



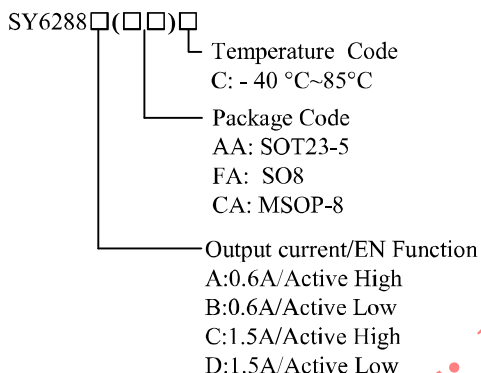
SY6288

Low Loss Power Distribution Switch Preliminary Spec

General Description

SY6288 is an ultra-low $R_{ds(on)}$ switches with current limiting function to protect the power source from over current and short circuit conditions.

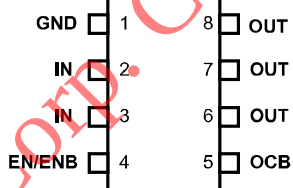
Ordering Information



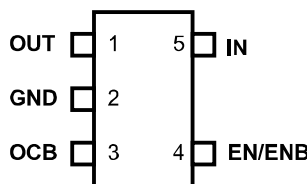
Features

- Distribution voltages: 2.5V to 5.5V
- Over temperature shutdown and automatic retry
- Reverse blocking (no body diode)
- At shutdown, OUT can be forced higher than IN
- Fault flag (OCB) output under over current and fault conditions
- Automatic output discharge at shutdown
- Built-in softstart
- 0.4ms rise time
- RoHS Compliant and Halogen Free
- Four different enable logics
 - SY6288A: Active High/0.6A
 - SY6288B: Active Low/0.6A
 - SY6288C: Active High/1.5A
 - SY6288D: Active Low/1.5A
- Compact packages minimize the board space: SOT23-5, SO8, MSOP8

Pinout (top view)



(SO8, MSOP8)



(SOT23-5)

Top Mark: AAJxyz for SY6288AFAC AALxyz for SY6288BFAC ABDxyz for SY6288BCAC
CGxyz for SY6288BAAC AAMxyz for SY6288CFAC AANxyz for SY6288DFAC
ABExyz for SY6288DCAC BUxyz for SY6288DAAC
(Device code: AAJ for SY6288AFAC, etc.; x=year code, y=week code, z=lot number code)

Pin Name	Pin Number (SO8, MSOP8)	Pin number (SOT23-5)	Pin Description
IN	2,3	5	Input pin
GND	1	2	Ground pin
OUT	6,7,8	1	Output pin



SY6288

EN- SY6288A/C	4	4	ON/OFF control. Don't leave it floating. EN: high enable. ENB: low enable.
ENB- SY6288B/D			
OCB	5	3	Open Drain Fault Flag

Absolute Maximum Ratings (Note 1)

All pins	6V
Power Dissipation, P_D @ $T_A = 25^\circ\text{C}$ SOT23-5/MSOP8/SO8	0.4/0.5/0.65W
Package Thermal Resistance (Note 2)	
θ_{JA}	250/150/90 $^\circ\text{C}/\text{W}$
θ_{JC}	130/ 65/ 45 $^\circ\text{C}/\text{W}$
Junction Temperature Range	-55 $^\circ\text{C}$ to 150 $^\circ\text{C}$
Lead Temperature (Soldering, 10 sec.)	260 $^\circ\text{C}$
Storage Temperature Range	-65 $^\circ\text{C}$ to 150 $^\circ\text{C}$
ESD Susceptibility (Note 2)	
HBM (Human Body Mode)	2kV
MM (Machine Mode)	200V

Recommended Operating Conditions (Note 3)

IN	2.5V to 5.5V
All other pins	0-5.5V
Junction Temperature Range	-40 $^\circ\text{C}$ to 125 $^\circ\text{C}$
Ambient Temperature Range	-40 $^\circ\text{C}$ to 85 $^\circ\text{C}$

Electrical Characteristics

($V_{IN} = 5V$, $C_L = 1\mu\text{F}$, per channel, $T_A = 25^\circ\text{C}$ 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}	$R_{load} = \text{open}$, switch off		0.1	1	μA
Quiescent Supply Current	I_Q	$R_{load} = \text{open}$, switch on		25		μA
FET RON	$R_{DS(on)1}$			90		m Ω
Current Limit	I_{LIM}	SY6288C, SY6288D	2			A
		SY6288A, SY6288B	1			A
EN/ $\overline{\text{EN}}$ threshold	Logic-Low Voltage	V_{IL}			0.8	V
	Logic-High Voltage	V_{IH}	2			V
IN UVLO threshold	$V_{IN,UVLO}$				2.4	V
IN UVLO hysteresis	$V_{IN,HYS}$			0.1		V
Turn-ON time	T_{ON}	$R_L = 50\text{ohm}$		400		μs
Turn-OFF time	T_{OFF}				200	μs
OCB low resistance	R_{OCB}			20		Ω
OUT shutdown discharge resistance	R_{DIS}			75		Ω
Thermal Shutdown Temperature	T_{SD}			150		$^\circ\text{C}$
Thermal Shutdown Hysteresis				20		$^\circ\text{C}$



Note 1: Stresses listed as the above “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 remain possibility to affect device reliability.

Note 2: θ_{JA} is measured in the natural convection at $T_A = 25^\circ\text{C}$ on a low effective single layer thermal conductivity test board of JEDEC 51-3 thermal measurement standard.

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

Operation

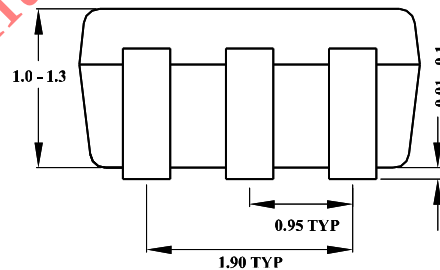
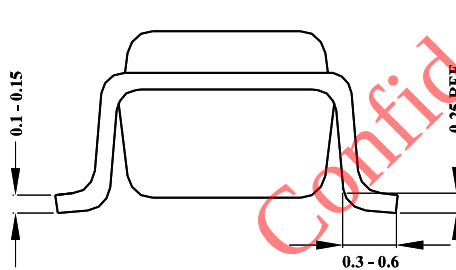
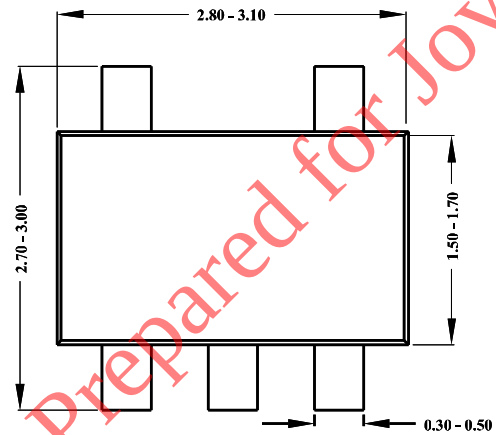
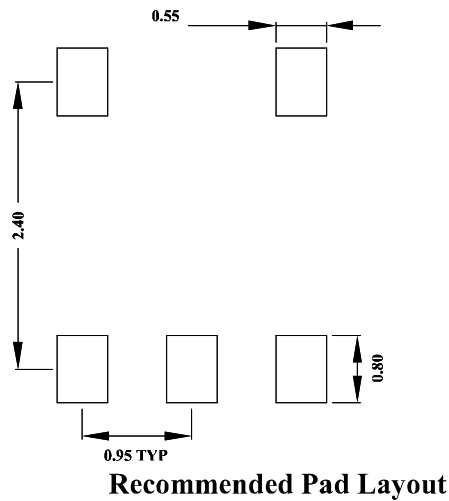
Over-current protection

When the over-current condition is sensed, the gate of the pass switch (PFET in this case) is modulated to achieve constant output current. Under output short circuit conditions, the normal current limit should be folded back 50%. If the over current condition exists for a long enough time, the junction temperature may exceed 150°C . the over-temperature protection will shut down the part. Once the chip temperature cooled down to 130°C , the part will restart.

Fault Flag (OCB)

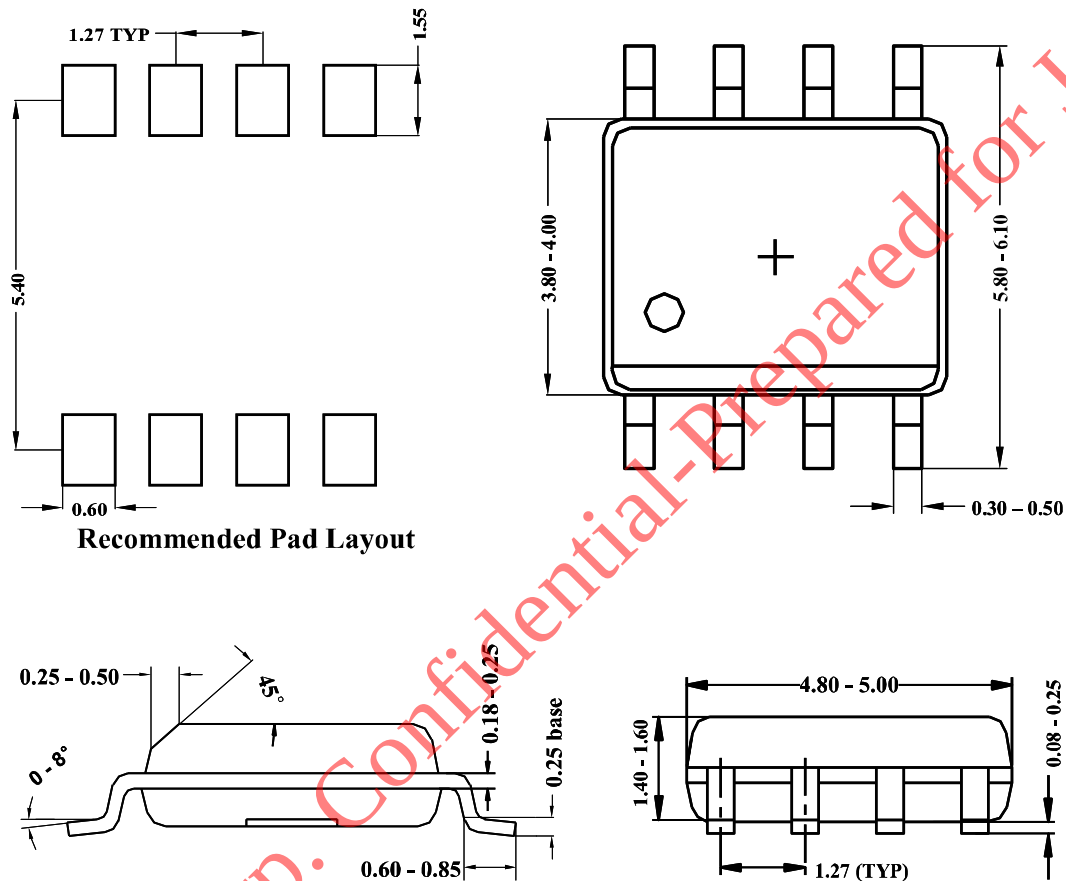
The OCB output is asserted (active low) when an overcurrent or overtemperature shutdown condition is encountered after a 10-ms deglitch timeout. The output remains asserted until the overcurrent or overtemperature condition is removed. Connecting a heavy capacitive load to an enabled device can cause a momentary overcurrent condition; however, no false reporting on OCB occurs due to the 10-ms deglitch circuit. OCB is not deglitched when the switch is turned OFF due to an overtemperature shutdown.

SOT23-5 Package outline & PCB layout design



Notes: All dimensions are in millimeters.
All dimensions don't include mold flash & metal burr.

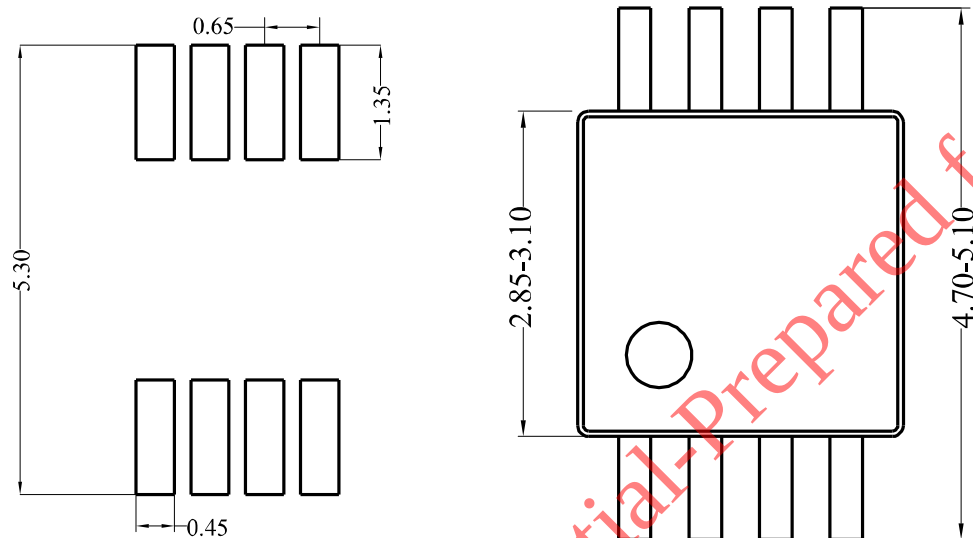
SO8 Package outline & PCB layout design



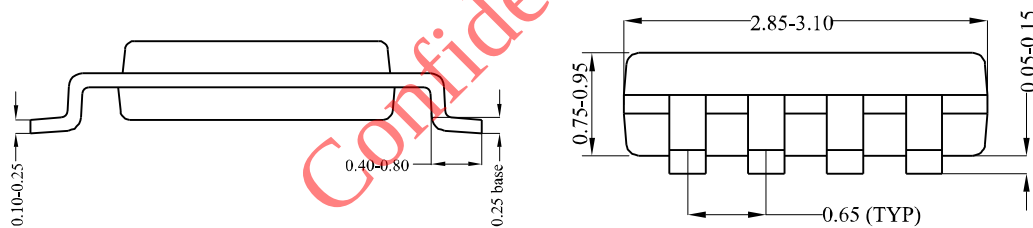
Notes: All dimensions are in millimeters.

All dimensions don't include mold flash & metal burr.

MSOP8 Package outline & PCB layout design



Recommended Pad Layout



Notes: All dimensions are in millimeters.

All dimensions BSI don't include mold flash & metal burr.