

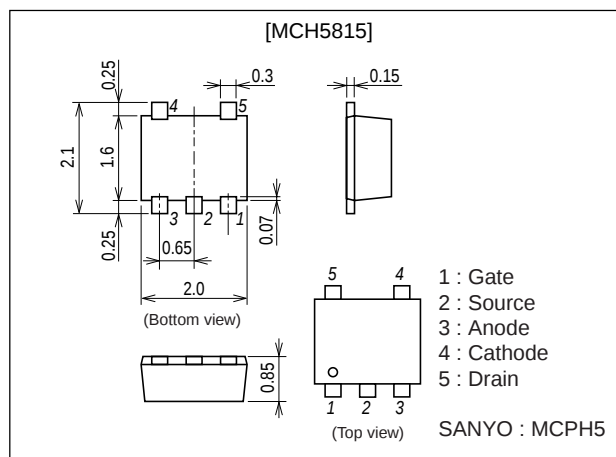
**MCH5815****DC / DC Converter Applications****Features**

- Composite type with a P-Channel Silicon MOSFET (MCH3317) and a Schottky Barrier Diode (SBS007M) contained in one package facilitating high-density mounting.
- [MOS]
  - 1) Low ON-resistance.
  - 2) Ultrahigh-speed switching.
  - 3) 1.8V drive.
- [SBD]
  - 1) Short reverse recovery time.
  - 2) Low forward voltage.

**Package Dimensions**

unit : mm

2195

**Specifications****Absolute Maximum Ratings** at Ta=25°C

| Parameter                                | Symbol    | Conditions                                                   | Ratings     | Unit |
|------------------------------------------|-----------|--------------------------------------------------------------|-------------|------|
| [MOSFET]                                 |           |                                                              |             |      |
| Drain-to-Source Voltage                  | $V_{DSS}$ |                                                              | -12         | V    |
| Gate-to-Source Voltage                   | $V_{GSS}$ |                                                              | ±10         | V    |
| Drain Current (DC)                       | $I_D$     |                                                              | -1.5        | A    |
| Drain Current (Pulse)                    | $I_{DP}$  | $PW \leq 10\mu s$ , duty cycle $\leq 1\%$                    | -6.0        | A    |
| Allowable Power Dissipation              | $P_D$     | Mounted on a ceramic board (900mm <sup>2</sup> ×0.8mm) 1unit | 0.8         | W    |
| Channel Temperature                      | $T_{ch}$  |                                                              | -150        | °C   |
| Storage Temperature                      | $T_{stg}$ |                                                              | -55 to +125 | °C   |
| [SBD]                                    |           |                                                              |             |      |
| Repetitive Peak Reverse Voltage          | $V_{RRM}$ |                                                              | 15          | V    |
| Nonrepetitive Peak Reverse Surge Voltage | $V_{RSM}$ |                                                              | 15          | V    |
| Average Output Current                   | $I_O$     |                                                              | 0.5         | A    |
| Surge Forward Current                    | $I_{FSM}$ | 50Hz sine wave, 1 cycle                                      | 3           | A    |
| Junction Temperature                     | $T_J$     |                                                              | -55 to +125 | °C   |
| Storage Temperature                      | $T_{stg}$ |                                                              | -55 to +125 | °C   |

Marking : QR

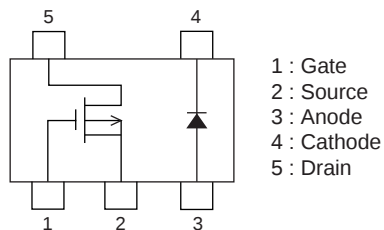
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# MCH5815

## Electrical Characteristics at Ta=25°C

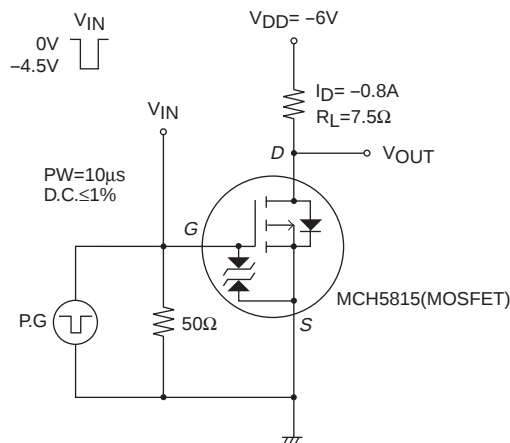
| Parameter                                  | Symbol   | Conditions                               | Ratings |       |      | Unit |
|--------------------------------------------|----------|------------------------------------------|---------|-------|------|------|
|                                            |          |                                          | min     | typ   | max  |      |
| [MOSFET]                                   |          |                                          |         |       |      |      |
| Drain-to-Source Breakdown Voltage          | V(BR)DSS | ID=-1mA, VGS=0                           | -12     |       |      | V    |
| Zero-Gate Voltage Drain Current            | IDSS     | VDS=-12V, VGS=0                          |         |       | -10  | μA   |
| Gate-to-Source Leakage Current             | IGSS     | VGS=±8.0V, VDS=0                         |         |       | ±10  | μA   |
| Cutoff Voltage                             | VGS(off) | VDS=-6V, ID=-1mA                         | -0.3    |       | -1.0 | V    |
| Forward Transfer Admittance                | yfs      | VDS=-6V, ID=-0.8A                        | 1.3     | 1.8   |      | S    |
| Static Drain-to-Source On-State Resistance | RDS(on)1 | ID=-0.8A, VGS=-4.5V                      |         | 220   | 290  | mΩ   |
|                                            | RDS(on)2 | ID=-0.4A, VGS=-2.5V                      |         | 320   | 450  | mΩ   |
|                                            | RDS(on)3 | ID=-0.1A, VGS=-1.8V                      |         | 430   | 650  | mΩ   |
| Input Capacitance                          | Ciss     | VDS=-6V, f=1MHz                          |         | 160   |      | pF   |
| Output Capacitance                         | Coss     | VDS=-6V, f=1MHz                          |         | 45    |      | pF   |
| Reverse Transfer Capacitance               | Crss     | VDS=-6V, f=1MHz                          |         | 35    |      | pF   |
| Turn-ON Delay Time                         | td(on)   | See specified Test Circuit.              |         | 11    |      | ns   |
| Rise Time                                  | tr       | See specified Test Circuit.              |         | 45    |      | ns   |
| Turn-OFF Delay Time                        | td(off)  | See specified Test Circuit.              |         | 29    |      | ns   |
| Fall Time                                  | tf       | See specified Test Circuit.              |         | 30    |      | ns   |
| Total Gate Charge                          | Qg       | VDS=-6V, VGS=-4.5V, ID=-1.5A             |         | 2.6   |      | nC   |
| Gate-to-Source Charge                      | Qgs      | VDS=-6V, VGS=-4.5V, ID=-1.5A             |         | 0.25  |      | nC   |
| Gate-to-Drain "Miller" Charge              | Qgd      | VDS=-6V, VGS=-4.5V, ID=-1.5A             |         | 0.65  |      | nC   |
| Diode Forward Voltage                      | VSD      | IS=-1.5A, VGS=0                          |         | -0.92 | -1.5 | V    |
| [SBD]                                      |          |                                          |         |       |      |      |
| Reverse Voltage                            | VR       | IR=0.5mA                                 | 15      |       |      | V    |
| Forward Voltage                            | VF1      | IF=0.3A                                  |         | 0.35  | 0.41 | V    |
|                                            | VF2      | IF=0.5A                                  |         | 0.4   | 0.46 | V    |
| Reverse Current                            | IR       | VR=6V                                    |         |       | 200  | μA   |
| Interterminal Capacitance                  | C        | VR=10V, f=1MHz cycle                     |         | 20    |      | pF   |
| Reverse Recovery Time                      | trr      | IF=IR=100mA, see specified Test Circuit. |         |       | 10   | ns   |

## Electrical Connection (Top view)



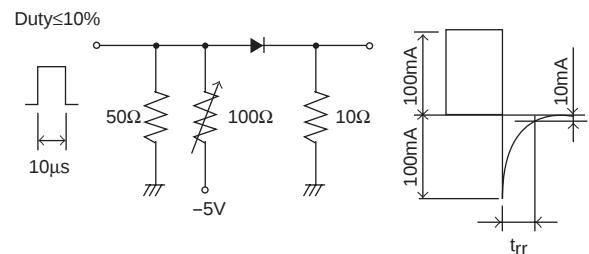
## Switching Time Test Circuit

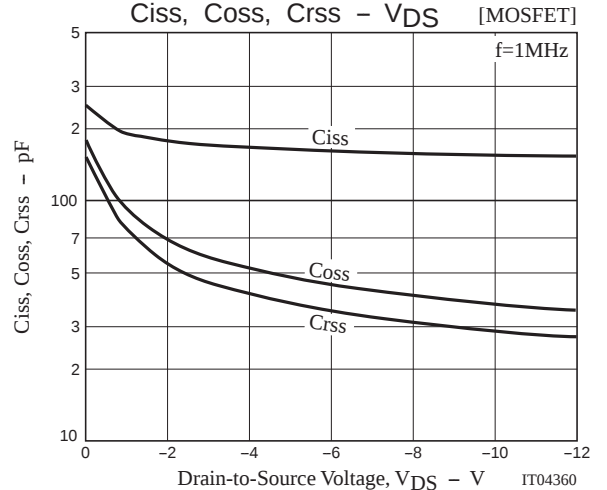
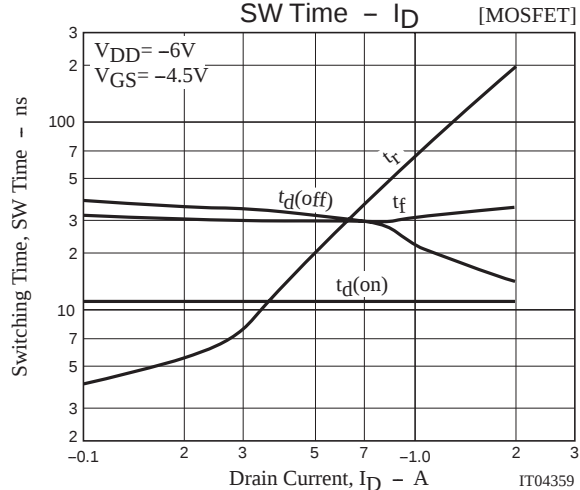
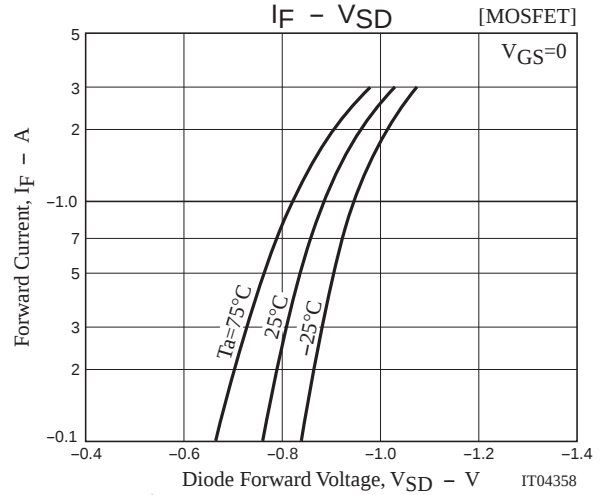
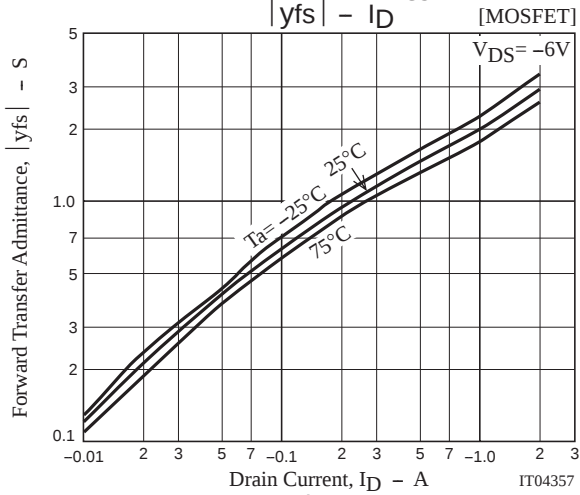
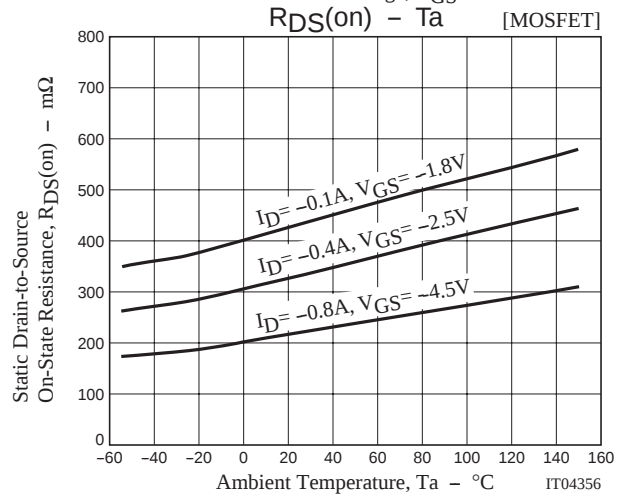
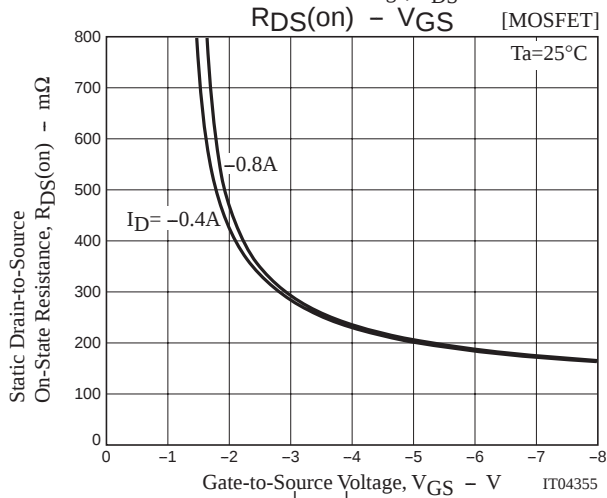
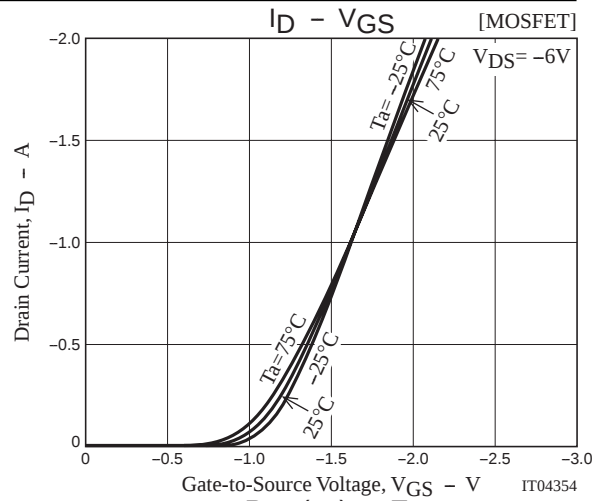
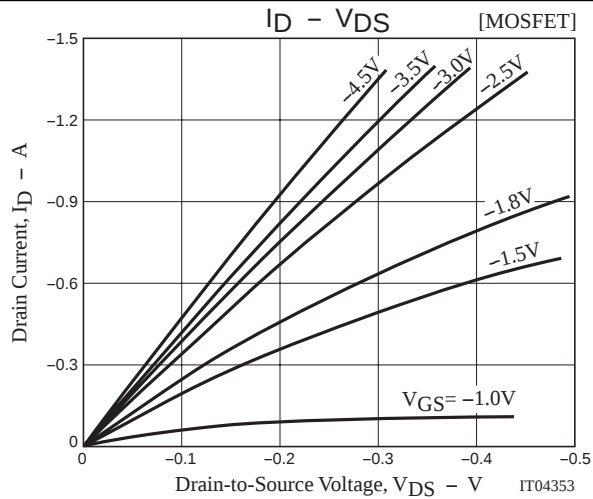
[MOSFET]

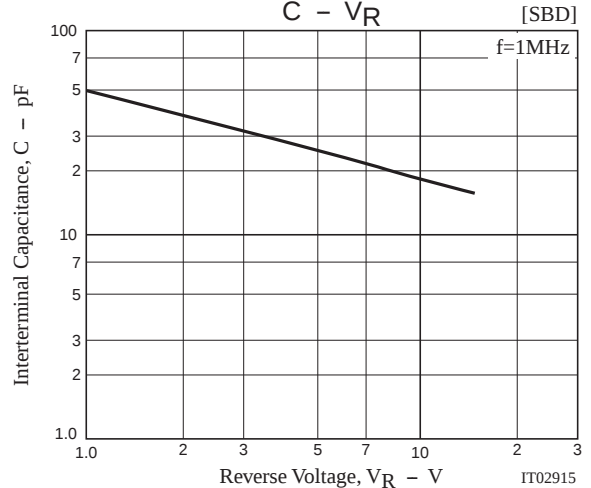
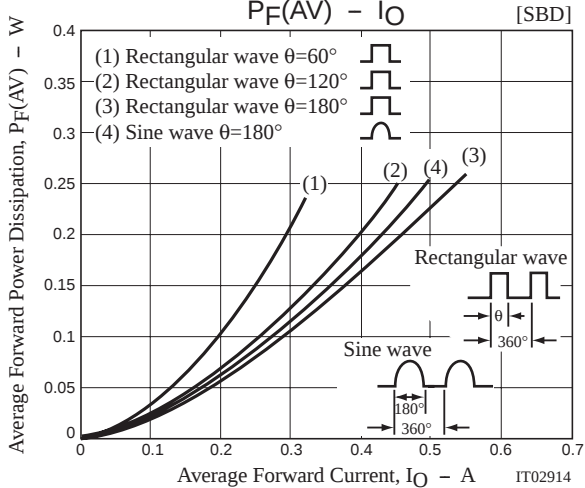
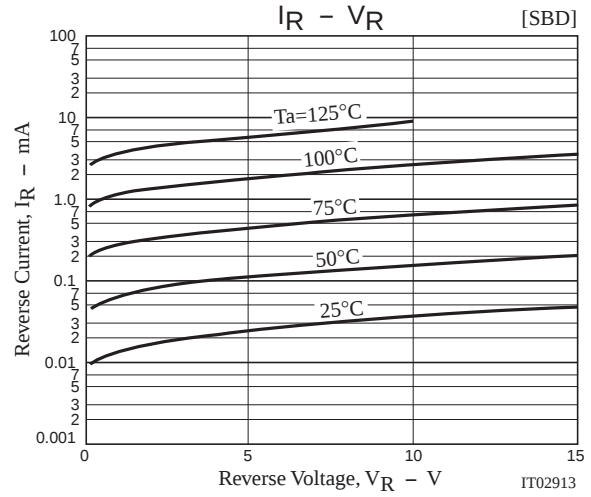
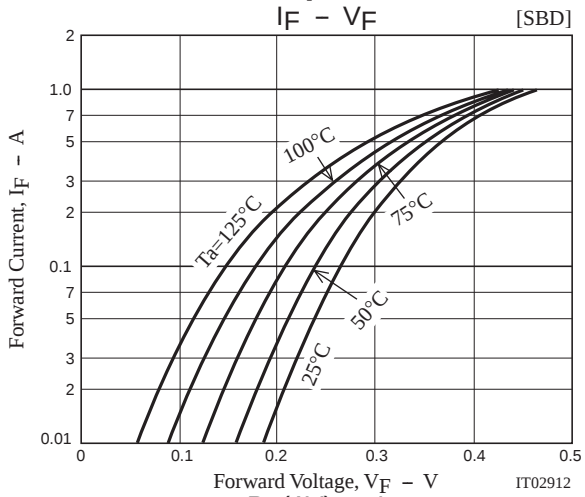
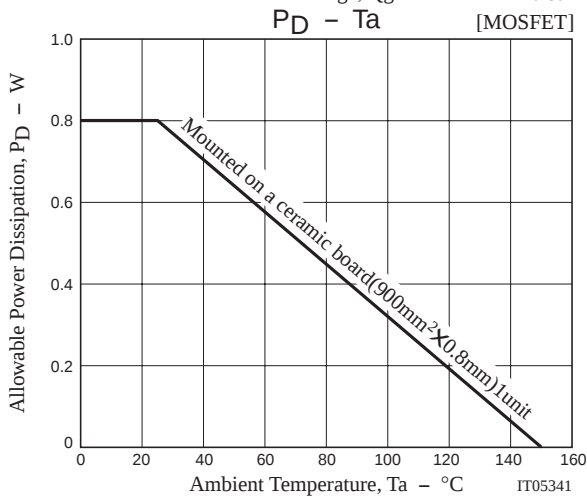
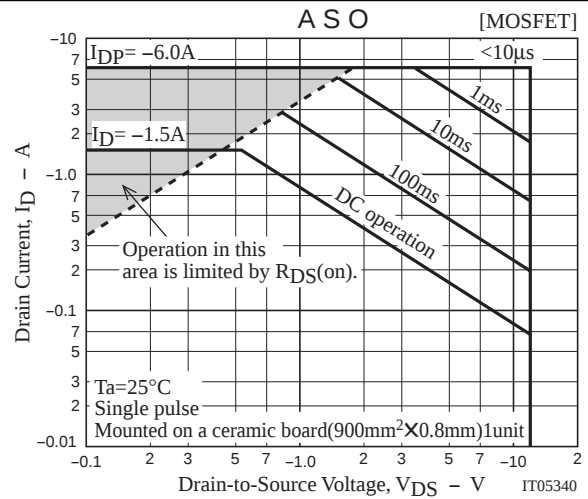
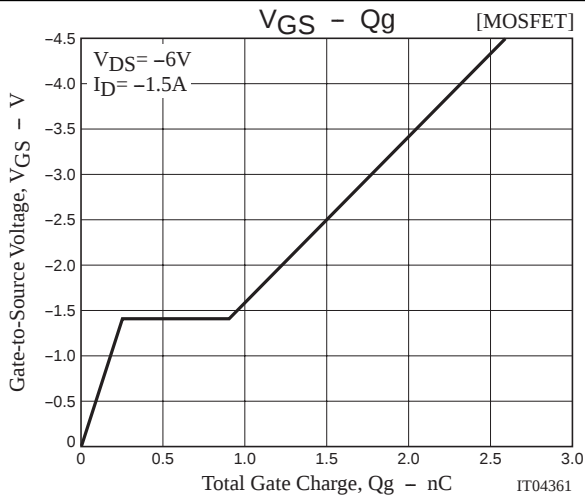


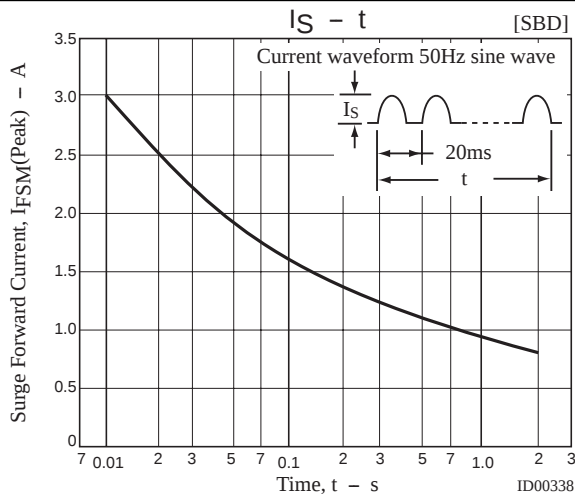
## $t_{rr}$ Test Circuit

[SBD]









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