

PROTECTION PRODUCTS

Description

TClamp®3602P provides dedicated surge and ESD protection for RS-485 and other 36V lines in industrial applications. It features high surge current capability of 30A ($t_p=8/20\mu s$) and low clamping voltage making them ideal for use in harsh transient environments.

This device is designed to replace multiple discrete components by integrating low capacitance, surge rated compensation diodes with a high power transient voltage suppressor (TVS). Capacitance is limited to 4pF maximum to ensure correct signal transmission on high-speed lines. Each TClamp3602P may be used to protect up to two lines.

The TClamp3602P is in a 5-pin SLF2010N5 package, measuring 2.0 x 1.0mm with a nominal height of 0.55mm. The flow-through package design simplifies PCB layout.

Features

- High ESD withstand Voltage: +/-30kV (Contact and Air) per IEC 61000-4-2
- Protects up to two lines
- Low capacitance: 4pF Maximum
- Operating voltage: 36V
- Low leakage current
- Solid-state silicon-avalanche technology

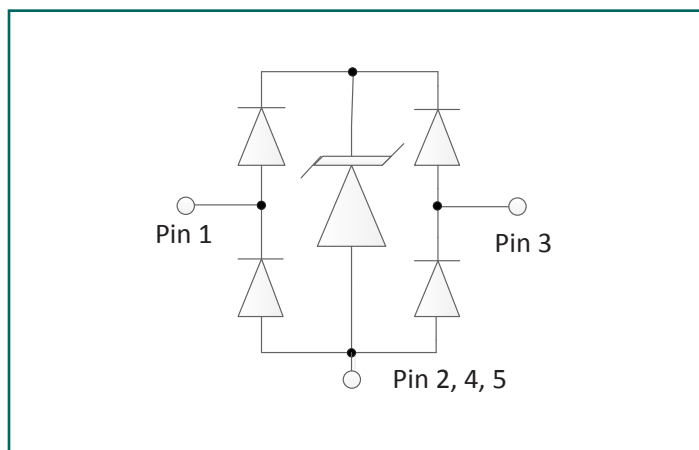
Mechanical Characteristics

- SLF2010N5 Package
- Pb-Free, Halogen Free, RoHS/WEEE Compliant
- Lead Finish: NiPdAu
- Molding Compound Flammability Rating: UL 94V-0
- Marking : Marking code + Date Code
- Packaging : Tape and Reel

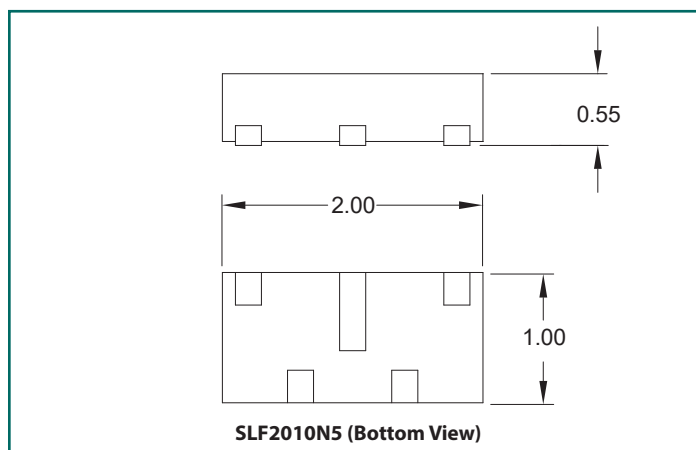
Applications

- RS-485 Surge Protection
- RS-422 Surge Protection
- Industrial Equipment
- Remote Meter Readers
- Automatic Teller Machines
- Digital Surveillance Cameras
- CAN-bus

Functional Circuit Diagram



Package Configuration



Absolute Maximum Rating

Rating	Symbol	Value	Units
Peak Pulse Power ($t_p = 8/20\mu s$), Pin 1 to 3	P_{PK}	350	W
Peak Pulse Current ($t_p = 8/20\mu s$)	I_{PP}	30	A
ESD per IEC 61000-4-2 (Air) ⁽¹⁾ ESD per IEC 61000-4-2 (Contact) ⁽¹⁾	V_{ESD}	± 30 ± 30	kV
Operating Temperature	T_{OP}	-40 to +85	°C
Storage Temperature	T_{STG}	-55 to +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Reverse Stand-Off Voltage	V_{RWM}	Pins 1 or 3 to Pins 2, 4 and 5 ⁽⁴⁾ , Pin 1 to 3, -40 °C to +85 °C			36	V
Reverse Breakdown Voltage	V_{BR}	$I_{BR} = 10mA$, Pin 1 to 3	40	44	50	V
Holding Current	I_H	Pin 1 to Pin 3		20		mA
Reverse Leakage Current	I_R	$V_{RWM} = 36V$ Pins 1 or 3 to Pins 2, 4 and 5 ⁽⁴⁾	$T = 25^\circ C$	<0.01	0.1	μA
			$T = 85^\circ C$	<0.02	0.1	
Clamping Voltage	V_C	$t_p = 8/20\mu s$, Pin 1 to 3	$I_{PP} = 30A$	9.3	11.5	V
Dynamic Resistance ^{(2),(3)}	R_{DYN}	$t_p = 0.2/100ns$, Pins 1 to Pin 3		0.07		Ω
Junction Capacitance	C_J	$V_R = 0V$, $f = 1MHz$ Pins 1 or 3 to Pins 2, 4 and 5 ⁽⁴⁾		2.6	4	pF

Notes

(1) ESD gun return path connected to ESD ground plane

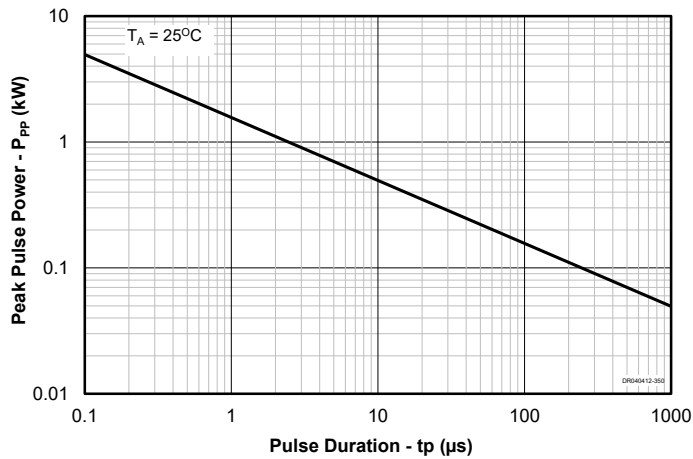
(2) Transmission Line Pulse Test (TLP) Settings: $t_p = 100ns$, $t_r = 0.2ns$, I_{TLP} and V_{TLP} averaging window: $t_1 = 70ns$ to $t_2 = 90ns$

(3) Dynamic resistance calculated from $I_{TLP} = 4A$ to $I_{TLP} = 16A$

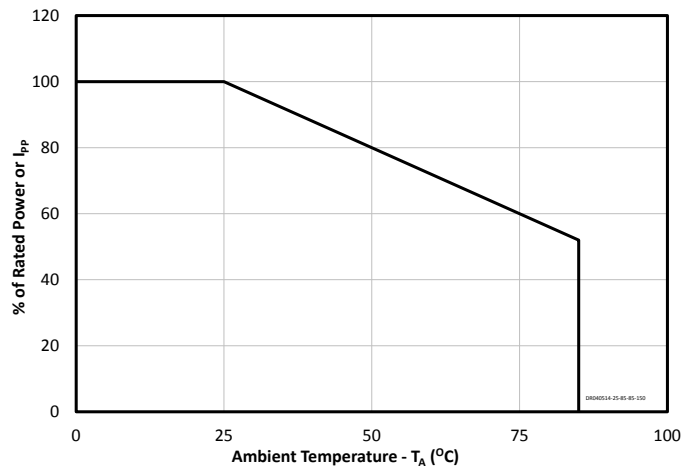
(4) Pin 2, 4, 5 are internally connected.

Typical Characteristics

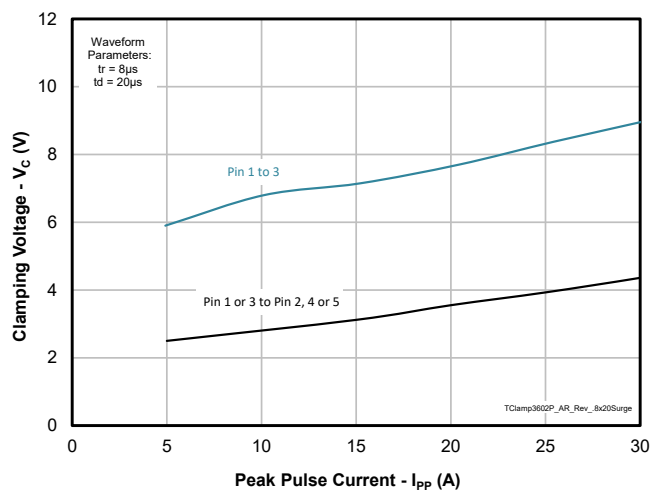
**Non-Repetitive Peak Pulse Power vs. Pulse Time
Pin 1 to 3**



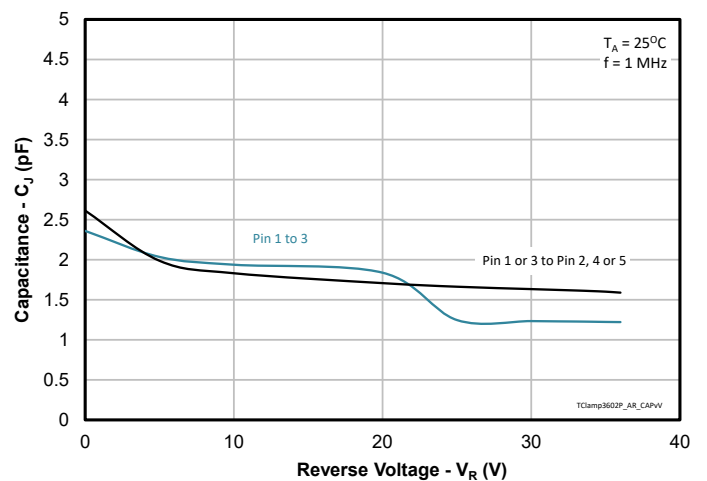
Power Derating Curve



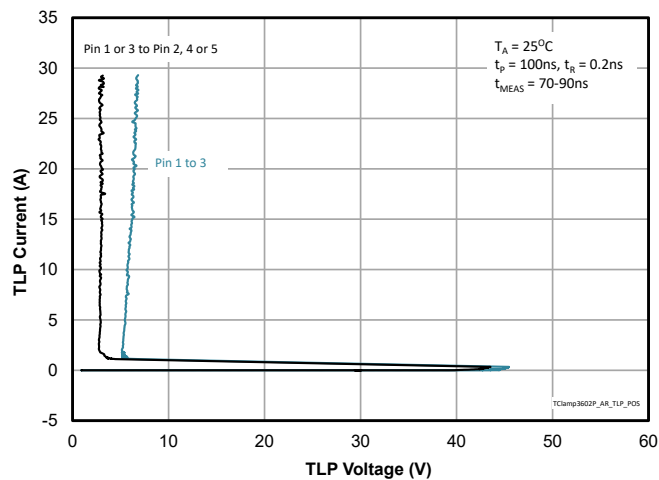
Clamping Voltage vs. Peak Pulse Current ($t_p=8/20\mu$ s)



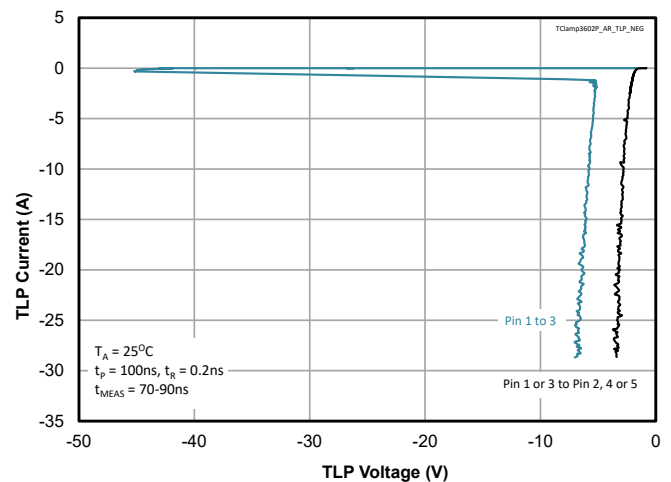
Capacitance vs. Voltage



TLP Characteristics (Positive)

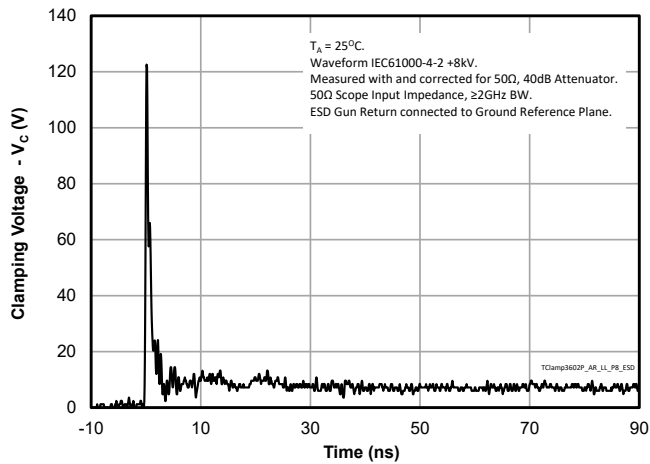


TLP Characteristics (Negative)

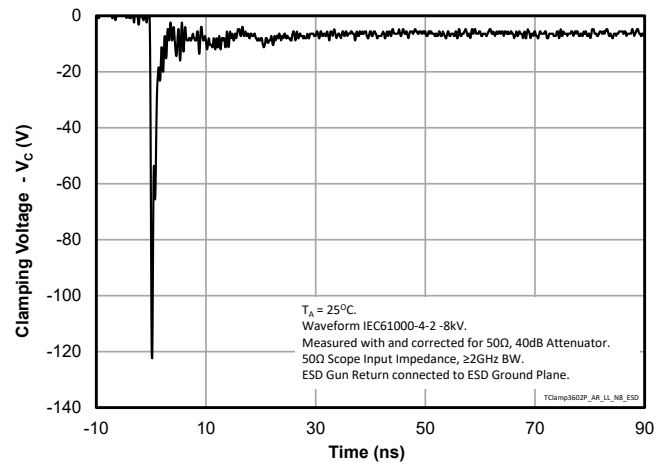


Typical Characteristics (Continued)

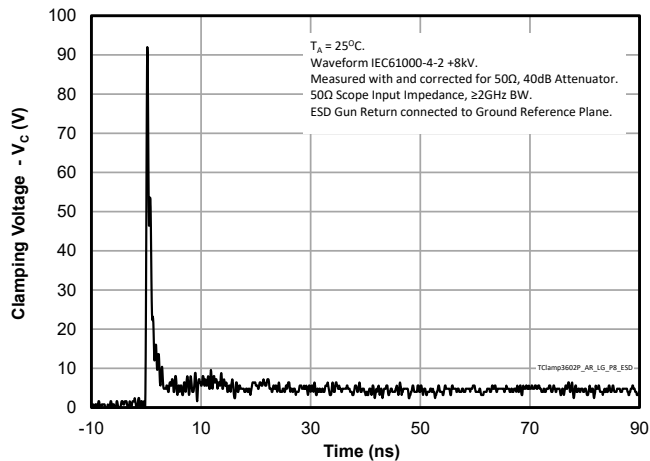
**ESD Clamping (8kV Contact per IEC 61000-4-2)
Pin 1 to Pin 3**



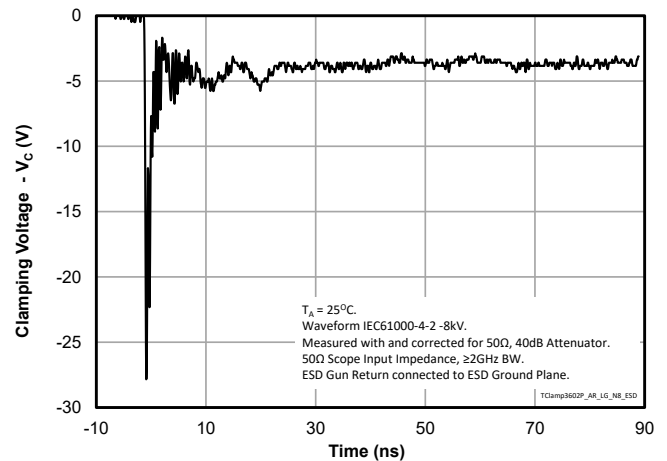
**ESD Clamping (-8kV Contact per IEC 61000-4-2)
Pin 1 to Pin 3**



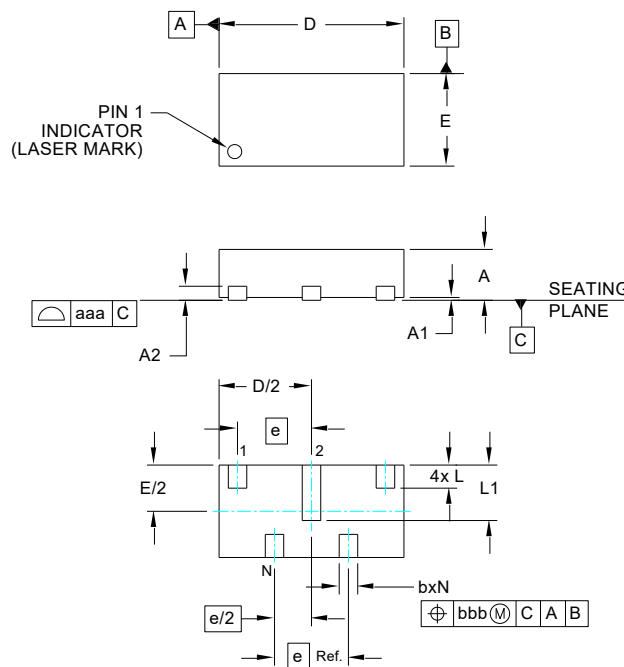
**ESD Clamping (8kV Contact per IEC 61000-4-2)
Pin 1 to Pin 2, 4, or 5**



**ESD Clamping (-8kV Contact per IEC 61000-4-2)
Pin 1 to Pin 2, 4, or 5**



Outline Drawing - SLF2010N5

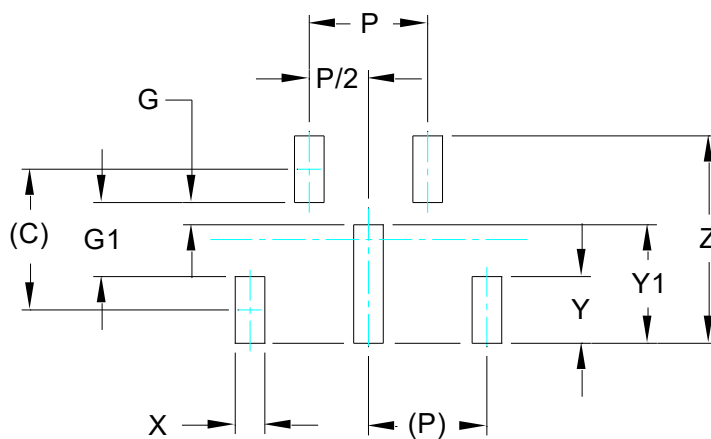


DIMENSIONS			
DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.50	0.55	0.60
A1	0.00	0.02	0.05
A2	(0.152)		
b	0.15	0.20	0.25
D	1.95	2.00	2.05
E	0.95	1.00	1.05
e	0.80 BSC		
L	0.20	0.25	0.30
L1	0.55	0.60	0.65
N	5		
aaa	0.08		
bbb	0.10		

NOTES:

1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).

Land Pattern - SLF2010N5

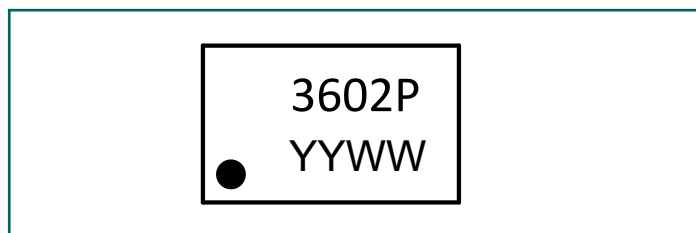


DIMENSIONS	
DIM	MILLIMETERS
C	(0.95)
G	0.15
G1	0.50
P	0.80
X	0.20
Y	0.45
Y1	0.80
Z	1.40

NOTES:

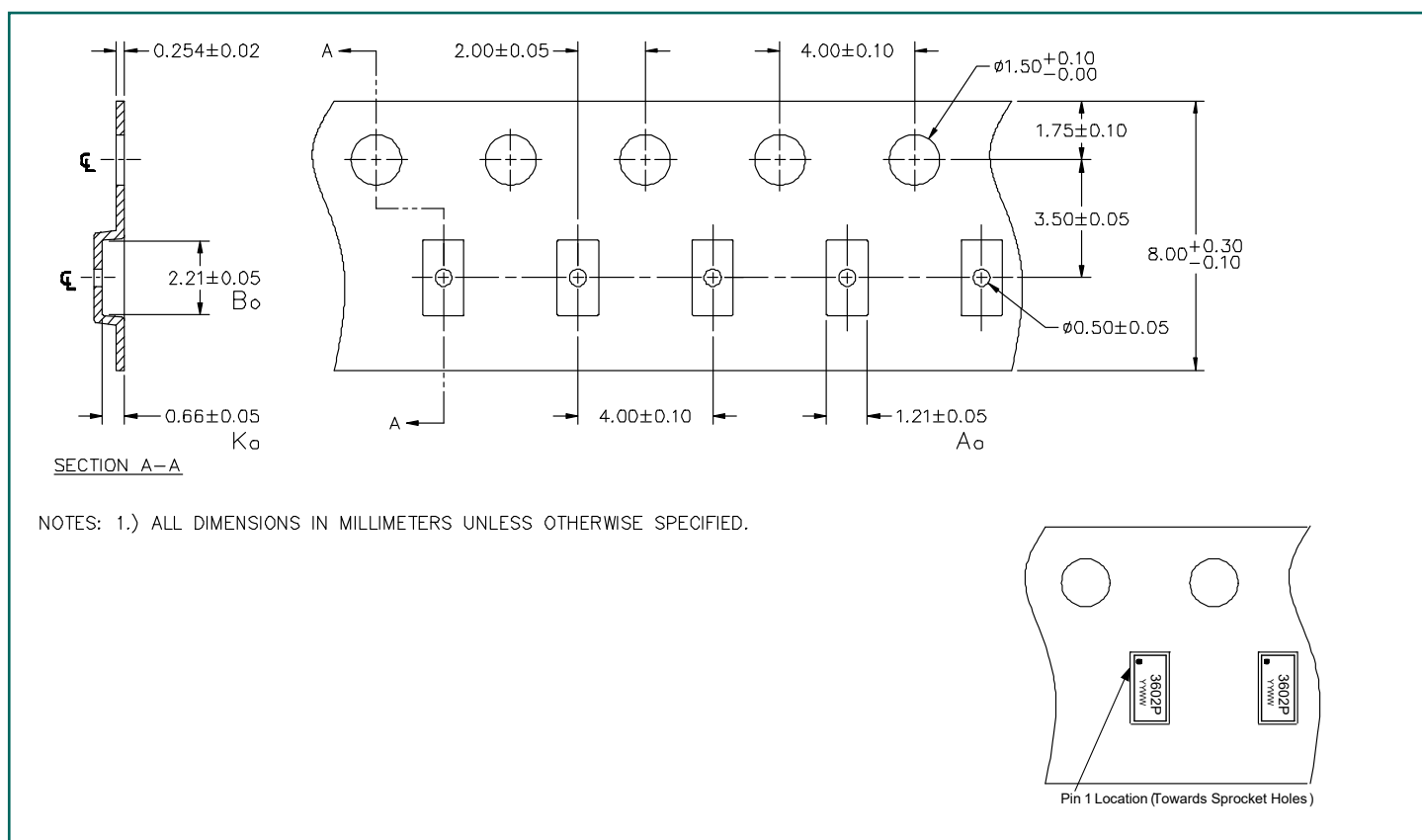
1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. THIS LAND PATTERN IS FOR REFERENCE PURPOSES ONLY.
CONSULT YOUR MANUFACTURING GROUP TO ENSURE YOUR
COMPANY'S MANUFACTURING GUIDELINES ARE MET.

Marking Code



Note: YYWW = Alphanumeric character date code

Tape and Reel Specification



Ordering Information

Part Number	Qty per Reel	Reel Size
TClamp3602P.TCT	3,000	7"



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