

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 (8/20 μ s)	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.

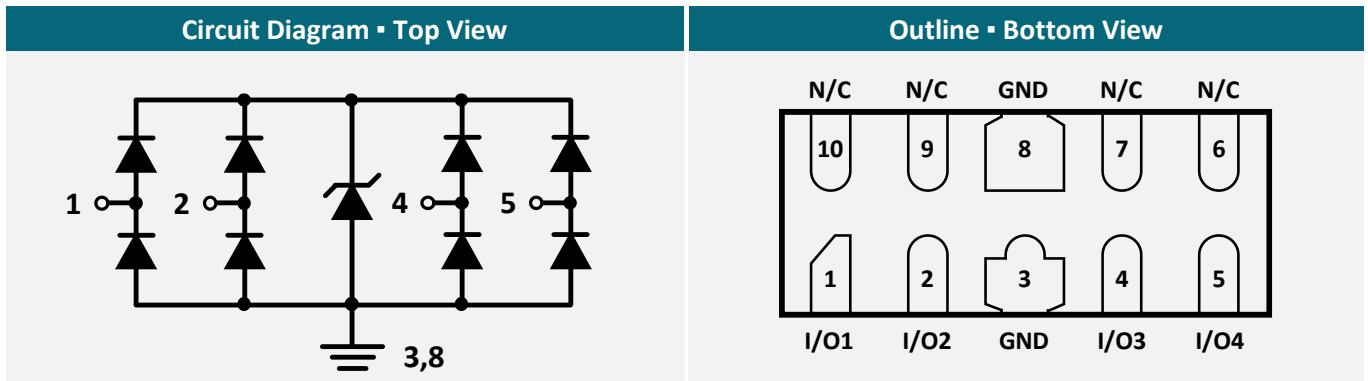
EMC STANDARDS

- ▲ 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 (8/20 μ s)

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)

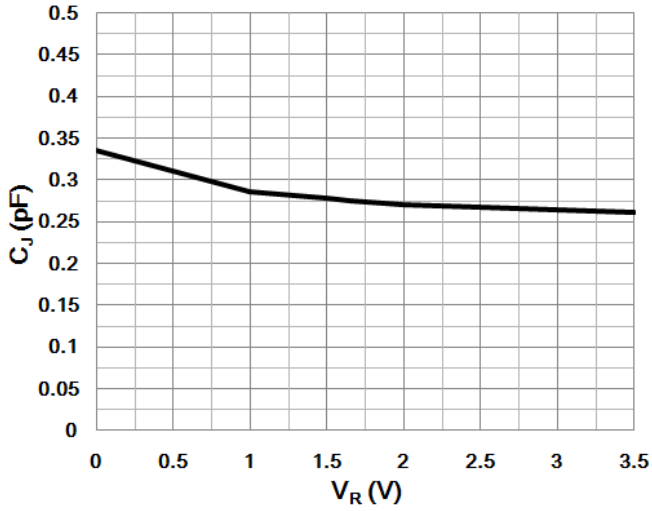


Fig. 2 • TLP Clamping Voltage ($t_{period} = 100ns, t_r = 1ns$)

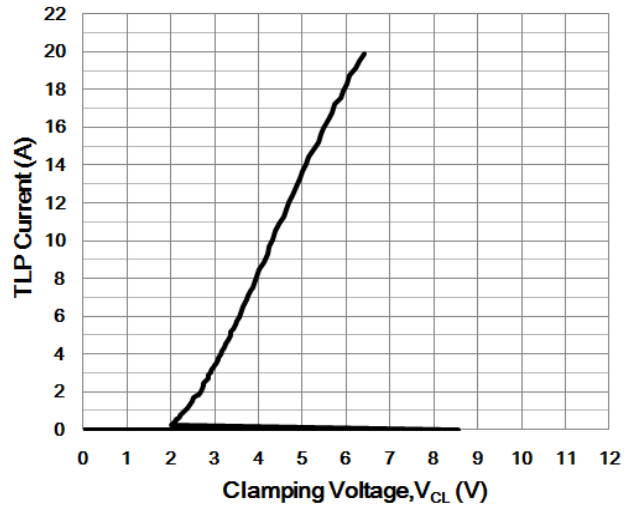


Fig. 3 • Junction Capacitance (I/O Pin to I/O Pin)

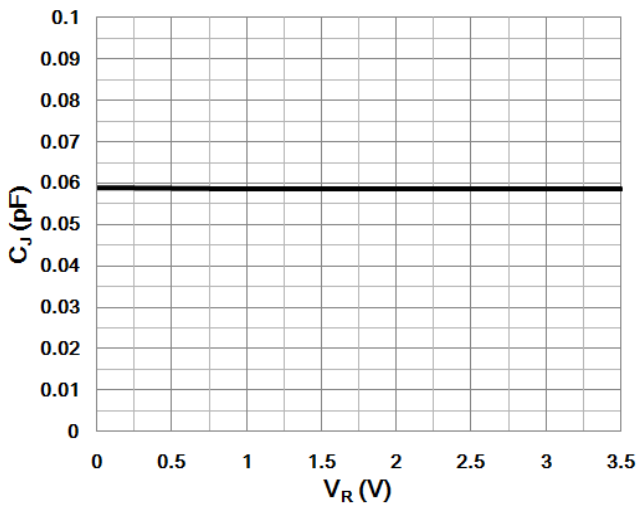
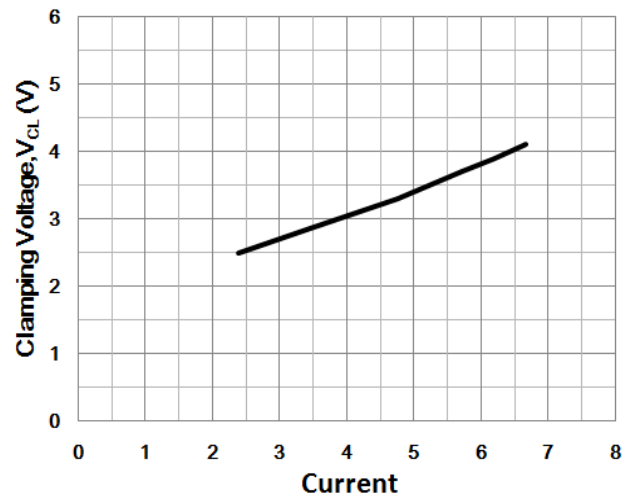
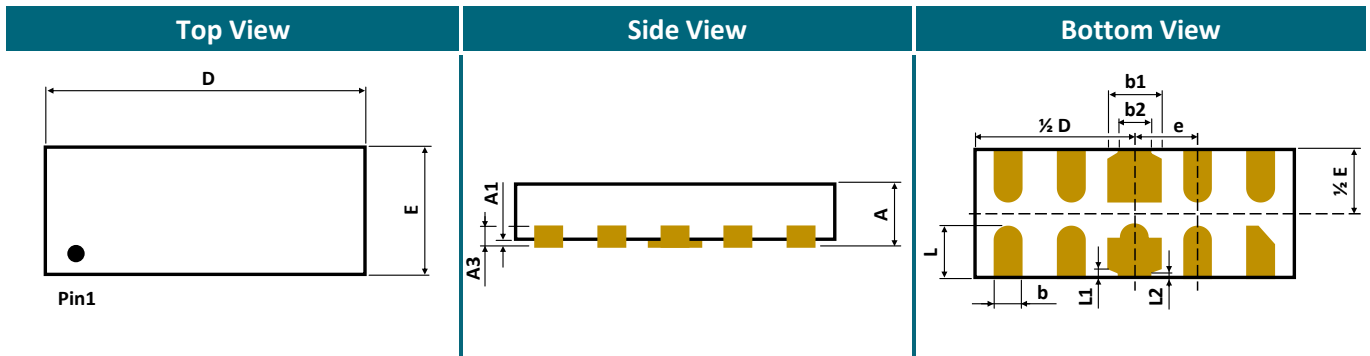


Fig. 4 • Surge Clamping Voltage



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

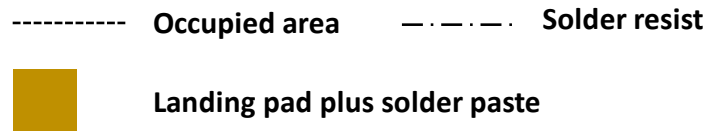
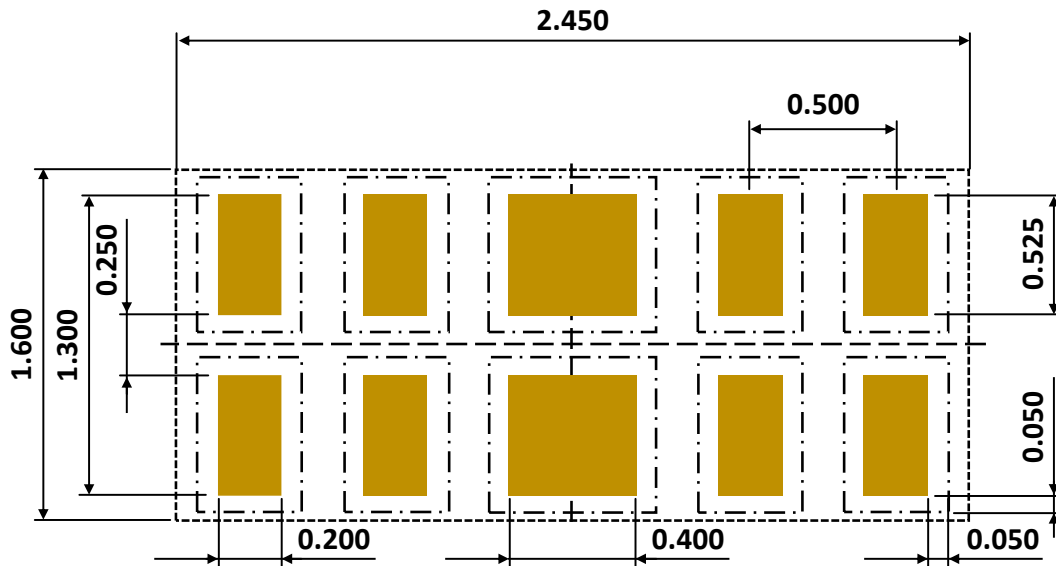
- Package Outline Unit Description:**
BSC: Basic. Represents theoretical exact dimension or dimension target.
MIN: Minimum dimension specified
MAX: Maximum dimension specified
REF: Reference. Represents dimension for reference use only. This value is not a device specification.
TYP: Typical. Provided 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

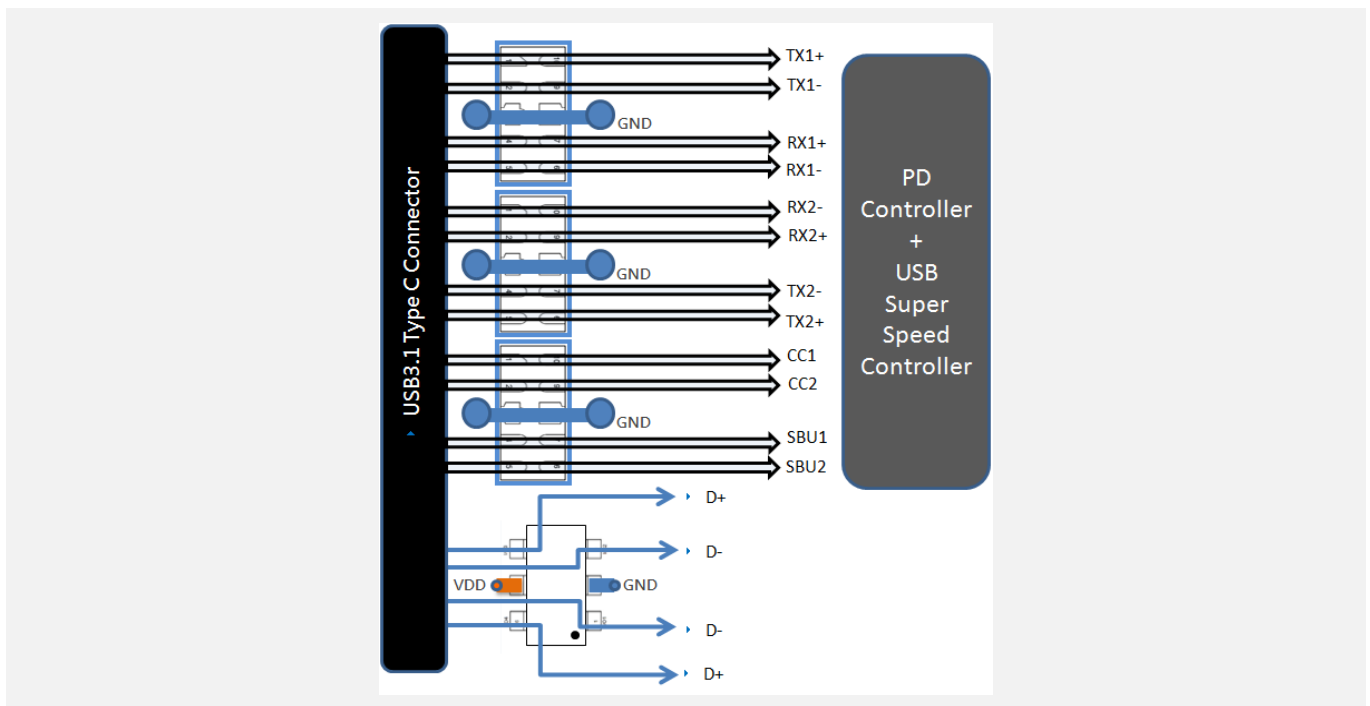
Package Type	Vacuum Package			
DFN2510-10L	Packing	Reel 180mm (7")	Inner Box (3 Reels)	Carton (12 Boxes)
	Tape and Reel	3 000pcs	9 000pcs	108 000pcs

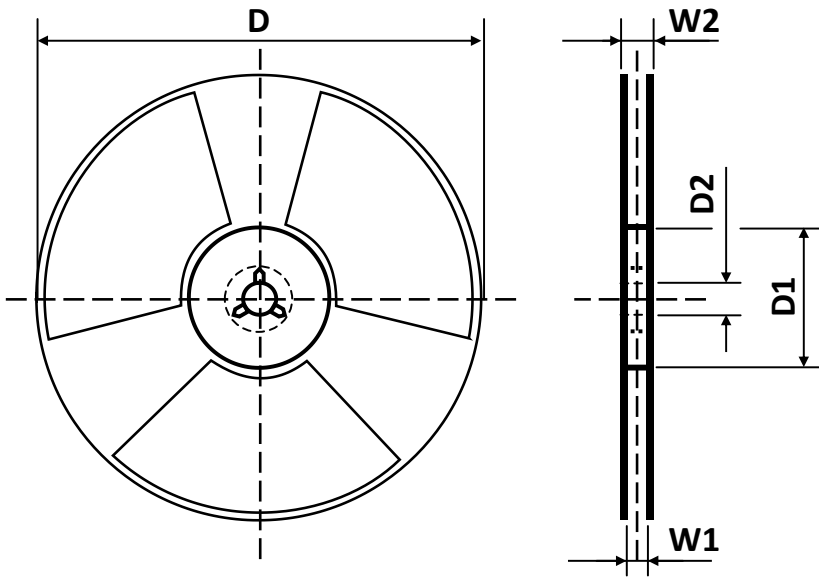
RECOMMENDED PAD LAYOUT FOR DFN2510-10L ▲ All dimensions in mm



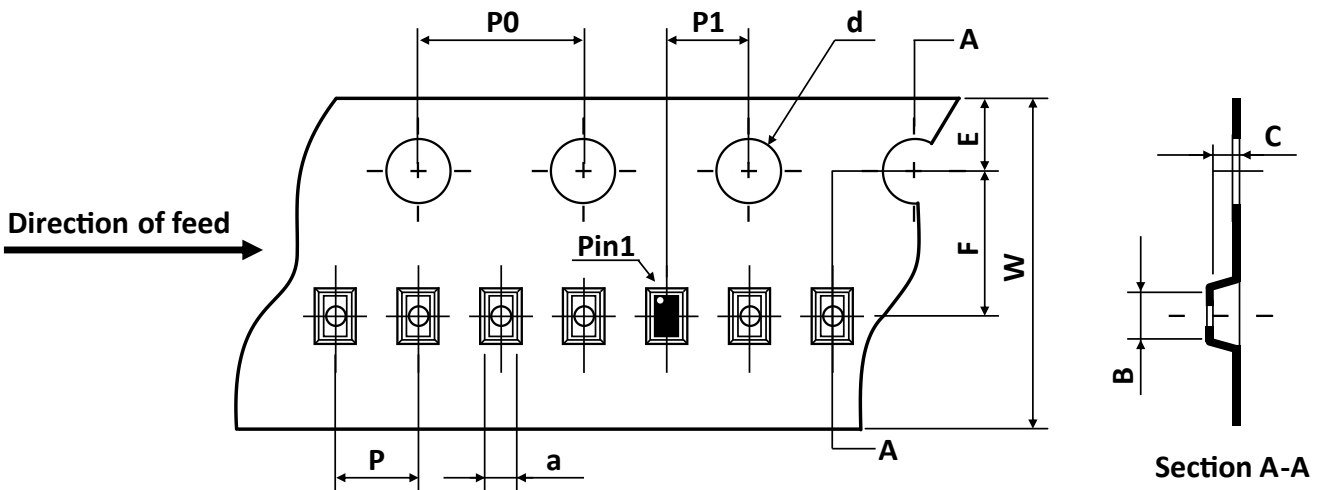
TYPICAL APPLICATION CIRCUIT

Fig. 5 ▪ USB 3.1 Type C Connector Protection



REEL DIMENSIONS ▲ All dimensions in mm


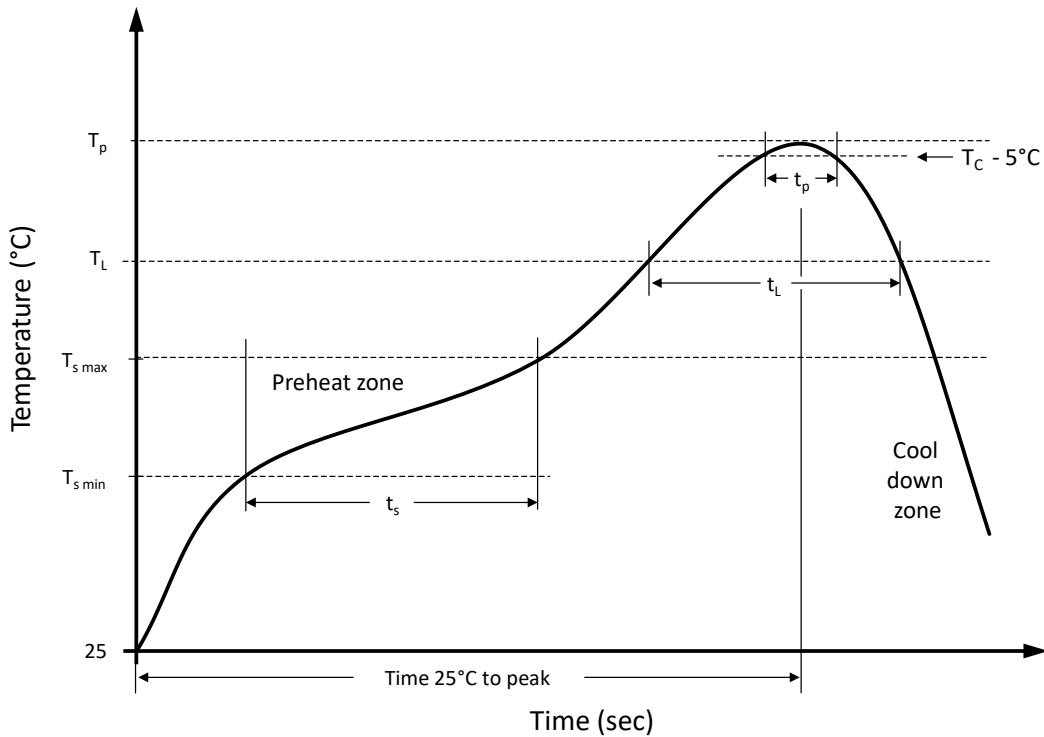
Tape Size	Reel Size	D	D1	D2	W1	W2
8mm	7 inch	∅178.00	54.40	13.00	9.50	12.30

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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