

## H5N5016PL

Silicon N Channel MOS FET  
High Speed Power Switching

REJ03G0175-0200Z

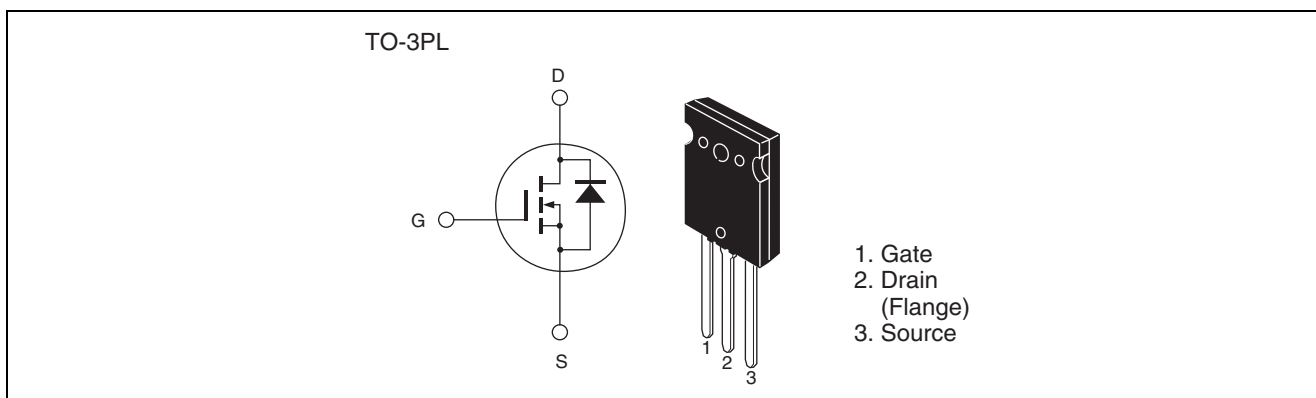
Rev.2.00

Jul.02.2004

### Features

- Low on-resistance
- Low leakage current
- High speed switching
- Built-in fast recovery diode

### Outline



### Absolute Maximum Ratings

(Ta = 25°C)

| Item  | Symbol                            | Ratings     | Unit  |
|---|-----------------------------------|-------------|-------|
| Drain to source voltage                     | $V_{DSS}$                         | 500         | V     |
| Gate to source voltage                      | $V_{GSS}$                         | $\pm 30$    | V     |
| Drain current                               | $I_D$                             | 50          | A     |
| Drain peak current                          | $I_D$ (pulse) <sup>Note1</sup>    | 200         | A     |
| Body-drain diode reverse drain current      | $I_{DR}$                          | 50          | A     |
| Body-drain diode reverse drain peak current | $I_{DR}$ (pulse) <sup>Note1</sup> | 200         | A     |
| Avalanche current                           | $I_{AP}$ <sup>Note3</sup>         | 10          | A     |
| Avalanche energy                            | $E_{AR}$ <sup>Note3</sup>         | 5.5         | mJ    |
| Channel dissipation                         | $P_{ch}$ <sup>Note 2</sup>        | 250         | W     |
| Channel to case Thermal Impedance           | $\theta_{ch-c}$                   | 0.5         | °C /W |
| Channel temperature                         | $T_{ch}$                          | 150         | °C    |
| Storage temperature                         | $T_{stg}$                         | -55 to +150 | °C    |

Notes 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1\%$

2. Value at  $T_c = 25^\circ C$

3.  $STch = 25^\circ C$ ,  $T_{ch} \leq 150^\circ C$

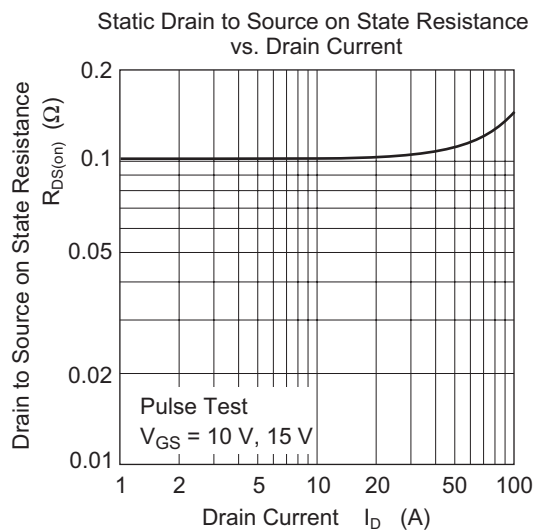
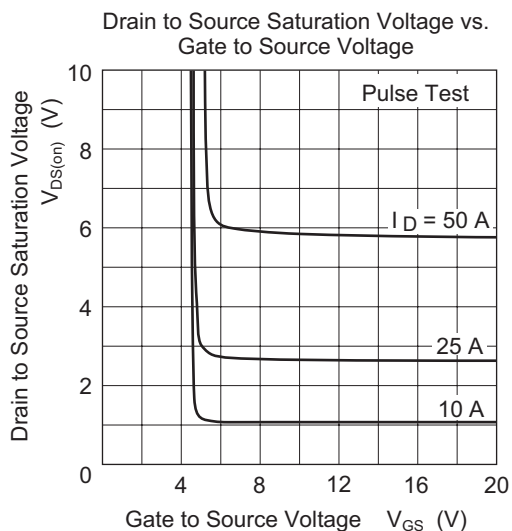
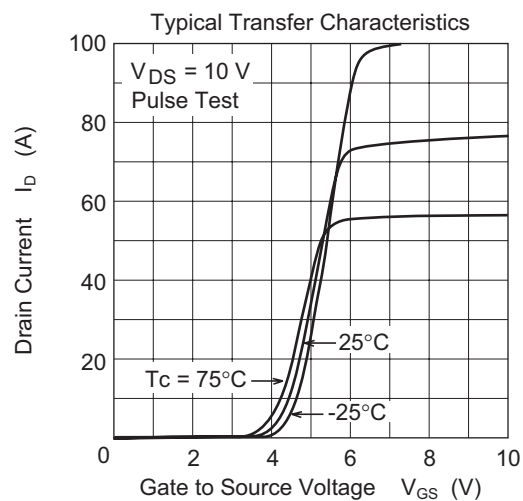
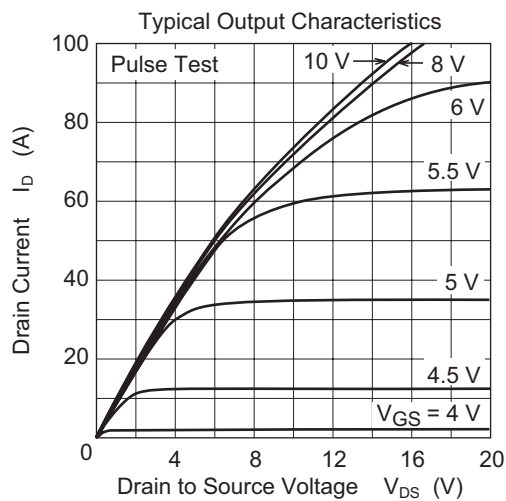
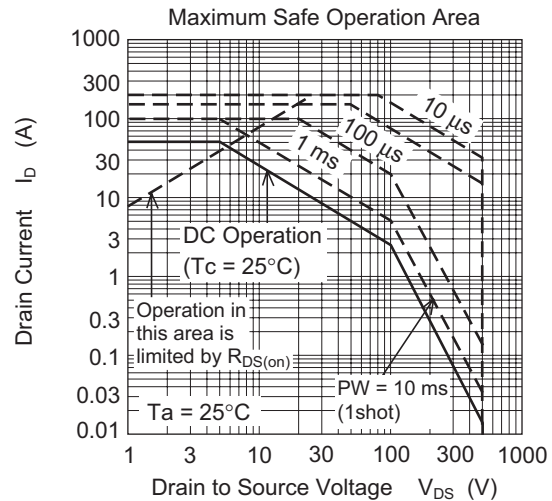
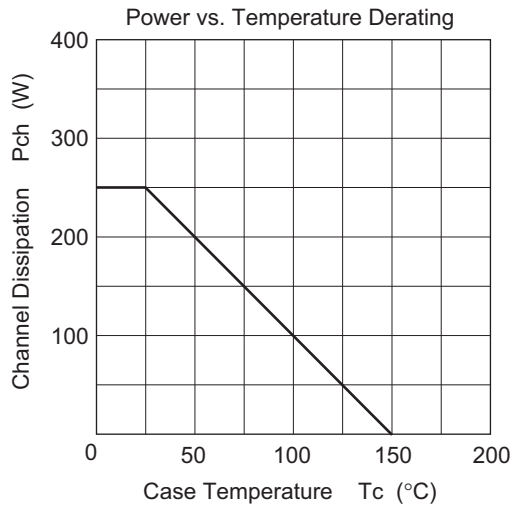
## Electrical Characteristics

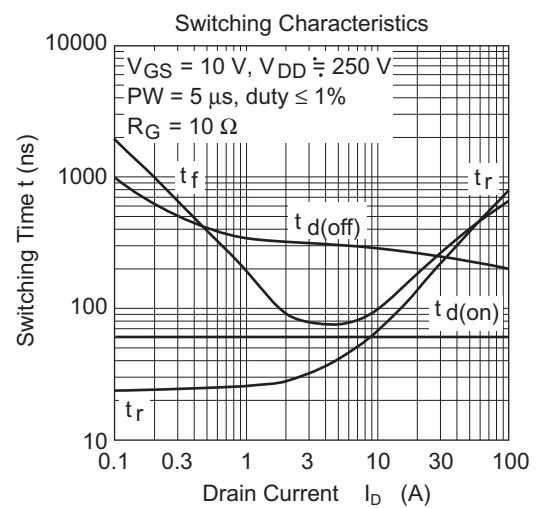
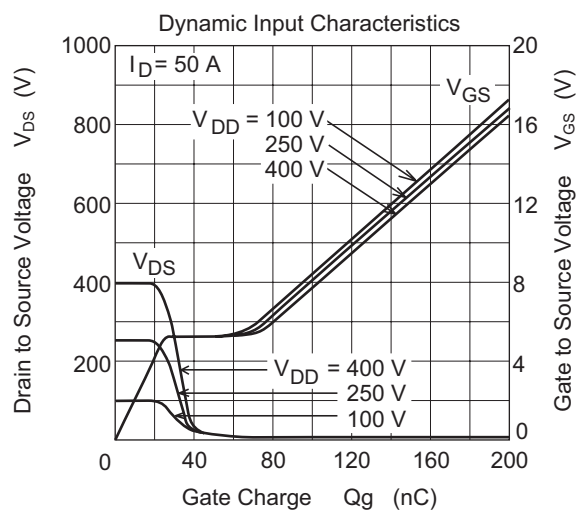
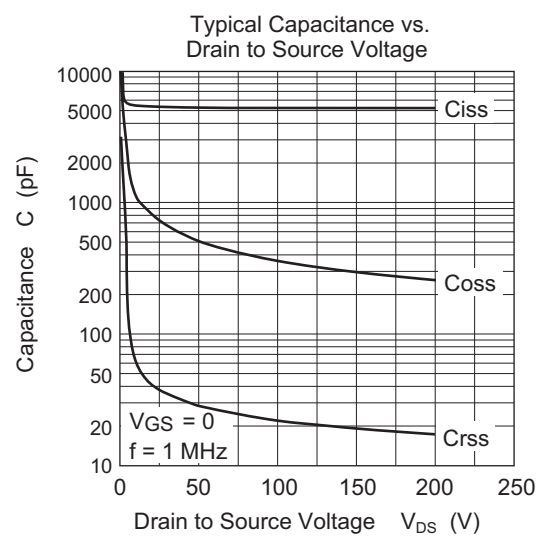
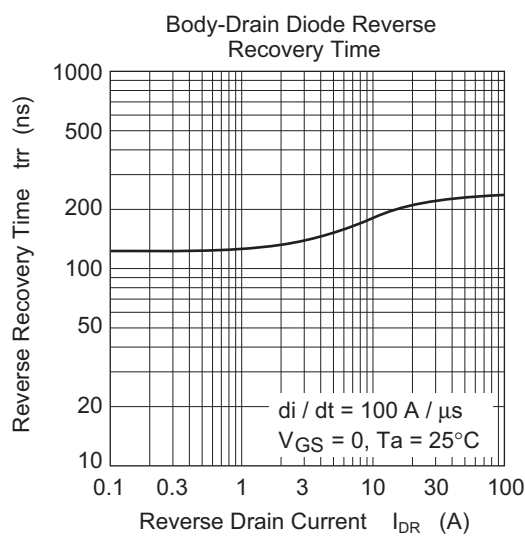
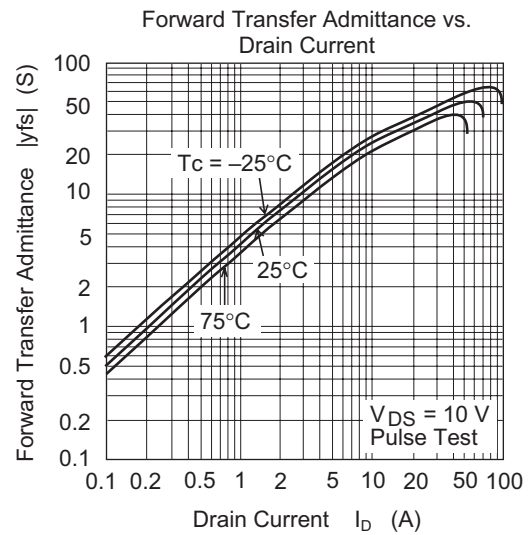
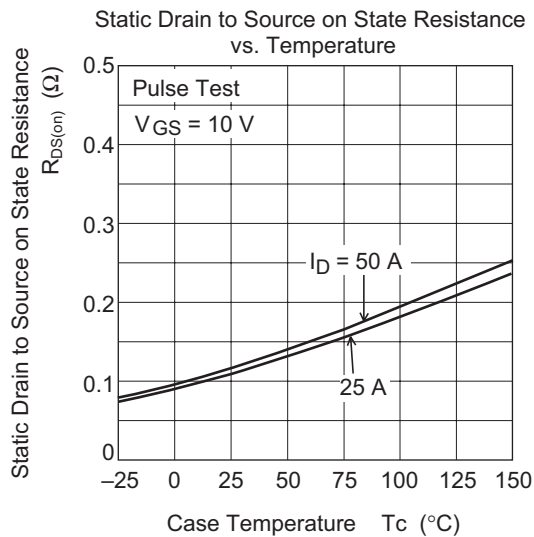
(Ta = 25°C)

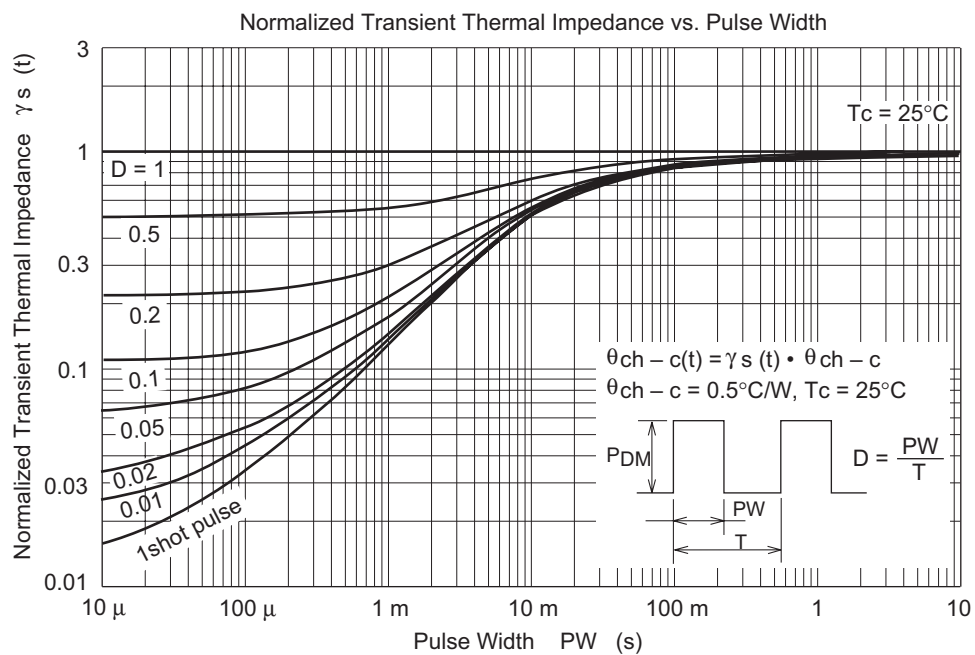
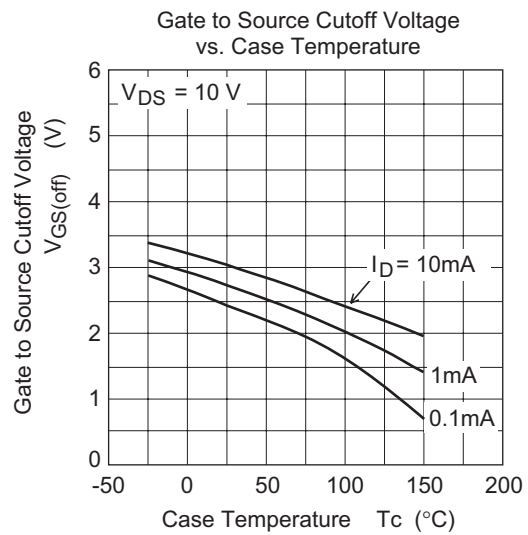
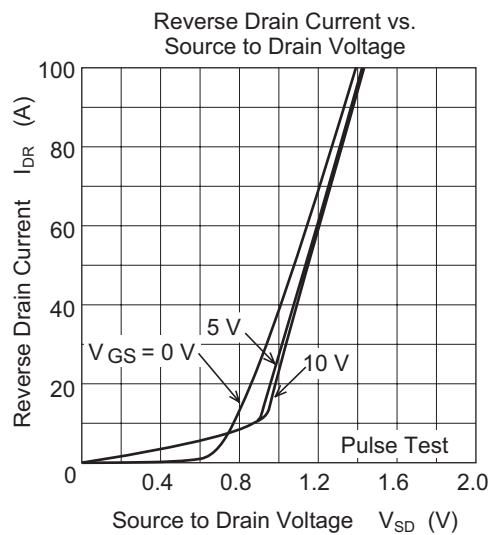
| Item                                       | Symbol        | Min | Typ   | Max       | Unit          | Test Conditions   |
|--|---------------|-----|-------|-----------|---------------|---|
| Drain to source breakdown voltage          | $V_{(BR)DSS}$ | 500 | —     | —         | V             | $I_D = 10 \text{ mA}$ , $V_{GS} = 0$  |
| Zero gate voltage drain current            | $I_{DSS}$     | —   | —     | 10        | $\mu\text{A}$ | $V_{DS} = 500 \text{ V}$ , $V_{GS} = 0$   |
| Gate to source leak current                | $I_{GSS}$     | —   | —     | $\pm 0.1$ | $\mu\text{A}$ | $V_{GS} = \pm 30 \text{ V}$ , $V_{DS} = 0$  |
| Gate to source cutoff voltage              | $V_{GS(off)}$ | 1.5 | —     | 4.0       | V             | $V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$  |
| Forward transfer admittance                | $ y_{fs} $    | 23  | 38    | —         | S             | $I_D = 25 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note4</sup>                           |
| Static drain to source on state resistance | $R_{DS(on)}$  | —   | 0.108 | 0.128     | $\Omega$      | $I_D = 25 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note4</sup>                           |
| Input capacitance                          | $C_{iss}$     | —   | 5300  | —         | pF            | $V_{DS} = 25 \text{ V}$<br>$V_{GS} = 0$<br>$f = 1 \text{ MHz}$                            |
| Output capacitance                         | $C_{oss}$     | —   | 720   | —         | pF            |   |
| Reverse transfer capacitance               | $C_{rss}$     | —   | 37    | —         | pF            |   |
| Turn-on delay time                         | $t_{d(on)}$   | —   | 60    | —         | ns            | $I_D = 25 \text{ A}$<br>$V_{GS} = 10 \text{ V}$<br>$R_L = 10 \Omega$<br>$R_g = 10 \Omega$ |
| Rise time                                  | $t_r$         | —   | 190   | —         | ns            |   |
| Turn-off delay time                        | $t_{d(off)}$  | —   | 250   | —         | ns            |   |
| Fall time                                  | $t_f$         | —   | 240   | —         | ns            |   |
| Total gate charge                          | $Q_g$         | —   | 130   | —         | nC            | $V_{DD} = 400 \text{ V}$<br>$V_{GS} = 10 \text{ V}$<br>$I_D = 50 \text{ A}$               |
| Gate to source charge                      | $Q_{gs}$      | —   | 25    | —         | nC            |   |
| Gate to drain charge                       | $Q_{gd}$      | —   | 50    | —         | nC            |   |
| Body-drain diode forward voltage           | $V_{DF}$      | —   | 1.05  | 1.6       | V             | $I_F = 50 \text{ A}$ , $V_{GS} = 0 \text{ V}$ <sup>Note4</sup>                            |
| Body-drain diode reverse recovery time     | $t_{rr}$      | —   | 230   | —         | ns            | $I_F = 50 \text{ A}$ , $V_{GS} = 0$<br>$diF/dt = 100 \text{ A}/\mu\text{s}$               |
| Body-drain diode reverse recovery charge   | $Q_{rr}$      | —   | 1.5   | —         | $\mu\text{C}$ |   |

Notes: 4. Pulse test

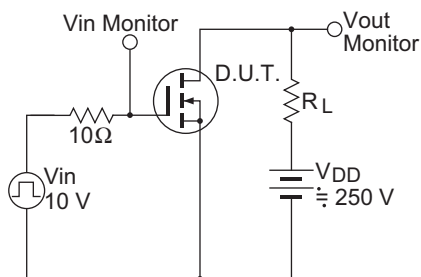
## Main Characteristics



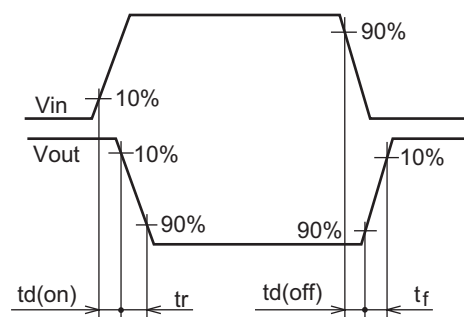




Switching Time Test Circuit



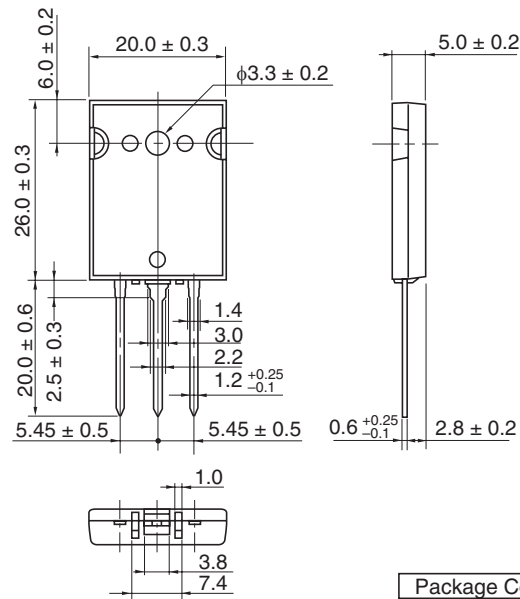
Waveform



## Package Dimensions

As of January, 2003

Unit: mm



|                        |        |
|------------------------|--------|
| Package Code           | TO-3PL |
| JEDEC                  | —      |
| JEITA                  | —      |
| Mass (reference value) | 9.9 g  |

## Ordering Information

| Part Name | Quantity | Shipping Container |
|-----------|----------|--------------------|
| H5N5016PL | 100 pcs  | Plastic case       |

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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