

3-Channel Supervisor IC for Power Supply

Features

- Over-voltage protection and lockout
- Under-voltage protection and lockout
- Open drain power good output signal
- Built-in 300mS delay for power good
- 38mS de-bounce for PSON/ control
- 73uS de-bounce for noise immunity
- Wide power supply range

Applications

- PC power supply
- LCD TV power supply

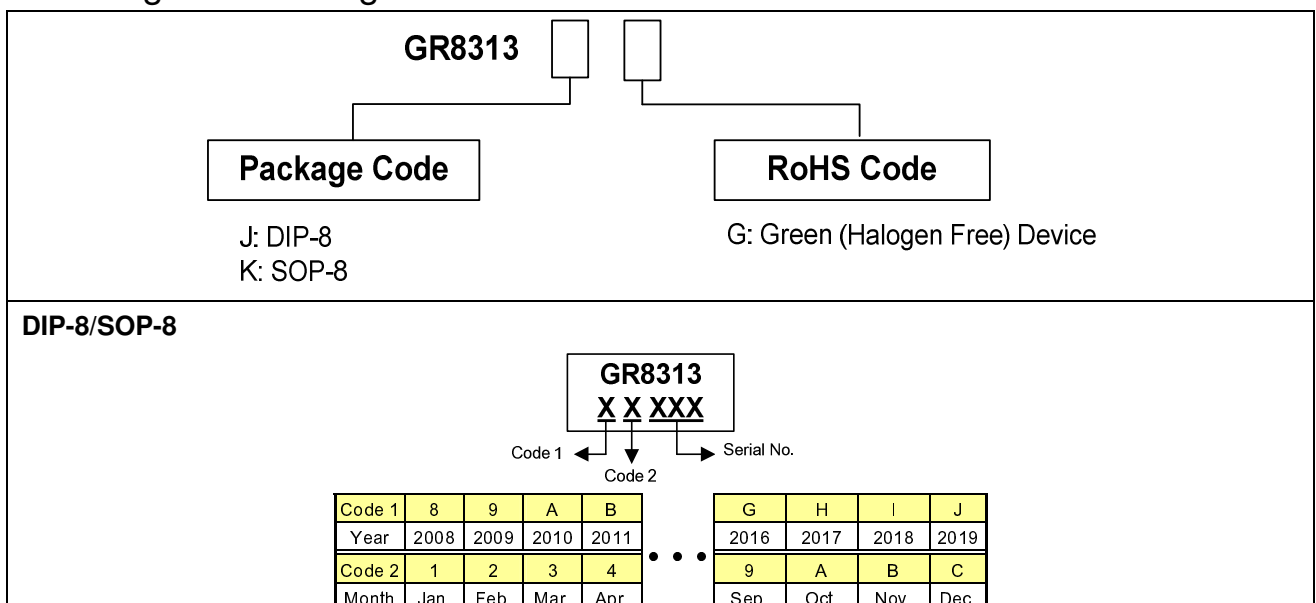
Description

GR8313 is designed to monitor the outputs of switching power supply and generate the power good signal to inform the system. There are three important functions of GR8313: over-voltage protection, under-voltage protection and power good signal generating.

Over-voltage protection (OVP) monitors 3.3V, 5V and 12V to protect the power supply and system when one of these supply voltages exceeds their normal operation voltage.

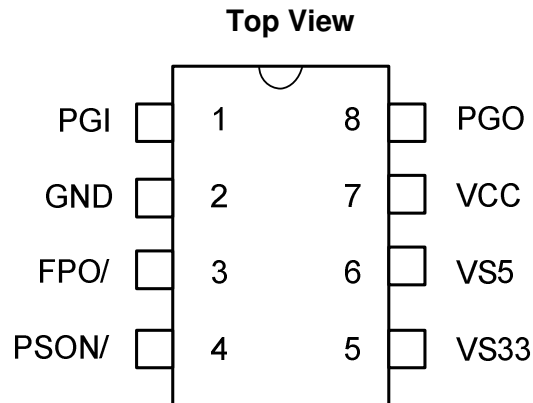
Under-voltage protection (UVP) monitors 3.3V, 5V and 12V to protect the power supply and system. When power supply is ready or going to shutdown, power good signal generating notifies personal computers; it provides a reliable power supply environment for system.

Ordering and Marking Information



Greenergy OPTO Inc. reserves the right to make changes to improve reliability or manufacture ability without notice, and advise customers to obtain the latest version of relevant information to verify before placing orders.

Pin Configuration



Pin Descriptions

| Pin No. | Name | Function |
|---------|-------|---|
| 1 | PGI | Power good input signal pin |
| 2 | GND | Ground |
| 3 | FPO/ | Inverted fault protection output, open drain output stage |
| 4 | PSON/ | Remote ON/OFF control input pin |
| 5 | VS33 | 3.3V over/under voltage protection input pin |
| 6 | VS5 | 5.0V over/under voltage protection input pin |
| 7 | VCC | Power supply |
| 8 | PGO | Power good output signal pin, open drain output stage |

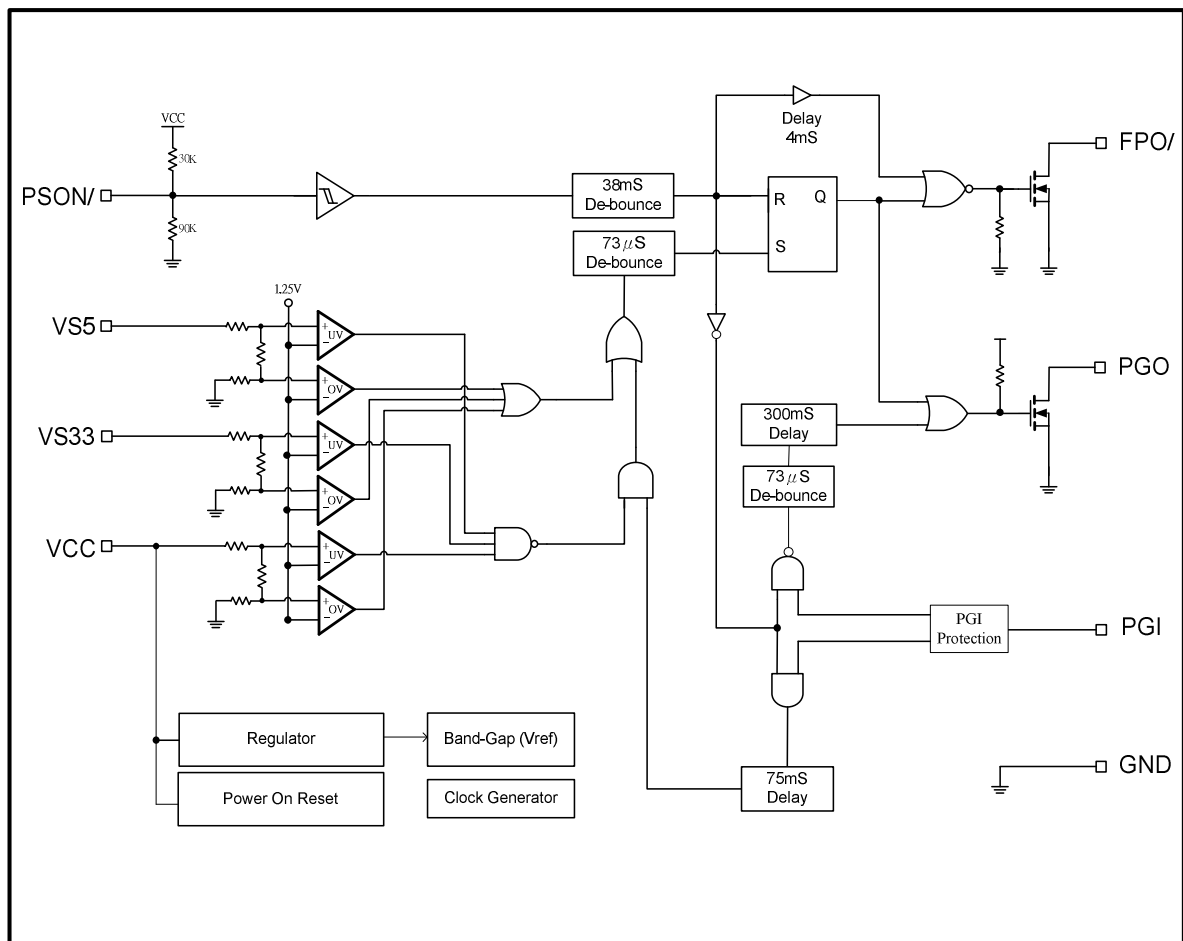
Absolute Maximum Ratings

| | | |
|--|-------|-------------------|
| VCC, PGI, FPO/ | ----- | -0.5 ~ 16V |
| VS5, VS33, PSON/, PGO | ----- | -0.5 ~ VCC + 0.5V |
| Junction temperature | ----- | 150°C |
| Operating ambient temperature | ----- | -20°C ~ 85°C |
| Storage temperature range | ----- | -65°C ~ 150°C |
| DIP-8 package thermal resistance | ----- | 100°C/W |
| Power dissipation (DIP-8, at ambient temperature = 85°C) | ----- | 650mW |
| Lead temperature (All Pb free packages, soldering, 10 sec) | ----- | 260°C |
| ESD voltage protection, human body model | ----- | 3KV |
| ESD voltage protection, machine model | ----- | 250V |

Recommended Operating Conditions

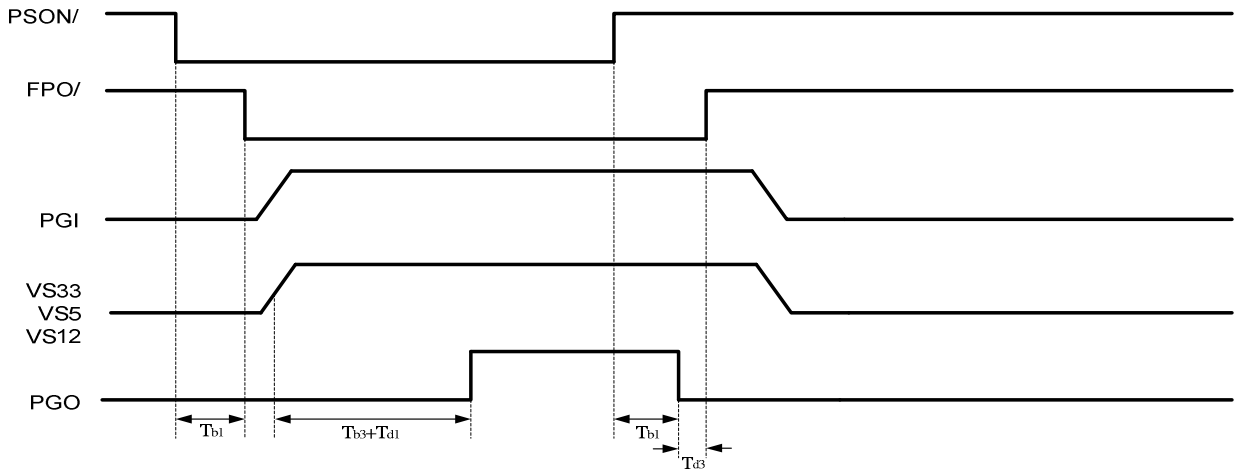
| Item | Min. | Max. | Unit |
|--------------------|------|------|------|
| Supply voltage VCC | 4.5 | 15 | V |

Block Diagram

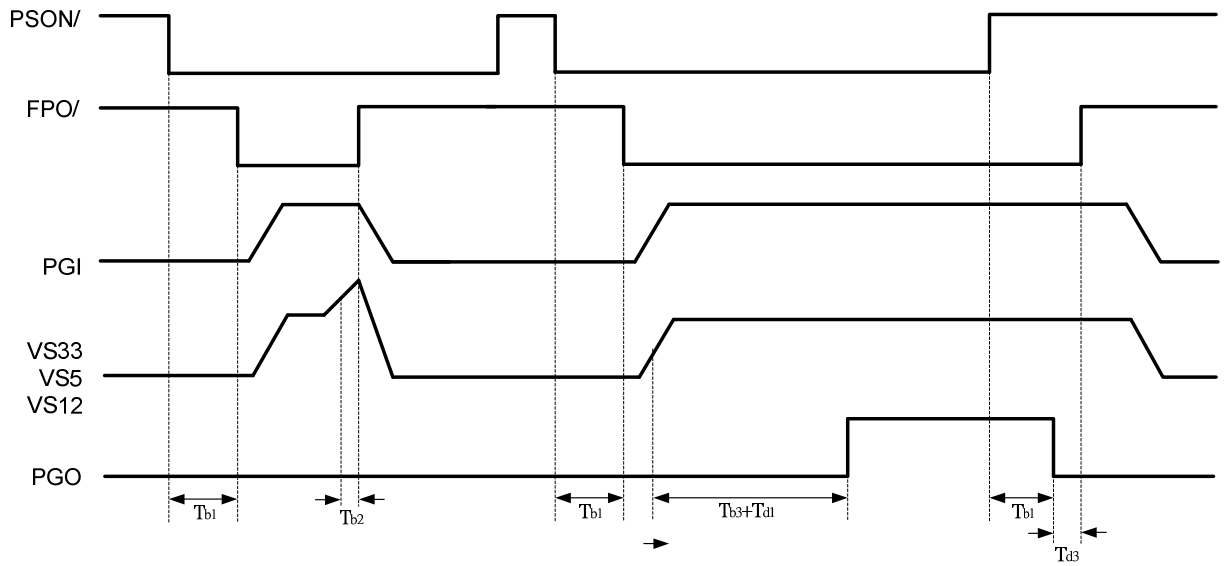


Timing Chart

1. PSON/ Signal Characteristics



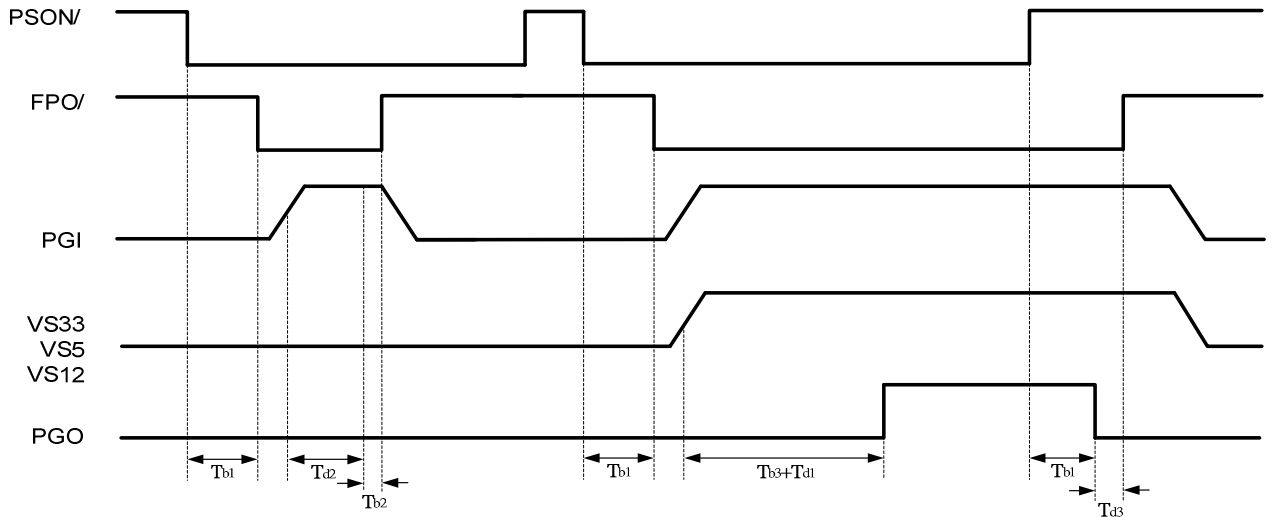
2. Over-Voltage Characteristics



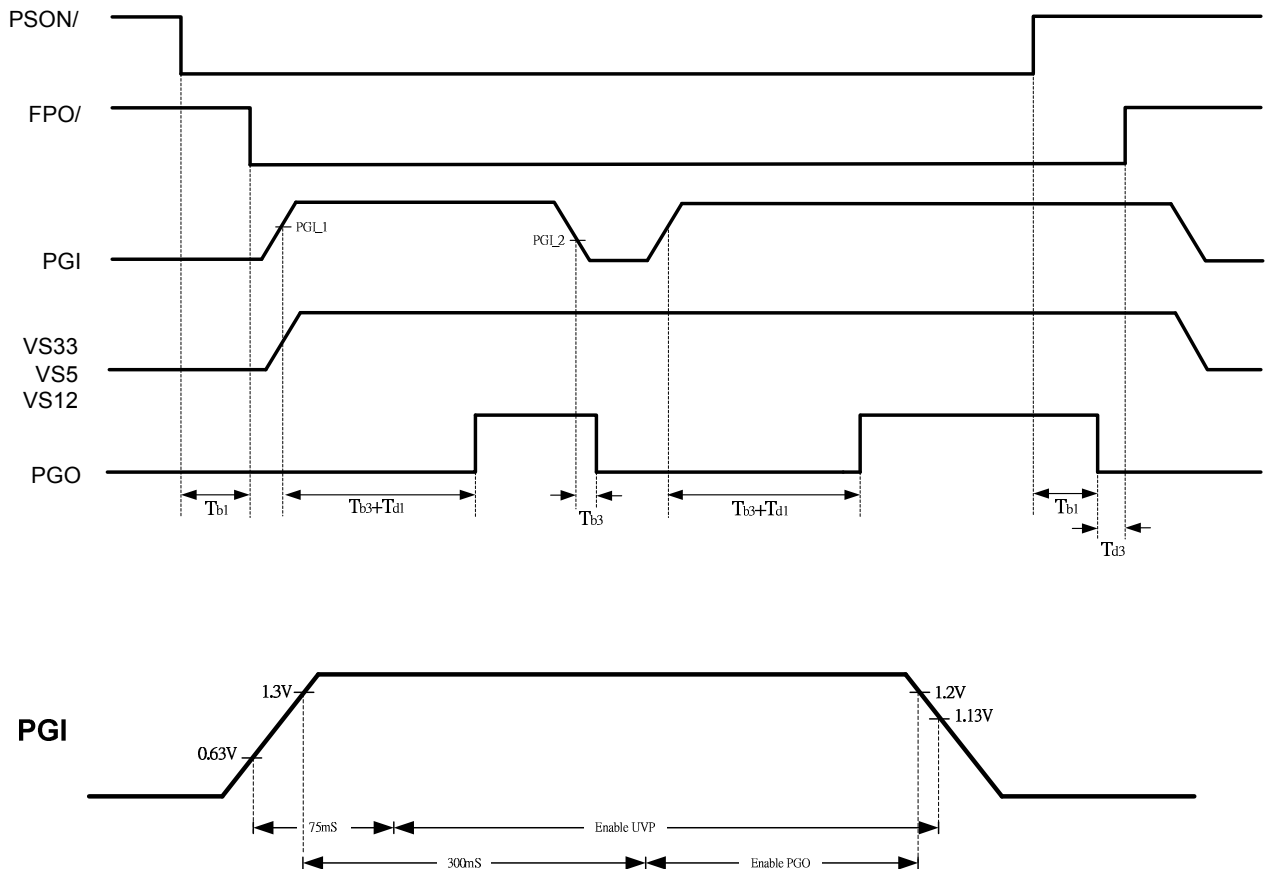


Timing Chart (Cont.)

3. Under-Voltage Characteristics



4. PGI Characteristics



Electrical Characteristics ($T_A = +25^\circ\text{C}$ unless otherwise stated, $V_{CC} = 12.0\text{V}$)

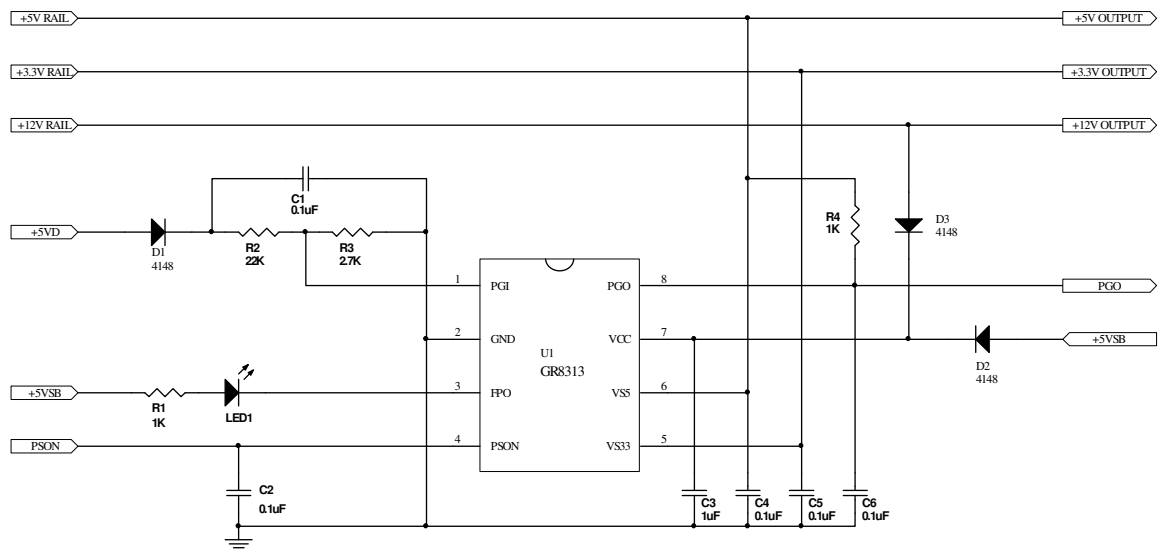
| Parameter | Conditions | Symbol | Min. | Typ. | Max. | Unit |
|------------------------------------|---------------------------------|----------------------|------|------|------|------|
| POWER SUPPLY | | | | | | |
| Supply voltage | | VCC | 4.0 | 5.0 | 16.0 | V |
| Supply current | $V_{\text{PSON/}} = 5\text{V}$ | Ivcc | | 2 | 3 | mA |
| OVER-VOLTAGE PROTECTION | | | | | | |
| Over-voltage threshold | | VS33 | 3.7 | 3.9 | 4.1 | V |
| | | VS5 | 5.7 | 6.1 | 6.5 | V |
| | | VS12 | 13.2 | 13.8 | 14.4 | V |
| UNDER-VOLTAGE PROTECTION | | | | | | |
| Under-voltage threshold | | VS33 | 2.0 | 2.2 | 2.4 | V |
| | | VS5 | 3.3 | 3.5 | 3.7 | V |
| | | VS12 | 8.5 | 9.0 | 9.5 | V |
| PSON/ | | | | | | |
| High-level input threshold voltage | | V_{IH} | 1.4 | 1.5 | | V |
| Low-level input threshold voltage | | V_{IL} | | 1.0 | 1.1 | V |
| PGI AND PGO, FPO/ | | | | | | |
| PGI threshold voltage | PGI_1 | V_{PGL_1} | | 1.3 | 1.37 | V |
| | PGI_2 | V_{PGL_2} | 1.13 | 1.2 | | V |
| Threshold voltage for Td2 | | $V_{\text{PGL,Td2}}$ | 0.6 | 0.63 | 0.75 | V |
| Disable UVP threshold voltage | | | 1.05 | 1.13 | 1.21 | V |
| Leakage current (PGO) | $V_{\text{PGO}} = 5\text{V}$ | I_{LKG} | | | 5 | uA |
| Low level output voltage (PGO) | $I_{\text{SINK}} = 10\text{mA}$ | V_{OL} | | | 0.35 | V |
| Leakage current (FPO/) | $V_{\text{FPO/}} = 5\text{V}$ | I_{LKG} | | | 5 | uA |
| Low level output voltage(FPO/) | $I_{\text{SINK}} = 10\text{mA}$ | V_{OL} | | | 0.35 | V |
| SWITCHING CHARACTERISTICS | | | | | | |
| PSON/ de-bounce time | | Tb1 | 24 | 38 | 61 | mS |
| FPO/ Noise de-glitch time | | Tb2 | 47 | 73 | 110 | uS |
| PGO Noise de-glitch time | | Tb3 | 47 | 73 | 110 | uS |
| PGI to PGO delay time | | Td1 | 200 | 300 | 480 | mS |
| UVP protection delay time | | Td2 | 49 | 75 | 114 | mS |
| PGO to FPO/ delay time | | Td3 | 2 | 4 | 6 | mS |

Function Table

| PGI | PSON_N | UV | OV | FPO/ | PGO |
|--------------------|--------|-----|-----|------|-----|
| < 0.63V | L | No | No | L | L |
| < 0.63V | L | No | Yes | H | L |
| < 0.63V | L | Yes | No | L | L |
| 0.63V < PGI < 1.3V | L | No | No | L | L |
| 0.63V < PGI < 1.3V | L | No | Yes | H | L |
| 0.63V < PGI < 1.3V | L | Yes | No | H | L |
| PGI > 1.3V | L | No | No | L | H |
| PGI > 1.3V | L | No | Yes | H | L |
| PGI > 1.3V | L | Yes | No | H | L |
| X | H | X | X | H | L |

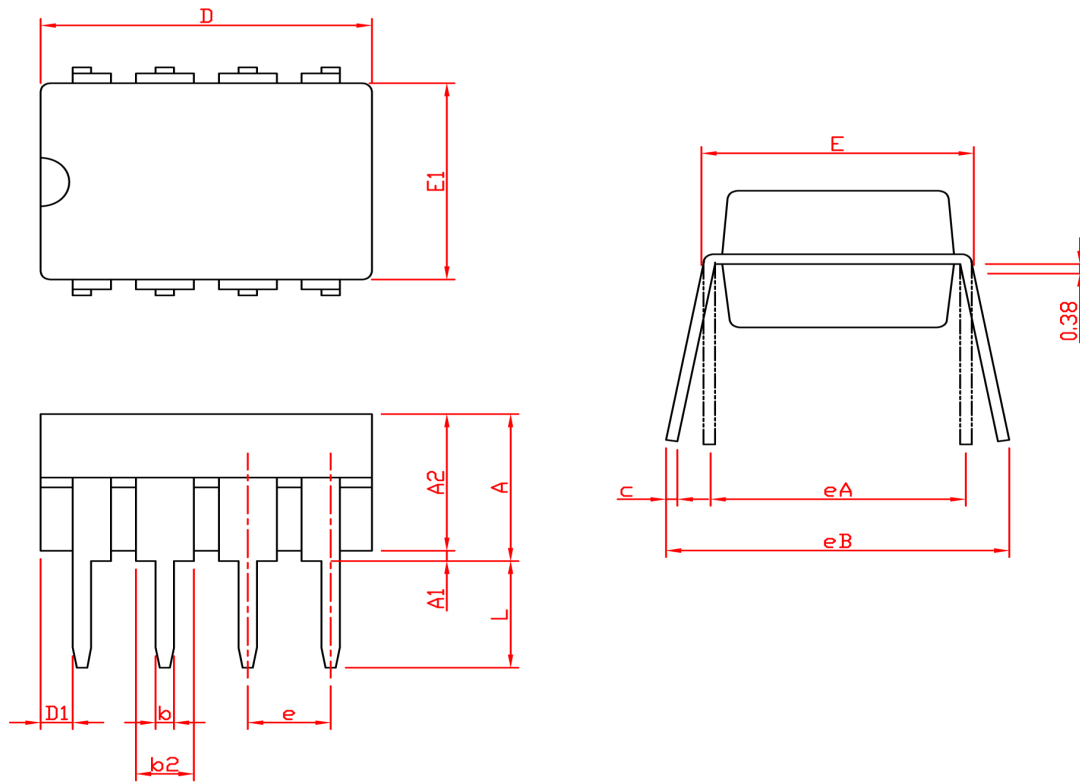
X = Don't care

Typical Application Circuit



Application Information

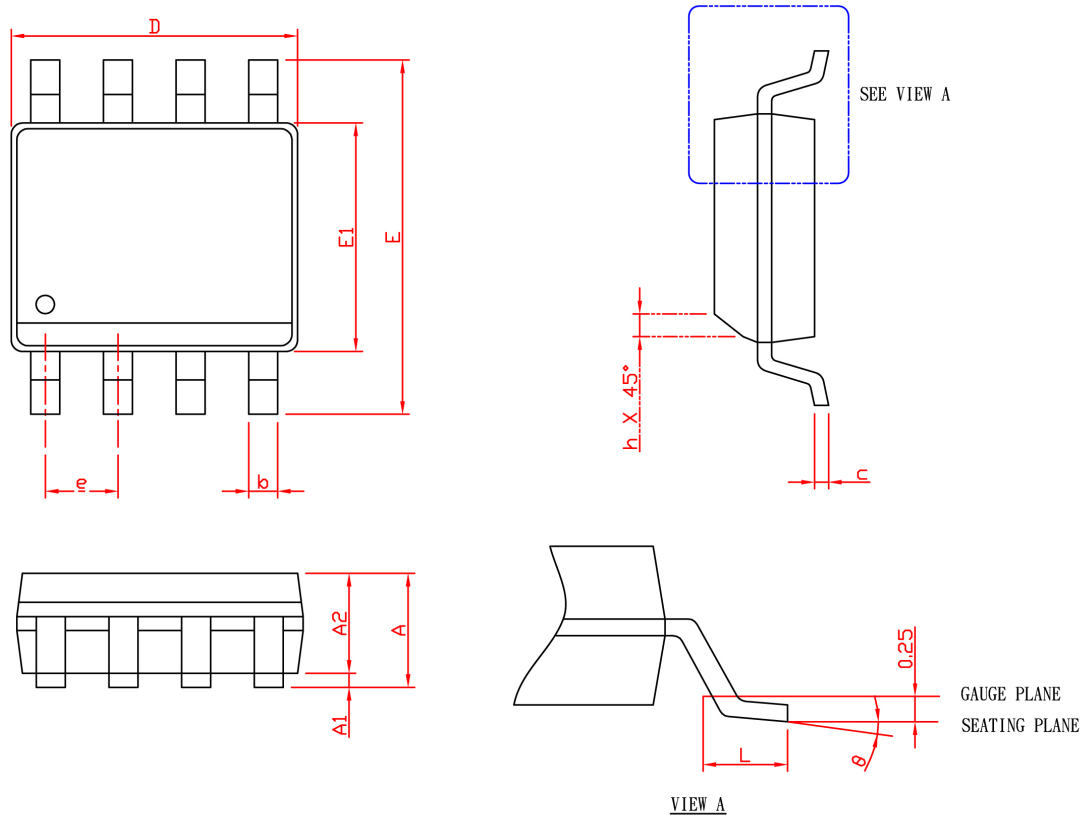
1. The power supply bypass capacitor C3 suggests to be 0.1uF ~ 10uF and around the VCC pin and GND pin while layout. Other bypass capacitors suggests to be 0.01uF ~ 1uF.

Package Information


| SYMBOL | DIP-8 | | | |
|--------|-------------|-------|-----------|-------|
| | MILLIMETERS | | INCHES | |
| | MIN. | MAX. | MIN. | MAX. |
| A | | 5.33 | | 0.210 |
| A1 | 0.38 | | 0.015 | |
| A2 | 2.92 | 4.95 | 0.115 | 0.195 |
| b | 0.36 | 0.56 | 0.014 | 0.022 |
| b2 | 1.14 | 1.78 | 0.045 | 0.070 |
| c | 0.20 | 0.35 | 0.008 | 0.014 |
| D | 9.01 | 10.16 | 0.355 | 0.400 |
| D1 | 0.13 | | 0.005 | |
| E | 7.62 | 8.26 | 0.300 | 0.325 |
| E1 | 6.10 | 7.11 | 0.240 | 0.280 |
| e | 2.54 BSC | | 0.100 BSC | |
| eA | 7.62 BSC | | 0.300 BSC | |
| eB | | 10.92 | | 0.430 |
| L | 2.92 | 3.81 | 0.115 | 0.150 |

Note: 1. Followed from JEDEC MS-001 BA.

2. Dimension D, D1 and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 10 mil.

Package Information


| SYMBOL | SOP-8 | | | |
|----------|-------------|------|-----------|-------|
| | MILLIMETERS | | INCHES | |
| | MIN. | MAX. | MIN. | MAX. |
| A | | 1.75 | | 0.069 |
| A1 | 0.10 | 0.25 | 0.004 | 0.010 |
| A2 | 1.25 | | 0.049 | |
| b | 0.31 | 0.51 | 0.012 | 0.020 |
| c | 0.17 | 0.25 | 0.007 | 0.010 |
| D | 4.80 | 5.00 | 0.189 | 0.197 |
| E | 5.80 | 6.20 | 0.228 | 0.244 |
| E1 | 3.80 | 4.00 | 0.150 | 0.157 |
| e | 1.27 BSC | | 0.050 BSC | |
| h | 0.25 | 0.50 | 0.010 | 0.020 |
| L | 0.40 | 1.27 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |

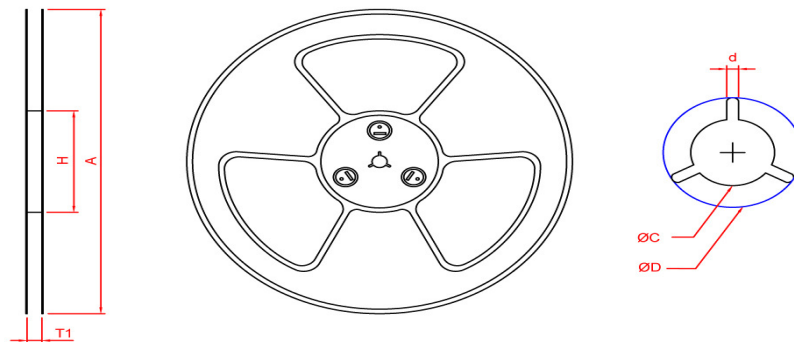
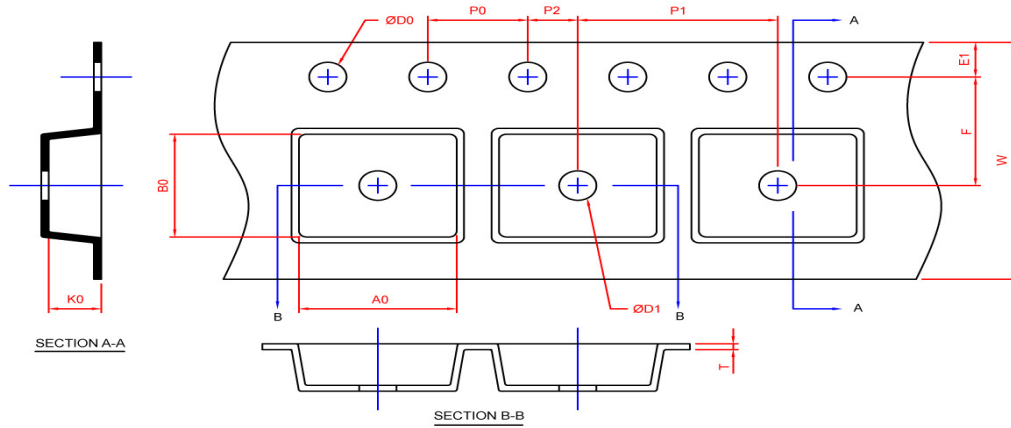
Note: 1. Followed from JEDEC MS-012 AA.

2. Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side.

3. Dimension "E1" does not include inter-lead flash or protrusions. Inter-lead flash and protrusions shall not exceed 10 mil per side.

Carrier Tape & Reel Dimensions

SOP-8



| Application | A | H | T1 | C | d | D | W | E1 | F |
|-------------|-----------|----------|--------------------|--------------------|----------|-------------------|-----------|-----------|-----------|
| SOP-8 | 330.0±2.0 | 50 MIN. | 12.4+2.00 -0.00 | 13.0+0.50 -0.20 | 1.5 MIN. | 20.2 MIN. | 12.0±0.30 | 1.75±0.10 | 5.5±0.05 |
| | P0 | P1 | P2 | D0 | D1 | T | A0 | B0 | K0 |
| | 4.0±0.10 | 8.0±0.10 | 2.0±0.05 | 1.5+0.10 -0.00 | 1.5 MIN. | 0.6+0.00 -0.40 | 6.40±0.20 | 5.20±0.20 | 2.10±0.20 |

(mm)

Devices Per Unit

| Application | Carrier Width | Cover Tape Width | Devices Per Reel |
|-------------|---------------|------------------|------------------|
| SOP-8 | 12 | - | 2500 |

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