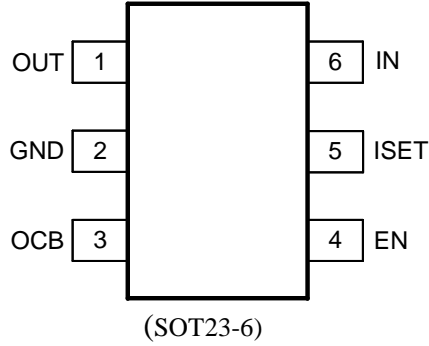


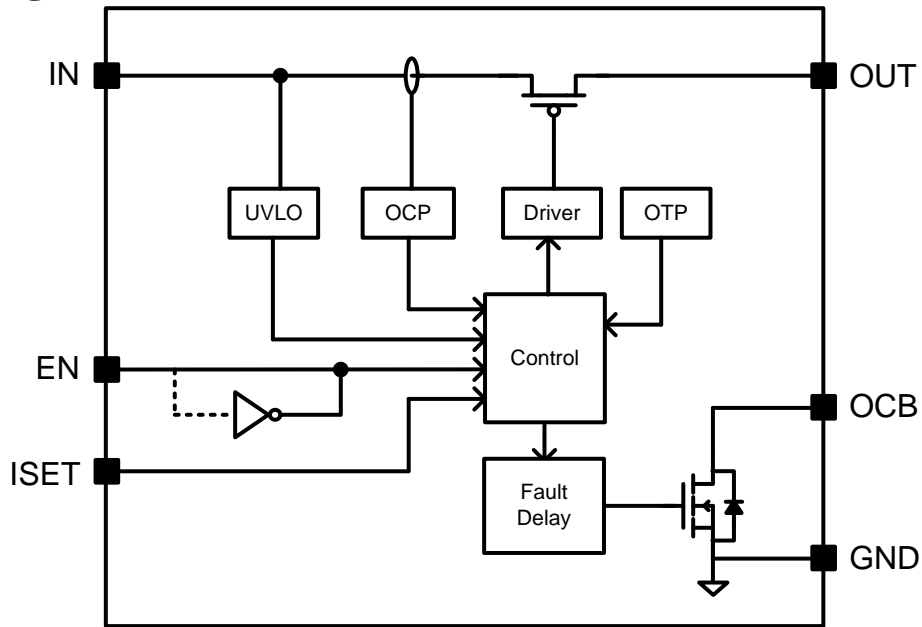
Pinout (Top View)



Top Mark: Pdxyz (Device code: Pd, x=*year code*, y=*week code*, z=*lot number code*)

Pin Name	Pin number	Pin Description
	SOT23-6	
OUT	1	Output pin, decoupled with a 10 μ F capacitor to GND.
GND	2	Ground pin.
OCB	3	Open drain fault flag.
EN	4	ON/OFF control. Do not leave it floating.
ISET	5	Current limit programming pin. Connect a resistor R _{SET} from this pin to ground to program the current limit: I _{LIM} (A) = 6800/R _{SET} (Ω).
IN	6	Input pin, decoupled with a 10 μ F capacitor to GND.

Block Diagram



Absolute Maximum Ratings (Note 1)

OUT, OCB, EN, ISET, IN	-----	-0.3V to 6V
Power Dissipation, P _D @ T _A = 25 °C SOT23-6	-----	1.64W
Package Thermal Resistance (Note 2)		
θ _{JA}	-----	61 °C/W
θ _{JC}	-----	22 °C/W
Junction Temperature	-----	150 °C
Lead Temperature (Soldering, 10 sec.)	-----	260 °C
Storage Temperature Range	-----	-65 °C to 150 °C

Recommended Operating Conditions (Note 3)

IN	-----	2.5V to 5.5V
OUT, OCB, EN, ISET	-----	0V to 5.5V
Junction Temperature Range	-----	-40 °C to 125 °C
Ambient Temperature Range	-----	-40 °C to 85 °C

Electrical Characteristics

($V_{IN} = 5V$, $C_{OUT} = 10\mu F$, $T_A = 25^\circ C$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V_{IN}		2.5		5.5	V
Shutdown Input Current	I_{SHDN}	Open load, switch off		0.1	1	μA
		Output grounded, switch off		0.1	1	μA
Quiescent Supply Current	I_Q	Open load, switch on		35		μA
FET $R_{DS(ON)}$	$R_{DS(ON)}$	$V_{IN} = 5V$, $I_{OUT} = 0.5A$	38	45	50	$m\Omega$
Current Limit	I_{LIM}	$R_{set} = 6.8k$	0.75	1	1.25	A
Fold back Current	I_{FBC}	$V_{IN} > 3.5V$, $V_{OUT} < 1V$		0.6	0.75	A
Programmable Current Limit Range	I_{LIM_RANGE}		0.4		4	A
EN Threshold	Logic-Low Voltage	V_{IL}			0.5	V
	Logic-High Voltage	V_{IH}	1.0			V
IN UVLO Threshold	V_{IN_UVLO}				2.45	V
IN UVLO Hysteresis	V_{IN_HYS}			0.1		V
Rise Time	t_{RISE}	$V_{IN} = 3.3V$, $R_L = 3\Omega$, $C_L = 1\mu F$	1	1.5	2	ms
		$V_{IN} = 5.0V$, $R_L = 5\Omega$, $C_L = 1\mu F$	1.6	2.3	3	ms
OCB Low Resistance	R_{OCB}			65		Ω
OCB Delay Time	t_{OCB_Delay}			10		ms
Thermal Shutdown Temperature	T_{SD}			150		$^\circ C$
Thermal Shutdown Hysteresis	T_{HYS}			20		$^\circ C$

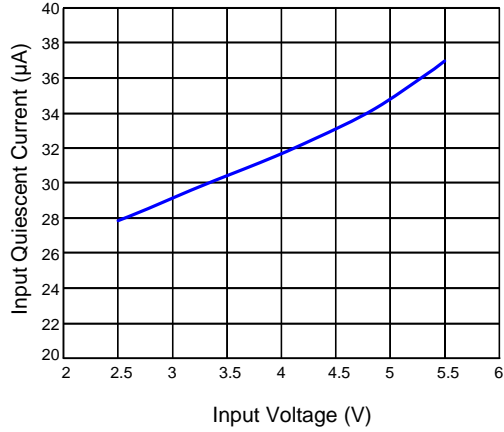
Note 1: Stresses beyond “Absolute Maximum Ratings” may cause permanent damage to the device. These are for stress ratings. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute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

Note 2: θ_{JA} is measured in the natural convection at $T_A = 25^\circ C$ on a Silergy test board. Pin 2 of SOT23 package is the case position for θ_{JC} measurement.

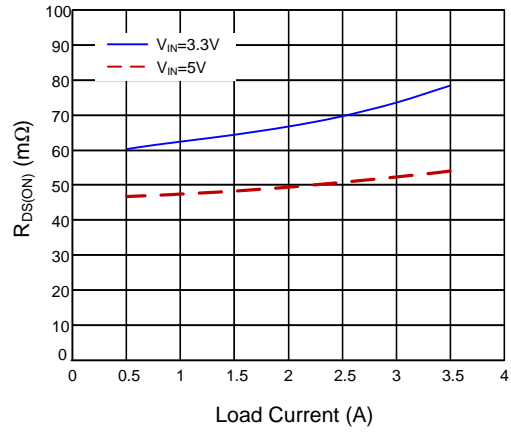
Note 3: The device is not guaranteed to function outside its operating conditions.

Typical Performance Characteristics

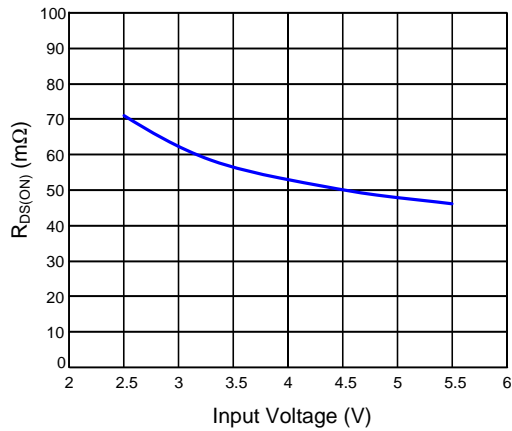
Input Quiescent Current vs. Input Voltage



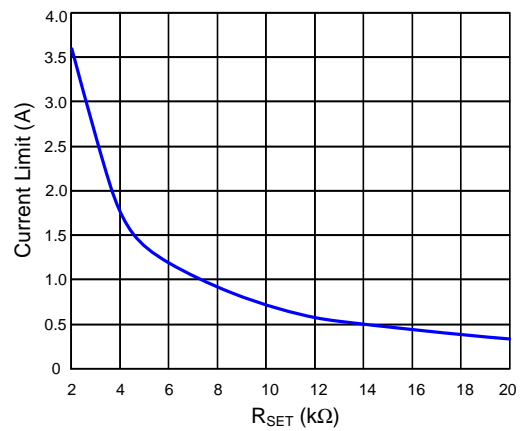
$R_{DS(ON)}$ vs. Load Current



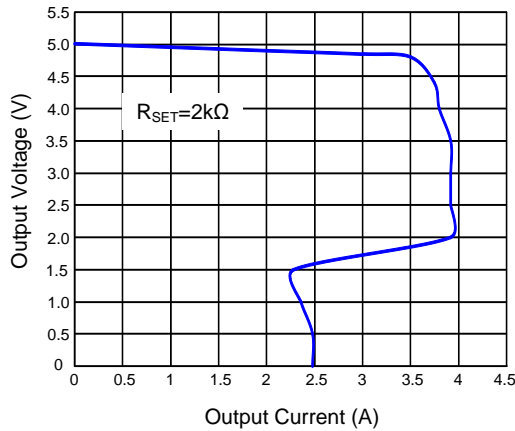
$R_{DS(ON)}$ vs. Input Voltage



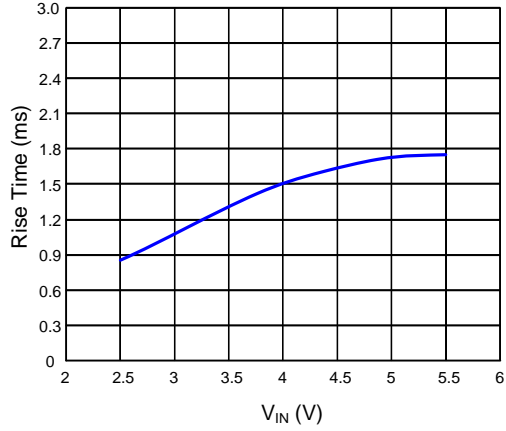
R_{SET} vs. Current Limit



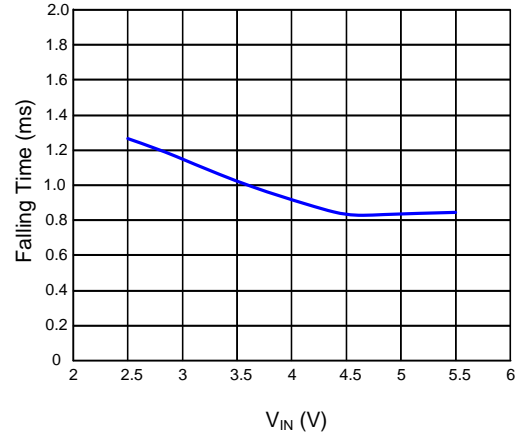
Output Voltage vs. Output Current



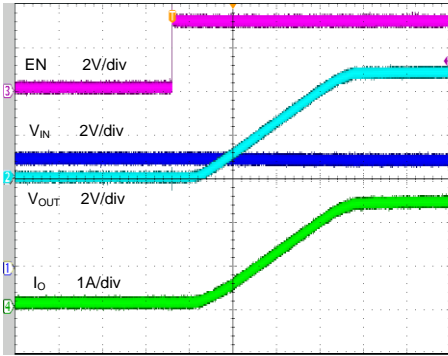
Rise Time vs. V_{IN}



Falling Time vs. V_{IN}

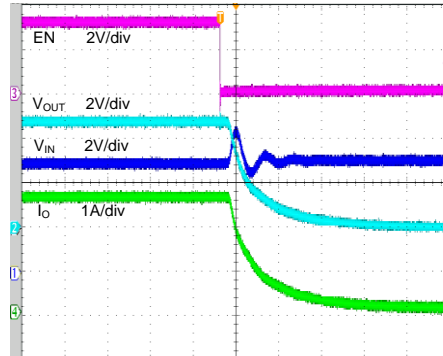


Startup from Enable
($V_{IN}=5V, I_O=2.5A$)



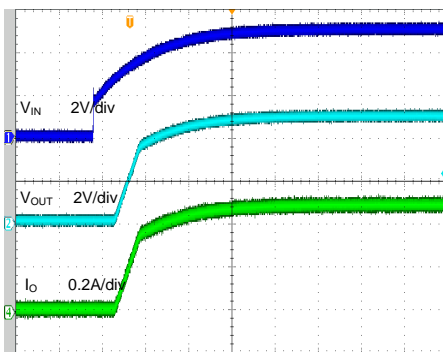
Time (800 μ s/div)

Shutdown from Enable
($V_{IN}=5V, I_O=2.5A$)



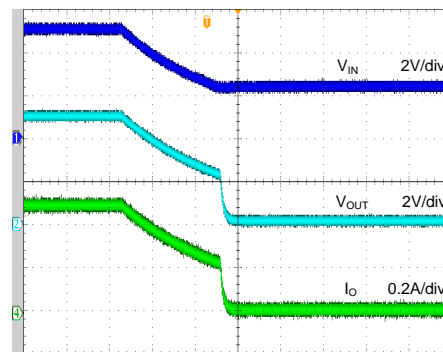
Time (20 μ s/div)

Startup from V_{IN}
($V_{IN}=5V, I_O=1A$)



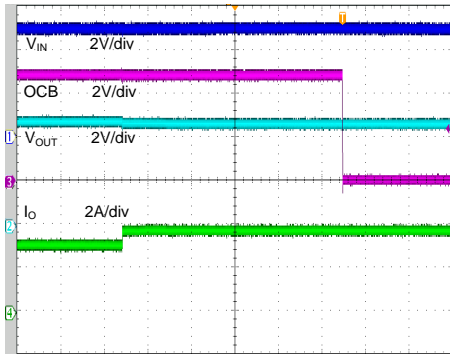
Time(2ms/div)

Shutdown from V_{IN}
($V_{IN}=5V, I_O=1A$)



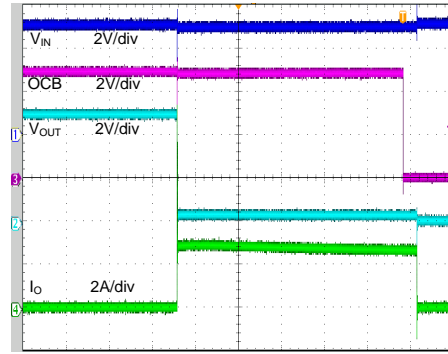
Time (800 μ s/div)

OCB Response
(OCB Response during Over Load)



Time (2ms/div)

OCB Response
(OCB Response during Short Circuit)



Time (2ms/div)

Applications Information

The SY6288F3 is a current limited P-channel MOSFET power switch with over current and over temperature protections. There is no body diode across the drain and the source of the MOSFET. It prevents the current flow from the output to the input after the chip is disabled.

Over-current Protection

The SY6288F3 supports current limit programming. Connect a resistor R_{SET} from ISET pin to ground to program the current limit:

$$I_{LIM} (A) = 6800 / R_{SET} (\Omega)$$

The minimum current limit is 0.4A. Current limit beyond 4A is not recommended.

When the over-current condition is sensed, the SY6288F3 is modulated to achieve constant output current. Under output short circuit conditions, the normal current limit folded back 50%..

Thermal Shutdown Protection

If the junction temperature of the device exceeds the thermal protection threshold which is typically 150°C, over temperature protection will shut down the SY6288F3. Once the chip temperature drops to 130°C, the SY6288F3 will restart.

Fault flag

The OCB pin is an active-low, open drain output. It is high impedance when there's no protection occurring or the device is disable. When the device is enabled, the OCB pin will go low whenever over-current protection or thermal shutdown protection will occur.

Input Capacitor

To reduce device inrush current, a 10μF ceramic capacitor, C_{IN} , is recommended. A higher value of C_{IN} can be used for reducing the voltage drop experienced as the switch is turned on into large capacitive load.

To minimize the potential noise problem, C_{IN} should be placed really close to the IN and GND pins.

Output Capacitor

A 10μF ceramic output cap is recommended to prevent parasitic board inductance from forcing V_{OUT} below GND when switching off.

Reverse Block Function:

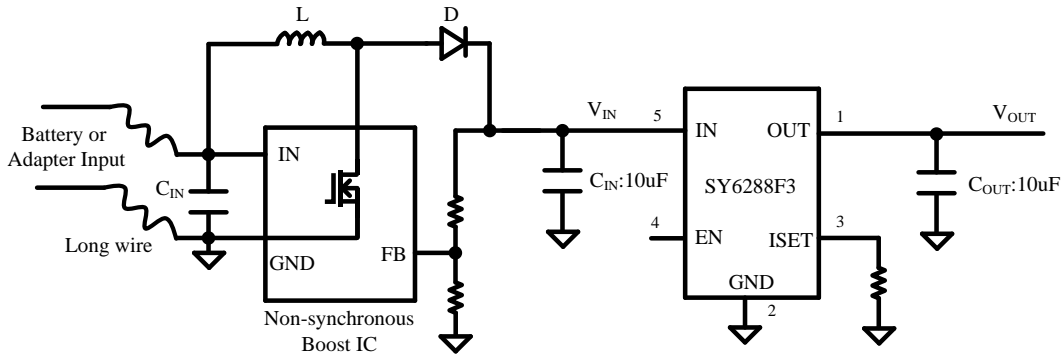
The SY6288F3 integrates reverse block function. Once the deviation voltage of OUT-IN exceeds 160mV, the reverse block function will be triggered. The power FET will be shutdown in 800ns to block the reverse current flow from OUT to IN.

Maximum input voltage consideration:

For any application, input voltage for the SY6288F3 should not be allowed to exceed the maximum recommended value (5.5V).

Below is a typical application circuit for the SY6288F3. The front stage is a non-synchronous boost stage and the input power supply can be a battery or an adapter.

Some adapters may have poor output voltage tolerance, or may have large output voltage overshoot if the adapter is hot plug in directly. The voltage overshoot higher than $V_{IN}(5.5V)$ will significantly reduce the reliability of the SY6288F3 and may even lead to IC EOS failure.



PCB Layout Guide

For best performance of the SY6288F3, the following guidelines must be strictly followed:

- Keep all power traces as short and wide as possible and use at least 2 ounce copper for all power traces.
- Place a ground plane under all circuitry to lower both resistance and inductance and improve DC and transient performance.
- Input decoupling ceramic capacitor should be placed as close as possible between IN and GND pin to reduce the leakage inductance.
- Output decoupling ceramic capacitor should be placed as close as possible between OUT and GND pin to reduce the leakage inductance.

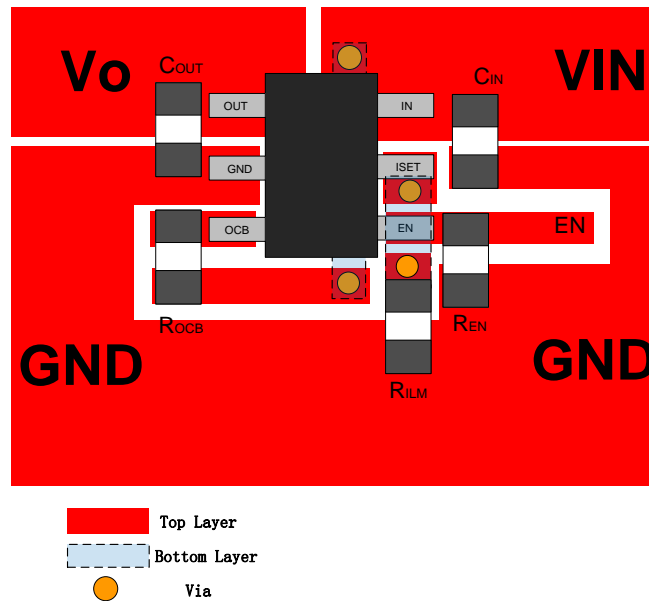
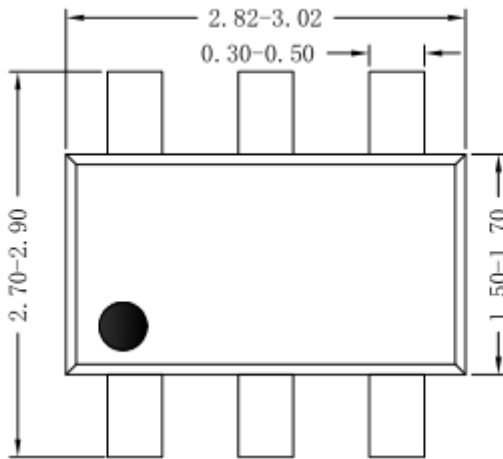
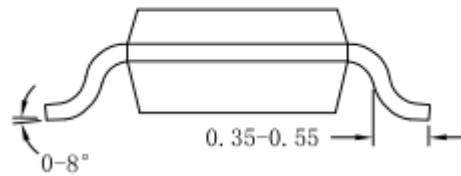


Figure2. PCB Layout Suggestion

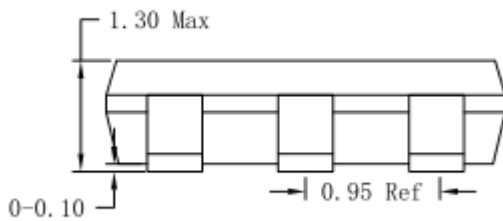
SOT23-6 Package Outline & PCB layout



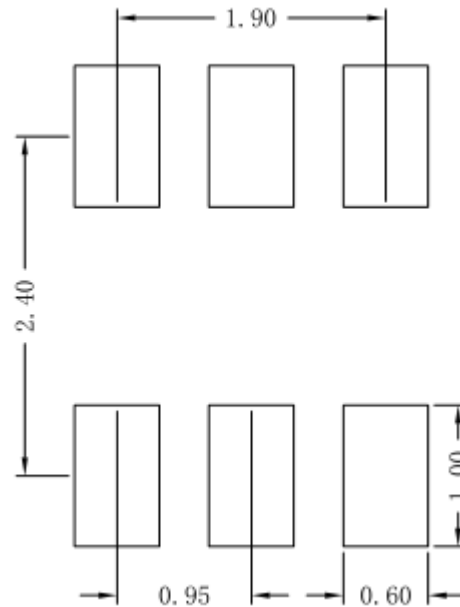
Top View



Side View



Side View



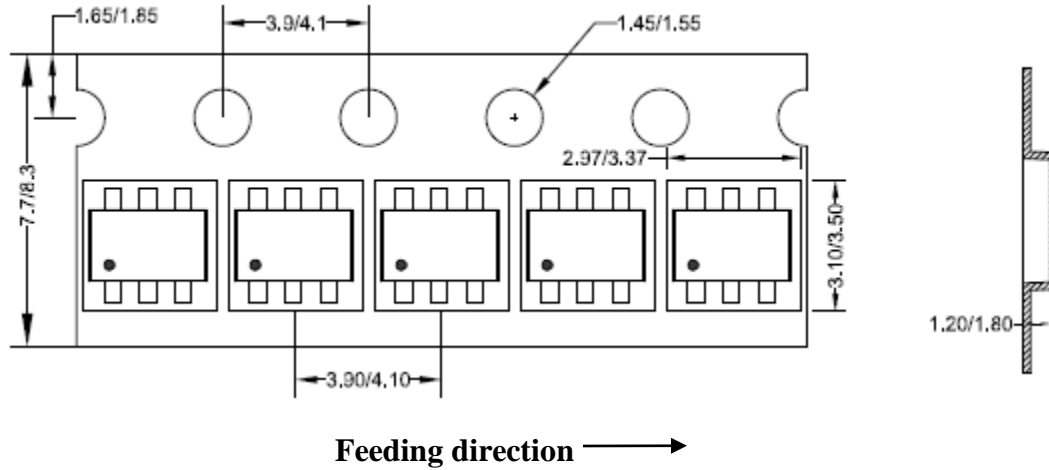
Recommended Pad Layout

Notes: All dimensions in millimeter and exclude mold flash & metal burr.

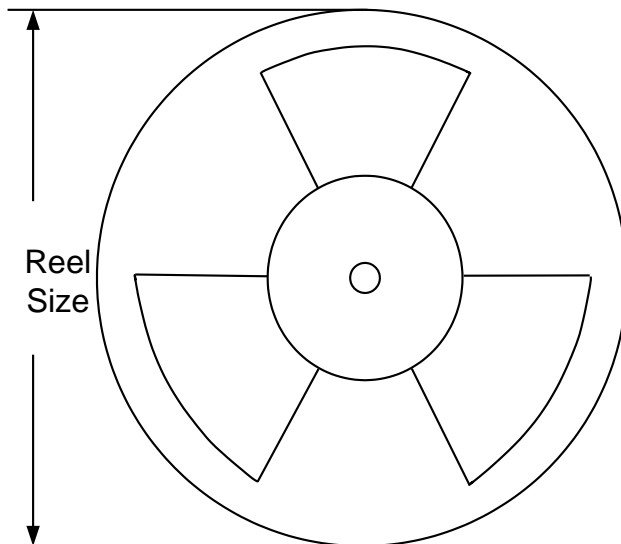
Taping & Reel Specification

1. Taping orientation

SOT23-6



2. Carrier Tape & Reel specification for packages



Package types	Tape width (mm)	Pocket pitch(mm)	Reel size (Inch)	Trailer length(mm)	Leader length (mm)	Qty per reel
SOT23-6	8	4	7"	280	160	3000

3. Others: NA



IMPORTANT NOTICE

- 1. Right to make changes.** Silergy and its subsidiaries (hereafter Silergy) reserve the right to change any information published in this document, including but not limited to circuitry, specification and/or product design, manufacturing or descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products are sold subject to Silergy's standard terms and conditions of sale.
- 2. Applications.** Application examples that are described herein for any of these products are for illustrative purposes only. Silergy makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification. Buyers are responsible for the design and operation of their applications and products using Silergy products. Silergy or its subsidiaries assume no liability for any application assistance or designs of customer products. It is customer's sole responsibility to determine whether the Silergy product is suitable and fit for the customer's applications and products planned. To minimize the risks associated with customer's products and applications, customer should provide adequate design and operating safeguards. Customer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Silergy assumes no liability related to any default, damage, costs or problem in the customer's applications or products, or the application or use by customer's third-party buyers. Customer will fully indemnify Silergy, its subsidiaries, and their representatives against any damages arising out of the use of any Silergy components in safety-critical applications. It is also buyers' sole responsibility to warrant and guarantee that any intellectual property rights of a third party are not infringed upon when integrating Silergy products into any application. Silergy assumes no responsibility for any said applications or for any use of any circuitry other than circuitry entirely embodied in a Silergy product.
- 3. Limited warranty and liability.** Information furnished by Silergy in this document is believed to be accurate and reliable. However, Silergy makes no representation or warranty, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. In no event shall Silergy be liable for any indirect, incidental, punitive, special or consequential damages, including but not limited to lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges, whether or not such damages are based on tort or negligence, warranty, breach of contract or any other legal theory. Notwithstanding any damages that customer might incur for any reason whatsoever, Silergy' aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Standard Terms and Conditions of Sale of Silergy.
- 4. Suitability for use.** Customer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of Silergy components in its applications, notwithstanding any applications-related information or support that may be provided by Silergy. Silergy products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an Silergy product can reasonably be expected to result in personal injury, death or severe property or environmental damage. Silergy assumes no liability for inclusion and/or use of Silergy products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.
- 5. Terms and conditions of commercial sale.** Silergy products are sold subject to the standard terms and conditions of commercial sale, as published at <http://www.silergy.com/stdterms>, unless otherwise agreed in a valid written individual agreement specifically agreed to in writing by an authorized officer of Silergy. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. Silergy hereby expressly objects to and denies the application of any customer's general terms and conditions with regard to the purchase of Silergy products by the customer.
- 6. No offer to sell or license.** Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights. Silergy makes no representation or warranty that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right. Information published by Silergy regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from Silergy under the patents or other intellectual property of Silergy.

For more information, please visit: www.silergy.com

© 2020 Silergy Corp.

All Rights Reserved.