

# SHINDENGEN

## VX-2 Series Power MOSFET

N-Channel Enhancement type

**2SK2196**  
**(F20W50VX2)**

**500V 20A**

### FEATURES

- Input capacitance (Ciss) is small. Especially, input capacitance at 0 bias is small.
- The static Rds(on) is small.
- The switching time is fast.

### APPLICATION

- Switching power supply of AC 100V input
- High voltage power supply
- Inverter

### RATINGS

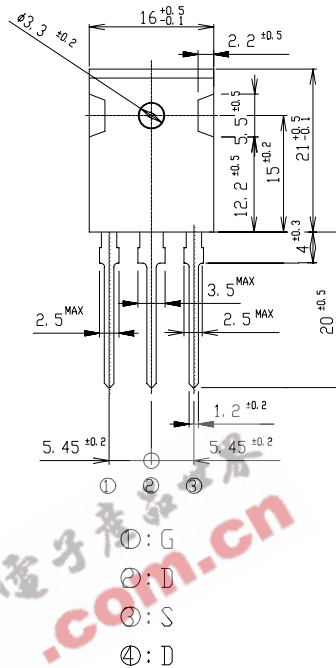
- Absolute Maximum Ratings (Tc = 25°C)

| Item                            | Symbol           | Conditions                       | Ratings | Unit |
|---------------------------------|------------------|----------------------------------|---------|------|
| Storage Temperature             | T <sub>stg</sub> |                                  | -55~150 | °C   |
| Channel Temperature             | T <sub>ch</sub>  |                                  | 150     |      |
| Drain-Source Voltage            | V <sub>DSS</sub> |                                  | 500     | V    |
| Gate-Source Voltage             | V <sub>GSS</sub> |                                  | ±30     |      |
| Continuous Drain Current (DC)   | I <sub>D</sub>   |                                  | 20      | A    |
| Continuous Drain Current (Peak) | I <sub>DP</sub>  |                                  | 60      |      |
| Continuous Source Current (DC)  | I <sub>S</sub>   |                                  | 20      |      |
| Total Power Dissipation         | P <sub>T</sub>   |                                  | 125     | W    |
| Single Pulse Avalanche Current  | I <sub>AS</sub>  | T <sub>ch</sub> = 25°C           | 20      | A    |
| Mounting Torque                 | TOR              | ( Recommended torque : 0.5 N·m ) | 0.8     | N·m  |

### OUTLINE DIMENSIONS

Case : MTO-3P

(Unit : mm)



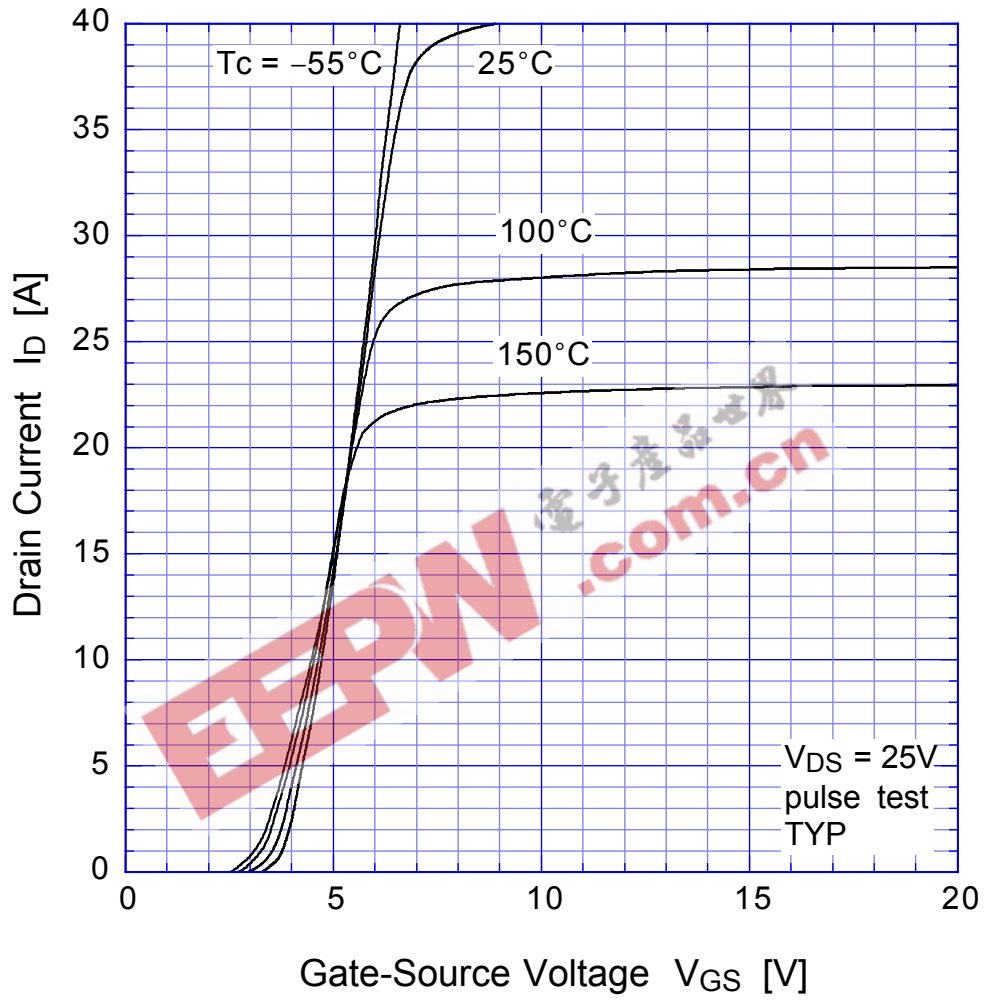
●Electrical Characteristics  $T_c = 25^\circ\text{C}$

| Item                                    | Symbol        | Conditions  | Min. | Typ. | Max.      | Unit                      |
|---|---------------|---|------|------|-----------|---------------------------|
| Drain-Source Breakdown Voltage          | $V_{(BR)DSS}$ | $I_D = 1\text{mA}, V_{GS} = 0\text{V}$                        | 500  |      |           | V                         |
| Zero Gate Voltage Drain Current         | $I_{DSS}$     | $V_{DS} = 500\text{V}, V_{GS} = 0\text{V}$                    |      |      | 250       | $\mu\text{A}$             |
| Gate-Source Leakage Current             | $I_{GSS}$     | $V_{GS} = \pm 30\text{V}, V_{DS} = 0\text{V}$                 |      |      | $\pm 0.1$ |                           |
| Forward Transconductance                | $g_{fs}$      | $I_D = 10\text{A}, V_{DS} = 10\text{V}$                       | 6    | 15   |           | S                         |
| Static Drain-Source On-state Resistance | $R_{DS(ON)}$  | $I_D = 10\text{A}, V_{GS} = 10\text{V}$                       |      | 0.27 | 0.35      | $\Omega$                  |
| Gate Threshold Voltage                  | $V_{TH}$      | $I_D = 1\text{mA}, V_{DS} = 10\text{V}$                       | 2.5  | 3.0  | 3.5       | V                         |
| Source-Drain Diode Forwade Voltage      | $V_{SD}$      | $I_S = 10\text{A}, V_{GS} = 0\text{V}$                        |      |      | 1.5       |                           |
| Thermal Resistance                      | $\theta_{jc}$ | junction to case  |      |      | 1.0       | $^\circ\text{C}/\text{W}$ |
| Total Gate Charge                       | $Q_g$         | $V_{DD} = 400\text{V}, V_{GS} = 10\text{V}, I_D = 20\text{A}$ |      | 85   |           | nC                        |
| Input Capacitance                       | $C_{iss}$     | $V_{DS} = 10\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$    |      | 2400 |           | pF                        |
| Reverse Transfer Capacitance            | $C_{rss}$     |   |      | 170  |           |                           |
| Output Capacitance                      | $C_{oss}$     |   |      | 500  |           |                           |
| Turn-On Time                            | $t_{on}$      | $I_D = 10\text{A}, V_{GS} = 10\text{V}, R_L = 15\Omega$       |      | 135  | 225       | ns                        |
| Turn-Off Time                           | $t_{off}$     |   |      | 340  | 565       |                           |

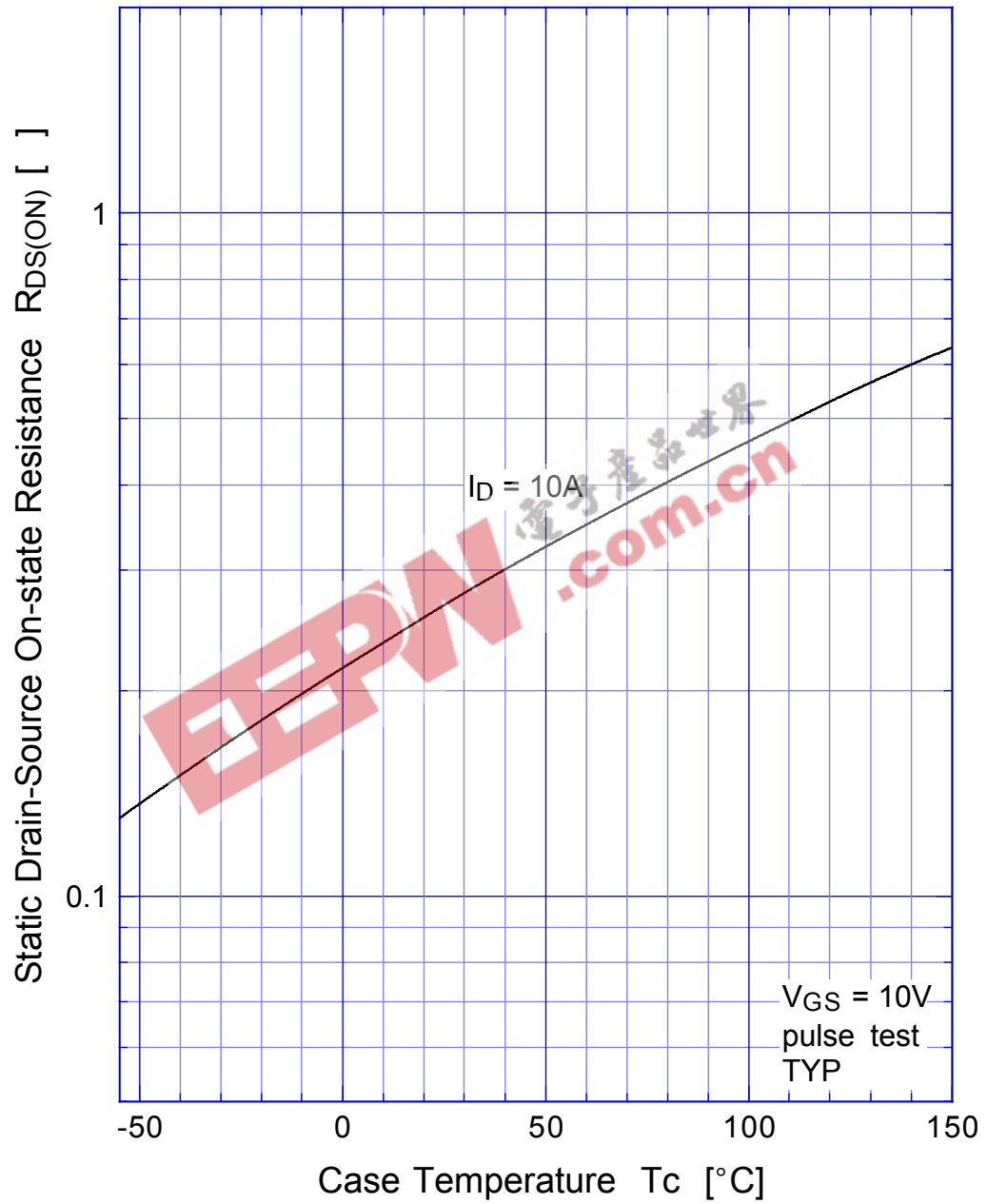
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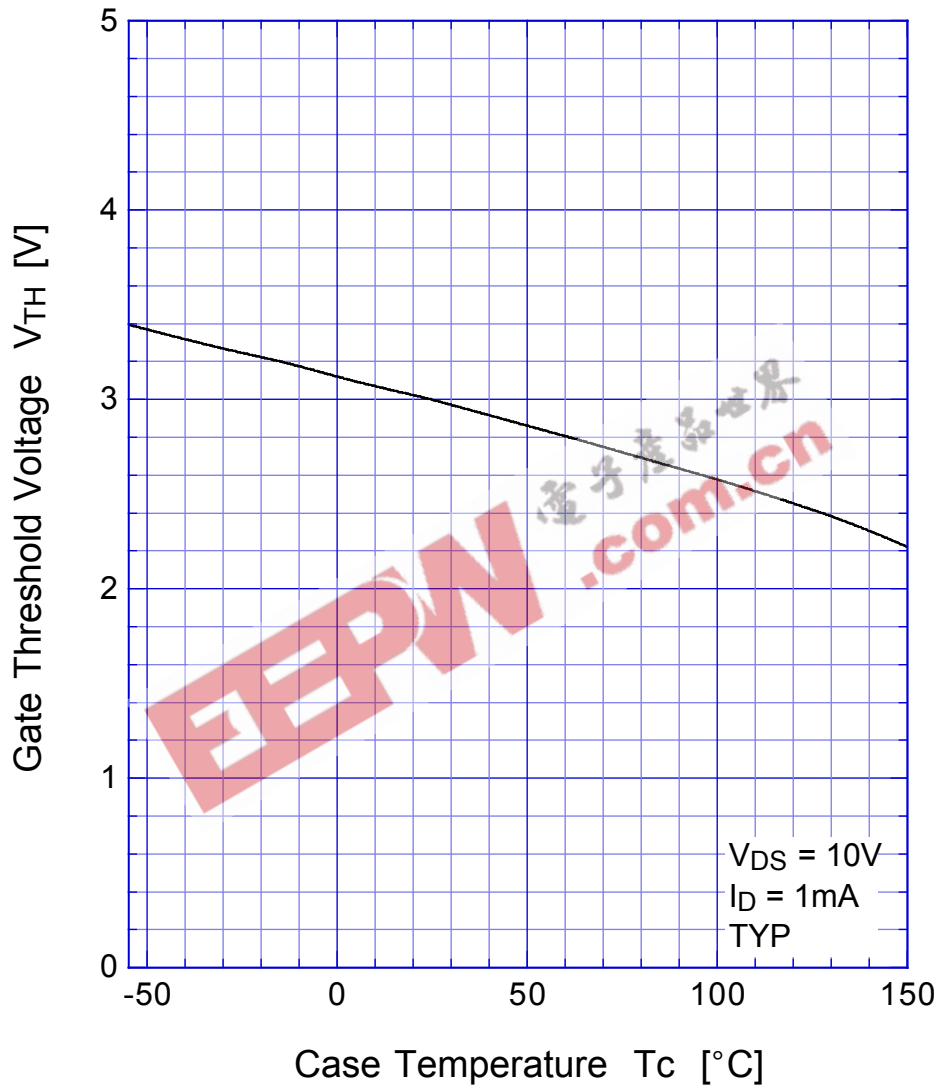
## Transfer Characteristics



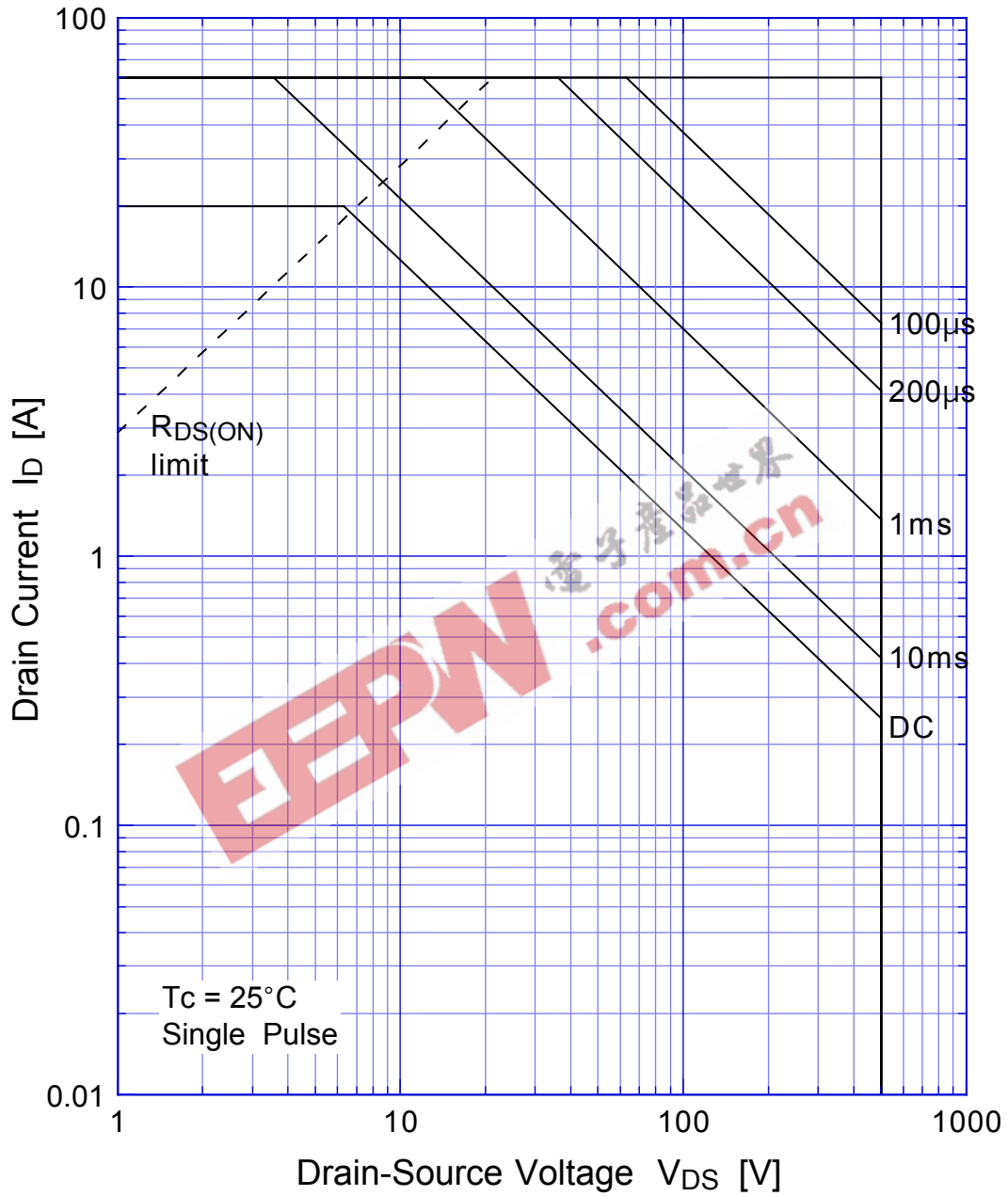
## 2SK2196 Static Drain-Source On-state Resistance



## 2SK2196 Gate Threshold Voltage

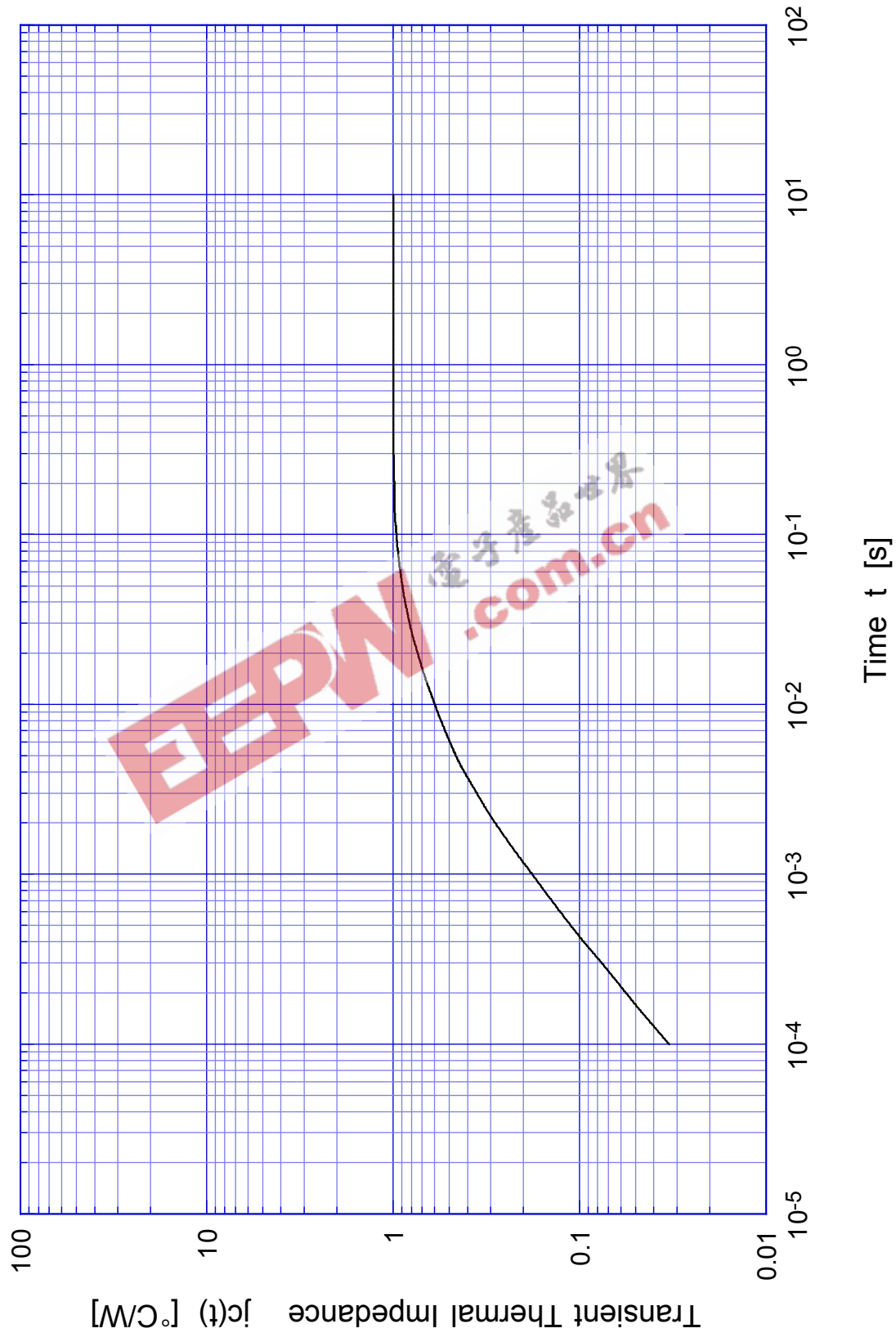


# 2SK2196 Safe Operating Area



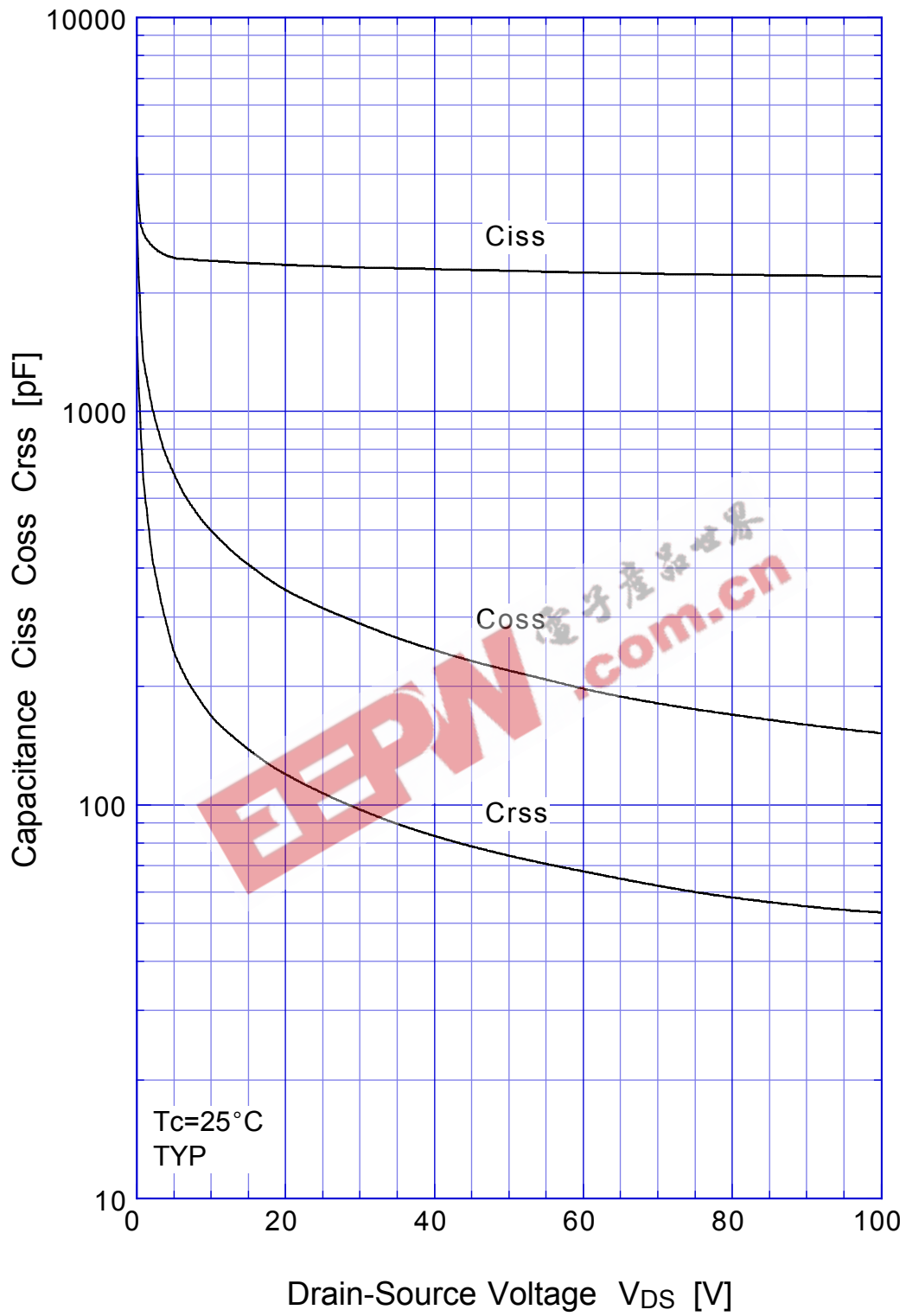
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Transient Thermal Impedance



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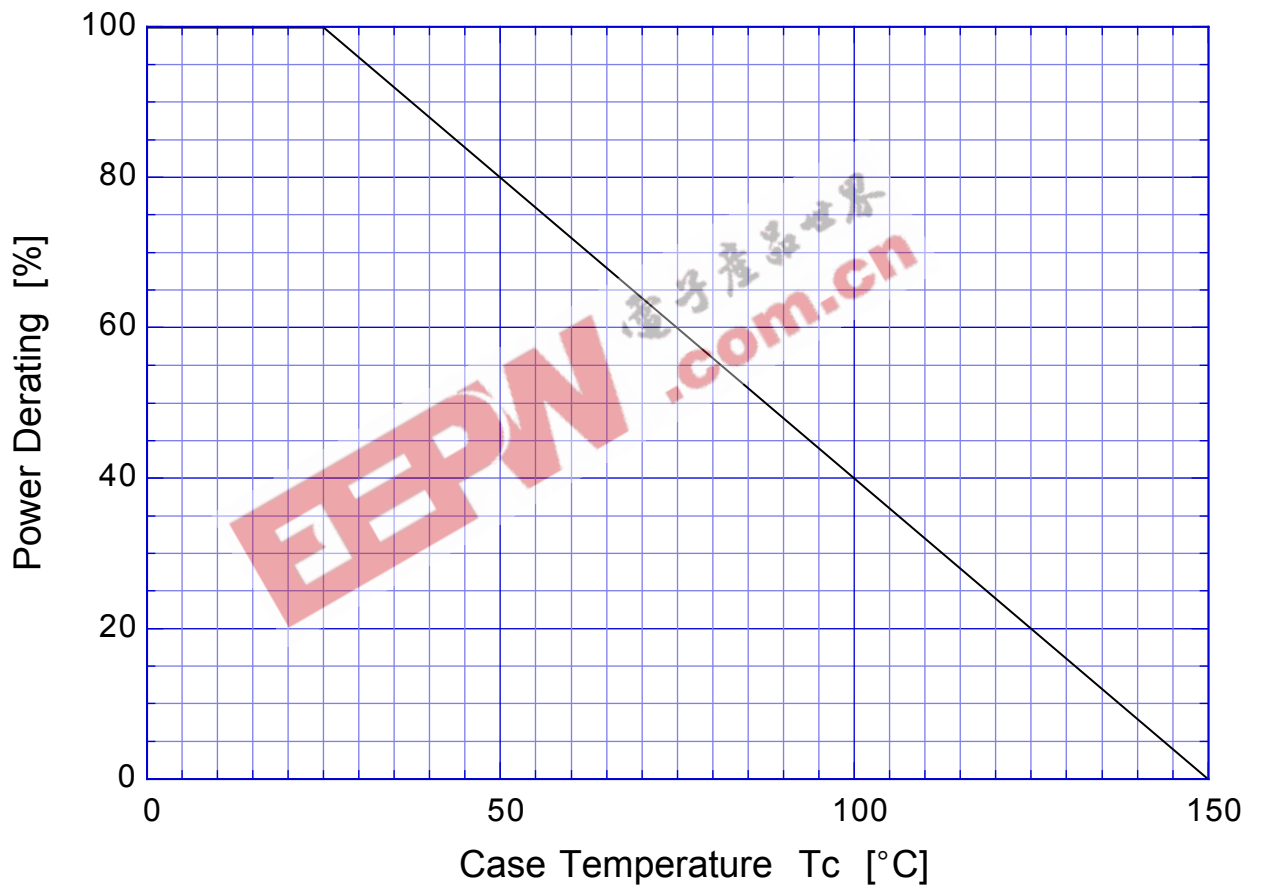
# Capacitance





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Power Derating



## 2SK2196 Gate Charge Characteristics

