



# CPH6615 — General-Purpose Switching Device Applications

N-Channel and P-Channel Silicon MOSFETs

## Features

- The CPH6615 incorporates a N-channel MOSFET and a P-channel MOSFET that feature low ON-resistance, Ultrahigh-speed switching, thereby enabling high-density mounting.
- Excellent ON-resistance characteristic.
- Best suited for load switches.
- 4V drive.

## Specifications

### Absolute Maximum Ratings at Ta=25°C

| Parameter                   | Symbol           | Conditions  | N-channel   | P-channel | Unit |
|-----------------------------|------------------|---|-------------|-----------|------|
| Drain-to-Source Voltage     | V <sub>DSS</sub> |   | 30          | -30       | V    |
| Gate-to-Source Voltage      | V <sub>GSS</sub> |   | ±20         | ±20       | V    |
| Drain Current (DC)          | I <sub>D</sub>   |   | 2.5         | -1.8      | A    |
| Drain Current (Pulse)       | I <sub>DP</sub>  | PW≤10μs, duty cycle≤1%                                      | 10          | -7.2      | A    |
| Allowable Power Dissipation | P <sub>D</sub>   | Mounted on a ceramic board (900mm <sup>2</sup> X0.8mm)1unit | 0.9         |           | W    |
| Channel Temperature         | T <sub>ch</sub>  |   | 150         |           | °C   |
| Storage Temperature         | T <sub>stg</sub> |   | -55 to +150 |           | °C   |

### Electrical Characteristics at Ta=25°C

| Parameter                                  | Symbol               | Conditions                                 | Ratings |     |     | Unit |
|--|----------------------|--|---------|-----|-----|------|
|  |                      |  | min     | typ | max |      |
| [N-channel]                                |                      |  |         |     |     |      |
| Drain-to-Source Breakdown Voltage          | V <sub>(BR)DSS</sub> | I <sub>D</sub> =1mA, V <sub>GS</sub> =0    | 30      |     |     | V    |
| Zero-Gate Voltage Drain Current            | I <sub>DSS</sub>     | V <sub>DS</sub> =30V, V <sub>GS</sub> =0   |         |     | 1   | μA   |
| Gate-to-Source Leakage Current             | I <sub>GSS</sub>     | V <sub>GS</sub> =±16V, V <sub>DS</sub> =0  |         |     | ±10 | μA   |
| Cutoff Voltage                             | V <sub>GS(off)</sub> | V <sub>DS</sub> =10V, I <sub>D</sub> =1mA  | 1.2     |     | 2.6 | V    |
| Forward Transfer Admittance                | y <sub>fs</sub>      | V <sub>DS</sub> =10V, I <sub>D</sub> =1.5A | 1.2     | 2.0 |     | S    |
| Static Drain-to-Source On-State Resistance | R <sub>DS(on)1</sub> | I <sub>D</sub> =1.5A, V <sub>GS</sub> =10V |         | 79  | 105 | mΩ   |
|  | R <sub>DS(on)2</sub> | I <sub>D</sub> =1A, V <sub>GS</sub> =4V    |         | 150 | 210 | mΩ   |
| Input Capacitance                          | C <sub>iss</sub>     | V <sub>DS</sub> =10V, f=1MHz               |         | 187 |     | pF   |
| Output Capacitance                         | C <sub>oss</sub>     | V <sub>DS</sub> =10V, f=1MHz               |         | 40  |     | pF   |
| Reverse Transfer Capacitance               | C <sub>rss</sub>     | V <sub>DS</sub> =10V, f=1MHz               |         | 33  |     | pF   |

Marking : WB

Continued on next page.

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# CPH6615

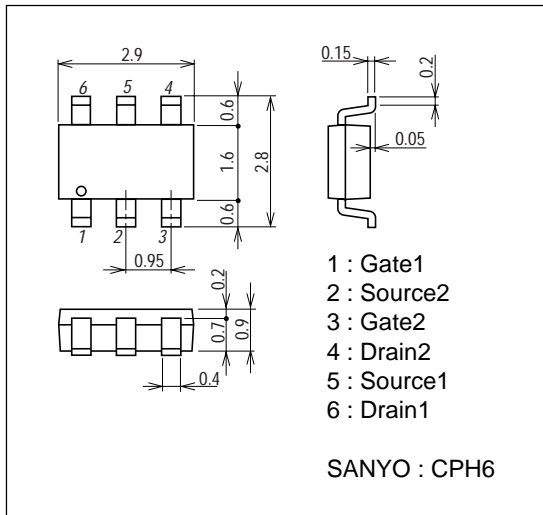
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| Parameter                                  | Symbol        | Conditions                            | Ratings |       |          | Unit      |
|--|---------------|---------------------------------------|---------|-------|----------|-----------|
|  |               |                                       | min     | typ   | max      |           |
| Turn-ON Delay Time                         | $t_{d(on)}$   | See specified Test Circuit.           |         | 7.8   |          | ns        |
| Rise Time                                  | $t_r$         | See specified Test Circuit.           |         | 18.5  |          | ns        |
| Turn-OFF Delay Time                        | $t_{d(off)}$  | See specified Test Circuit.           |         | 22    |          | ns        |
| Fall Time                                  | $t_f$         | See specified Test Circuit.           |         | 12    |          | ns        |
| Total Gate Charge                          | $Q_g$         | $V_{DS}=10V, V_{GS}=10V, I_D=2.5A$    |         | 5.2   |          | nC        |
| Gate-to-Source Charge                      | $Q_{gs}$      | $V_{DS}=10V, V_{GS}=10V, I_D=2.5A$    |         | 1     |          | nC        |
| Gate-to-Drain "Miller" Charge              | $Q_{gd}$      | $V_{DS}=10V, V_{GS}=10V, I_D=2.5A$    |         | 0.97  |          | nC        |
| Diode Forward Voltage                      | $V_{SD}$      | $I_S=2.5A, V_{GS}=0$                  |         | 0.9   | 1.2      | V         |
| [P-channel]                                |               |                                       |         |       |          |           |
| Drain-to-Source Breakdown Voltage          | $V_{(BR)DSS}$ | $I_D=-1mA, V_{GS}=0$                  | -30     |       |          | V         |
| Zero-Gate Voltage Drain Current            | $I_{DSS}$     | $V_{DS}=-30V, V_{GS}=0$               |         |       | -1       | $\mu A$   |
| Gate-to-Source Leakage Current             | $I_{GSS}$     | $V_{GS}=\pm 16V, V_{DS}=0$            |         |       | $\pm 10$ | $\mu A$   |
| Cutoff Voltage                             | $V_{GS(off)}$ | $V_{DS}=-10V, I_D=-1mA$               | -1.2    |       | -2.6     | V         |
| Forward Transfer Admittance                | $ y_{fs} $    | $V_{DS}=-10V, I_D=-1A$                | 1.1     | 1.8   |          | S         |
| Static Drain-to-Source On-State Resistance | $R_{DS(on)1}$ | $I_D=-1A, V_{GS}=-10V$                |         | 180   | 235      | $m\Omega$ |
|  | $R_{DS(on)2}$ | $I_D=-0.5A, V_{GS}=-4V$               |         | 320   | 450      | $m\Omega$ |
| Input Capacitance                          | $C_{iss}$     | $V_{DS}=-10V, f=1MHz$                 |         | 226   |          | pF        |
| Output Capacitance                         | $C_{oss}$     | $V_{DS}=-10V, f=1MHz$                 |         | 43    |          | pF        |
| Reverse Transfer Capacitance               | $C_{rss}$     | $V_{DS}=-10V, f=1MHz$                 |         | 36    |          | pF        |
| Turn-ON Delay Time                         | $t_{d(on)}$   | See specified Test Circuit.           |         | 8.5   |          | ns        |
| Rise Time                                  | $t_r$         | See specified Test Circuit.           |         | 10.5  |          | ns        |
| Turn-OFF Delay Time                        | $t_{d(off)}$  | See specified Test Circuit.           |         | 29    |          | ns        |
| Fall Time                                  | $t_f$         | See specified Test Circuit.           |         | 22    |          | ns        |
| Total Gate Charge                          | $Q_g$         | $V_{DS}=-10V, V_{GS}=-10V, I_D=-1.8A$ |         | 5.5   |          | nC        |
| Gate-to-Source Charge                      | $Q_{gs}$      | $V_{DS}=-10V, V_{GS}=-10V, I_D=-1.8A$ |         | 1     |          | nC        |
| Gate-to-Drain "Miller" Charge              | $Q_{gd}$      | $V_{DS}=-10V, V_{GS}=-10V, I_D=-1.8A$ |         | 0.97  |          | nC        |
| Diode Forward Voltage                      | $V_{SD}$      | $I_S=-1.8A, V_{GS}=0$                 |         | -0.91 | -1.5     | V         |

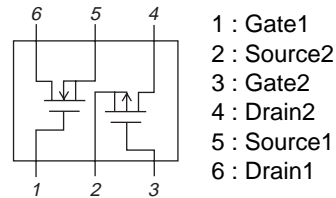
## Package Dimensions

unit : mm

2238



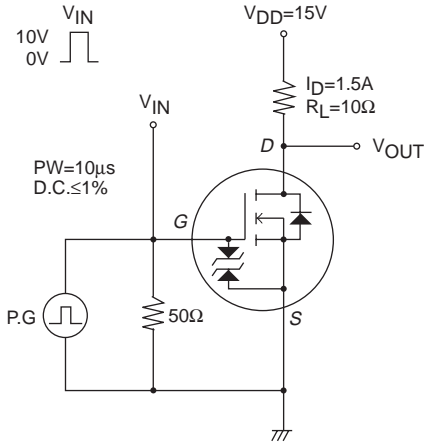
## Electrical Connection



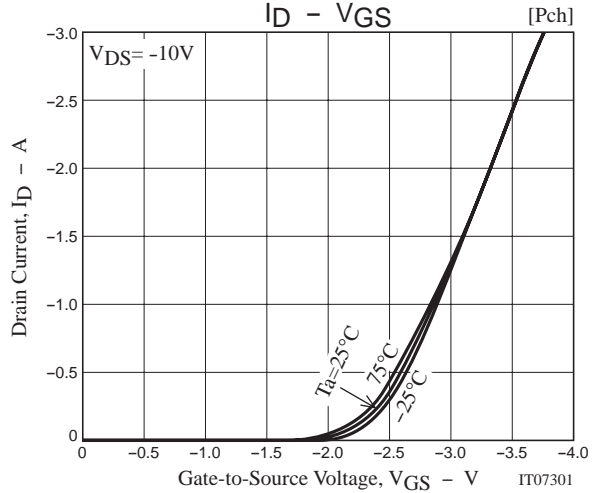
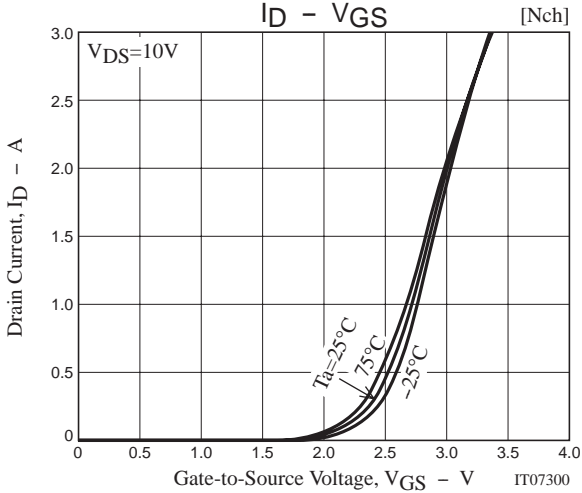
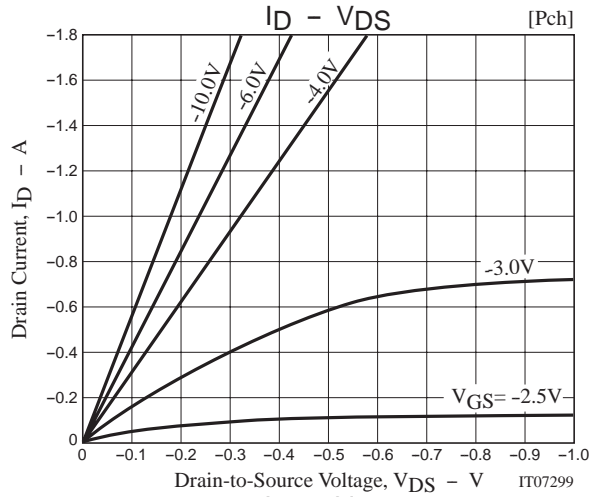
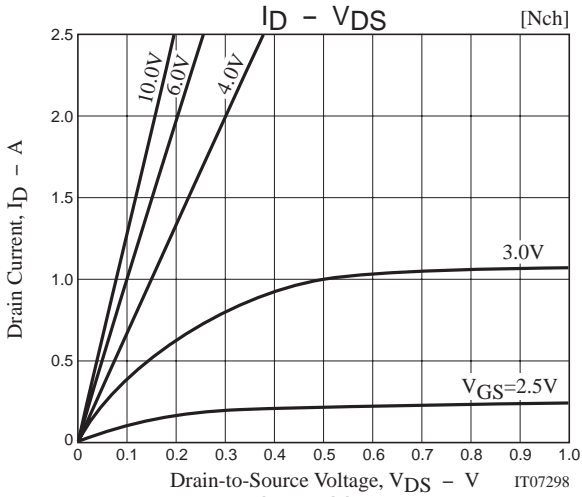
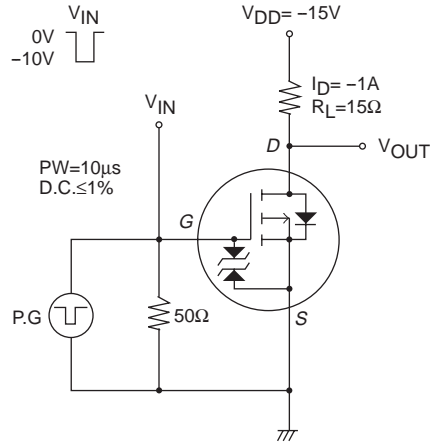
Top view

Switching Time Test Circuit

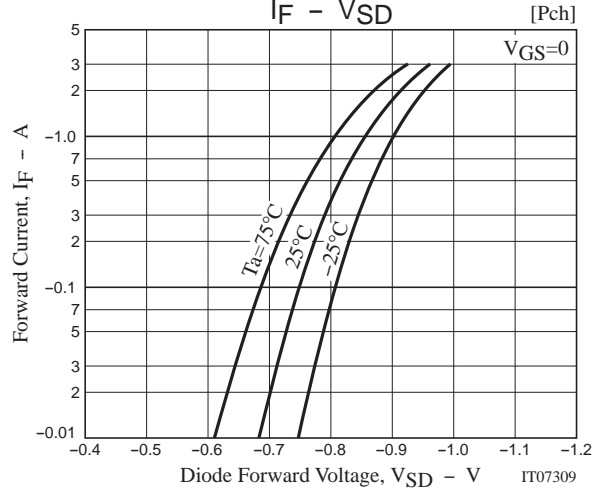
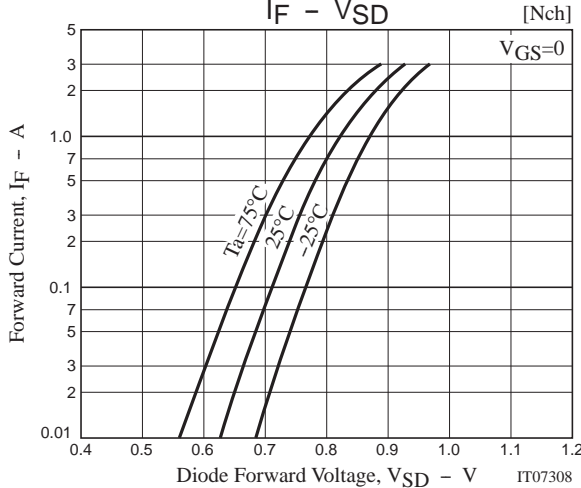
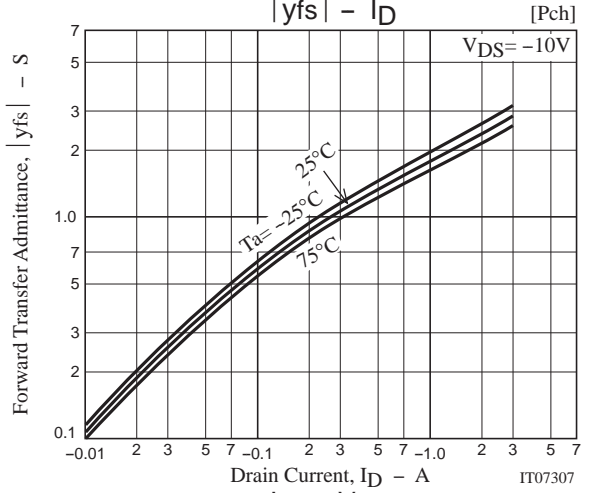
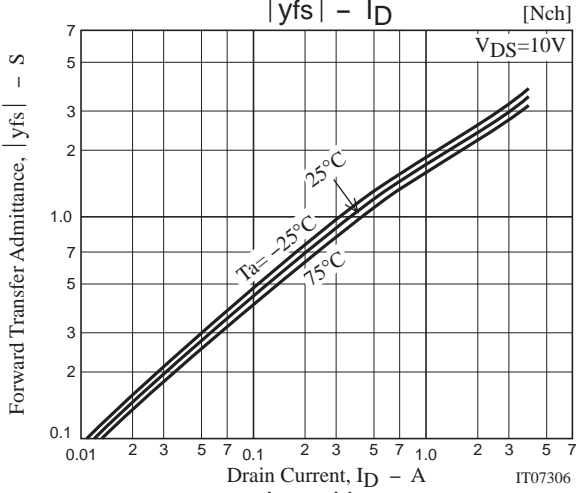
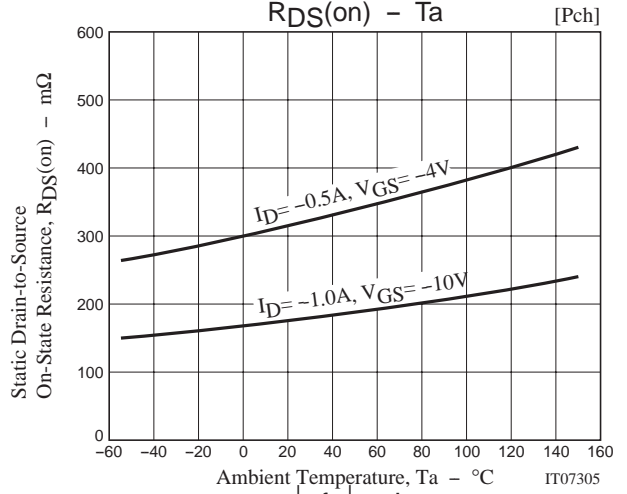
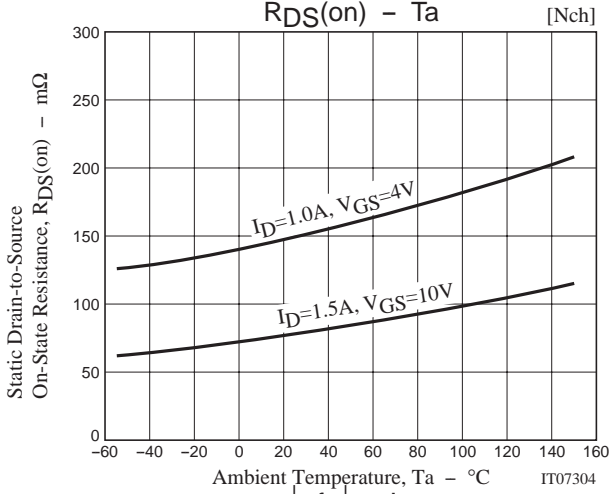
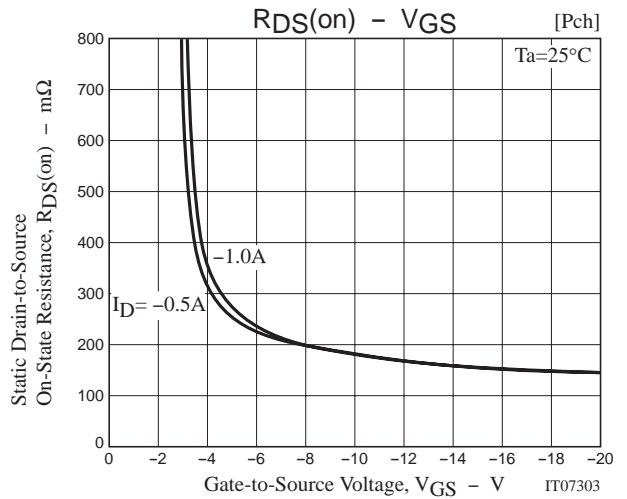
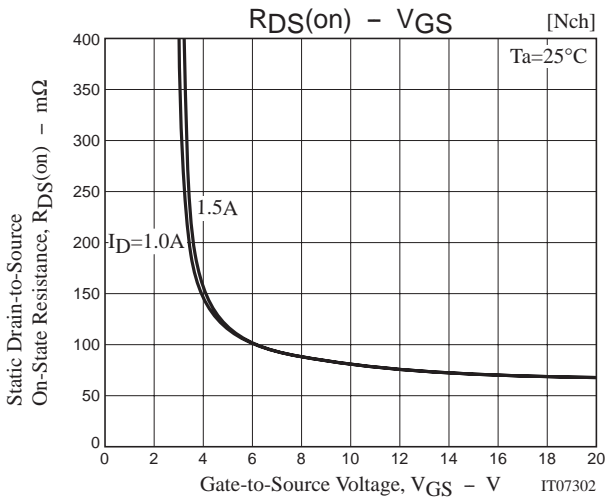
[N-channel]



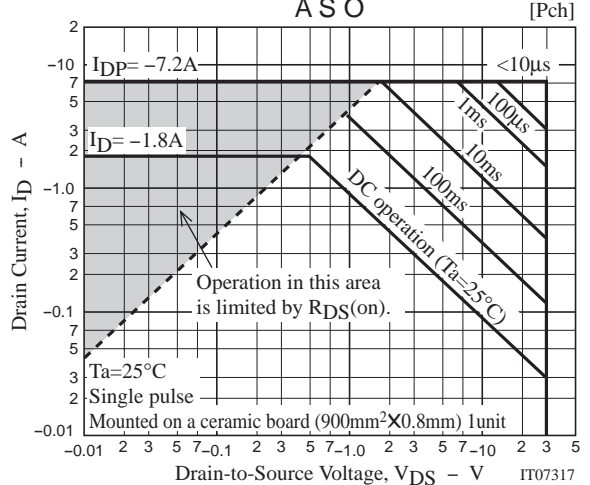
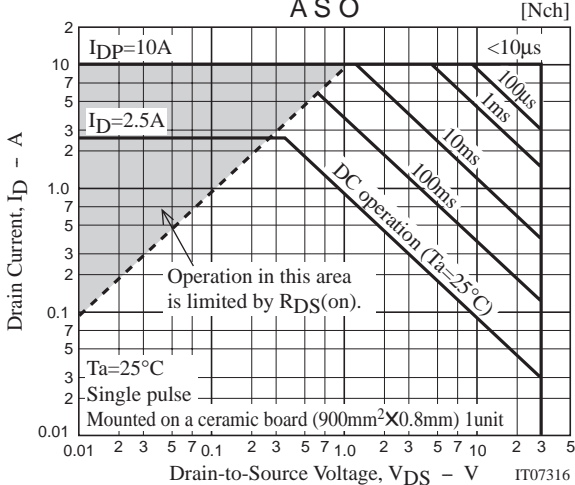
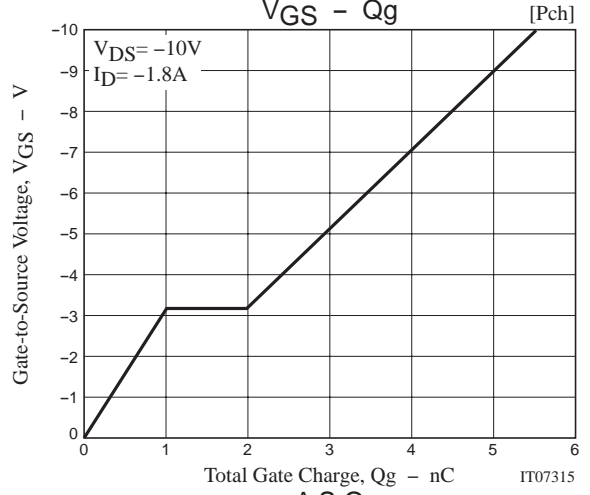
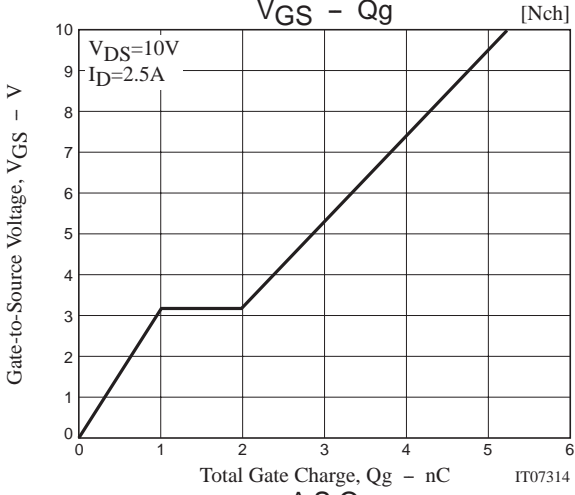
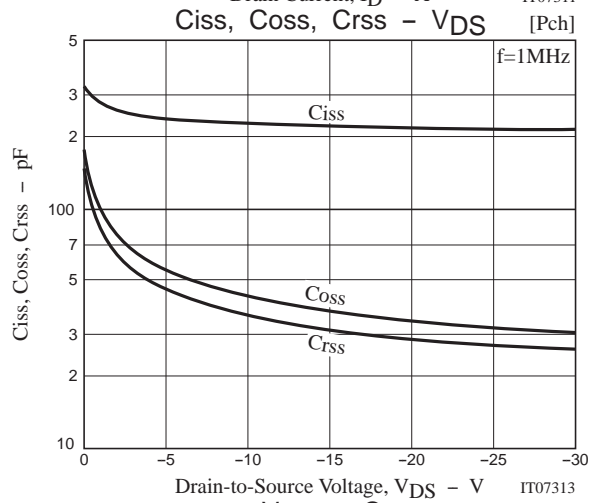
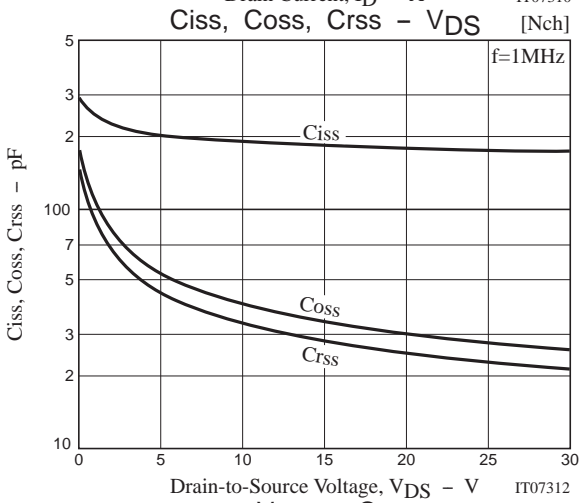
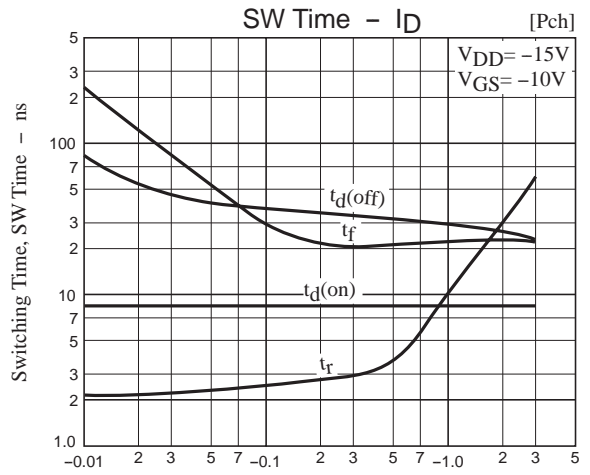
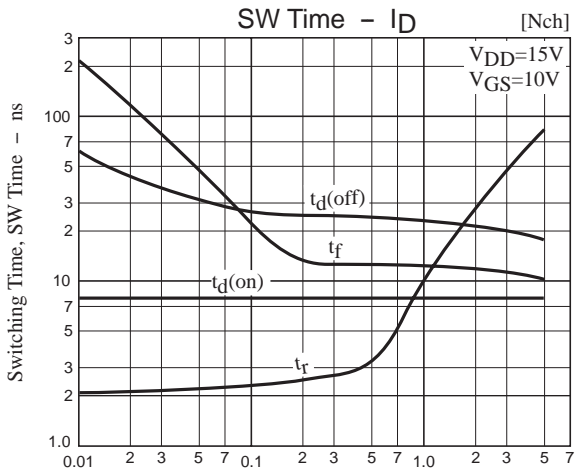
[P-channel]



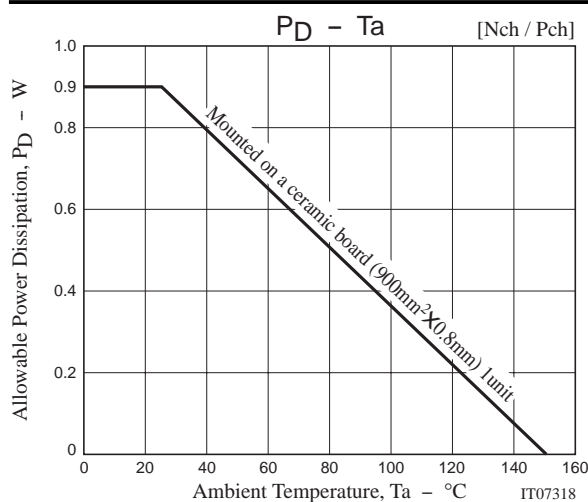
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Note on usage : Since the CPH6615 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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