



SANYO Semiconductors

## DATA SHEET

P-Channel Silicon MOSFET

# ECH8304 — General-Purpose Switching Device Applications

## Features

- Best suited for load switching.
- Low ON-resistance.
- 1.8V drive.

## Specifications

Absolute Maximum Ratings at Ta=25°C

| Parameter                   | Symbol           | Conditions                                | Ratings     | Unit |
|-----------------------------|------------------|-------------------------------------------|-------------|------|
| Drain-to-Source Voltage     | V <sub>DSS</sub> |                                           | -12         | V    |
| Gate-to-Source Voltage      | V <sub>GSS</sub> |                                           | ±9          | V    |
| Drain Current (DC)          | I <sub>D</sub>   |                                           | -9.5        | A    |
| Drain Current (Pulse)       | I <sub>DP</sub>  | PW≤10μs, duty cycle≤1%                    | -40         | A    |
| Allowable Power Dissipation | P <sub>D</sub>   | Mounted on a ceramic board (900mm²×0.8mm) | 1.6         | 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  |      |
| Drain-to-Source Breakdown Voltage          | V(BR) <sub>DSS</sub> | I <sub>D</sub> =-1mA, V <sub>GS</sub> =0      | -12     |      |      | V    |
| Zero-Gate Voltage Drain Current            | I <sub>DSS</sub>     | V <sub>DS</sub> =-12V, V <sub>GS</sub> =0     |         |      | -10  | μA   |
| Gate-to-Source Leakage Current             | I <sub>GSS</sub>     | V <sub>GS</sub> =±7.2V, V <sub>DS</sub> =0    |         |      | ±10  | μA   |
| Cutoff Voltage                             | V <sub>GS(off)</sub> | V <sub>DS</sub> =-6V, I <sub>D</sub> =-1mA    | -0.3    |      | -1.0 | V    |
| Forward Transfer Admittance                | y <sub>fs</sub>      | V <sub>DS</sub> =-6V, I <sub>D</sub> =-4.5A   | 12      | 20   |      | S    |
| Static Drain-to-Source On-State Resistance | R <sub>DS(on)1</sub> | I <sub>D</sub> =-4.5A, V <sub>GS</sub> =-4.5V |         | 12   | 16   | mΩ   |
|                                            | R <sub>DS(on)2</sub> | I <sub>D</sub> =-2A, V <sub>GS</sub> =-2.5V   |         | 18   | 26   | mΩ   |
|                                            | R <sub>DS(on)3</sub> | I <sub>D</sub> =-1A, V <sub>GS</sub> =-1.8V   |         | 27   | 39   | mΩ   |
| Input Capacitance                          | C <sub>iss</sub>     | V <sub>DS</sub> =-6V, f=1MHz                  |         | 3180 |      | pF   |
| Output Capacitance                         | C <sub>oss</sub>     | V <sub>DS</sub> =-6V, f=1MHz                  |         | 970  |      | pF   |
| Reverse Transfer Capacitance               | C <sub>rss</sub>     | V <sub>DS</sub> =-6V, f=1MHz                  |         | 920  |      | pF   |
| Turn-ON Delay Time                         | t <sub>d(on)</sub>   | See specified Test Circuit.                   |         | 26   |      | ns   |
| Rise Time                                  | t <sub>r</sub>       | See specified Test Circuit.                   |         | 234  |      | ns   |
| Turn-OFF Delay Time                        | t <sub>d(off)</sub>  | See specified Test Circuit.                   |         | 280  |      | ns   |
| Fall Time                                  | t <sub>f</sub>       | See specified Test Circuit.                   |         | 295  |      | ns   |

Marking : JF

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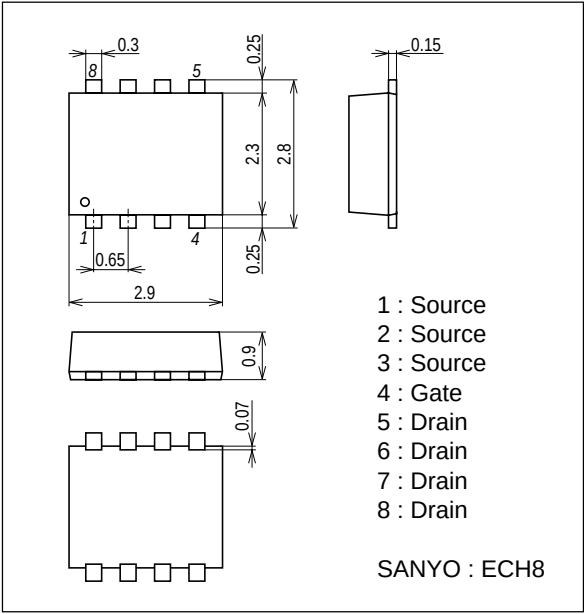
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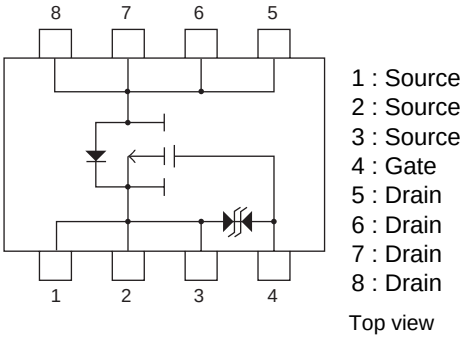
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|-------------------------------|-----------------|---------------------------------------------------------------------|---------|-------|------|------|
|                               |                 |                                                                     | min     | typ   | max  |      |
| Total Gate Charge             | Qg              | V <sub>DS</sub> =-6V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-9.5A |         | 33    |      | nC   |
| Gate-to-Source Charge         | Qgs             | V <sub>DS</sub> =-6V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-9.5A |         | 5.3   |      | nC   |
| Gate-to-Drain "Miller" Charge | Qgd             | V <sub>DS</sub> =-6V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-9.5A |         | 9.4   |      | nC   |
| Diode Forward Voltage         | V <sub>SD</sub> | I <sub>S</sub> =-9.5A, V <sub>GS</sub> =0                           |         | -0.82 | -1.2 | V    |

Package Dimensions

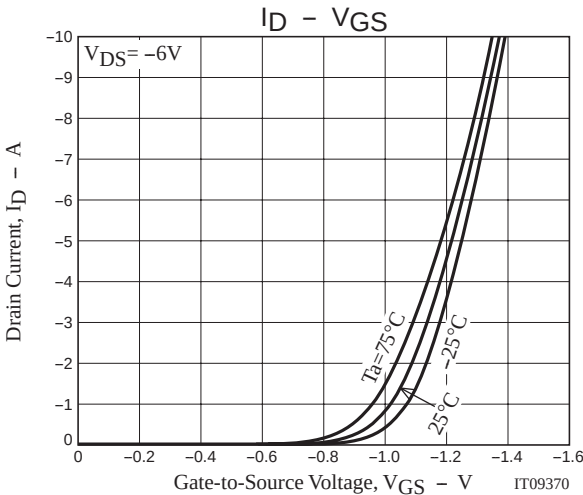
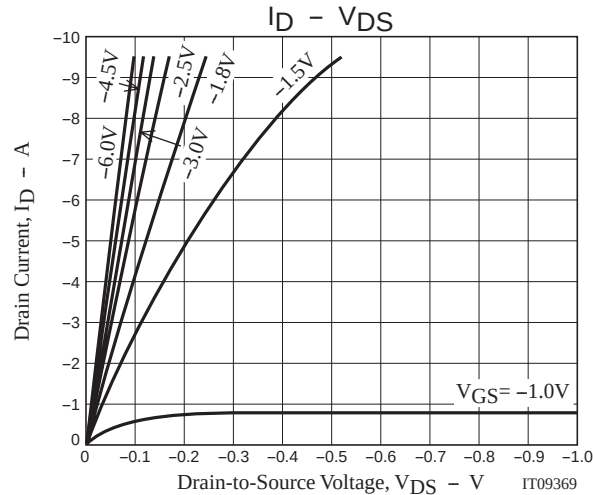
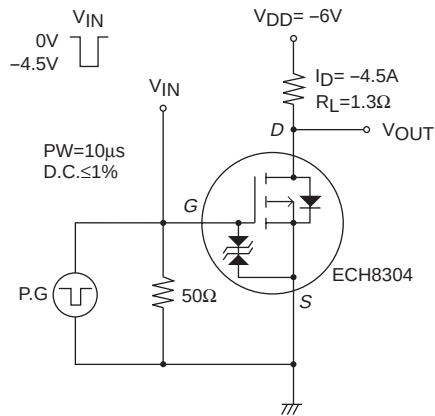
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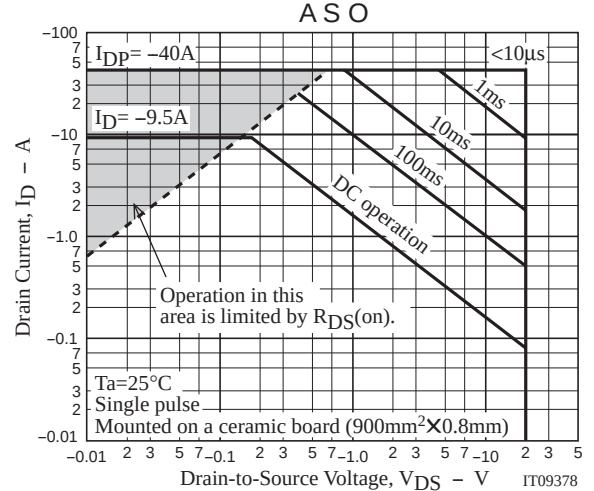
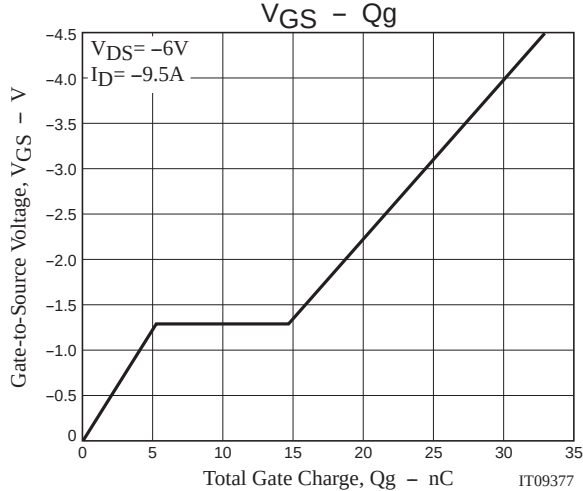
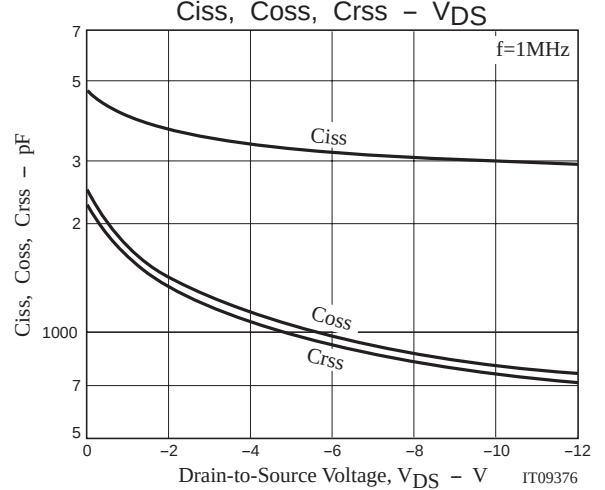
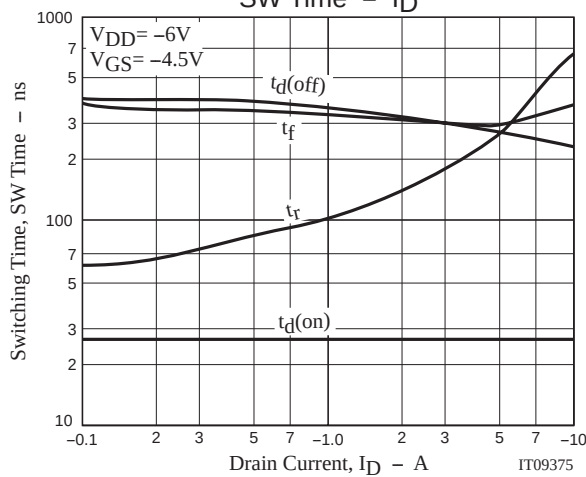
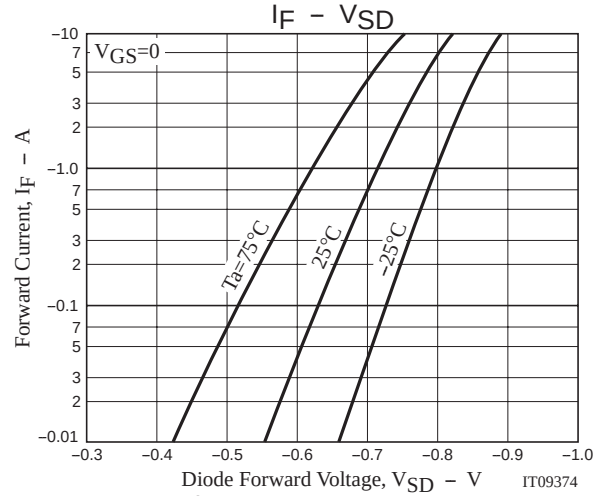
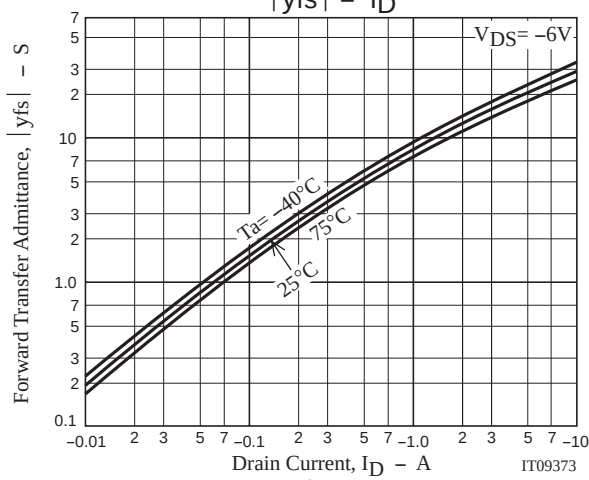
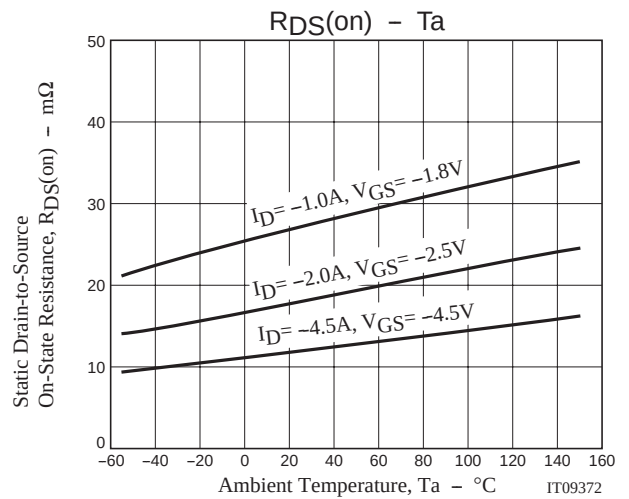
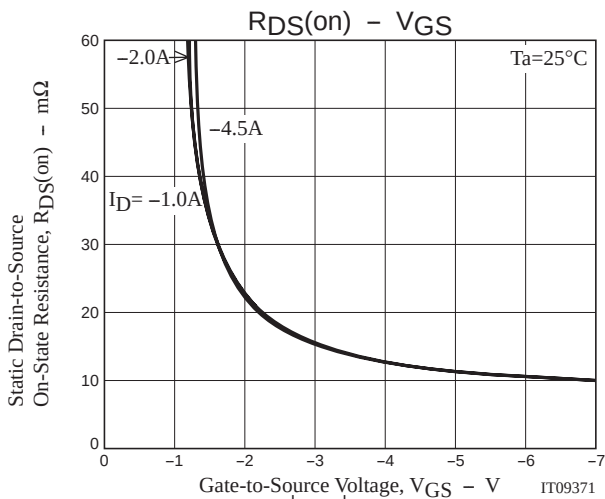


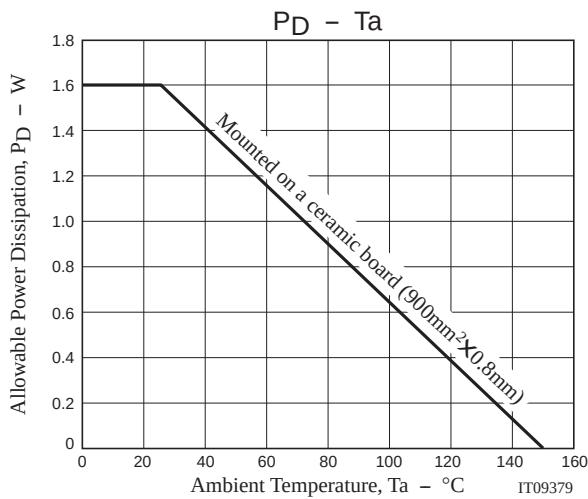
Electrical Connection



Switching Time Test Circuit







Note on usage : Since the ECH8304 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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