

### Product Overview

The RFSW6222 is a Dual-Pole Double-Throw (DPDT) switch designed for general purpose switching applications. The low insertion loss along with excellent linearity performance makes the RFSW6222 ideal for filter or amplifier bypass switching. The operational supply voltage is from 2.4V to 3.5V. And the control logic is compatible with 1.3V and 2.7V systems. The standard 12-pin QFN package in 2.0mm x 2.0mm size is a compact, easy-to-use, switch component for quick integration into multi-mode, multi-band systems.

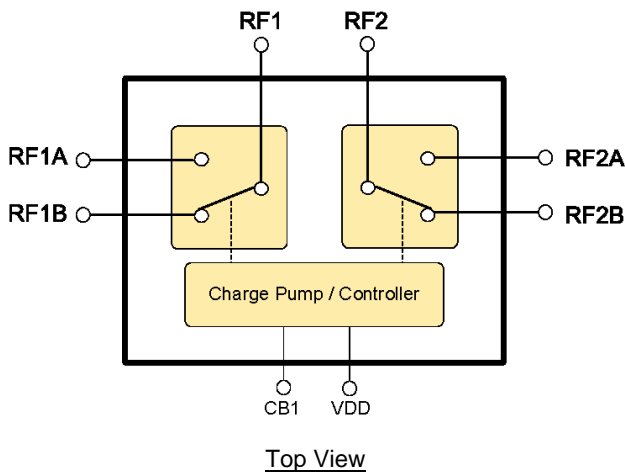


12-Pin, 2 x 2 mm QFN Package

### Key Features

- 50 – 3700 MHz Operation
- Low Insertion Loss: 0.29dB at 2700MHz Typical
- High Port-to-Port Isolation: 29dB at 2700MHz Typical
- Power Handling  $\leq$  +35dBm
- Very Low Current Consumption
- 1.3V to 2.7V GPIO Compatible

### Functional Block Diagram



### Applications

- Filter Switching
- LNA Bypass Switching
- Antenna Switching
- Dual Single-Ended Configuration
- Differential Pair Configuration

### Ordering Information

Part No.	Description
RFSW6222TR7	2,500 pieces on a 7" reel
RFSW6222 PCBA-410	50 MHz – 3700MHz Evaluation Board

## Absolute Maximum Ratings

Parameter	Rating	
Storage Temperature	-65 to +150 °C	
RF Input Power, Momentary Infrequent	50 Ω Load	+38 dBm
	6:1 VSWR	+36dBm
RF Input Power, Continuous	50 Ω Load	+36 dBm
	6:1 VSWR	+35dBm
DC Supply Voltage (VDD)	+3.9 V	
Control Voltage to Digital Input (CB1)	+3.0 V	

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability.

## Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
Device Voltage (VDD)	+2.4	+2.8	+3.5	V
T <sub>CASE</sub>	-30	+25	+90	°C

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

## Electrical Specifications

Parameter	Conditions <sup>(1)</sup>	Min	Typ	Max	Units	
Operational Frequency Range		50		2700	MHz	
Insertion Loss <sup>(2)</sup> (RFx to RFxA/RFxB)	700 MHz to 960 MHz		0.26	0.40	dB	
	961 MHz to 1710 MHz		0.26	0.45	dB	
	1711 MHz to 2170 MHz		0.27	0.45	dB	
	2171 MHz to 2700 MHz		0.29	0.50	dB	
Isolation (RF1 to RF1A/RF1B)	700 MHz to 960 MHz	31	40		dB	
	961 MHz to 1710 MHz	25	36		dB	
	1711 MHz to 2170 MHz	25	30		dB	
	2171 MHz to 2700 MHz	25	30		dB	
Isolation (RF2 to RF2A/RF2B)	700 MHz to 960 MHz	31	40		dB	
	961 MHz to 1710 MHz	25	35		dB	
	1711 MHz to 2170 MHz	25	32		dB	
	2171 MHz to 2700 MHz	25	29		dB	
Phase Balance			± 5		°	
IP3	700 MHz to 2700MHz, +35dBm		70		dBm	
Harmonics	2 x f <sub>0</sub>	f <sub>0</sub> 787 MHz, Pin 26 dBm		-79		dBc
	3 x f <sub>0</sub>	f <sub>0</sub> 710 MHz, Pin 26 dBm		-84		dBc
	2 x f <sub>0</sub>	f <sub>0</sub> 915 MHz, Pin 26 dBm		-107	-84	dBc
	3 x f <sub>0</sub>			-106	-84	dBc
	2 x f <sub>0</sub>	f <sub>0</sub> 915 MHz, Pin 35 dBm		-103	-76	dBc
	3 x f <sub>0</sub>			-90	-76	dBc
	2 x f <sub>0</sub>	f <sub>0</sub> 1980 MHz, Pin 26 dBm		-105	-86	dBc
	3 x f <sub>0</sub>			-105	-86	dBc
	2 x f <sub>0</sub>	f <sub>0</sub> 1980 MHz, Pin 32 dBm		-99	-76	dBc
	3 x f <sub>0</sub>			-94	-76	dBc
	2 x f <sub>0</sub>	f <sub>0</sub> 2570 MHz, Pin 26 dBm		-108	-86	dBc
	3 x f <sub>0</sub>			-109	-86	dBc
	2 x f <sub>0</sub>	f <sub>0</sub> 2690 MHz, Pin 26 dBm		-109	-86	dBc
	3 x f <sub>0</sub>			-105	-86	dBc

## Electrical Specifications (Continued)

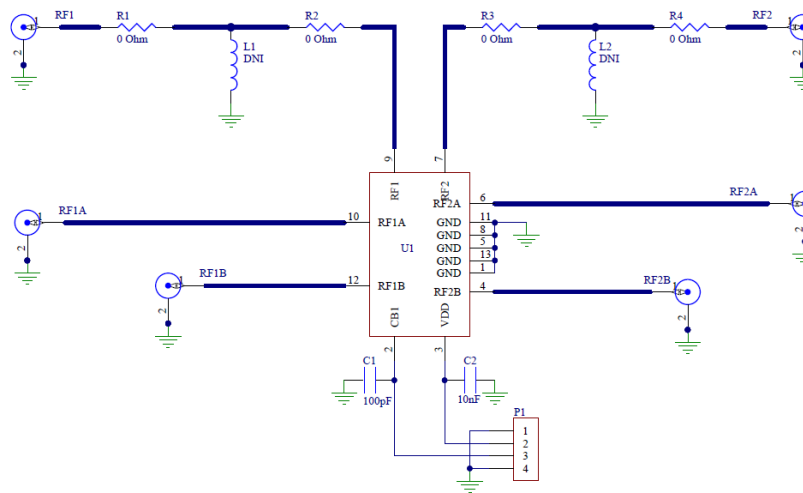
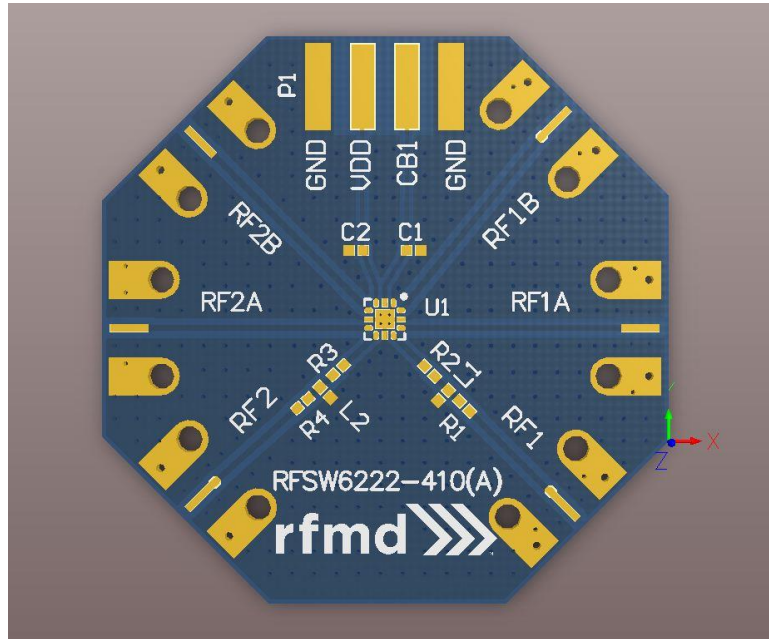
Parameter	Conditions <sup>(1)</sup>	Min	Typ	Max	Units
VSWR	700 MHz to 2700 MHz		1.1:1	1.3:1	Ratio
Device Current, I <sub>VDD</sub>			90	110	μA
Control Current, I <sub>CB1</sub>				1	μA
Control Voltage High, V <sub>CB1</sub>		1.3	1.8	2.7	V
Control Voltage Low, V <sub>CB1</sub>		0		0.45	V
Switching Time	50% control to 10/90% RF			5	μs

Notes:

1. Test conditions unless otherwise noted: VDD = +2.8V, VCB1 High/Low = +1.8V / 0V, Temp = +25 °C, Single-ended 50 Ω system,
2. PCB trace loss deducted

## Truth Table – Control Logic

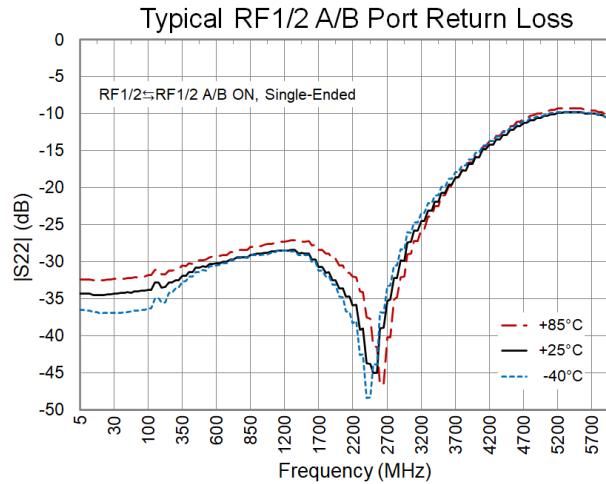
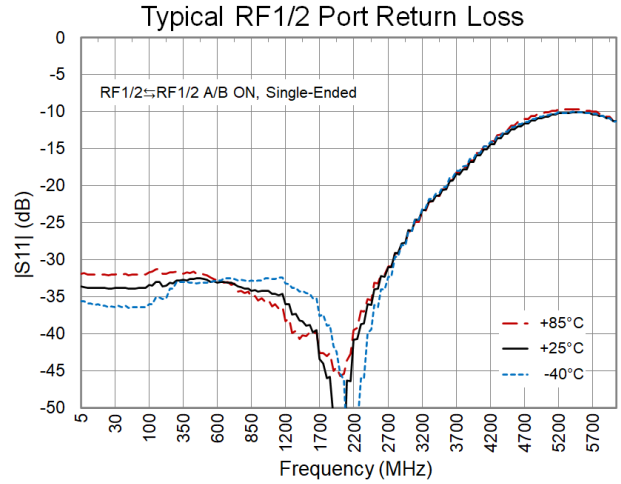
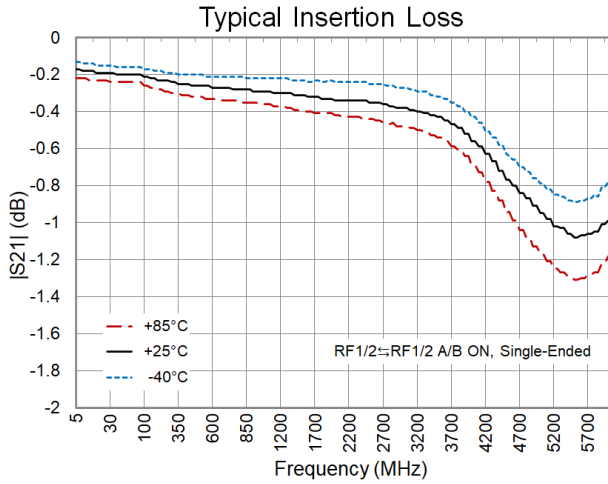
Control Input CB1	Mode of Signal Path	
	Switch RF1	Switch RF2
0	RF1 ↔ RF1A	RF2 ↔ RF2A
1	RF1 ↔ RF1B	RF2 ↔ RF2B

**50 MHz to 2700 MHz Evaluation Board**

**Evaluation Board Bill of Material – RFSW6222PCBA-410**

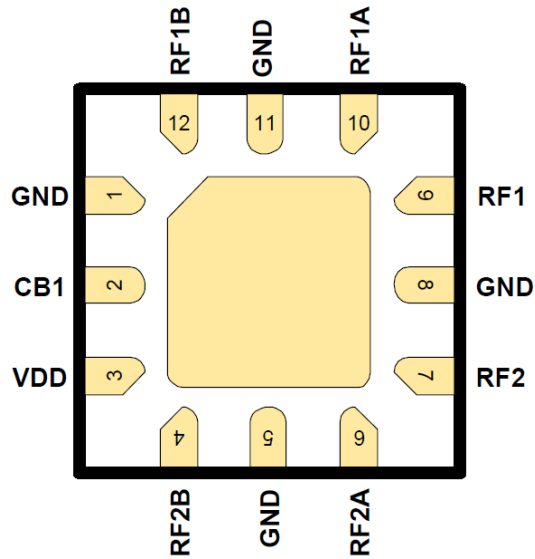
Reference Des.	Value	Description	Manuf.	Part Number
-	-	Printed Circuit Board	Qorvo	RFSW6222-410(A)
U1	-	MOD, General Purpose DPDT RF switch	Qorvo	RFSW6222
C1	100 pF	CAP, 100 pF, 5%, 50V, COG, 0402	Taiyo Yuden	RM UMK105 CG101JV-F
C2	1000 pF	CAP, 1000 pF, 10%, 50V, X7R, 0402	Murata	GRM155R71E103KA01D
R1 – R4	0 Ω	RES, 0 Ω, 0402	Kamaya	RMC1/16SJPTH
RF1, RF2, RF1A, RF1B, RF2A, RF2B	SMA	CONN, SMA, END LUCH, MINI, FLT, 0.068"	Aliner	20-001CF-T
P1	-	CONN, HDR, ST, PLRZD, 4-Pin, 0.100"	ITW Pancon	MPSS100-4-C

**Performance Plots – RFSW6222PCK-410**

Test conditions unless otherwise noted: VDD = +3.3 V, Single Ended 50 Ω System, Temp.=+25 °C



## Pad Configuration and Description

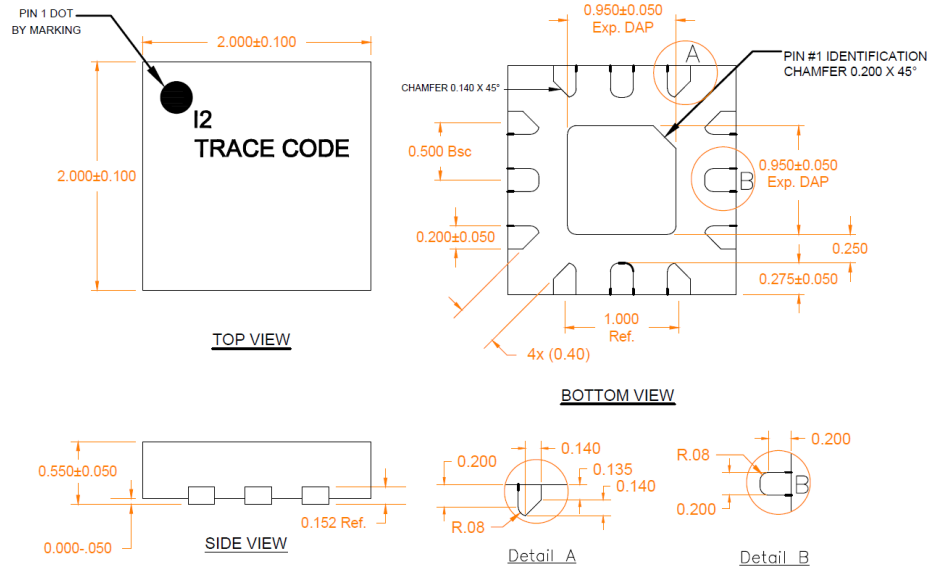


Top View

Pad No.	Label	Description
1	GND	DC and RF Ground
2	CB1	Control Input
3	VDD	DC Supply Voltage Input
4	RF2B	RF2 Output B
5	GND	DC and RF Ground
6	RF2A	RF2 Output A
7	RF2	RF2 Common Input
8	GND	DC and RF Ground
9	RF1	RF1 Common Input
10	RF1A	RF1 Output A
11	GND	DC and RF Ground
12	RF1B	RF1 Output B
Backside Paddle	-	RF and DC Ground. Must be soldered on PCB ground plane over a bed of via holes to minimize inductance and thermal resistance

## Package Marking and Dimensions

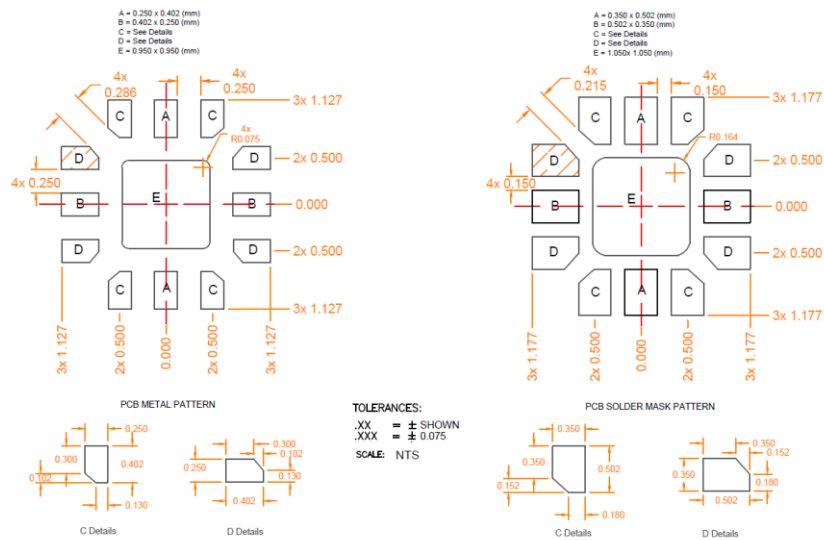
Marking: Part ID – I2  
Trace Code – Assigned by subcontractor



**Notes:**

- All dimensions are in millimeters. Angles are in degrees. Interpret dimensions and tolerances per ASME Y14.5 - 2009
- The terminal #1 identifier and terminal numbering conform to JESD 95-1 SPP-012.
- Contact plating: Matte Sn

## PCB Mounting Pattern



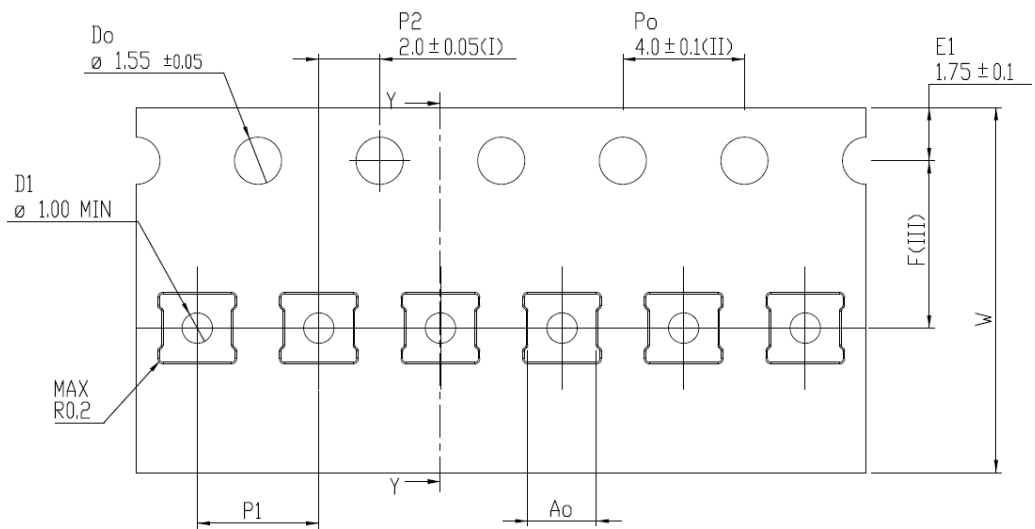
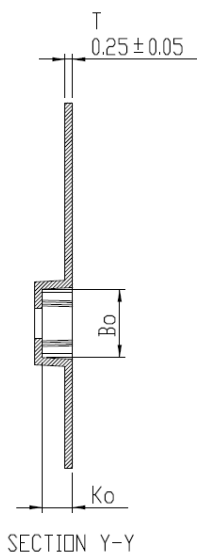
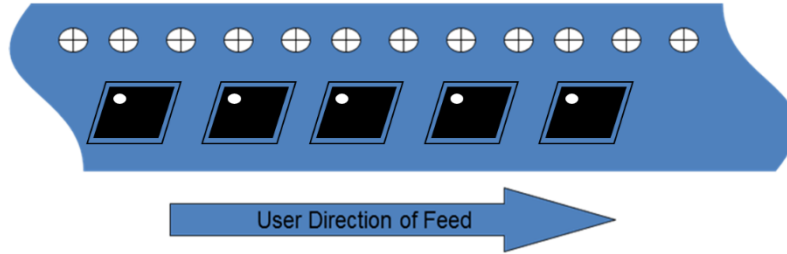
Shaded are represents Pin 1 location.

Thermal vias for center slug "E" should be incorporated into the PCB design.

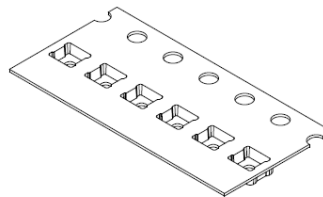
**Notes:**

- All dimensions are in millimeters. Angles are in degrees.
- Use 1 oz. copper minimum for top and bottom layer metal.
- Via holes are required under the backside paddle of this device for proper RF/DC grounding and thermal dissipation. We recommend a 0.35mm (#80/.0135") diameter bit for drilling via holes and a final plated thru diameter of 0.25 mm (0.01").
- Ensure good package backside paddle solder attach for reliable operation and best electrical performance.

**Tape and Reel Information – Carrier and Cover Tape Dimensions**



Ao	2.20 +/- 0.05
Bo	2.20 +/- 0.05
Ko	0.95 +/- 0.05
F	5.50 +/- 0.05
P1	4.00 +/- 0.1
W	12.00 +/- 0.3



- (I) Measured from centreline of sprocket hole to centreline of pocket.
- (II) Cumulative tolerance of 10 sprocket holes is ± 0.20.
- (III) Measured from centreline of sprocket hole to centreline of pocket.
- (IV) Other material available.

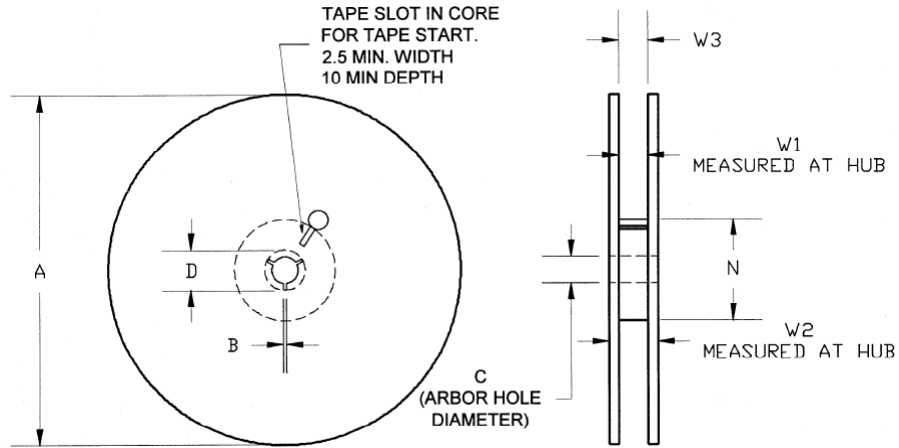
ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.

Feature	Measure	Symbol	Size (in)	Size (mm)
Cavity	Length	A0	0.087	2.20
	Width	B0	0.087	2.20
	Depth	K0	0.037	0.95
	Pitch	P1	0.157	4.00
Centerline Distance	Cavity to Perforation - Length Direction	P2	0.079	2.00
	Cavity to Perforation - Width Direction	F	0.217	5.50
Cover Tape	Width	C	0.362	9.20
Carrier Tape	Width	W	0.472	12.0



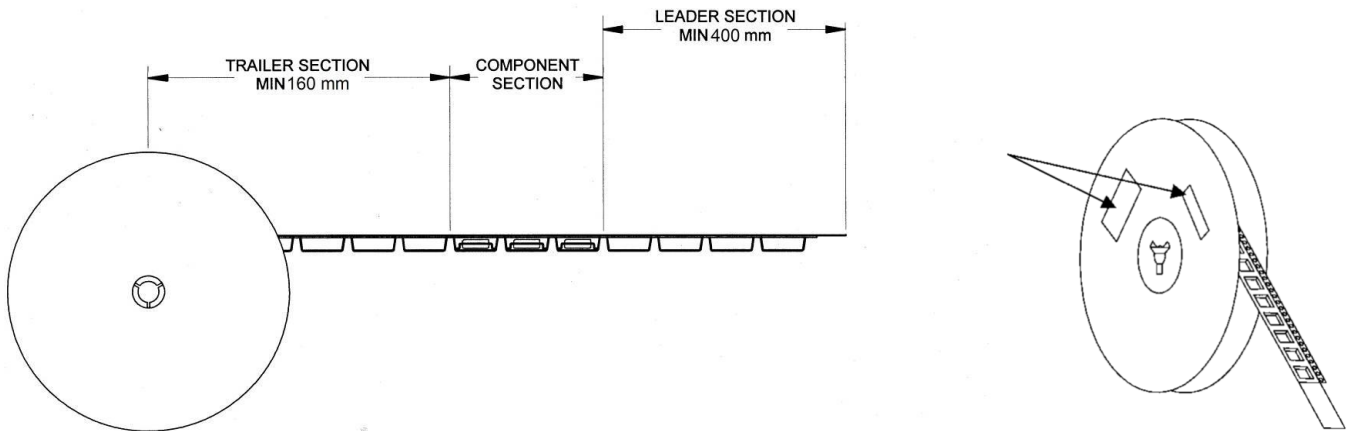
**Tape and Reel Information – Reel Dimensions**

Standard T/R size = 2,500 pieces on a 7" reel.



Feature	Measure	Symbol	Size (in)	Size (mm)
Flange	Diameter	A	6.969	177.0
	Thickness	W2	0.717	18.2
	Space Between Flange	W1	0.504	12.8
Hub	Outer Diameter	N	2.283	58.0
	Arbor Hole Diameter	C	0.512	13.0
	Key Slit Width	B	0.079	2.0
	Key Slit Diameter	D	0.787	20.0

**Tape and Reel Information – Tape Length and Label Placement**



- Notes:
1. Empty part cavities at the trailing and leading ends are sealed with cover tape. See EIA 481-1-A.
  2. Labels are placed on the flange opposite the sprockets in the carrier tape.