



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

P-Channel Silicon MOSFET

## ECH8654 — General-Purpose Switching Device Applications

### Features

- Low ON-resistance.
- 1.8V drive.
- Halogen free compliance.

### Specifications

Absolute Maximum Ratings at Ta=25°C

| Parameter                   | Symbol           | Conditions   | Ratings     | Unit |
|-----------------------------|------------------|--|-------------|------|
| Drain-to-Source Voltage     | V <sub>DSS</sub> |  | -20         | V    |
| Gate-to-Source Voltage      | V <sub>GSS</sub> |  | ±10         | V    |
| Drain Current (DC)          | I <sub>D</sub>   |  | -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 (900mm <sup>2</sup> ×0.8mm) 1unit | 1.3         | W    |
| Total Power 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  |      |
| 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   | -0.4    |     | -1.3 | V    |
| Forward Transfer Admittance                | y <sub>fs</sub>      | V <sub>DS</sub> =-10V, I <sub>D</sub> =-3A    | 4.9     | 8.3 |      | S    |
| Static Drain-to-Source On-State Resistance | R <sub>DS(on)1</sub> | I <sub>D</sub> =-3A, V <sub>GS</sub> =-4.5V   |         | 29  | 38   | mΩ   |
|  | R <sub>DS(on)2</sub> | I <sub>D</sub> =-1.5A, V <sub>GS</sub> =-2.5V |         | 41  | 58   | mΩ   |
|  | R <sub>DS(on)3</sub> | I <sub>D</sub> =-0.5A, V <sub>GS</sub> =-1.8V |         | 64  | 98   | mΩ   |

Marking : WZ

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**SANYO Semiconductor Co., Ltd.**

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

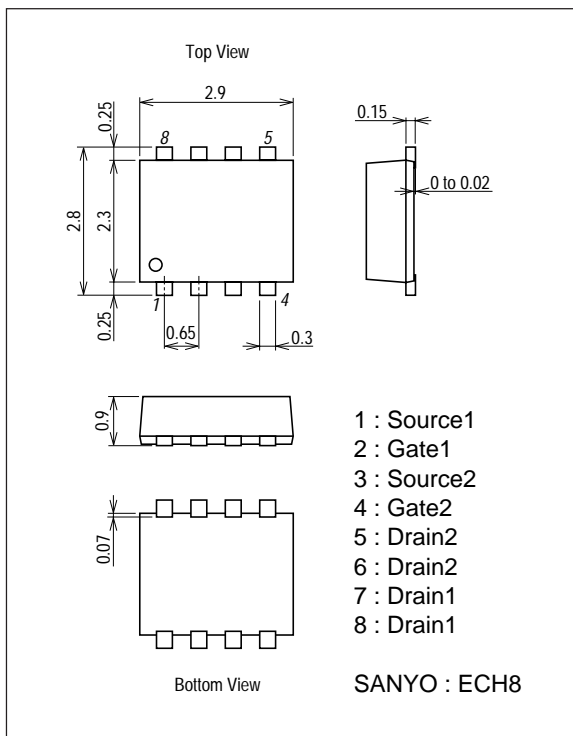
# ECH8654

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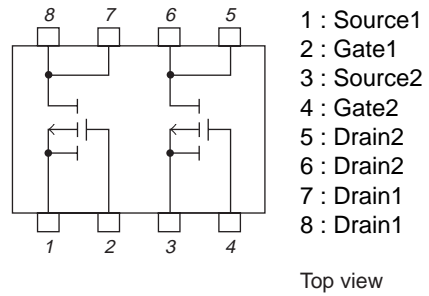
| Parameter                     | Symbol              | Conditions   | Ratings |       |      | Unit |
|-------------------------------|---------------------|--|---------|-------|------|------|
|                               |                     |  | min     | typ   | max  |      |
| Input Capacitance             | Ciss                | V <sub>DS</sub> =-10V, f=1MHz                                      |         | 960   |      | pF   |
| Output Capacitance            | Coss                | V <sub>DS</sub> =-10V, f=1MHz                                      |         | 180   |      | pF   |
| Reverse Transfer Capacitance  | Crss                | V <sub>DS</sub> =-10V, f=1MHz                                      |         | 140   |      | pF   |
| Turn-ON Delay Time            | t <sub>d(on)</sub>  | See specified Test Circuit.  |         | 14    |      | ns   |
| Rise Time                     | t <sub>r</sub>      | See specified Test Circuit.  |         | 55    |      | ns   |
| Turn-OFF Delay Time           | t <sub>d(off)</sub> | See specified Test Circuit.  |         | 92    |      | ns   |
| Fall Time                     | t <sub>f</sub>      | See specified Test Circuit.  |         | 68    |      | ns   |
| Total Gate Charge             | Qg                  | V <sub>DS</sub> =-10V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A |         | 11    |      | nC   |
| Gate-to-Source Charge         | Qgs                 | V <sub>DS</sub> =-10V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A |         | 2.0   |      | nC   |
| Gate-to-Drain "Miller" Charge | Qgd                 | V <sub>DS</sub> =-10V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A |         | 2.8   |      | nC   |
| Diode Forward Voltage         | V <sub>SD</sub>     | I <sub>S</sub> =-5A, V <sub>GS</sub> =0V                           |         | -0.82 | -1.2 | V    |

## Package Dimensions

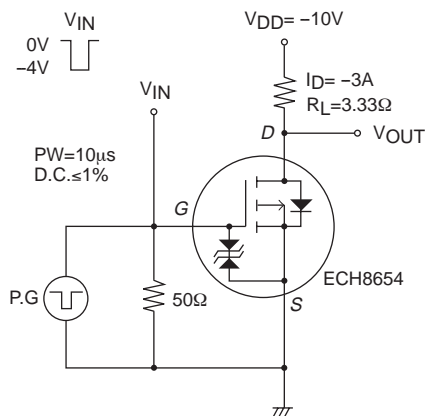
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7011A-001

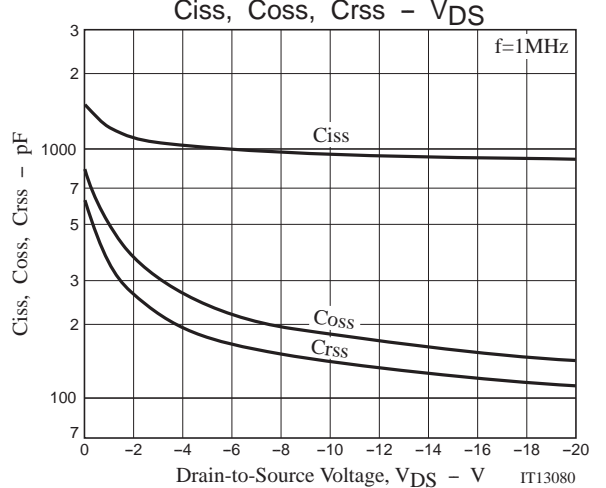
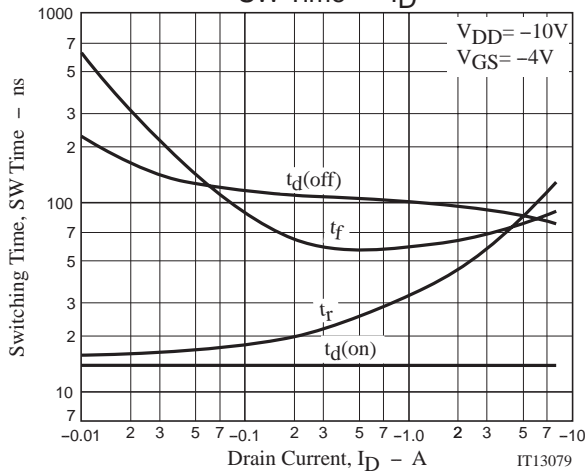
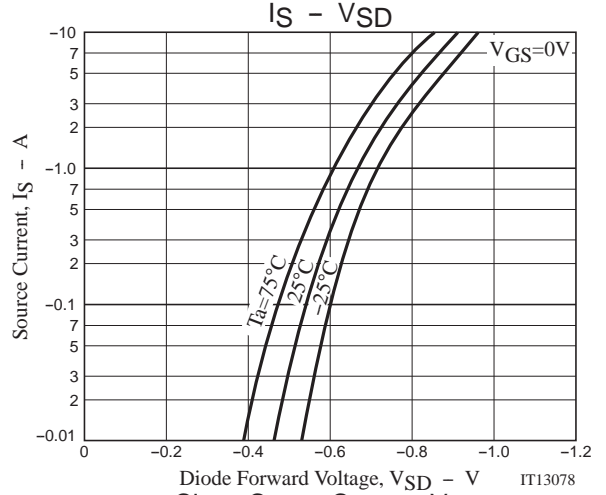
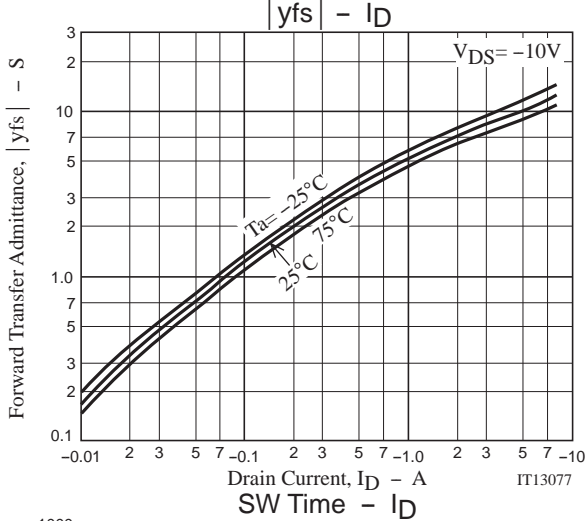
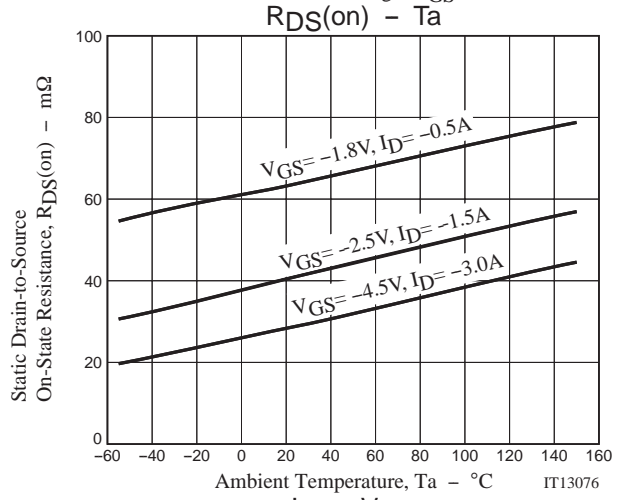
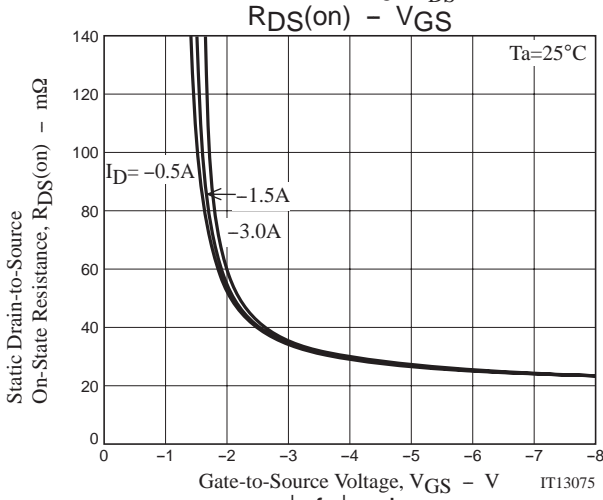
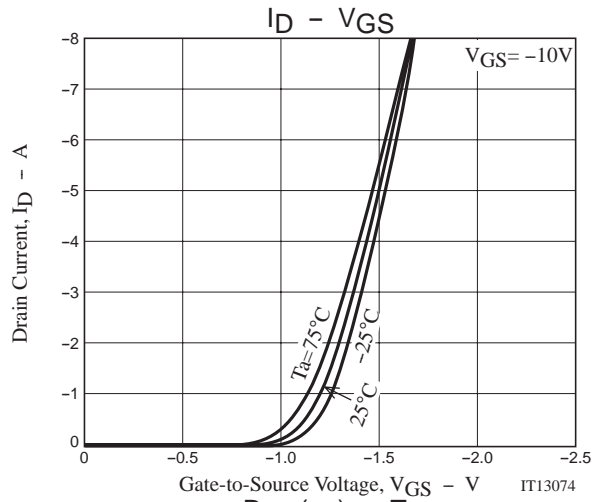
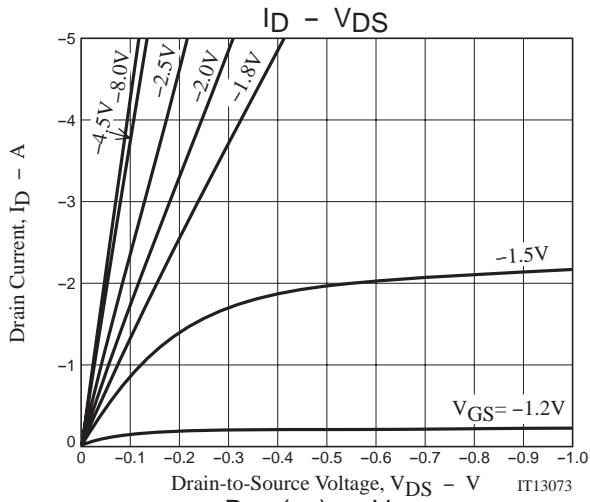


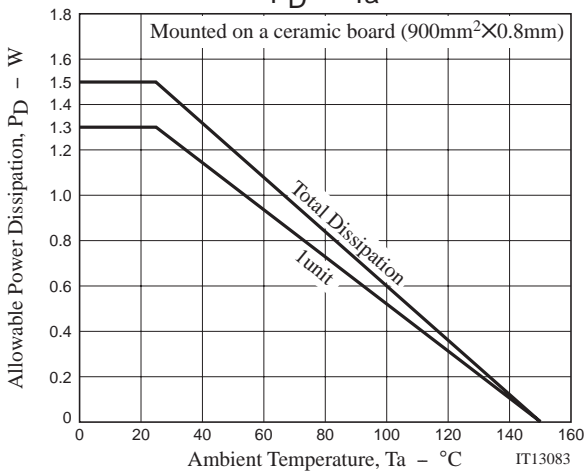
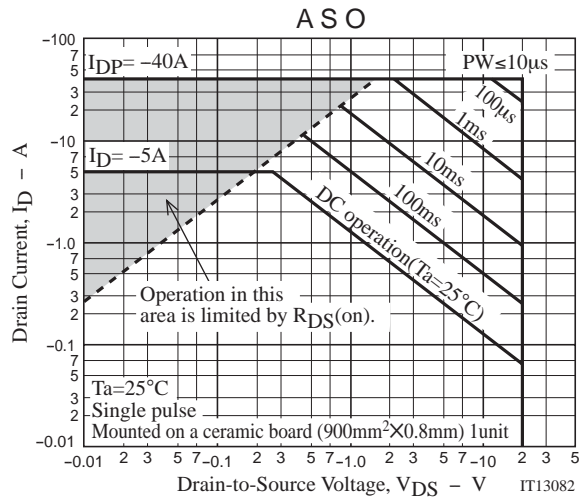
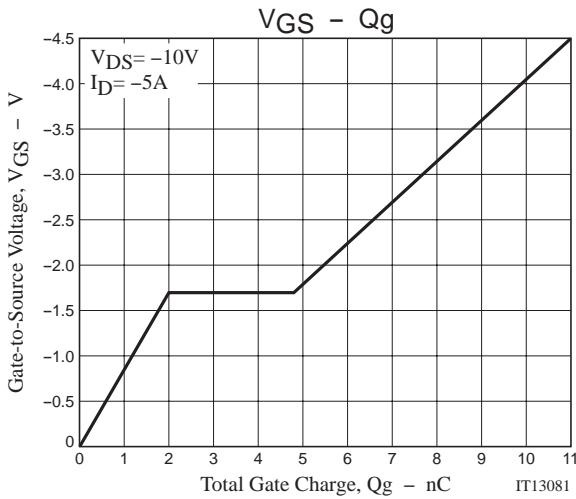
## Electrical Connection



## Switching Time Test Circuit







Note on usage : Since the ECH8654 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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