



Description

The TD3281 consists of a single input AlGaAs LED optically coupled to a Random Phase triac driver chip. The TD3281 provides high input-to-output isolation and is designed to drive high-powered triacs. Typical uses include interfacing logic level control signals to equipment powered from 240V_{AC} lines and higher.

The TD3281 comes standard in a miniature 6 pin DIP package making it ideal for high-density board applications.

Features

- Random Phase Switching
- 800V Blocking Voltage
- Trigger Current (15mA MAX)
- High Isolation Voltage (5000V_{RMS})
- High dV/dt (1kV/μS MIN)
- Long Life / High Reliability
- RoHS / Pb-Free / REACH Compliant

Applications

- Home Appliances
- Motor / Drive Controls
- Solid State Relays
- Solenoid / Valve Controls
- Temperature Controls
- Dimmer Controls

Agency Approvals

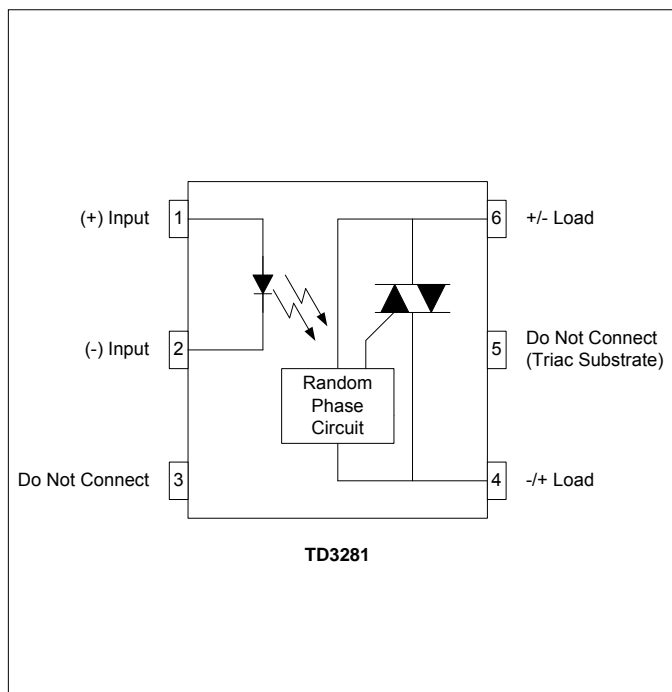
UL/C-UL: File # E201932
VDE: File # 40035191 (EN 60747-5-2)

Absolute Maximum Ratings

The values indicated are absolute stress ratings. Functional operation of the device is not implied at these or any conditions in excess of those defined in electrical characteristics section of this document. Exposure to absolute Maximum Ratings may cause permanent damage to the device and may adversely affect reliability.

Storage Temperature-55 to +125°C
Operating Temperature-40 to +100°C
Continuous Input Current.....50mA
Transient Input Current.....400mA
Reverse Input Control Voltage5V
Input Power Dissipation.....40mW
Output Power Dissipation330mW
Solder Temperature – Wave (10sec).....260°C
Solder Temperature – IR Reflow (10sec).....260°C

Schematic Diagram



Ordering Information

| Part Number | Description |
|-------------|--|
| TD3281 | 6 pin DIP, (60/Tube) |
| TD3281-H | 0.40" (10.16mm) Lead Spacing (VDE0884) |
| TD3281-S | 6 pin SMD, (60/Tube) |
| TD3281-STR | 6 pin SMD, Tape and Reel (1000/Reel) |

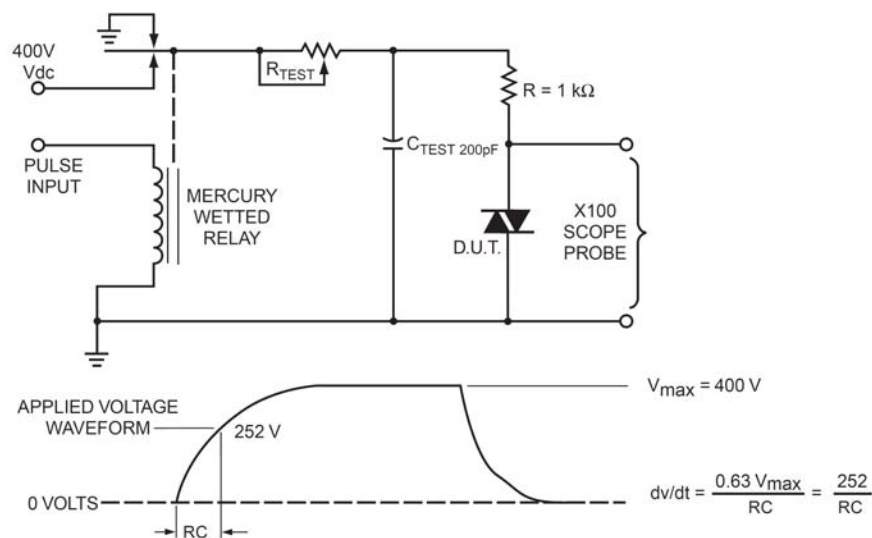
NOTE: Suffixes listed above are not included in marking on device for part number identification

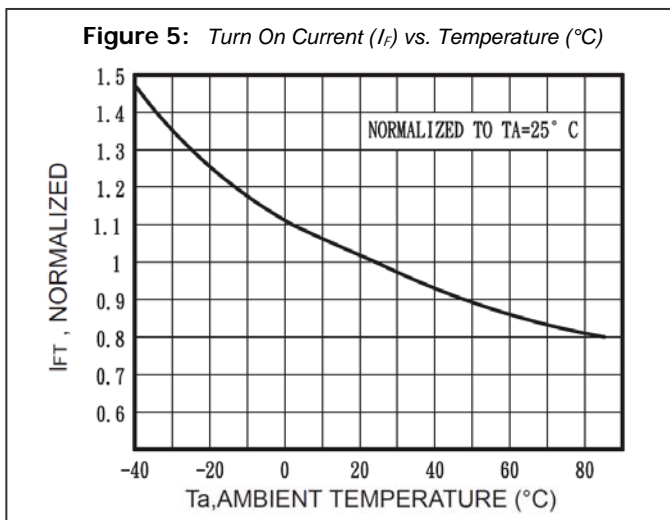
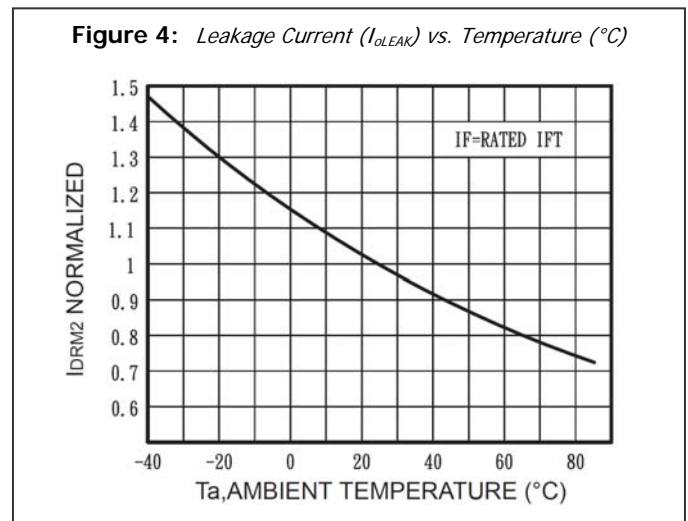
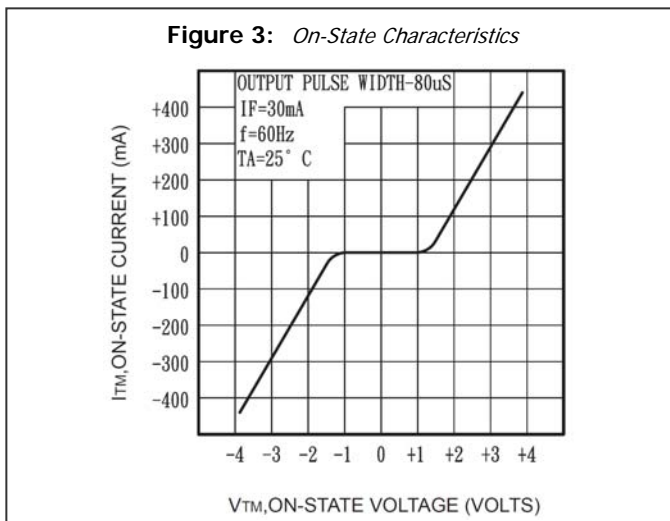
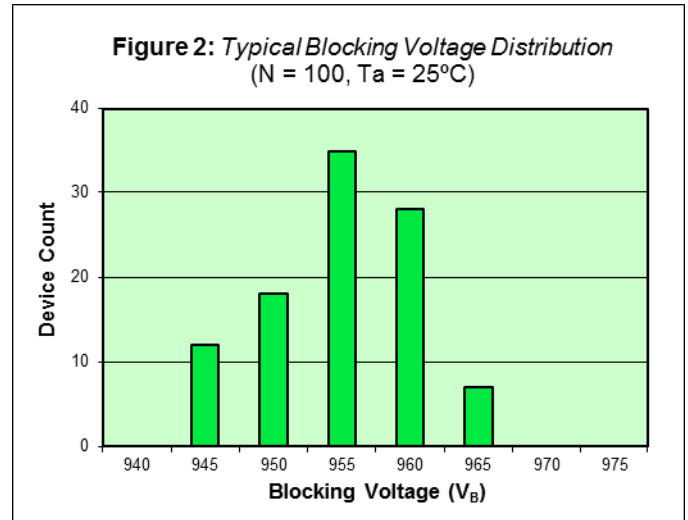
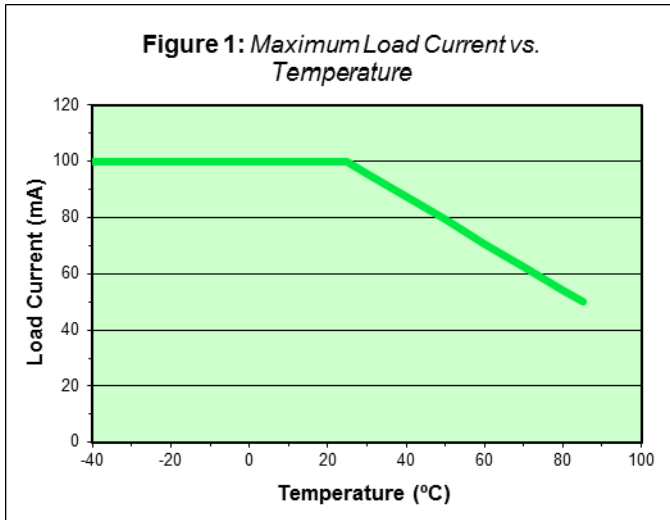
Electrical Characteristics, $T_A = 25^\circ\text{C}$ (unless otherwise specified)

| Parameter | Symbol | Min. | Typ. | Max. | Units | Test Conditions |
|------------------------------------|---------------|-------|-----------|------|------------------------|--|
| Input Specifications | | | | | | |
| LED Forward Voltage | V_F | - | 1.4 | 1.8 | V | $I_F = 10\text{mA}$ |
| LED Reverse Voltage | BV_R | 5 | - | - | V | $I_R = 10\mu\text{A}$ |
| Reverse Leakage Current | $I_{InRleak}$ | - | - | 10 | μA | $V_R = 5\mu\text{A}$ |
| Trigger Current ¹ | I_{InOn} | - | - | 15 | mA | Main Terminal Voltage = 3V |
| Output Specifications | | | | | | |
| Blocking Voltage | V_{DRM} | 800 | - | - | V | $I_O = 1\mu\text{A}$ |
| Peak Blocking Current | I_{DRM1} | - | 10 | 100 | nA | $V_{DRM} = 800$ |
| Continuous Load Current | I_O | - | - | 100 | mA | $I_F = 15\text{mA}$ |
| On-State Voltage | V_{ON} | - | 2 | 3 | V | $I_F = 15\text{mA}, I_{TM} = 100\text{mA}$ |
| Leakage Current | I_{DRM2} | - | 0.2 | 1 | μA | $I_F = 0\text{mA}, V_{DRM} = 800\text{V}$ |
| Holding Current | I_{HOLD} | - | 250 | - | μA | - |
| Critical Rate of Rise ² | dV/dt | 1,000 | 1,500 | - | $\text{V}/\mu\text{S}$ | - |
| Isolation Specifications | | | | | | |
| Isolation Voltage | V_{ISO} | 5,000 | - | - | V_{RMS} | $RH \leq 50\%, t=1\text{min}$ |
| Input-Output Resistance | R_{I-O} | - | 10^{12} | - | Ω | $V_{I-O} = 500V_{DC}$ |

Note 1: Resistive load. For inductive loads, higher drive current is recommended

Note 2: This is for static dV/dt . Test Circuit Below

TD3281 Static dV/dt Test Circuit:


TD3281 Performance & Characteristics Plots, $T_A = 25^\circ\text{C}$ (unless otherwise specified)


TD3281 Solder Temperature Profile Recommendations
(1) Infrared Reflow:

Refer to the following figure as an example of an optimal temperature profile for single occurrence infrared reflow. Soldering process should not exceed temperature or time limits expressed herein. Surface temperature of device package should not exceed 250°C:

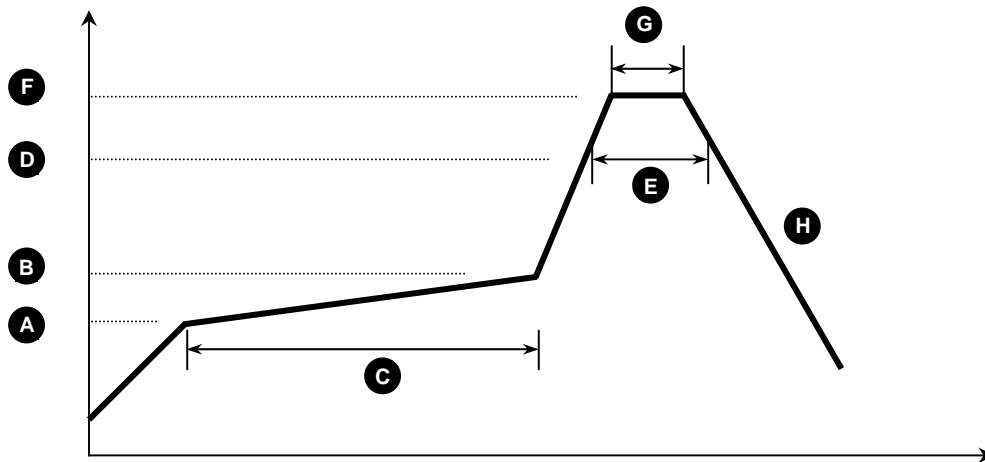


Figure 1

| Process Step | Description | Parameter |
|--------------|------------------------------------|-----------|
| A | Preheat Start Temperature (°C) | 150°C |
| B | Preheat Finish Temperature (°C) | 180°C |
| C | Preheat Time (s) | 90 - 120s |
| D | Melting Temperature (°C) | 230°C |
| E | Time above Melting Temperature (s) | 30s |
| F | Peak Temperature, at Terminal (°C) | 260°C |
| G | Dwell Time at Peak Temperature (s) | 10s |
| H | Cool-down (°C/s) | <6°C/s |

(2) Wave Solder:

Maximum Temperature: 260°C (at terminal)
 Maximum Time: 10s
 Pre-heating: 100 - 150°C (30 - 90s)
 Single Occurrence

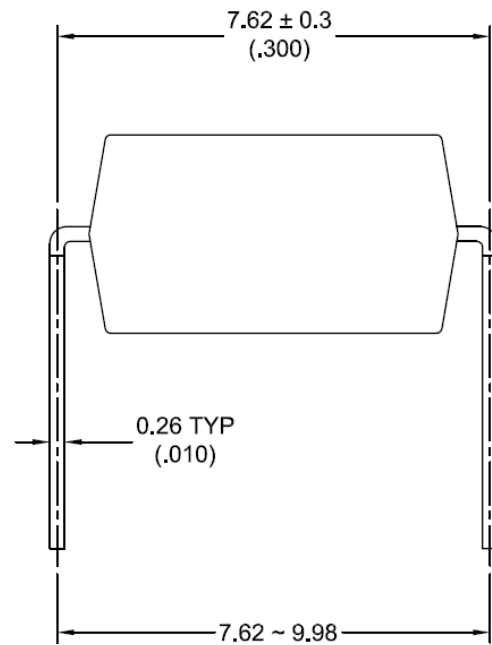
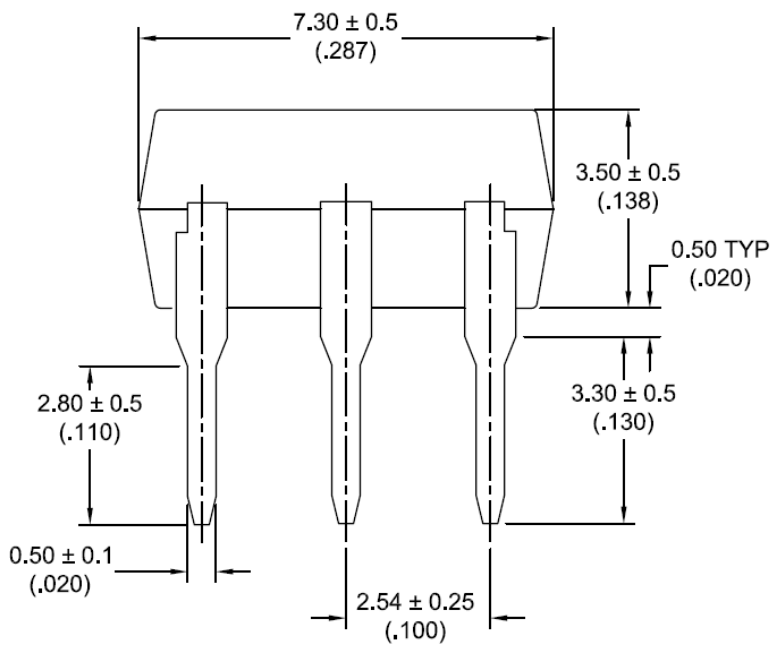
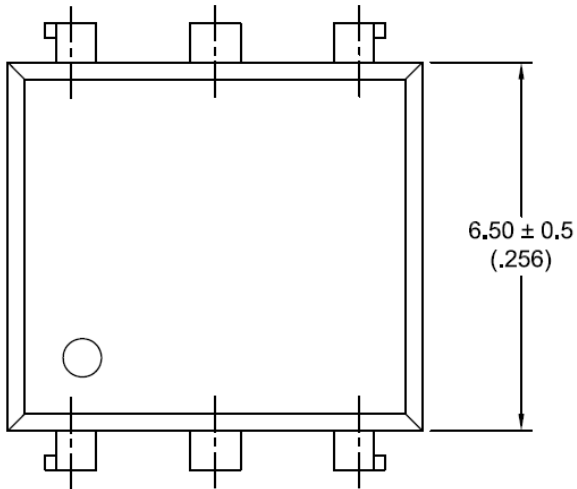
(3) Hand Solder:

Maximum Temperature: 350°C (at tip of soldering iron)
 Maximum Time: 3s
 Single Occurrence

TD3281 Package Dimensions

6 PIN DIP Package

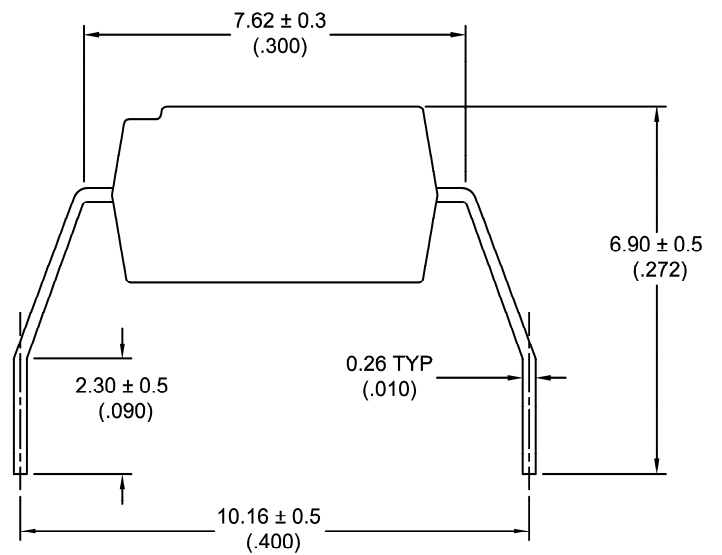
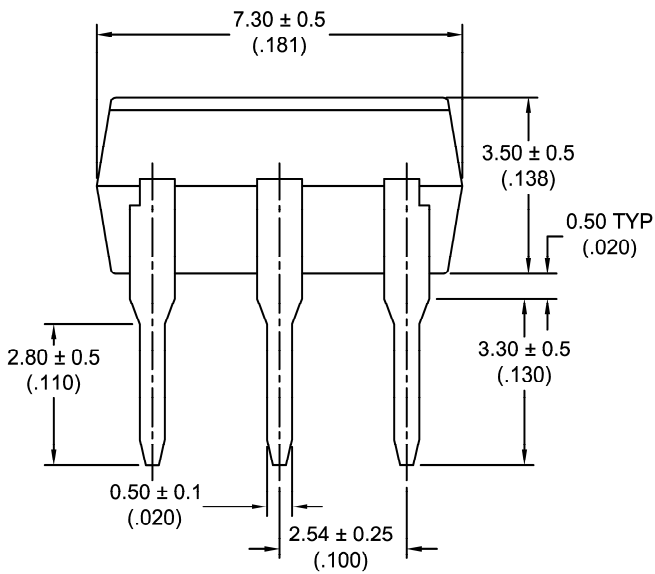
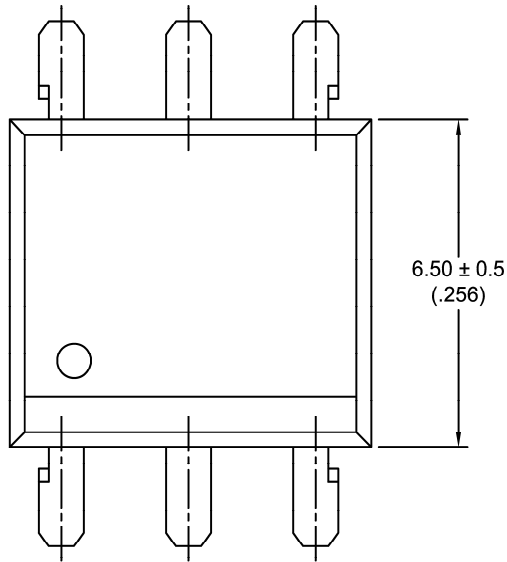
Note: All dimensions in millimeters with inches ["] in parenthesis ()



TD3281 Package Dimensions

6 PIN WIDE Lead Space Package (-H)

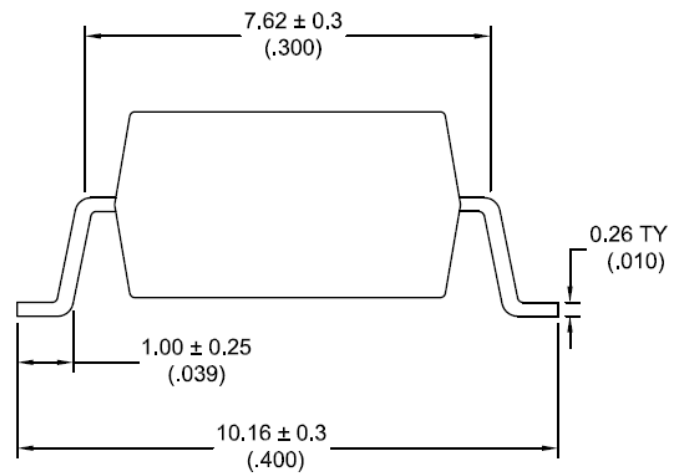
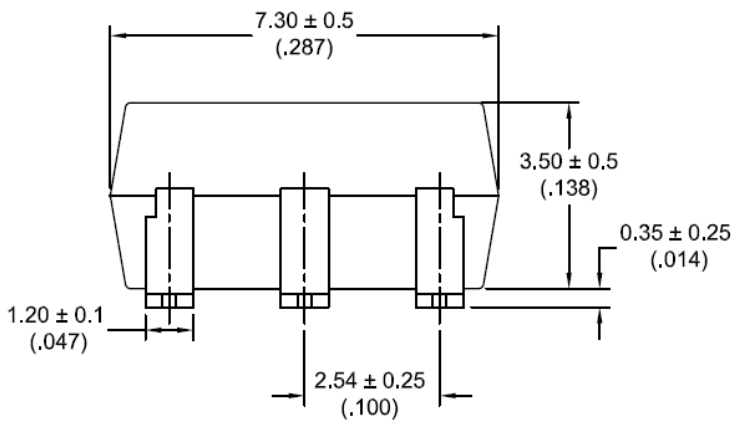
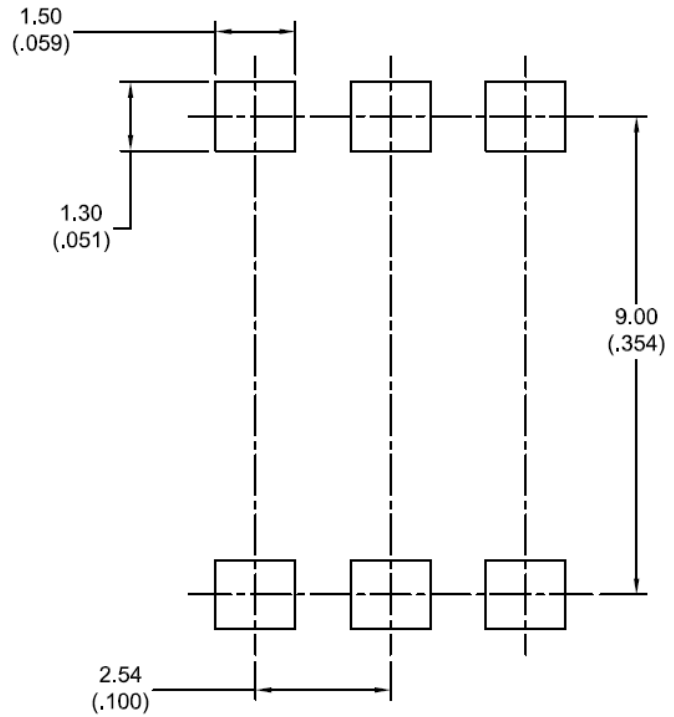
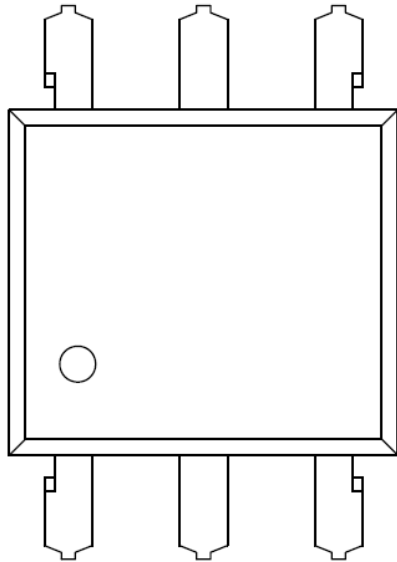
Note: All dimensions in millimeters [mm] with inches in parenthesis ()



TD3281 Package Dimensions

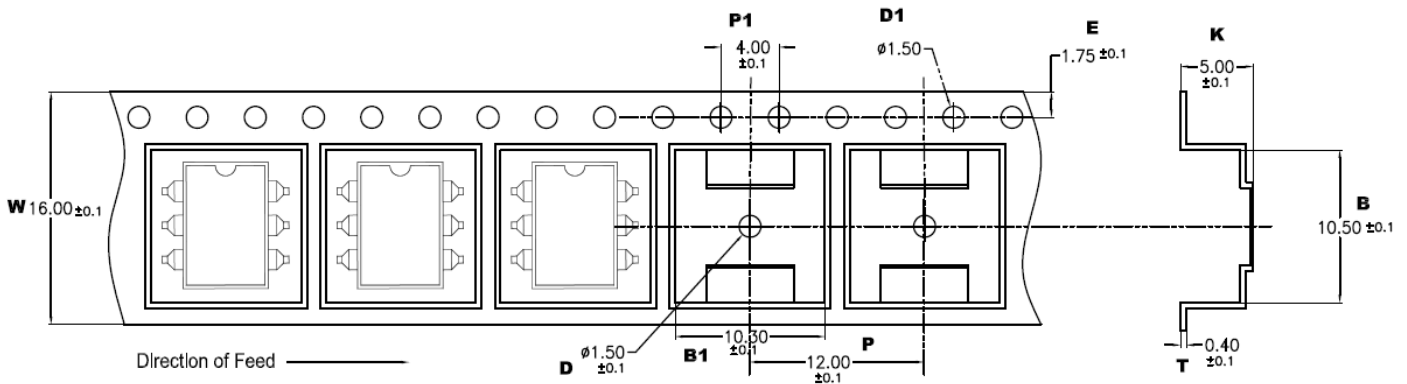
6 PIN SMD Surface Mount Package (-S)

Note: All dimensions in millimeters with inches ["] in parenthesis ()

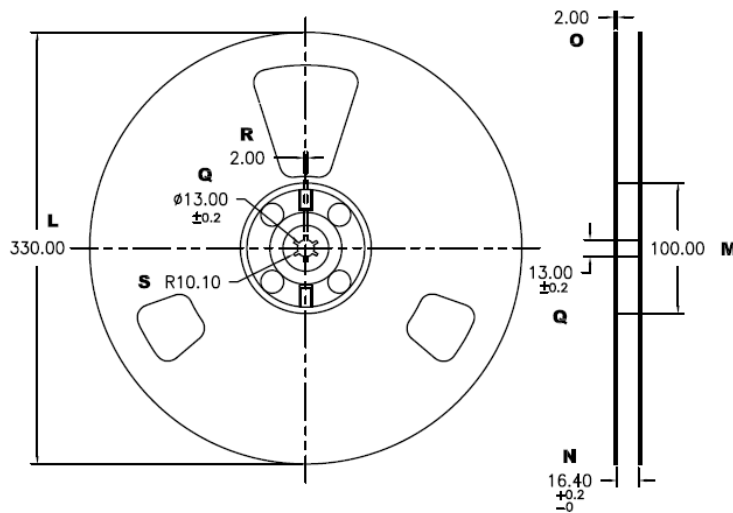


TD3281 Package Dimensions

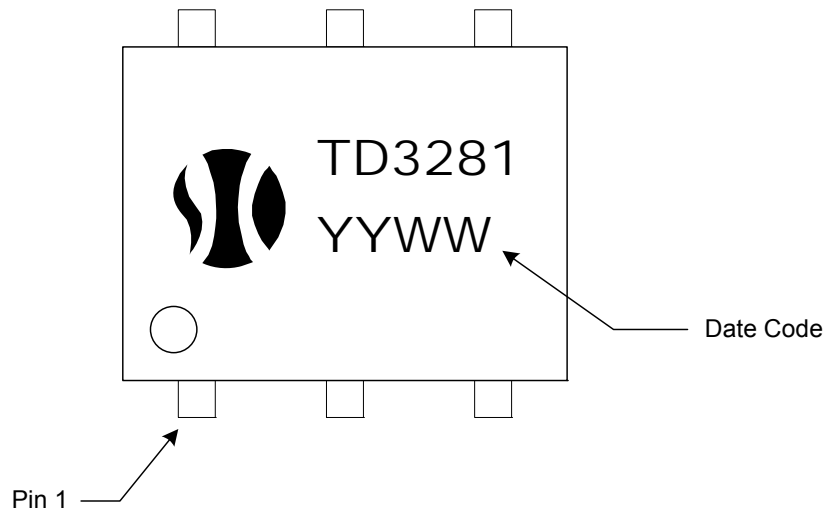
6 PIN SMD Tape & Reel (-STR)

Note: All dimensions in millimeters


| W | B | B1 | P | P1 | K | E | T | D | D1 |
|------------|------------|------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 16.00 ±0.1 | 10.50 ±0.1 | 10.30 ±0.1 | 12.00 ±0.1 | 4.00 ±0.1 | 5.00 ±0.1 | 1.75 ±0.1 | 0.40 ±0.1 | 1.50 ±0.1 | 1.50 ±0.1 |



| L | M | N | O | Q | R | S |
|--------|--------|------------|-----------|------------|------|-------|
| 330.00 | 100.00 | 16.40 ±0.2 | 2.00 ±0.1 | 13.00 ±0.2 | 2.00 | 10.00 |

TD3281 Package Marking

TD3281 Package Weights

| Device | Single Unit | Full Tube (60pcs) | Full Pouch (10 tubes) | Full Reel (1000pcs) |
|------------|-------------|----------------------|--------------------------|------------------------|
| TD3281 | 0.41 | 43 | 450 | - |
| TD3281-S | 0.40 | 42 | 440 | - |
| TD3281-H | 0.42 | 44 | 460 | - |
| TD3281-STR | 0.40 | - | - | 880 |

Note: All weights above are in GRAMS, and include packaging materials where applicable

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