



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

## ECH8656 — N-Channel Silicon MOSFET — General-Purpose Switching Device Applications

### Features

- ON-resistance  $R_{DS(on)1}=13m\Omega$  (typ.)
- Halogen free compliance
- Protection diode in
- 1.8V drive
- Nch + Nch MOSFET

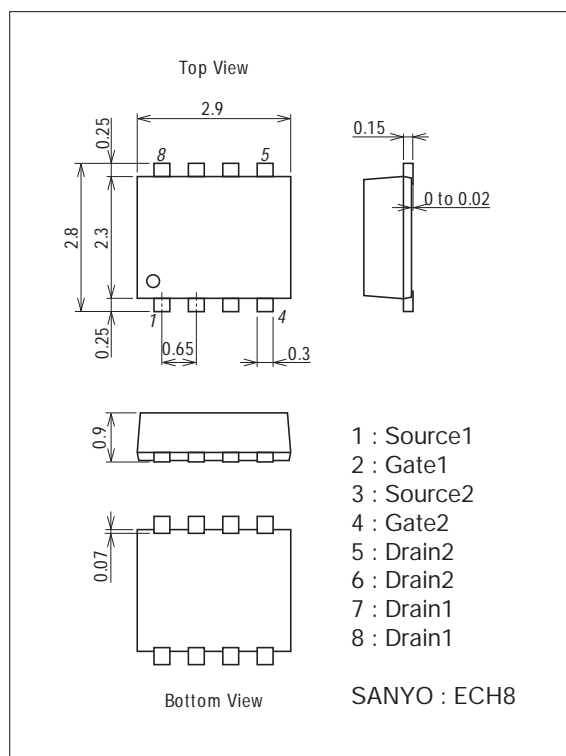
### Specifications

Absolute Maximum Ratings at  $T_a=25^\circ C$

| Parameter                   | Symbol    | Conditions   | Ratings     | Unit       |
|-----------------------------|-----------|--|-------------|------------|
| Drain-to-Source Voltage     | $V_{DSS}$ |  | 20          | V          |
| Gate-to-Source Voltage      | $V_{GSS}$ |  | $\pm 10$    | V          |
| Drain Current (DC)          | $I_D$     |  | 7.5         | A          |
| Drain Current (Pulse)       | $I_{DP}$  | $PW \leq 10\mu s$ , duty cycle $\leq 1\%$                            | 40          | A          |
| Allowable Power Dissipation | $P_D$     | When mounted on ceramic substrate (900mm <sup>2</sup> x 0.8mm) 1unit | 1.3         | W          |
| Total Dissipation           | $P_T$     | When mounted on ceramic substrate (900mm <sup>2</sup> x 0.8mm)       | 1.5         | W          |
| Channel Temperature         | $T_{ch}$  |  | 150         | $^\circ C$ |
| Storage Temperature         | $T_{stg}$ |  | -55 to +150 | $^\circ C$ |

### Package Dimensions

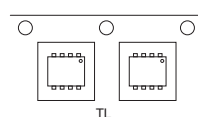
unit : mm (typ)  
7011A-001



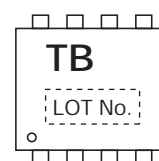
### Product & Package Information

- Package : ECH8
- JEITA, JEDEC : -
- Minimum Packing Quantity : 3,000 pcs./reel

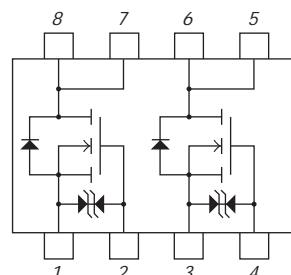
### Packing Type : TL



### Marking



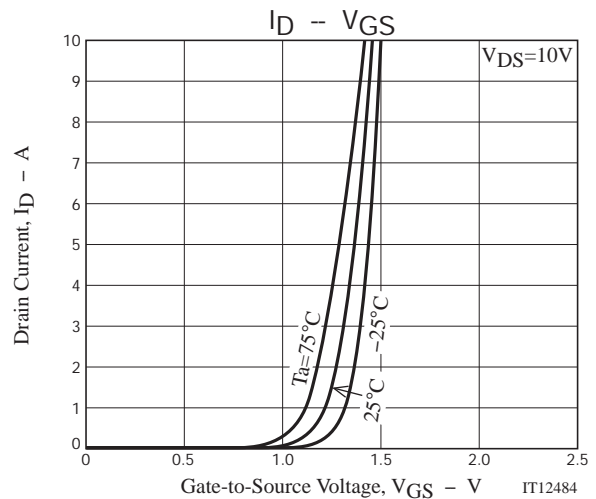
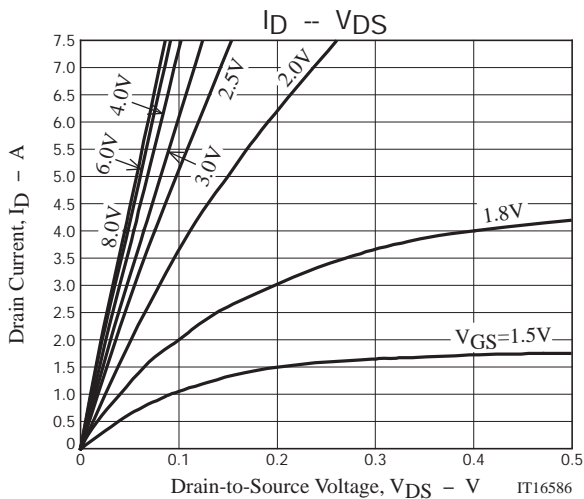
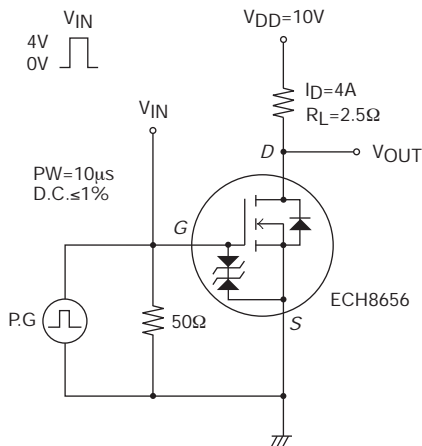
### Electrical Connection

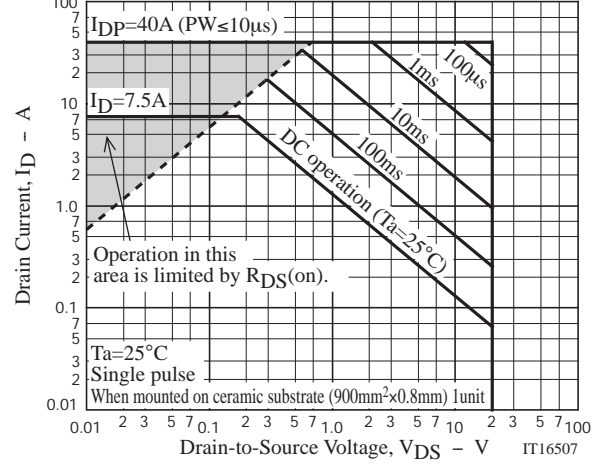
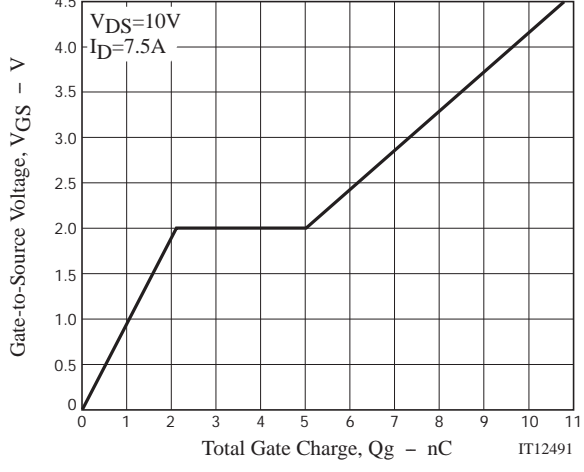
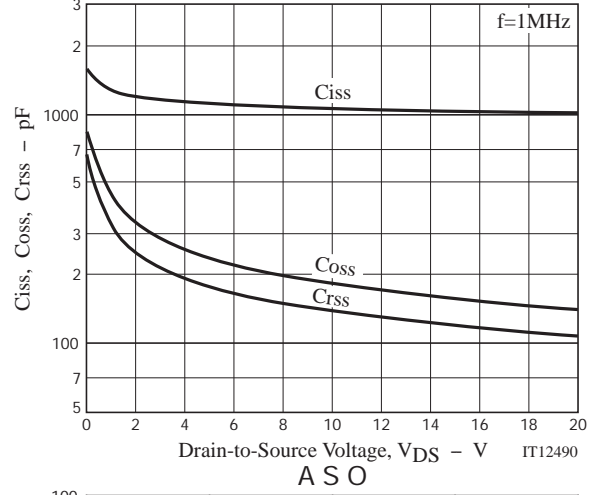
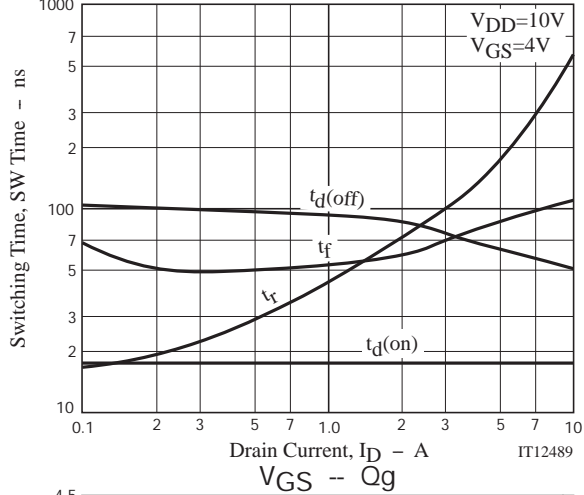
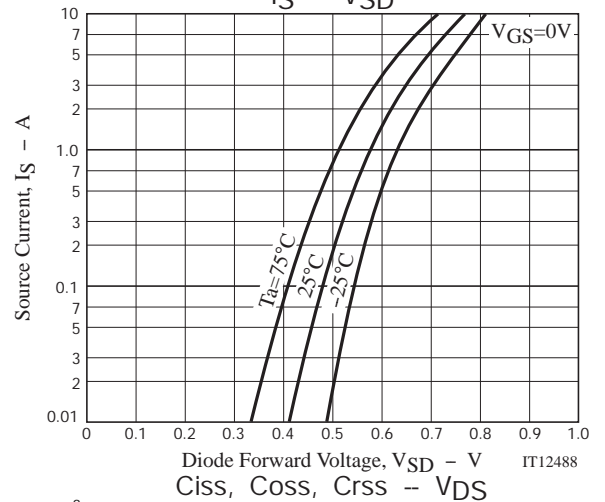
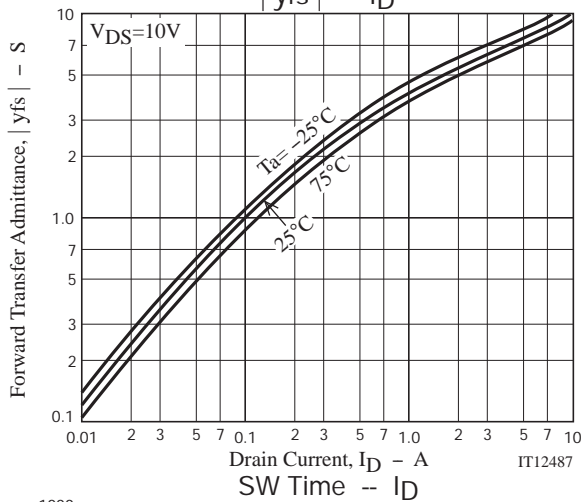
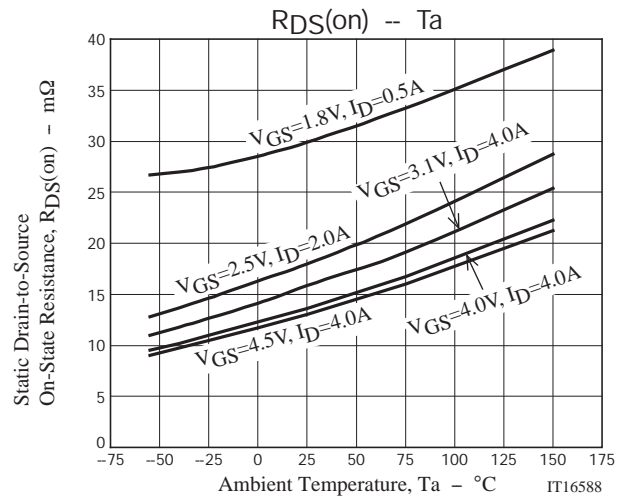
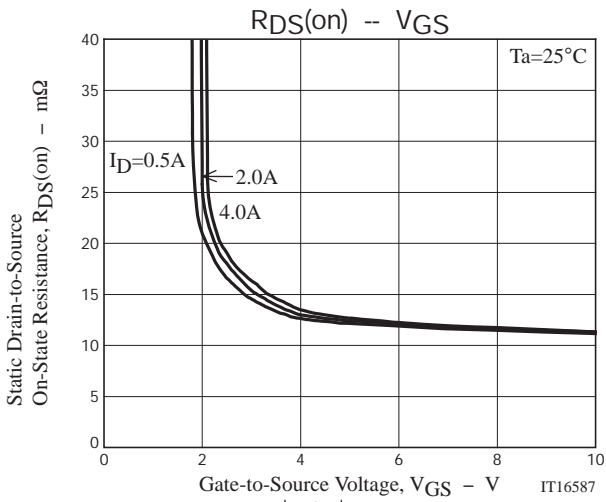


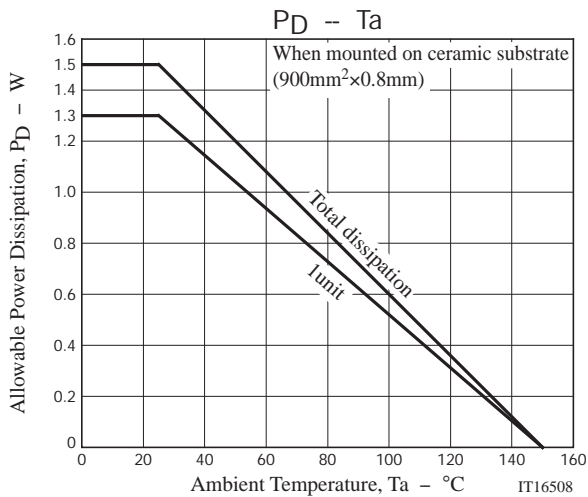
Electrical Characteristics at Ta=25°C

| Parameter                                  | Symbol   | Conditions                  | Ratings |      |     | Unit |
|--|----------|-----------------------------|---------|------|-----|------|
|  |          |                             | min     | typ  | max |      |
| Drain-to-Source Breakdown Voltage          | V(BR)DSS | ID=1mA, VGS=0V              | 20      |      |     | V    |
| Zero-Gate Voltage Drain Current            | IDSS     | VDS=20V, VGS=0V             |         |      | 1   | μA   |
| Gate-to-Source Leakage Current             | IGSS     | VGS=±8V, VDS=0V             |         |      | ±10 | μA   |
| Cutoff Voltage                             | VGS(off) | VDS=10V, ID=1mA             | 0.5     |      | 1.3 | V    |
| Forward Transfer Admittance                | yfs      | VDS=10V, ID=4A              |         | 7    |     | S    |
| Static Drain-to-Source On-State Resistance | RDS(on)1 | ID=4A, VGS=4.5V             | 9       | 13   | 17  | mΩ   |
|  | RDS(on)2 | ID=4A, VGS=4.0V             | 9.4     | 13.5 | 18  | mΩ   |
|  | RDS(on)3 | ID=4A, VGS=3.1V             | 11      | 16   | 22  | mΩ   |
|  | RDS(on)4 | ID=2A, VGS=2.5V             | 12.5    | 18   | 26  | mΩ   |
|  | RDS(on)5 | ID=0.5A, VGS=1.8V           | 17      | 30   | 48  | mΩ   |
| Input Capacitance                          | Ciss     | VDS=10V, f=1MHz             |         | 1060 |     | pF   |
| Output Capacitance                         | Coss     | VDS=10V, f=1MHz             |         | 180  |     | pF   |
| Reverse Transfer Capacitance               | Crss     | VDS=10V, f=1MHz             |         | 135  |     | pF   |
| Turn-ON Delay Time                         | td(on)   | See specified Test Circuit. |         | 17.5 |     | ns   |
| Rise Time                                  | tr       | See specified Test Circuit. |         | 120  |     | ns   |
| Turn-OFF Delay Time                        | td(off)  | See specified Test Circuit. |         | 68   |     | ns   |
| Fall Time                                  | tf       | See specified Test Circuit. |         | 80   |     | ns   |
| Total Gate Charge                          | Qg       | VDS=10V, VGS=4.5V, ID=7.5A  |         | 10.8 |     | nC   |
| Gate-to-Source Charge                      | Qgs      | VDS=10V, VGS=4.5V, ID=7.5A  |         | 2.1  |     | nC   |
| Gate-to-Drain "Miller" Charge              | Qgd      | VDS=10V, VGS=4.5V, ID=7.5A  |         | 2.9  |     | nC   |
| Diode Forward Voltage                      | VSD      | IS=7.5A, VGS=0V             |         | 0.74 | 1.2 | V    |

Switching Time Test Circuit







Note on usage : Since the ECH8656 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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