



# 2SK4209 — N-Channel Silicon MOSFET

## General-Purpose Switching Device Applications

### Features

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

### Specifications

**Absolute Maximum Ratings** at  $T_a=25^\circ\text{C}$

| Parameter                          | Symbol    | Conditions                                      | Ratings     | Unit             |
|------------------------------------|-----------|-------------------------------------------------|-------------|------------------|
| Drain-to-Source Voltage            | $V_{DSS}$ |                                                 | 800         | V                |
| Gate-to-Source Voltage             | $V_{GSS}$ |                                                 | $\pm 30$    | V                |
| Drain Current (DC)                 | $I_D$     |                                                 | 12          | A                |
| Drain Current (Pulse)              | $I_{DP}$  | $PW \leq 10\mu\text{s}$ , duty cycle $\leq 1\%$ | 24          | A                |
| Allowable Power Dissipation        | PD        |                                                 | 2.5         | W                |
|                                    |           | $T_c=25^\circ\text{C}$                          | 190         | W                |
| Channel Temperature                | $T_{ch}$  |                                                 | 150         | $^\circ\text{C}$ |
| Storage Temperature                | $T_{stg}$ |                                                 | -55 to +150 | $^\circ\text{C}$ |
| Avalanche Energy (Single Pulse) *1 | EAS       |                                                 | 410         | mJ               |
| Avalanche Current *2               | $I_{AV}$  |                                                 | 12          | A                |

Note : \*1  $V_{DD}=99\text{V}$ ,  $L=5\text{mH}$ ,  $I_{AV}=12\text{A}$

\*2  $L \leq 5\text{mH}$ , Single pulse

**Electrical Characteristics** at  $T_a=25^\circ\text{C}$

| Parameter                         | Symbol        | Conditions                                   | Ratings |     |           | Unit |
|-----------------------------------|---------------|----------------------------------------------|---------|-----|-----------|------|
|                                   |               |                                              | min     | typ | max       |      |
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D=10\text{mA}$ , $V_{GS}=0\text{V}$       | 800     |     |           | V    |
| Zero-Gate Voltage Drain Current   | $I_{DSS}$     | $V_{DS}=640\text{V}$ , $V_{GS}=0\text{V}$    |         |     | 1.0       | mA   |
| Gate-to-Source Leakage Current    | $I_{GSS}$     | $V_{GS}=\pm 30\text{V}$ , $V_{DS}=0\text{V}$ |         |     | $\pm 100$ | nA   |
| Cutoff Voltage                    | $V_{GS(off)}$ | $V_{DS}=10\text{V}$ , $I_D=1\text{mA}$       | 2.0     |     | 4.0       | V    |

Marking : K4209

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# 2SK4209

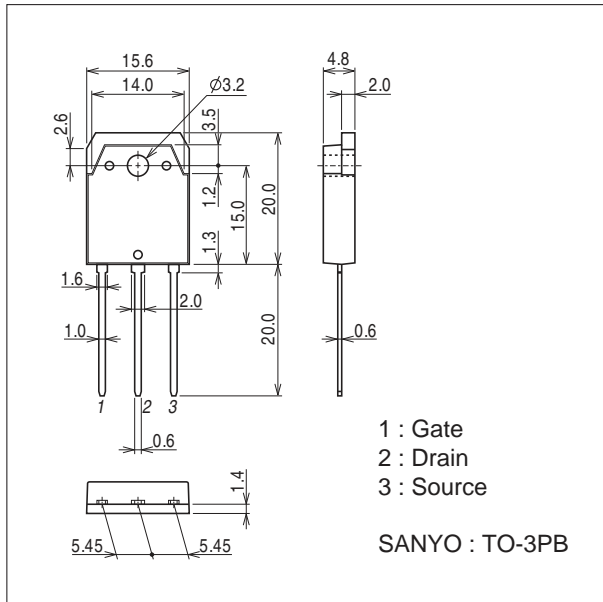
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| Parameter                                  | Symbol       | Conditions                         | Ratings |      |      | Unit     |
|--------------------------------------------|--------------|------------------------------------|---------|------|------|----------|
|                                            |              |                                    | min     | typ  | max  |          |
| Forward Transfer Admittance                | $ y_{fs} $   | $V_{DS}=20V, I_D=6A$               | 3.4     | 6.8  |      | S        |
| Static Drain-to-Source On-State Resistance | $R_{DS(on)}$ | $I_D=6A, V_{GS}=10V$               |         | 0.83 | 1.08 | $\Omega$ |
| Input Capacitance                          | $C_{iss}$    | $V_{DS}=30V, f=1MHz$               |         | 1500 |      | pF       |
| Output Capacitance                         | $C_{oss}$    | $V_{DS}=30V, f=1MHz$               |         | 250  |      | pF       |
| Reverse Transfer Capacitance               | $C_{rss}$    | $V_{DS}=30V, f=1MHz$               |         | 87   |      | pF       |
| Turn-ON Delay Time                         | $t_{d(on)}$  | See specified Test Circuit.        |         | 27   |      | ns       |
| Rise Time                                  | $t_r$        | See specified Test Circuit.        |         | 72   |      | ns       |
| Turn-OFF Delay Time                        | $t_{d(off)}$ | See specified Test Circuit.        |         | 260  |      | ns       |
| Fall Time                                  | $t_f$        | See specified Test Circuit.        |         | 77   |      | ns       |
| Total Gate Charge                          | $Q_g$        | $V_{DS}=200V, V_{GS}=10V, I_D=12A$ |         | 75   |      | nC       |
| Gate-to-Source Charge                      | $Q_{gs}$     | $V_{DS}=200V, V_{GS}=10V, I_D=12A$ |         | 12   |      | nC       |
| Gate-to-Drain "Miller" Charge              | $Q_{gd}$     | $V_{DS}=200V, V_{GS}=10V, I_D=12A$ |         | 38   |      | nC       |
| Diode Forward Voltage                      | $V_{SD}$     | $I_S=12A, V_{GS}=0V$               |         | 0.85 | 1.2  | V        |

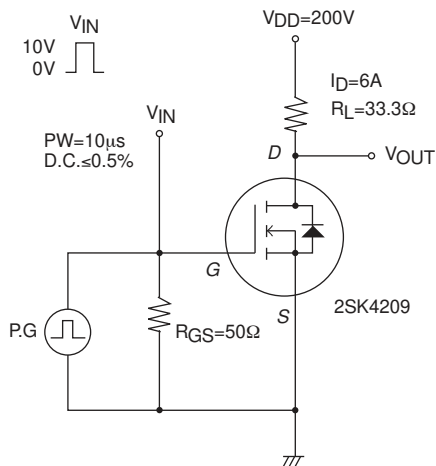
## Package Dimensions

unit : mm (typ)

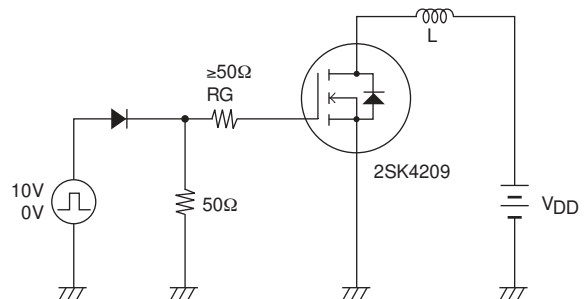
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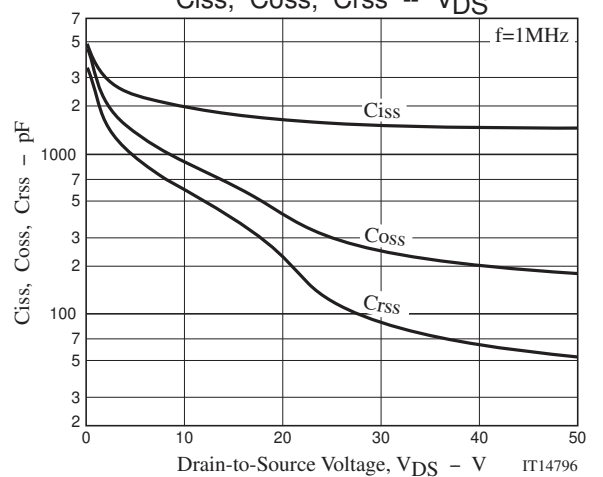
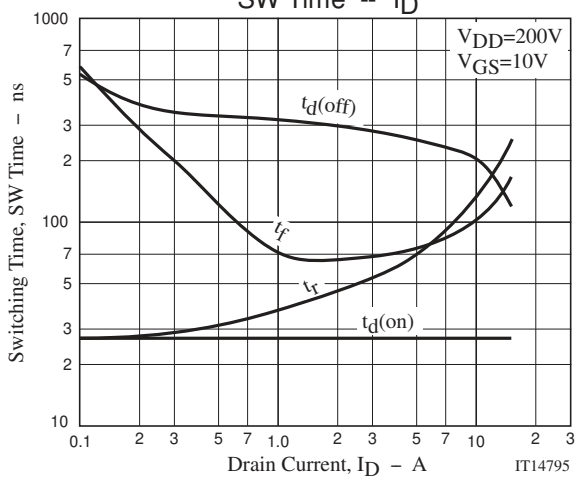
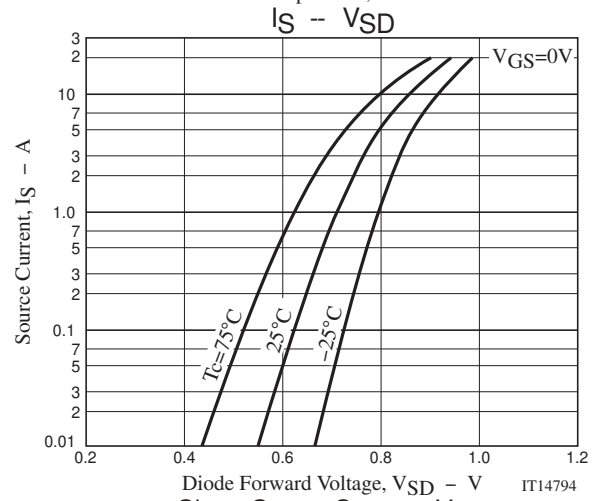
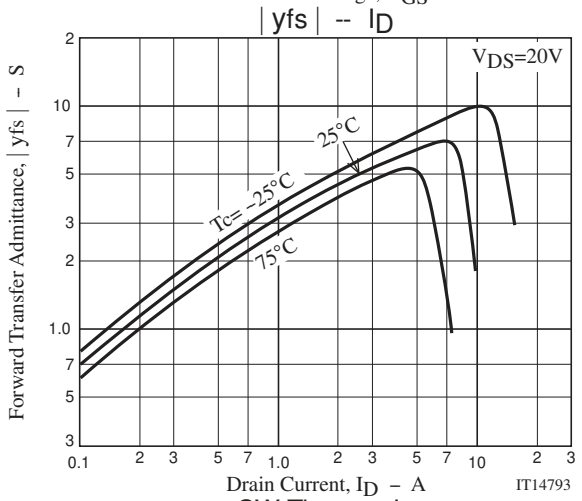
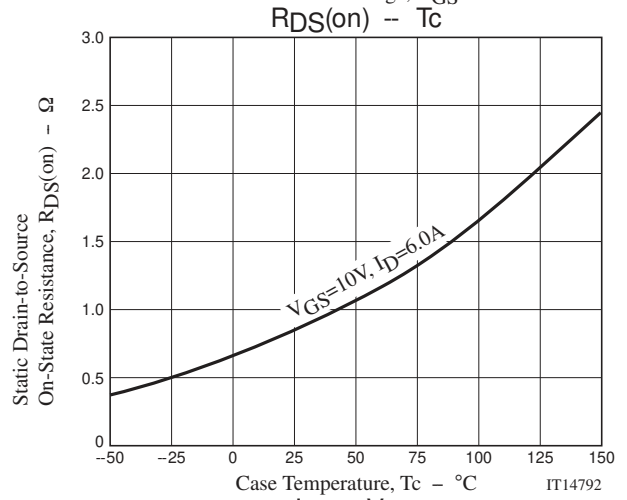
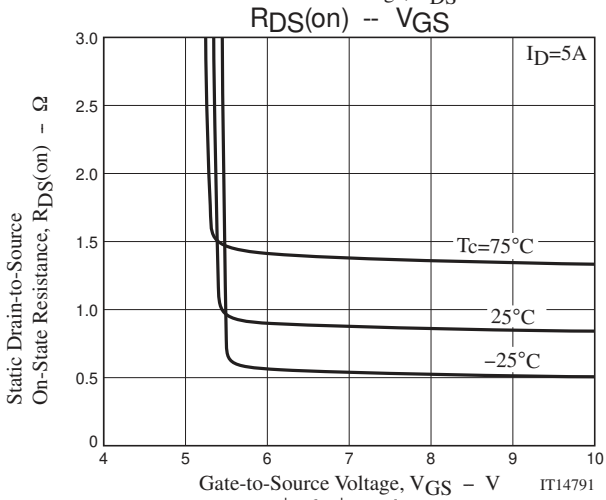
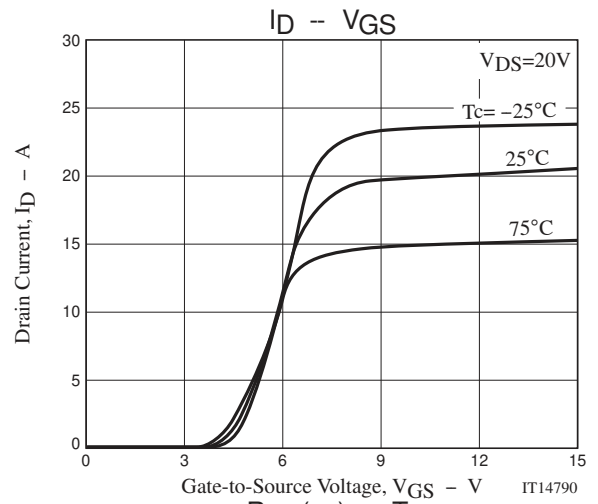
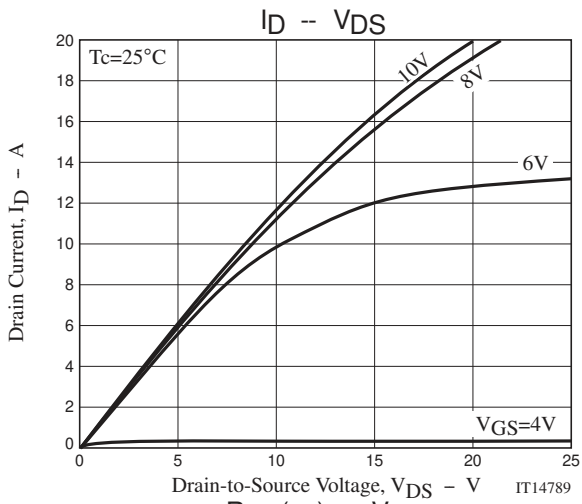


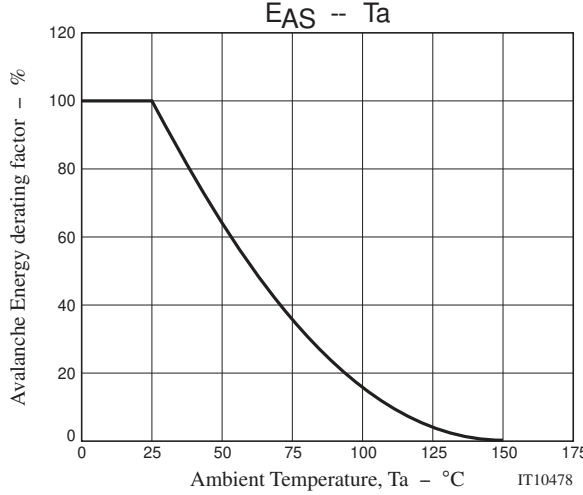
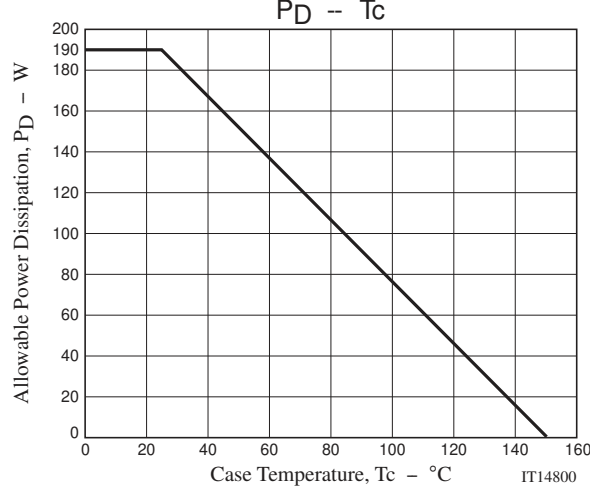
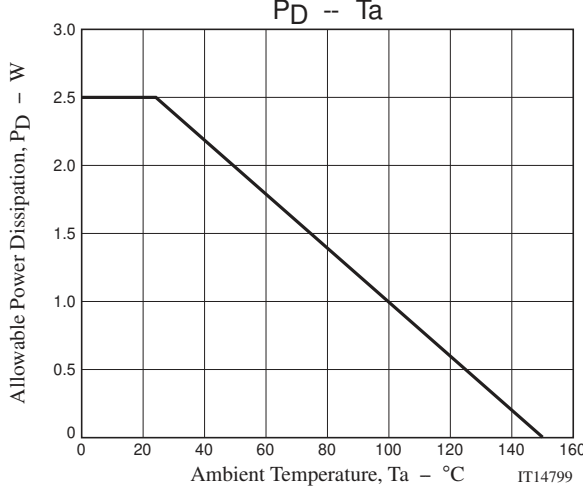
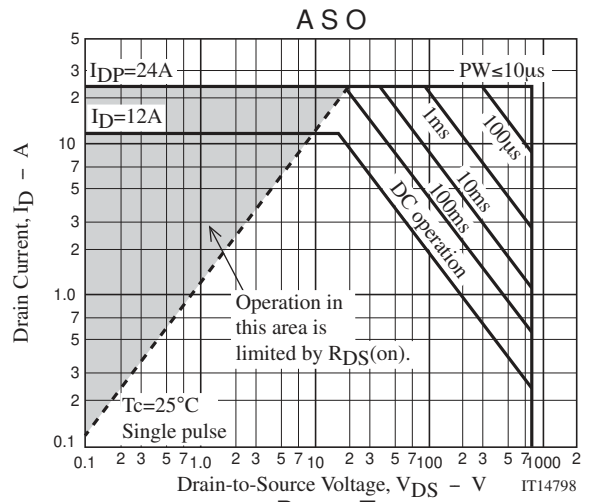
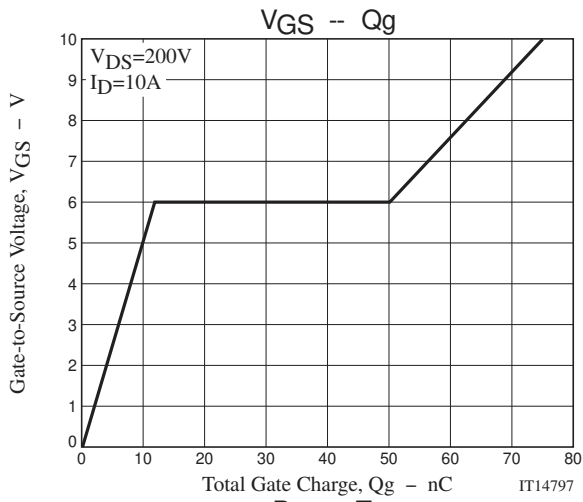
## Switching Time Test Circuit



## Avalanche Resistance Test Circuit







Note on usage : Since the 2SK4209 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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