Ordering number : ENN6639

N-Channel Silicon MOSFET

# 5HN01SP

## Ultrahigh-Speed Switching Applications

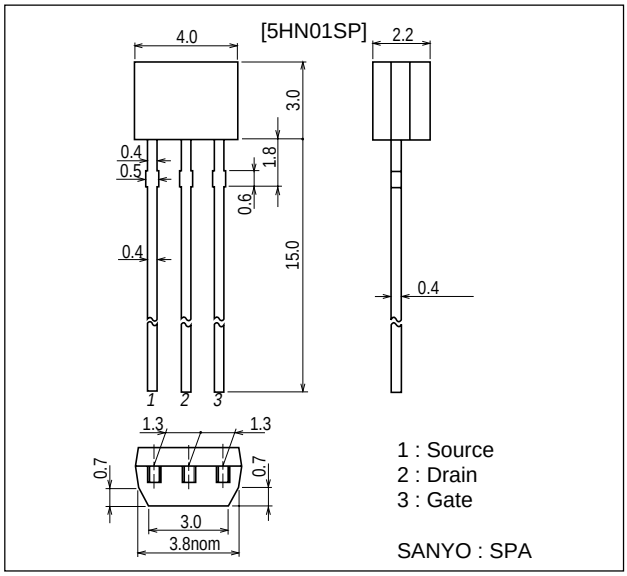
### Features

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

### Package Dimensions

unit : mm

2180




### 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) | $I_D$ | | 0.1 | A |
| Drain Current (Pulse) | $I_{DP}$ | PW≤10μs, duty cycle≤1% | 0.4 | A |
| Allowable Power Dissipation | $P_D$ | | 0.25 | W |
| Channel Temperature | Tch | | 150 | °C |
| Storage Temperature | Tstg | | -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-Sourse Leakage Current | $I_{GSS}$ | $V_{GS}$=±16V, $V_{DS}$=0 | | | ±10 | μA |
| Cutoff Voltage | $V_{GS(off)}$ | $V_{DS}$=10V, $I_D$=100μA | 1 | | 2.4 | V |

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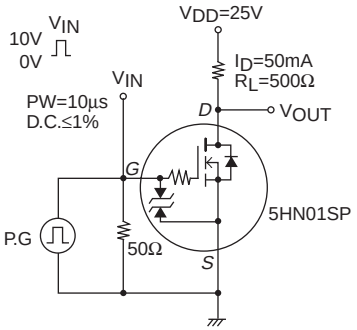
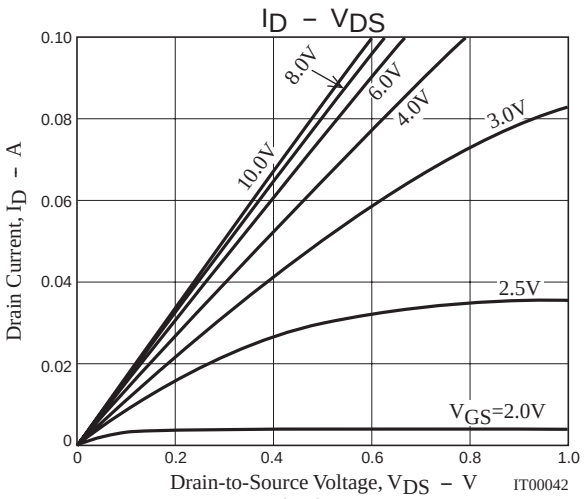
Continued from preceding page.

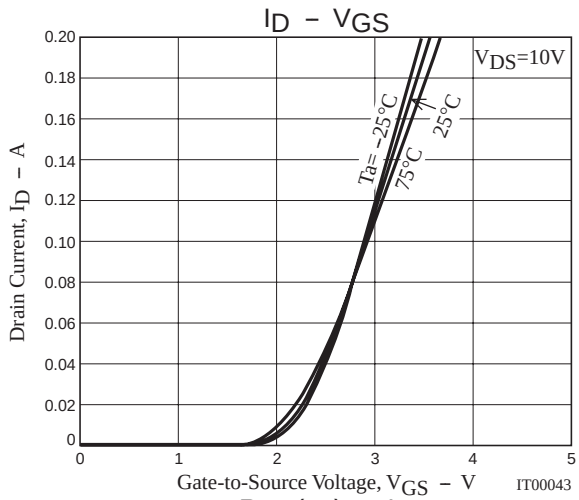
| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Forward Transfer Admittance | \|yfs\| | $V_{DS}$=10V, $I_D$=50mA | 85 | 120 | | mS |
| Static Drain-to-Source On-State Resistance | $R_{DS}$(on)1 | $I_D$=50mA, $V_{GS}$=10V | | 5.8 | 7.5 | Ω |
| | $R_{DS}$(on)2 | $I_D$=30mA, $V_{GS}$=4V | | 7.5 | 10.5 | Ω |
| Input Capacitance | Ciss | $V_{DS}$=10V, f=1MHz | | 6.2 | | pF |
| Output Capacitance | Coss | $V_{DS}$=10V, f=1MHz | | 4.4 | | pF |
| Reverse Transfer Capacitance | Crss | $V_{DS}$=10V, f=1MHz | | 1.5 | | pF |
| Turn-ON Delay Time | $t_d$(on) | See specified Test Circuit | | 10 | | ns |
| Rise Time | $t_r$ | See specified Test Circuit | | 11 | | ns |
| Turn-OFF Delay Time | $t_d$(off) | See specified Test Circuit | | 105 | | ns |
| Fall Time | $t_f$ | See specified Test Circuit | | 75 | | ns |
| Total Gate Charge | Qg | $V_{DS}$=10V, $V_{GS}$=10V, $I_D$=100mA | | 1.40 | | nC |
| Gate Source Charge | Qgs | $V_{DS}$=10V, $V_{GS}$=10V, $I_D$=100mA | | 0.21 | | nC |
| Gate-to-Drain “Miller” Charge | Qgd | $V_{DS}$=10V, $V_{GS}$=10V, $I_D$=100mA | | 0.34 | | nC |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=100mA, $V_{GS}$=0 | | 0.85 | 1.2 | V |

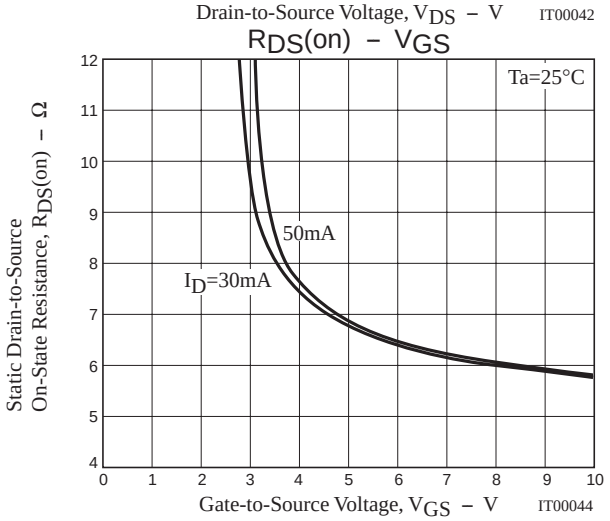
Marking : YC

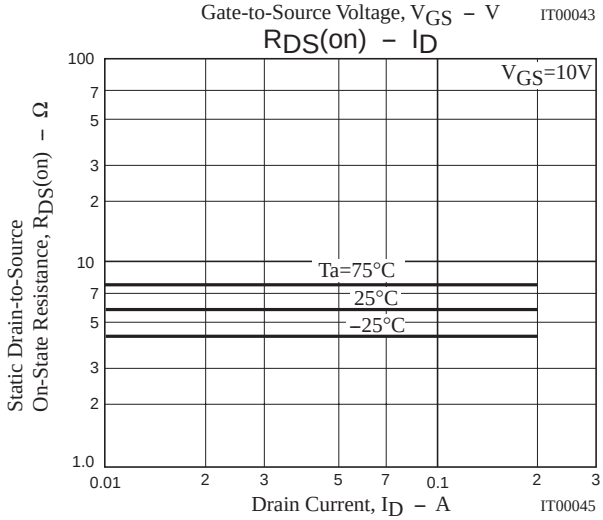
## Switching Time Test Circuit

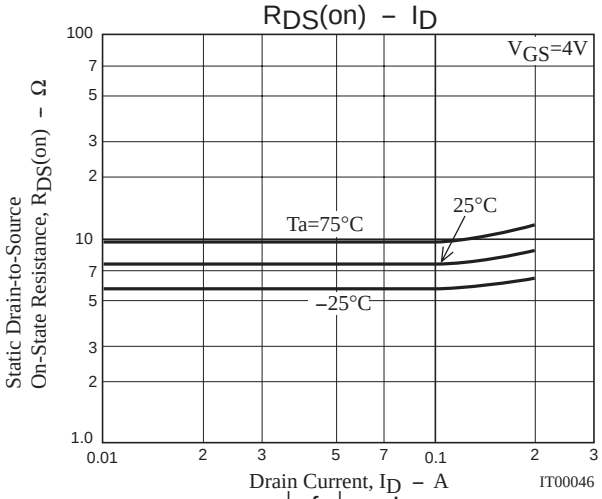


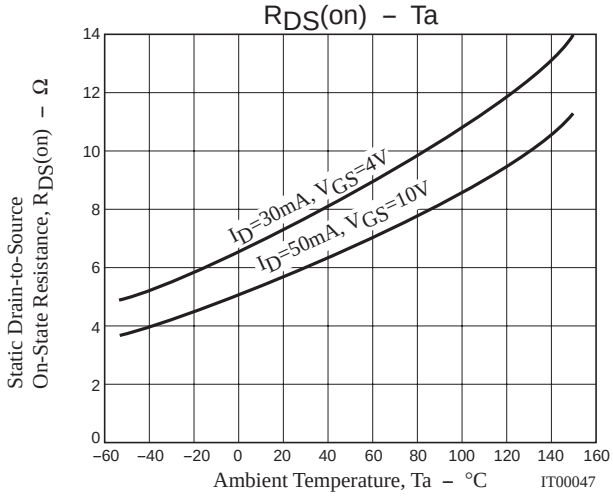



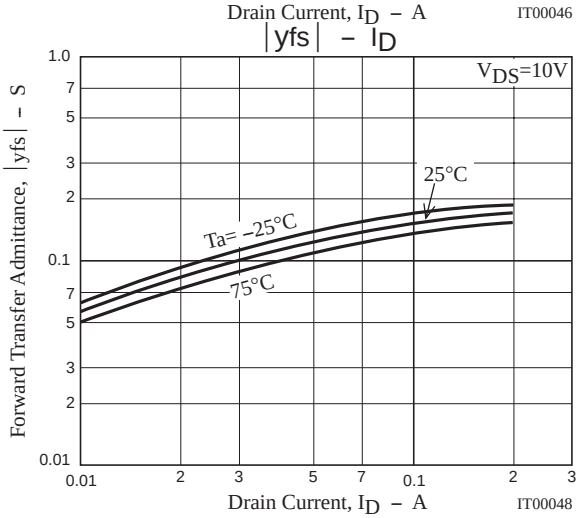



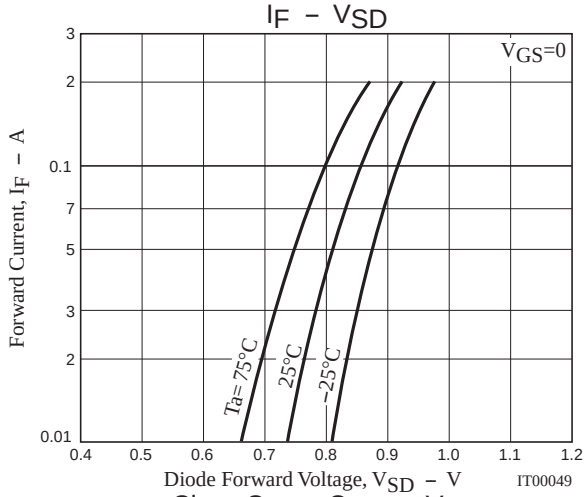



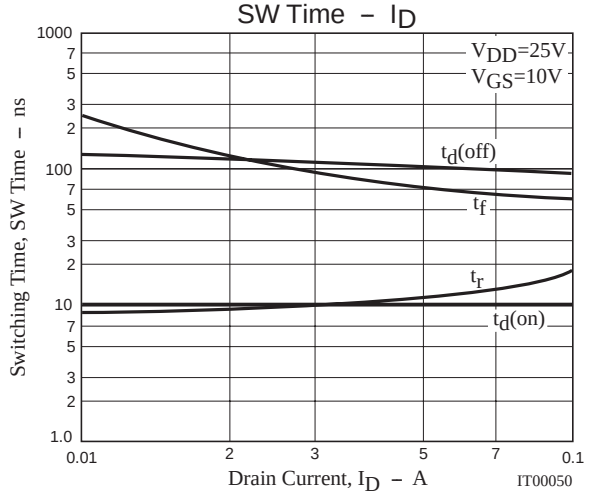



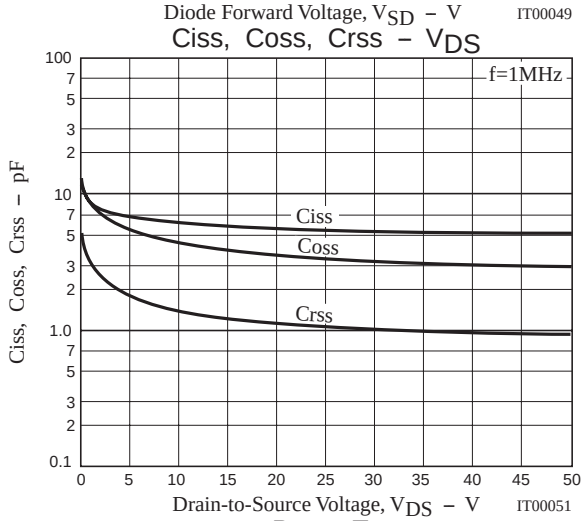

RDS(on) – ID
VGS=4V
Ta=75°C
25°C
–25°C
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Drain Current, ID – A
IT00046

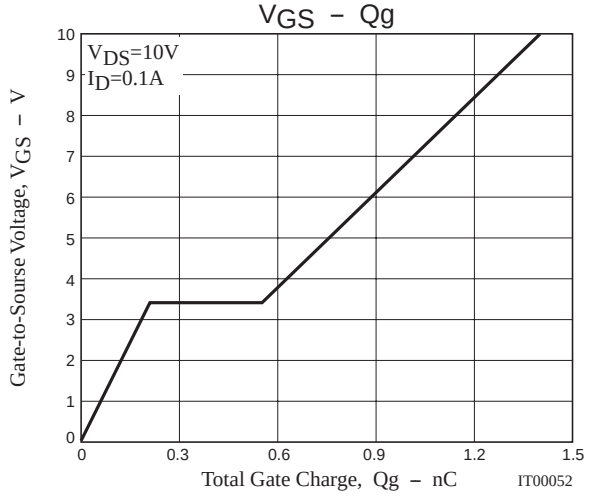

RDS(on) – Ta
ID=30mA, VGS=4V
ID=50mA, VGS=10V
Static Drain-to-Source On-State Resistance, RDS(on) – Ω
Ambient Temperature, Ta – °C
IT00047

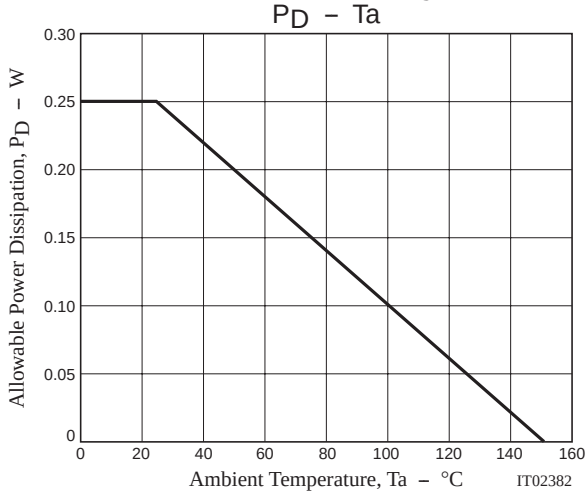

|yfs| – ID
VDS=10V
25°C
Ta= –25°C
75°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT00048


IF – VSD
VGS=0
Ta=75°C
25°C
–25°C
Forward Current, IF – A
Diode Forward Voltage, VSD – V
IT00049


SW Time – ID
VDD=25V
VGS=10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT00050


Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT00051


VGS – Qg
VDS=10V
ID=0.1A
Gate-to-Sourse Voltage, VGS – V
Total Gate Charge, Qg – nC
IT00052


PD – Ta
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT02382

Note on usage : Since the 5HN01SP is designed for high-speed switching applications, please avoid using this device in the vicinity of highly charged objects.