



SILERGY

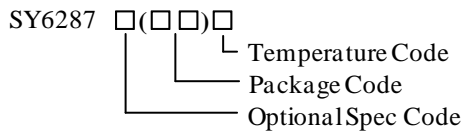
SY6287Z

Low Loss Power Distribution Switch With Programmable Current limit

General Description

The SY6287Z is an ultra-low $R_{DS(ON)}$ power distribution switch with current limit to protect the power source from over current and short circuit conditions. It incorporates over temperature protection and reverse blocking function.

Ordering Information



Ordering Number	Package Type	Note
SY6287ZDEC	DFN2×2-6	

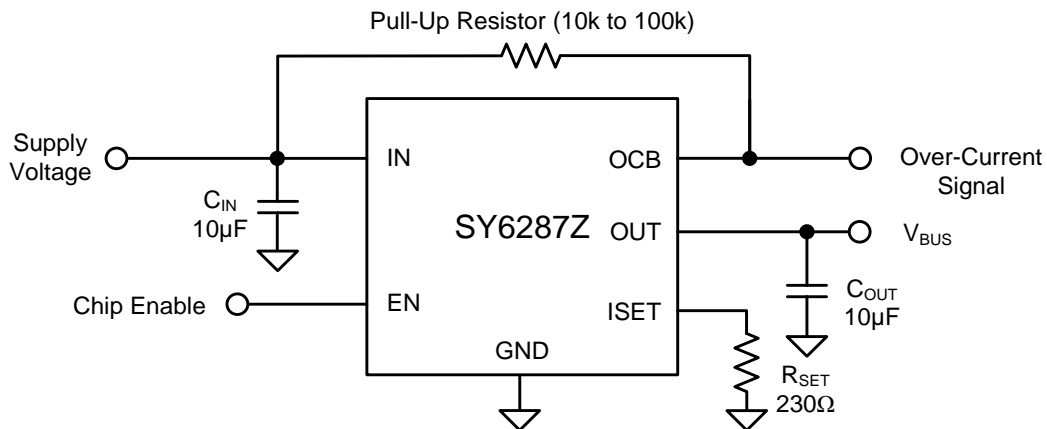
Features

- Input Voltage: 2.5V to 5.5V
- Extremely Low Power Path Resistance: 65mΩ (Typ.)
- Adjustable Current Limit up to 2.0A
- Over Temperature Shutdown and Automatic Retry
- Reverse Blocking (No Body Diode)
- Fault Flag (OCB) Output for Over Current and Fault Conditions
- Built-in Soft-start
- Compact Package Minimizes the Board Space: DFN2×2-6
- RoHS Compliant and Halogen Free
- UL(CB) Certification NO. E491480

Applications

- USB 3.1 Application
- USB 3G Data Card
- USB Dongle
- Mini PCI Accessories
- USB Charger
- Public Place Multi-USB Charger
- PC Card Hot Swap Applications

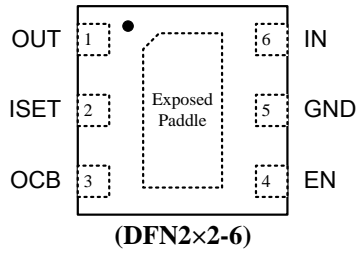
Typical Application Circuit



Note: If 1µF input cap will lead to large V_{in} voltage spike, it is strongly recommended to add additional 10µF ceramic cap.

Figure1. Schematic Diagram

Pinout (Top view)



Top Mark: nBxyz (device code: nB, x=year code, y=week code, z=lot number code)

Pin Name	Pin Number	Pin Description
IN	6	Input pin, decoupled with a 10μF capacitor to GND.
GND	5, Exposed Paddle	Ground pin.
OUT	1	Output pin, decoupled with a 10μF capacitor to GND.
EN	4	ON/OFF control, active high. Do not leave it floating.
ISET	2	Current limit programming pin. Connect a resistor R_{SET} from this pin to ground to program the current limit: $I_{LIM} (A) = 230/R_{SET} (\Omega)$.
OCB	3	Open-drain fault flag.

Block Diagram

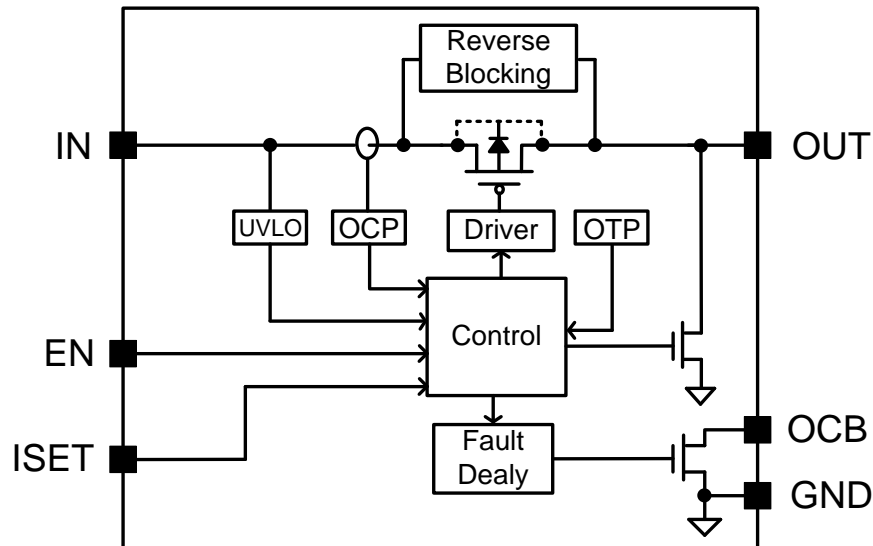


Figure2. Block Diagram



Absolute Maximum Ratings (Note 1)

IN, OUT	-----	-0.3V to 7V
ISET, OCB, EN	-----	-0.3V to 7V
Power Dissipation, P _D @ T _A = 25°C, DFN2×2-6	-----	1.53W
Package Thermal Resistance (Note 2)		
DFN2×2-6, θ _{JA}	-----	65.3°C/W
DFN2×2-6, θ _{JC}	-----	16.2°C/W
Junction Temperature Range	-----	-40°C to 150°C
Lead Temperature (Soldering, 10 sec.)	-----	260°C
Storage Temperature Range	-----	-65°C to 150°C

Recommended Operating Conditions (Note 3)

IN, OUT	-----	2.5V to 5.5V
ISET, OCB, EN	-----	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}=10μF, T_A = 25°C, BOLD values indicate -40°C to 85°C, unless otherwise specified.)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V _{IN}		2.5		5.5	V
IN UVLO Threshold	V _{IN,UVLO}				2.45	V
IN UVLO Hysteresis	V _{IN,HYS}			0.1		V
Shutdown Input Current	I _{SHDN}	Open load, switch off		0.1	5	μA
		Output grounded, switch off		0.1	5	μA
Reverse Leakage Current		IN tied to GND, V _{OUT} =5V		0.1	5	μA
Reverse Blocking Threshold	V _{RBT}	V _{OUT} -V _{IN}		100		mV
Reverse Blocking Recovery Threshold	V _{RBT_REC}	V _{OUT} -V _{IN}		-30		mV
Quiescent Supply Current	I _Q	Open load, switch on		45	100	μA
FET R _{DS(ON)}	R _{DS(ON)}	V _{IN} =5V, I _{OUT} =0.5A		65	100	mΩ
Current Limit	I _{LIM}	V _{OUT} =4V, R _{SET} =460Ω (Note5)	0.425	0.5	0.575	A
		V _{OUT} =4V, R _{SET} =153.3Ω(Note5)	1.382	1.5	1.617	A
EN/ $\overline{\text{EN}}$ Threshold	Logic-low Voltage	V _{IL}			0.4	V
	Logic-high Voltage	V _{IH}	1.0			V
EN Input Cap	C _{EN}	(Note4)		1		pF
EN Leakage Current	I _{ENLK}				1	μA
Output Turn On Time	t _{ON}	R _L =10Ω, C _L =1μF. Measure from EN ON to V _{OUT} reach V _{IN} ×90%	1	2	5	ms
Output Turn On Rise Time	t _R	R _L =10Ω, C _L =1μF. Measure from V _{OUT} =10% of V _{IN} to 90% of V _{IN}	1	2	5	ms



Output Turn Off Time	t_{OFF}	$R_L=10\Omega, C_L=1\mu F$. Measure from EN OFF to V_{OUT} reach $V_{IN}\times 10\%$		22		μs
Output Turn Off Fall Time	t_F	$R_L=10\Omega, C_L=1\mu F$. Measure from $V_{OUT}=90\%$ of V_{IN} to 10% of V_{IN}		21		μs
OCB Low Resistance	R_{OCB}	$V_{IN}=5V, I_L=10\mu A$		9		Ω
		$V_{IN}=3.3V, I_L=10\mu A$		12		Ω
OUT Shutdown Discharge Resistance	R_{DSG}	EN=0, $V_{OUT}=0.1V$		25		Ω
OCB Leakage Current	I_{LKG_OCB}	$V_{OCB}=5V$		0.01	1	μA
Thermal Shutdown Temperature	T_{SD}			150		$^{\circ}C$
Thermal Shutdown Hysteresis	T_{HYS}			20		$^{\circ}C$
Current Limit Response Time	t_{OC_RES}	$I_{LOAD}=1.2I_{LIMIT}$ (Note 5)		25		μs
Short Circuit Response Time	t_{OC}	$I_{LOAD}=1.5I_{LIMIT}$ (Note 5)		2		μs
Over Current Flag Response Time	t_{OCB}	$I_{LOAD}=1.2I_{LIMIT}$ (Note 5)	4	8	12	μs
Reverse Blocking Response Time	t_{RBT}	Note4		800		ns

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.

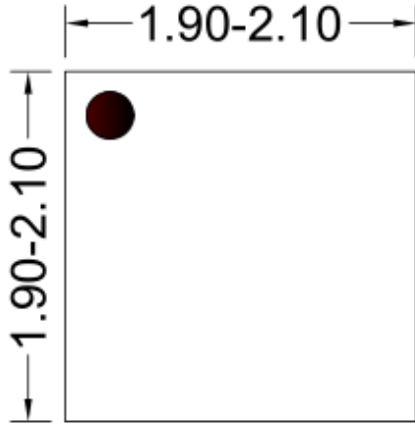
Note 2: θ_{JA} is measured in the natural convection at $T_A = 25^{\circ}C$ on a Silergy’s test board. The exposed paddle of DFN2x2-6 packages is the case position for θ_{JC} measurement.

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

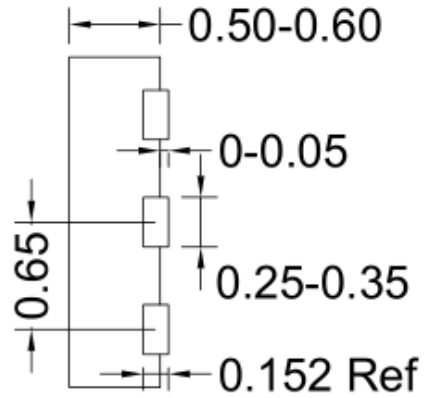
Note 4: Guaranteed by design but not production tested.

Note5: Current limit threshold is determined by $I_{LMT}=230V/R_{SET}$, where R_{SET} is in ohms.

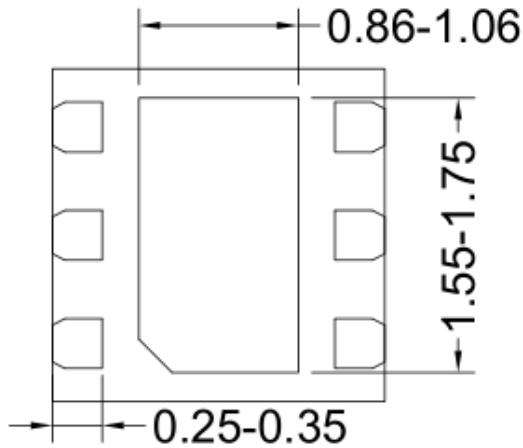
DFN2×2-6 Package Outline



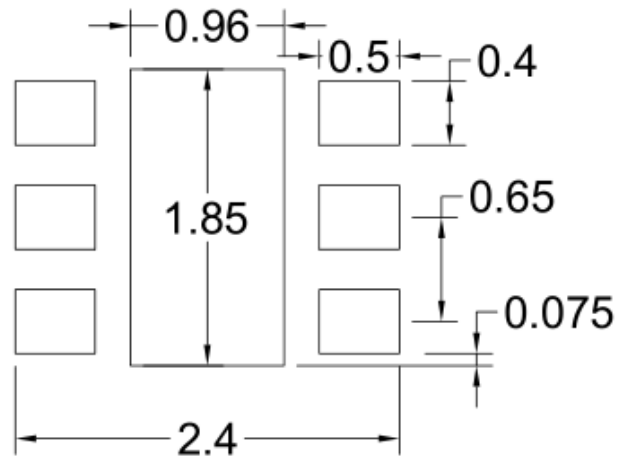
Top View



Side View



Bottom View



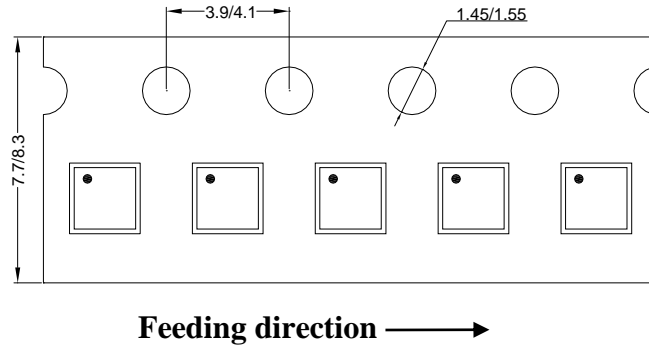
Recommended PCB layout

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

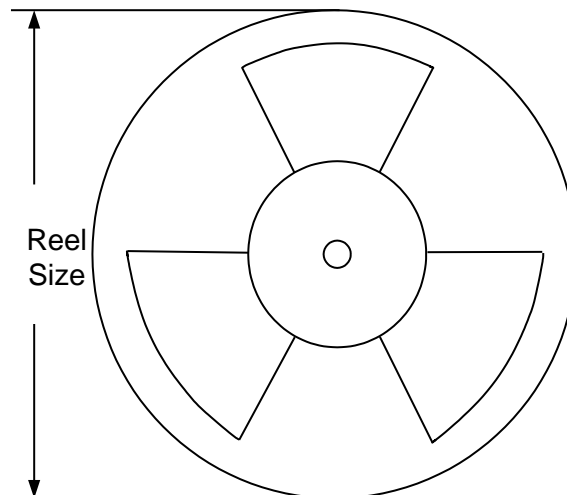
Taping & Reel Specification

1. Taping Orientation

DFN2x2 taping orientation



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
DFN2x2	8	4	7"	400	160	3000

3. Others: NA