

PROTECTION PRODUCTS - TransClamp®

Description

The TClamp®1272S provides dedicated line driver side surge and ESD protection for ADSL and VDSL applications. It is designed to replace multiple discrete components in portable applications. They feature high surge current capability of 20A ($t_p=8/20\mu s$) and low clamping voltage making them ideal for use on the IC side of a coupling transformer.

The TClamp1272S integrates low capacitance, surge-rated compensation diodes with high power transient voltage suppressors (TVS). The capacitance is limited to 5pF maximum to ensure correct signal transmission on high-speed lines. Two internal bias diodes are provided for the TVS diode.

The TClamp1272S is in a 6-pin, RoHS/WEEE compliant, SOT-23 package. The leads are finished with lead-free matte tin. The flow-through package design simplifies PCB layout.

Features

- ◆ Transient protection for high-speed data lines to
IEC 61000-4-2 (ESD) 30kV (air), 30kV (contact)
IEC 61000-4-4 (EFT) 40A (5/50ns)
IEC 61000-4-5 (Lightning) 25A (8/20 μs)
- ◆ Array of surge rated diodes with internal TVS Diode
- ◆ Bias diodes prevent charging and discharging of TVS capacitance
- ◆ Low capacitance: (<5pF)
- ◆ Operating voltage: 12V
- ◆ Low leakage current
- ◆ Solid-state silicon-avalanche technology

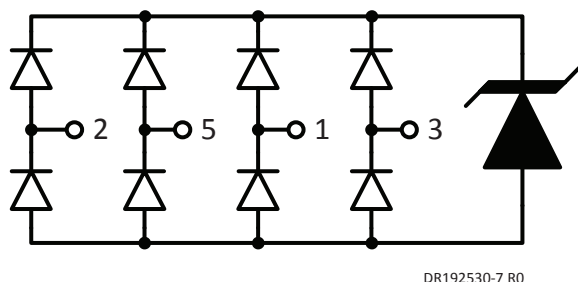
Mechanical Characteristics

- ◆ JEDEC SOT-23 6L package
- ◆ Pb-Free, Halogen Free, RoHS/WEEE Compliant
- ◆ Molding compound flammability rating: UL 94V-0
- ◆ Marking : Marking code + date code
- ◆ Packaging : Tape and Reel

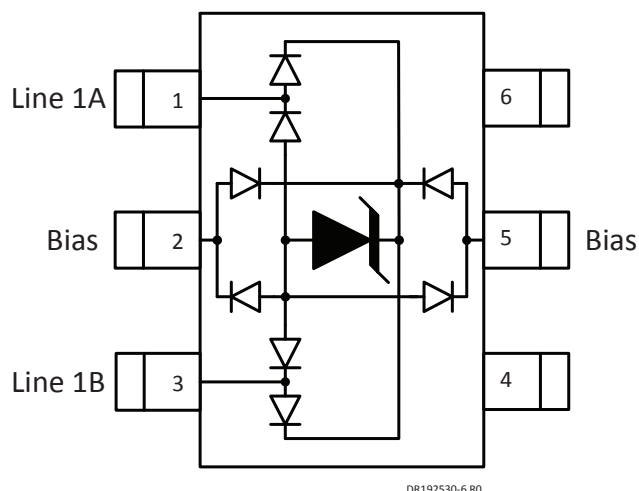
Applications

- ◆ Line Driver Side protection of ADSL and VDSL interfaces
- ◆ Modems and Gateways
- ◆ Access Equipment
- ◆ Central Office Equipment
- ◆ Customer Premise Equipment

Circuit Diagram



Pin Configuration



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Absolute Maximum Ratings

| Rating | Symbol | Value | Units |
|--|-----------|-------------|-------|
| Peak Pulse Power ($t_p = 8/20\mu s$) | P_{pk} | 600 | Watts |
| Peak Pulse Current ($t_p = 8/20\mu s$) | I_{pp} | 20 | A |
| ESD per IEC 61000-4-2 (Air) | V_{ESD} | 30 | kV |
| ESD per IEC 61000-4-2 (Contact) | | 30 | |
| Operating Temperature | T_j | -40 to +85 | °C |
| Storage Temperature | T_{STG} | -55 to +150 | °C |

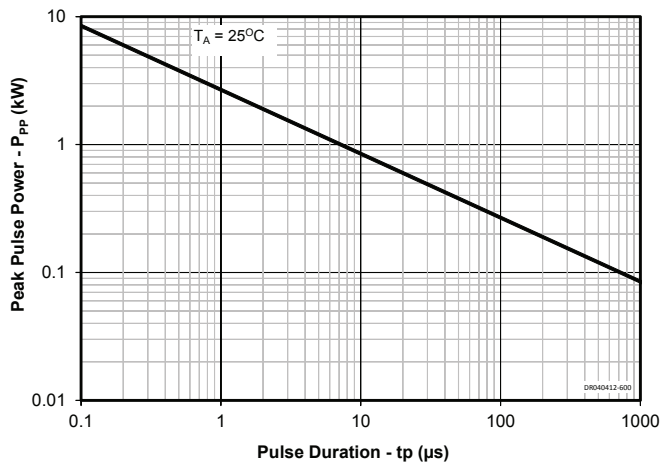
Electrical Characteristics (T=25°C unless otherwise specified)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units |
|---------------------------|-----------|---|------|------|------|---------------|
| Reverse Stand-Off Voltage | V_{RWM} | $T = -40 \text{ to } +85^\circ\text{C}$ | | | 12 | V |
| Reverse Breakdown Voltage | V_{BR} | $I_{BR} = 1\text{mA}$ | 13.5 | 15 | 17 | V |
| Reverse Leakage Current | I_R | $V_{RWM} = 12\text{V}, T = 25^\circ\text{C}$ | | | 0.10 | μA |
| | | $V_{RWM} = 12\text{V}, T = 85^\circ\text{C}$ | | | 0.30 | |
| Clamping Voltage | V_C | $I_{pp} = 5\text{A}, t_p = 8/20\mu s$ | | | 20 | V |
| | | $I_{pp} = 20\text{A}, t_p = 8/20\mu s$ | | | 30 | V |
| Peak Pulse Current | I_{pp} | $t_p = 8/20\mu s$ | | | 20 | A |
| Junction Capacitance | C_j | Between any I/O pin and Ground; $T = -40 \text{ to } +85^\circ\text{C}$ Bias+ to GND = 6V; Bias- to GND = -6V; VR = 0V; $f = 1\text{MHz}$ | | | 5 | pF |

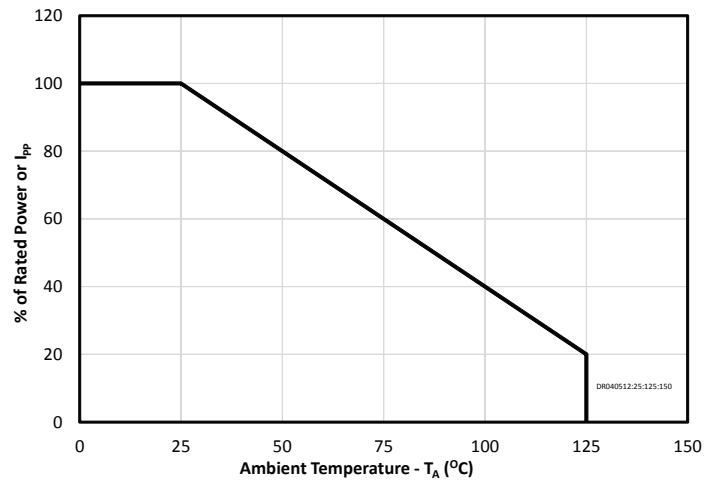
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Typical Characteristics

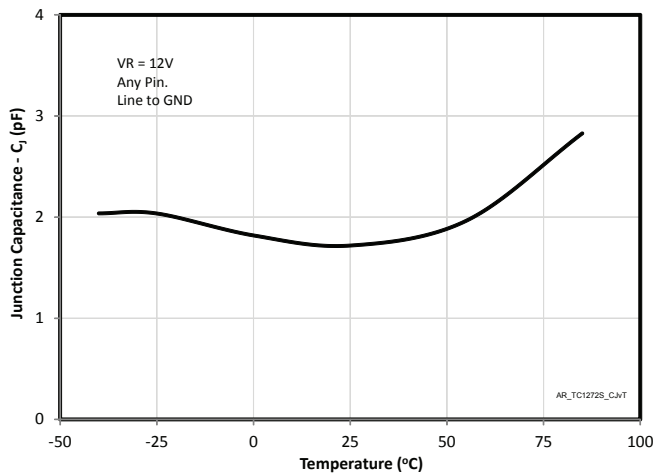
Non-Repetitive Peak Pulse Power vs. Pulse Time



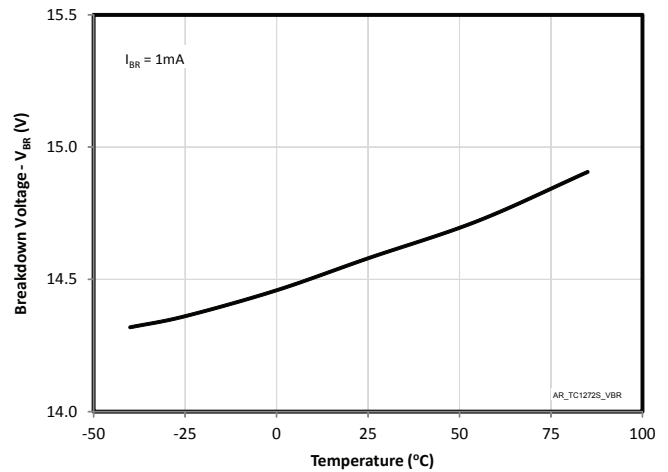
Power Derating Curve



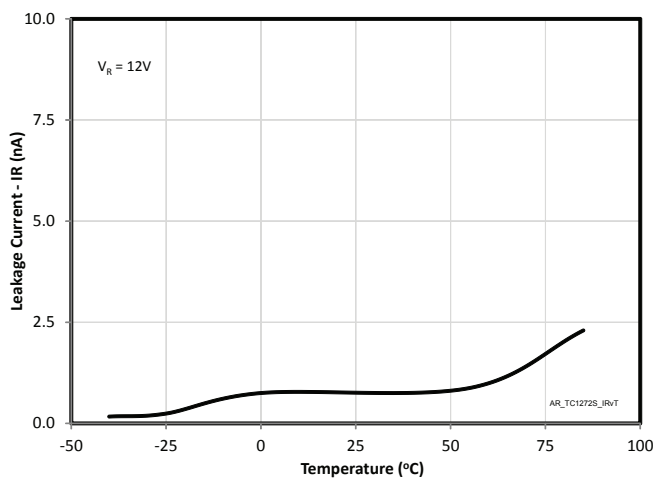
Capacitance vs. Temperature



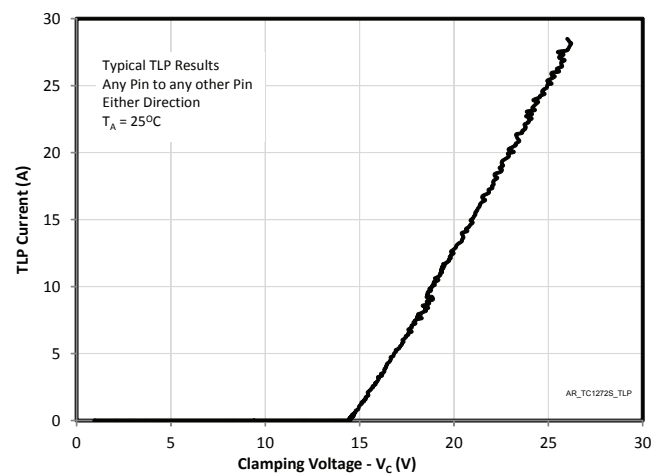
Breakdown Voltage vs Temperature

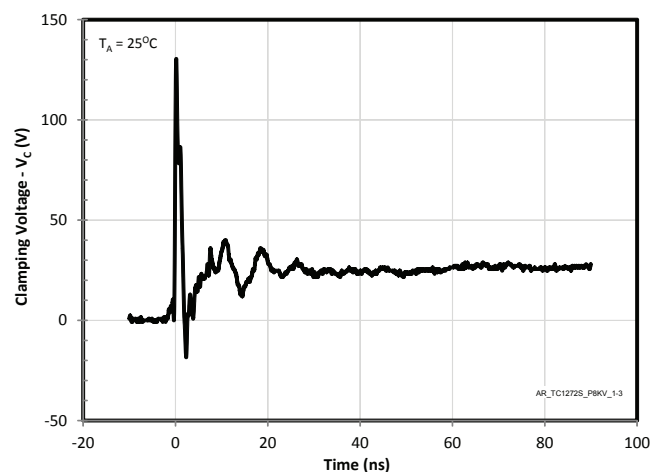
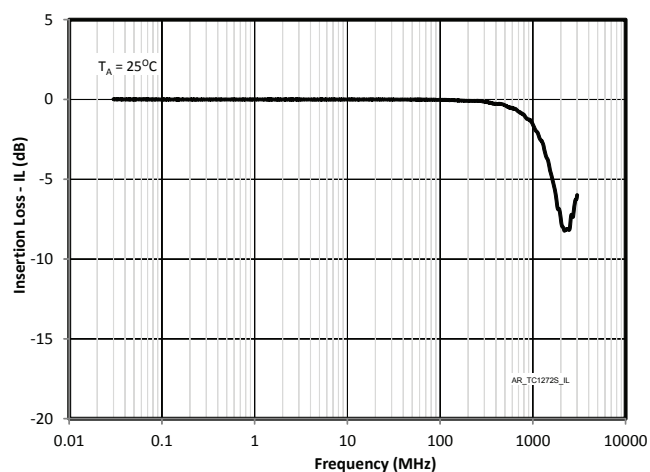


Leakage Current vs Temperature



TLP Characteristic



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

Typical Insertion Loss S21


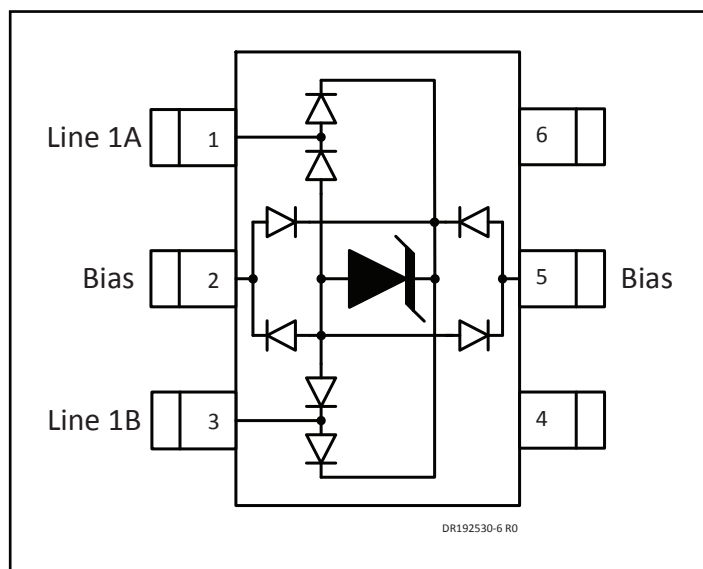
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Applications Information

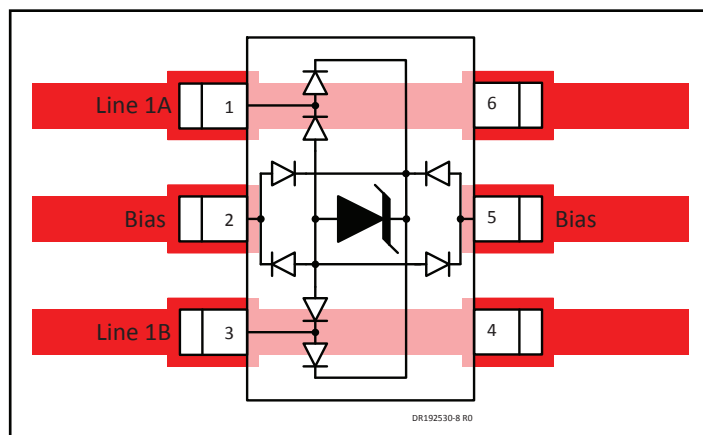
Device Connection for Metallic Protection of High-Speed Data Lines

The TClamp1272S is designed to protect high-speed data lines from transient over-voltages which result from lightning and ESD. The device is designed to protect one line in common mode (Line-to-Ground) or one line pair in metallic (Line-to-Line) mode. The part is designed to allow straight-through connection, see the Wiring Diagram opposite. Line 1A is connected at pin1 and its trace can continue under the part and connect to pin6, which is not connected internally to the part. A similar connection can be made for Line 1B. For metallic mode protection, the two lines are connected to pin1 and pin3. For common mode protection, connect the line to pin1 and ground pin3 (or vice-versa). The ground connection should be made directly to the ground plane for best results. Bias voltage may be applied at pins 2 and 5 with either polarity.

Pin Configuration (Top Side View)

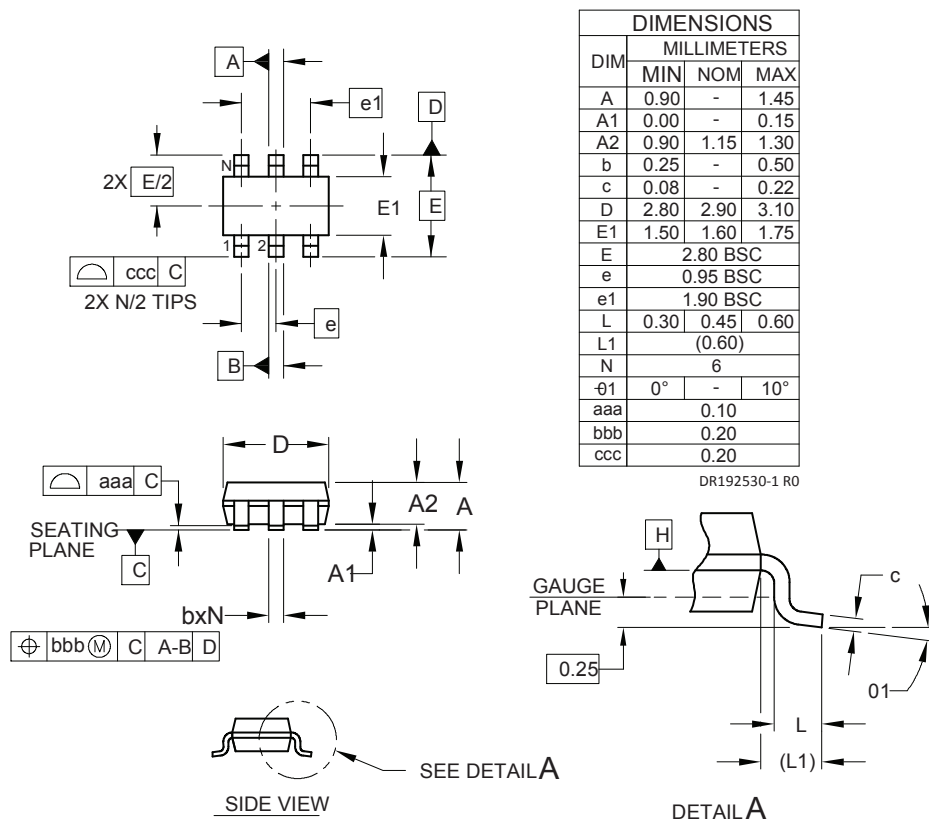


Wiring Diagram



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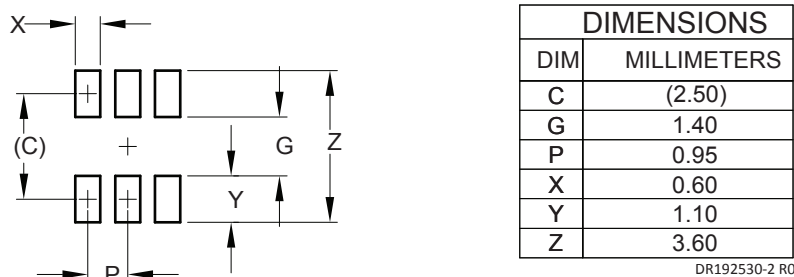
Outline Drawing - SOT-23-6L



NOTES:

1. CONTROLLING DIMENSIONS ARE IN MILLIMETERS (ANGLES IN DEGREES).
2. DATUMS $\boxed{-A-}$ AND $\boxed{-B-}$ TO BE DETERMINED AT DATUM PLANE $\boxed{-H-}$
3. DIMENSIONS "E1" AND "D" DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

Land Pattern - SOT-23-6L

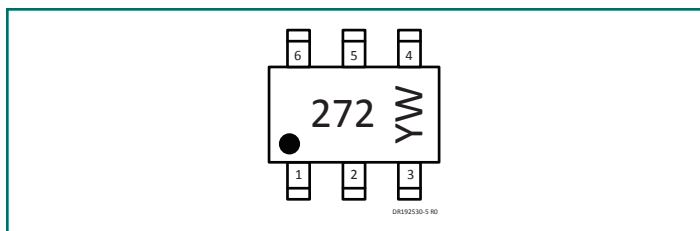


NOTES:

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.

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Marking



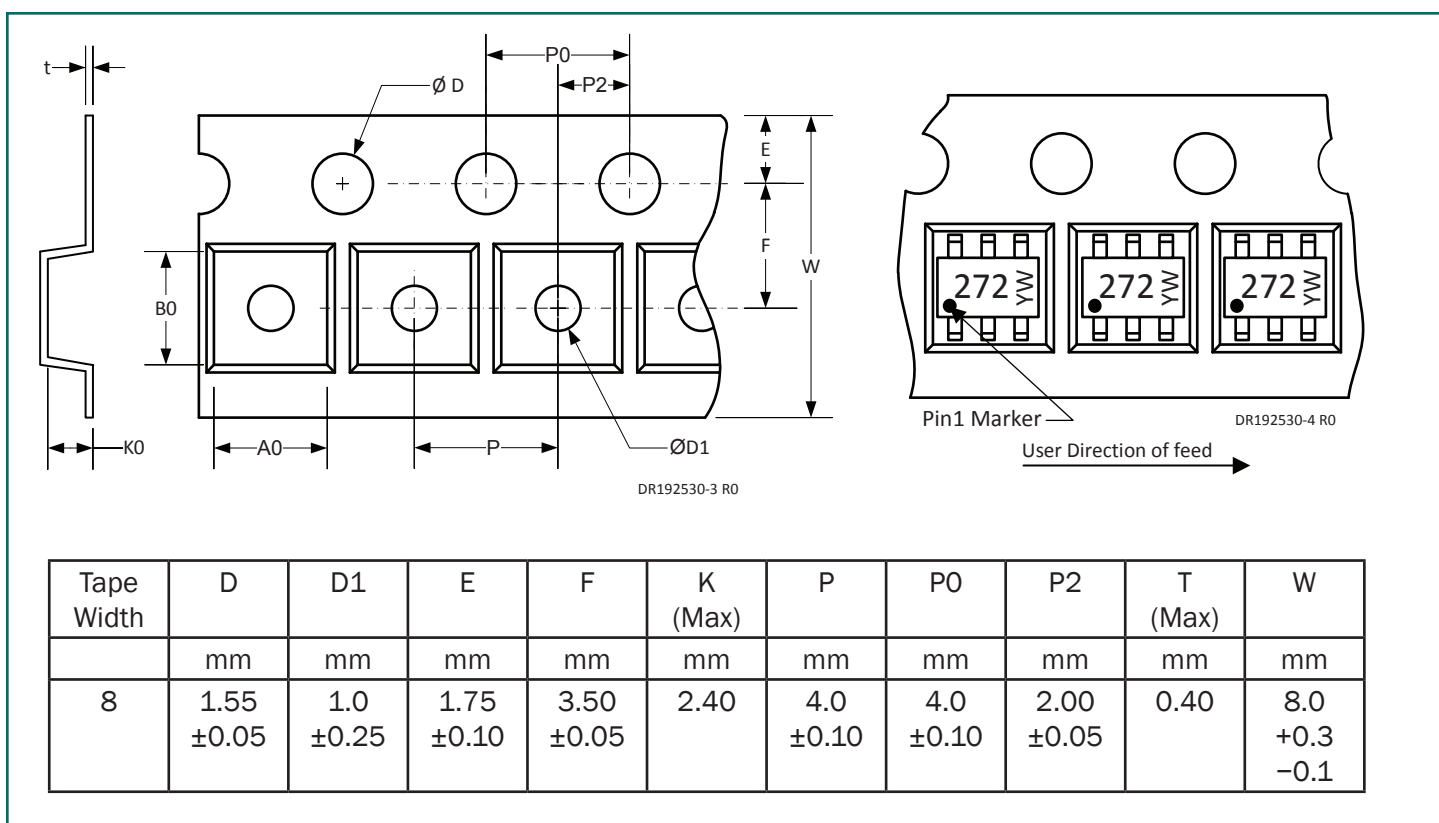
Notes: YW = Alphanumeric character Date Code

Ordering Information

| Part Number | Lead Finish | Qty per Reel | Reel Size |
|-----------------|-------------|--------------|-----------|
| TClamp1272S.TCT | Matte Tin | 3000 | 7" |

TransClamp and TClamp are registered trademarks of Semtech Corporation.

Tape and Reel Specification



Contact Information

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