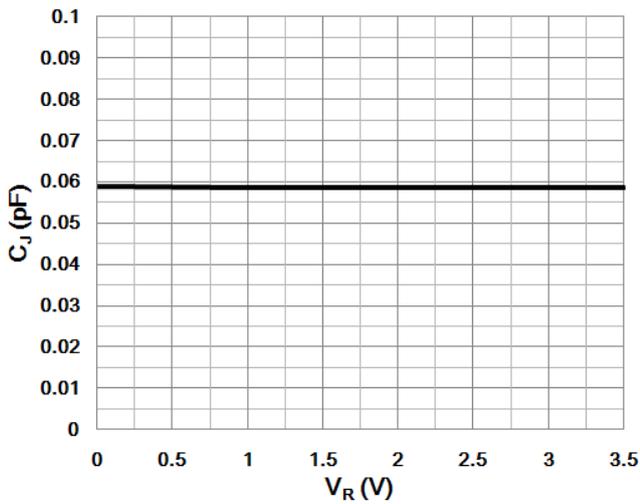
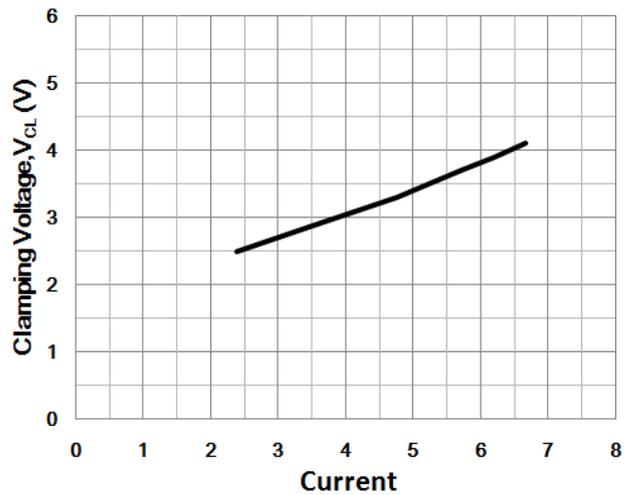
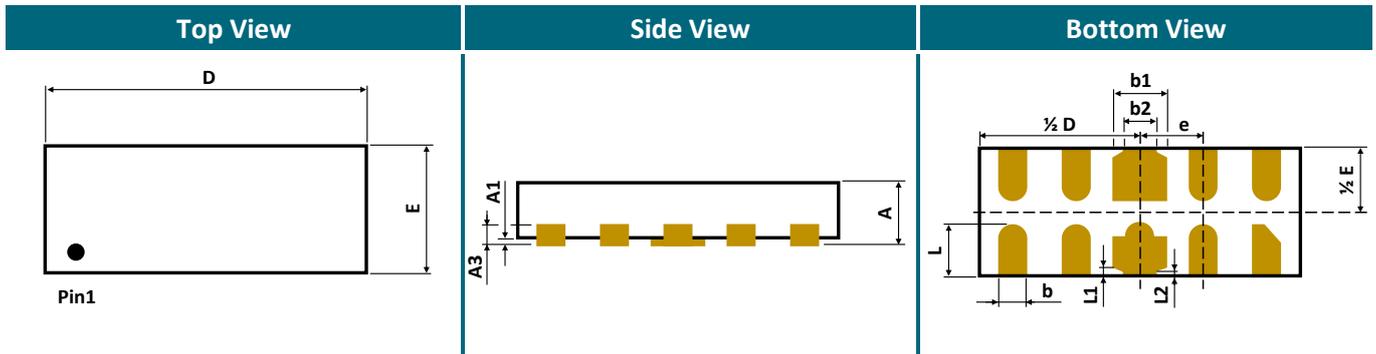


Fig. 4 • Surge Clamping Voltage



PACKAGE OUTLINE AND PART MARKING



| Sym | Millimeters (Min.) | Millimeters (Typ.) | Millimeters (Max.) |
|-----|-----------------------|-----------------------|-----------------------|
| A | 0.40 | 0.50 | 0.60 |
| A1 | 0.00 | 0.02 | 0.05 |
| A3 | | 0.152 REF | |
| b | 0.15 | 0.20 | 0.25 |
| b1 | 0.35 | | 0.45 |
| b2 | 0.13 | | 0.30 |
| D | 2.40 | 2.50 | 2.60 |
| E | 0.90 | 1.00 | 1.10 |
| e | | 0.50 BSC | |
| L1 | | 0.075 REF | |
| L2 | | 0.050 REF | |
| L | 0.30 | 0.40 | 0.50 |



Marking:

7f: Product code
UT848ZA
XXXX: Date code

Note

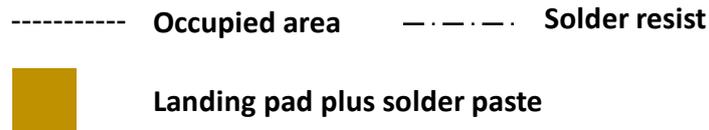
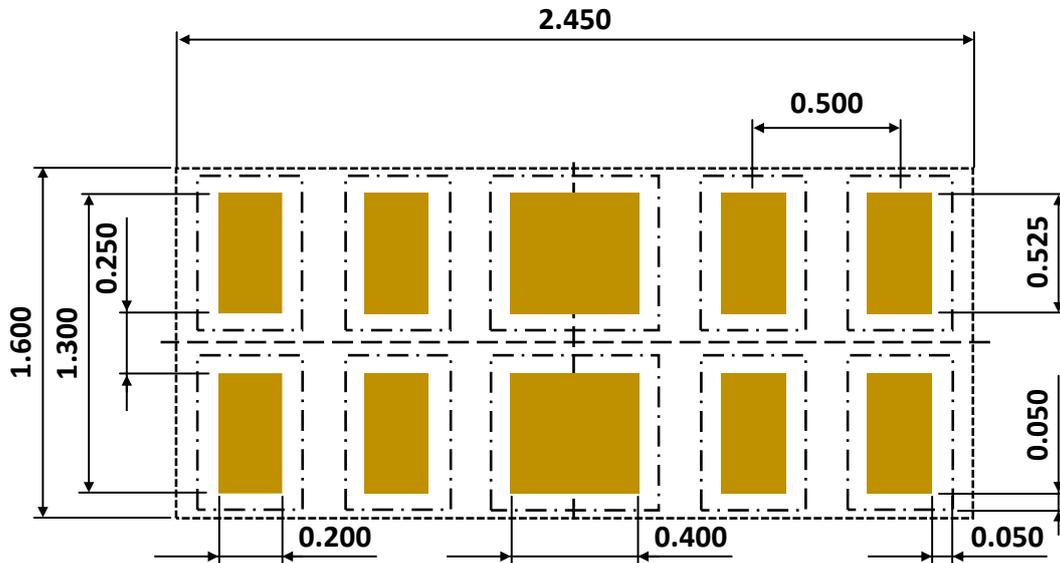
- Package Outline Unit Description:**
BSC: Basic. Represents theoretical exact dimension or dimension target.
MIN: Minimum dimension specified
MAX: Maximum dimension specified
REF: Reference. Represents dimension for reference use only. This value is not a device specification.
TYP: Typical. Provided as a general value. This value is not a device specification.
- Dimensions in Millimeters
- Drawing not to scale
- These dimensions do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm.

ORDERING INFORMATION

| Part Number | Package Type | Package Code | Part Marking | Parameter |
|-------------|--------------|--------------|--------------|---------------------------------------|
| UT848ZAD5A | DFN2510-10L | D5A | 7fXXXX | 7f = Product Code XXXX = Date Code |

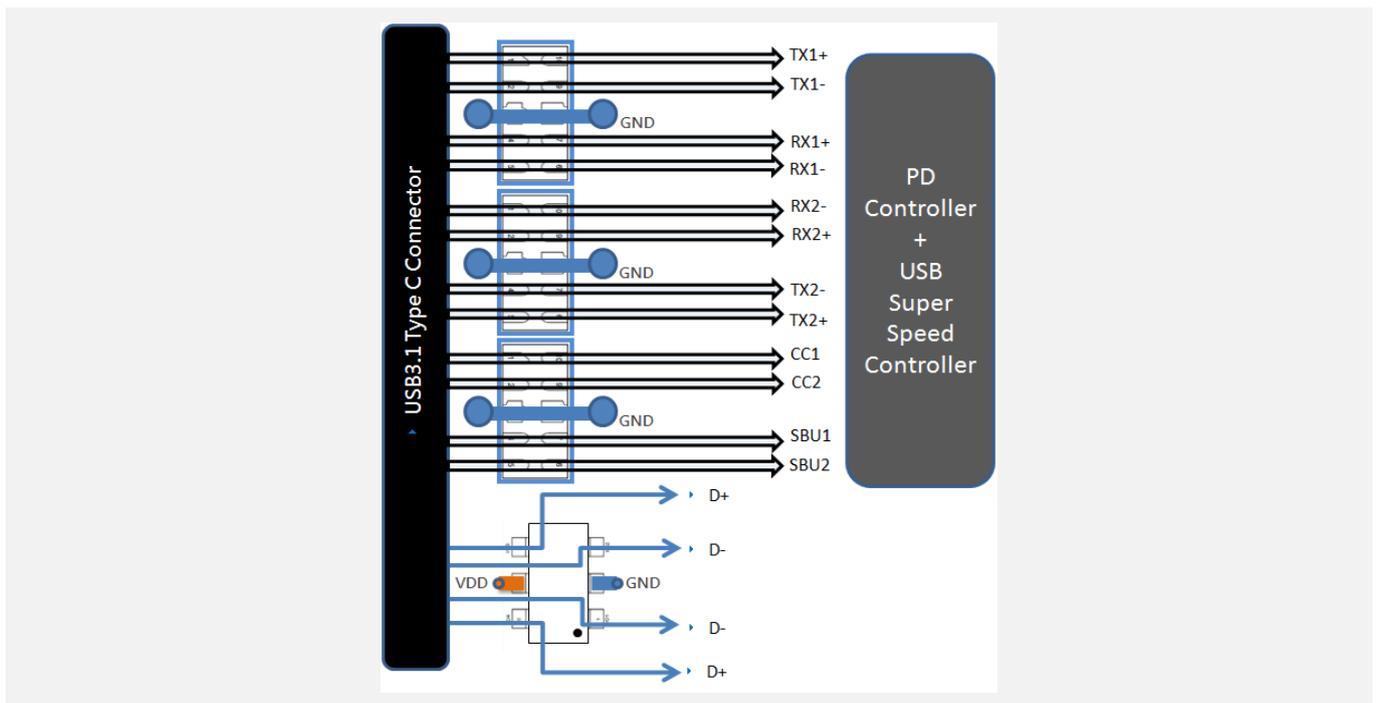
| Package Type | Vacuum Package | | | |
|--------------|----------------|-----------------|---------------------|-------------------|
| DFN2510-10L | Packing | Reel 180mm (7") | Inner Box (3 Reels) | Carton (12 Boxes) |
| | Tape and Reel | 3 000pcs | 9 000pcs | 108 000pcs |

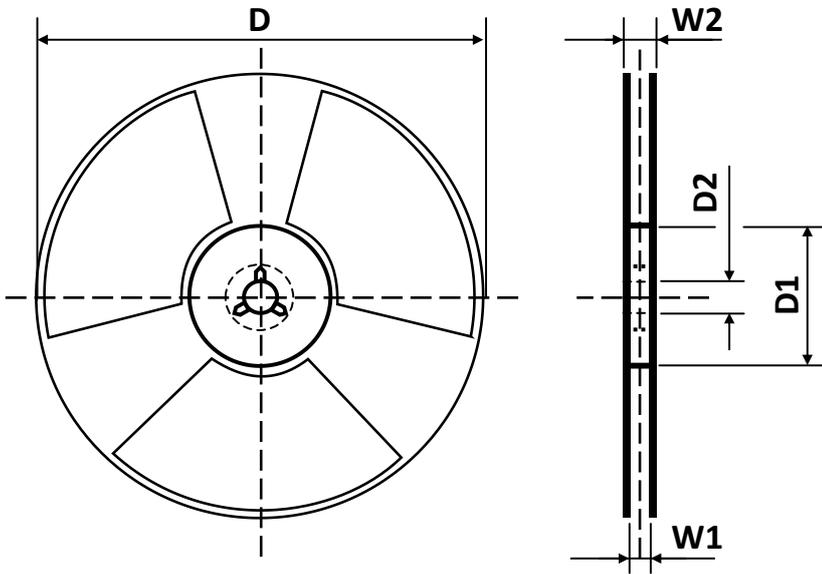
RECOMMENDED PAD LAYOUT FOR DFN2510-10L ▲ All dimensions in mm



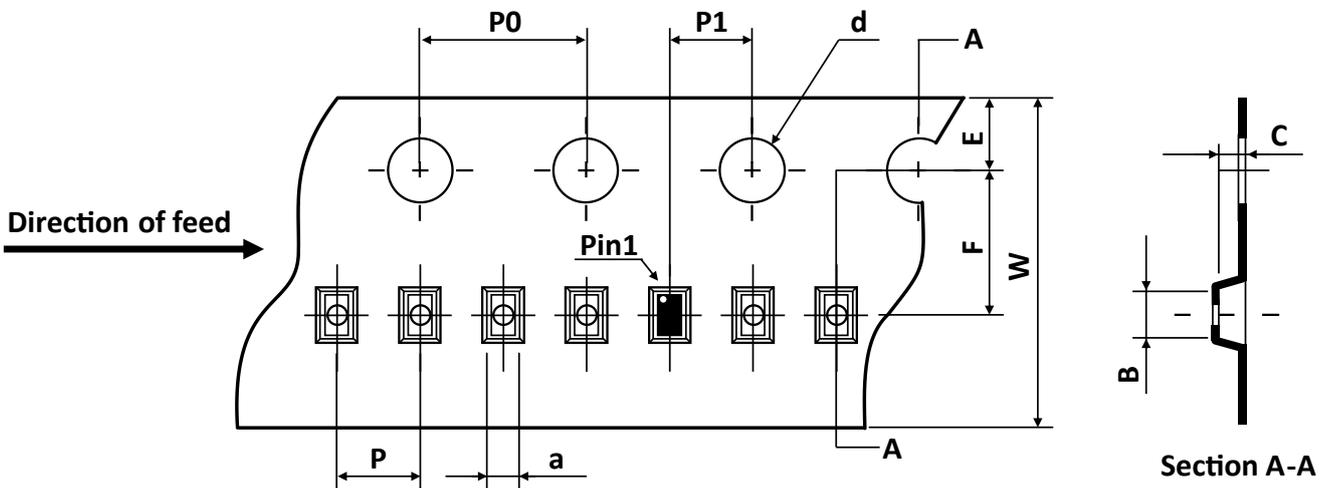
TYPICAL APPLICATION CIRCUIT

Fig. 5 ▪ USB 3.1 Type C Connector Protection



REEL DIMENSIONS ▲ All dimensions in mm


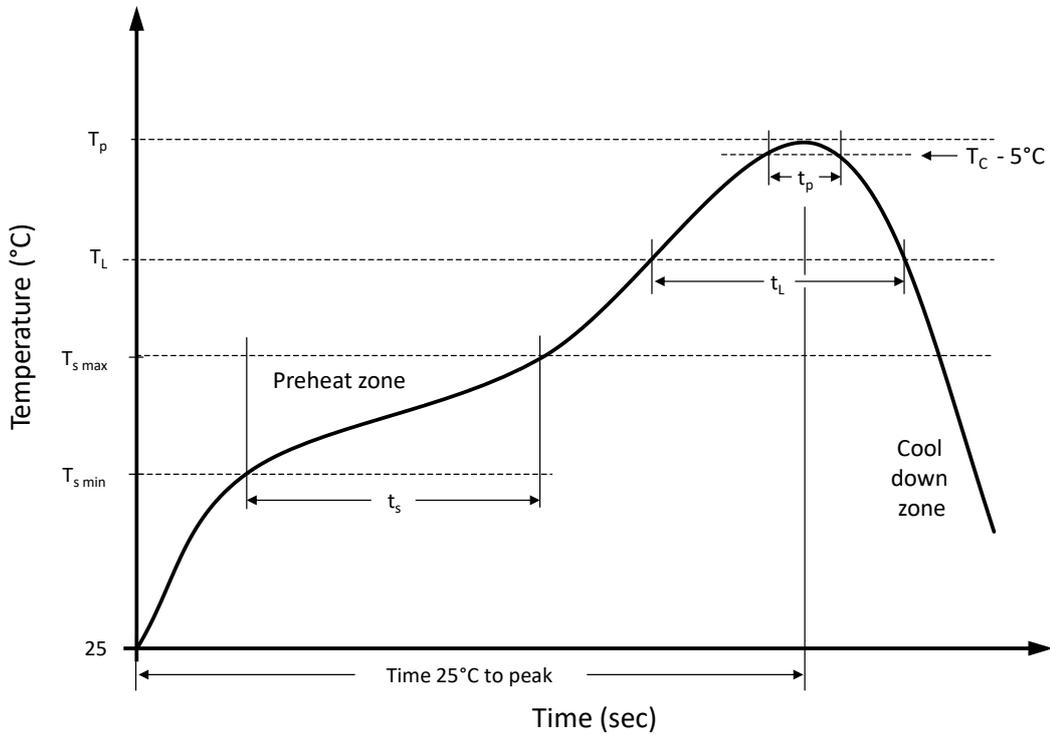
| Tape Size | Reel Size | D | D1 | D2 | W1 | W2 |
|-----------|-----------|---------|-------|-------|------|-------|
| 8mm | 7 inch | ∅178.00 | 54.40 | 13.00 | 9.50 | 12.30 |

TAPE DIMENSIONS ▲ All dimensions in mm


| Package | a | B | C | d | E | F | P0 | P | P1 | W |
|-------------|------|------|------|------|------|------|------|------|------|------|
| DFN2510-10L | 1.15 | 2.65 | 0.70 | 1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |

Note: All dimensions meet EIA-481-D requirements.

RECOMMENDED REFLOW SOLDERING PROFILE



Recommended reflow soldering conditions ▲ Refer to JEDEC J-STD-020E

| Profile Features | | Sn-Pb Eutetic Assembly | Pb-Free Assembly |
|--|--------------|------------------------|------------------|
| Preheat temperature min. | $T_{s\ min}$ | 100 °C | 150 °C |
| Preheat temperature max. | $T_{s\ max}$ | 150 °C | 200 °C |
| Preheat time t_s from $T_{s\ min}$ to $T_{s\ max}$ | t_s | 120 seconds | 120 seconds |
| Ramp-up rate (T_L to T_p) | | max. 3 °C/second | max. 3 °C/second |
| Liquidous temperature | T_L | 183 °C | 217 °C |
| Time t_L maintained above T_L | t_L | 150 seconds max. | 150 seconds max. |
| Peak package body temperature | T_p | 235°C | 260°C |
| Timeframe of within 5°C below and up to max actual peak body temperature | t_p | 20 seconds max. | 30 seconds max. |
| Ramp-down rate (T_L to T_p) | | max. 6 °C/second | max. 6 °C/second |
| Time 25°C to peak temperature | | max. 6 minutes | max. 8 minutes |

REVISION TABLE

| Revision | Date | Status | Notes |
|----------|------------|-----------------|---------------------|
| 001 | 01/10/2021 | Initial release | Initial publication |
| | | | |
| | | | |
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