



SANYO Semiconductors

## DATA SHEET

CPH5811

MOSFET : N-Channel Silicon MOSFET

SBD : Schottky Barrier Diode

## DC / DC Converter Applications

## Features

- Composite type with an N-Channel Silicon MOSFET (MCH3406) and a Schottky Barrier Diode (SBS004) contained in one package facilitating high-density mounting.

[MOSFET]

- Low ON-resistance.
- Ultrahigh-speed switching.
- 1.8V driver

[SBD]

- Short reverse recovery time.
- Low forward voltage.

## Specifications

Absolute Maximum Ratings at Ta=25°C

| Parameter                                | Symbol           | Conditions                                                   | Ratings     | Unit |
|------------------------------------------|------------------|--------------------------------------------------------------|-------------|------|
| [MOSFET]                                 |                  |                                                              |             |      |
| Drain-to-Source Voltage                  | V <sub>DSS</sub> |                                                              | 20          | V    |
| Gate-to-Source Voltage                   | V <sub>GSS</sub> |                                                              | ±10         | V    |
| Drain Current (DC)                       | I <sub>D</sub>   |                                                              | 3           | A    |
| Drain Current (Pulse)                    | I <sub>DP</sub>  | PW≤10μs, duty cycle≤1%                                       | 12          | A    |
| Allowable Power Dissipation              | P <sub>D</sub>   | Mounted on a ceramic board (600mm <sup>2</sup> ×0.8mm) 1unit | 0.9         | W    |
| Channel Temperature                      | T <sub>ch</sub>  |                                                              | 150         | °C   |
| Storage Temperature                      | T <sub>stg</sub> |                                                              | -55 to +125 | °C   |
| [SBD]                                    |                  |                                                              |             |      |
| Repetitive Peak Reverse Voltage          | V <sub>RRM</sub> |                                                              | 15          | V    |
| Nonrepetitive Peak Reverse Surge Voltage | V <sub>RSM</sub> |                                                              | 15          | V    |
| Average Output Current                   | I <sub>O</sub>   |                                                              | 1           | A    |
| Surge Forward Current                    | I <sub>FSM</sub> | 50Hz sine wave, 1 cycle                                      | 10          | A    |
| Junction Temperature                     | T <sub>j</sub>   |                                                              | -55 to +125 | °C   |
| Storage Temperature                      | T <sub>stg</sub> |                                                              | -55 to +125 | °C   |

Marking : QM

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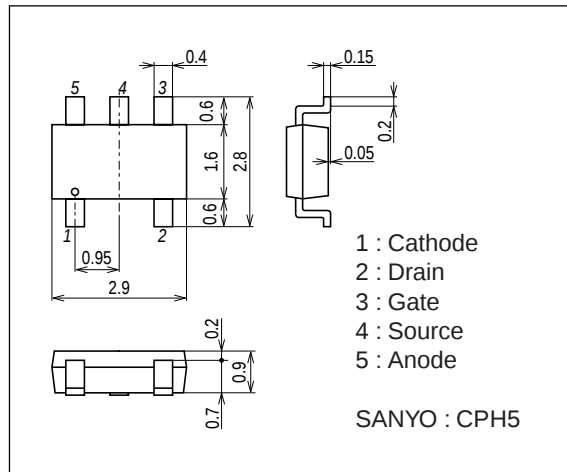
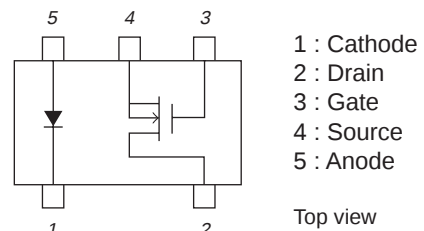
**Electrical Characteristics** at Ta=25°C

| Parameter                                  | Symbol   | Conditions                                | Ratings |      |      | Unit   |
|--------------------------------------------|----------|-------------------------------------------|---------|------|------|--------|
|                                            |          |                                           | min     | typ  | max  |        |
| [MOSFET]                                   |          |                                           |         |      |      |        |
| Drain-to-Source Breakdown Voltage          | V(BR)DSS | ID=1mA, VGS=0                             | 20      |      |      | V      |
| Zero-Gate Voltage Drain Current            | IDSS     | VDS=20V, VGS=0                            |         |      | 1    | μA     |
| Gate-to-Source Leakage Current             | IGSS     | VGS=±8V, VDS=0                            |         |      | ±10  | μA     |
| Cutoff Voltage                             | VGS(off) | VDS=10V, ID=1mA                           | 0.4     |      | 1.3  | V      |
| Forward Transfer Admittance                | yfs      | VDS=10V, ID=1.5A                          | 3.36    | 5.6  |      | S      |
| Static Drain-to-Source On-State Resistance | RDS(on)1 | ID=1.5A, VGS=4V                           |         | 48   | 63   | mΩ     |
|                                            | RDS(on)2 | ID=1A, VGS=2.5V                           |         | 58   | 82   | mΩ     |
|                                            | RDS(on)3 | ID=0.5A, VGS=1.8V                         |         | 72   | 100  | mΩ     |
| Input Capacitance                          | Ciss     | VDS=10V, f=1MHz                           |         | 280  |      | pF     |
| Output Capacitance                         | Coss     | VDS=10V, f=1MHz                           |         | 60   |      | pF     |
| Reverse Transfer Capacitance               | Crss     | VDS=10V, f=1MHz                           |         | 38   |      | pF     |
| Turn-ON Delay Time                         | td(on)   | See specified Test Circuit.               |         | 13   |      | ns     |
| Rise Time                                  | tr       | See specified Test Circuit.               |         | 35   |      | ns     |
| Turn-OFF Delay Time                        | td(off)  | See specified Test Circuit.               |         | 35   |      | ns     |
| Fall Time                                  | tf       | See specified Test Circuit.               |         | 25   |      | ns     |
| Total Gate Charge                          | Qg       | VDS=10V, VGS=4V, ID=3A                    |         | 8.8  |      | nC     |
| Gate-to-Source Charge                      | Qgs      | VDS=10V, VGS=4V, ID=3A                    |         | 0.85 |      | nC     |
| Gate-to-Drain "Miller" Charge              | Qgd      | VDS=10V, VGS=4V, ID=3A                    |         | 0.85 |      | nC     |
| Diode Forward Voltage                      | VSD      | IS=3A, VGS=0                              |         | 0.82 | 1.2  | V      |
| [SBD]                                      |          |                                           |         |      |      |        |
| Reverse Voltage                            | VR       | IR=1mA                                    | 15      |      |      | V      |
| Forward Voltage                            | VF1      | IF=0.5A                                   |         | 0.30 | 0.35 | V      |
|                                            | VF2      | IF=1A                                     |         | 0.35 | 0.40 | V      |
| Reverse Current                            | IR       | VR=6V                                     |         |      | 500  | μA     |
| Interterminal Capacitance                  | C        | VR=10V, f=1MHz cycle                      |         | 42   |      | pF     |
| Reverse Recovery Time                      | trr      | IF=IR=100mA, See specified Test Circuit.  |         |      | 15   | ns     |
| Thermal Resistance                         | Rth(j-a) | Mounted on a ceramic board (600mm²X0.8mm) |         | 110  |      | °C / W |

**Package Dimensions**

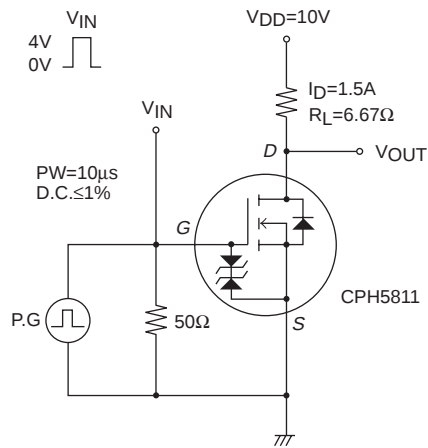
unit : mm

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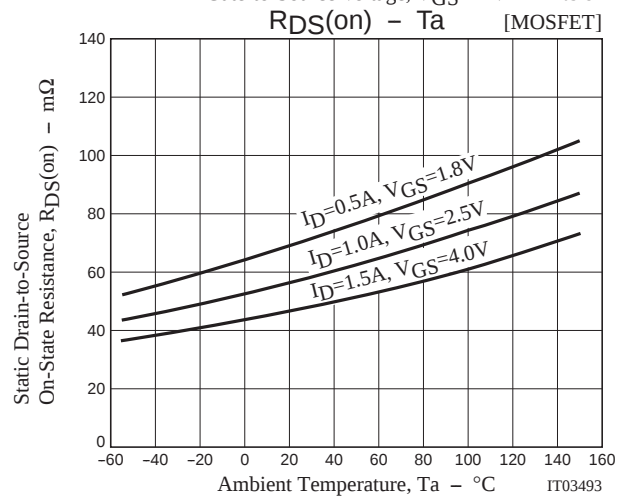
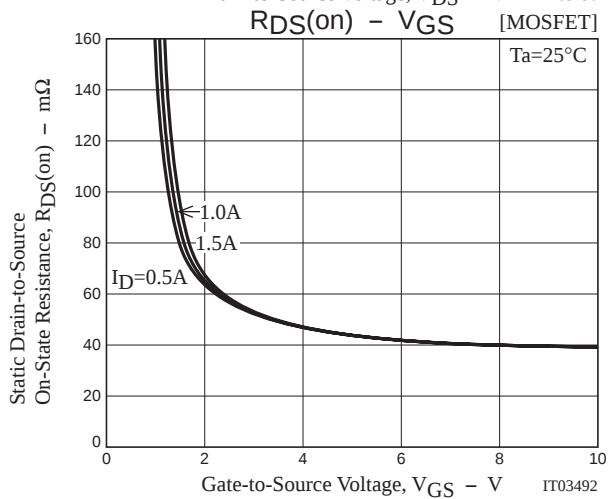
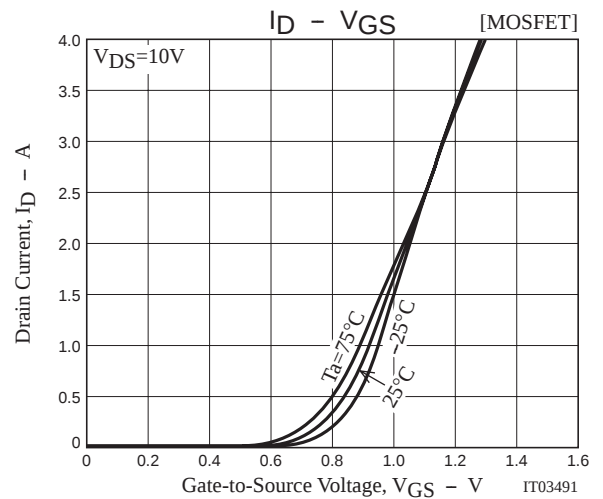
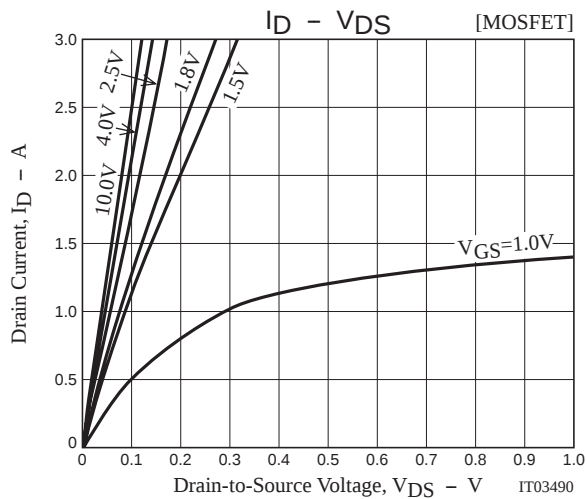
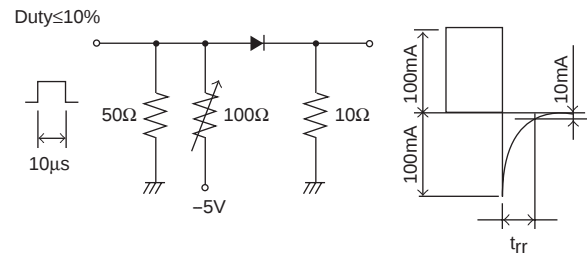
**Electrical Connection**

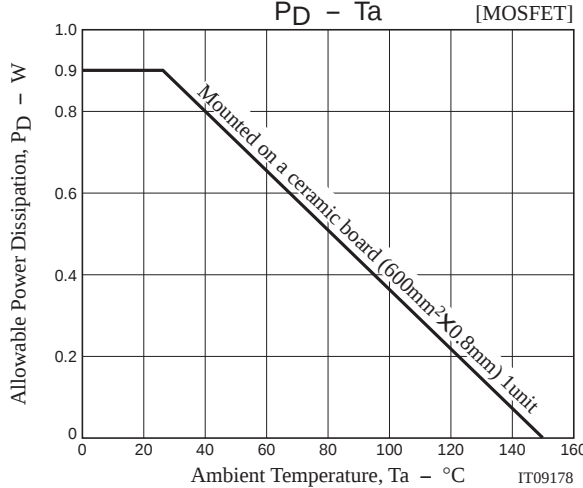
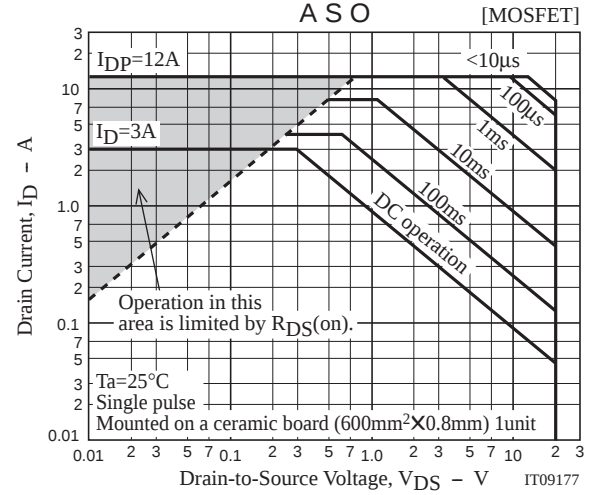
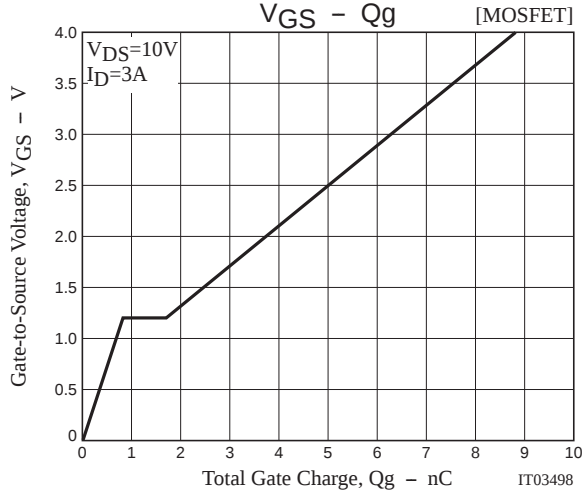
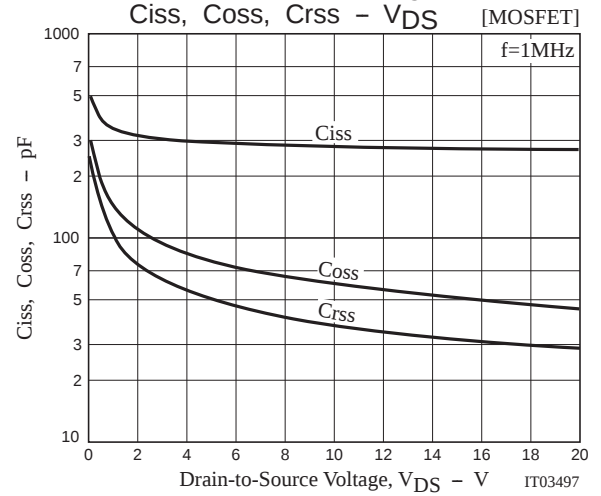
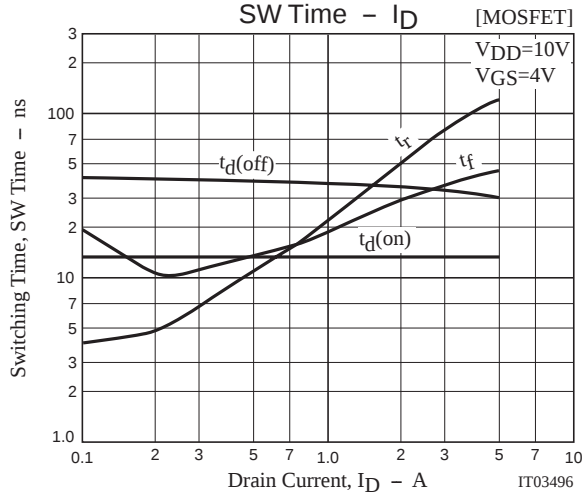
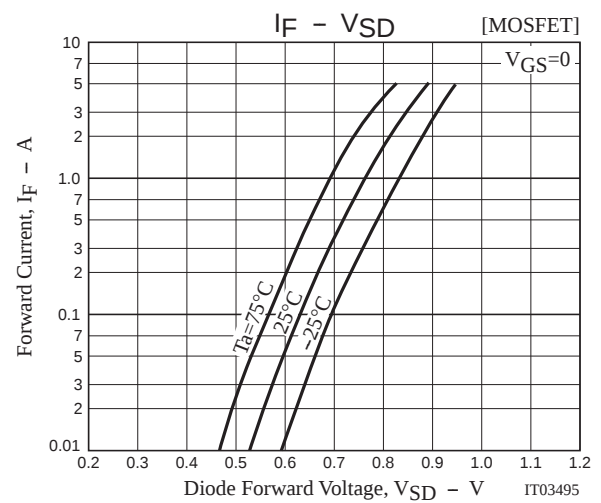
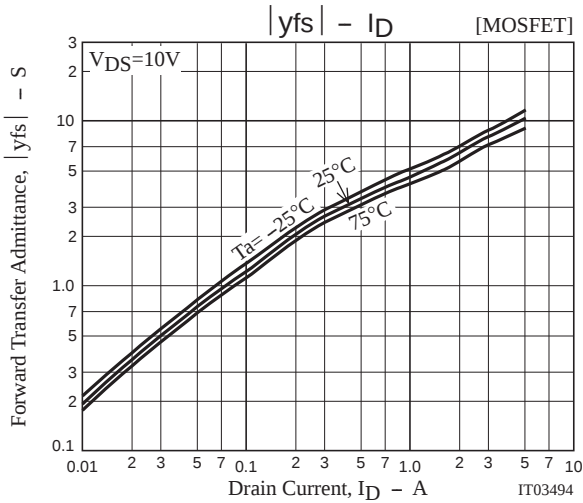
## Switching Time Test Circuit

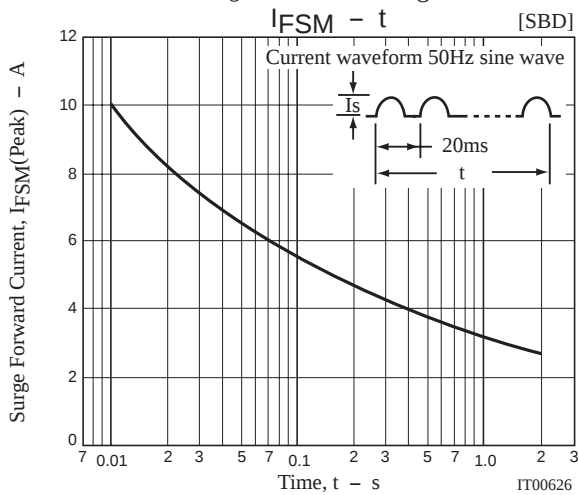
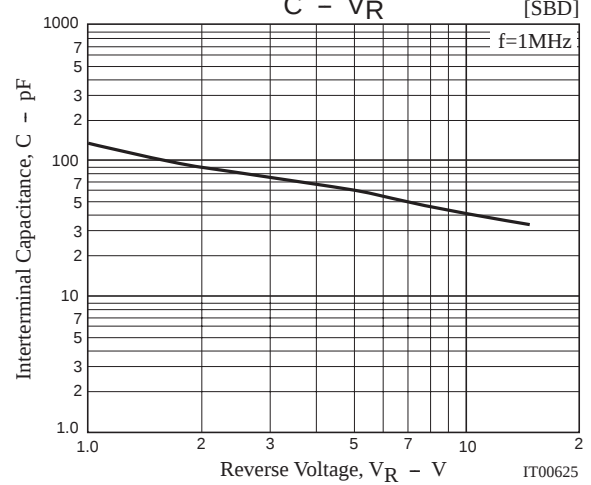
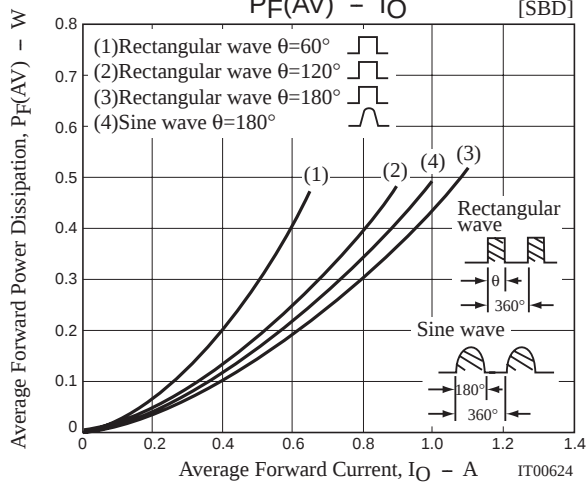
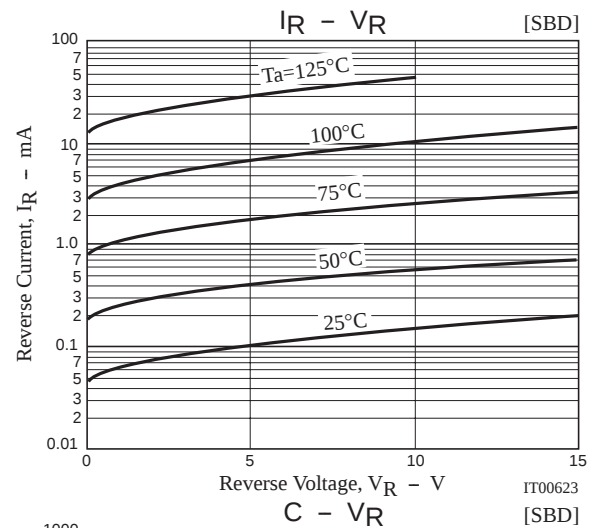
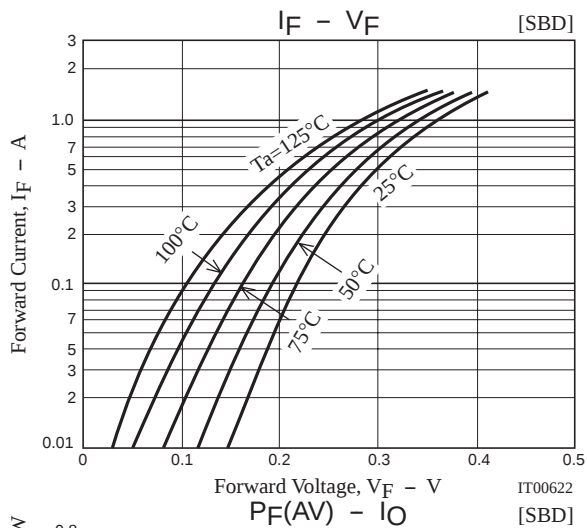
[MOSFET]

 $t_{rr}$  Test Circuit

[SBD]







Note on usage : Since the CPH5811 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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