

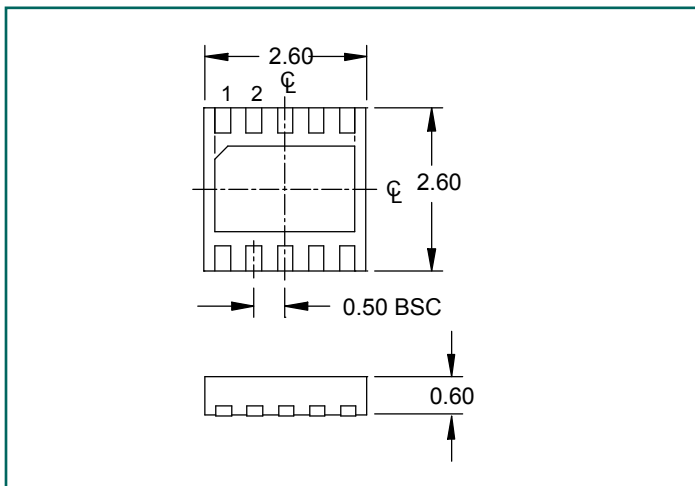
PROTECTION PRODUCTS

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.

Nominal Dimensions (mm)



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

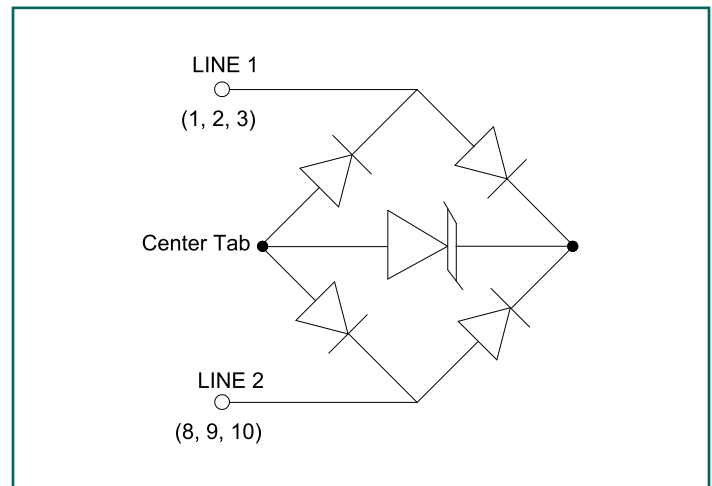
Mechanical Characteristics

- 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

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: t₁ = 70ns to t₂ = 90ns.
- (4): Dynamic resistance calculated from I_{TLP} = 4A to I_{TLP} = 16A

Absolute Maximum Ratings

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

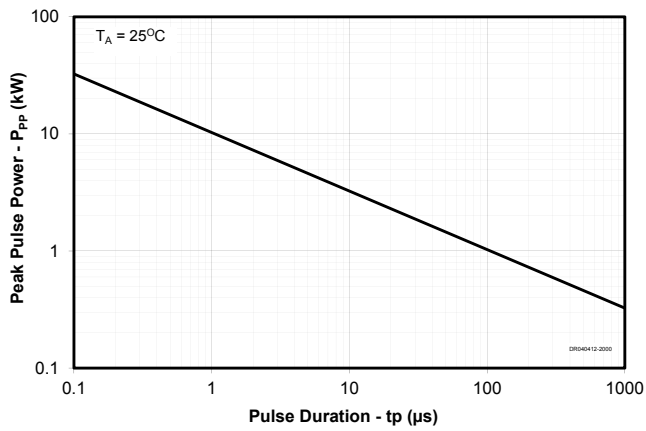
TClamp3312N							
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units	
Reverse Stand-Off Voltage	V_{RWM}	-40°C to 85°C			3.3	V	
Punch-Through Voltage	V_{PT}	$I_{PT} = 2\mu A$ Line 1 or Line 2 to Center Tab	3.5		5.5	V	
Reverse Leakage Current	I_R	$V_{RWM} = 3.3V$	T = 25°C		0.01	0.100	μA
			T = 85°C		0.02	0.250	μA
Clamping Voltage ⁽²⁾	V_C	$I_{PP} = 100A$, $t_p = 8/20\mu s$ Line 1 to Line 2		15	20	V	
Dynamic Resistance ^{(3), (4)}	V_{BO}	$t_p = 0.2/100ns$ (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:

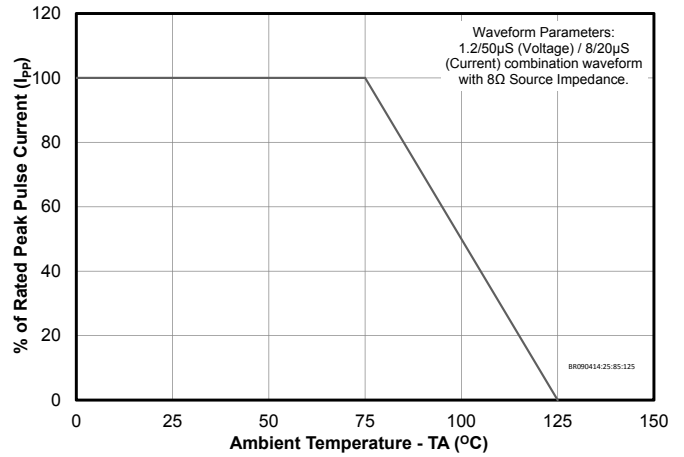
- (1): ESD Gun return path to Ground Reference Plane (GRP)
- (2): Measured using an 8/20us constant current source waveform.
- (3): Transmission Line Pulse Test (TLP) Settings: $t_p = 100ns$, $t_r = 0.2ns$, I_{TLP} and V_{TLP} averaging window: $t_1 = 70ns$ to $t_2 = 90ns$.
- (4): Dynamic resistance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

Typical Characteristics

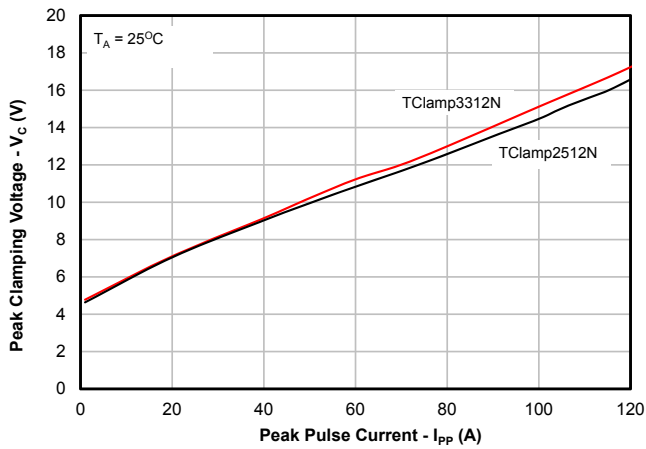
Non-Repetitive Peak Pulse Power vs. Pulse Time



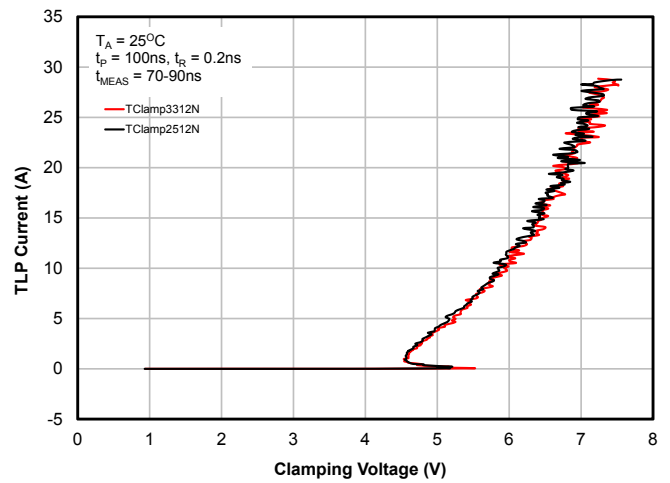
Power Derating Curve



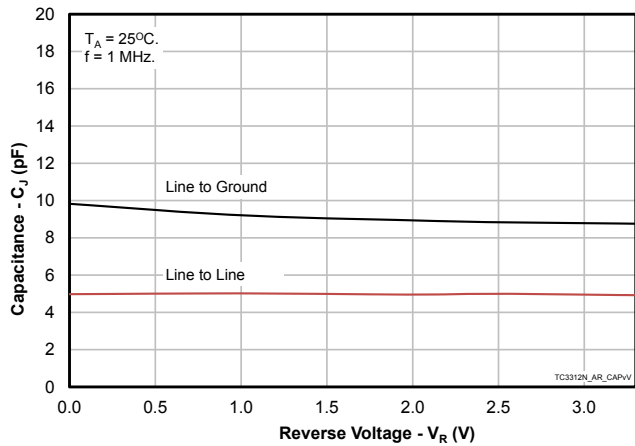
Clamping Voltage vs. Peak Pulse Current



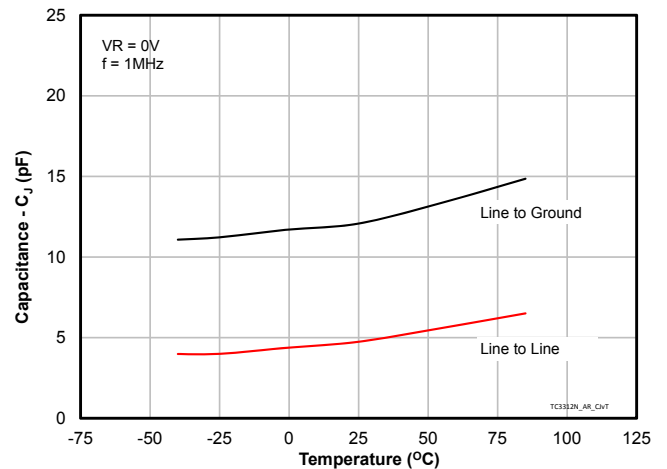
TLP Characteristic



Capacitance vs. Reverse Voltage

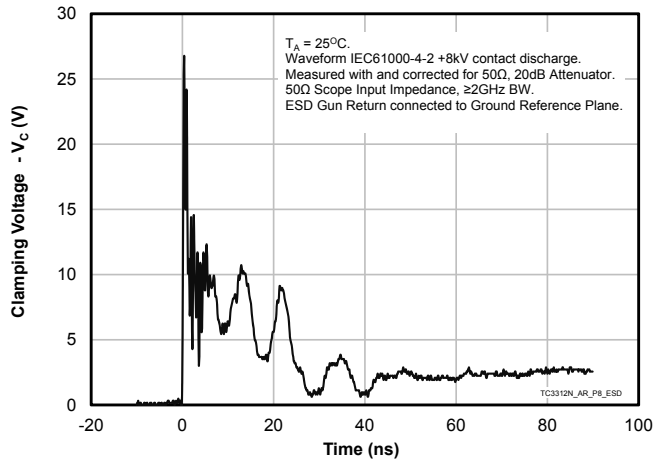


Capacitance vs. Temperature

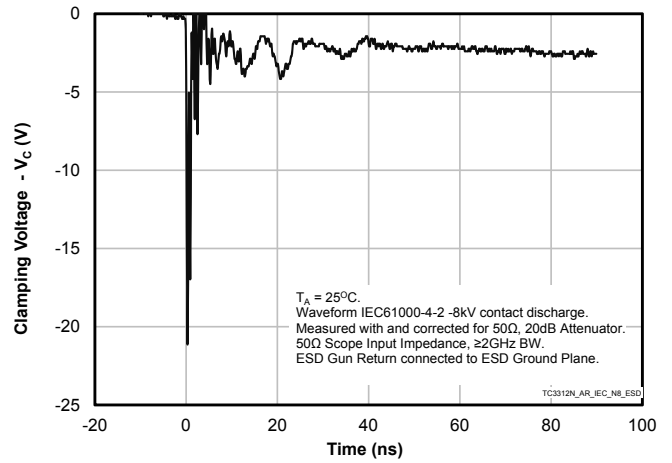


Typical Characteristics

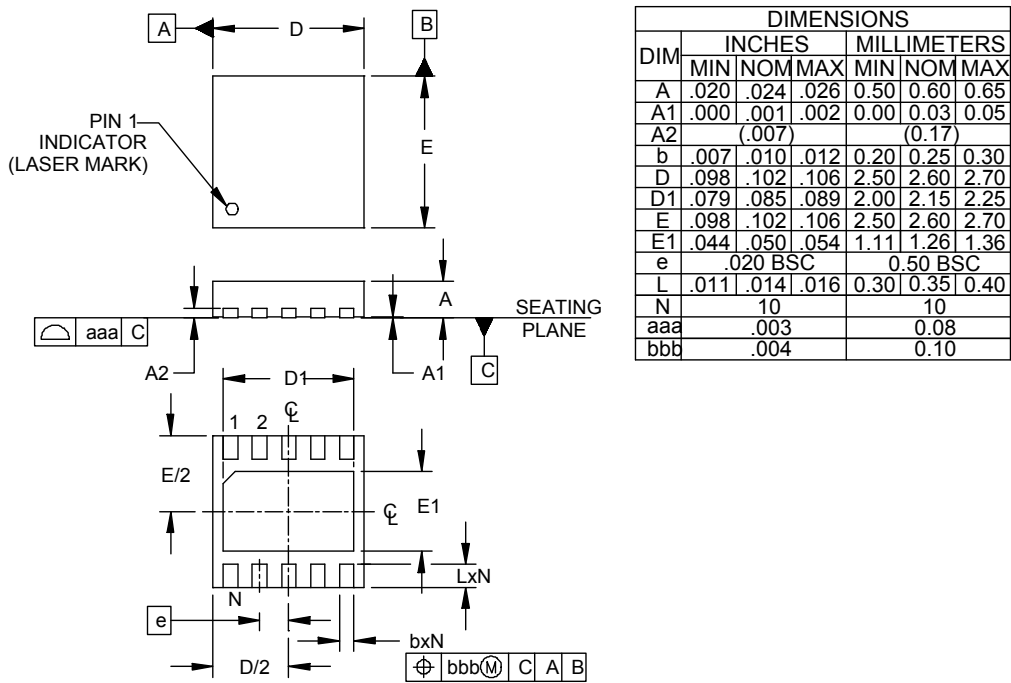
ESD Clamping (+8kV Contact per IEC 61000-4-2)



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

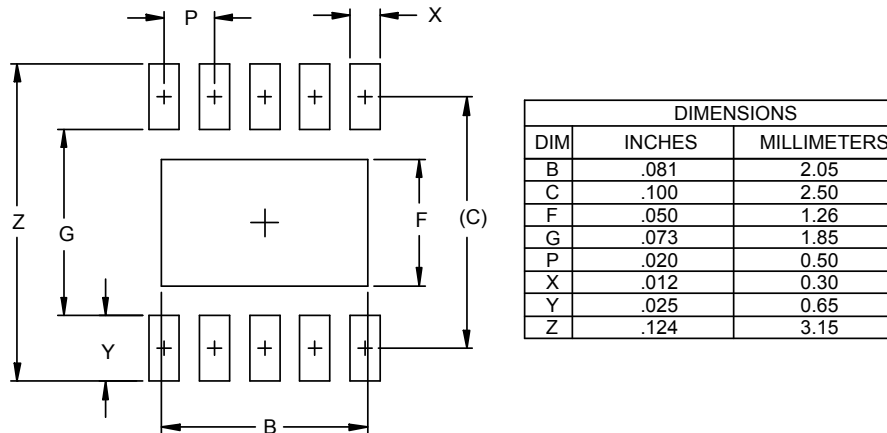


Outline Drawing - SLP2626P10



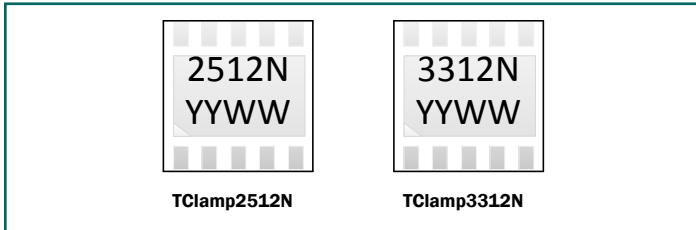
- NOTES:
1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
 2. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

Land Pattern - SLP2626P10



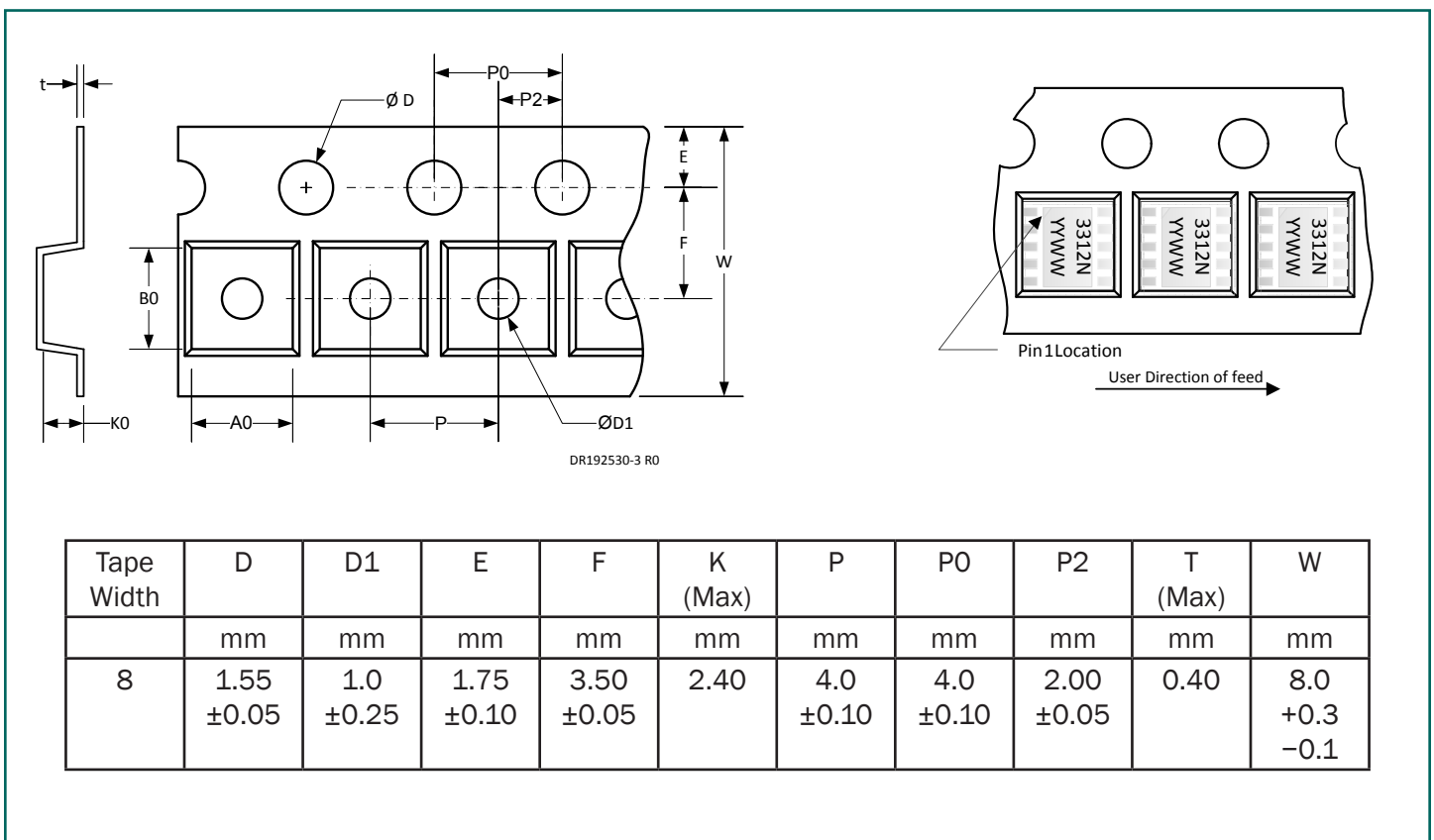
- NOTES:
1. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY. CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR COMPANY'S MANUFACTURING GUIDELINES ARE MET.

Marking Example



Notes:
 YW = Alphanumeric character Date Code

Tape and Reel Specification



Ordering Information

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

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