

Normal Capacitance ESD Protector

Description

The PESDNC23T712I is a Transient Voltage Suppressor Arrays that designed to protect components which are connected to data and transmission lines against electrostatic discharge(ESD), electrical fast transients(EFT), and lightning.

All pins are rated to withstand 30kV ESD pulses using the IEC61000-4-2 air discharge method.

Feature

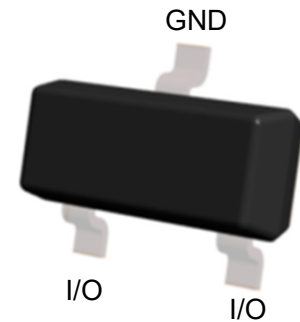
- Peak pulse power ($t_p=8/20\mu s$) :
 - Pin1/Pin2 to Pin3 : 360W
 - Pin3 to Pin1/Pin2 : 350W
- SOT-23 Package
- Protects two Uni-directional lines
- Working voltage:
 - Pin1/Pin2 to Pin3 : 12V
 - Pin3 to Pin1/Pin2 : 7V
- Low leakage current
- Low clamping voltage
- RoHS Compliant
- Transient Protection for High Speed Data Lines to IEC61000-4-2(ESD) $\pm 30kV$ (air), $\pm 30kV$ (Contact)

Applications

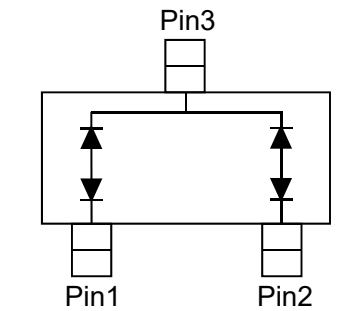
- Cellular handsets and accessories
- Portable electronics
- Control & monitoring systems
- Servers, notebooks, and desktop PCs
- Set-top box
- Communication systems

Mechanical Characteristics

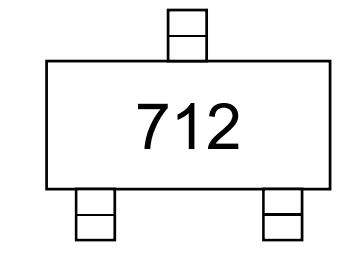
- Lead finish:100% matte Sn(Tin)
- Mounting position: Any
- Device meets MSL 3 requirements
- Qualified max reflow temperature:260°C
- Pure tin plating: 7 ~ 17 μm
- Pin flatness: $\leq 3mil$



SOT-23(Top View)



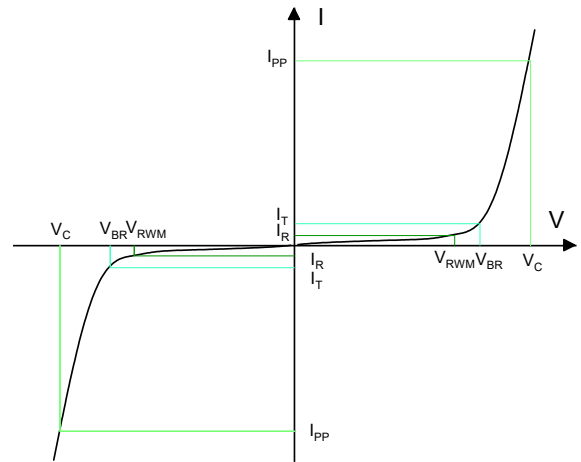
Circuit Diagram



Marking (Top View)

Electronics Parameter

Symbol	Parameter
V_{RWM}	Peak Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
P_{PP}	Peak Pulse Power
C_J	Junction Capacitance
I_F	Forward Current
V_F	Forward Voltage @ I_F



Electrical characteristics per line@25°C (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Peak Reverse Working Voltage	V_{RWM}	pin1/pin2 to pin3	-	-	12	V
		pin3 to pin1/pin2	-	-	7.0	
Breakdown Voltage	V_{BR}	$I_R = 1\text{mA}$, pin1/pin2 to pin3	13.5	-	19	V
		$I_R = 1\text{mA}$, pin3 to pin1/pin2	7.5	-	12.5	
Reverse Leakage Current	I_R	$V_{RWM} = 12\text{V}$, pin1/pin2 to pin3	-	-	1.0	μA
		$V_{RWM} = 7\text{V}$, pin3 to pin1/pin2	-	-	1.0	
ESD Clamping Voltage ⁽¹⁾	V_C	TLP, 16A, $t_p = 100\text{ns}$, pin1/pin2 to pin3	-	21	-	V
		TLP, 16A, $t_p = 100\text{ns}$, pin3 to pin1/pin2	-	15	-	
Dynamic Resistance ⁽¹⁾	R_{DYN}	TLP, 16A, $t_p = 100\text{ns}$, pin1/pin2 to pin3	-	0.19	-	Ω
		TLP, 16A, $t_p = 100\text{ns}$, pin3 to pin1/pin2	-	0.2	-	
Reverse Clamping Voltage ⁽²⁾	V_C	$I_{PP} = 15\text{A}$, 8/20 μs , pin1/pin2 to pin3	-	24	27	V
		$I_{PP} = 20\text{A}$, 8/20 μs , pin3 to pin1/pin2	-	17	20	
Junction Capacitance	C_J	$V_R = 0\text{V}$, $f = 1\text{MHz}$	-	48	60	pF

Notes:

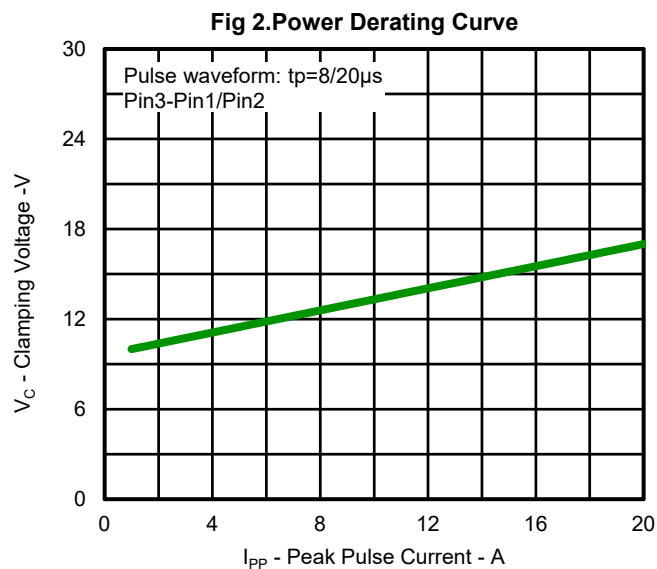
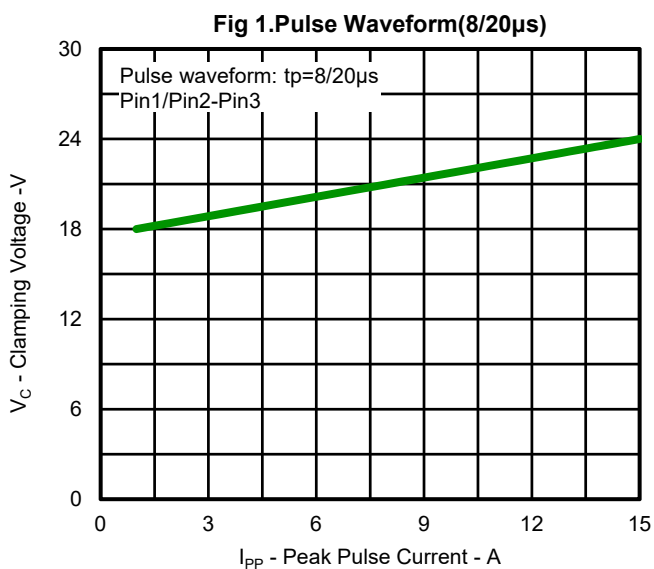
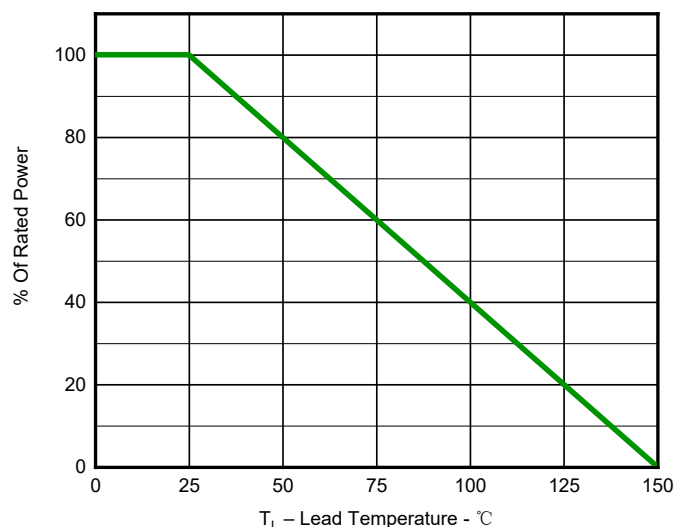
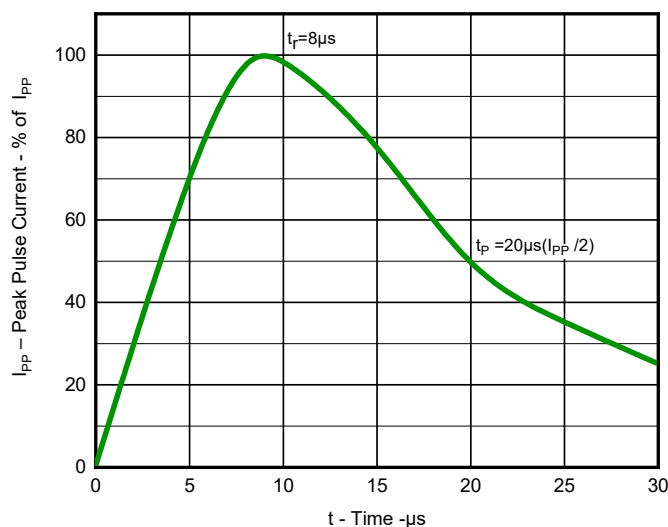
1. TLP parameter: $Z_0=50\Omega$, $t_p=100\text{ns}$, $t_r=2\text{ns}$, averaging window from 70ns to 90ns. R_{DYN} is calculated from 4A to 16A.

2. Non-repetitive current pulse, according to IEC61000-4-5.

Electronics Parameter

Rating	Symbol	Value	Units
Peak Pulse Power ($t_p = 8/20\mu s$)	P_{PP} , pin1/pin 2 to pin3	360	W
	P_{PP} , pin3 to pin 1/pin2	350	
Peak Pulse Current ($t_p = 8/20\mu s$)	I_{PP} , pin1/pin 2 to pin3	15	A
	I_{PP} , pin3 to pin 1/pin2	20	
Lead Soldering Temperature	T_L	260 (10 sec)	°C
Junction and Storage Temperature Range	T_J, T_{STG}	-55~+150	°C
ESD Protection-Contact Discharge	V_{ESD}	± 30	kV
ESD Protection-Air Discharge	V_{ESD}	± 30	kV

Typical Characteristics



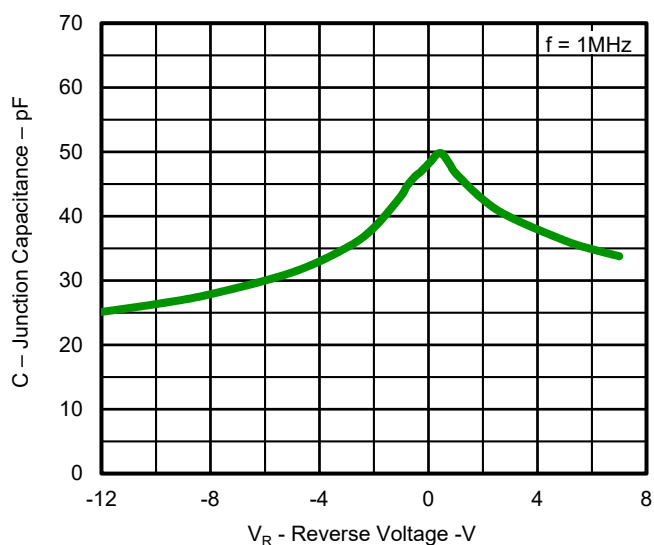


Fig.5 Capacitance vs. Reverse Voltage

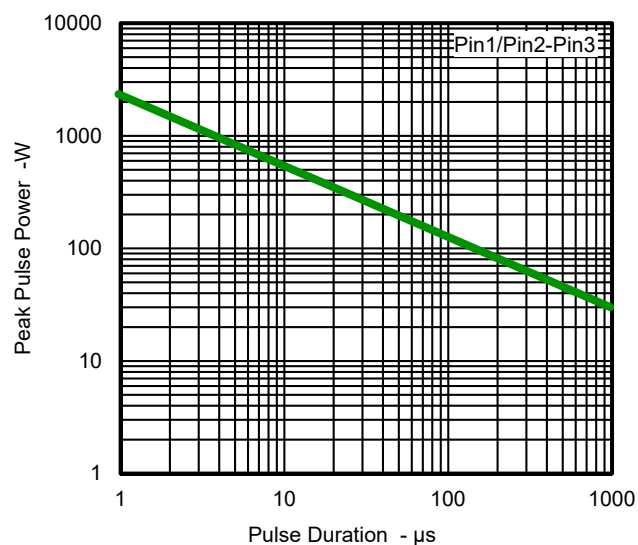


Fig.6 Non-Repetitive Peak Pulse Power vs. Pulse Time

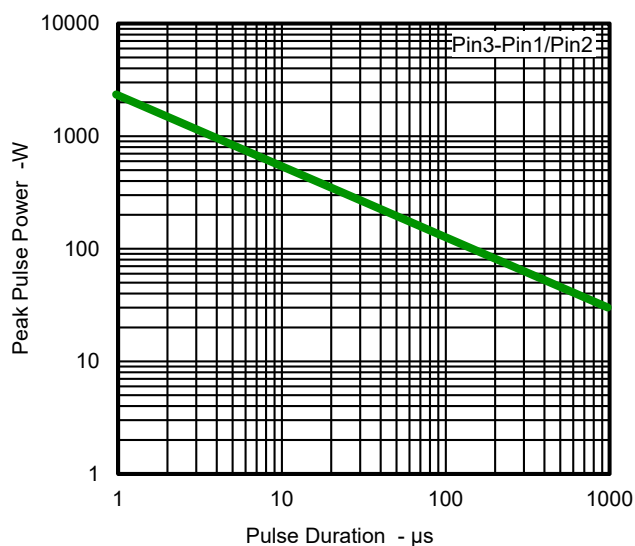


Fig.7 Non-Repetitive Peak Pulse Power vs. Pulse Time

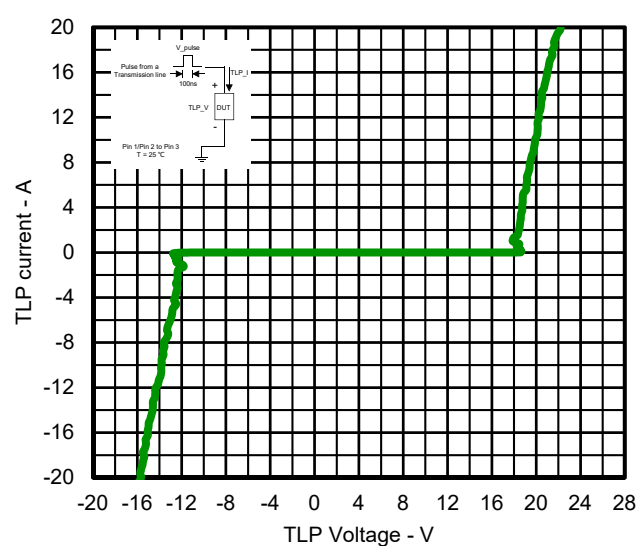
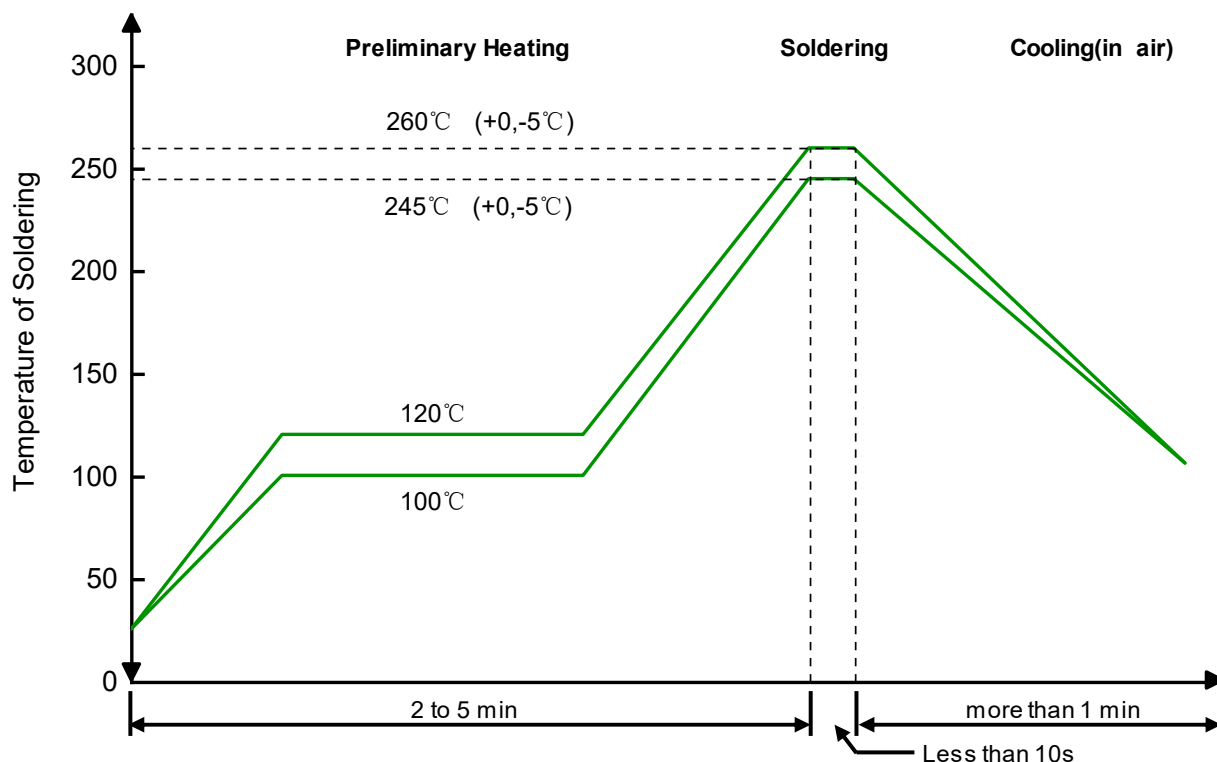


Fig.8 TLP Measurement

Solder Reflow Recommendation



Remark: Pb free for 260°C; Pb for 245°C.

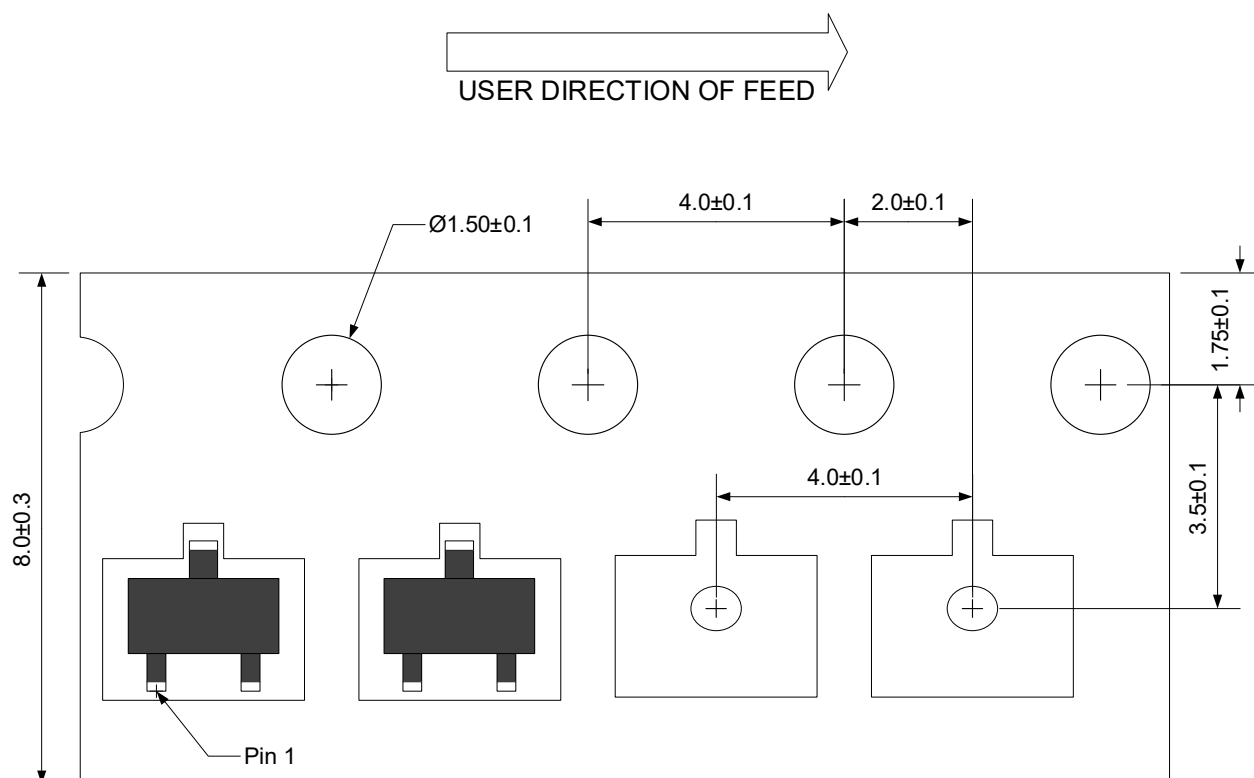
PCB Design

For TVS diodes a low-ohmic and low-inductive path to chassis earth is absolutely mandatory in order to achieve good ESD protection. Novices in the area of ESD protection should take following suggestions to heart:

- Do not use stubs, but place the cathode of the TVS diode directly on the signal trace.
- Do not make false economies and save copper for the ground connection.
- Place via holes to ground as close as possible to the anode of the TVS diode.
- Use as many via holes as possible for the ground connection.
- Keep the length of via holes in mind! The longer the more inductance they will have.

Ordering information

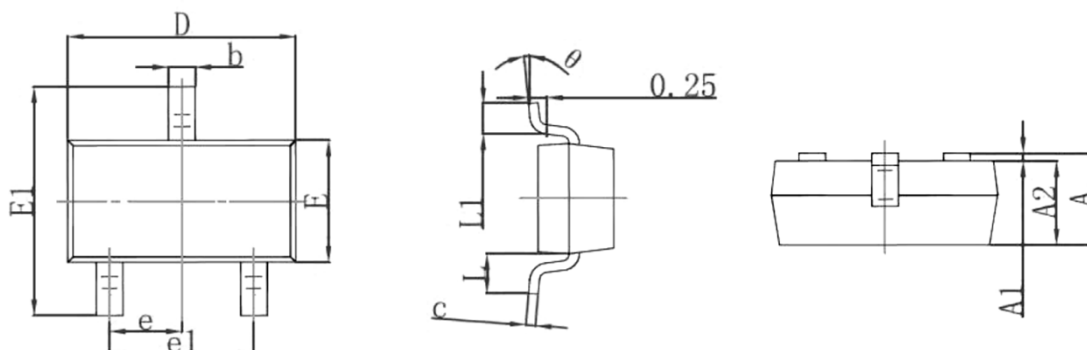
Package	Reel	Shipping
SOT-23	7"	3000 / Tape & Reel



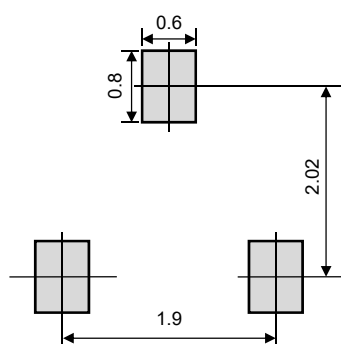
Unit:mm

Unit:mm

Product Dimension (SOT-23)



Dim	Millimeters		Inches	
	Min	Max	Min	Max
A	0.90	1.15	0.035	0.045
A1	0.00	0.10	0.000	0.004
A2	0.90	1.05	0.035	0.041
b	0.30	0.50	0.012	0.020
c	0.08	0.25	0.003	0.010
D	2.80	3.00	0.110	0.118
E	1.20	1.40	0.047	0.055
E1	2.25	2.55	0.089	0.100
e	0.95 Typ.		0.037 Typ.	
e1	1.80	2.00	0.071	0.079
L	0.550 Ref.		0.022 Ref.	
L1	0.30	0.50	0.012	0.020
θ	0°	8°	0°	8°



Unit: mm

Suggested PCB Layout

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