

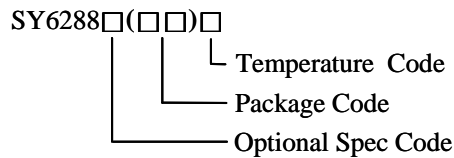


## Low Loss Power Distribution Switch Preliminary Specification

### General Description

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

### Ordering Information



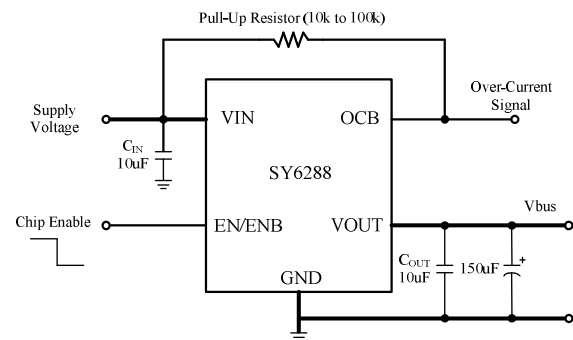
Temperature Range: -40°C to 85°C

| Ordering Number | Package type | Note             |
|-----------------|--------------|------------------|
| SY6288AAAC      | SOT23-5      | 0.6A/Active High |
| SY6288ACAC      | MSOP8        | 0.6A/Active High |
| SY6288AFAC      | SO8          | 0.6A/Active High |
| SY6288BAAC      | SOT23-5      | 0.6A/Active Low  |
| SY6288BCAC      | MSOP8        | 0.6A/Active Low  |
| SY6288BFAC      | SO8          | 0.6A/Active Low  |
| SY6288CAAC      | SOT23-5      | 2A/Active High   |
| SY6288CCAC      | MSOP8        | 2A/Active High   |
| SY6288CFAC      | SO8          | 2A/Active High   |
| SY6288DAAC      | SOT23-5      | 2A/Active Low    |
| SY6288DCAC      | MSOP8        | 2A/Active Low    |
| SY6288DFAC      | SO8          | 2A/Active Low    |
| SY6288D1AAC     | SOT23-5      | 1.5A/Active Low  |
| SY6288D1CAC     | MSOP8        | 1.5A/Active Low  |
| SY6288D1FAC     | SO8          | 1.5A/Active Low  |
| SY6288EAAC      | SOT23-5      | 2A/Active Low    |
| SY6288ECAC      | MSOP8        | 2A/Active Low    |
| SY6288EFAC      | SO8          | 2A/Active Low    |

### Features

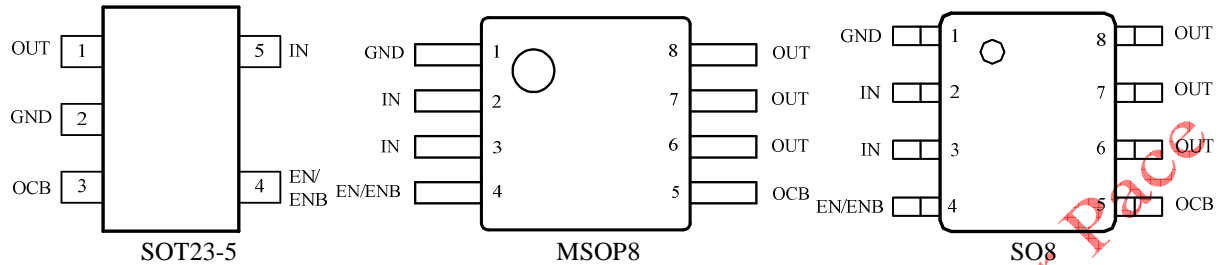
- Distribution voltages: 2.5V to 5.5V
- Over temperature shutdown and automatic retry
- Reverse blocking (no body diode)
- At shutdown, OUT can be forced higher than IN
- Fault flag (OCB) output for over current and fault conditions
- Automatic output discharge at shutdown
- Built-in softstart
- 0.4ms rise time
- RoHS Compliant and Halogen Free
- Two Enable polarities and three current levels
  - SY6288A: Active High/0.6A
  - SY6288B: Active Low/0.6A
  - SY6288C: Active High/2A
  - SY6288D: Active Low/2A
  - SY6288D1: Active Low/1.5A
  - SY6288E: Active Low/2A
- Compact packages minimize board space: SOT23-5, SO8, MSOP8

### Typical Application Circuit



Note: A low-ESR 150uF aluminum electrolytic or tantalum between VOUT and GND is strongly recommended.

## Pin Configurations (Top View)



| Part Number | Package type | Top Mark <sup>①</sup> |
|-------------|--------------|-----------------------|
| SY6288AAAC  | SOT23-5      | CW <sub>xyz</sub>     |
| SY6288ACAC  | MSOP8        | ABT <sub>xyz</sub>    |
| SY6288AFAC  | SO8          | AAJ <sub>xyz</sub>    |
| SY6288BAAC  | SOT23-5      | DB <sub>xyz</sub>     |
| SY6288BCAC  | MSOP8        | ABD <sub>xyz</sub>    |
| SY6288BFAC  | SO8          | AAI <sub>xyz</sub>    |
| SY6288CAAC  | SOT23-5      | DF <sub>xyz</sub>     |
| SY6288CCAC  | MSOP8        | ABU <sub>xyz</sub>    |
| SY6288CFAC  | SO8          | AAM <sub>xyz</sub>    |
| SY6288DAAC  | SOT23-5      | BU <sub>xyz</sub>     |
| SY6288DCAC  | MSOP8        | ABE <sub>xyz</sub>    |
| SY6288DFAC  | SO8          | AAN <sub>xyz</sub>    |
| SY6288D1AAC | SOT23-5      | DS <sub>xyz</sub>     |
| SY6288D1CAC | MSOP8        | ACK <sub>xyz</sub>    |
| SY6288D1FAC | SO8          | ACJ <sub>xyz</sub>    |
| SY6288EAAC  | SOT23-5      | CO <sub>xyz</sub>     |
| SY6288ECAC  | MSOP8        | ABW <sub>xyz</sub>    |
| SY6288EFAC  | SO8          | ABV <sub>xyz</sub>    |

Note<sup>①</sup>: x=year code, y=week code, z=lot number code.

## Functional Pin Description

| 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  |
| EN- SY6288A/C<br>ENB- SY6288B/D/E | 4                       | 4                    | ON/OFF control. Don't float.<br>EN: high enable. ENB: low enable. |
| OCB                               | 5                       | 3                    | Open Drain Fault Flag   |



**Absolute Maximum Ratings** (Note 1)

|   |                 |
|---|-----------------|
| All pins  | 6V              |
| Power Dissipation, P <sub>D</sub> @ T <sub>A</sub> = 25°C SOT23-5/MSOP8/SO8 | 0.4/0.5/0.65W   |
| Package Thermal Resistance (Note 2)   |                 |
| SOT23-5/MSOP8/SO8, θ <sub>JA</sub>  | 250/150/90°C/W  |
| SOT23-5/MSOP8/SO8, θ <sub>JC</sub>  | 130/ 65/ 45°C/W |
| Junction Temperature Range  | 150°C           |
| Lead Temperature (Soldering, 10 sec.)                                       | 260°C           |
| Storage Temperature Range   | -65°C to 150°C  |
| ESD Susceptibility (Note 2)   |                 |
| HBM (Human Body Mode)   | 2kV             |
| MM (Machine Mode)   | 200V            |

**Recommended Operating Conditions** (Note 3)

|                            |                                |
|----------------------------|--------------------------------|
| I <sub>N</sub>             | 2.5V to 5.5V                   |
| EN/ENB                     | -0.3V to V <sub>IN</sub> +0.3V |
| All other pins             | 0-5.5V                         |
| Junction Temperature Range | -40°C to 125°C                 |
| Ambient Temperature Range  | -40°C to 85°C                  |



## Electrical Characteristics

( $V_{IN} = 5V$ ,  $C_L = 1\mu F$ , per channel,  $T_A = 25^\circ C$  unless otherwise specified)

| Parameter                         | Symbol             | Test Conditions                    | Min                       | Typ | Max | Unit       |
|-----------------------------------|--------------------|------------------------------------|---------------------------|-----|-----|------------|
| Input Voltage Range               | $V_{IN}$           |                                    | 2.5                       |     | 5.5 | V          |
| Shutdown Input Current            | $I_{SHDN}$         | $R_{LOAD} = R_{OPEN}$ , switch off |                           | 0.1 | 1   | $\mu A$    |
| Quiescent Supply Current          | $I_Q$              | $R_{LOAD} = R_{OPEN}$ , switch on  |                           | 32  |     | $\mu A$    |
| FET RON                           | $R_{DS(ON)}$       | SOT23-5(SY6288A/B/C/D/D1)          | 60                        | 80  | 100 | m $\Omega$ |
|                                   |                    | SOT23-5(SY6288E)                   | 50                        | 70  | 90  | m $\Omega$ |
|                                   |                    | MSOP8 SY6288A/B/C/D/D1)            | 60                        | 80  | 100 | m $\Omega$ |
|                                   |                    | MSOP8 SY6288E)                     | 50                        | 70  | 90  | m $\Omega$ |
|                                   |                    | SO8( SY6288A/B/C/D/D1)             | 65                        | 85  | 105 | m $\Omega$ |
|                                   |                    | SO8( SY6288E)                      | 55                        | 75  | 95  | m $\Omega$ |
| Current Limit                     | $I_{LIM}$          | SY6288A/B                          | 0.8                       |     | 1.6 | A          |
|                                   |                    | SY6288C/D                          | 2.1                       |     | 3.7 | A          |
|                                   |                    | SY6288D1                           | 1.6                       |     | 3.7 | A          |
|                                   |                    | SY6288E                            | 2.2                       |     | 3.7 | A          |
| EN/ $\overline{EN}$ threshold     | Logic-Low Voltage  | $V_{IL}$                           | $V_{IN} = 2.5V$ to $5.5V$ |     | 0.8 | V          |
|                                   | Logic-High Voltage | $V_{IH}$                           | $V_{IN} = 2.5V$ to $5.5V$ |     | 2   | V          |
| IN UVLO Threshold                 | $V_{IN,UVLO}$      |                                    |                           |     | 2.4 | V          |
| IN UVLO Hysteresis                | $V_{IN,HYS}$       |                                    |                           | 0.1 |     | V          |
| Turn-ON Time                      | $T_{ON}$           | $R_L = 5\text{ohm}$                |                           | 400 |     | $\mu s$    |
| Turn-OFF Time                     | $T_{OFF}$          |                                    |                           |     | 200 | $\mu s$    |
| OCB Low Resistance                | $R_{OCB}$          |                                    |                           | 10  |     | $\Omega$   |
| OCB Delay Time                    | $T_{OCB\_Delay}$   |                                    |                           | 10  |     | ms         |
| OUT Shutdown Discharge Resistance | $R_{DIS}$          |                                    |                           | 10  |     | $\Omega$   |
| Thermal Shutdown Temperature      | $T_{SD}$           |                                    |                           | 150 |     | $^\circ C$ |
| Thermal Shutdown Hysteresis       |                    |                                    |                           | 20  |     | $^\circ C$ |

**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.

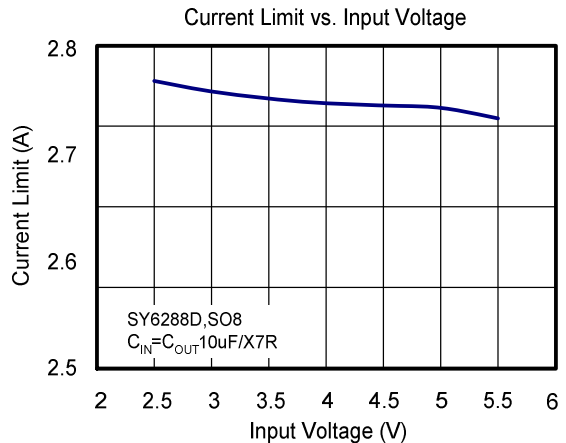
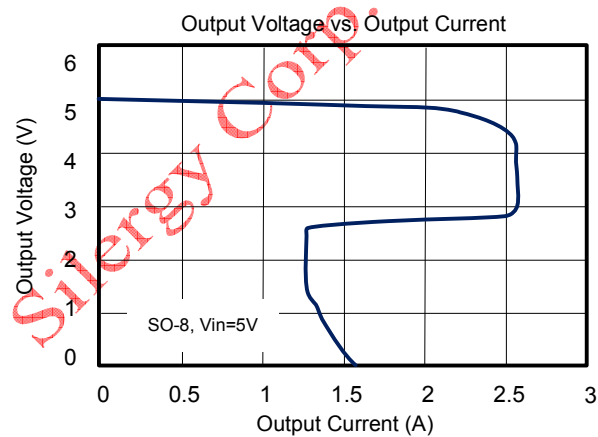
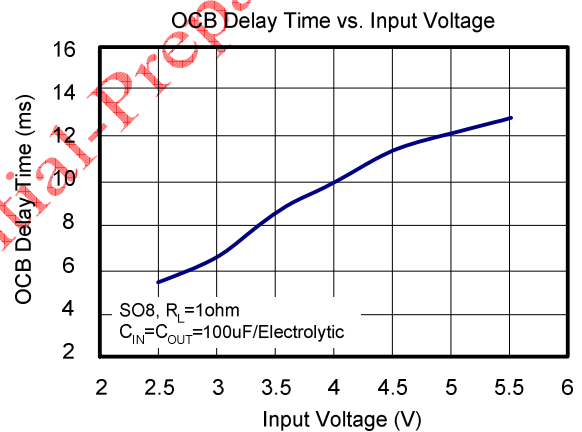
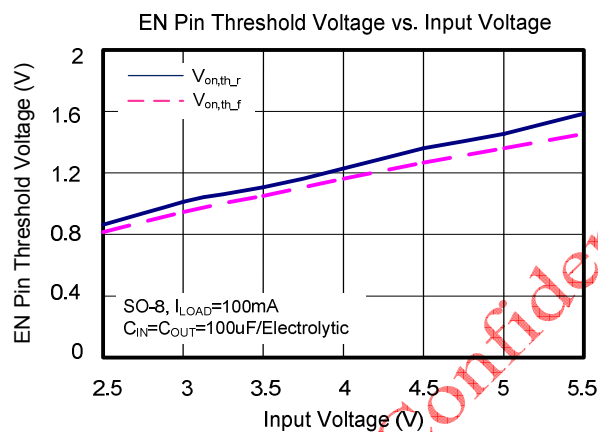
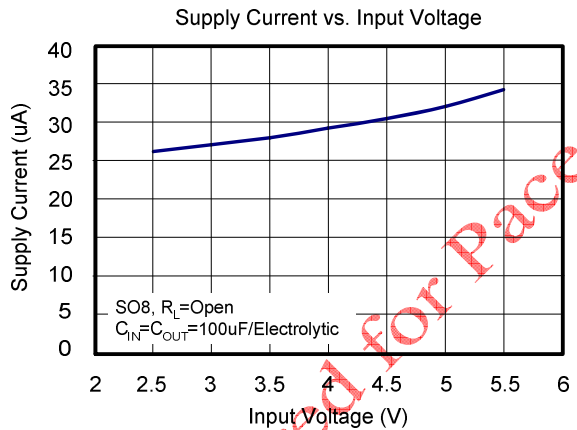
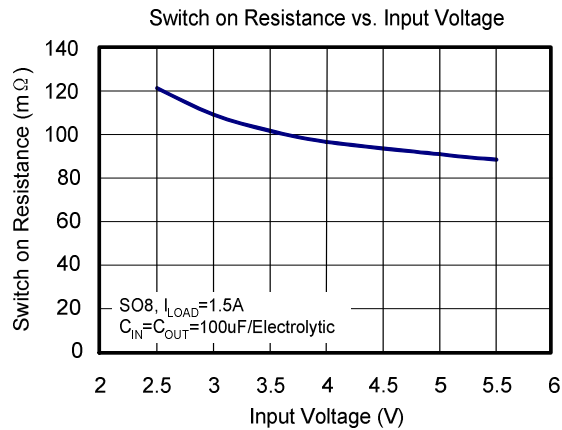
**Note 2:**  $\theta_{JA}$  is measured in the natural convection at  $T_A = 25^\circ C$  on a low effective single layer thermal conductivity test board of JEDEC 51-3 thermal measurement standard.

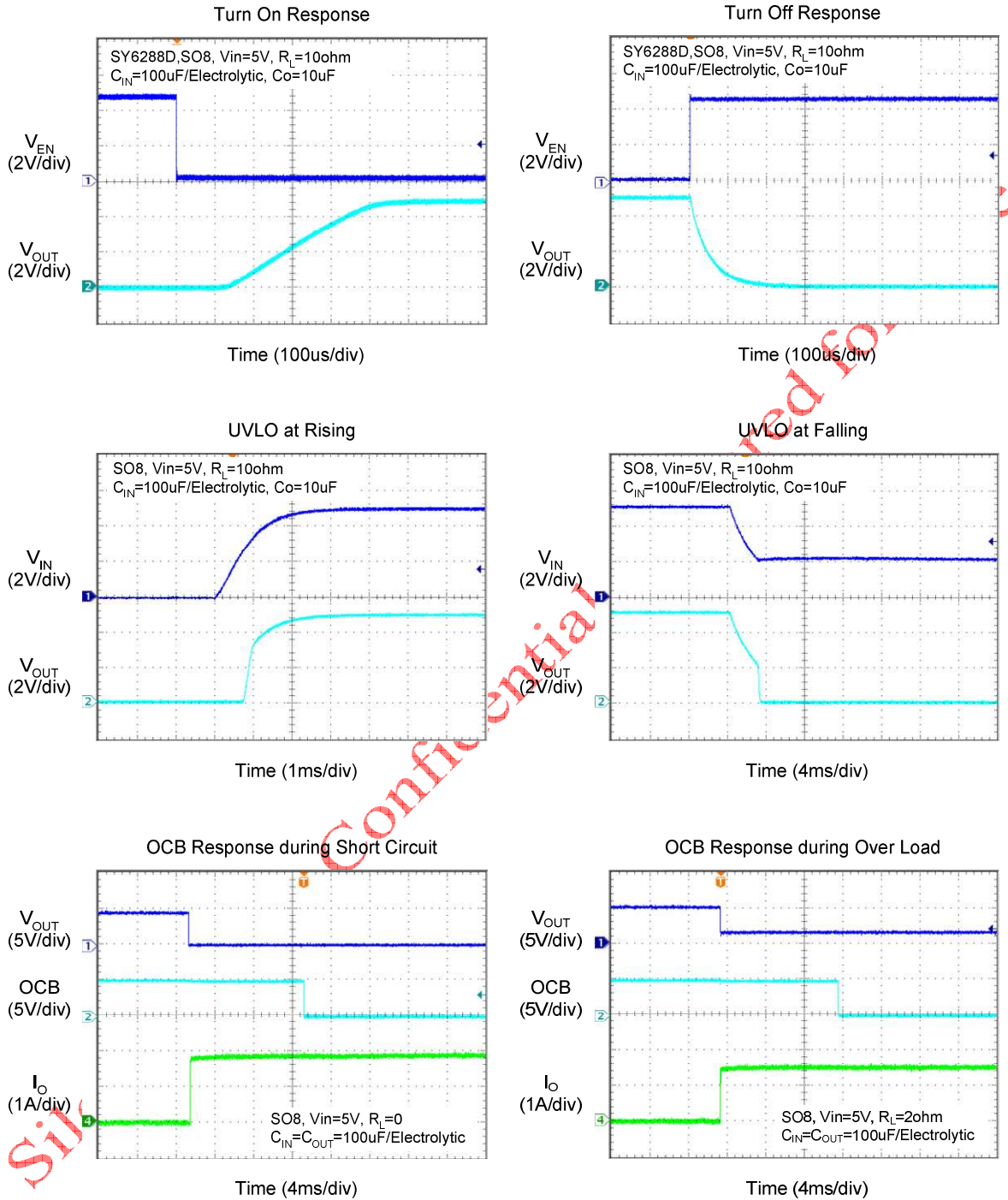
**Note 3:** The device is not guaranteed to function outside its operating conditions



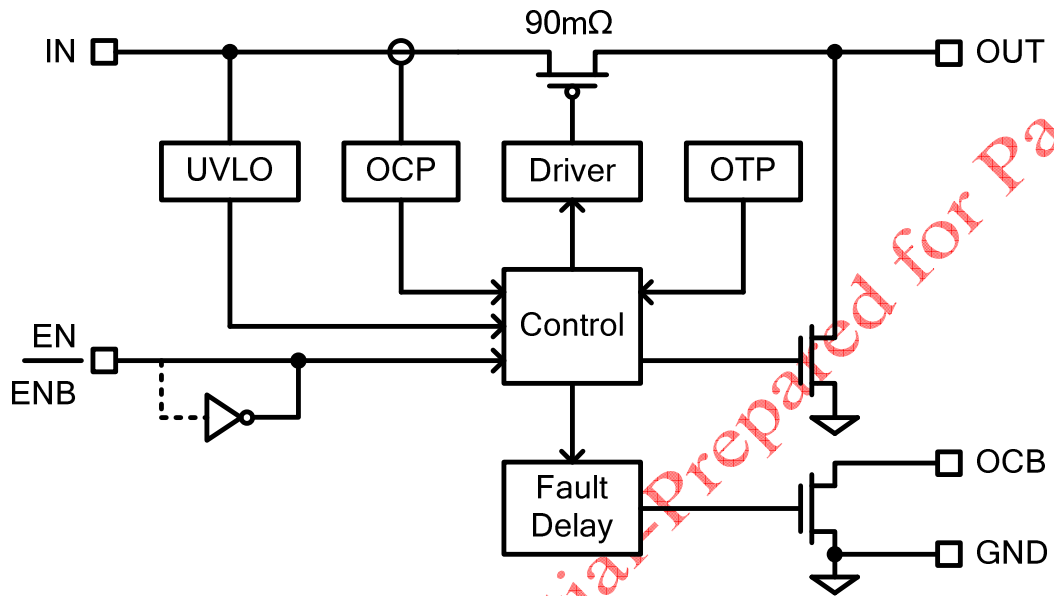
SILERGY

### Typical Operating Characteristics

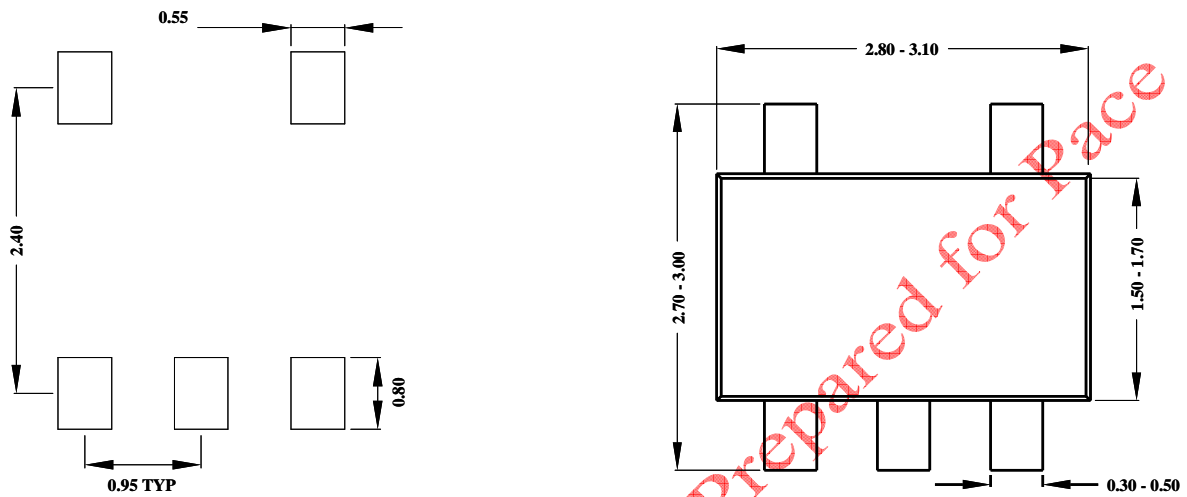




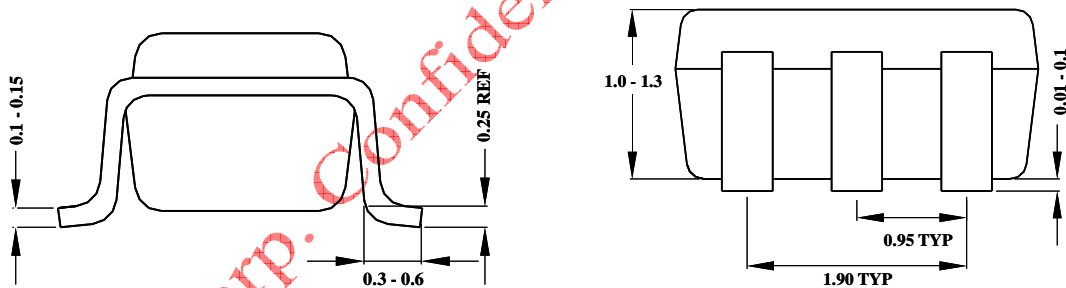
Block diagram



## SOT23-5L Package Outline & PCB layout



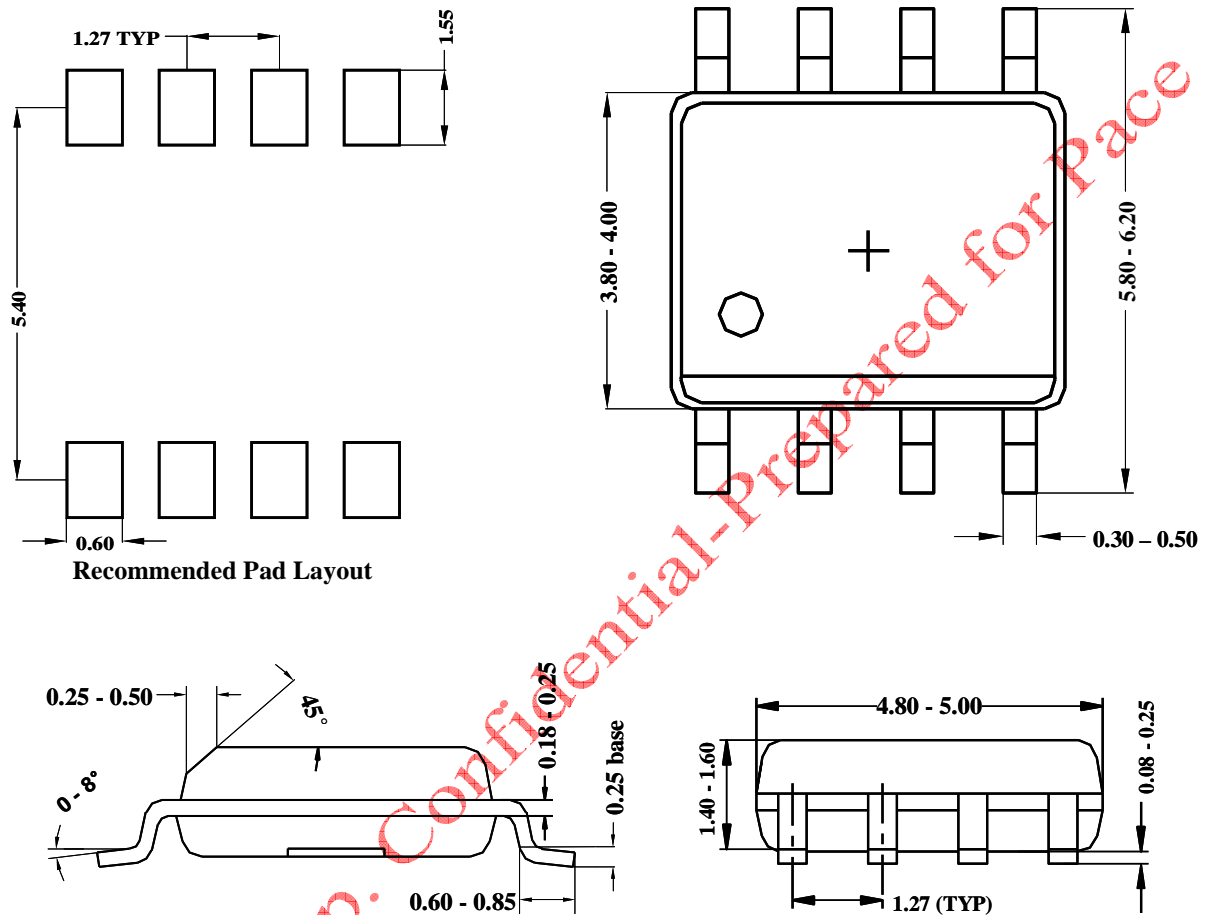
Recommended Pad Layout



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



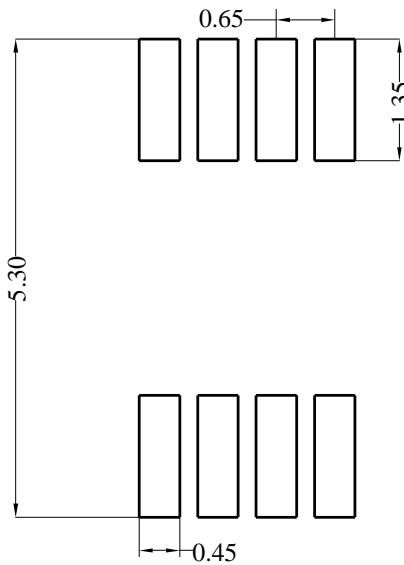
## SO8 Package outline & PCB layout design



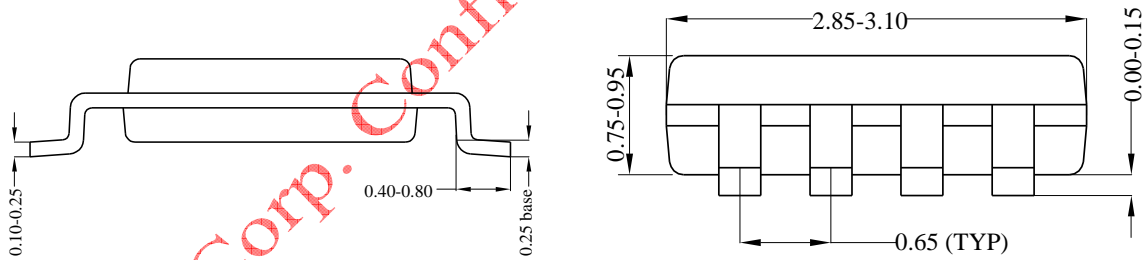
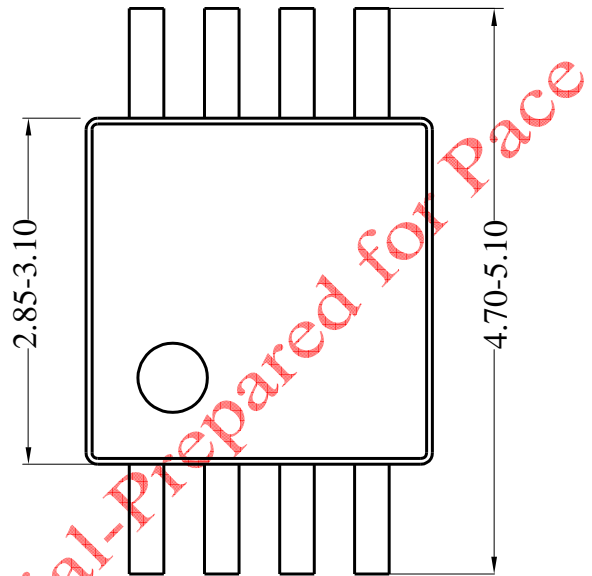
**Notes: All dimensions are in millimeters.**

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

## MSOP8 Package outline & PCB layout



Recommended Pad Layout



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