



# 2SK3705 — N-Channel Silicon MOSFET

## General-Purpose Switching Device Applications

### Features

- Low ON-resistance.
- Ultrahigh-speed switching.
- 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> |                        | 60          | V    |
| Gate-to-Source Voltage             | V <sub>GSS</sub> |                        | ±20         | V    |
| Drain Current (DC)                 | I <sub>D</sub> * |                        | 60          | A    |
| Drain Current (Pulse)              | I <sub>DP</sub>  | PW≤10μs, duty cycle≤1% | 208         | A    |
| Allowable Power Dissipation        | P <sub>D</sub>   |                        | 2.0         | W    |
|                                    |                  | Tc=25°C                | 35          | 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>  |                        | 540         | mJ   |
| Avalanche Current *2               | I <sub>AV</sub>  |                        | 60          | A    |

\*Shows Chip Capability

\*1 V<sub>DD</sub>=20V, I<sub>AV</sub>=60A, L=200μH

\*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)DSS             | I <sub>D</sub> =1mA, V <sub>GS</sub> =0    | 60      |     |      | V    |
| Zero-Gate Voltage Drain Current            | I <sub>DSS</sub>     | V <sub>DS</sub> =60V, 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> =26A  | 28      | 40  |      | S    |
| Static Drain-to-Source On-State Resistance | R <sub>DS(on)1</sub> | I <sub>D</sub> =26A, V <sub>GS</sub> =10V  |         | 9.0 | 12.5 | mΩ   |
|  | R <sub>DS(on)2</sub> | I <sub>D</sub> =26A, V <sub>GS</sub> =4V   |         | 12  | 17   | mΩ   |

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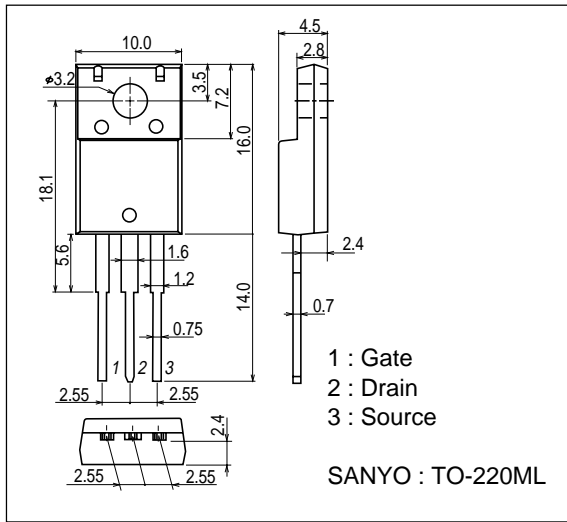
| Parameter                     | Symbol              | Conditions  | Ratings |      |     | Unit |
|-------------------------------|---------------------|---|---------|------|-----|------|
|                               |                     |   | min     | typ  | max |      |
| Input Capacitance             | Ciss                | V <sub>DS</sub> =20V, f=1MHz                                    |         | 5500 |     | pF   |
| Output Capacitance            | Coss                | V <sub>DS</sub> =20V, f=1MHz                                    |         | 750  |     | pF   |
| Reverse Transfer Capacitance  | Crss                | V <sub>DS</sub> =20V, f=1MHz                                    |         | 550  |     | pF   |
| Turn-ON Delay Time            | t <sub>d(on)</sub>  | See specified Test Circuit.                                     |         | 38   |     | ns   |
| Rise Time                     | t <sub>r</sub>      | See specified Test Circuit.                                     |         | 215  |     | ns   |
| Turn-OFF Delay Time           | t <sub>d(off)</sub> | See specified Test Circuit.                                     |         | 380  |     | ns   |
| Fall Time                     | t <sub>f</sub>      | See specified Test Circuit.                                     |         | 280  |     | ns   |
| Total Gate Charge             | Q <sub>g</sub>      | V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =52A |         | 100  |     | nC   |
| Gate-to-Source Charge         | Q <sub>gs</sub>     | V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =52A |         | 18   |     | nC   |
| Gate-to-Drain "Miller" Charge | Q <sub>gd</sub>     | V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =52A |         | 16   |     | nC   |
| Diode Forward Voltage         | V <sub>SD</sub>     | I <sub>S</sub> =52A, V <sub>GS</sub> =0                         |         | 1.0  | 1.2 | V    |

Marking : K3705

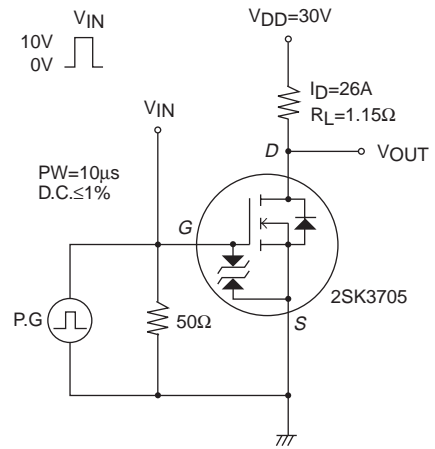
## Package Dimensions

unit : mm

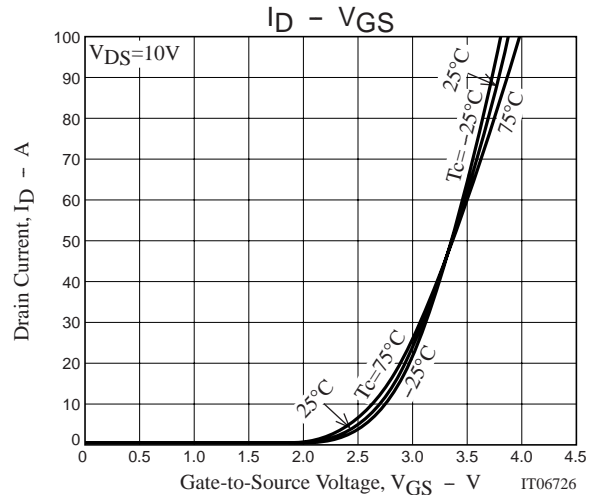
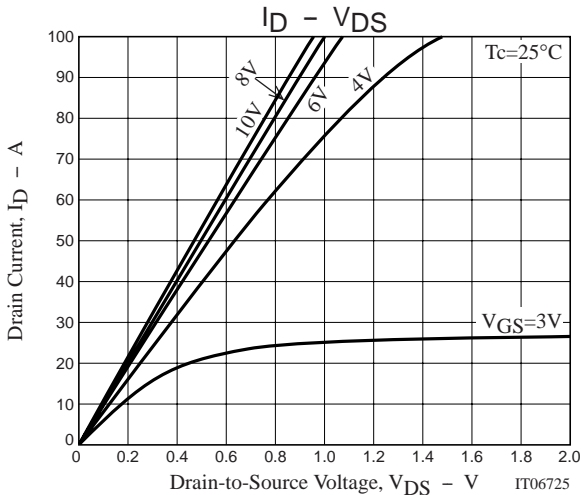
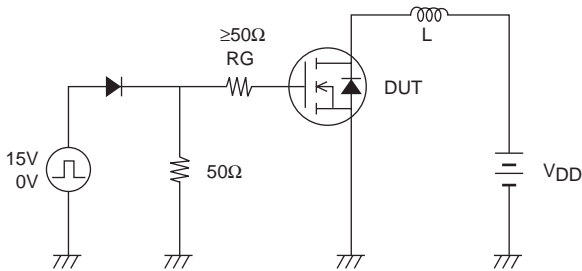
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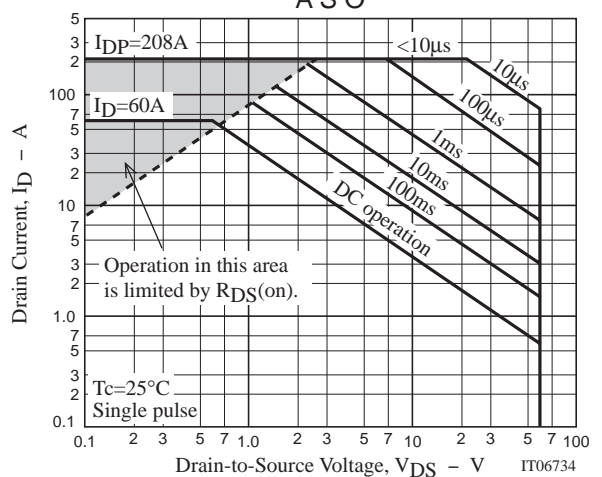
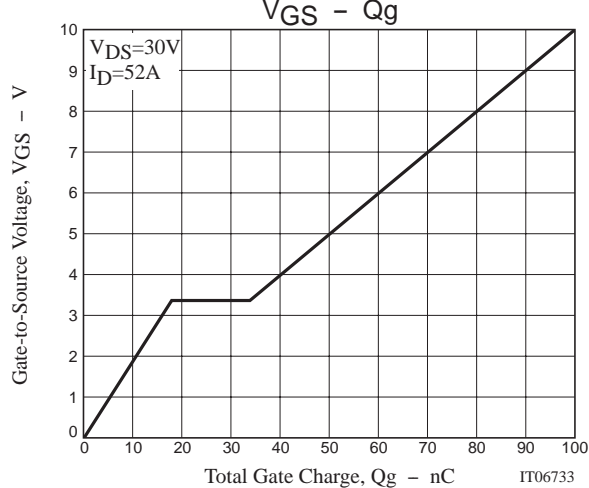
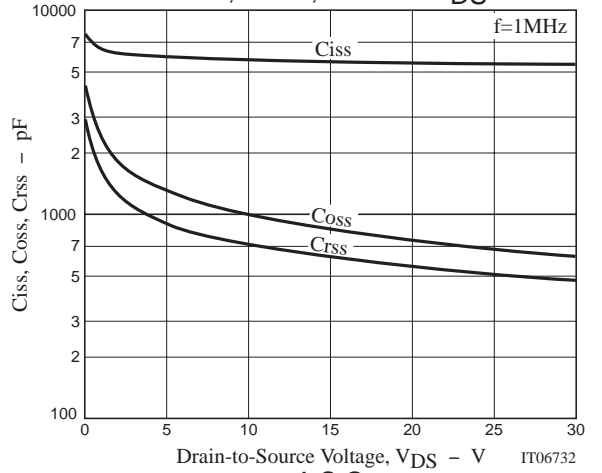
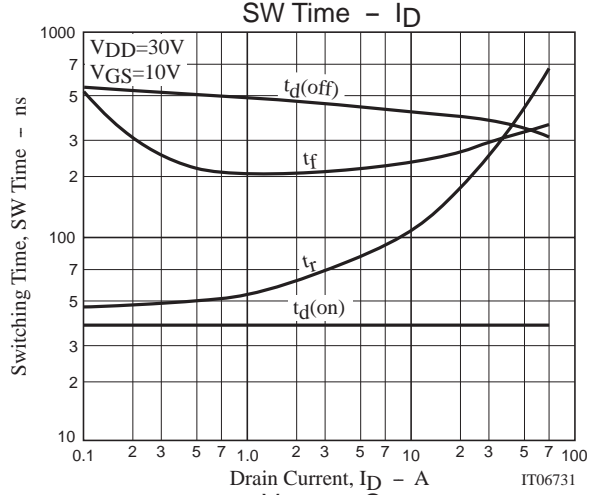
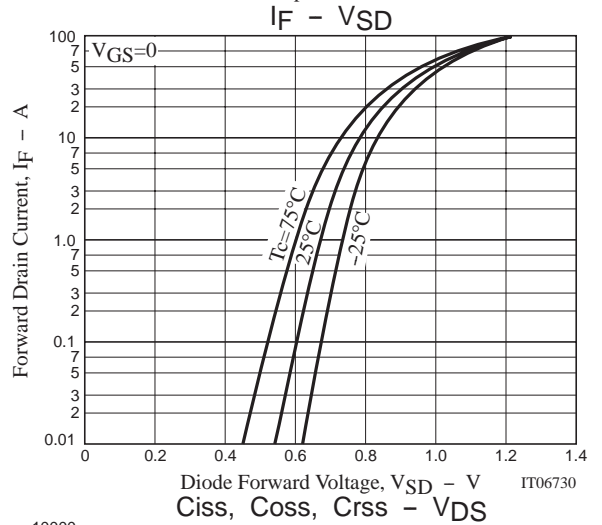
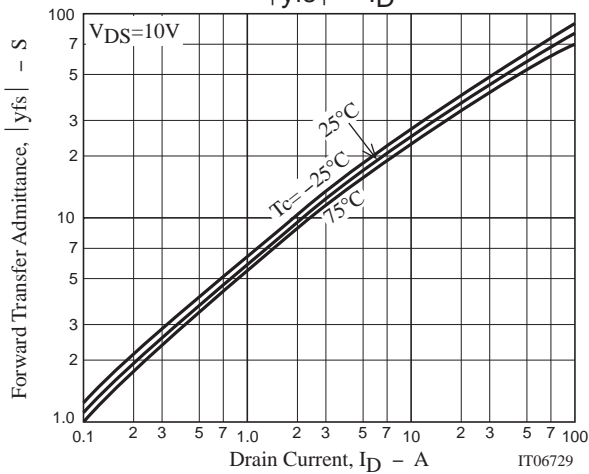
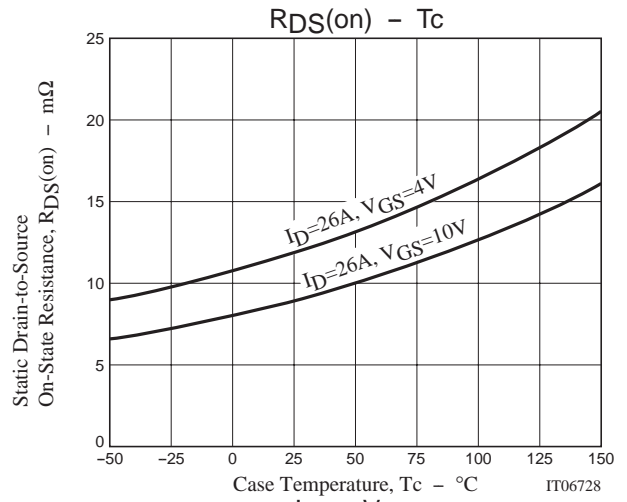
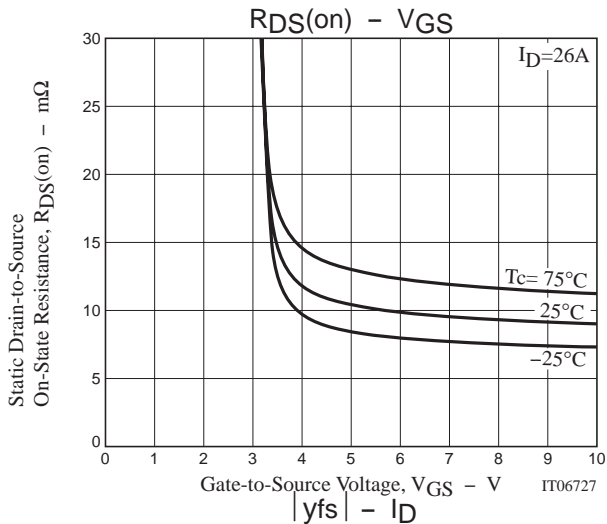
## Switching Time Test Circuit

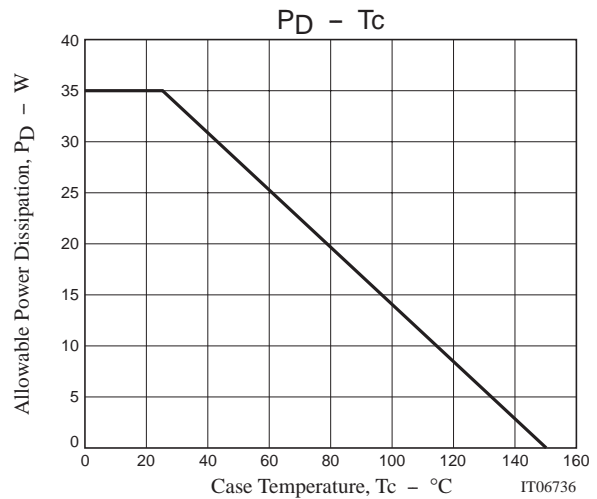
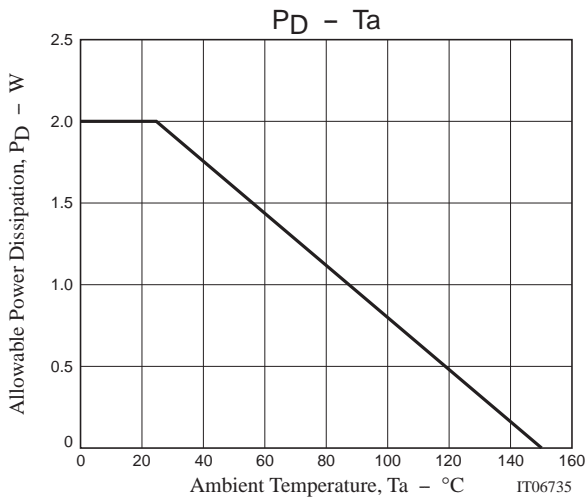


## Unclamped Inductive Test Circuit



# 2SK3705





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