



**Description**

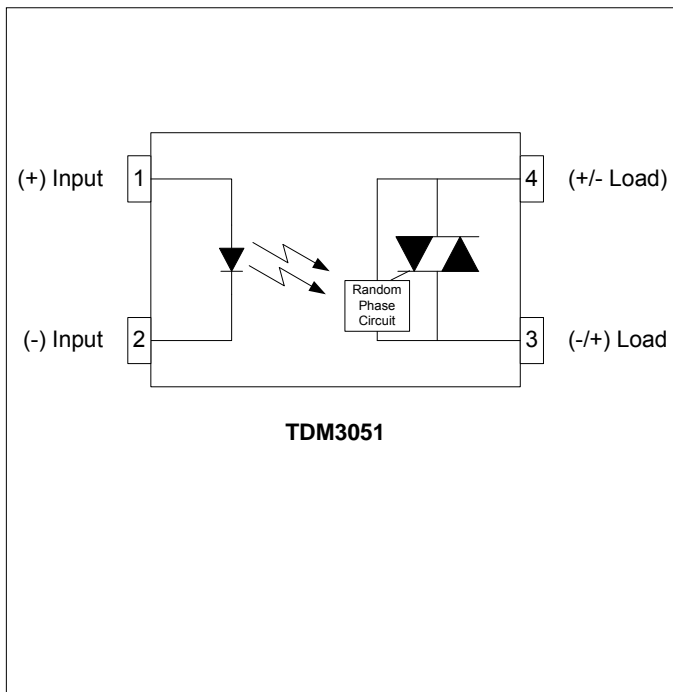
The TDM3051 consists of a GaAs LED optically coupled to a Random Phase photo-sensitive Triac Driver chip. The miniature 4 pin SOP package provides high input-to-output isolation and drives high powered triacs while using very little board space. Typical uses include interfacing logic level control signals to equipment powered from 110V<sub>AC</sub> to 240V<sub>AC</sub> lines.

The TDM3051 comes standard in a miniature 4 pin SOP package.

**Applications**

- Home Appliances
- Motor / Drive Controls
- Solid State Relays
- High Power Triacs
- Dimmer Controls

**Schematic Diagram**



**Features**

- Ultra Miniature 4-Pin Small Outline Package
- Random Phase Switching
- 600V Blocking Voltage
- Low Trigger Current (15mA MAX)
- High Input-to-Output Isolation (3.75kV<sub>RMS</sub>)
- Long Life / High Reliability
- RoHS / Pb-Free / REACH Compliant

**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 .....	500mA
Reverse Input Control Voltage .....	5V
Input Power Dissipation .....	70mW
Total Power Dissipation .....	170mW
Solder Temperature – Wave (10sec).....	260°C
Solder Temperature – IR Reflow (10sec).....	260°C

**Ordering Information**

Part Number	Description
TDM3051	4 pin SOP, (100/Tube)
TDM3051-TR	4 pin SOP, Tape and Reel (2000/Reel)

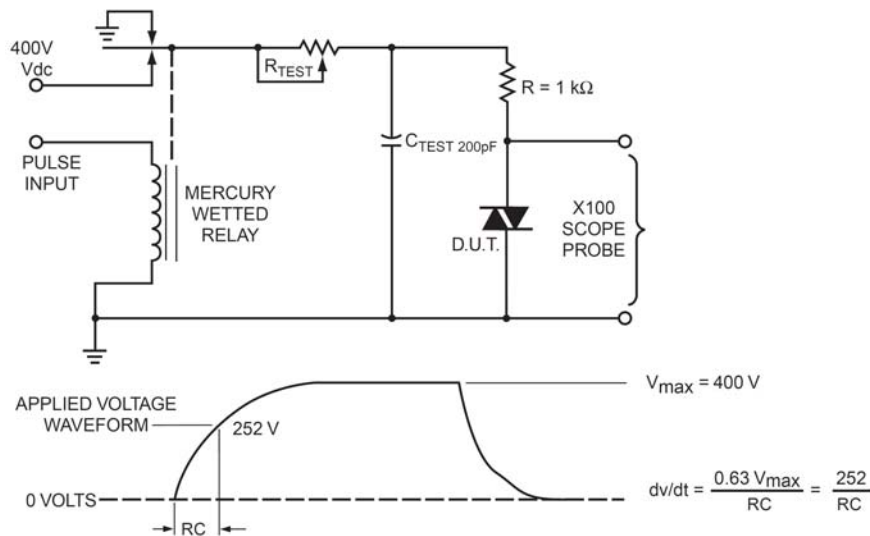
**NOTES: Suffixes listed above are not included in marking on device for part number identification**

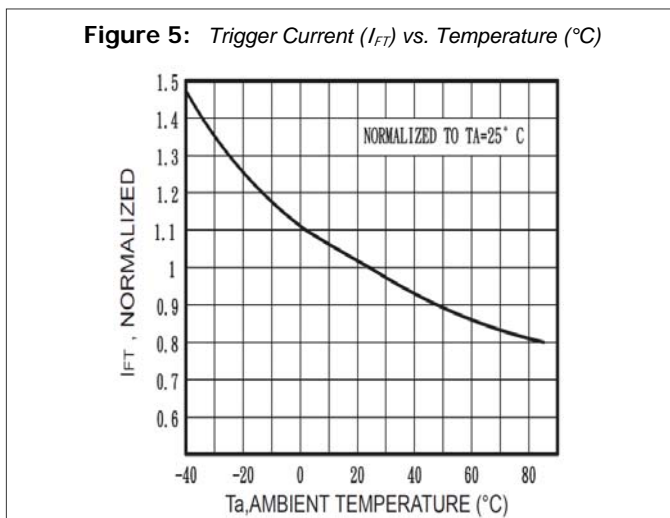
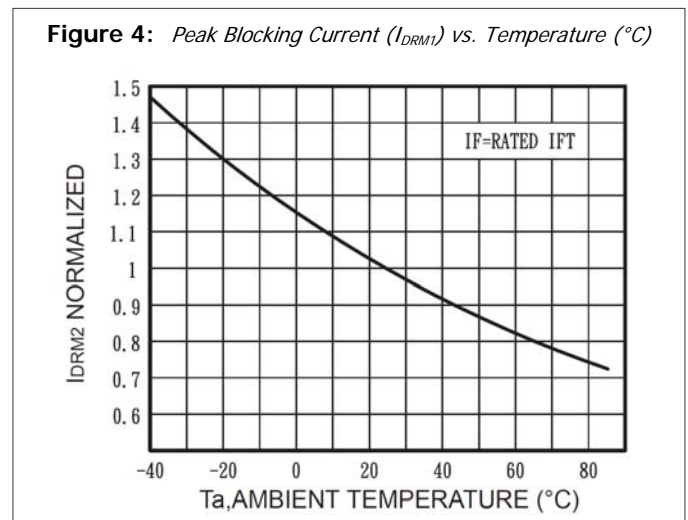
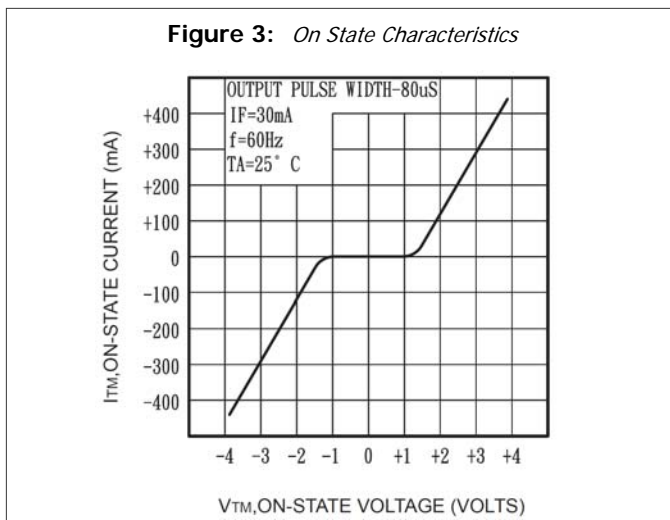
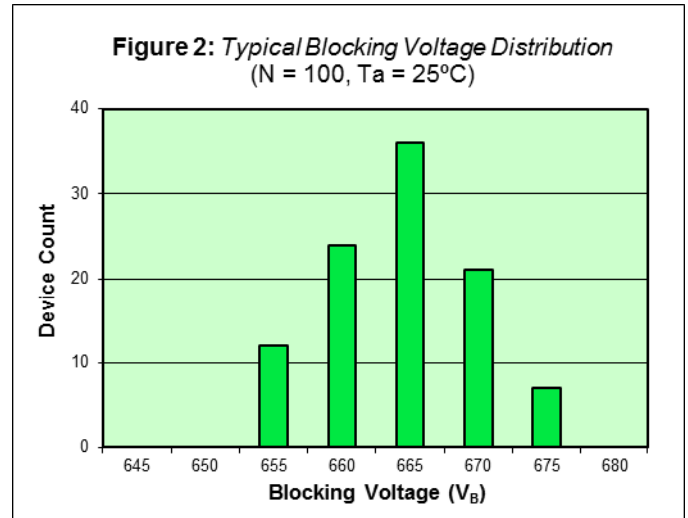
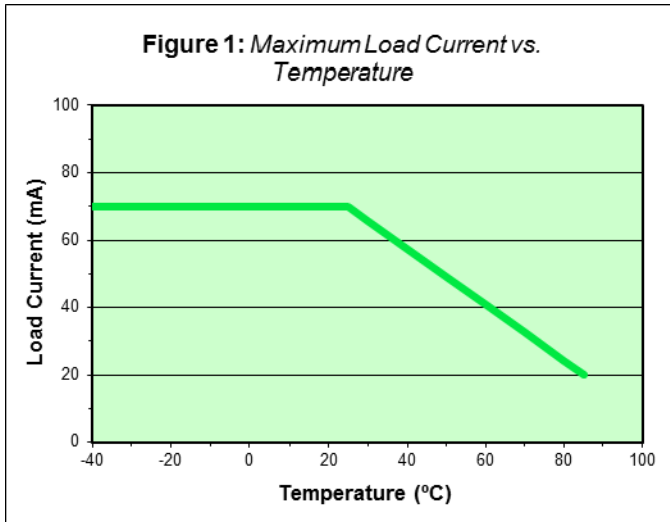
**Electrical Characteristics,  $T_A = 25^\circ\text{C}$  (unless otherwise specified)**

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>	$I_{FT}$	-	-	15	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	$I_O$	-	-	70	mA	$I_F = 15\text{mA}$
On-State Voltage	$V_{ON}$	-	2	3	V	$I_F = 15\text{mA}, I_{TM} = 70\text{mA}$
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	$V_{ISO}$	3,750	-	-	$V_{RMS}$	$RH \leq 50\%, t=1\text{min}$
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

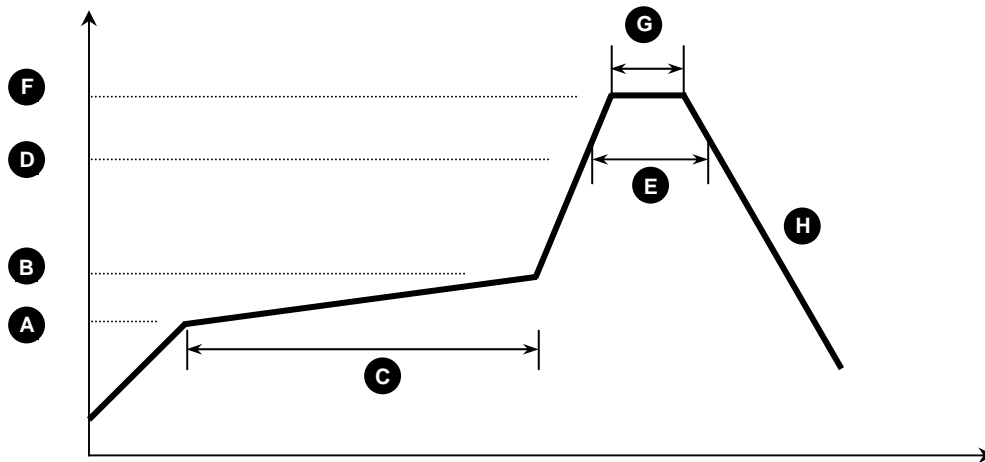
Note 2: This is for static  $dV/dt$ . Test Circuit Below

**TDM3051 Static  $dV/dt$  Test Circuit:**


**TDM3051 Performance & Characteristics Plots,  $T_A = 25^\circ\text{C}$  (unless otherwise specified)**


**TDM3051 Solder Reflow 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:



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

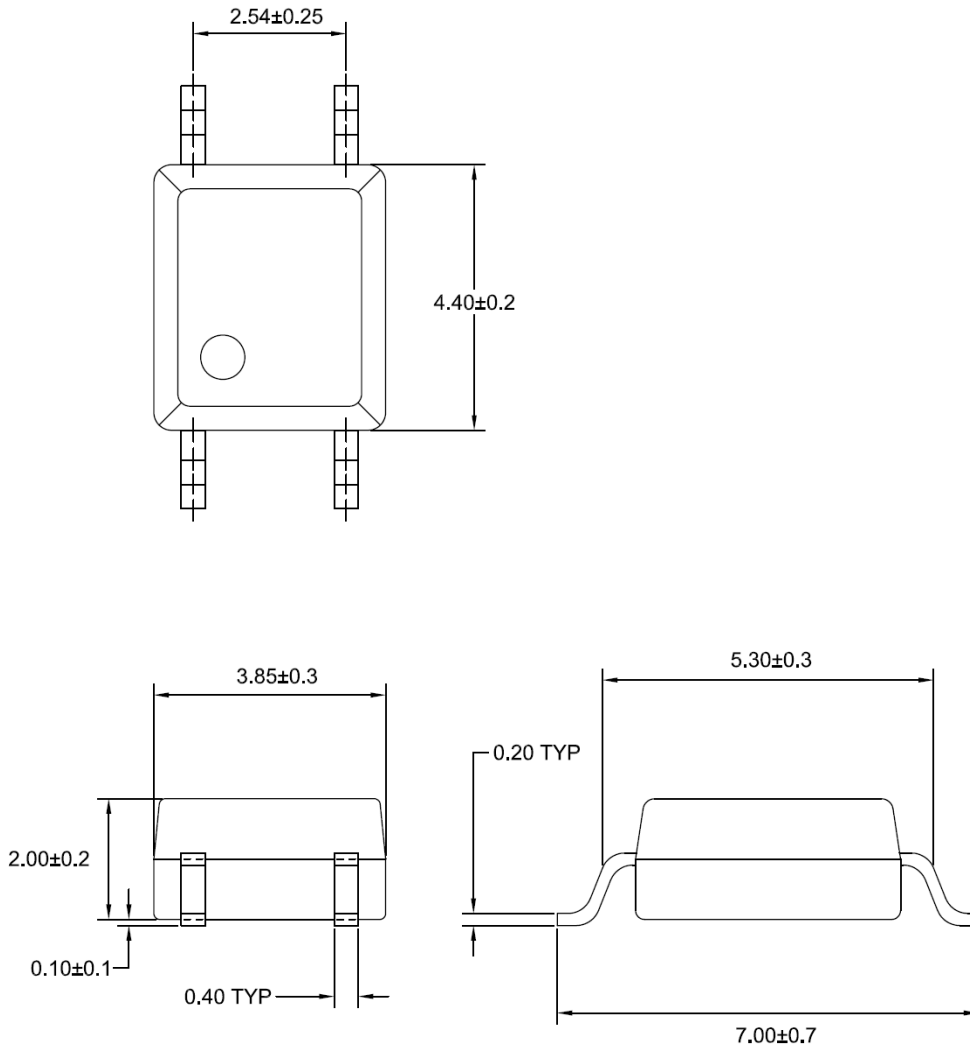
**(3) *Hand Solder:***

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

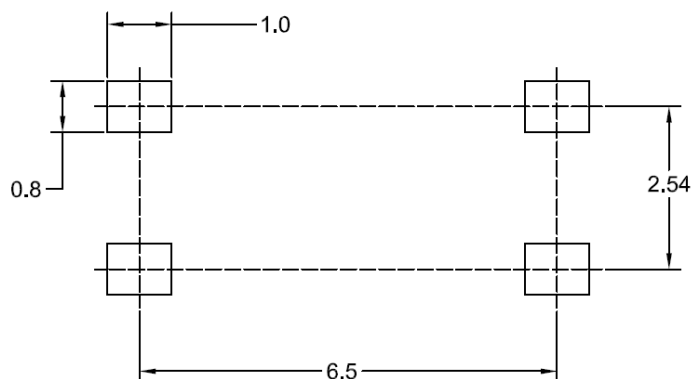
**TDM3051 Package Dimensions**

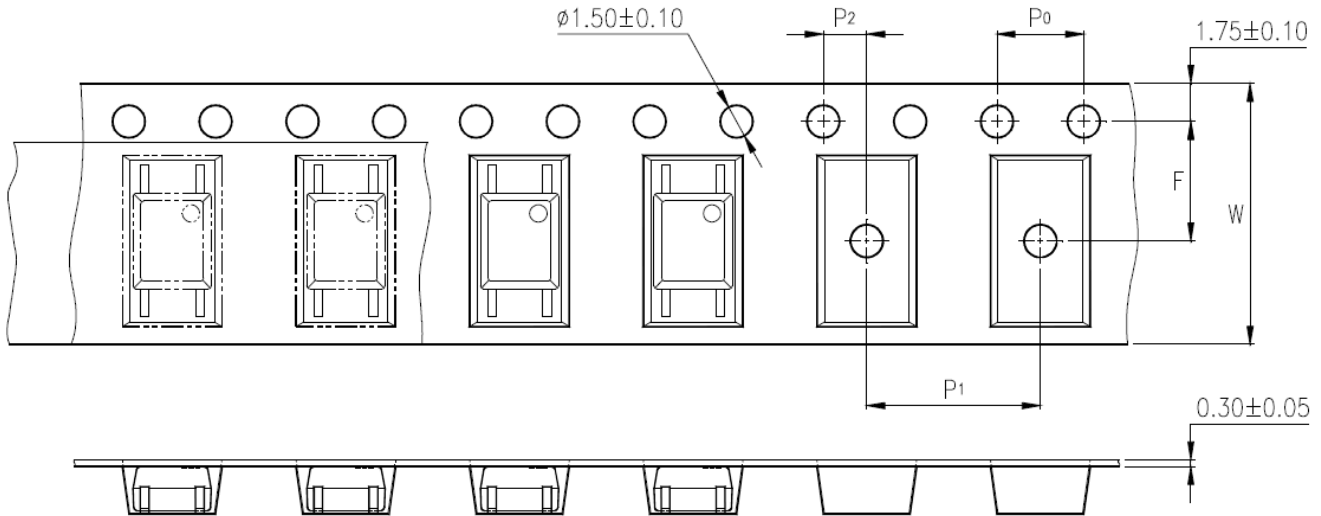
4 PIN SOP Package

**Note:** All dimensions in millimeters [mm]



4 PIN SOP Footprint



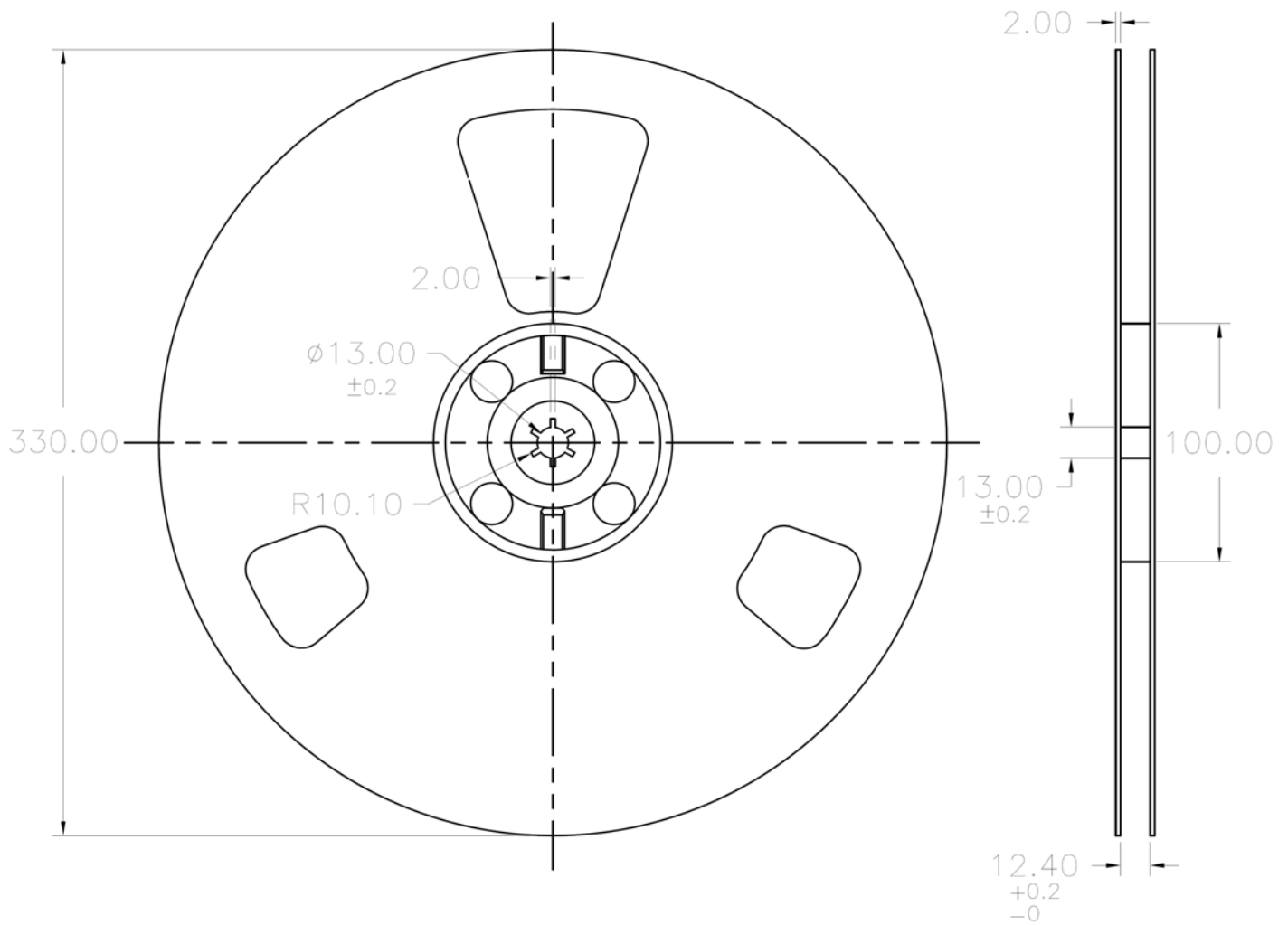
**TDM3051 Packaging Specifications**
*Tape & Reel Specifications (T&R)*
**Note:** All dimensions in millimeters [mm]


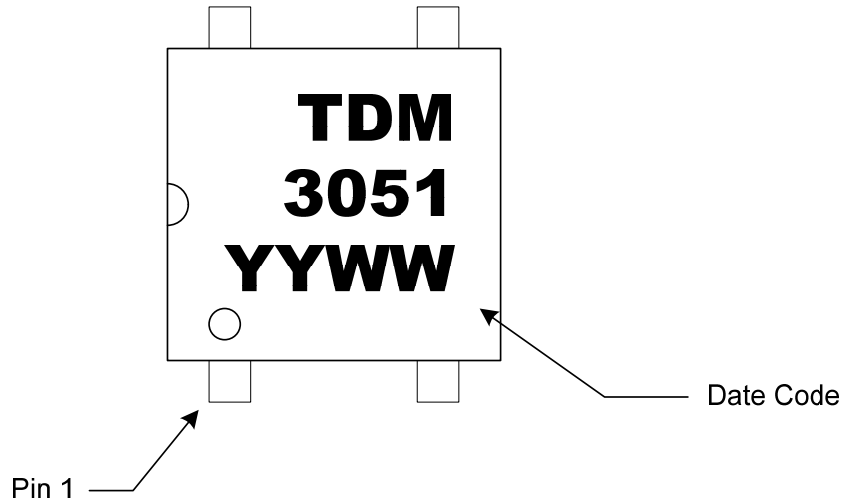
Specification	Symbol	Dimensions, mm ( inches )
Tape Width	W	$12 \pm 0.3$ ( 0.47 )
Sprocket Hole Pitch	P0	$4 \pm 0.1$ ( 0.15 )
Compartment Location	F P2	$5.5 \pm 0.1$ ( 0.217 ) $2 \pm 0.1$ ( 0.079 )
Compartment Pitch	P1	$8 \pm 0.1$ ( 0.315 )

**TDM3051 Packaging Specifications**

*Tape & Reel Specifications (T&R)*

**Note:** All dimensions in millimeters [mm]



**TDM3051 Package Marking**

**TDM3051 Package Weights**

Device	Single Unit	Full Tube (100pcs)	Full Pouch (10 tubes)	Full Reel (2000pcs)
TDM3051	0.10	23	240	-
TDM3051-TR	0.10	-	-	500

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

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