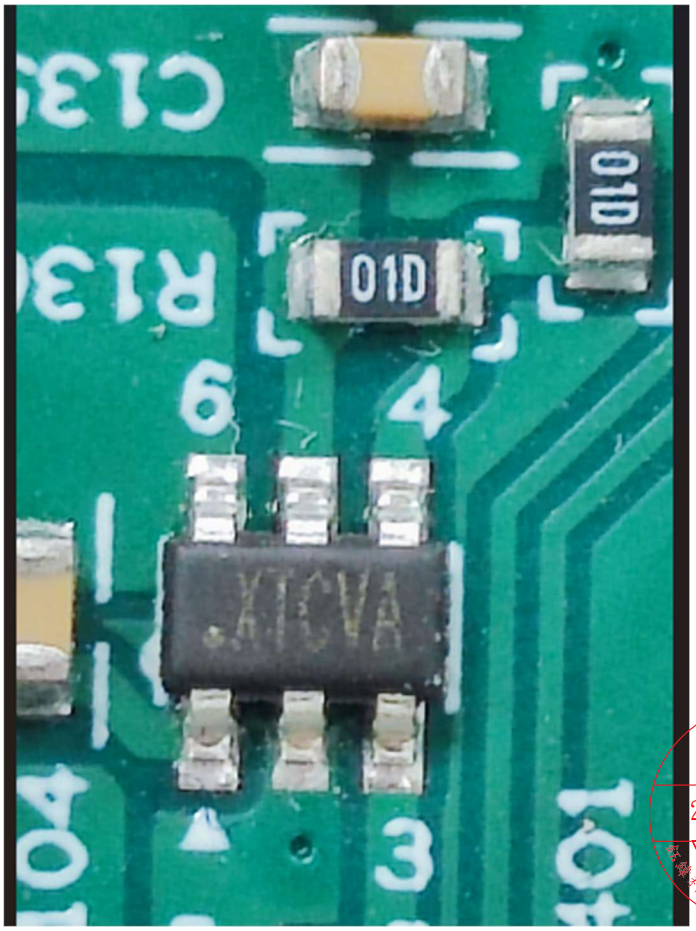


設計驗證
工程課
2024 -12- 20
發行

承 認 書
APPROVAL SHEET

公 司 名 稱： DIVA Laboratories, Ltd.
Company Name



廠 牌 名 稱： Silergy
Brand Name

品 名 規 格： SY8253ADC
Part Number

客 戶 料 號： 3ASY825301Y (A0549)
Customer Part Number

日 期： 2024/12/16
Date

SY8253

High Efficiency, 500kHz, 3A, 23V Input Synchronous Step Down Regulator

General Description

The SY8253 is a high efficiency 500 kHz synchronous step-down DC-DC converter capable of delivering 3A current. The SY8253 operates over a wide input voltage range from 4.5V to 23V and integrates main switch and synchronous switch with very low $R_{DS(ON)}$ to minimize the conduction loss.

Low output voltage ripple and small external inductor and capacitor sizes are achieved with 500 kHz switching frequency. It adopts the instant PWM architecture to achieve fast transient responses for high step down applications

Features

- low $R_{DS(ON)}$ for internal switches (top/bottom): 105mΩ/50mΩ
- 4.5-23V input voltage range
- 3A output current capability
- 500 kHz switching frequency
- Instant PWM architecture to achieve fast transient responses.
- Cycle-by-cycle peak current limitation
- Internal softstart limits the inrush current
- Hic-cup mode output short circuit protection
- ±1.5% 0.6V reference
- Power good indicator (SY8253AIC only)
- TSOT23-8/ TSOT23-6 package

Ordering Information

SY8253 □(□□)□
- Temperature Code
- Package Code
- Optional Spec Code

Ordering Number	Package type	Note
SY8253AIC	TSOT23-8	--
SY8253ADC	TSOT23-6	--

Applications

- Set Top Box
- Portable TV
- Access Point Router
- DSL Modem
- LCD TV

Typical Applications

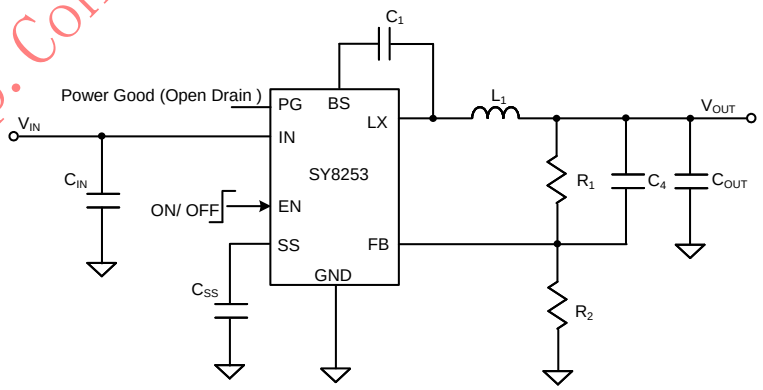


Figure 1. Schematic Diagram (SY8253AIC)

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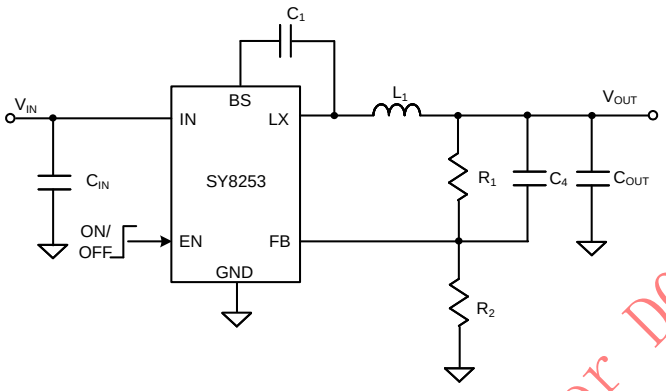
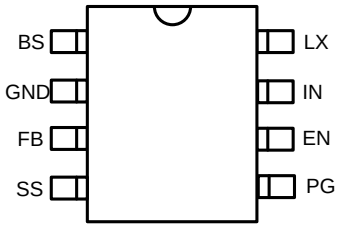


Figure 2. Schematic Diagram (SY8253ADC)

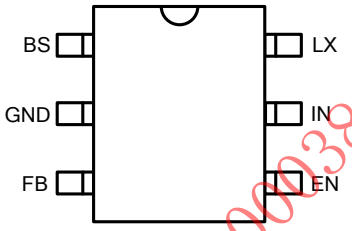
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Pinout (top view)



(TSOT23-8)



(TSOT23-6)

Part Number	Package type	Top Mark①
SY8253AIC	TSOT23-8	**XU*xyz***
SY8253ADC	TSOT23-6	**XT*xyz***

Note①： ***x=year code, y=week code, z= lot number code.***

Pin Name	TSOT23-8	TSOT23-6	Pin Description
BS	1	1	Boot-Strap Pin. Supply high side gate driver. Decouple this pin to LX pin with 0.1uF ceramic cap.
GND	2	2	Ground pin
FB	3	3	Output Feedback Pin. Connect this pin to the center point of the output resistor divider (as shown in Figure 1) to program the output voltage: Vout=0.6*(1+R1/R2)
SS	4	/	Softstart programming pin. Connect a capacitor from this pin to ground to program the softstart time. Tss=Css*0.6V/4uA. Leave this pin open for default 1ms soft-start.
PG	5	/	Power good Indicator. Open drain output.
EN	6	4	Enable control. Pull high to turn on. Do not float.
IN	7	5	Input pin. Decouple this pin to GND pin with at least 1uF ceramic cap
LX	8	6	Inductor pin. Connect this pin to the switching node of inductor

Absolute Maximum Ratings (Note 1)

Supply Input Voltage ---------- 25V
BS-LX, SS ---------- 4V
All other pins ---------- VIN + 0.3V
Power Dissipation, PD @ TA = 25℃, TSOT23-8 /TSOT23-6---------- 1.5W
Package Thermal Resistance (Note 2)
θJA ---------- 66℃/W
θJC ---------- 15℃/W
Junction Temperature Range ---------- 150℃
Lead Temperature (Soldering, 10 sec.) ---------- 260℃
Storage Temperature Range ---------- -65℃ to 150℃
Dynamic LX voltage in 10ns duration ---------- IN+3V to GND-5V

Recommended Operating Conditions (Note 3)

Supply Input Voltage ---------- 4.5V to 23V
Junction Temperature Range ---------- -40℃ to 125℃
Ambient Temperature Range ---------- -40℃ to 85℃

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Electrical Characteristics

(V_{IN} = 12V, V_{OUT} =3.3V, L = 4.7uH, C_{OUT} = 47uF, T_A = 25℃, I_{OUT} = 1A unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V_{IN}		4.5		23	V
Quiescent Current	I_Q	I_{OUT}=0, V_{FB}=V_{REF}*105%		100		μA
Shutdown Current	I_{SHDN}	EN=0		5	10	μA
Feedback Reference Voltage	V_{REF}		0.591	0.6	0.609	V
FB Input Current	I_{FB}	V_{FB}=3.3V	-50		50	nA
Top FET RON	$R_{DS(ON)1}$			105		mΩ
Top FET Peak Current Limit	$I_{LIM,TOP}$		5.1	6	6.9	A
Bottom FET RON	$R_{DS(ON)2}$			50		mΩ
Bottom FET Valley Current Limit	$I_{LIM,BOT}$		3.0	3.7	4.5	A
EN Rising Threshold	V_{ENH}		1.5			V
EN Falling Threshold	V_{ENL}				0.4	V
Power Good Threshold	V_{PG}	V_{FB} falling, PG from high to low		90		%V_{REF}
		V_{FB} rising, PG from low to high		95		%V_{REF}
		V_{FB} rising, PG from high to low		115		%V_{REF}
		V_{FB} falling, PG from low to high		110		%V_{REF}
Power Good Delay Time	T_{PG_F}	PG falling edge		10		μs
	T_{PG_R}	PG rising edge		60		μs
Output OVP Response Time	T_{OVP}			10		μs
Output OVP Off Time	$t_{OFF,OVP}$			1000		μs
Soft-start Charging Current	I_{SS}			4		μA
Short Circuit Protection Wait Time	$t_{WAIT,SCP}$			1.9		ms
Short Circuit Protection Off Time	$t_{OFF,SCP}$			15		ms
Input UVLO Threshold	V_{UVLO}				4.5	V
Input UVLO Hysteresis	V_{HYS}			0.3		V
Min ON Time				80		ns
Min OFF Time				160		ns
Switching Frequency			425	500	575	kHz
Thermal Shutdown Temperature	T_{SD}			150		℃
Thermal Shutdown Hysteresis	T_{HYS}			15		℃

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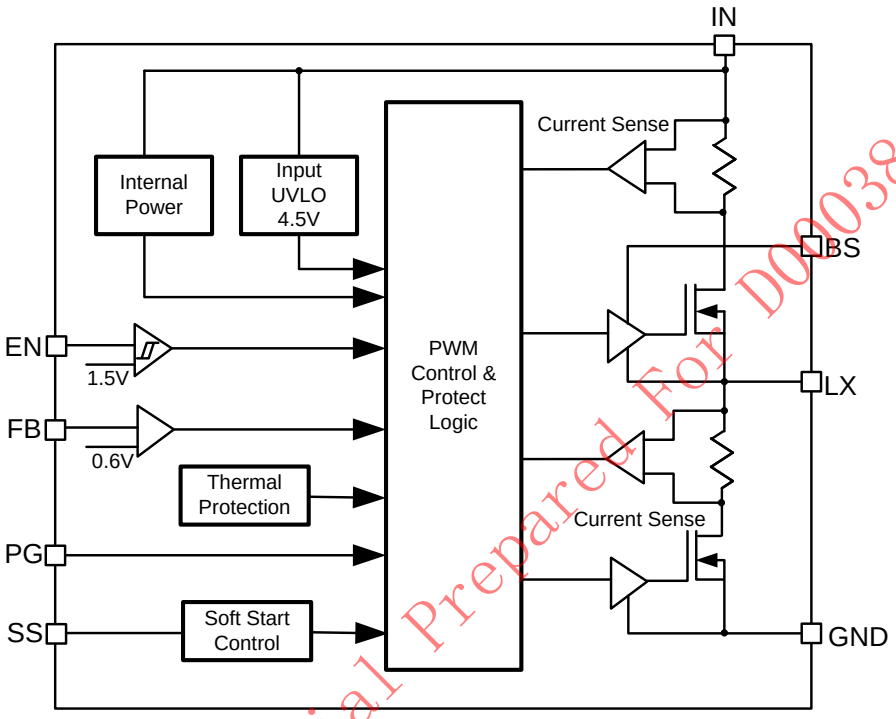
Note 1: Stresses beyond the "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Note 2: θJA is measured in the natural convection at T_A = 25℃ on a two-layer Silergy Evaluation Board.

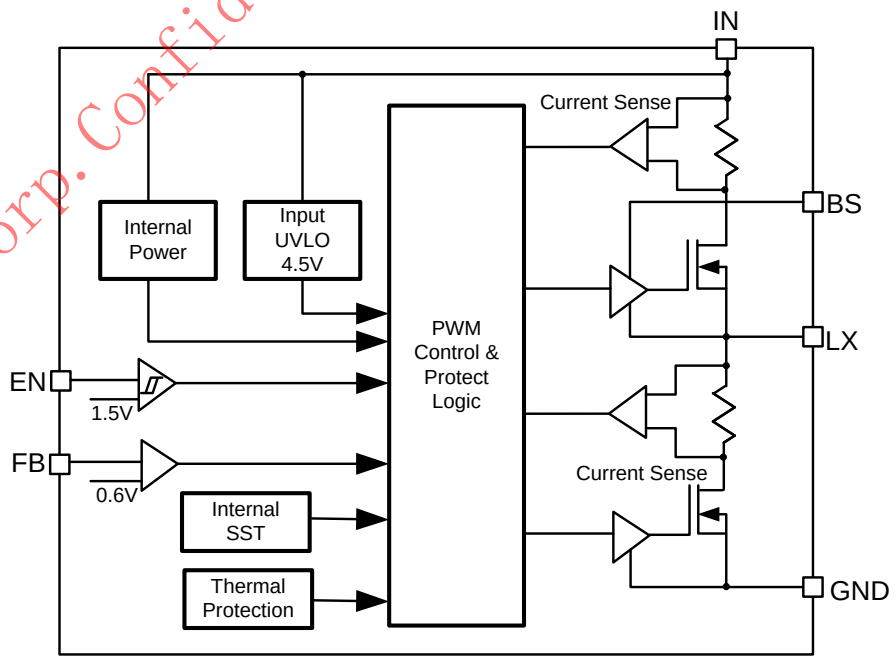
Note 3: The device is not guaranteed to function outside its operating conditions.

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Block Diagram



(SY8253AIC)

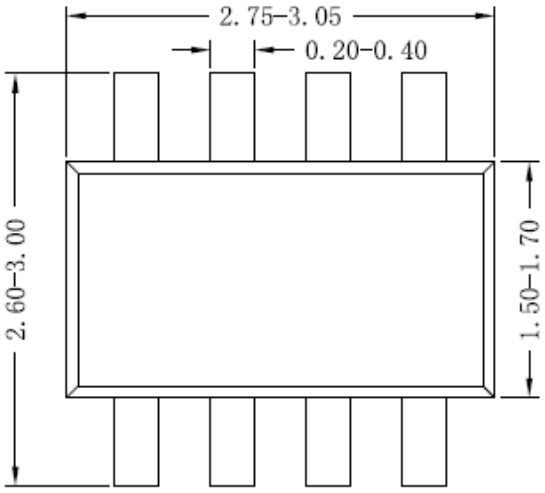


(SY8253ADC)

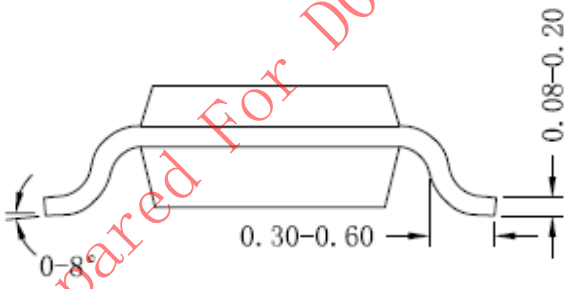
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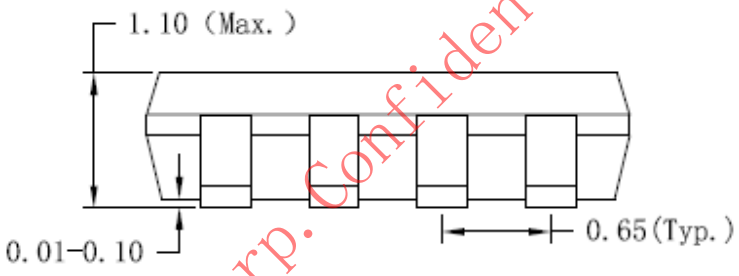
TSOT23-8 Package Outline Drawing



Top view



Side view A



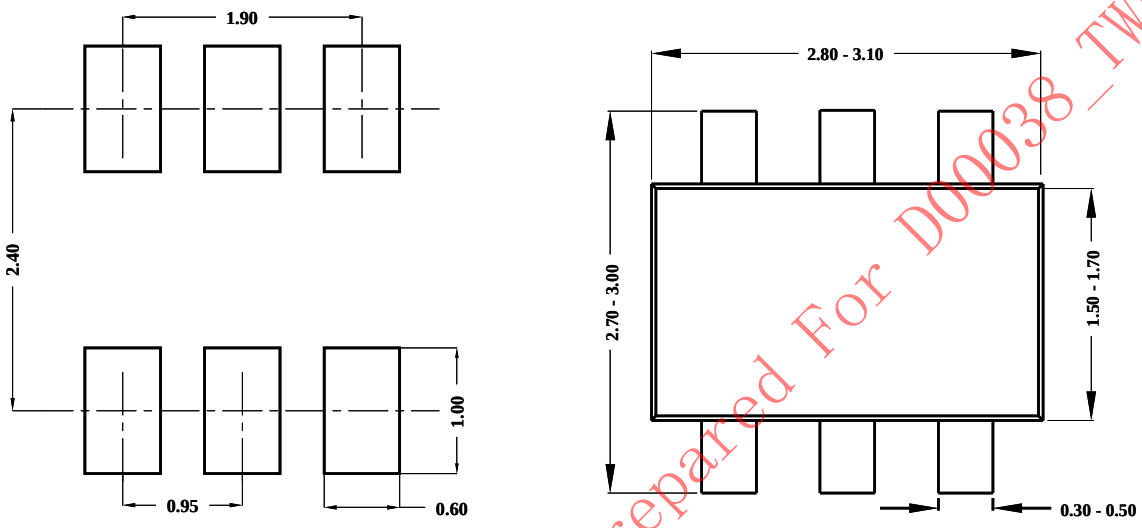
Side view B

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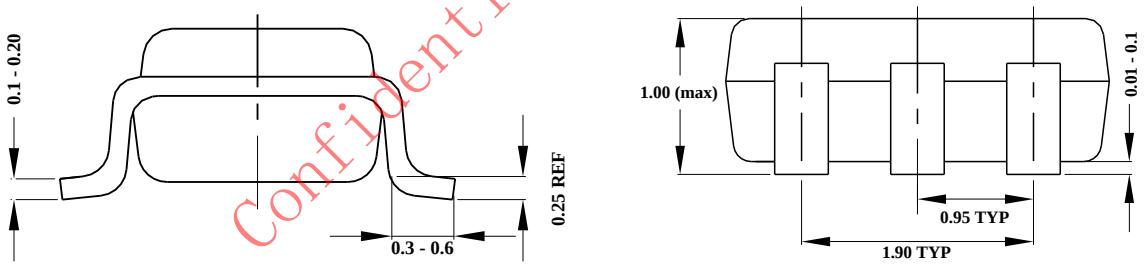
Notes: **All dimension in millimeter and exclude mold flash & metal burr**

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TSOT23-6L Package Outline Drawing



Recommended Pad Layout



Notes: **All dimension in MM**
All dimension don't include mold flash & metal burr

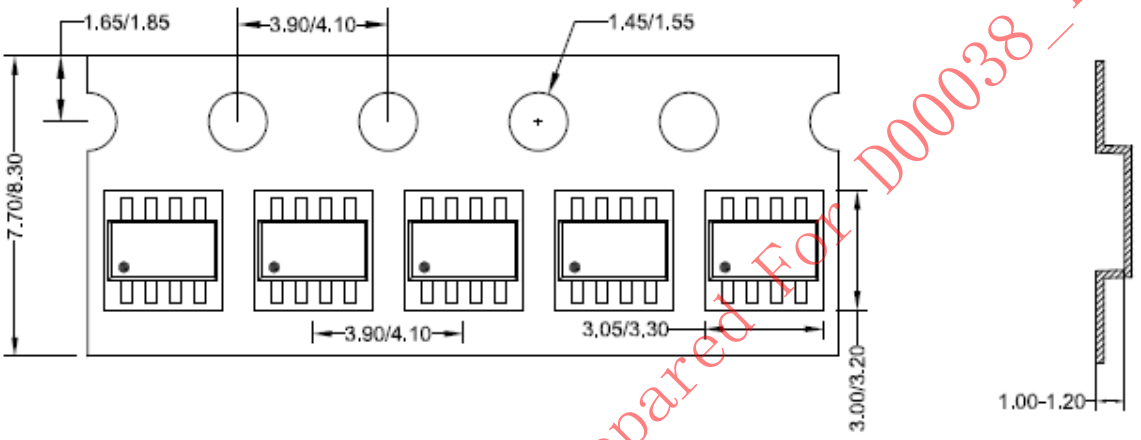
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Taping & Reel Specification

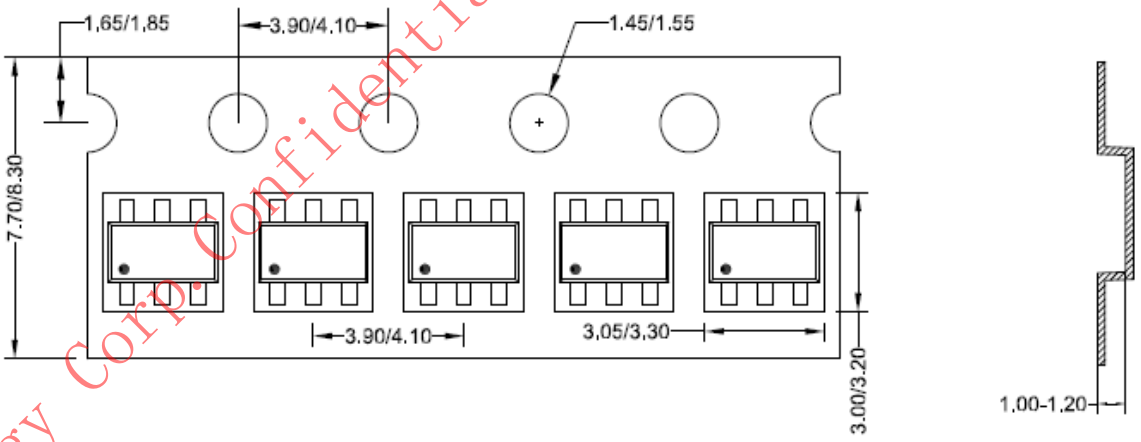
1. Taping orientation

TSOT23-8



Feeding direction →

TSOT23-6

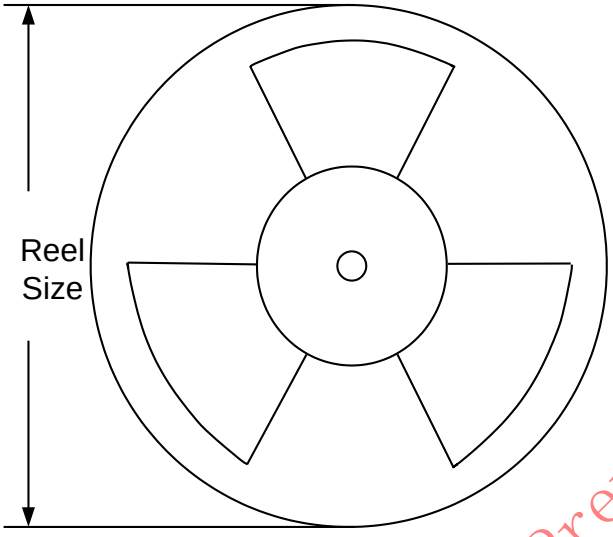


Feeding direction →

2. Carrier Tape & Reel specification for packages

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Package types	Tape width (mm)	Pocket pitch(mm)	Reel size (Inch)	Trailer length(mm)	Leader length (mm)	Qty per reel
TSOT23-8	8	4	7	400	160	3000
TSOT23-6	8	4	7	400	160	3000

3. Others: NA

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