



# 2SK4221 — N-Channel Silicon MOSFET

## General-Purpose Switching Device

### Applications

#### Features

- Low ON-resistance, low input capacitance, ultrahigh-speed switching.
- Adoption of high reliability HVP process.
- Avalanche resistance guarantee.

#### Specifications

Absolute Maximum Ratings at Ta=25°C

| Parameter                          | Symbol           | Conditions             | Ratings     | Unit |
|------------------------------------|------------------|------------------------|-------------|------|
| Drain-to-Source Voltage            | V <sub>DSS</sub> |                        | 500         | V    |
| Gate-to-Source Voltage             | V <sub>GSS</sub> |                        | ±30         | V    |
| Drain Current (DC)                 | I <sub>D</sub>   |                        | 26          | A    |
| Drain Current (Pulse)              | I <sub>DP</sub>  | PW≤10μs, duty cycle≤1% | 90          | A    |
| Allowable Power Dissipation        | PD               |                        | 2.5         | W    |
|                                    |                  | Tc=25°C                | 220         | W    |
| Channel Temperature                | T <sub>ch</sub>  |                        | 150         | °C   |
| Storage Temperature                | T <sub>stg</sub> |                        | -55 to +150 | °C   |
| Avalanche Energy (Single Pulse) *1 | E <sub>AS</sub>  |                        | 608         | mJ   |
| Avalanche Current *2               | I <sub>AV</sub>  |                        | 14          | A    |

Note : \*1 V<sub>DD</sub>=99V, L=5mH, I<sub>AV</sub>=14A

\*2 L≤5mH, Single pulse

Electrical Characteristics at Ta=25°C

| Parameter                         | Symbol               | Conditions                                 | Ratings |     |      | Unit |
|-----------------------------------|----------------------|--|---------|-----|------|------|
|                                   |                      |  | min     | typ | max  |      |
| Drain-to-Source Breakdown Voltage | V <sub>(BR)DSS</sub> | I <sub>D</sub> =10mA, V <sub>GS</sub> =0V  | 500     |     |      | V    |
| Zero-Gate Voltage Drain Current   | I <sub>DSS</sub>     | V <sub>DS</sub> =400V, V <sub>GS</sub> =0V |         |     | 100  | μA   |
| Gate-to-Source Leakage Current    | I <sub>GSS</sub>     | V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V |         |     | ±100 | nA   |
| Cutoff Voltage                    | V <sub>GS(off)</sub> | V <sub>DS</sub> =10V, I <sub>D</sub> =1mA  | 3       |     | 5    | V    |

Marking : K4221

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# 2SK4221

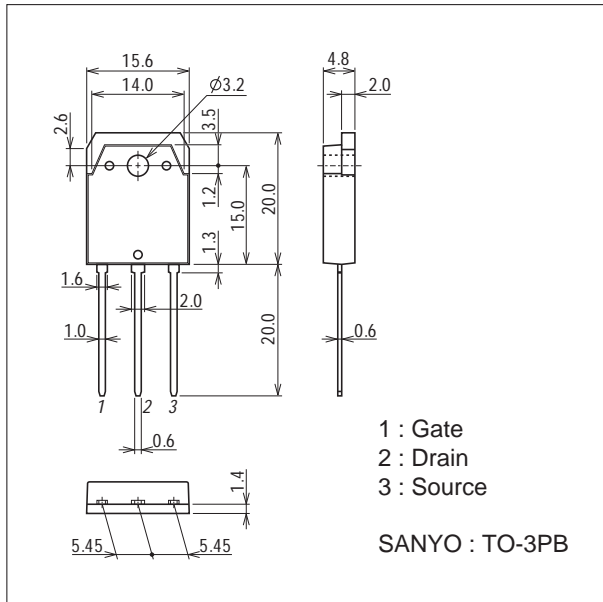
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| Parameter                                  | Symbol       | Conditions                         | Ratings |      |      | Unit     |
|--|--------------|------------------------------------|---------|------|------|----------|
|  |              |                                    | min     | typ  | max  |          |
| Forward Transfer Admittance                | $ y_{fs} $   | $V_{DS}=10V, I_D=13A$              | 7.5     | 15.5 |      | S        |
| Static Drain-to-Source On-State Resistance | $R_{DS(on)}$ | $I_D=13A, V_{GS}=10V$              |         | 0.18 | 0.24 | $\Omega$ |
| Input Capacitance                          | $C_{iss}$    | $V_{DS}=30V, f=1MHz$               |         | 2250 |      | pF       |
| Output Capacitance                         | $C_{oss}$    | $V_{DS}=30V, f=1MHz$               |         | 450  |      | pF       |
| Reverse Transfer Capacitance               | $C_{rss}$    | $V_{DS}=30V, f=1MHz$               |         | 90   |      | pF       |
| Turn-ON Delay Time                         | $t_{d(on)}$  | See specified Test Circuit.        |         | 44   |      | ns       |
| Rise Time                                  | $t_r$        | See specified Test Circuit.        |         | 156  |      | ns       |
| Turn-OFF Delay Time                        | $t_{d(off)}$ | See specified Test Circuit.        |         | 224  |      | ns       |
| Fall Time                                  | $t_f$        | See specified Test Circuit.        |         | 94   |      | ns       |
| Total Gate Charge                          | $Q_g$        | $V_{DS}=200V, V_{GS}=10V, I_D=26A$ |         | 87   |      | nC       |
| Gate-to-Source Charge                      | $Q_{gs}$     | $V_{DS}=200V, V_{GS}=10V, I_D=26A$ |         | 16   |      | nC       |
| Gate-to-Drain "Miller" Charge              | $Q_{gd}$     | $V_{DS}=200V, V_{GS}=10V, I_D=26A$ |         | 47   |      | nC       |
| Diode Forward Voltage                      | $V_{SD}$     | $I_S=26A, V_{GS}=0V$               |         | 1.0  | 1.3  | V        |

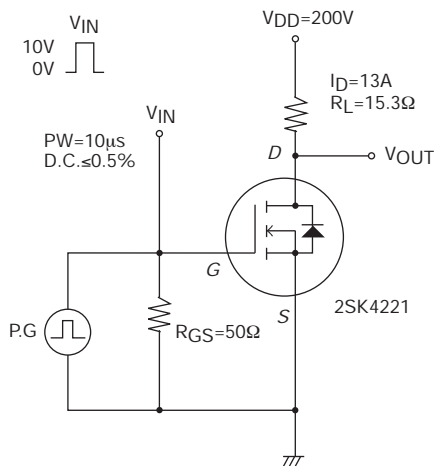
## Package Dimensions

unit : mm (typ)

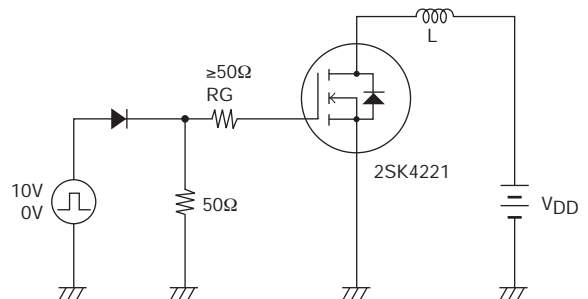
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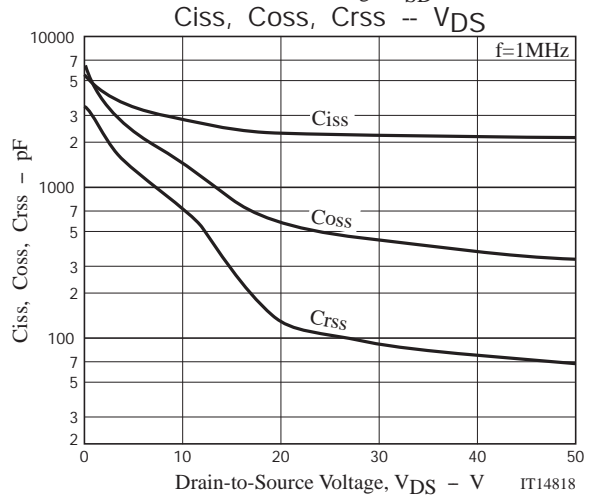
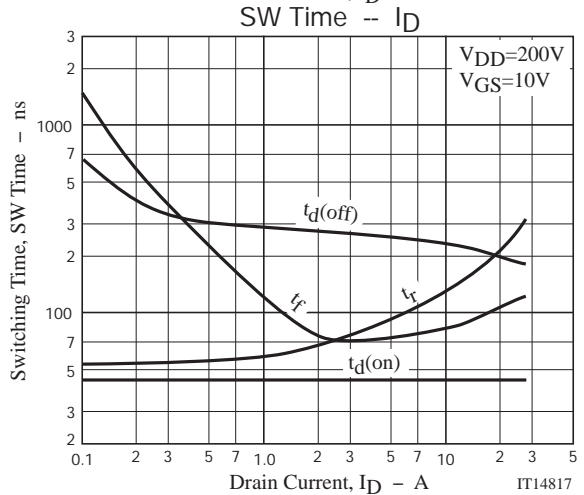
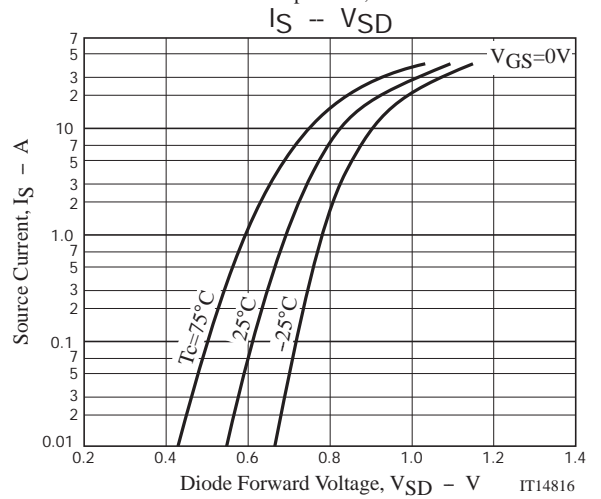
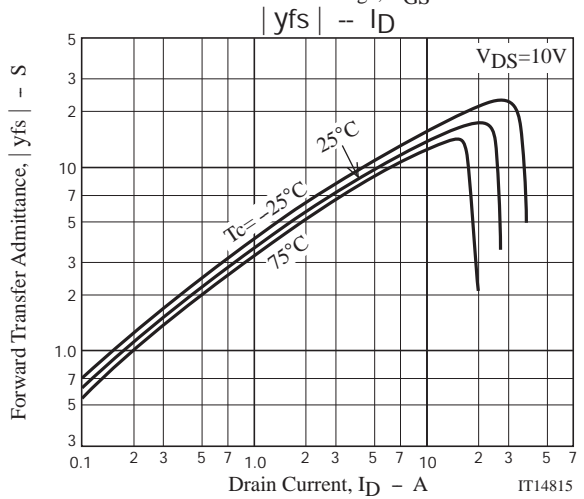
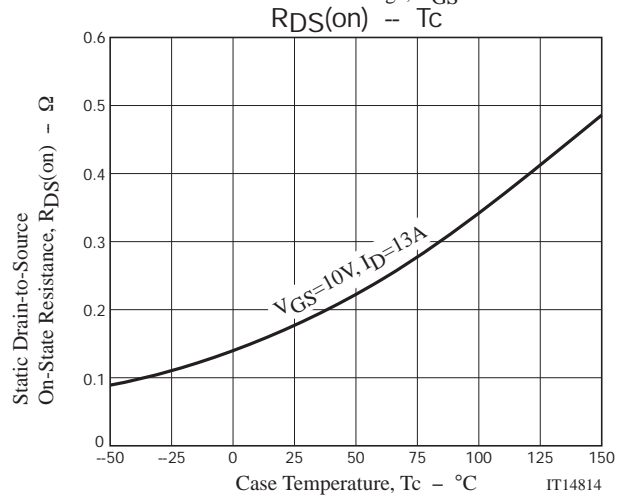
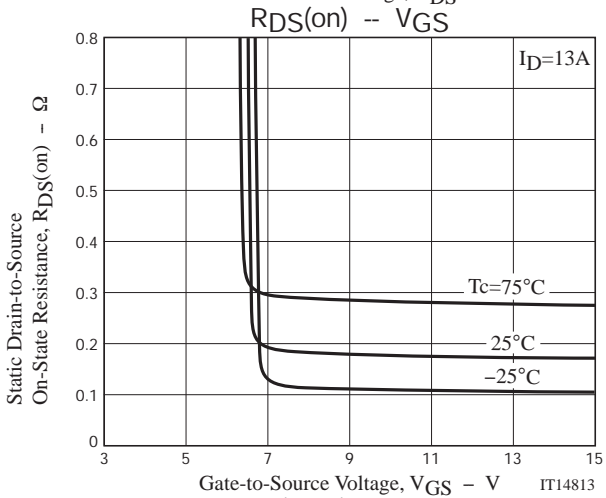
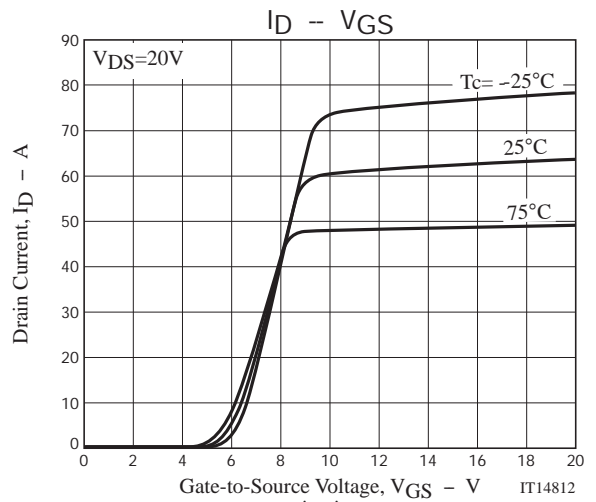
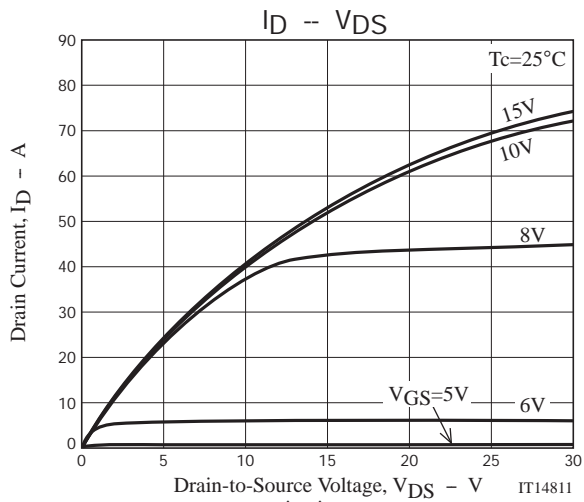


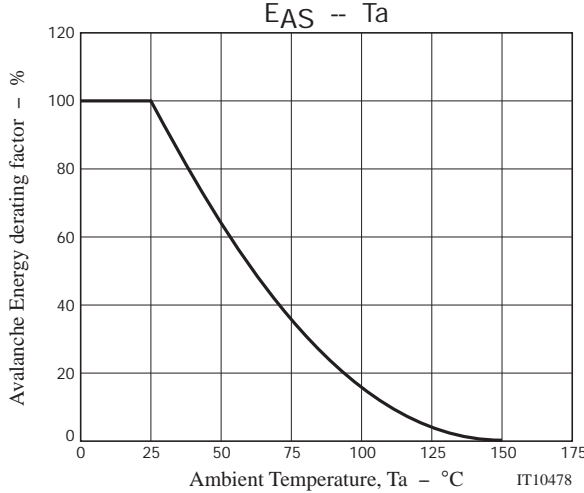
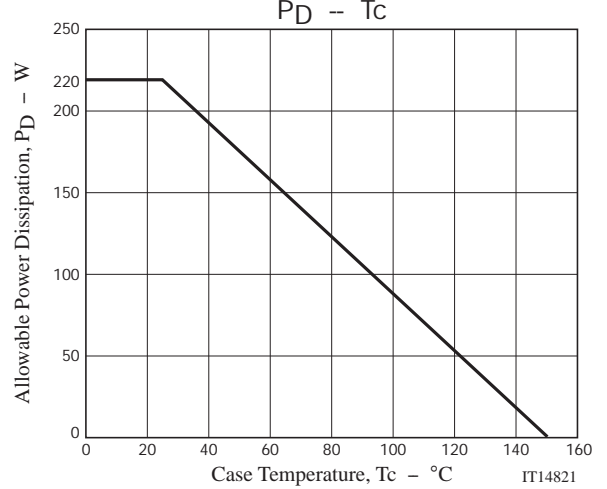
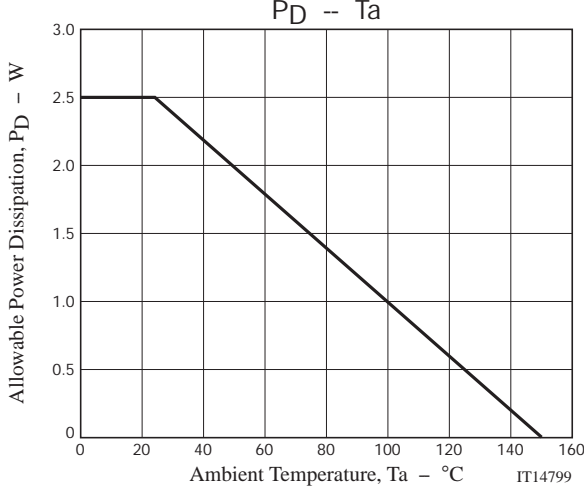
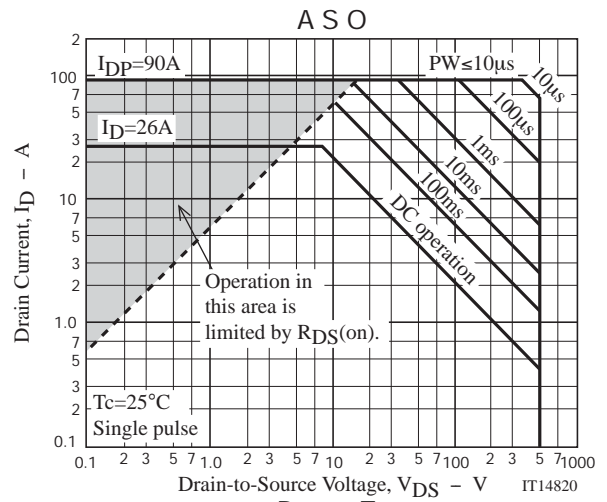
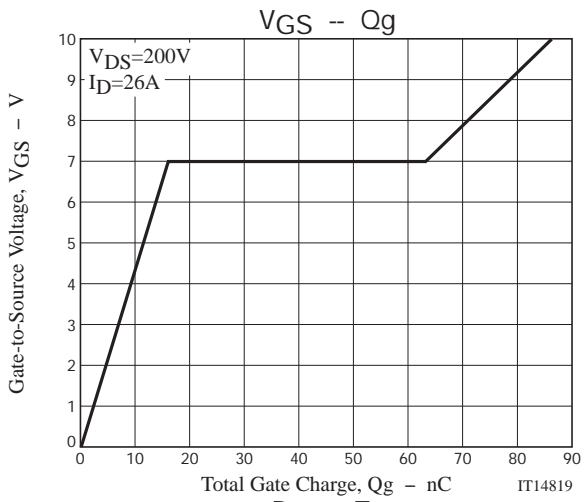
## Switching Time Test Circuit



## Avalanche Resistance Test Circuit









Note on usage : Since the 2SK4221 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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