TClamp2512N & TClamp3312N

Low Capacitance TransClamp® Surge Protection for Ethernet Interfaces

PROTECTION PRODUCTS

Description

TClamp®2512N and TClamp3312N are specifically designed to provide secondary surge and ESD protection for Ethernet and telecom interfaces. They integrate low capacitance, surge-rated steering diodes with a high power transient voltage suppressor (TVS) to provide up to 120A (tp=8/20us) of lightning surge protection. Capacitance is limited to 8pF maximum from line-to-line to ensure correct signal transmission on high-speed lines.

TClamp2512N and TClamp3312N are in a 10-pin SLP2626P10 package measuring 2.6 x 2.6 x 0.60mm. Leads are spaced at a pitch of 0.5mm and are finished with lead-free NiPdAu. They may be used to meet Telcordia GR-1089-CORE short-haul (intra-building) surge requirements and are particularly well suited for applications where board space is at a premium such as integrated connectors/magnetics and carrier class Ethernet equipment.

Features

- Transient Protection to
  - Bellcore 1089 (Intra-Building) 120A (8/20µs)
  - IEC 61000-4-2 (ESD) 30kV (Air), 30kV (Contact)
  - IEC 61000-4-4 (EFT) 4kV (5/50ns)
  - IEC 61000-4-5 (Lightning) 120A (8/20µs)
- Small SLP package saves board space
- Working Voltage Options: 2.5V and 3.3V
- Low Capacitance: 8pF Maximum (Line-to-Line)
- Low Dynamic Resistance
- Solid-State Silicon-Avalanche Technology

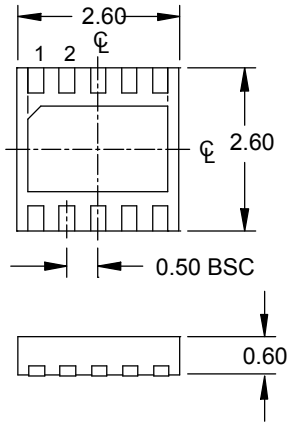
Mechanical Characteristics

- SLP2626P10 Package
- Nominal Dimensions: 2.6 x 2.6 x 0.60mm
- Pb-Free, Halogen Free, RoHS/WEEE Compliant
- Lead Finish: matte NiPdAu
- Molding Compound Flammability Rating: UL 94V-0
- Marking : Marking Code + Date Code
- Packaging : Tape and Reel

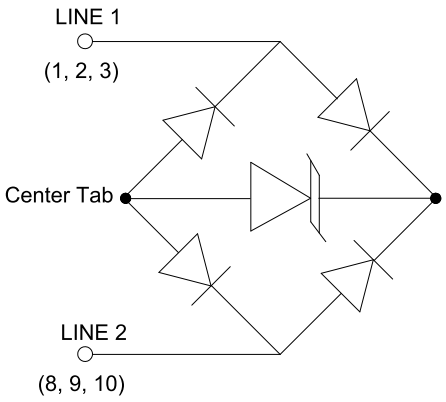
Applications

- 10/100/1000 Ethernet
- Integrated magnetics
- Access Equipment
- Central Office Equipment
- Customer Premise Equipment

Nominal Dimensions (mm)



Schematic and Pin Configuration



Absolute Maximum Ratings

Rating	Symbol	Value	Units
Peak Pulse Power (tp = 8/20µs)	P_{PK}	2300	W
Peak Pulse Current (tp = 8/20µs)	I_{PP}	120	A
ESD per IEC 61000-4-2 (Contact)(1), (3)	V_{ESD}	±30	kV
Operating Temperature	T_J	-40 to +85	°C
Storage Temperature	T_{STG}	-55 to +150	°C

Electrical Characteristics (T=25°C unless otherwise specified)

TClamp2512N							
Parameter	**Symbol**	**Conditions**		**Min.**	**Typ.**	**Max.**	**Units**
Reverse Stand-Off Voltage	V_{RWM}	-40°C to 85°C				2.5	V
Punch-Through Voltage	V_{PT}	I_{PT} = 2µA Line 1 or Line 2 to Center Tab		2.7		4.5	V
Reverse Leakage Current	I_R	V_{RWM} = 2.5V	T = 25°C		0.01	0.100	µA
			T = 85°C		0.02	0.250	µA
Clamping Voltage(2)	V_C	I_{PP} = 100A, tp = 8/20µs Line 1 to Line 2			14.5	18	V
Dynamic Resistance(3), (4)	V_{BO}	tp = 0.2/100ns (TLP) Line 1 to Line 2				0.12	Ohms
Junction Capacitance	C_J	V_R = 0V, f = 1MHz Line 1 to Line 2			5	8	pF
		V_R = 0V, f = 1MHz Line 1 or Line 2 to Center Tab			10	15	pF

Notes:
(1): ESD Gun return path to Ground Reference Plane (GRP)
(2): Measured using an 8/20us constant current source waveform.
(3): Transmission Line Pulse Test (TLP) Settings: tp = 100ns, tr = 0.2ns, I_{TLP} and V_{TLP} averaging window: t_1 = 70ns to t_2 = 90ns.
(4): Dynamic resistance calculated from I_{TLP} = 4A to I_{TLP} = 16A

Absolute Maximum Ratings

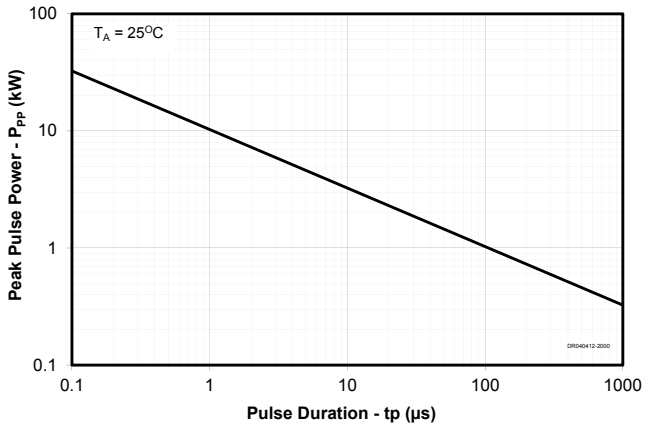
Electrical Characteristics (T=25°C unless otherwise specified)

TClamp3312N							
Parameter	**Symbol**	**Conditions**		**Min.**	**Typ.**	**Max.**	**Units**
Reverse Stand-Off Voltage	V_{RWM}	-40°C to 85°C				3.3	V
Punch-Through Voltage	V_{PT}	I_{PT} = 2µA Line 1 or Line 2 to Center Tab		3.5		5.5	V
Reverse Leakage Current	I_R	V_{RWM} = 3.3V	T = 25°C		0.01	0.100	µA
			T = 85°C		0.02	0.250	µA
Clamping Voltage(2)	V_C	I_{PP} = 100A, tp = 8/20µs Line 1 to Line 2			15	20	V
Dynamic Resistance(3), (4)	V_{BO}	tp = 0.2/100ns (TLP) Line 1 to Line 2				0.12	Ohms
Junction Capacitance	C_J	V_R = 0V, f = 1MHz Line 1 to Line 2			5	8	pF
		V_R = 0V, f = 1MHz Line 1 or Line 2 to Center Tab			10	15	pF

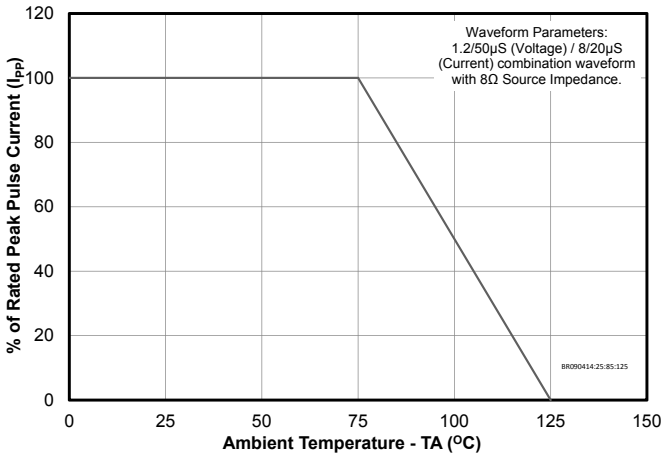
Notes:
(1): ESD Gun return path to Ground Reference Plane (GRP)
(2): Measured using an 8/20us constant current source waveform.
(3): Transmission Line Pulse Test (TLP) Settings: tp = 100ns, tr = 0.2ns, I_{TLP} and V_{TLP} averaging window: t_1 = 70ns to t_2 = 90ns.
(4): Dynamic resistance calculated from I_{TLP} = 4A to I_{TLP} = 16A

Typical Characteristics

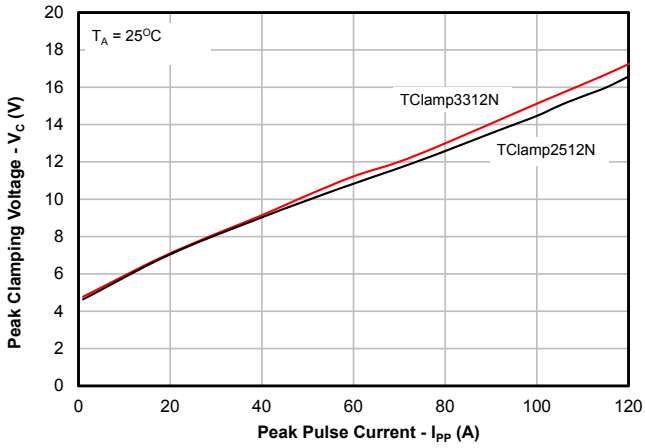
Non-Repetitive Peak Pulse Power vs. Pulse Time



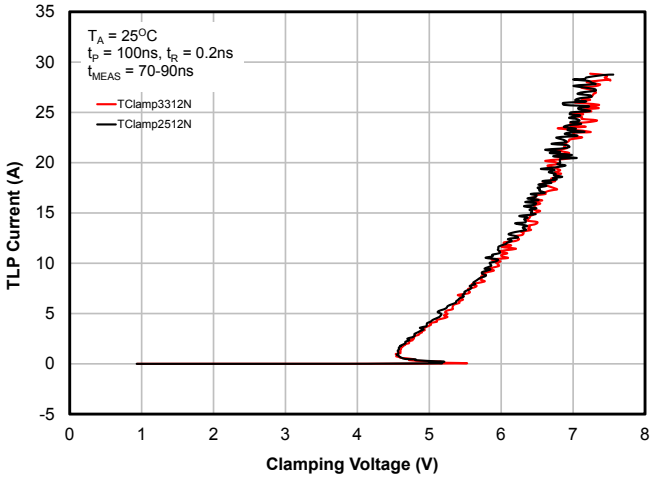
Power Derating Curve



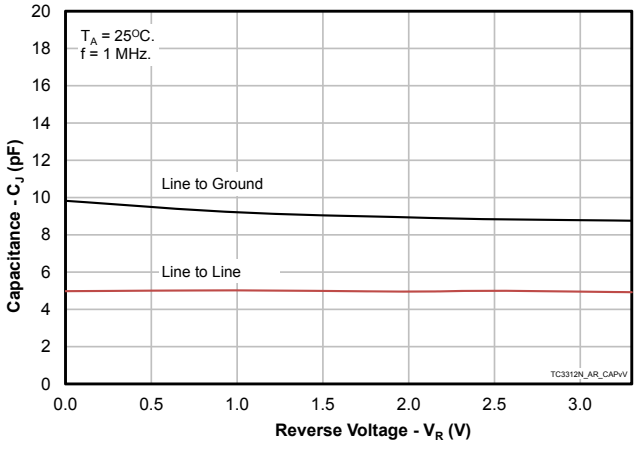
Clamping Voltage vs. Peak Pulse Current



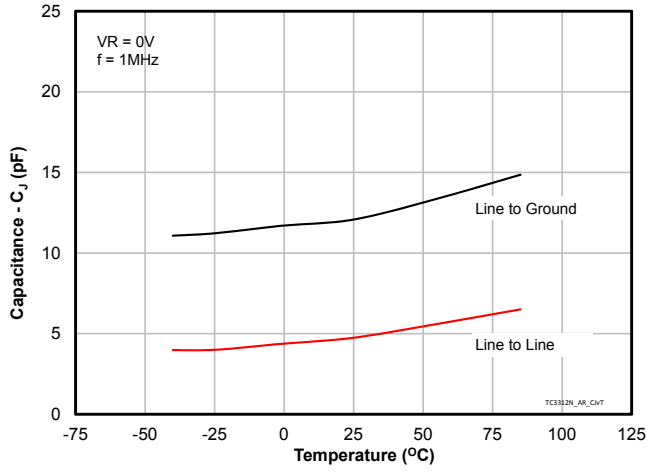
TLP Characteristic



Capacitance vs. Reverse Voltage

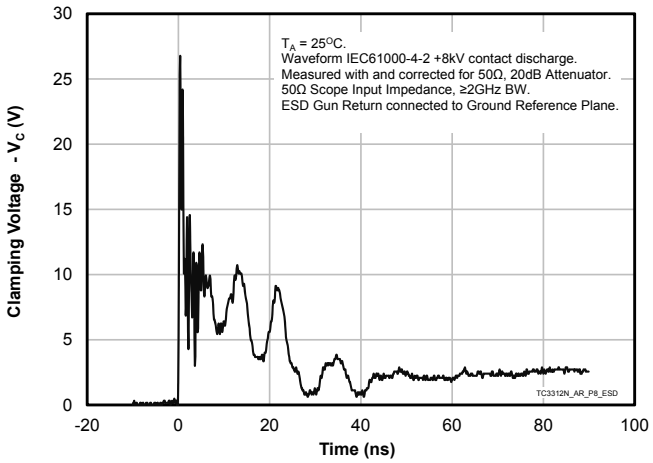


Capacitance vs. Temperature

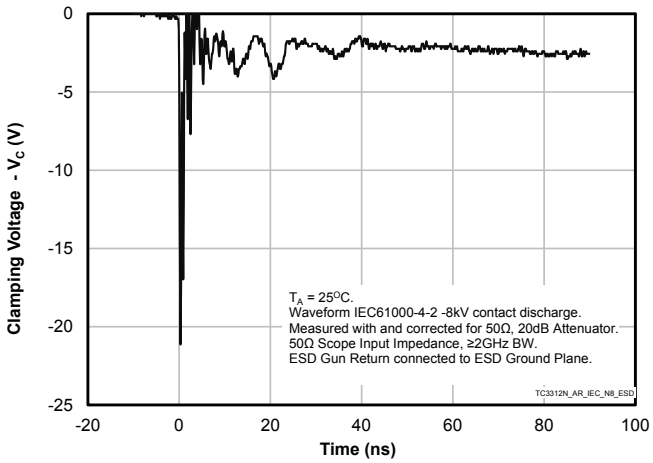


Typical Characteristics

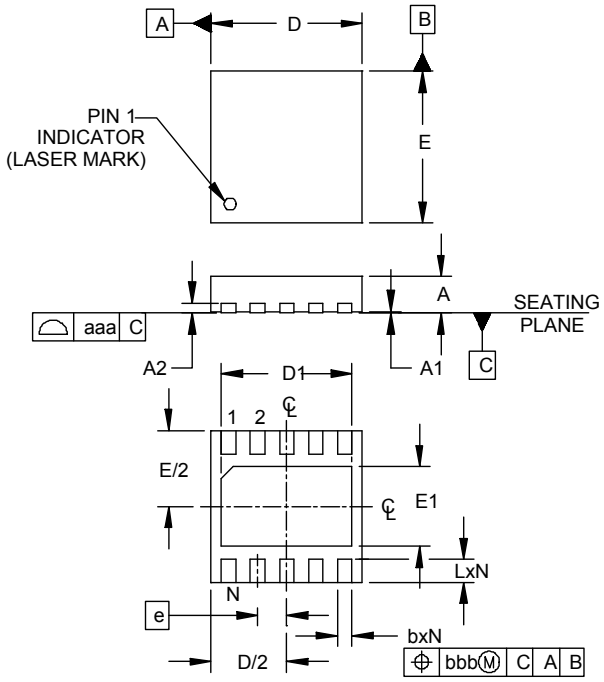
ESD Clamping (+8kV Contact per IEC 61000-4-2)



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



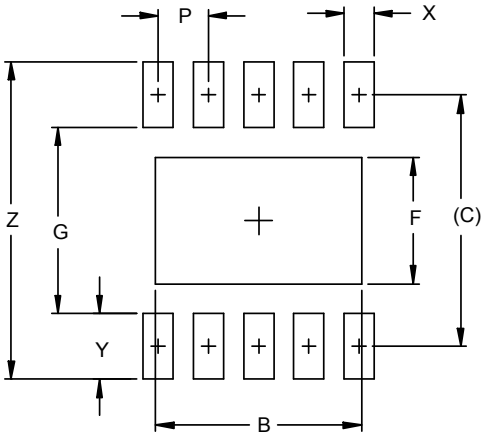
Outline Drawing - SLP2626P10



DIMENSIONS						
DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.020	.024	.026	0.50	0.60	0.65
A1	.000	.001	.002	0.00	0.03	0.05
A2		(.007)			(0.17)	
b	.007	.010	.012	0.20	0.25	0.30
D	.098	.102	.106	2.50	2.60	2.70
D1	.079	.085	.089	2.00	2.15	2.25
E	.098	.102	.106	2.50	2.60	2.70
E1	.044	.050	.054	1.11	1.26	1.36
e	.020 BSC			0.50 BSC		
L	.011	.014	.016	0.30	0.35	0.40
N	10			10		
aaa	.003			0.08		
bbb	.004			0.10		

NOTES:
1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

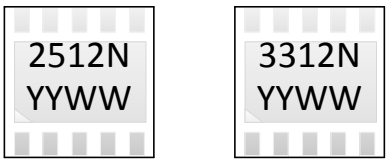
Land Pattern - SLP2626P10



DIMENSIONS		
DIM	INCHES	MILLIMETERS
B	.081	2.05
C	.100	2.50
F	.050	1.26
G	.073	1.85
P	.020	0.50
X	.012	0.30
Y	.025	0.65
Z	.124	3.15

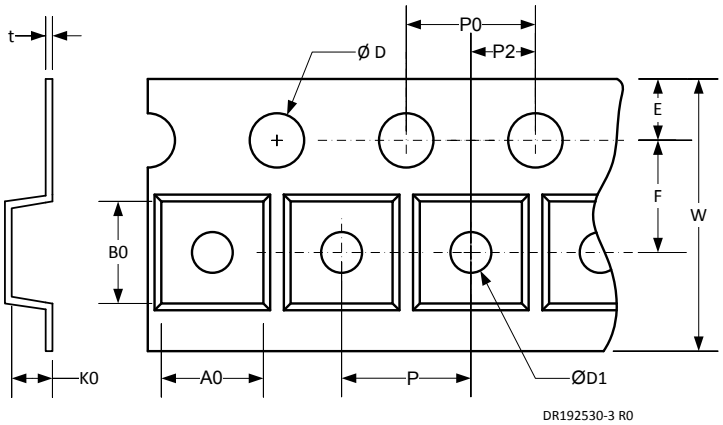
NOTES:
1. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY. CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR COMPANY'S MANUFACTURING GUIDELINES ARE MET.

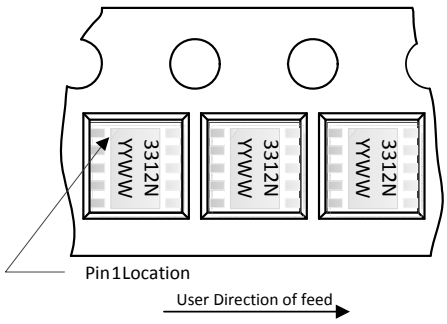
Marking Example



Notes:
YW = Alphanumeric character Date Code

Tape and Reel Specification





Tape Width	D	D1	E	F	K (Max)	P	P0	P2	T (Max)	W
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
8	1.55 ±0.05	1.0 ±0.25	1.75 ±0.10	3.50 ±0.05	2.40	4.0 ±0.10	4.0 ±0.10	2.00 ±0.05	0.40	8.0 +0.3 −0.1

Ordering Information

Part Number	Working Voltage	Qty per 7 Inch Reel
TClamp2512N.TCT	2.5V	3000
TClamp3312N.TCT	3.3V	3000