



# SANYO Semiconductors

## DATA SHEET

N-Channel and P-Channel Silicon MOSFETs

# ECH8608 — General-Purpose Switching Device Applications

## Features

- The ECH8608 incorporates an N-channel MOSFET and a P-channel MOSFET that feature low ON-resistance and ultrahigh-speed switching, thereby enabling high-density mounting.
- 2.5V 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> |                                                             | 20          | -20       | V    |
| Gate-to-Source Voltage      | V <sub>GSS</sub> |                                                             | ±10         | ±10       | V    |
| Drain Current (DC)          | I <sub>D</sub>   |                                                             | 6           | -4        | A    |
| Drain Current (Pulse)       | I <sub>DP</sub>  | PW≤10μs, duty cycle≤1%                                      | 40          | -40       | A    |
| Allowable Power Dissipation | P <sub>D</sub>   | Mounted on a ceramic board (900mm <sup>2</sup> ×0.8mm)1unit | 1.3         |           | W    |
| Total Dissipation           | P <sub>T</sub>   | Mounted on a ceramic board (900mm <sup>2</sup> ×0.8mm)      | 1.5         |           | 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(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   | 0.5     |     | 1.3 | V    |
| Forward Transfer Admittance                | yfs      | VDS=10V, ID=3A    | 7       | 10  |     | S    |
| Static Drain-to-Source On-State Resistance | RDS(on)1 | ID=3A, VGS=4V     |         | 22  | 30  | mΩ   |
|                                            | RDS(on)2 | ID=1.5A, VGS=2.5V |         | 30  | 44  | mΩ   |
| Input Capacitance                          | Ciss     | VDS=10V, f=1MHz   |         | 780 |     | pF   |
| Output Capacitance                         | Coss     | VDS=10V, f=1MHz   |         | 300 |     | pF   |
| Reverse Transfer Capacitance               | Crss     | VDS=10V, f=1MHz   |         | 150 |     | pF   |

Marking : FA

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# ECH8608

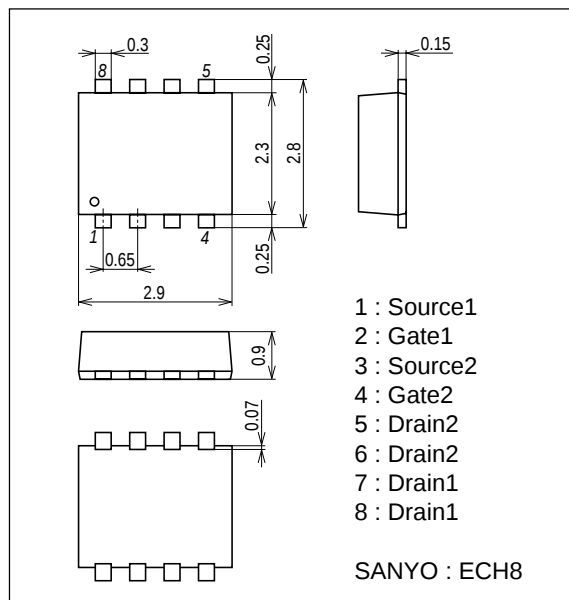
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| Parameter                                  | Symbol        | Conditions                          | Ratings |       |          | Unit      |
|--------------------------------------------|---------------|-------------------------------------|---------|-------|----------|-----------|
|                                            |               |                                     | min     | typ   | max      |           |
| Turn-ON Delay Time                         | $t_{d(on)}$   | See specified Test Circuit.         |         | 19    |          | ns        |
| Rise Time                                  | $t_r$         | See specified Test Circuit.         |         | 134   |          | ns        |
| Turn-OFF Delay Time                        | $t_{d(off)}$  | See specified Test Circuit.         |         | 90    |          | ns        |
| Fall Time                                  | $t_f$         | See specified Test Circuit.         |         | 94    |          | ns        |
| Total Gate Charge                          | $Q_g$         | $V_{DS}=10V, V_{GS}=10V, I_D=6A$    |         | 23    |          | nC        |
| Gate-to-Source Charge                      | $Q_{gs}$      | $V_{DS}=10V, V_{GS}=10V, I_D=6A$    |         | 1.6   |          | nC        |
| Gate-to-Drain "Miller" Charge              | $Q_{gd}$      | $V_{DS}=10V, V_{GS}=10V, I_D=6A$    |         | 3.6   |          | nC        |
| Diode Forward Voltage                      | $V_{SD}$      | $I_S=6A, V_{GS}=0$                  |         | 0.84  | 1.2      | V         |
| [P-channel]                                |               |                                     |         |       |          |           |
| Drain-to-Source Breakdown Voltage          | $V_{(BR)DSS}$ | $I_D=-1mA, V_{GS}=0$                | -20     |       |          | V         |
| Zero-Gate Voltage Drain Current            | $I_{DSS}$     | $V_{DS}=-20V, V_{GS}=0$             |         |       | -1       | $\mu A$   |
| Gate-to-Source Leakage Current             | $I_{GSS}$     | $V_{GS}=\pm 8V, V_{DS}=0$           |         |       | $\pm 10$ | $\mu A$   |
| Cutoff Voltage                             | $V_{GS(off)}$ | $V_{DS}=-10V, I_D=-1mA$             | -0.4    |       | -1.3     | V         |
| Forward Transfer Admittance                | $ y_{fs} $    | $V_{DS}=-10V, I_D=-2A$              | 4.9     | 7     |          | S         |
| Static Drain-to-Source On-State Resistance | $R_{DS(on)1}$ | $I_D=-2A, V_{GS}=-4.5V$             |         | 37    | 54       | $m\Omega$ |
|                                            | $R_{DS(on)2}$ | $I_D=-1A, V_{GS}=-2.5V$             |         | 58    | 87       | $m\Omega$ |
| Input Capacitance                          | $C_{iss}$     | $V_{DS}=-10V, f=1MHz$               |         | 800   |          | pF        |
| Output Capacitance                         | $C_{oss}$     | $V_{DS}=-10V, f=1MHz$               |         | 210   |          | pF        |
| Reverse Transfer Capacitance               | $C_{rss}$     | $V_{DS}=-10V, f=1MHz$               |         | 160   |          | pF        |
| Turn-ON Delay Time                         | $t_{d(on)}$   | See specified Test Circuit.         |         | 17    |          | ns        |
| Rise Time                                  | $t_r$         | See specified Test Circuit.         |         | 197   |          | ns        |
| Turn-OFF Delay Time                        | $t_{d(off)}$  | See specified Test Circuit.         |         | 88    |          | ns        |
| Fall Time                                  | $t_f$         | See specified Test Circuit.         |         | 128   |          | ns        |
| Total Gate Charge                          | $Q_g$         | $V_{DS}=-10V, V_{GS}=-10V, I_D=-4A$ |         | 21    |          | nC        |
| Gate-to-Source Charge                      | $Q_{gs}$      | $V_{DS}=-10V, V_{GS}=-10V, I_D=-4A$ |         | 1.4   |          | nC        |
| Gate-to-Drain "Miller" Charge              | $Q_{gd}$      | $V_{DS}=-10V, V_{GS}=-10V, I_D=-4A$ |         | 3.2   |          | nC        |
| Diode Forward Voltage                      | $V_{SD}$      | $I_S=-4A, V_{GS}=0$                 |         | -0.82 | -1.2     | V         |

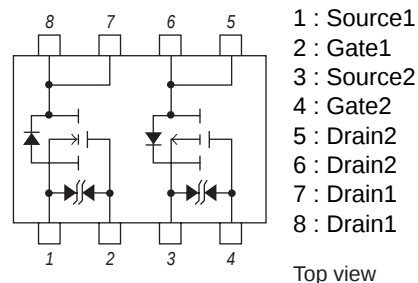
## Package Dimensions

unit : mm

2206B

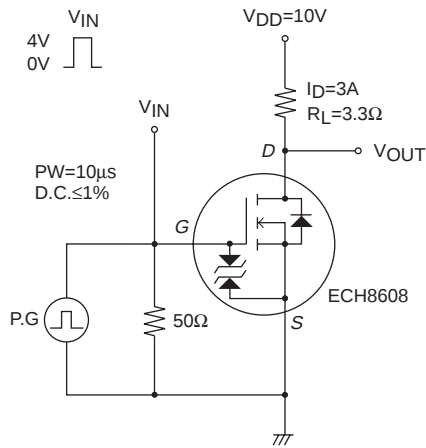


## Electrical Connection

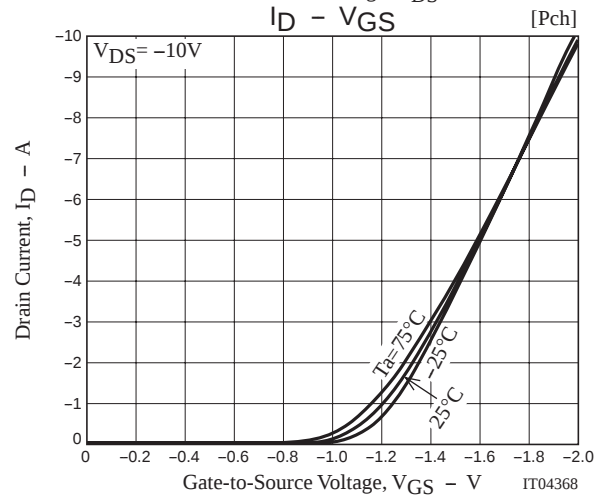
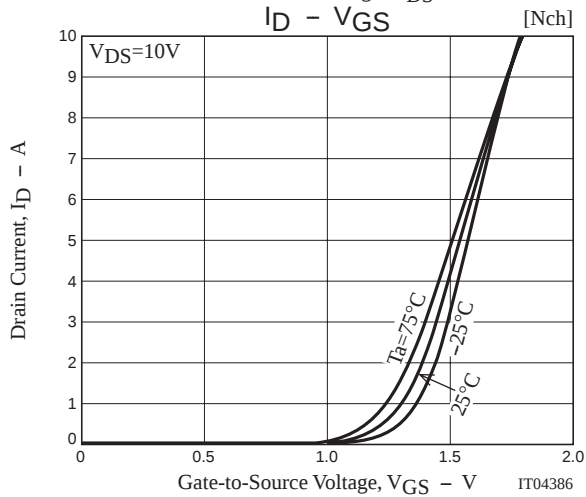
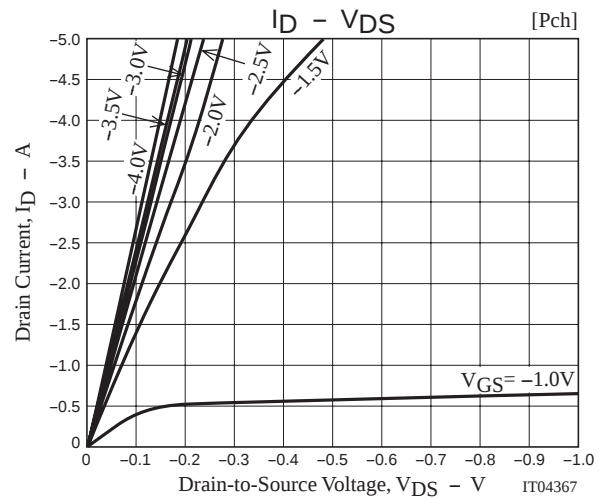
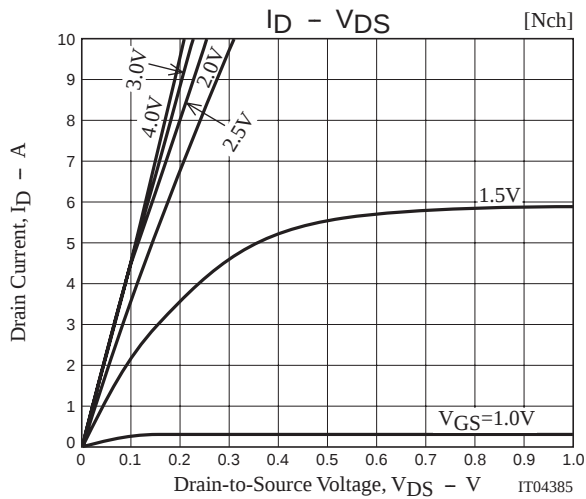
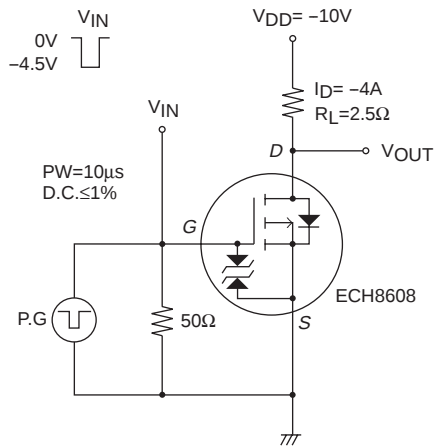


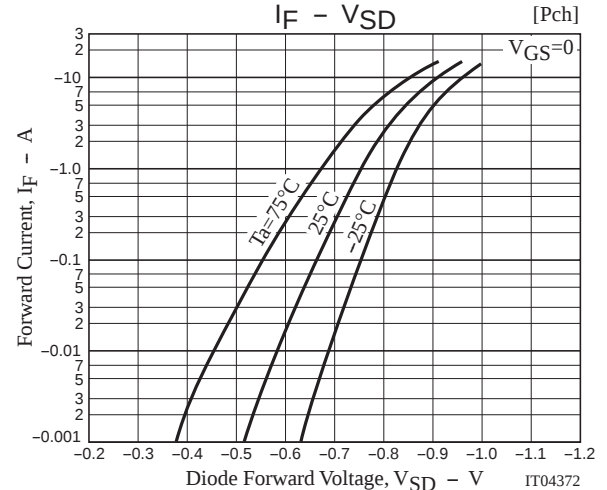
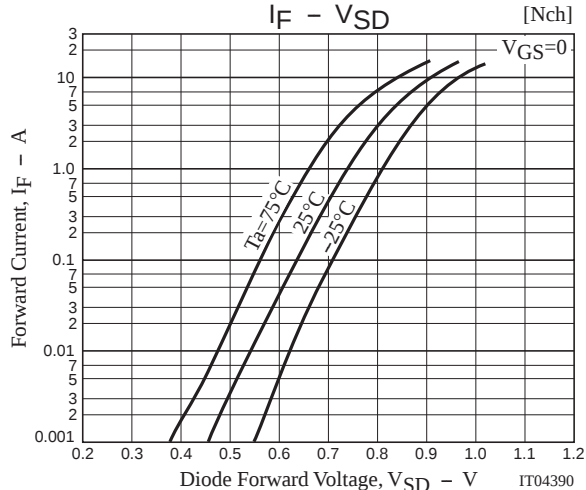
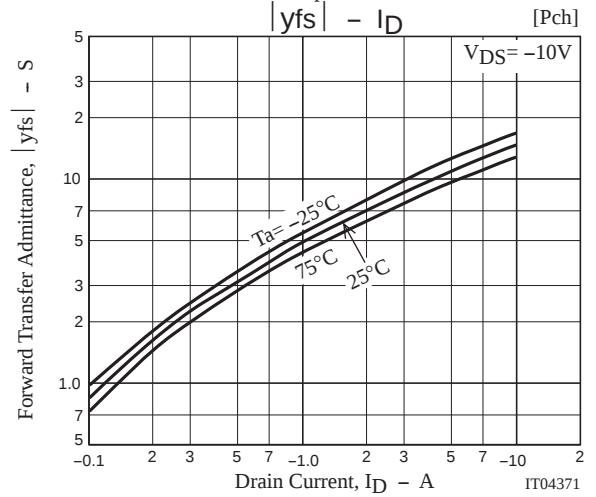
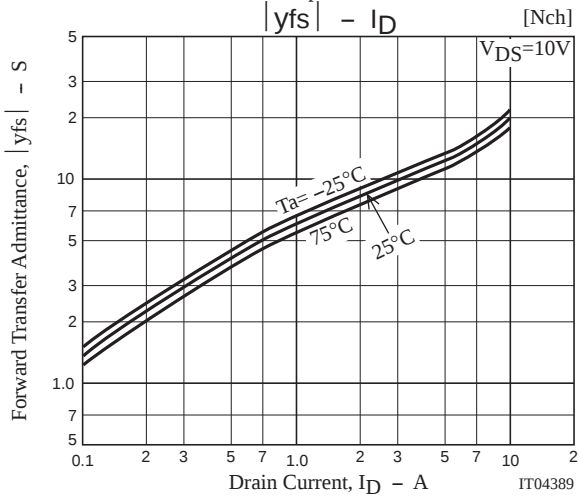
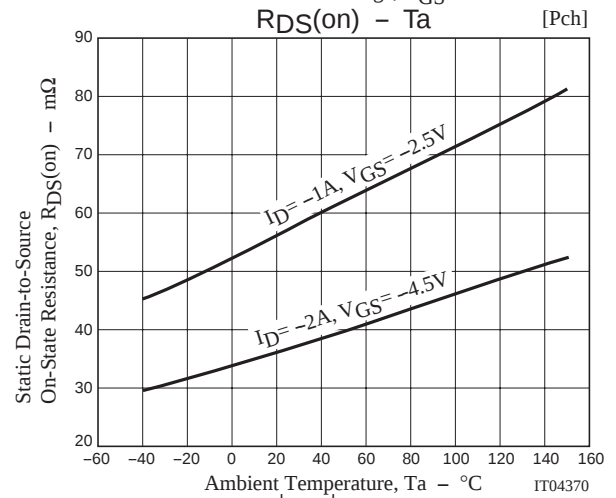
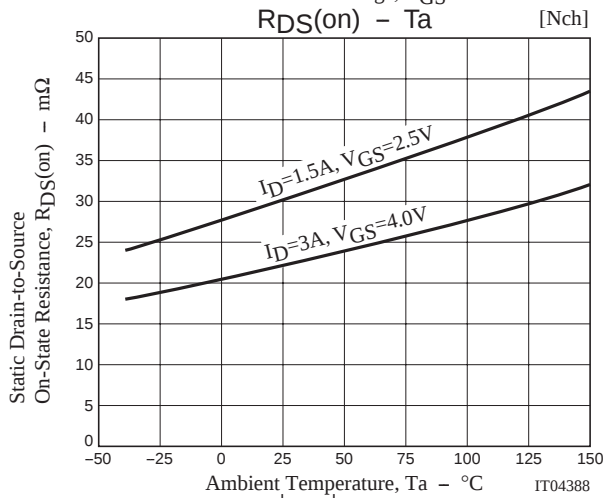
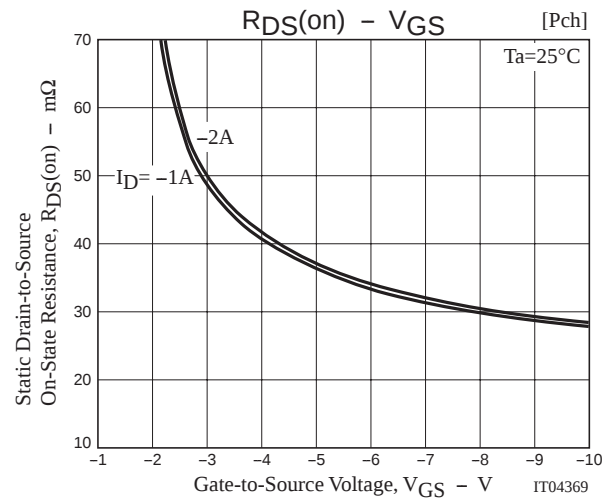
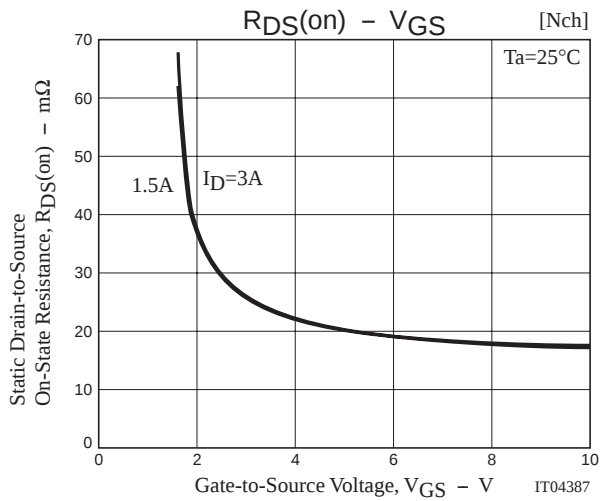
## Switching Time Test Circuit

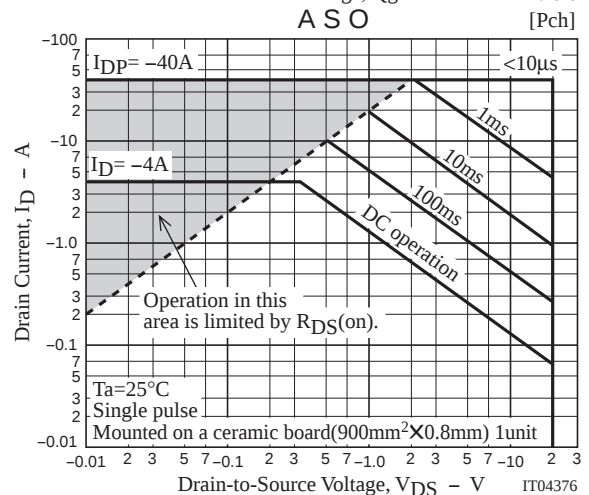
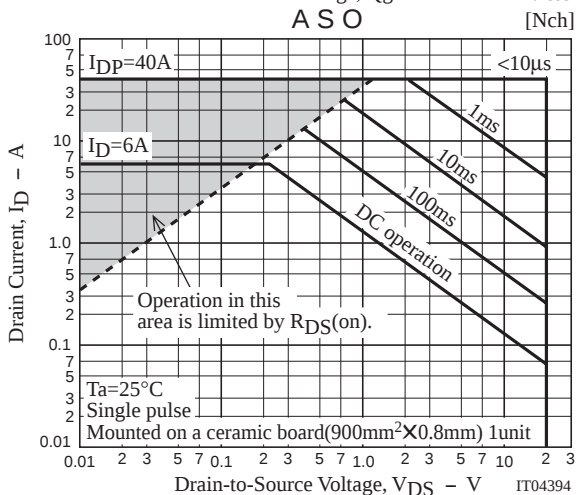
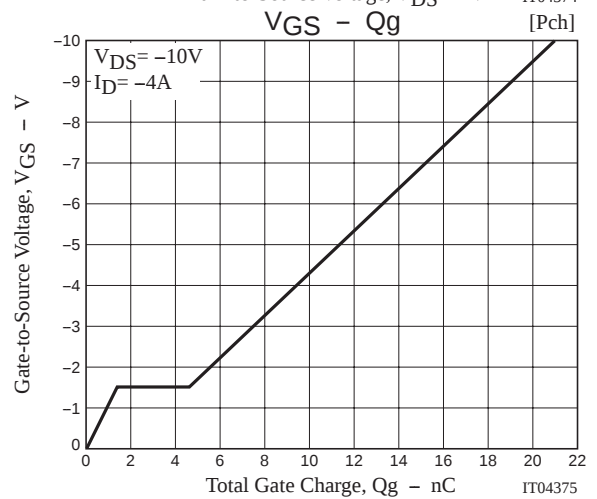
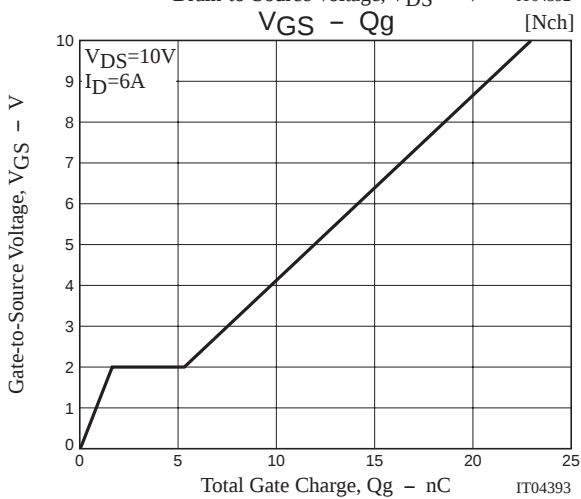
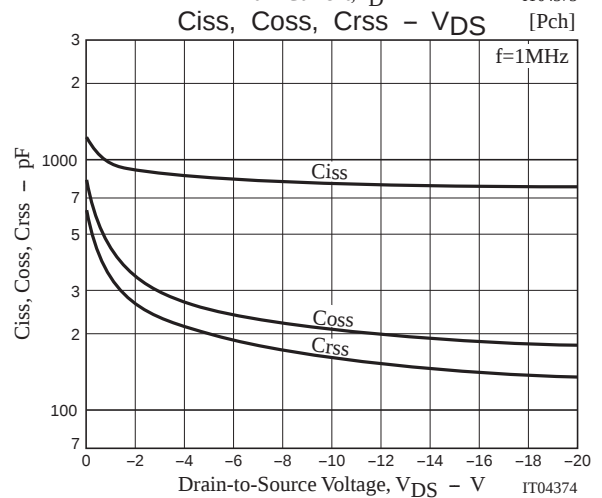
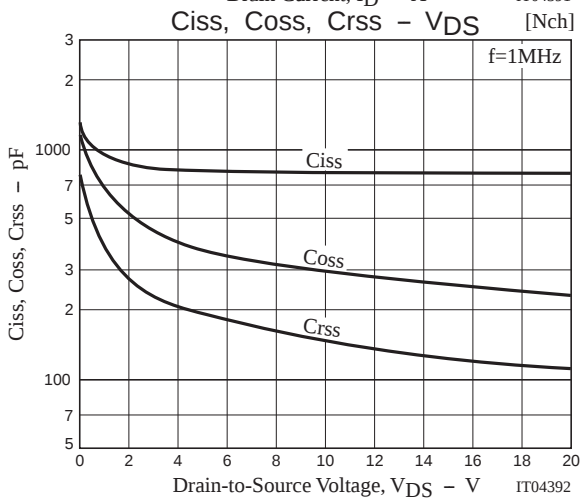
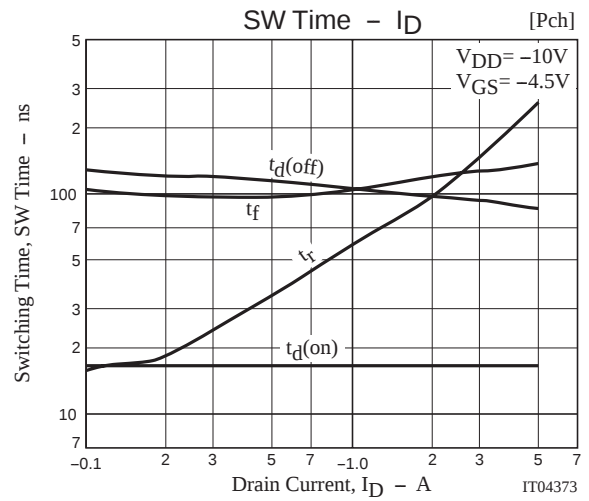
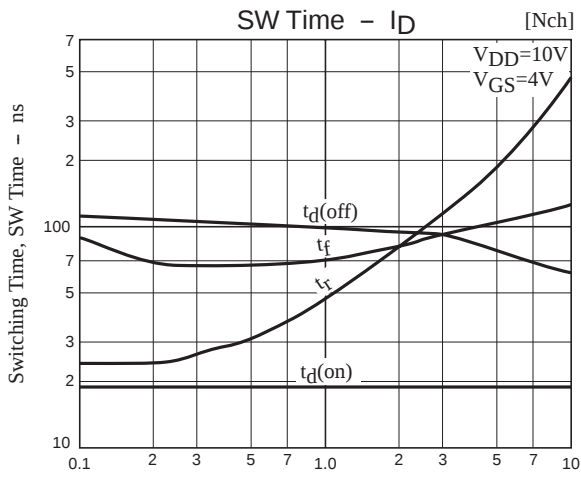
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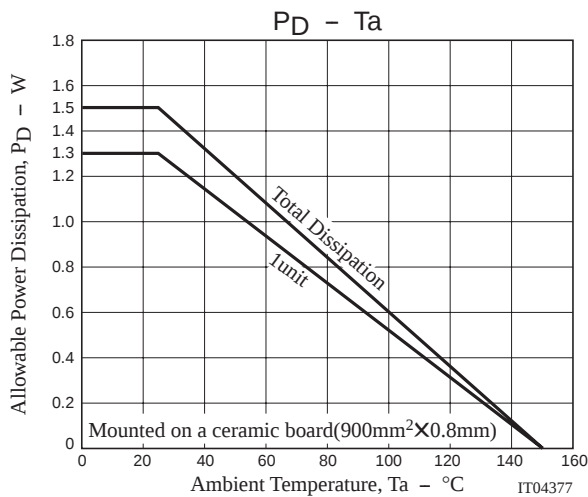


[P-channel]









Note on usage : Since the ECH8608 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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