

**FS30VSJ-3**

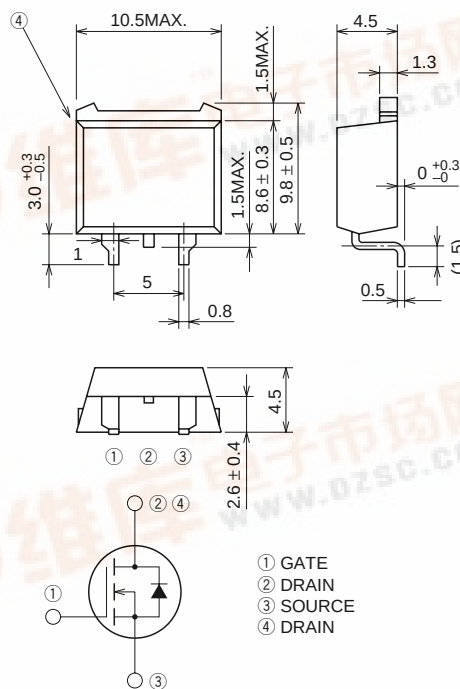
HIGH-SPEED SWITCHING USE

**FS30VSJ-3**

- 4V DRIVE
- $V_{DS}$  ..... 150V
- $r_{DS(ON)}$  (MAX) .....  $86m\Omega$
- $I_D$  ..... 30A
- Integrated Fast Recovery Diode (TYP.) ..... 100ns

**OUTLINE DRAWING**

Dimensions in mm

**TO-220S****APPLICATION**

Motor control, Lamp control, Solenoid control  
DC-DC converter, etc.

**MAXIMUM RATINGS** ( $T_c = 25^\circ\text{C}$ )

| Symbol    | Parameter                        | Conditions     | Ratings         | Unit             |
|-----------|----------------------------------|----------------|-----------------|------------------|
| $V_{DS}$  | Drain-source voltage             | $V_{GS} = 0V$  | 150             | V                |
| $V_{GSS}$ | Gate-source voltage              | $V_{DS} = 0V$  | $\pm 20$        | V                |
| $I_D$     | Drain current                    |                | 30              | A                |
| $I_{DM}$  | Drain current (Pulsed)           |                | 120             | A                |
| $I_{DA}$  | Avalanche drain current (Pulsed) | $L = 100\mu H$ | 30              | A                |
| $I_S$     | Source current                   |                | 30              | A                |
| $I_{SM}$  | Source current (Pulsed)          |                | 120             | A                |
| $P_D$     | Maximum power dissipation        |                | 70              | W                |
| $T_{ch}$  | Channel temperature              |                | $-55 \sim +150$ | $^\circ\text{C}$ |
| $T_{stg}$ | Storage temperature              |                | $-55 \sim +150$ | $^\circ\text{C}$ |
| —         | Weight                           | Typical value  | 1.2             | g                |

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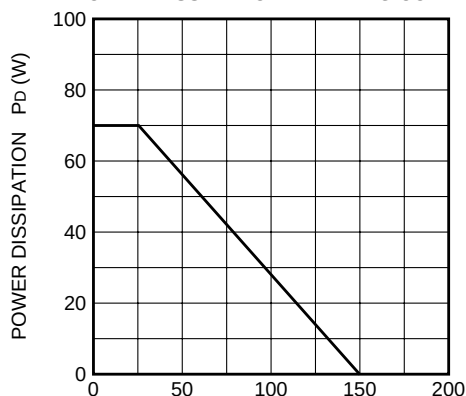
## HIGH-SPEED SWITCHING USE

### ELECTRICAL CHARACTERISTICS (Tch = 25°C)

| Symbol     | Parameter                        | Test conditions                                  | Limits |      |      | Unit |
|------------|----------------------------------|--------------------------------------------------|--------|------|------|------|
|            |                                  |                                                  | Min.   | Typ. | Max. |      |
| V (BR) DSS | Drain-source breakdown voltage   | Id = 1mA, Vgs = 0V                               | 150    | —    | —    | V    |
| IGSS       | Gate-source leakage current      | Vgs = ±20V, Vds = 0V                             | —      | —    | ±0.1 | μA   |
| IDSS       | Drain-source leakage current     | Vds = 150V, Vgs = 0V                             | —      | —    | 0.1  | mA   |
| VGS (th)   | Gate-source threshold voltage    | Id = 1mA, Vds = 10V                              | 1.0    | 1.5  | 2.0  | V    |
| rDS (ON)   | Drain-source on-state resistance | Id = 15A, Vgs = 10V                              | —      | 66   | 86   | mΩ   |
| rDS (ON)   | Drain-source on-state resistance | Id = 15A, Vgs = 4V                               | —      | 69   | 90   | mΩ   |
| VDS (ON)   | Drain-source on-state voltage    | Id = 15A, Vgs = 10V                              | —      | 0.99 | 1.29 | V    |
| yfs        | Forward transfer admittance      | Id = 15A, Vds = 10V                              | —      | 38   | —    | S    |
| Ciss       | Input capacitance                | Vds = 10V, Vgs = 0V, f = 1MHz                    | —      | 3000 | —    | pF   |
| Coss       | Output capacitance               |                                                  | —      | 320  | —    | pF   |
| Crss       | Reverse transfer capacitance     |                                                  | —      | 160  | —    | pF   |
| td (on)    | Turn-on delay time               | VDD = 80V, Id = 15A, Vgs = 10V, RGEN = RGS = 50Ω | —      | 22   | —    | ns   |
| tr         | Rise time                        |                                                  | —      | 42   | —    | ns   |
| td (off)   | Turn-off delay time              |                                                  | —      | 280  | —    | ns   |
| tf         | Fall time                        |                                                  | —      | 130  | —    | ns   |
| VSD        | Source-drain voltage             | Is = 15A, Vgs = 0V                               | —      | 1.0  | 1.5  | V    |
| Rth (ch-c) | Thermal resistance               | Channel to case                                  | —      | —    | 1.78 | °C/W |
| trr        | Reverse recovery time            | Is = 30A, dis/dt = -100A/μs                      | —      | 100  | —    | ns   |

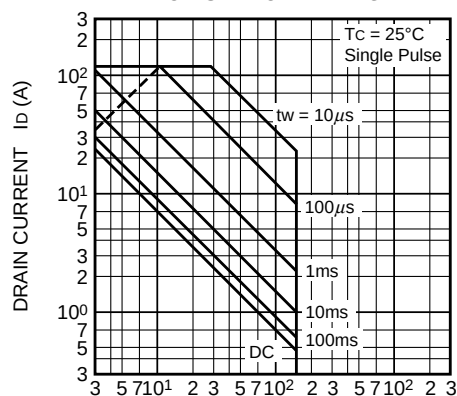
### PERFORMANCE CURVES

POWER DISSIPATION DERATING CURVE



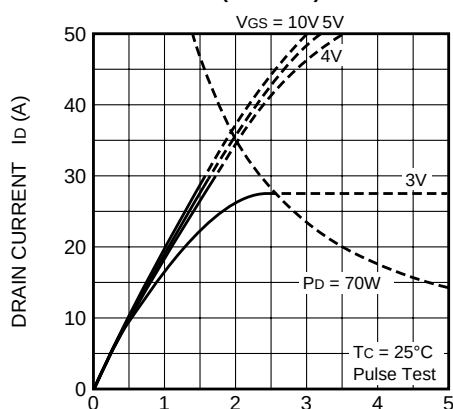
CASE TEMPERATURE Tc (°C)

MAXIMUM SAFE OPERATING AREA



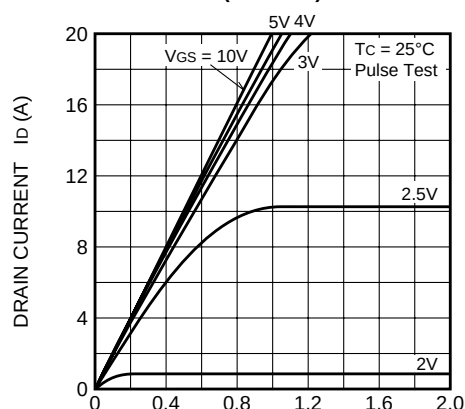
DRAIN-SOURCE VOLTAGE Vds (V)

OUTPUT CHARACTERISTICS (TYPICAL)



DRAIN-SOURCE VOLTAGE Vds (V)

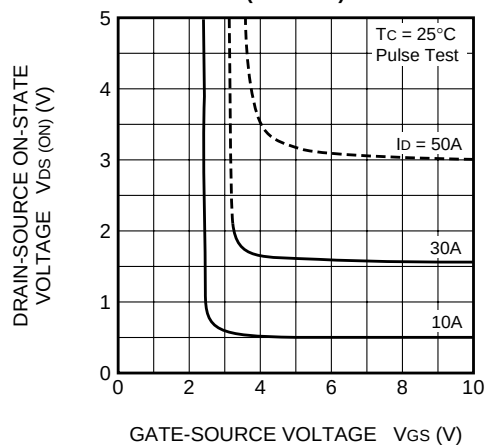
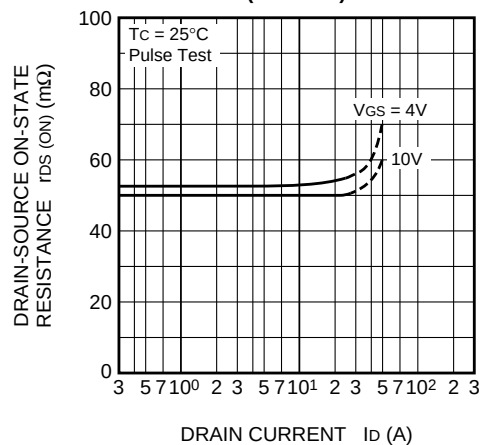
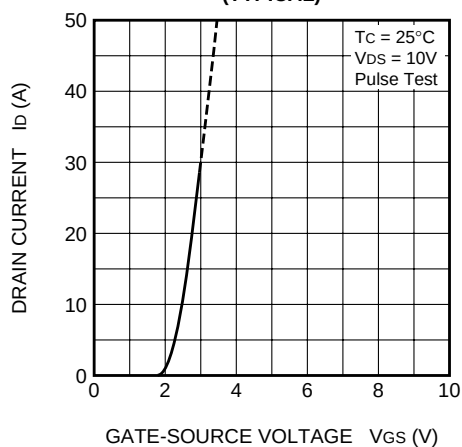
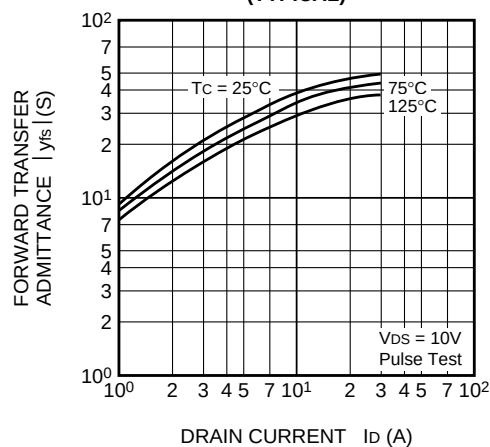
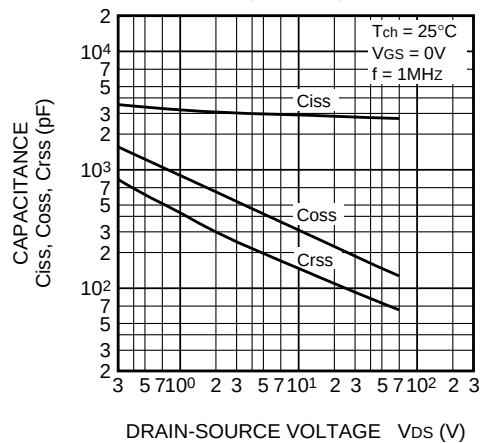
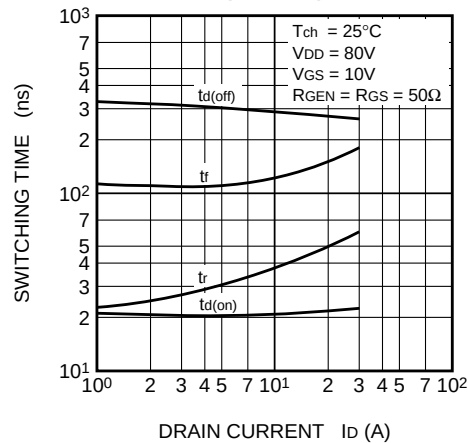
OUTPUT CHARACTERISTICS (TYPICAL)



DRAIN-SOURCE VOLTAGE Vds (V)

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## HIGH-SPEED SWITCHING USE

ON-STATE VOLTAGE VS.  
GATE-SOURCE VOLTAGE  
(TYPICAL)ON-STATE RESISTANCE VS.  
DRAIN CURRENT  
(TYPICAL)TRANSFER CHARACTERISTICS  
(TYPICAL)FORWARD TRANSFER ADMITTANCE  
VS. DRAIN CURRENT  
(TYPICAL)CAPACITANCE VS.  
DRAIN-SOURCE VOLTAGE  
(TYPICAL)SWITCHING CHARACTERISTICS  
(TYPICAL)

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