



## Ultrahigh-Speed Switching Applications

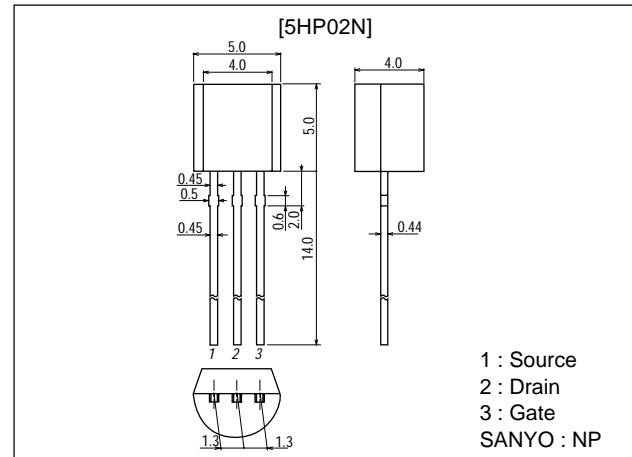
### Features

- Low ON-resistance.
- Ultrahigh-speed switching.
- 4V drive.

### Package Dimensions

unit:mm

2178



### Specifications

#### Absolute Maximum Ratings at Ta = 25°C

| Parameter                   | Symbol    | Conditions                                | Ratings     | Unit |
|-----------------------------|-----------|---|-------------|------|
| Drain-to-Source Voltage     | $V_{DSS}$ |   | -50         | V    |
| Gate-to-Source Voltage      | $V_{GSS}$ |   | ±20         | V    |
| Drain Current (DC)          | $I_D$     |   | -0.14       | A    |
| Drain Current (pulse)       | $I_{DP}$  | $PW \leq 10\mu s$ , duty cycle $\leq 1\%$ | -0.56       | A    |
| Allowable Power Dissipation | $P_D$     |   | 0.4         | W    |
| Channel Temperature         | $T_{ch}$  |   | 150         | °C   |
| Storage Temperature         | $T_{stg}$ |   | -55 to +150 | °C   |

#### Electrical Characteristics at Ta = 25°C

| Parameter                                  | Symbol        | Conditions                          | Ratings |      |      | Unit |
|--|---------------|-------------------------------------|---------|------|------|------|
|  |               |                                     | min     | typ  | max  |      |
| Drain-to-Source Breakdown Voltage          | $V_{(BR)DSS}$ | $I_D = -1mA$ , $V_{GS} = 0$         | -50     |      |      | V    |
| Zero-Gate Voltage Drain Current            | $I_{DSS}$     | $V_{DS} = -50V$ , $V_{GS} = 0$      |         |      | -10  | μA   |
| Gate-to-Source Leakage Current             | $I_{GSS}$     | $V_{GS} = \pm 16V$ , $V_{DS} = 0$   |         |      | ±10  | μA   |
| Cutoff Voltage                             | $V_{GS(off)}$ | $V_{DS} = -10V$ , $I_D = -100\mu A$ | -1      |      | -2.5 | V    |
| Forward Transfer Admittance                | $ y_{fs} $    | $V_{DS} = -10V$ , $I_D = -70mA$     | 0.12    | 0.16 |      | S    |
| Static Drain-to-Source On-State Resistance | $R_{DS(on)1}$ | $I_D = -70mA$ , $V_{GS} = -10V$     |         | 4.7  | 6.1  | Ω    |
|  | $R_{DS(on)2}$ | $I_D = -40mA$ , $V_{GS} = -4V$      |         | 6.5  | 9.1  | Ω    |

Marking : XF

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D2000TS (KOTO) TA-2936 No.6530-1/4

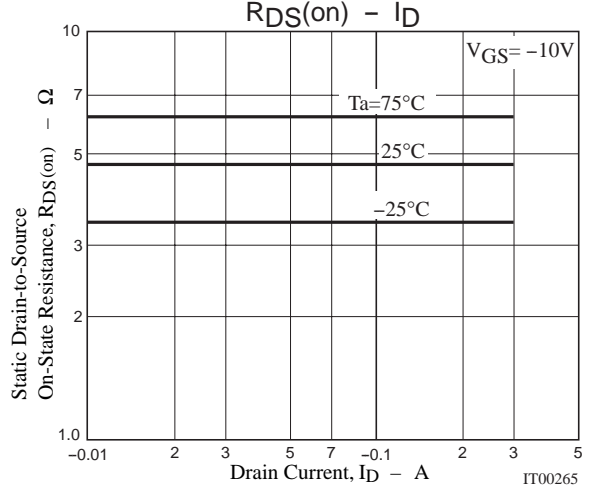
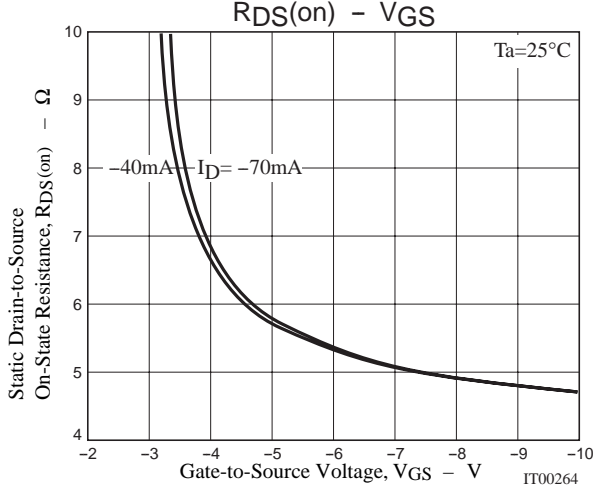
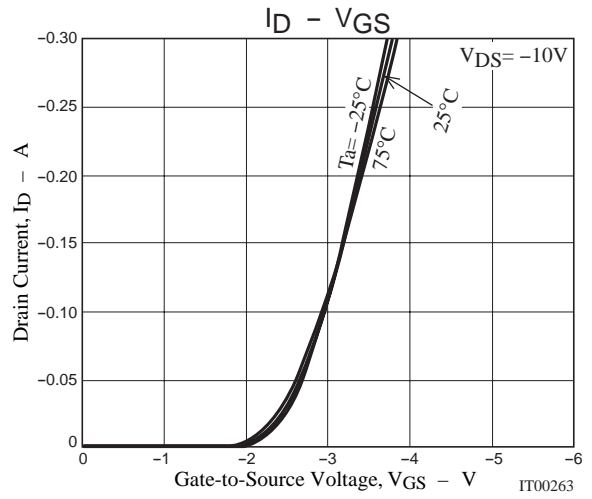
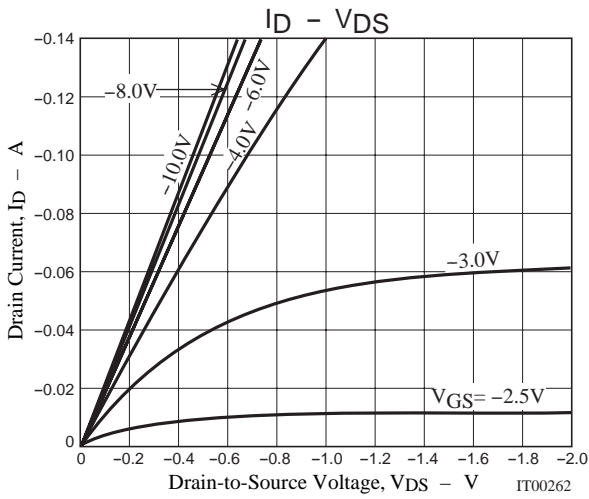
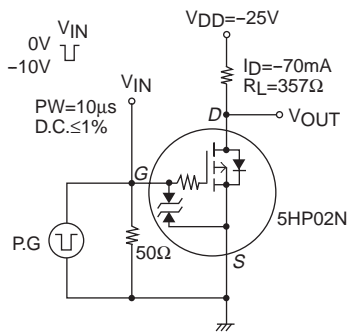
# 5HP02N

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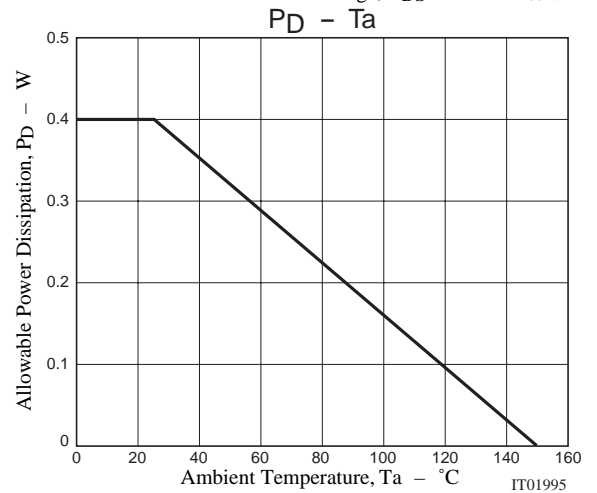
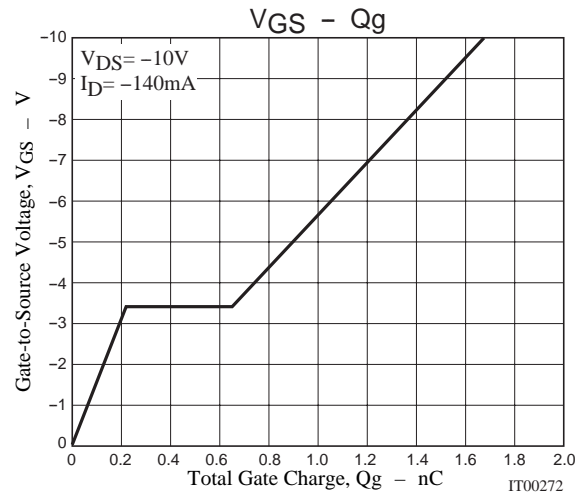
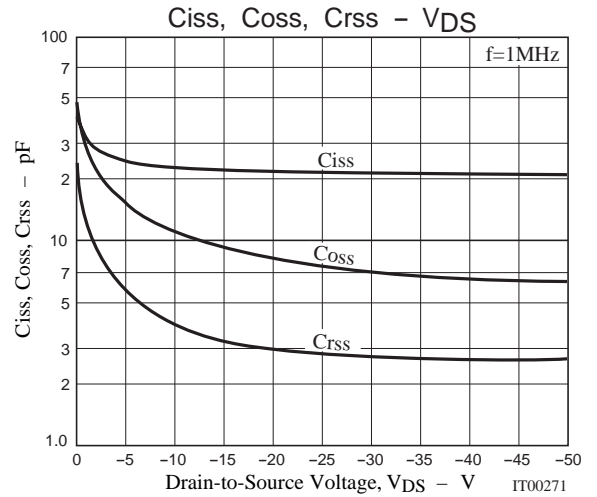
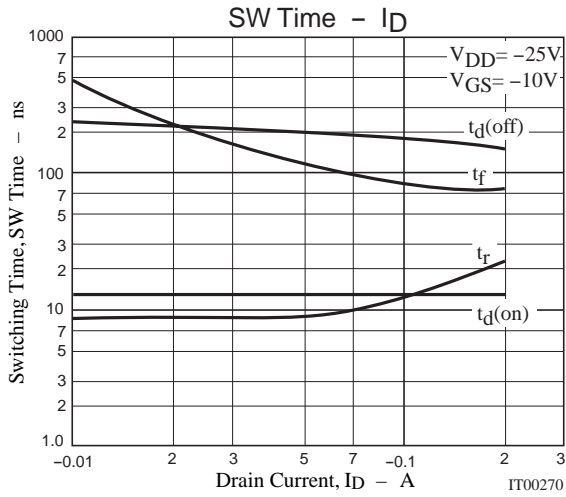
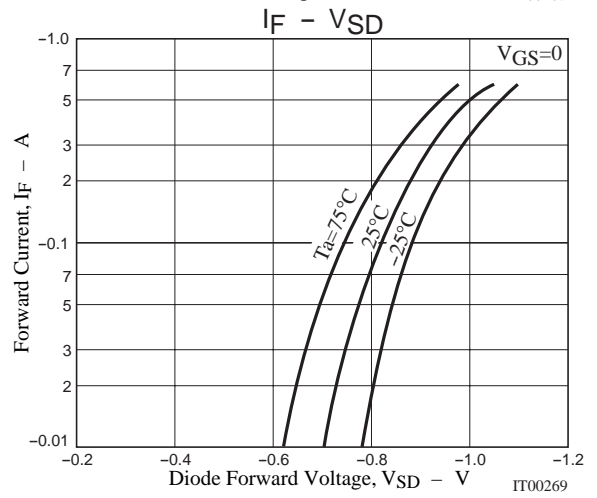
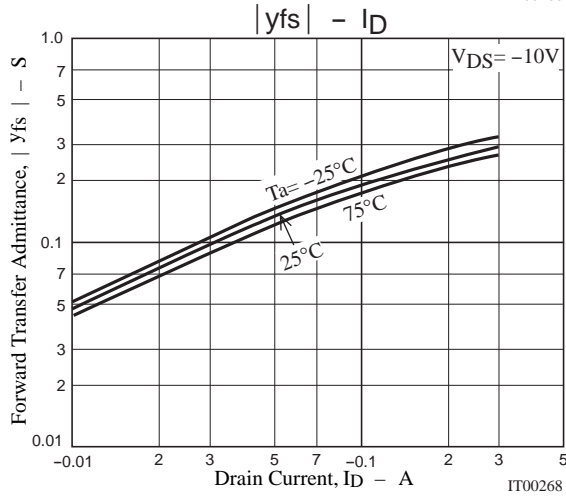
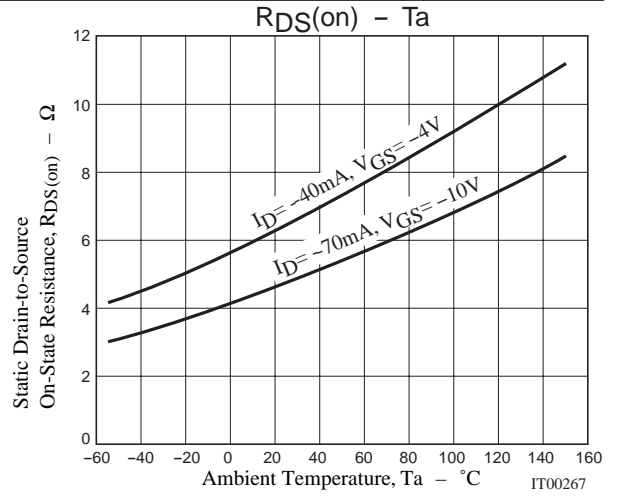
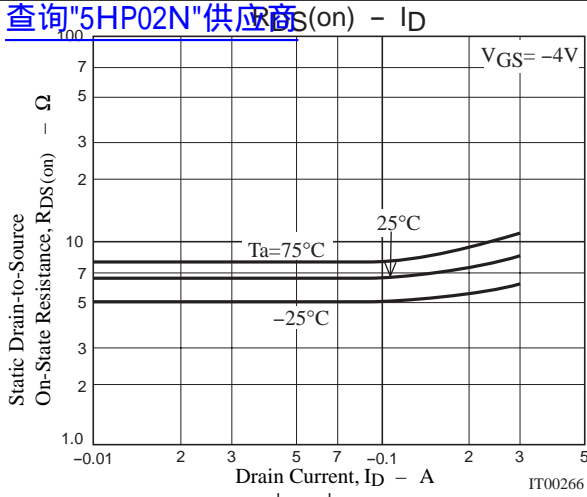
| Parameter                     | Symbol       | Conditions                             | Ratings |       |      | Unit |
|-------------------------------|--------------|--|---------|-------|------|------|
|                               |              |  | min     | typ   | max  |      |
| Input Capacitance             | $C_{iss}$    | $V_{DS}=-10V, f=1MHz$                  |         | 23    |      | pF   |
| Output Capacitance            | $C_{oss}$    | $V_{DS}=-10V, f=1MHz$                  |         | 11    |      | pF   |
| Reverse Transfer Capacitance  | $C_{rss}$    | $V_{DS}=-10V, f=1MHz$                  |         | 4     |      | pF   |
| Turn-ON Delay Time            | $t_{d(on)}$  | See specified Test Circuit             |         | 13    |      | ns   |
| Rise Time                     | $t_r$        | See specified Test Circuit             |         | 10    |      | ns   |
| Turn-OFF Delay Time           | $t_{d(off)}$ | See specified Test Circuit             |         | 190   |      | ns   |
| Fall Time                     | $t_f$        | See specified Test Circuit             |         | 95    |      | ns   |
| Total Gate Charge             | $Q_g$        | $V_{DS}=-10V, V_{GS}=-10V, I_D=-140mA$ |         | 1.68  |      | nC   |
| Gate-to-Source Charge         | $Q_{gs}$     | $V_{DS}=-10V, V_{GS}=-10V, I_D=-140mA$ |         | 0.22  |      | nC   |
| Gate-to-Drain "Miller" Charge | $Q_{gd}$     | $V_{DS}=-10V, V_{GS}=-10V, I_D=-140mA$ |         | 0.43  |      | nC   |
| Diode Forward Voltage         | $V_{SD}$     | $I_S=-140mA, V_{GS}=0$                 |         | -0.83 | -1.2 | V    |

## Switching Time Test Circuit



# 5HP02N

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Note on usage : Since the 5HP02N is designed for high-speed switching applications, please avoid using this device in the vicinity of highly charged objects.

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