

# 4V Drive Nch+Pch MOSFET

## SP8M2

### ●Structure

Silicon N-channel MOSFET /  
Silicon P-channel MOSFET

### ●Features

- 1) Low on-resistance.
- 2) Built-in G-S protection diode.
- 3) Small surface mount package (SOP8).

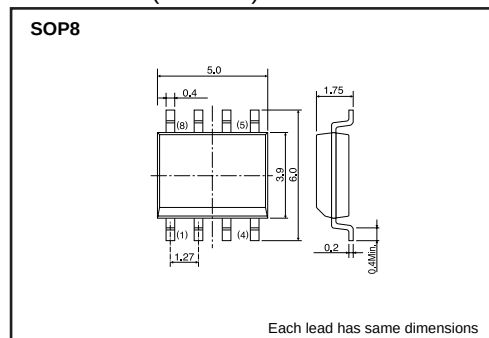
### ●Applications

Switching

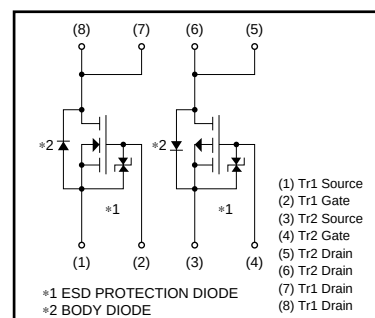
### ●Package specifications

| Type  | Package                      | Taping |
|-------|------------------------------|--------|
|       | Code                         | TB     |
|       | Basic ordering unit (pieces) | 2500   |
| SP8M2 |                              | ○      |

### ●Dimensions (Unit : mm)



### ●Inner circuit



### ●Absolute maximum ratings (Ta=25°C)

| Parameter                      | Symbol     | Limits        |            | Unit      |
|--------------------------------|------------|---------------|------------|-----------|
|                                |            | Tr1 : N-ch    | Tr2 : P-ch |           |
| Drain-source voltage           | $V_{DS}$   | 30            | -30        | V         |
| Gate-source voltage            | $V_{GS}$   | ±20           | ±20        | V         |
| Drain current                  | Continuous | $I_D$         | ±3.5       | A         |
|                                | Pulsed     | $I_{DP}^{*1}$ | ±14        | A         |
| Source current<br>(Body diode) | Continuous | $I_S$         | 1.6        | A         |
|                                | Pulsed     | $I_{SP}^{*1}$ | 14         | A         |
| Total power dissipation        | $P_D^{*2}$ | 2.0           |            | W / TOTAL |
| Channel temperature            | $T_{ch}$   | 150           |            | °C        |
| Storage temperature            | $T_{stg}$  | -55 to +150   |            | °C        |

\*1  $P_w \leq 10 \mu s$ , Duty cycle  $\leq 1\%$

\*2 Mounted on a ceramic board.

## Transistors

## N-ch

## ●Electrical characteristics (Ta=25°C)

| Parameter                               | Symbol         | Min. | Typ. | Max. | Unit | Conditions                        |
|-----------------------------------------|----------------|------|------|------|------|-----------------------------------|
| Gate-source leakage                     | $I_{GSS}$      | —    | —    | ±10  | μA   | $V_{GS}=\pm 20V$ , $V_{DS}=0V$    |
| Drain-source breakdown voltage          | $V_{(BR)DSS}$  | 30   | —    | —    | V    | $I_D=1mA$ , $V_{GS}=0V$           |
| Zero gate voltage drain current         | $I_{DSS}$      | —    | —    | 1    | μA   | $V_{DS}=30V$ , $V_{GS}=0V$        |
| Gate threshold voltage                  | $V_{GS(th)}$   | 1.0  | —    | 2.5  | V    | $V_{DS}=10V$ , $I_D=1mA$          |
| Static drain-source on-state resistance | $R_{DS(on)}$ * | —    | 59   | 83   | mΩ   | $I_D=3.5A$ , $V_{GS}=10V$         |
|                                         |                | —    | 93   | 130  | mΩ   | $I_D=3.5A$ , $V_{GS}=4.5V$        |
|                                         |                | —    | 107  | 150  | mΩ   | $I_D=3.5A$ , $V_{GS}=4V$          |
| Forward transfer admittance             | $ Y_{fs} $ *   | 2.0  | —    | —    | S    | $V_{DS}=10V$ , $I_D=3.5A$         |
| Input capacitance                       | $C_{iss}$      | —    | 140  | —    | pF   | $V_{DS}=10V$                      |
| Output capacitance                      | $C_{oss}$      | —    | 45   | —    | pF   | $V_{GS}=0V$                       |
| Reverse transfer capacitance            | $C_{rss}$      | —    | 30   | —    | pF   | $f=1MHz$                          |
| Turn-on delay time                      | $t_{d(on)}$ *  | —    | 6    | —    | ns   | $V_{DD}\doteq 15V$                |
| Rise time                               | $t_r$ *        | —    | 6    | —    | ns   | $I_D=1.75A$                       |
| Turn-off delay time                     | $t_{d(off)}$ * | —    | 17   | —    | ns   | $V_{GS}=10V$                      |
| Fall time                               | $t_f$ *        | —    | 4    | —    | ns   | $R_L=8.57\Omega$                  |
| Total gate charge                       | $Q_g$ *        | —    | 2.5  | 3.5  | nC   | $V_{DD}\doteq 15V$ , $V_{GS}=5V$  |
| Gate-source charge                      | $Q_{gs}$ *     | —    | 0.8  | —    | nC   | $I_D=3.5A$                        |
| Gate-drain charge                       | $Q_{gd}$ *     | —    | 0.8  | —    | nC   | $R_L=4.29\Omega$ , $R_G=10\Omega$ |

\*Pulsed

## ●Body diode characteristics (Source-drain) (Ta=25°C)

| Parameter       | Symbol     | Min. | Typ. | Max. | Unit | Conditions               |
|-----------------|------------|------|------|------|------|--------------------------|
| Forward voltage | $V_{SD}$ * | —    | —    | 1.2  | V    | $I_S=6.4A$ , $V_{GS}=0V$ |

\*Pulsed

## Transistors

## P-ch

## ●Electrical characteristics (Ta=25°C)

| Parameter                               | Symbol         | Min. | Typ. | Max. | Unit | Conditions                         |
|-----------------------------------------|----------------|------|------|------|------|------------------------------------|
| Gate-source leakage                     | $I_{GSS}$      | —    | —    | ±10  | μA   | $V_{GS} = \pm 20V, V_{DS} = 0V$    |
| Drain-source breakdown voltage          | $V_{(BR)DSS}$  | −30  | —    | —    | V    | $I_D = -1mA, V_{GS} = 0V$          |
| Zero gate voltage drain current         | $I_{DSS}$      | —    | —    | −1   | μA   | $V_{DS} = -30V, V_{GS} = 0V$       |
| Gate threshold voltage                  | $V_{GS(th)}$   | −1.0 | —    | −2.5 | V    | $V_{DS} = -10V, I_D = -1mA$        |
| Static drain-source on-state resistance | $R_{DS(on)}$ * | —    | 65   | 90   | mΩ   | $I_D = -3.5A, V_{GS} = -10V$       |
|                                         |                | —    | 100  | 140  | mΩ   | $I_D = -1.75A, V_{GS} = -4.5V$     |
|                                         |                | —    | 120  | 165  | mΩ   | $I_D = -1.75A, V_{GS} = -4V$       |
| Forward transfer admittance             | $ Y_{fs} $ *   | 1.8  | —    | —    | S    | $V_{DS} = -10V, I_D = -1.75A$      |
| Input capacitance                       | $C_{iss}$      | —    | 490  | —    | pF   | $V_{DS} = -10V$                    |
| Output capacitance                      | $C_{oss}$      | —    | 110  | —    | pF   | $V_{GS} = 0V$                      |
| Reverse transfer capacitance            | $C_{rss}$      | —    | 75   | —    | pF   | $f = 1MHz$                         |
| Turn-on delay time                      | $t_{d(on)}$ *  | —    | 10   | —    | ns   | $V_{DD} \doteq -15V$               |
| Rise time                               | $t_r$ *        | —    | 15   | —    | ns   | $I_D = -1.75A$                     |
| Turn-off delay time                     | $t_{d(off)}$ * | —    | 35   | —    | ns   | $V_{GS} = -10V$                    |
| Fall time                               | $t_f$ *        | —    | 10   | —    | ns   | $R_L = 8.57\Omega$                 |
| Total gate charge                       | $Q_g$ *        | —    | 5.5  | 7.7  | nC   | $V_{DD} \doteq -15V, V_{GS} = -5V$ |
| Gate-source charge                      | $Q_{gs}$ *     | —    | 1.5  | —    | nC   | $I_D = -3.5A$                      |
| Gate-drain charge                       | $Q_{gd}$ *     | —    | 2.0  | —    | nC   | $R_L = 4.29\Omega, R_G = 10\Omega$ |

\*Pulsed

## ●Body diode characteristics (Source-drain) (Ta=25°C)

| Parameter       | Symbol     | Min. | Typ. | Max. | Unit | Conditions                 |
|-----------------|------------|------|------|------|------|----------------------------|
| Forward voltage | $V_{SD}$ * | —    | —    | −1.2 | V    | $I_S = -1.6A, V_{GS} = 0V$ |

\*Pulsed

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