



SP689

Ultra High Voltage Start Up

DESCRIPTION

The SP689 is a low cost version ultra high voltage start up IC. This IC is ideal to use in conjunction with any PWM to further reduce the standby power. By using SP689, it can eliminate the need for startup resistors and bleeder resistors in switching mode power supply design. It would provide the users a superior AC/DC power application with higher efficiency and lower standby power. With low external component counts, SP689 is a low cost solution for the applications.

SP689 is available in SOT-23-5L package.

APPLICATIONS

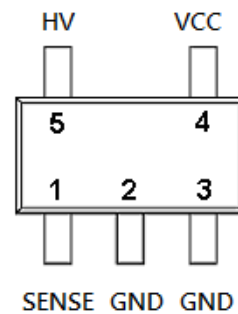
- AC/DC Switching Power Adaptor
- Battery Charger
- Open-Frame Switching Power Supply
- LED Power Supply

FEATURES

- 700V CDMOS Process
- Auto Re-Start
- High-voltage start-up
- Low standby power circuits
- SOT-23-5L Package

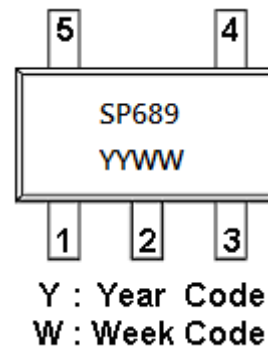
PIN CONFIGURATION

SOT-23-5L



PART MARKING

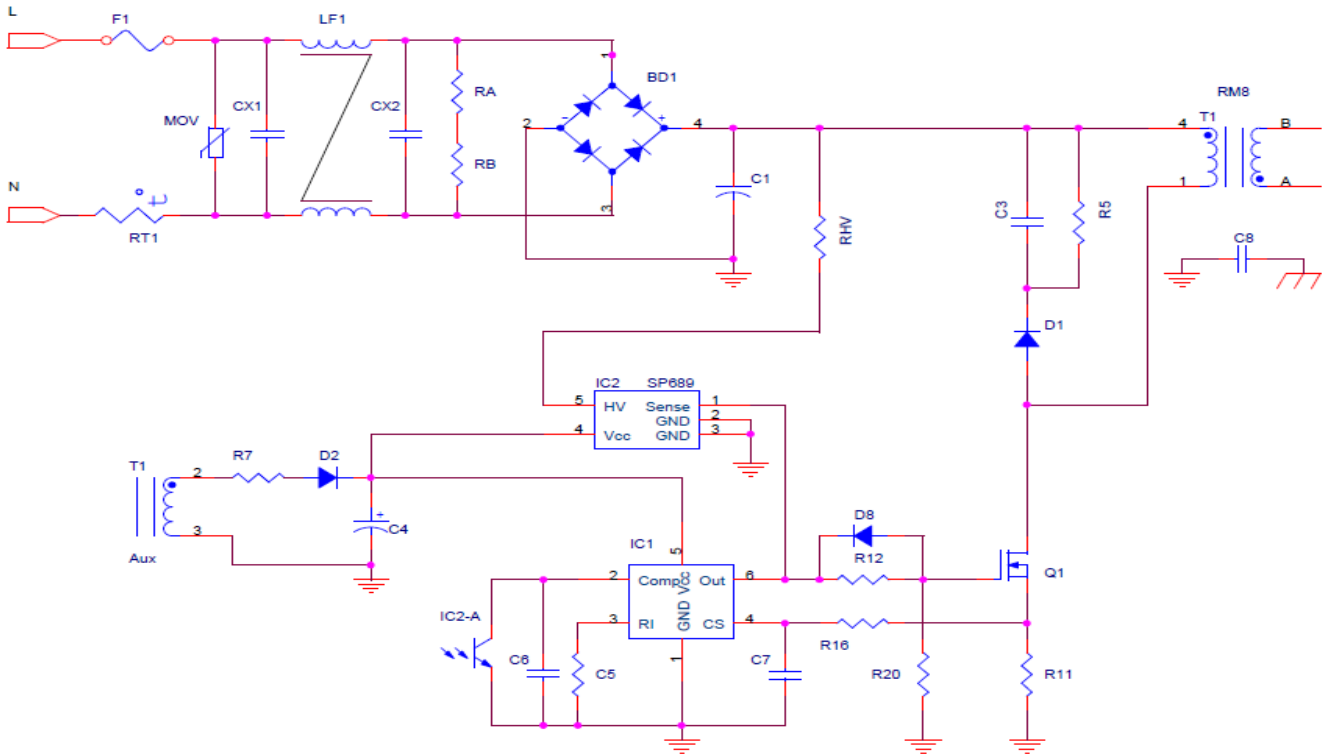
SOT-23-5L





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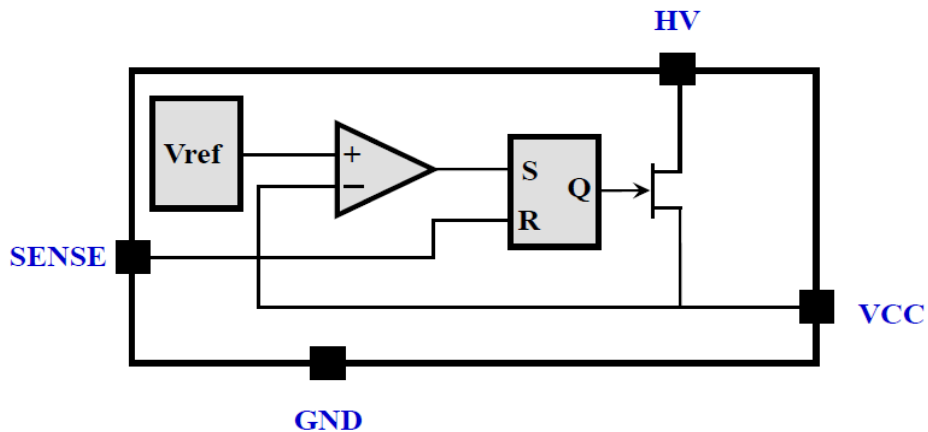
TYPICAL APPLICATION CIRCUIT



PIN DESCRIPTION

| Pin | Symbol | Description |
|-----|--------|---|
| 1 | SENSE | Sense External Signal to Switch off HV MOSFET |
| 2 | GND | Ground |
| 3 | GND | Ground |
| 4 | VCC | Supply Voltage In |
| 5 | HV | Ultra High Voltage |

BLOCK DIAGRAM





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ORDERING INFORMATION

| Part Number | Package | Part Marking |
|-------------|-----------|--------------|
| SP689S25RGB | SOT-23-5L | SP689 |

※ SP689S25RGB : Tape Reel ; Pb – Free ; Halogen-Free

ABSOLUTE MAXIMUM RATINGS (T_A=25°C, unless otherwise specified.)

The following ratings designate persistent limits beyond which damage to the device may occur.

| Symbol | Parameter | Value | Unit |
|-----------------------|--|------------------|------|
| V _{HV} | HV Voltage | -0.3~700 | V |
| V _{CC/SENSE} | VCC / SENSE Voltage | -0.3 ~ 40 | V |
| P _D | Power Dissipation @ T _A =85°C (*) | 0.3 | W |
| ESD | Human Body Model | 4 | KV |
| | Machine Model | 300 | V |
| T _J | Operating Junction Temperature Range | -40 ~ 150 | °C |
| T _{STG} | Storage Temperature Range | -40 ~ 150 | °C |
| R _{θJC} | Thermal Resistance Junction – Case (*) | SOT-23-5L 210 | °C/W |

(*) The power dissipation and thermal resistance are evaluated under copper board mounted with free air conditions.

ELECTRICAL CHARACTERISTICS

(T_A=25°C, V_{HV}=30V, unless otherwise specified.)

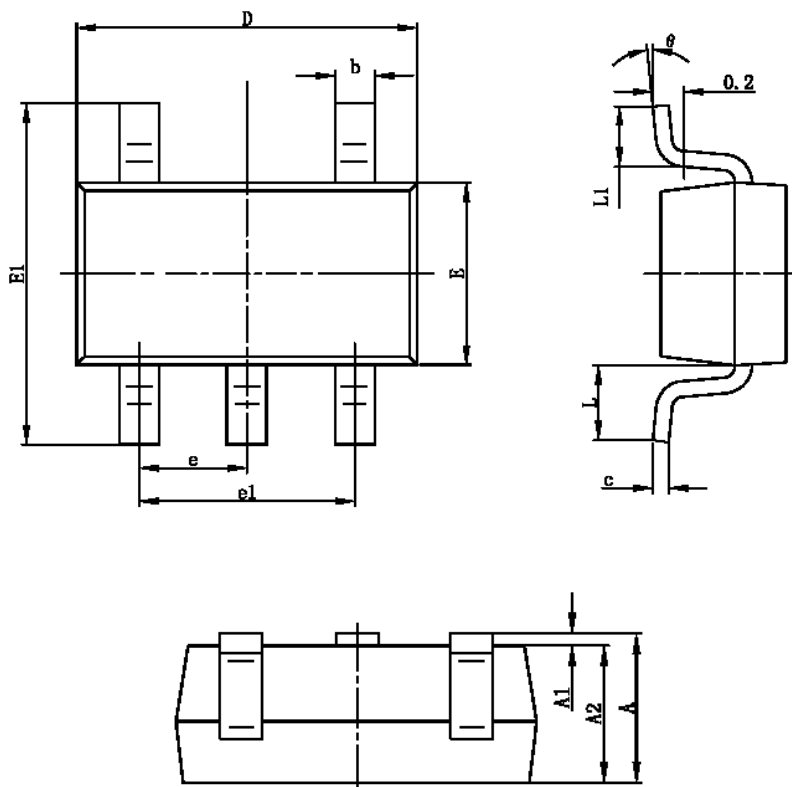
| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------------|--|---|------|------|------|------|
| V _{HV} | HV Voltage | I _r =50uA | 650 | | | V |
| I _{startup} | Start Up Current | V _{HV} = 30V | | 100 | 140 | uA |
| I _c | HV Current Source | V _{HV} = 30V, V _{CC} = 12V | 1.2 | | 5.5 | mA |
| | | V _{HV} = 30V, V _{CC} = 16V | 1.0 | | 5.0 | mA |
| | | V _{HV} = 120V, V _{CC} = 16V | 2.0 | | 6.5 | mA |
| V _{CC_RS} | V _{CC} decreasing level at when the HV Voltage Re-start | V _{HV} = 30V, | | 6.5 | | V |
| I _q | Quiescent Current, which HV turns-off | V _{HV} = 30V, V _{CC} = 16V | | 115 | 150 | uA |
| V _{SENSE HI} | Sense Voltage High(Logic level) | | 2.25 | | 2.75 | V |
| V _{SENSE LO} | Sense Voltage Low(Logic level) | | | | 0.7 | V |



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SOT-23-5L PACKAGE OUTLINE



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.400 | 0.012 | 0.016 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950TYP | | 0.037TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.700REF | | 0.028REF | |
| L1 | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |



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