

## MES0520H

### DC/DC Converter

#### General Description

MES0520H is a DC/DC converter which can be used to supply DC output from a commercial power supply (85 to 265 VAC). Using these module enable simple, easy drive of microcomputers, LEDs, and other electronic components without using a transformer.

It also allows set PCBs to be kept compact and lightweight, with extremely few attachments. It can accommodate the 85VAC~265VAC power supplies used as household power supplies.



#### Application

- Small multi-purpose power supply
- Stand-by power supply aimed at low power consumption when loaded light
- Insulated-type DC-DC converted

#### Features

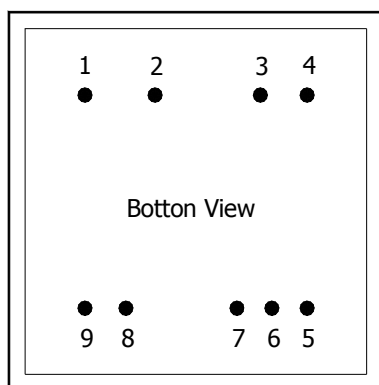
- Wide Input Range : FREEVOLT (AC 85V ~ 265V)
- A switching power supply can be made easily by adding simply external circuit
- Permits reduction of power consumption at low loads(when in stand-by)
- Able to deal with inputs of worldwide areas
- Ultra-compact size attained by application of high-density mounting technique
- Application of the unique molding technique features
  - Compliance with various safety regulations from the compact size
  - Humming is prevented when intermittent oscillation
- Over Temperature Protection
- Output Short Circuit Protection
- Over Load Protection

#### Absolute Maximum Ratings (Ta = 25°C)

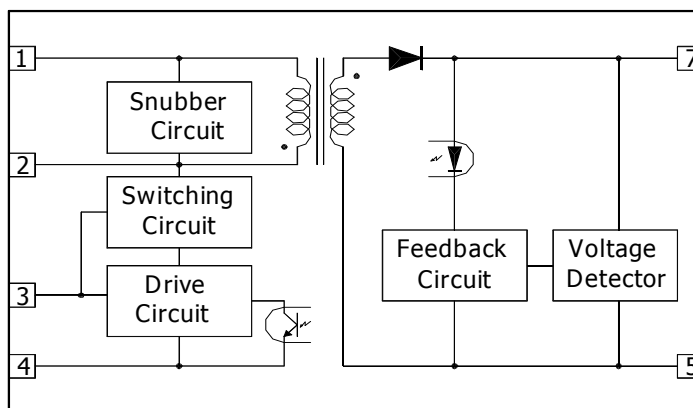
| Characteristics        | Symbol             | Rating    | Unit            |
|------------------------|--------------------|-----------|-----------------|
| Input Voltage          | V <sub>IN</sub>    | 120 ~ 375 | V <sub>DC</sub> |
| Output Voltage         | V <sub>OUT</sub>   | 5         | V               |
| Maximum Output Current | I <sub>OMAX</sub>  | 2,000     | mA              |
| Peak Output Current    | I <sub>OPEAK</sub> | 2.5       | Apk             |
| ESD Endurance          | V <sub>SURGE</sub> | 2         | kV              |

|                                     |           |            |    |
|-------------------------------------|-----------|------------|----|
| Maximum Surface Temperature         | $T_{MAX}$ | 105        | °C |
| Ambient Operating Temperature Range | $T_{OPR}$ | -10~ +60   | °C |
| Storage Temperature Range           | $T_{STG}$ | -40 ~ +105 | °C |

### Pin Assignment



### Block Diagram



### Pin Descriptions

| Pin Name | Pin No. | I/O | Description                                    |
|----------|---------|-----|--|
| +DC IN   | 1       | I   | Voltage Input Terminal, 120~375V <sub>IN</sub> |
| DRAIN    | 2       | O   | Drain Output Terminal                          |
| NC       | 3       |     | No Connection                                  |
| - DC IN  | 4       | I   | Voltage Input Terminal, 0V <sub>IN</sub>       |
| GND      | 5       | O   | Voltage Output Terminal, 0V <sub>DC</sub>      |
| NC       | 6       |     | No Connection                                  |
| +DC OUT  | 7       | O   | Voltage Output Terminal, 5V <sub>DC</sub>      |
| NC       | 8       |     | No Connection                                  |
| NC       | 9       |     | No Connection                                  |

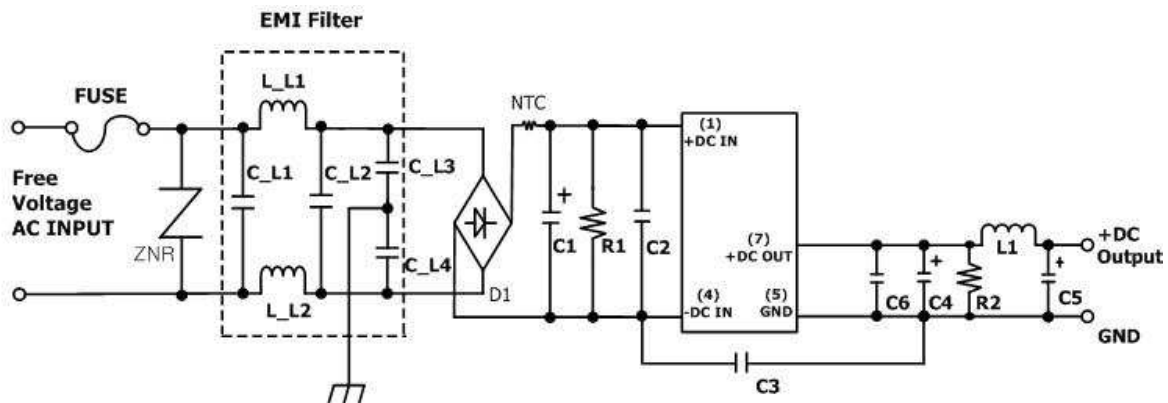
(Note1) Refer to the application circuit over pin connection

### Electrical Characteristics

| Characteristics     | Symbol          | Condition  | Min. | Typ. | Max.  | Unit            |
|---------------------|-----------------|--|------|------|-------|-----------------|
| Input Voltage Range | V <sub>IN</sub> |  | 120  | 311  | 375   | V <sub>DC</sub> |
| Output Voltage      | V <sub>O</sub>  | V <sub>i</sub> =311V, I <sub>o</sub> =2000mA     | 4.65 | 5.00 | 5.35  | V               |
| Output Current      | I <sub>O</sub>  | V <sub>i</sub> =311V                             | -    | -    | 2,000 | mA              |
| Line Regulation     | V <sub>R</sub>  | V <sub>i</sub> =120~375V, I <sub>o</sub> =2000mA | -    | 0.05 | 0.20  | V               |
| Load Regulation     | V <sub>L</sub>  | V <sub>i</sub> =311V, I <sub>o</sub> =0~2000mA   | -    | 0.05 | 0.25  | V               |

|                             |        |                        |    |      |      |           |
|-----------------------------|--------|------------------------|----|------|------|-----------|
| Output Ripple Voltage       | $V_p$  | $V_i=311V, I_o=2000mA$ | -  | 0.05 | 0.20 | $V_{p-p}$ |
| Power Conversion Efficiency | $\eta$ | $V_i=311V, I_o=2000mA$ | 60 | 70   | -    | %         |

### Application Circuit

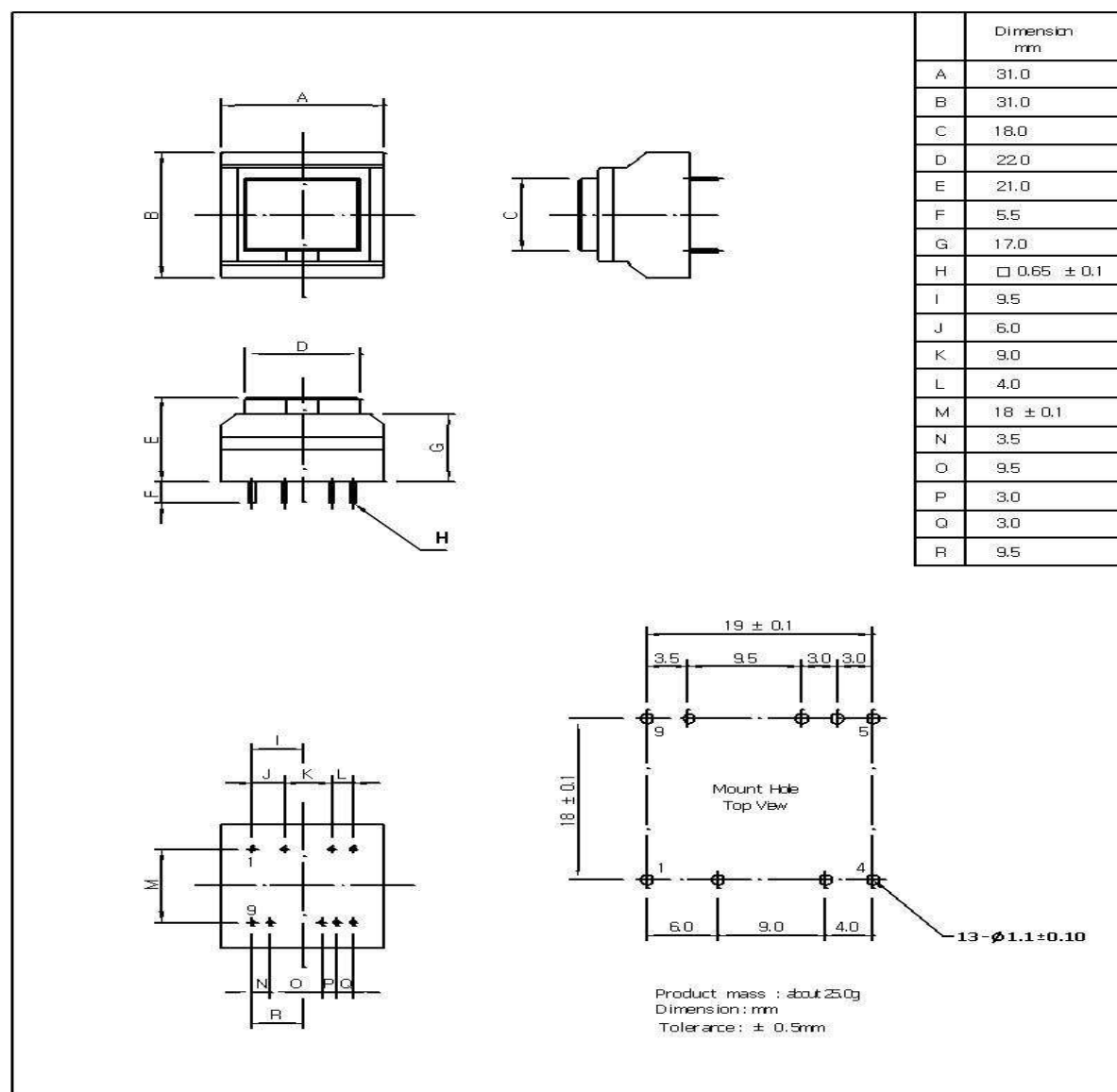


### External Component Setting

| FUSE   | Fuse                                      | Please make sure to use quick acting fuse 1A or higher  |
|--------|---|---|
| C1     | Capacitor for input voltage smoothing     | Capacitance : $33\mu F \sim 820\mu F$ , Rated voltage : 400V or higher<br>Ripple current is 0.13Arms above.   |
| C2     | For noise terminal voltage reduction      | Capacitance : $0.1\mu F \sim 0.22\mu F$ , Rated voltage : 400V or higher<br>Film capacitor or ceramic capacitor.<br>Reduce the noise terminal voltage.<br>The constant value should be evaluated in the set.      |
| C3     | Capacitor for Safety                      | Capacitance : $1nF \sim 4.7nF$ , Rated voltage : 400V or higher   |
| C4, C5 | Capacitor for output voltage smoothing    | Capacitance : $1000\mu F \sim 2000\mu F$ , Rated voltage : 16V or higher<br>ESD is 0.4Ω max.<br>Ripple current is 0.25Arms above.<br>Output noise voltage is influenced.<br>Please evaluate it in the actual set. |
| R1     | Discharge Resistor                        | 500kΩ or higher , 1W or higher  |
| R2     | Dummy Resistor                            | 500Ω, 0.5W  |
| C6     | Bypass Capacitor for high frequency noise | Capacitance : $10nF \sim 100nF$ , Rated voltage : 50V or higher<br>Film capacitor or ceramic capacitor.<br>Reduce the high frequency noise terminal output.   |

|    |                 |   |
|----|-----------------|---|
| L1 | Choke Coil      | L : 4.7~10 $\mu$ H, Allowable current : 3A or higher<br>Please use the one that is hard to be magnetic saturated even in the high temperature.  |
| D1 | Rectifier Diode | In the absolute maximum ratings, the reverse peak voltage should be 500V or higher, the average rectifying current should be 1A or higher, and the peak surge current should be 10A or higher. (Full-wave rectifier can be used in out part.) |

### Package Outline



### Ordering Information

| Order Number | Ambient Temperature Range | Package Type |
|--------------|---------------------------|--------------|
| MES0520H     | 0°C ~ 50°C                |              |

\* Please consult the factory or sales representative for pricing and availability.

**POWERGEN Co., Ltd.**

**67-13, Shinchon-dong, Changwon si, Gyeongnam, S.Korea, 642-370**

**TEL+82 55 275 7801~4 FAX +82 55 275 2522**

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