



## Description

The TD3053 consists of a single input AlGaAs LED optically coupled to a Random Phase triac driver chip. The TD3053 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 110V<sub>AC</sub> to 240V<sub>AC</sub> lines.

The TD3053 comes standard in a miniature 6 pin DIP package making it ideal for high-density board applications.

## Features

- Random Phase Switching
- 600V Blocking Voltage
- Trigger Current (5mA MAX)
- High Isolation Voltage (5000V<sub>RMS</sub>)
- 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

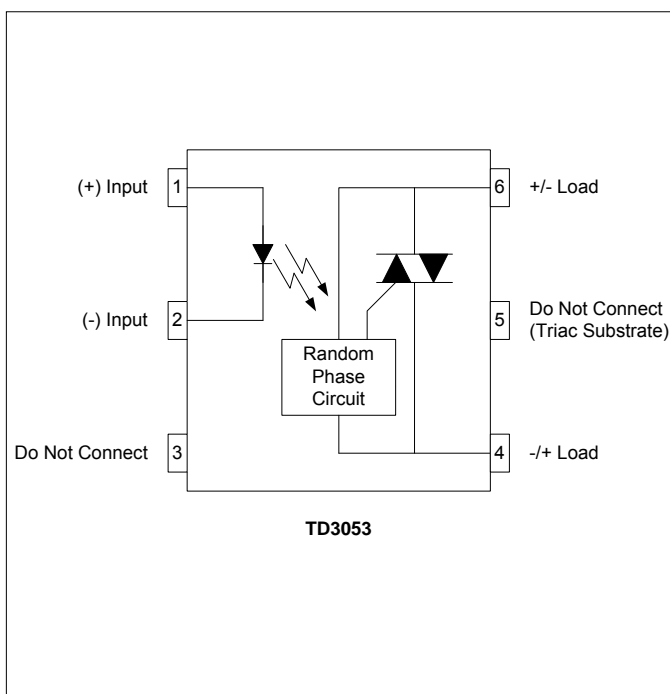
UL/C-UL: File # E201932  
VDE: File # 40035191 (EN 60747-5-2)

## 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 Voltage .....5V  
Input Power Dissipation.....40mW  
Output Power Dissipation .....330mW  
Solder Temperature – Wave (10sec).....260°C  
Solder Temperature – IR Reflow (10sec).....260°C

## Schematic Diagram



## Ordering Information

Part Number	Description
TD3053	6 pin DIP, (60/Tube)
TD3053-H	0.40" (10.16mm) Lead Spacing (VDE0884)
TD3053-S	6 pin SMD, (60/Tube)
TD3053-STR	6 pin SMD, Tape and Reel (1000/Reel)

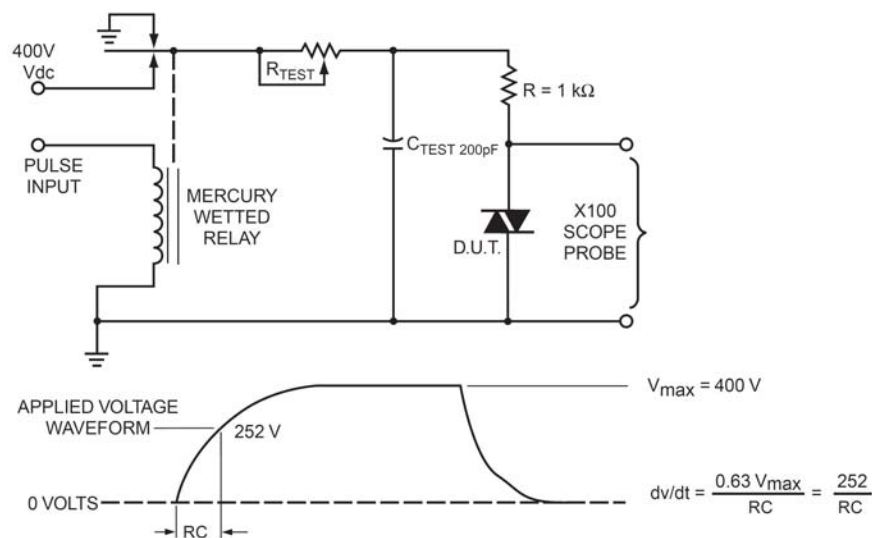
**NOTE: Suffixes listed above are not included in marking on device for part number identification**

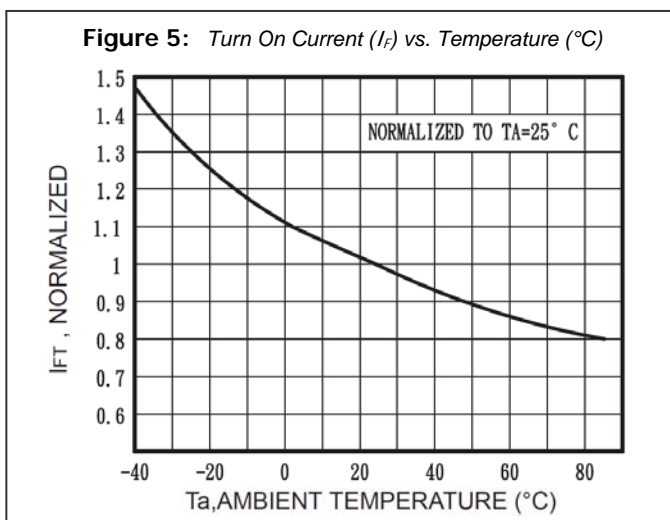
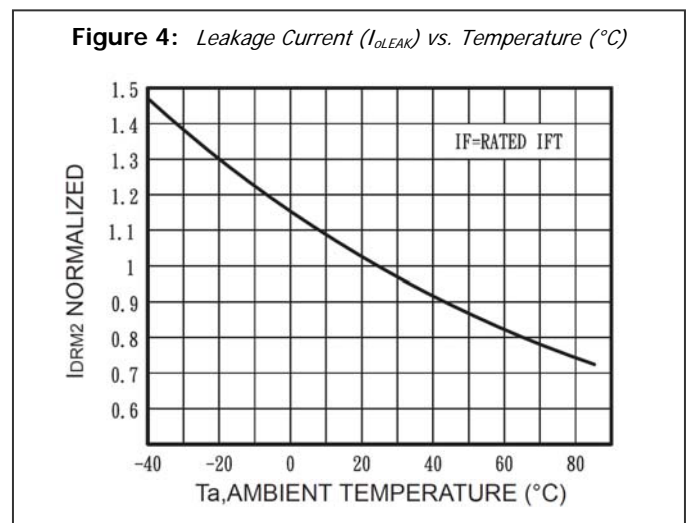
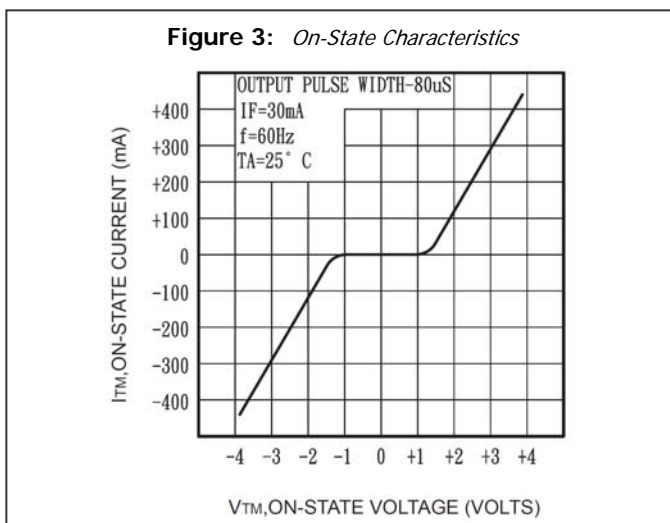
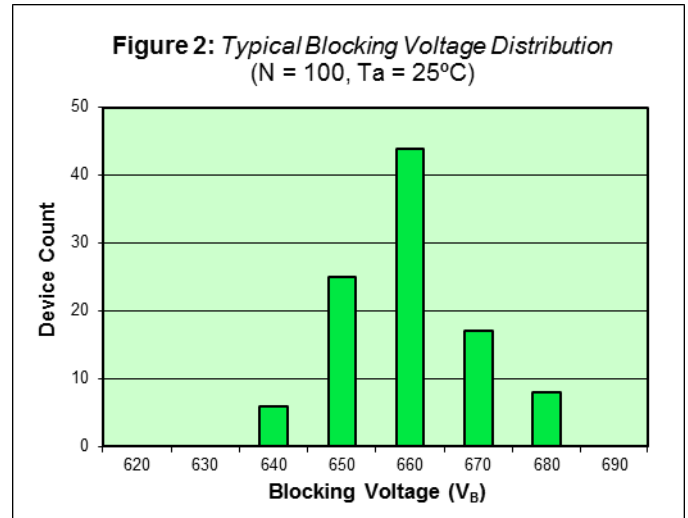
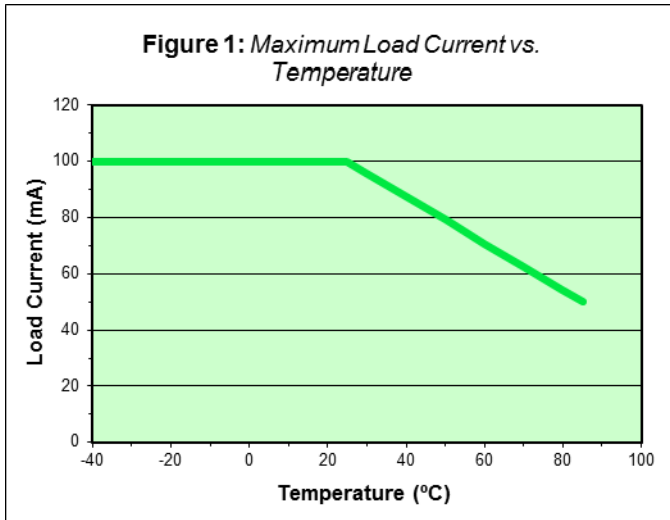
**Electrical Characteristics,  $T_A = 25^\circ\text{C}$  (unless otherwise specified)**

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
<b>Input Specifications</b>						
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	$\mu\text{A}$	$V_R = 5\mu\text{A}$
Trigger Current <sup>1</sup>	$I_{InOn}$	-	-	5	mA	Main Terminal Voltage = 3V
<b>Output Specifications</b>						
Blocking Voltage	$V_{DRM}$	600	-	-	V	$I_O = 1\mu\text{A}$
Peak Blocking Current	$I_{DRM1}$	-	10	100	nA	$V_{DRM} = 600$
Continuous Load Current	$I_O$	-	-	100	mA	$I_F = 5\text{mA}$
On-State Voltage	$V_{ON}$	-	2	3	V	$I_F = 5\text{mA}, I_{TM} = 100\text{mA}$
Leakage Current	$I_{DRM2}$	-	0.2	1	$\mu\text{A}$	$I_F = 0\text{mA}, V_{DRM} = 600\text{V}$
Holding Current	$I_{HOLD}$	-	250	-	$\mu\text{A}$	-
Critical Rate of Rise <sup>2</sup>	$dV/dt$	1,000	1,500	-	$\text{V}/\mu\text{S}$	-
<b>Isolation Specifications</b>						
Isolation Voltage	$V_{ISO}$	5,000	-	-	$V_{RMS}$	$RH \leq 50\%, t=1\text{min}$
Input-Output Resistance	$R_{I-O}$	-	$10^{12}$	-	$\Omega$	$V_{I-O} = 500V_{DC}$

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

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

**TD3053 Static  $dV/dt$  Test Circuit:**


**TD3053 Performance & Characteristics Plots,  $T_A = 25^\circ\text{C}$  (unless otherwise specified)**


**TD3053 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:

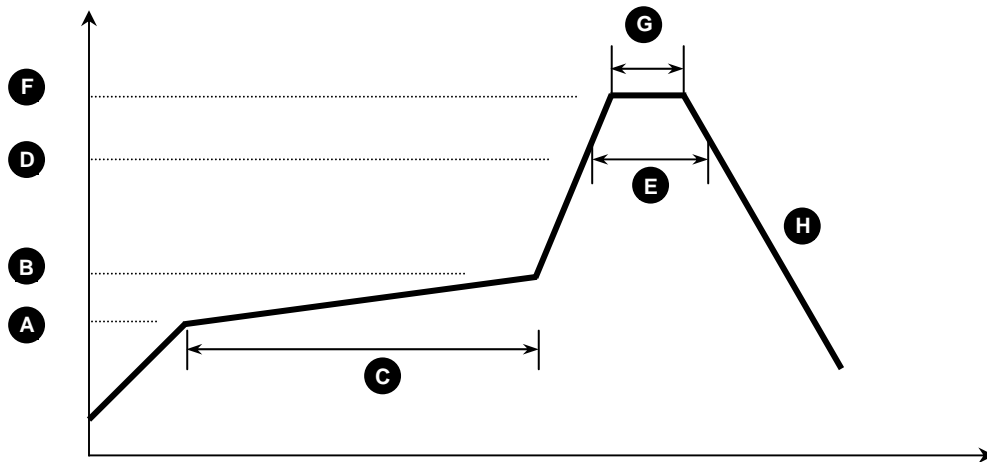


Figure 1

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

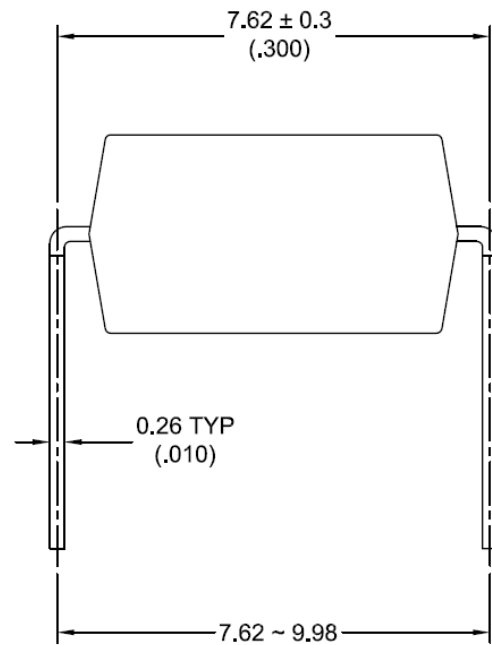
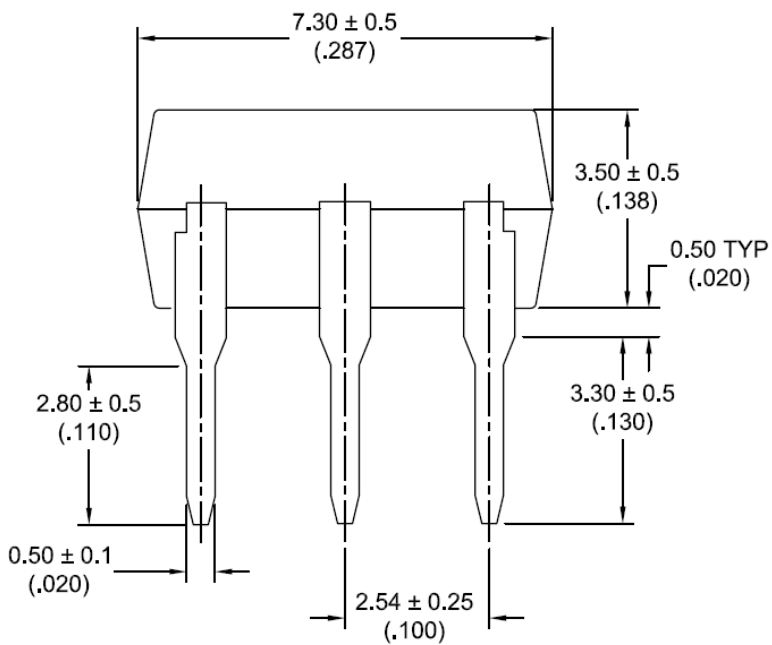
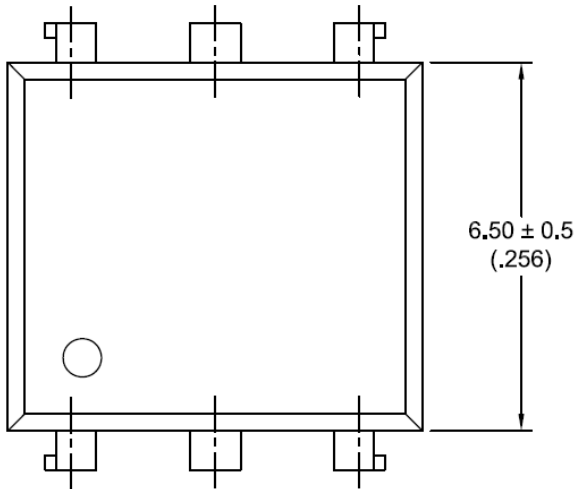
**(3) *Hand Solder:***

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

**TD3053 Package Dimensions**

6 PIN DIP Package

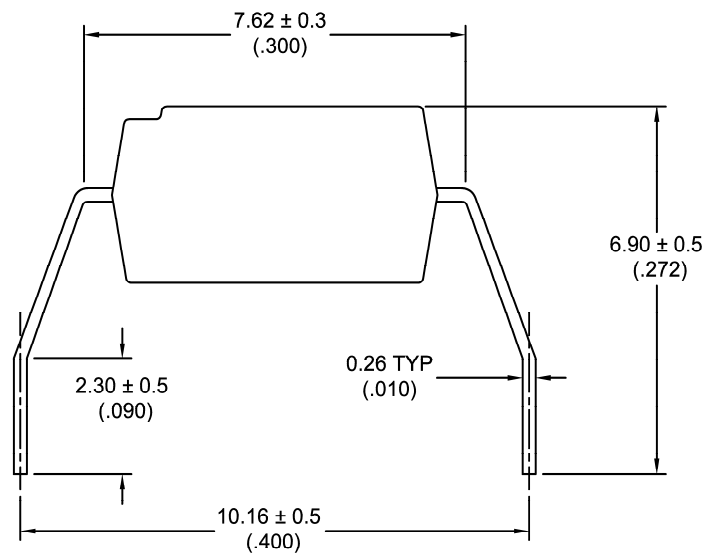
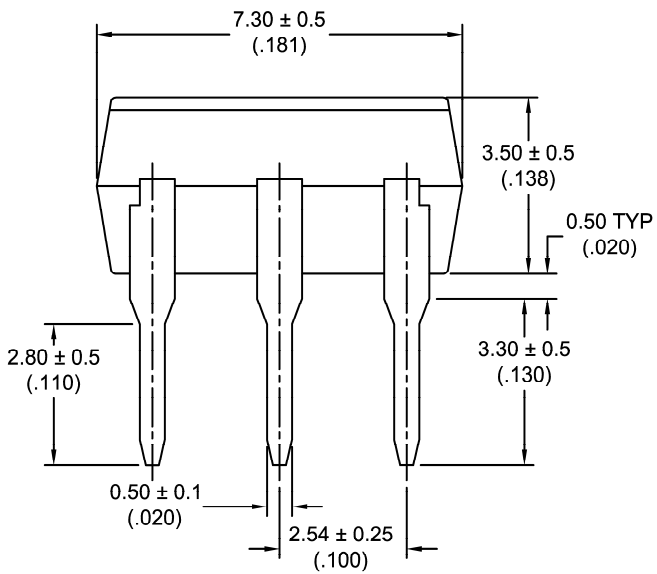
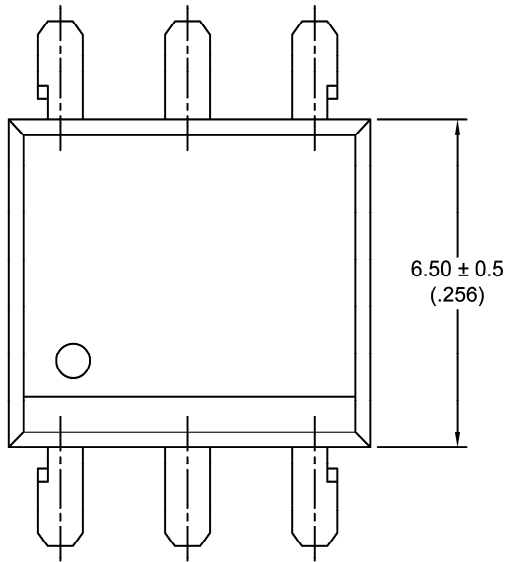
**Note:** All dimensions in millimeters with inches ["] in parenthesis ( )



**TD3053 Package Dimensions**

6 PIN WIDE Lead Space Package (-H)

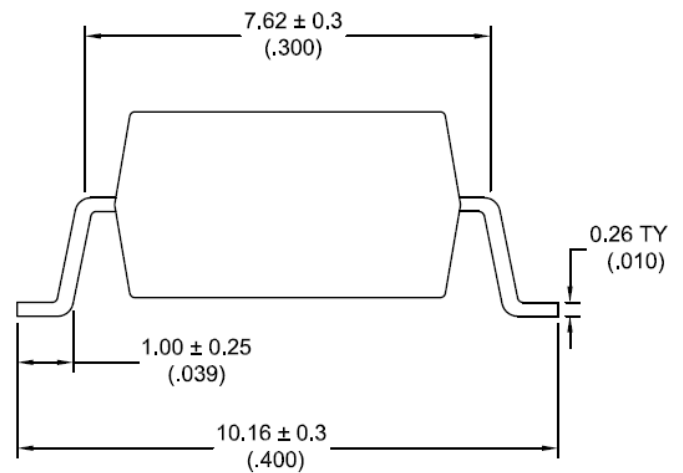
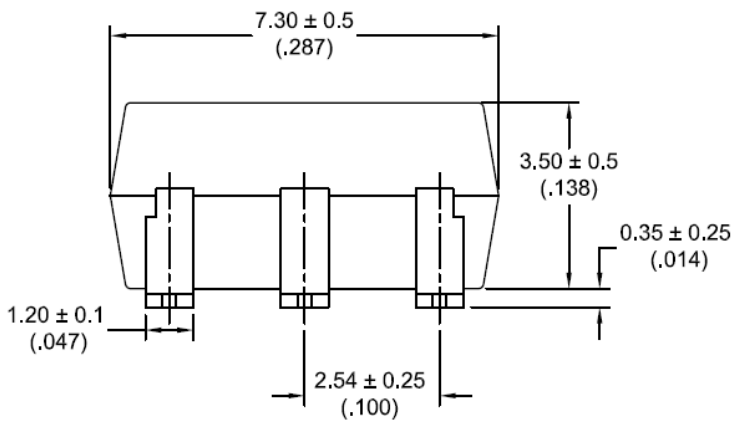
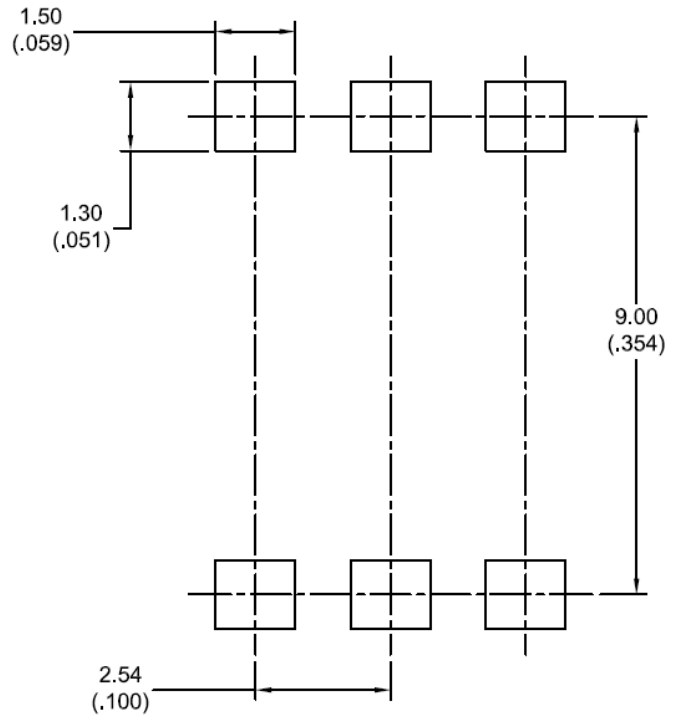
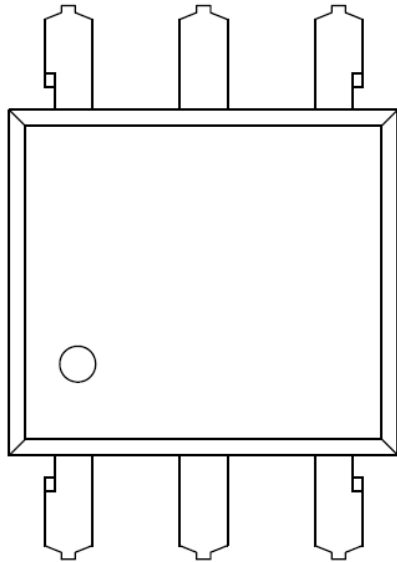
**Note:** All dimensions in millimeters [mm] with inches in parenthesis ( )



**TD3053 Package Dimensions**

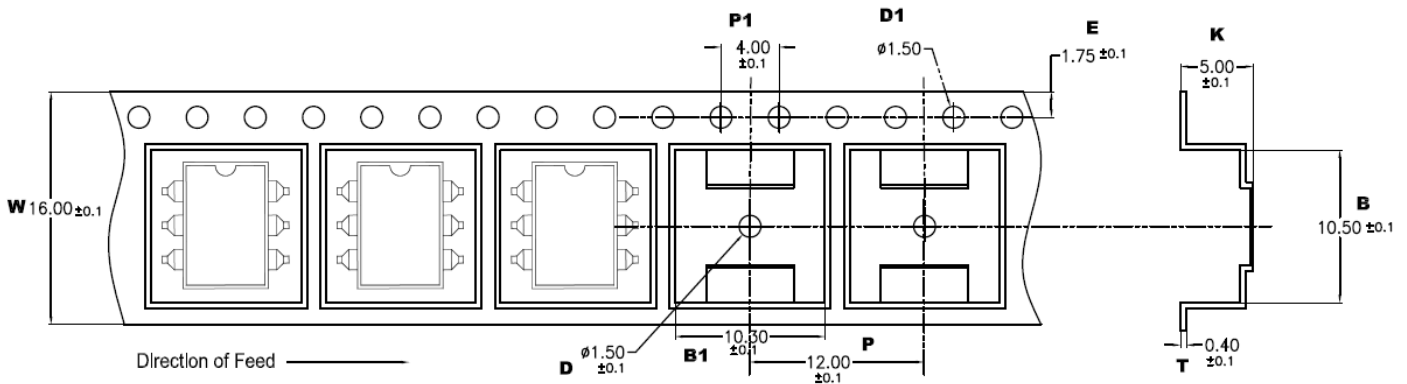
6 PIN SMD Surface Mount Package (-S)

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

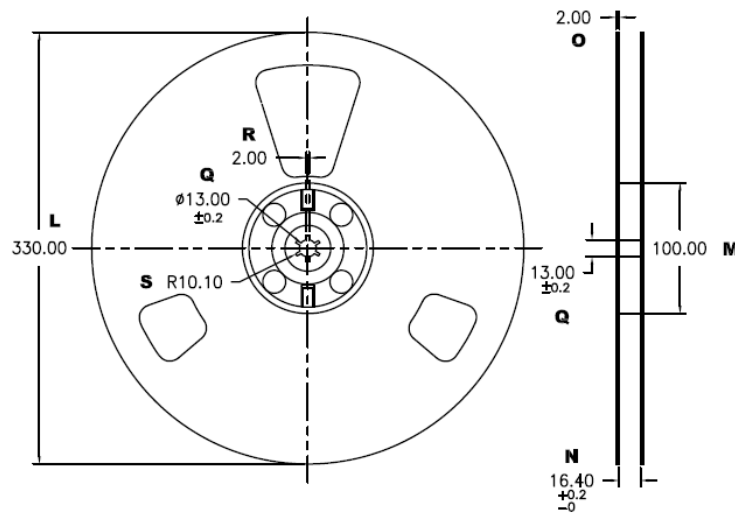


**TD3053 Package Dimensions**

6 PIN SMD Tape &amp; Reel (-STR)

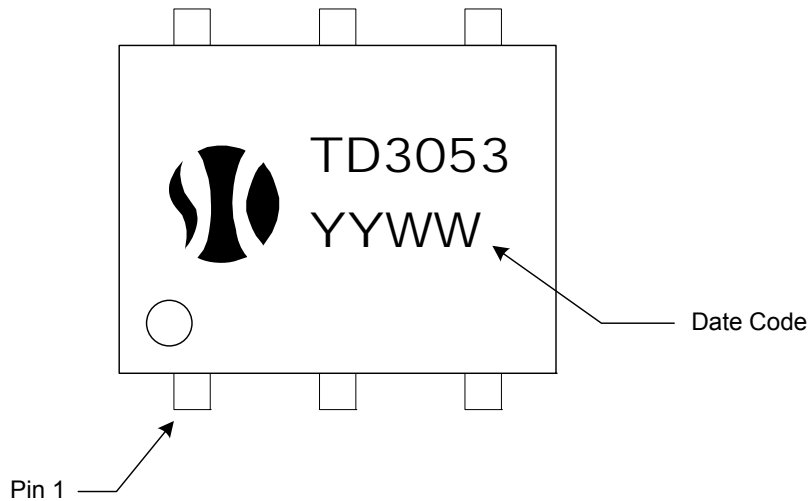
**Note:** All dimensions in millimeters


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



**TD3053 Package Marking**

**TD3053 Package Weights**

Device	Single Unit	Full Tube (60pcs)	Full Pouch (10 tubes)	Full Reel (1000pcs)
TD3053	0.41	43	450	-
TD3053-S	0.40	42	440	-
TD3053-H	0.42	44	460	-
TD3053-STR	0.40	-	-	880

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

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