



ON Semiconductor®

# ON Semiconductor DATA SHEET

## N-Channel and P-Channel Silicon MOSFETs

# FW905 — General-Purpose Switching Device

## Applications

### Features

- Composite type with an N-channel MOSFET and a P-channel MOSFET driving from a 2.5V supply voltage contained in a single package.
- High-density mounting.

### Specifications

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

| Parameter                   | Symbol           | Conditions  | N-channel   | P-channel | Unit |
|-----------------------------|------------------|---|-------------|-----------|------|
| Drain-to-Source Voltage     | V <sub>DSS</sub> |   | 20          | -20       | V    |
| Gate-to-Source Voltage      | V <sub>GSS</sub> |   | ±10         | ±10       | V    |
| Drain Current (DC)          | I <sub>D</sub>   |   | 7           | -6        | A    |
| Drain Current (PW≤10μs)     | I <sub>DP</sub>  | Duty cycle≤1%   | 52          | -52       | A    |
| Allowable Power Dissipation | P <sub>D</sub>   | Mounted on a ceramic board (1500mm²×0.8mm)1unit, PW≤10s | 2.3         |           | W    |
| Total Dissipation           | P <sub>T</sub>   | Mounted on a ceramic board (1500mm²×0.8mm), PW≤10s      | 2.5         |           | 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> =0V  | 20      |      |     | V    |
| Zero-Gate Voltage Drain Current            | I <sub>DSS</sub>     | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V |         |      | 1   | μA   |
| Gate-to-Source Leakage Current             | I <sub>GSS</sub>     | V <sub>GS</sub> =±8V, V <sub>DS</sub> =0V |         |      | ±10 | μA   |
| Cutoff Voltage                             | V <sub>GS(off)</sub> | V <sub>DS</sub> =10V, I <sub>D</sub> =1mA | 0.5     |      | 1.3 | V    |
| Forward Transfer Admittance                | y <sub>fs</sub>      | V <sub>DS</sub> =10V, I <sub>D</sub> =7A  | 9       | 15   |     | S    |
| Static Drain-to-Source On-State Resistance | R <sub>DS(on)1</sub> | I <sub>D</sub> =7A, V <sub>GS</sub> =4V   |         | 18   | 24  | mΩ   |
|  | R <sub>DS(on)2</sub> | I <sub>D</sub> =3A, V <sub>GS</sub> =2.5V |         | 20   | 33  | mΩ   |
| Input Capacitance                          | C <sub>iss</sub>     | V <sub>DS</sub> =10V, f=1MHz              |         | 1530 |     | pF   |
| Output Capacitance                         | C <sub>oss</sub>     | V <sub>DS</sub> =10V, f=1MHz              |         | 230  |     | pF   |
| Reverse Transfer Capacitance               | C <sub>rss</sub>     | V <sub>DS</sub> =10V, f=1MHz              |         | 215  |     | pF   |

Marking : W905

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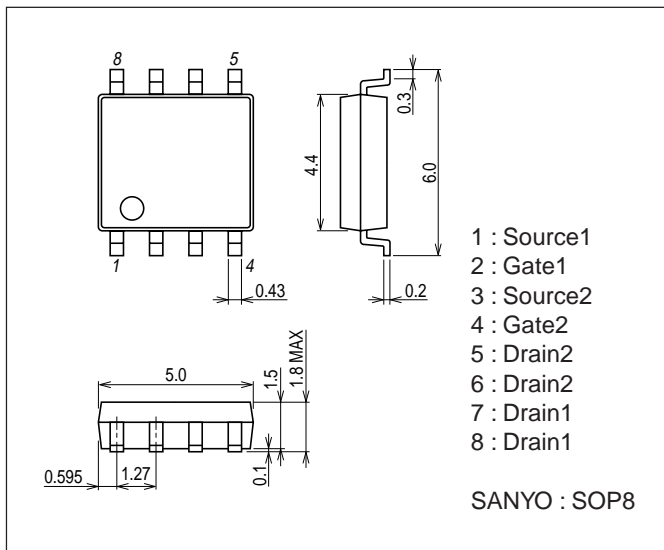
# FW905

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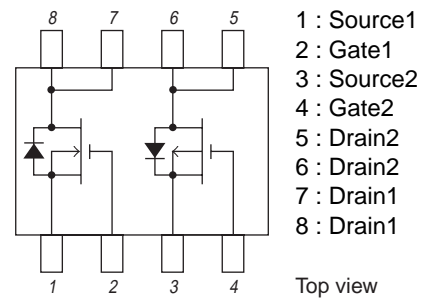
| Parameter                                  | Symbol        | Conditions                         | Ratings |       |          | Unit      |
|--|---------------|------------------------------------|---------|-------|----------|-----------|
|  |               |                                    | min     | typ   | max      |           |
| Turn-ON Delay Time                         | $t_{d(on)}$   | See specified Test Circuit.        |         | 19    |          | ns        |
| Rise Time                                  | $t_r$         | See specified Test Circuit.        |         | 225   |          | ns        |
| Turn-OFF Delay Time                        | $t_{d(off)}$  | See specified Test Circuit.        |         | 125   |          | ns        |
| Fall Time                                  | $t_f$         | See specified Test Circuit.        |         | 125   |          | ns        |
| Total Gate Charge                          | $Q_g$         | $V_{DS}=10V, V_{GS}=4V, I_D=7A$    |         | 18.5  |          | nC        |
| Gate-to-Source Charge                      | $Q_{gs}$      | $V_{DS}=10V, V_{GS}=4V, I_D=7A$    |         | 3.4   |          | nC        |
| Gate-to-Drain "Miller" Charge              | $Q_{gd}$      | $V_{DS}=10V, V_{GS}=4V, I_D=7A$    |         | 4.8   |          | nC        |
| Diode Forward Voltage                      | $V_{SD}$      | $I_S=7A, V_{GS}=0V$                |         | 0.79  | 1.2      | V         |
| [P-channel]                                |               |                                    |         |       |          |           |
| Drain-to-Source Breakdown Voltage          | $V_{(BR)DSS}$ | $I_D=-1mA, V_{GS}=0V$              | -20     |       |          | V         |
| Zero-Gate Voltage Drain Current            | $I_{DSS}$     | $V_{DS}=-20V, V_{GS}=0V$           |         |       | -1       | $\mu A$   |
| Gate-to-Source Leakage Current             | $I_{GSS}$     | $V_{GS}=\pm 8V, V_{DS}=0V$         |         |       | $\pm 10$ | $\mu A$   |
| Cutoff Voltage                             | $V_{GS(off)}$ | $V_{DS}=-10V, I_D=-1mA$            | -0.4    |       |          | V         |
| Forward Transfer Admittance                | $ y_{fs} $    | $V_{DS}=-10V, I_D=-6A$             | 7.8     | 13    |          | S         |
| Static Drain-to-Source On-State Resistance | $R_{DS(on)1}$ | $I_D=-6A, V_{GS}=-4V$              |         | 30    | 40       | $m\Omega$ |
|  | $R_{DS(on)2}$ | $I_D=-3A, V_{GS}=-2.5V$            |         | 42    | 59       | $m\Omega$ |
| Input Capacitance                          | $C_{iss}$     | $V_{DS}=-10V, f=1MHz$              |         | 1720  |          | pF        |
| Output Capacitance                         | $C_{oss}$     | $V_{DS}=-10V, f=1MHz$              |         | 260   |          | pF        |
| Reverse Transfer Capacitance               | $C_{rss}$     | $V_{DS}=-10V, f=1MHz$              |         | 245   |          | pF        |
| Turn-ON Delay Time                         | $t_{d(on)}$   | See specified Test Circuit.        |         | 19    |          | ns        |
| Rise Time                                  | $t_r$         | See specified Test Circuit.        |         | 390   |          | ns        |
| Turn-OFF Delay Time                        | $t_{d(off)}$  | See specified Test Circuit.        |         | 110   |          | ns        |
| Fall Time                                  | $t_f$         | See specified Test Circuit.        |         | 145   |          | ns        |
| Total Gate Charge                          | $Q_g$         | $V_{DS}=-10V, V_{GS}=-4V, I_D=-6A$ |         | 18.4  |          | nC        |
| Gate-to-Source Charge                      | $Q_{gs}$      | $V_{DS}=-10V, V_{GS}=-4V, I_D=-6A$ |         | 3.2   |          | nC        |
| Gate-to-Drain "Miller" Charge              | $Q_{gd}$      | $V_{DS}=-10V, V_{GS}=-4V, I_D=-6A$ |         | 5.2   |          | nC        |
| Diode Forward Voltage                      | $V_{SD}$      | $I_S=-6A, V_{GS}=0V$               |         | -0.82 | -1.2     | V         |

## Package Dimensions

unit : mm  
7005-003

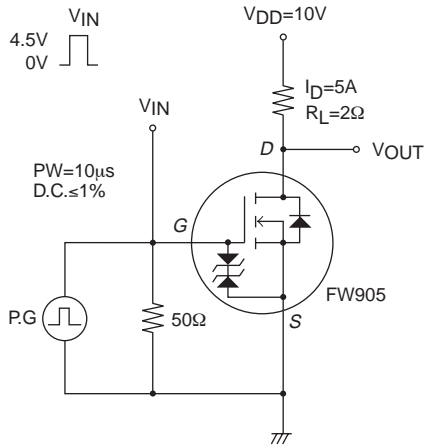


## Electrical Connection

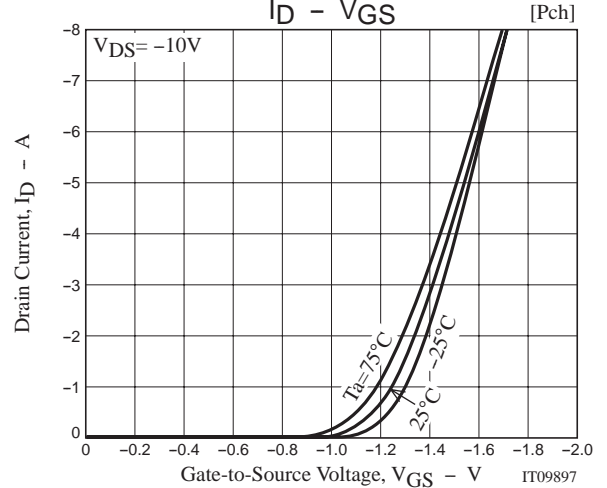
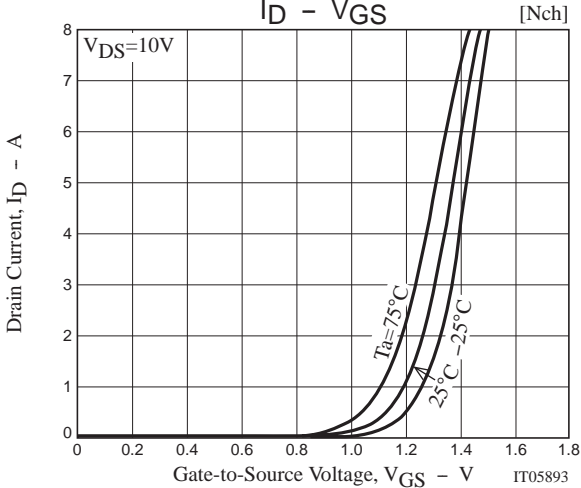
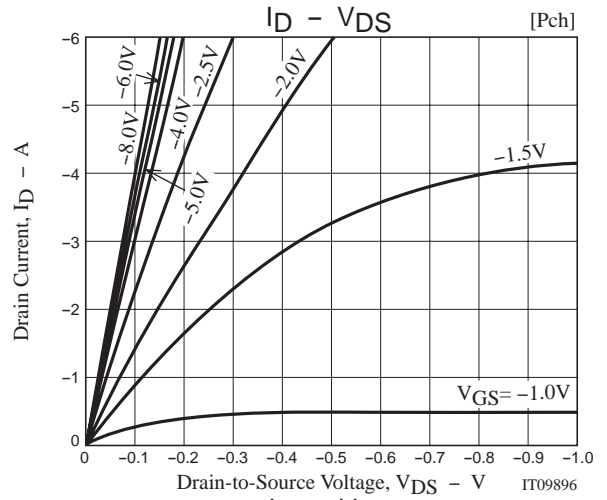
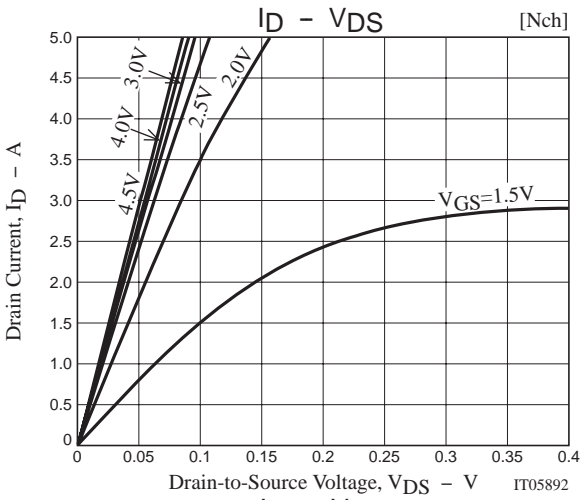
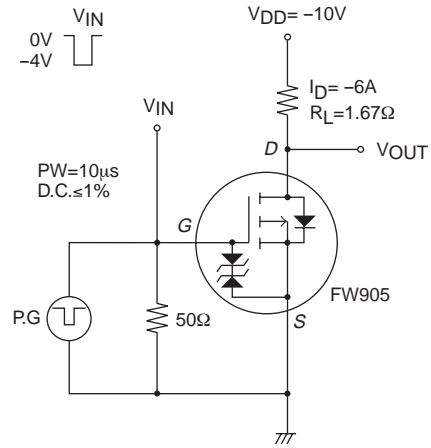


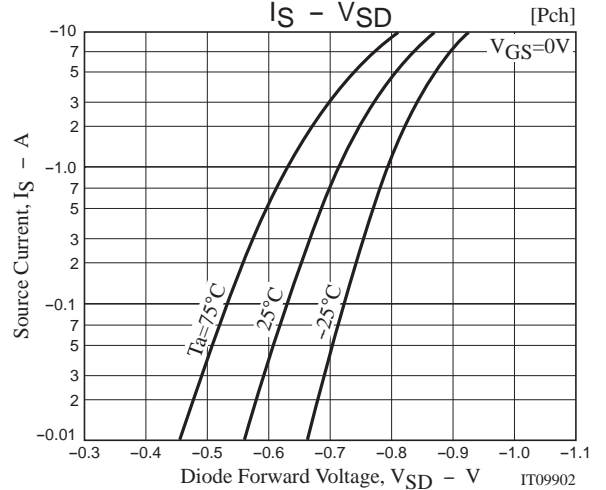
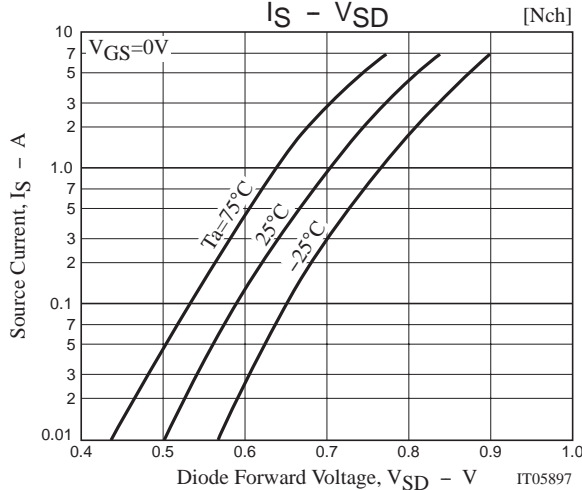
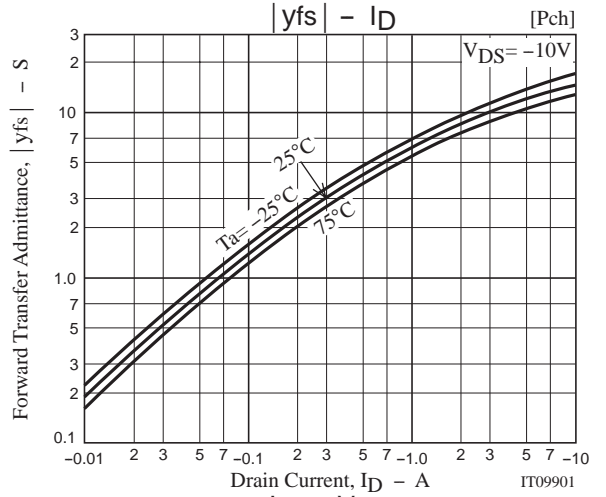
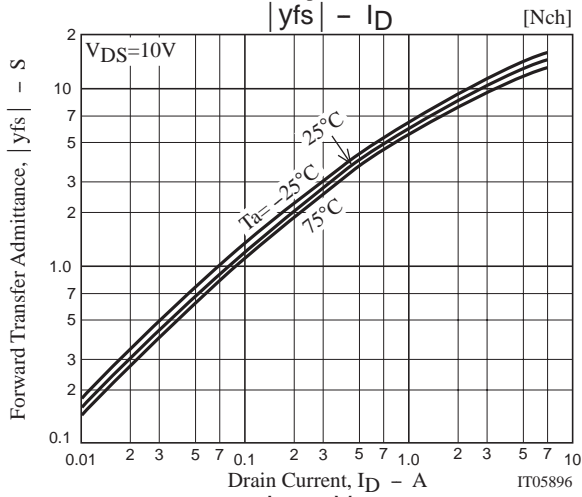
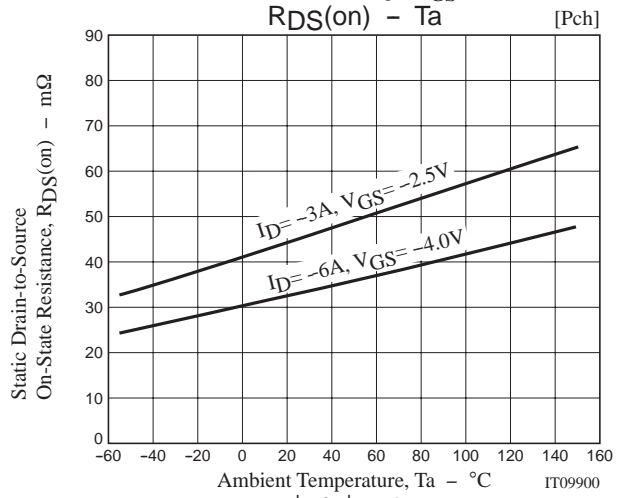
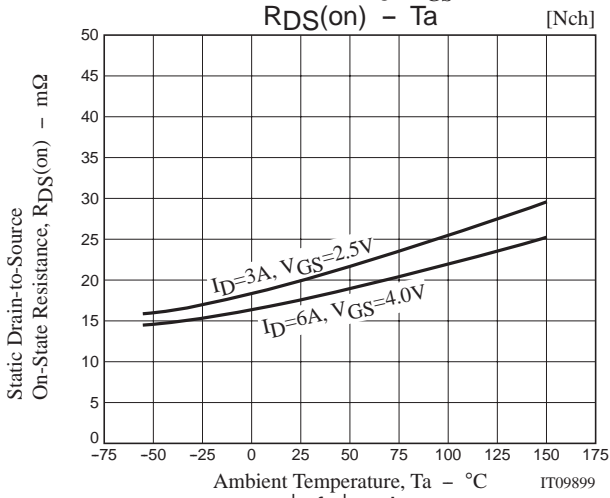
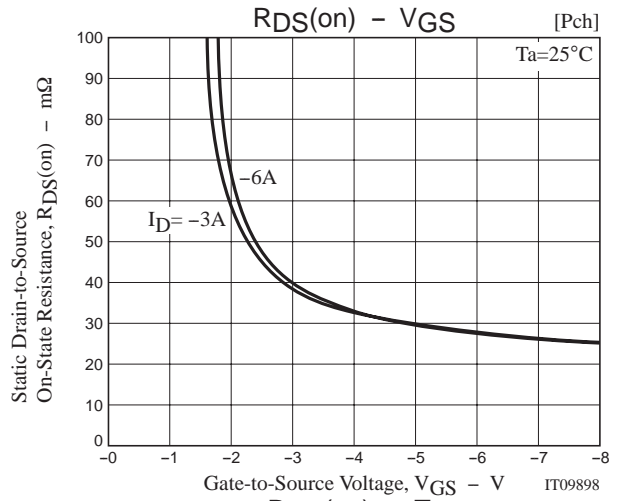
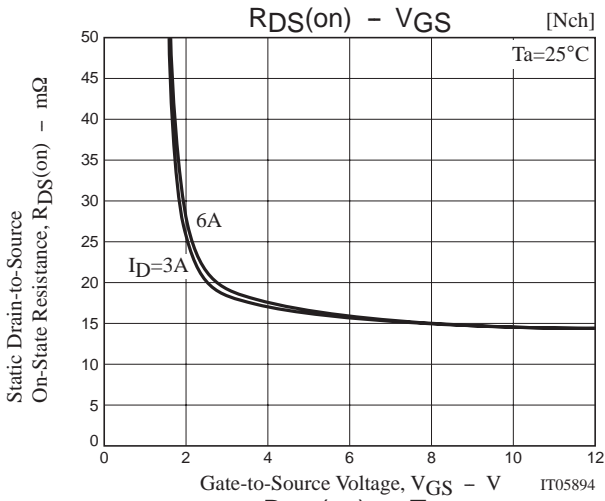
Switching Time Test Circuit

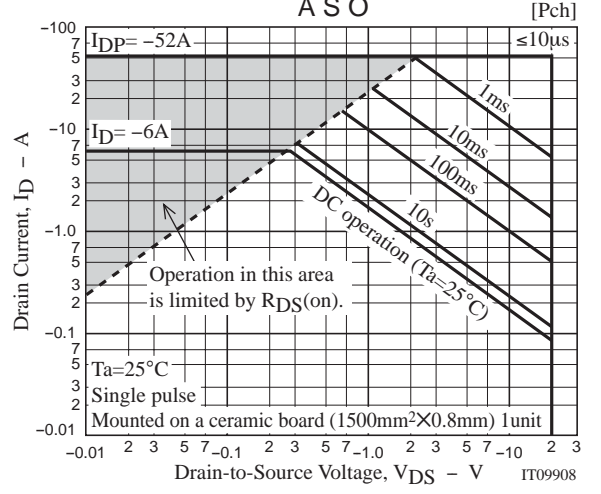
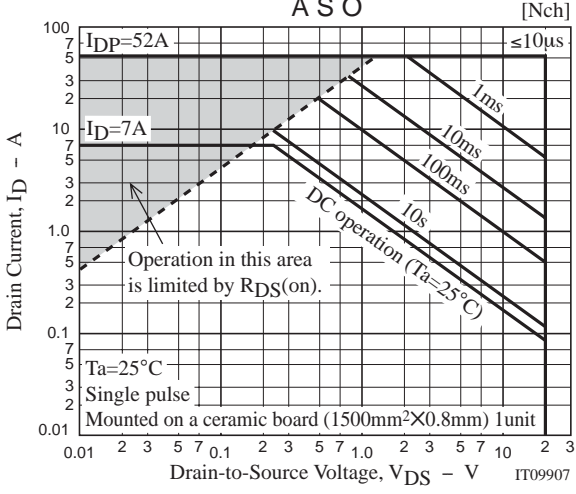
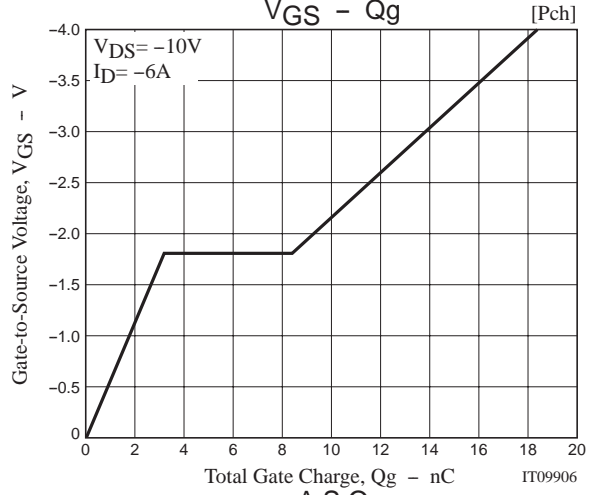
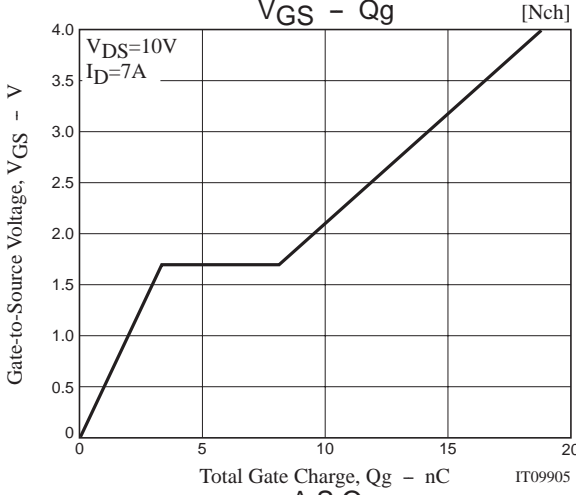
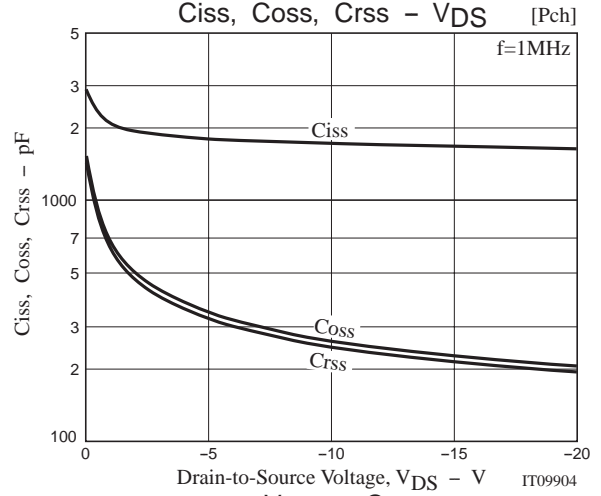
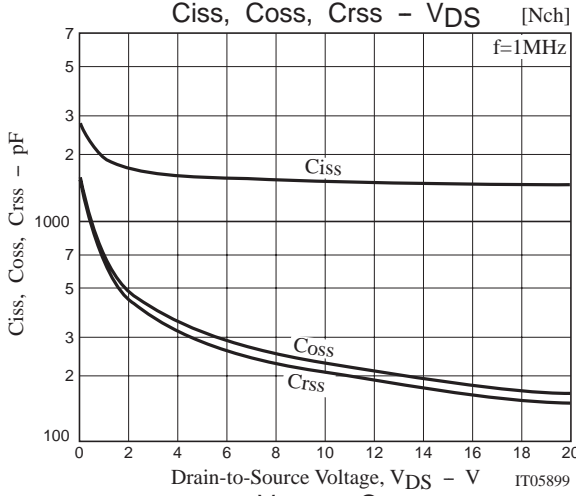
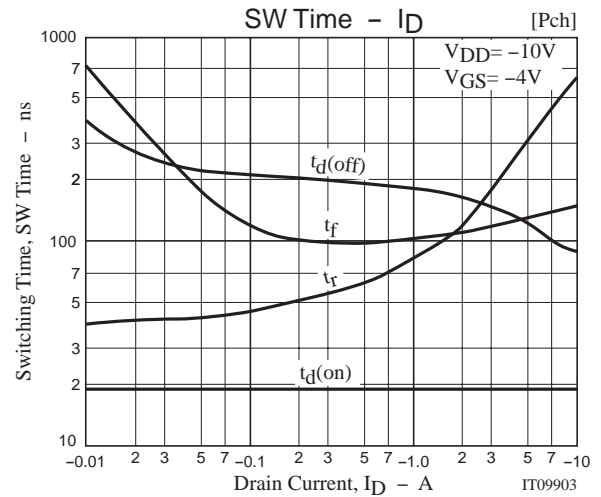
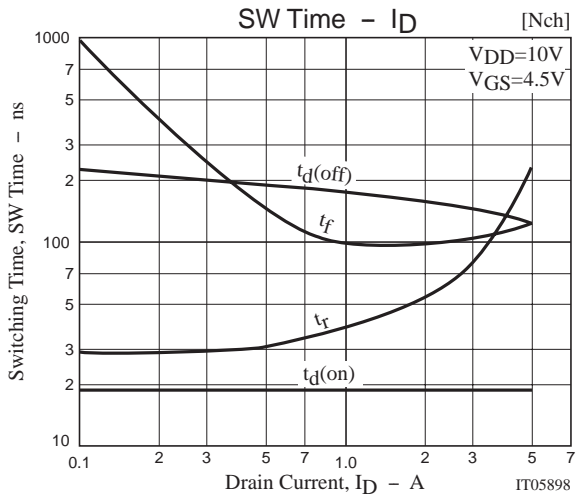
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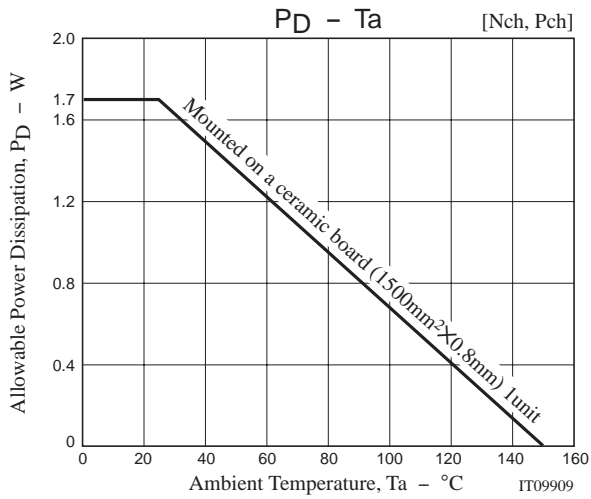
[P-channel]







# FW905



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