



ON Semiconductor®

# ON Semiconductor

## DATA SHEET

# 2SK3706

N-Channel Silicon MOSFET

## General-Purpose Switching Device Applications

### Features

- Low ON-resistance.
- 4V drive.
- Motor driver, DC / DC converter.
- Avalanche resistance guarantee.

### Specifications

**Absolute Maximum Ratings** at Ta=25°C

| Parameter                          | Symbol           | Conditions             | Ratings     | Unit |
|------------------------------------|------------------|------------------------|-------------|------|
| Drain-to-Source Voltage            | V <sub>DSS</sub> |                        | 100         | V    |
| Gate-to-Source Voltage             | V <sub>GSS</sub> |                        | ±20         | V    |
| Drain Current (DC)                 | I <sub>D</sub>   |                        | 12          | A    |
| Drain Current (Pulse)              | I <sub>DP</sub>  | PW≤10μs, duty cycle≤1% | 48          | A    |
| Allowable Power Dissipation        | P <sub>D</sub>   |                        | 2.0         | W    |
|                                    |                  | Tc=25°C                | 20          | 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>  |                        | 18          | mJ   |
| Avalanche Current *2               | I <sub>AV</sub>  |                        | 12          | A    |

\*1 V<sub>DD</sub>=20V, L=200μH, I<sub>AV</sub>=12A

\*2 L≤200μH, single pulse

**Electrical Characteristics** at Ta=25°C

| Parameter                                  | Symbol               | Conditions                                 | Ratings |     |     | Unit |
|--------------------------------------------|----------------------|--------------------------------------------|---------|-----|-----|------|
|                                            |                      |                                            | min     | typ | max |      |
| Drain-to-Source Breakdown Voltage          | V(BR) <sub>DSS</sub> | I <sub>D</sub> =1mA, V <sub>GS</sub> =0    | 100     |     |     | V    |
| Zero-Gate Voltage Drain Current            | I <sub>DSS</sub>     | V <sub>DS</sub> =100V, V <sub>GS</sub> =0  |         |     | 1   | μA   |
| Gate-to-Source Leakage Current             | I <sub>GSS</sub>     | V <sub>GS</sub> = ±16V, V <sub>DS</sub> =0 |         |     | ±10 | μA   |
| Cutoff Voltage                             | V <sub>GS(off)</sub> | V <sub>DS</sub> =10V, I <sub>D</sub> =1mA  | 1.2     |     | 2.6 | V    |
| Forward Transfer Admittance                | y <sub>fs</sub>      | V <sub>DS</sub> =10V, I <sub>D</sub> =6A   | 7       | 10  |     | S    |
| Static Drain-to-Source On-State Resistance | R <sub>DS(on)1</sub> | I <sub>D</sub> =6A, V <sub>GS</sub> =10V   |         | 100 | 130 | mΩ   |
|                                            | R <sub>DS(on)2</sub> | I <sub>D</sub> =6A, V <sub>GS</sub> =4V    |         | 120 | 160 | mΩ   |

Marking : K3706

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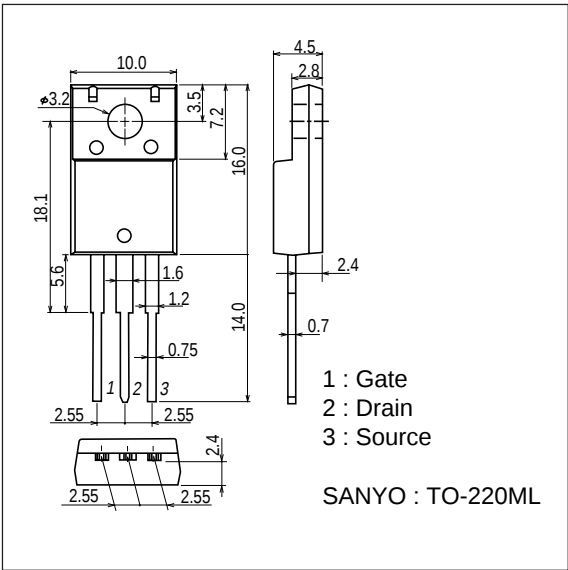
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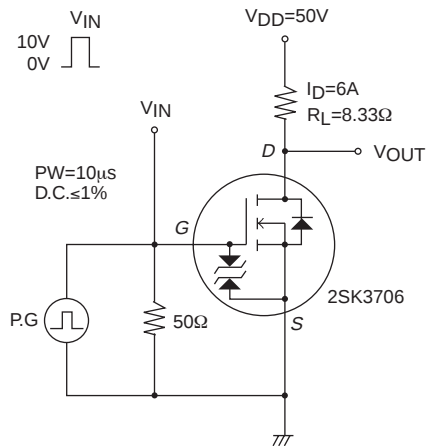
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|-------------------------------|---------------------|-----------------------------------------------------------------|---------|------|-----|------|
|                               |                     |                                                                 | min     | typ  | max |      |
| Input Capacitance             | Ciss                | V <sub>DS</sub> =20V, f=1MHz                                    |         | 880  |     | pF   |
| Output Capacitance            | Coss                | V <sub>DS</sub> =20V, f=1MHz                                    |         | 80   |     | pF   |
| Reverse Transfer Capacitance  | Crss                | V <sub>DS</sub> =20V, f=1MHz                                    |         | 55   |     | pF   |
| Turn-ON Delay Time            | t <sub>d(on)</sub>  | See specified Test Circuit.                                     |         | 11.5 |     | ns   |
| Rise Time                     | t <sub>r</sub>      | See specified Test Circuit.                                     |         | 16   |     | ns   |
| Turn-OFF Delay Time           | t <sub>d(off)</sub> | See specified Test Circuit.                                     |         | 97   |     | ns   |
| Fall Time                     | t <sub>f</sub>      | See specified Test Circuit.                                     |         | 45   |     | ns   |
| Total Gate Charge             | Q <sub>g</sub>      | V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =12A |         | 24   |     | nC   |
| Gate-to-Source Charge         | Q <sub>gs</sub>     | V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =12A |         | 3.2  |     | nC   |
| Gate-to-Drain "Miller" Charge | Q <sub>gd</sub>     | V <sub>DS</sub> =50V, V <sub>GS</sub> =10V, I <sub>D</sub> =12A |         | 5.5  |     | nC   |
| Diode Forward Voltage         | V <sub>SD</sub>     | I <sub>S</sub> =12A, V <sub>GS</sub> =0                         |         | 0.92 | 1.2 | V    |

Package Dimensions

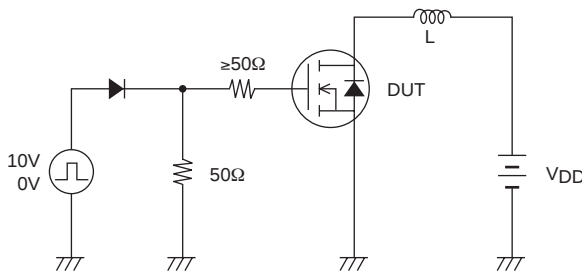
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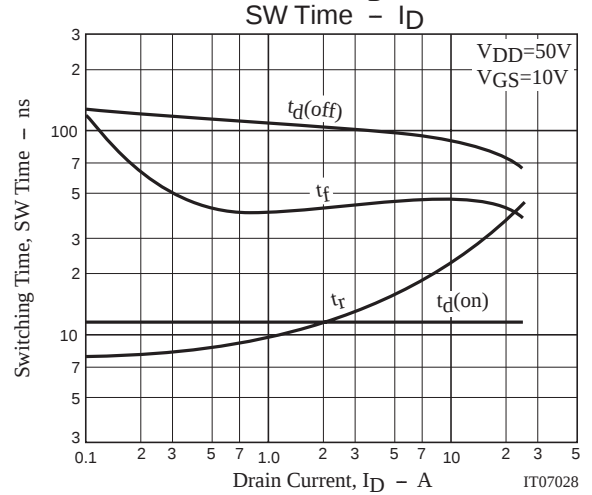
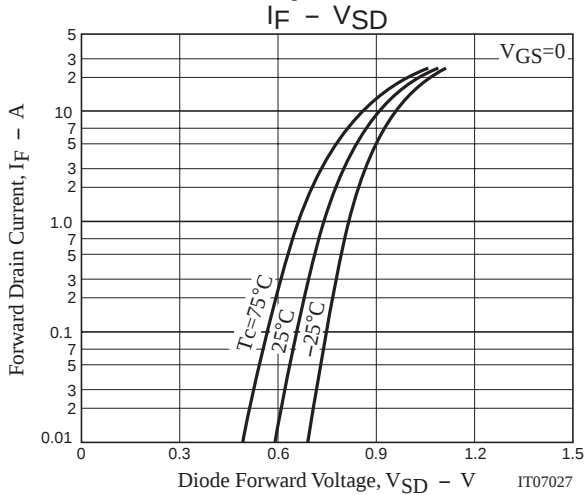
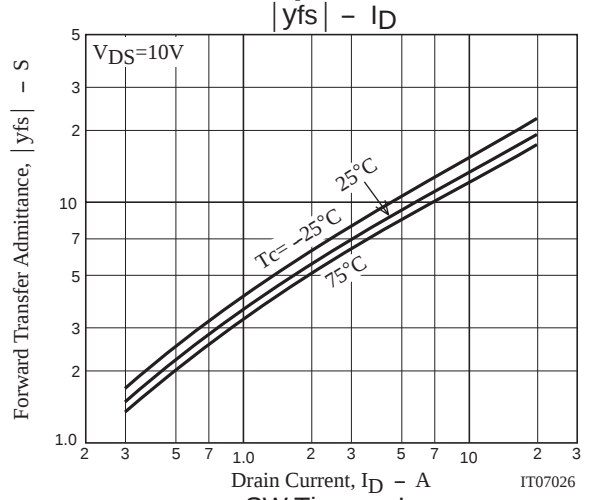
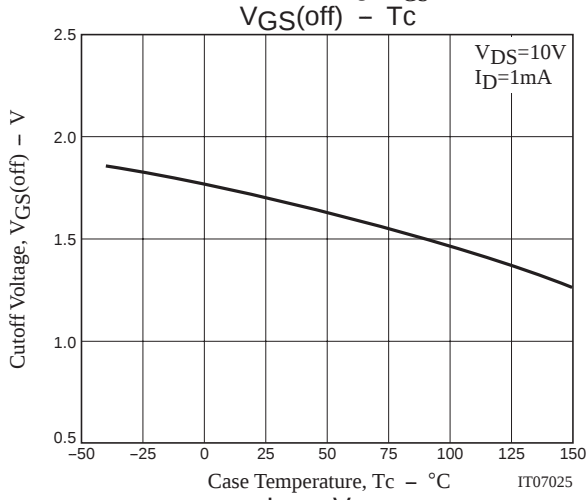
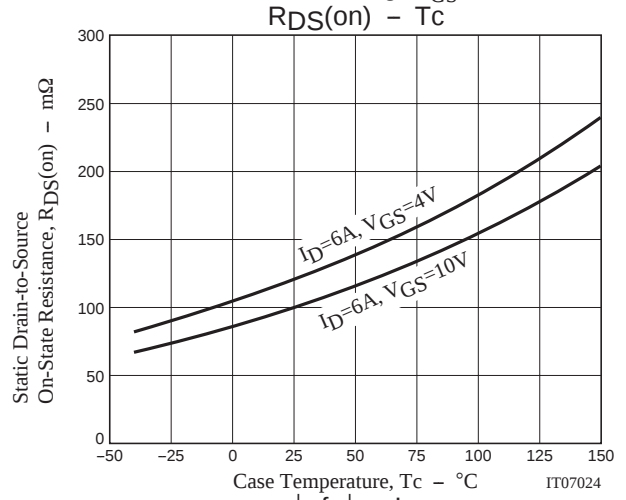
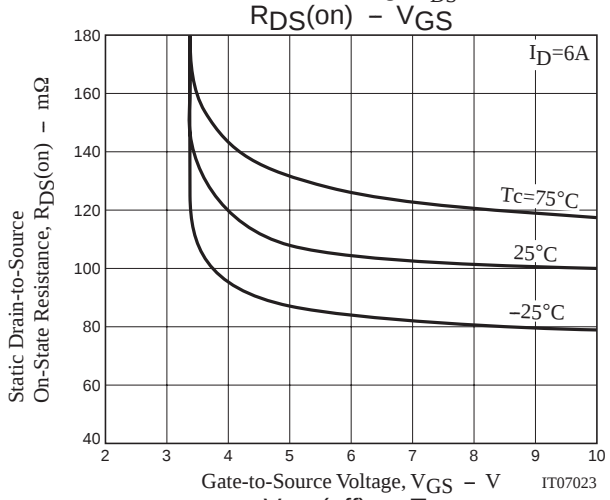
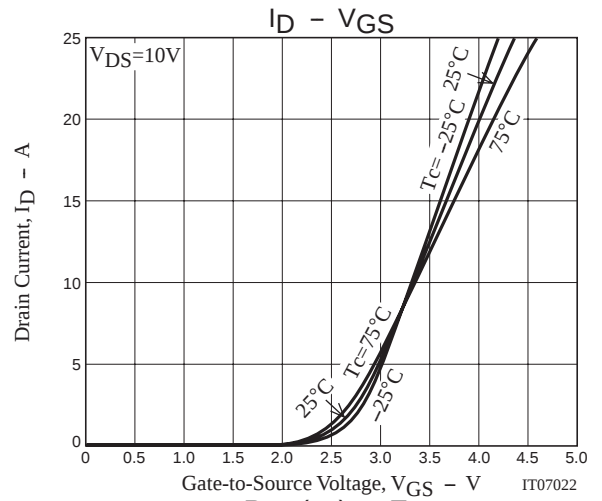
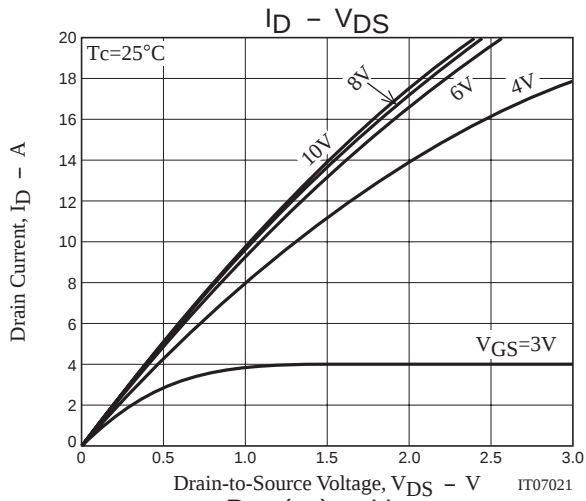


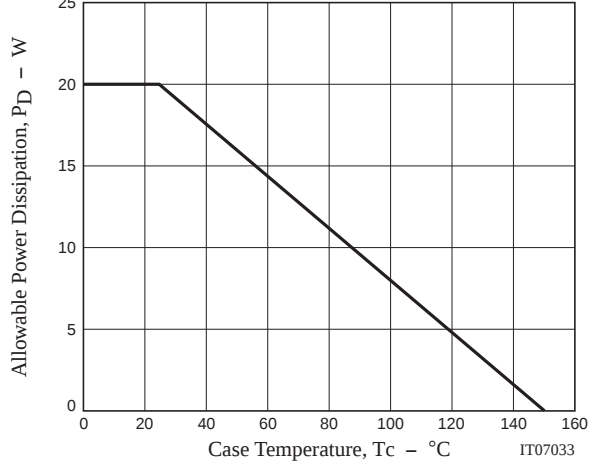
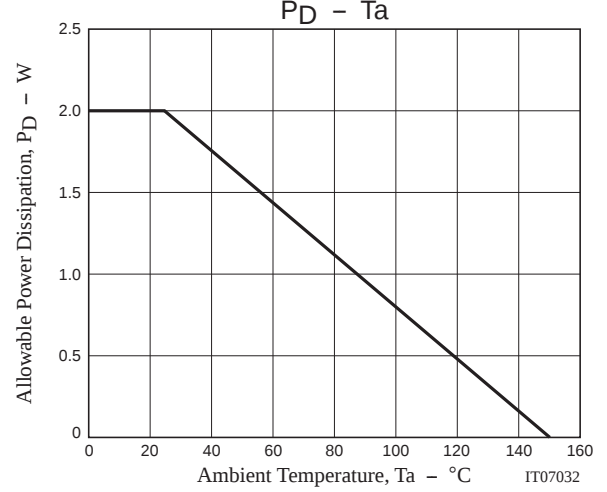
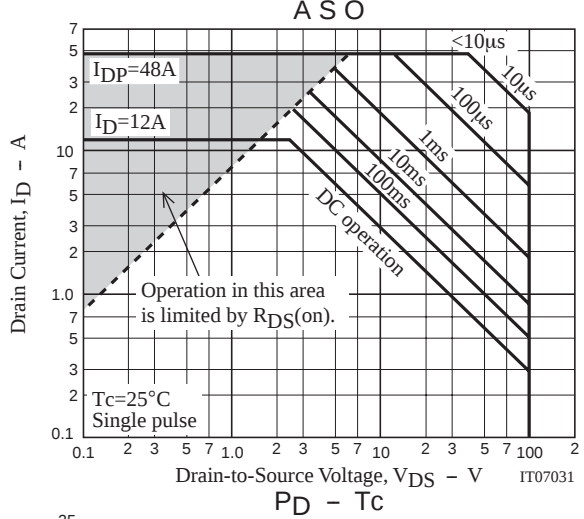
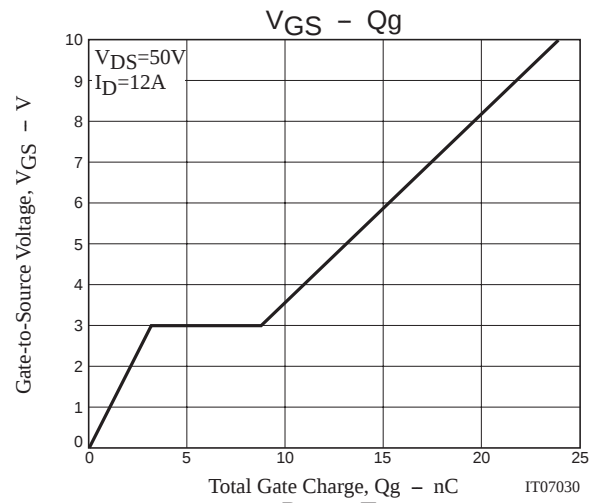
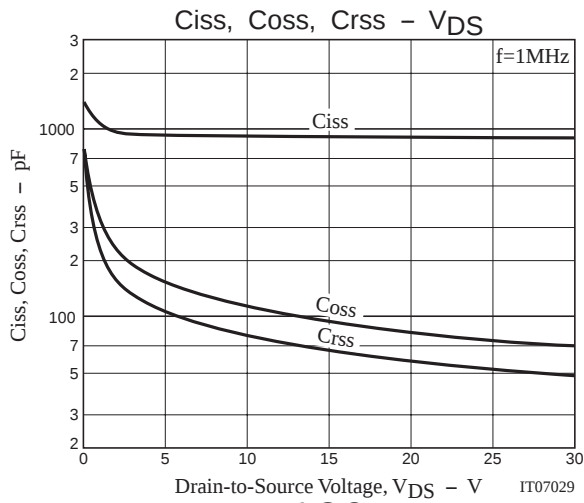
Switching Time Test Circuit



Unclamped Inductive Test Circuit







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