SOLID STATE OPTRONICS

TDM3023

Random Phase Switching
400V
Triac Driver

Description

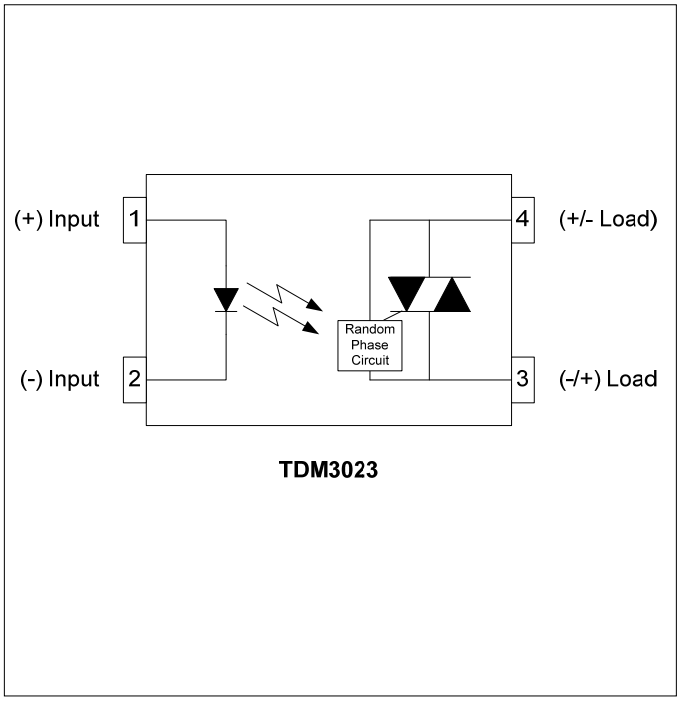
The TDM3023 consists of a GaAs LED optically coupled to a Random Phase photo-sensitive Triac Driver chip. The miniature 4 pin SOP package provides high input-to-output isolation and drives high powered triacs while using very little board space. Typical uses include interfacing logic level control signals to equipment powered from $110V_{AC}$ lines.

The TDM3023 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



TDM3023

Features

- Ultra Miniature 4-Pin Small Outline Package
- Random Phase Switching
- 400V Blocking Voltage
- Low Trigger Current (5mA MAX)
- High Input-to-Output Isolation ($3.75kV_{RMS}$)
- 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
TDM3023	4 pin SOP, (100/Tube)
TDM3023-TR	4 pin SOP, Tape and Reel (2000/Reel)

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

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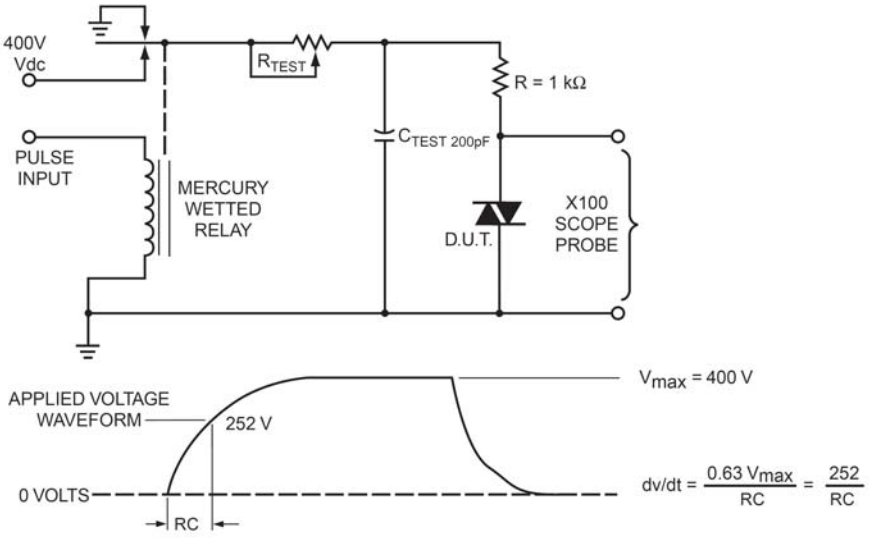
Electrical Characteristics, T_A = 25°C (unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Input Specifications						
LED Forward Voltage	V_F	-	1.4	1.8	V	I_F = 10mA
LED Reverse Voltage	BV_R	5	-	-	V	I_R = 10µA
Reverse Leakage Current	$I_{InRleak}$	-	-	10	µA	V_R = 5µA
Trigger Current[1]	I_{FT}	-	-	5	mA	Main Terminal Voltage = 3V
Output Specifications						
Blocking Voltage	V_{DRM}	400	-	-	V	I_O = 1µA
Peak Blocking Current	I_{DRM1}	-	10	100	nA	V_{DRM} = 400
Continuous Load Current	I_O	-	-	70	mA	I_F = 5mA
On-State Voltage	V_{ON}	-	2	3	V	I_F = 5mA, I_{TM} = 70mA
Leakage Current	I_{DRM2}	-	0.2	1	µA	I_F=0mA, V_{DRM} = 400V
Holding Current	I_{HOLD}	-	250	-	µA	-
Critical Rate of Rise[2]	dV/dt	1,000	1,500	-	V/µS	-
Isolation Specifications						
Isolation Voltage	V_{ISO}	3,750	-	-	V_{RMS}	RH ≤ 50%, t=1min
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

TDM3023 Static dV/dt Test Circuit:



TDM3023 Performance & Characteristics Plots, T_A = 25°C (unless otherwise specified)

Figure 1: *Maximum Load Current vs. Temperature*

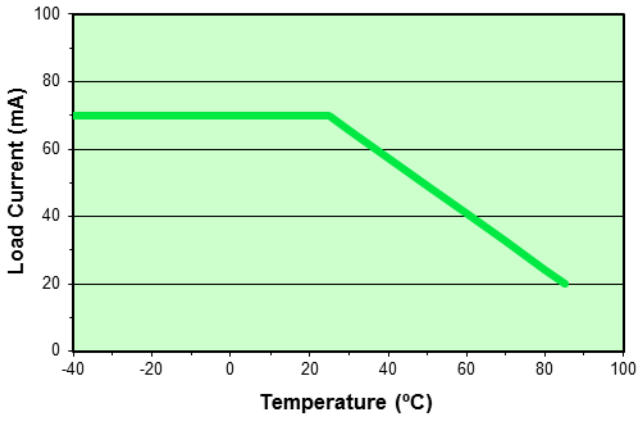


Figure 2: *Typical Blocking Voltage Distribution* (N = 100, Ta = 25°C)

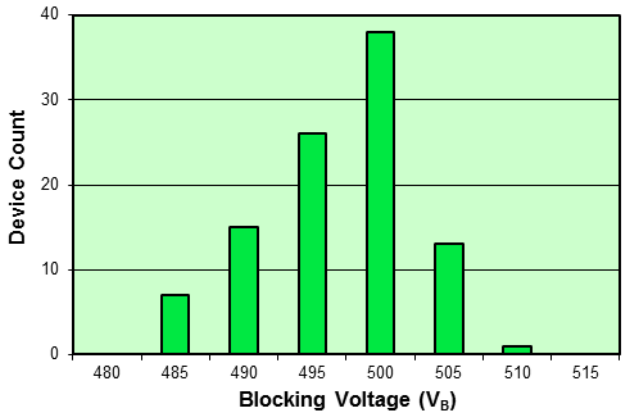


Figure 3: *On State Characteristics*

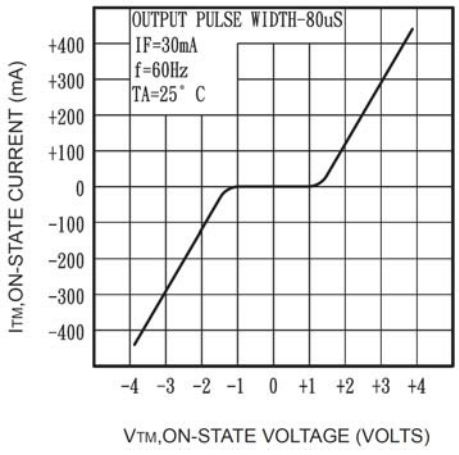


Figure 4: *Peak Blocking Current (I_{DRM1}) vs. Temperature (°C)*

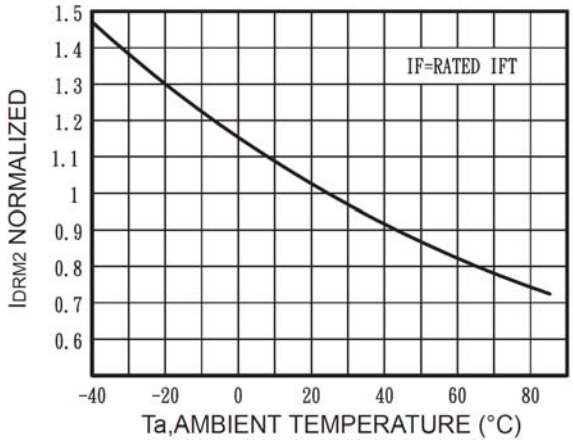
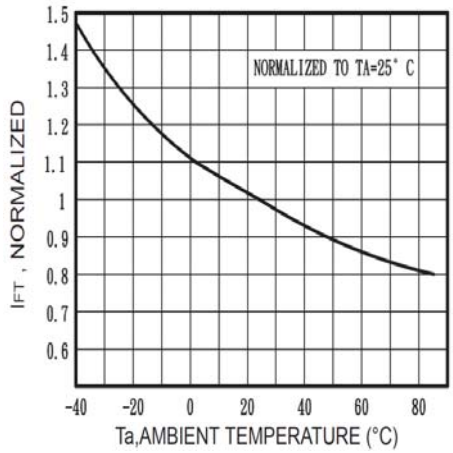


Figure 5: *Trigger Current (I_{FT}) vs. Temperature (°C)*

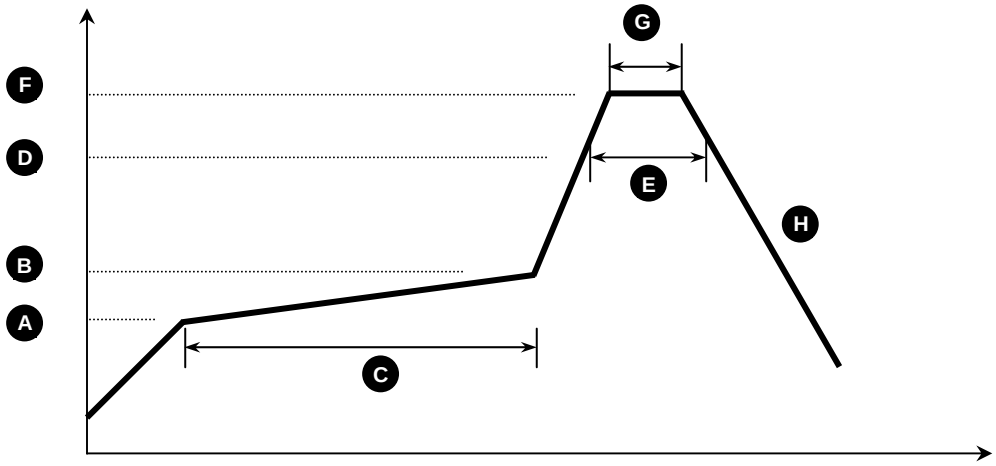


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TDM3023 Solder Reflow Temperature Profile Recommendations

(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 250ºC:



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

(2) *Wave Solder:*

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

(3) *Hand Solder:*

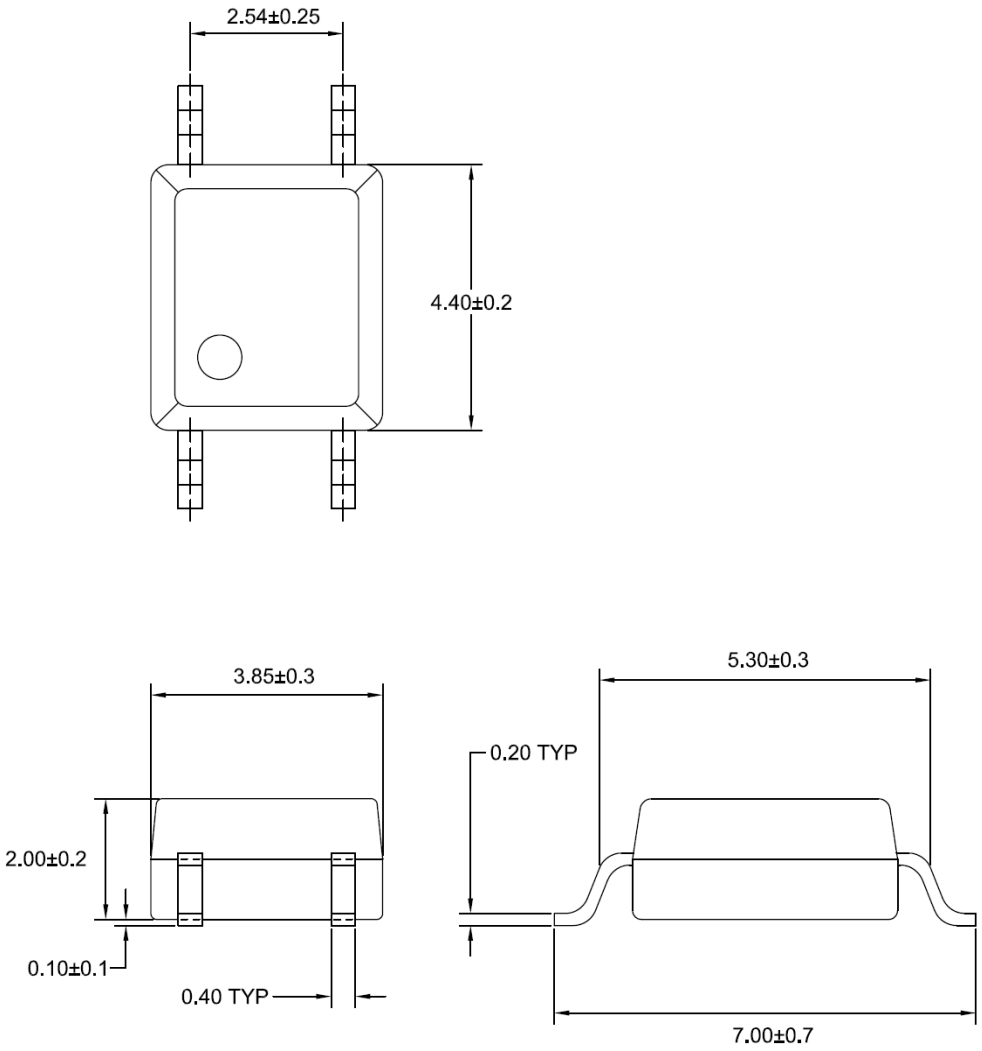
Maximum Temperature:	350ºC (at tip of soldering iron)
Maximum Time:	3s
Single Occurrence	

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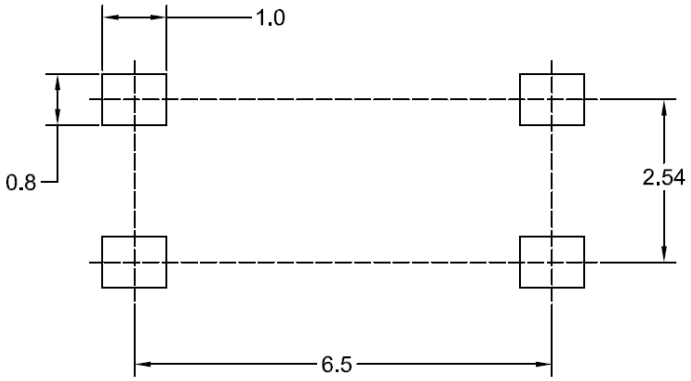
TDM3023 Package Dimensions

4 PIN SOP Package

Note: *All dimensions in millimeters [mm]*



4 PIN SOP Footprint

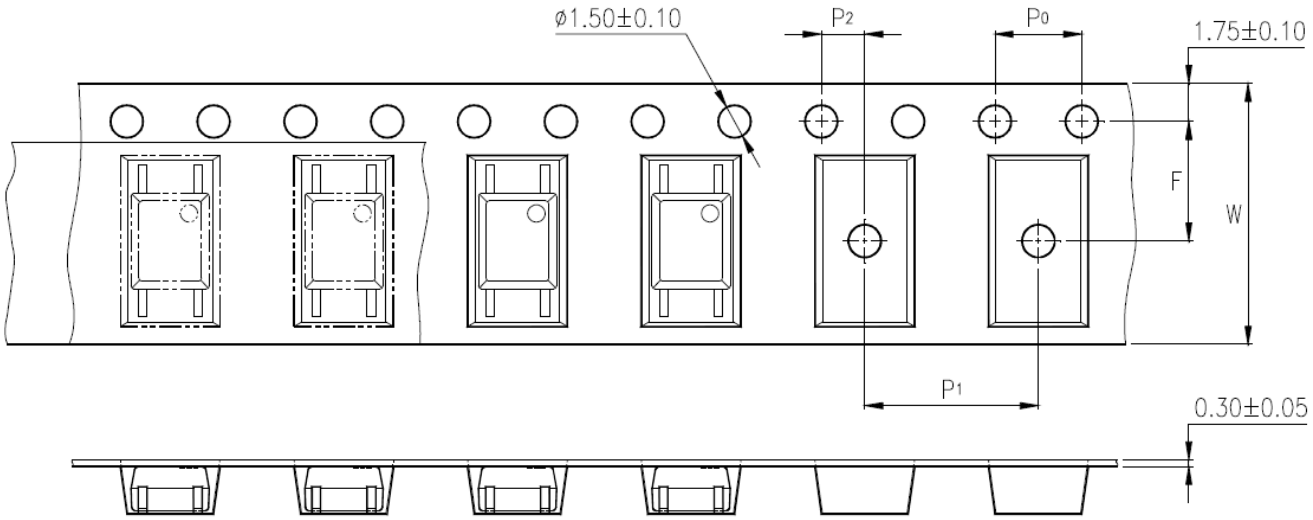


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TDM3023 Packaging Specifications

Tape & Reel Specifications (T&R)

Note: *All dimensions in millimeters [mm]*



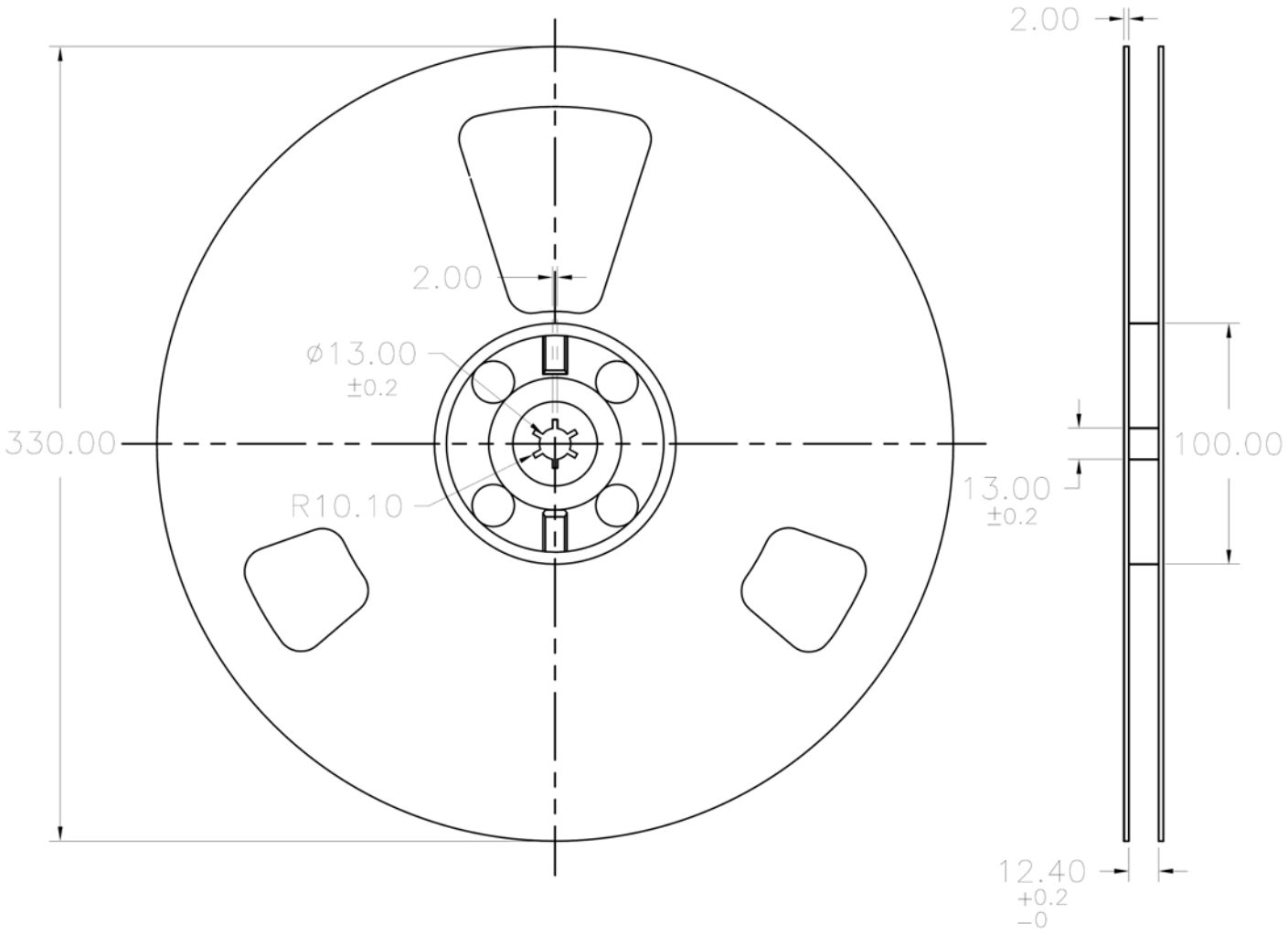
Specification	Symbol	Dimensions, mm (inches)
Tape Width	W	12 ± 0.3 (0.47)
Sprocket Hole Pitch	P0	4 ± 0.1 (0.15)
Compartment Location	F P2	5.5 ± 0.1 (0.217) 2 ± 0.1 (0.079)
Compartment Pitch	P1	8 ± 0.1 (0.315)

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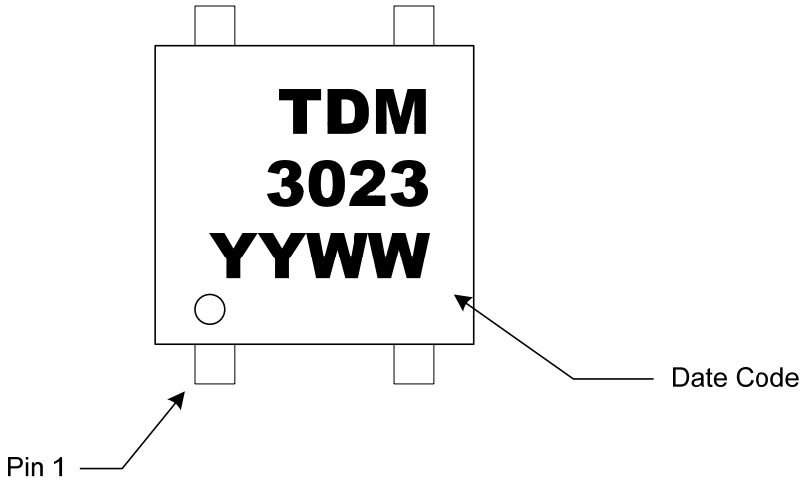
TDM3023 Packaging Specifications

Tape & Reel Specifications (T&R)

Note: *All dimensions in millimeters [mm*



TDM3023 Package Marking



TDM3023 Package Weights

Device	Single Unit	Full Tube (100pcs)	Full Pouch (10 tubes)	Full Reel (2000pcs)
TDM3023	0.10	23	240	-
TDM3023-TR	0.10	-	-	500

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

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