

## Features

- Advanced Trench MOSFET Process Technology
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- Halogen Free Available Upon Request By Adding Suffix "-HF"
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

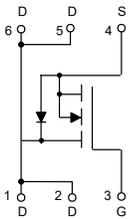
## Maximum Ratings

- Operating Junction Temperature Range: -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 73.5°C/W Junction to Ambient<sup>(Note2)</sup>

| Parameter                               | Symbol   | Rating | Unit |
|-----------------------------------------|----------|--------|------|
| Drain -Source Voltage                   | $V_{DS}$ | 60     | V    |
| Gate -Source Voltage                    | $V_{GS}$ | ±20    | V    |
| Drain Current-Continuous                | $I_D$    | 5      | A    |
| Pulsed Drain Current <sup>(Note1)</sup> | $I_{DM}$ | 30     | A    |
| Power Dissipation                       | $P_D$    | 1.7    | W    |

Note: 1. Pulse Width Limited by Maximum Junction Temperature.  
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.

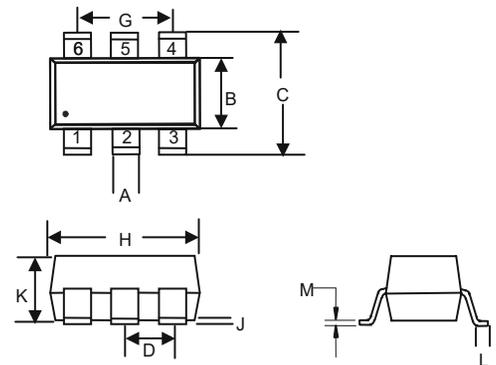
## Internal Structure



Marking: 5N06

# N-Channel Power MOSFET

## SOT23-6L



| DIM | DIMENSIONS |       |      |      | NOTE |
|-----|------------|-------|------|------|------|
|     | INCHES     |       | MM   |      |      |
|     | MIN        | MAX   | MIN  | MAX  |      |
| A   | 0.012      | 0.020 | 0.30 | 0.50 |      |
| B   | 0.051      | 0.070 | 1.30 | 1.80 |      |
| C   | 0.087      | 0.126 | 2.20 | 3.20 |      |
| D   | 0.037      |       | 0.95 |      | TYP. |
| G   | 0.074      |       | 1.90 |      | TYP. |
| H   | 0.106      | 0.122 | 2.70 | 3.10 |      |
| J   | 0.002      | 0.006 | 0.05 | 0.15 |      |
| K   | 0.030      | 0.051 | 0.75 | 1.30 |      |
| L   | 0.012      | 0.024 | 0.30 | 0.60 |      |
| M   | 0.003      | 0.008 | 0.08 | 0.22 |      |

**ELECTRICAL CHARACTERISTICS (Ta=25°C unless otherwise specified)**

| Parameter                                          | Symbol        | Test conditions                                                      | Min | Typ  | Max       | Unit       |
|----------------------------------------------------|---------------|----------------------------------------------------------------------|-----|------|-----------|------------|
| <b>Static Characteristics</b>                      |               |                                                                      |     |      |           |            |
| Drain-Source Breakdown Voltage                     | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$                                            | 60  |      |           | V          |
| Gate-Threshold Voltage <sup>(Note3)</sup>          | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=250\mu A$                                        | 1.0 |      | 3.0       | V          |
| Gate-Body Leakage Current                          | $I_{GSS}$     | $V_{GS} = \pm 20V, V_{DS} = 0V$                                      |     |      | $\pm 100$ | nA         |
| Zero Gate Voltage Drain Current                    | $I_{DSS}$     | $V_{DS} = 60V, V_{GS} = 0V$                                          |     |      | 1         | $\mu A$    |
| Drain-Source On-Resistance <sup>(Note3)</sup>      | $R_{DS(on)}$  | $V_{GS}=10V, I_D=5A$                                                 |     | 37   | 45        | m $\Omega$ |
| Forward Transconductance <sup>(Note3)</sup>        | $g_{fs}$      | $V_{DS}=5V, I_D=4.5A$                                                | 11  |      |           | S          |
| <b>Dynamic Characteristics<sup>(Note4)</sup></b>   |               |                                                                      |     |      |           |            |
| Input Capacitance                                  | $C_{iss}$     | $V_{DS}=30V, V_{GS}=0V, f=1MHz$                                      |     | 500  |           | pF         |
| Output Capacitance                                 | $C_{oss}$     |                                                                      |     | 60   |           |            |
| Reverse Transfer Capacitance                       | $C_{rss}$     |                                                                      |     | 25   |           |            |
| <b>Switching Characteristics<sup>(Note4)</sup></b> |               |                                                                      |     |      |           |            |
| Total Gate Charge                                  | $Q_g$         | $V_{DS}=48V, V_{GS}=10V, I_D=15A$                                    |     | 12   |           | nC         |
| Gate-Source Charge                                 | $Q_{gs}$      |                                                                      |     | 4.1  |           |            |
| Gate-Drain Charge                                  | $Q_{gd}$      |                                                                      |     | 4.5  |           |            |
| Turn-on Delay Time                                 | $t_{d(on)}$   | $V_{DD}=30V, V_{GS}=10V, I_D=2A, R_G=3\Omega, R_L=6.7\Omega$         |     | 5.0  |           | ns         |
| Turn-on Rise Time                                  | $t_r$         |                                                                      |     | 2.6  |           |            |
| Turn-off Delay Time                                | $t_{d(off)}$  |                                                                      |     | 16.1 |           |            |
| Turn-off Fall Time                                 | $t_f$         |                                                                      |     | 2.3  |           |            |
| <b>Drain-Source Diode Characteristics</b>          |               |                                                                      |     |      |           |            |
| Diode Forward Voltage <sup>(Note3)</sup>           | $V_{SD}$      | $V_{GS}=0V, I_s=20A$                                                 |     |      | 1.2       | V          |
| Diode Forward Current <sup>(Note2)</sup>           | $I_s$         |                                                                      |     |      | 20        | A          |
| Reverse Recovery Time                              | $t_{rr}$      | $I_F=20A, di/dt=100A/us$ <sup>(Note4)</sup>                          |     | 35   |           | nS         |
| Reverse Recovery Charge                            | $Q_{rr}$      |                                                                      |     |      | 53        |            |
| Forward Turn-On Time                               | $t_{on}$      | Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD) |     |      |           |            |

Note: 3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

4. Guaranteed by design, not subject to production.

**Curve Characteristics**

Fig. 1 -  $R_{DS(ON)} - I_D$

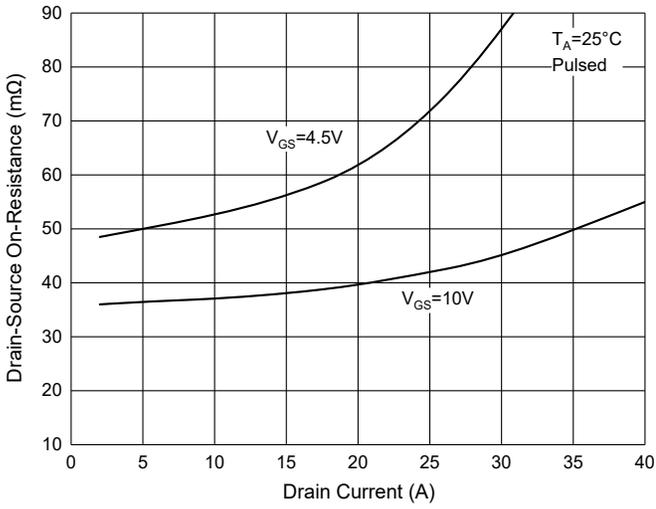


Fig. 2 - Gate Charge

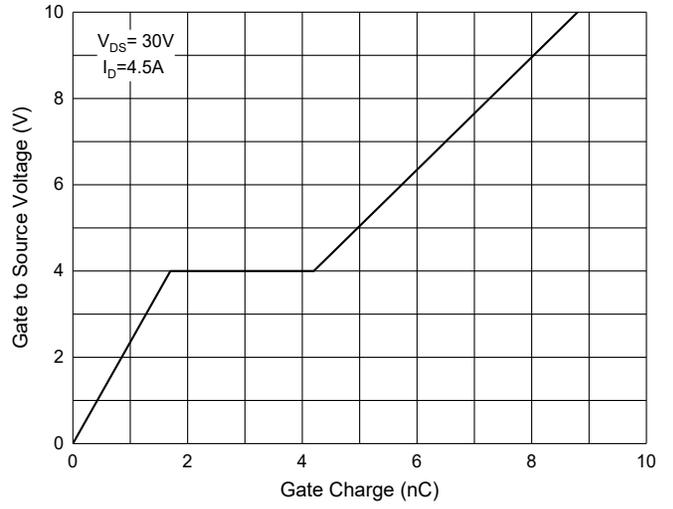


Fig. 3 - Capacitance Characteristics

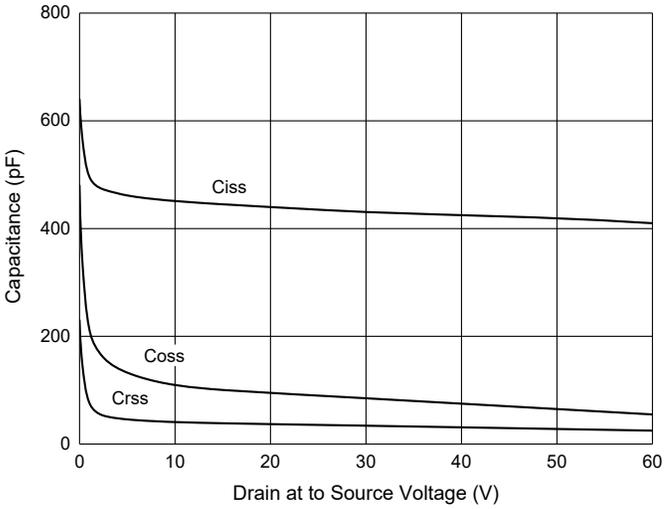
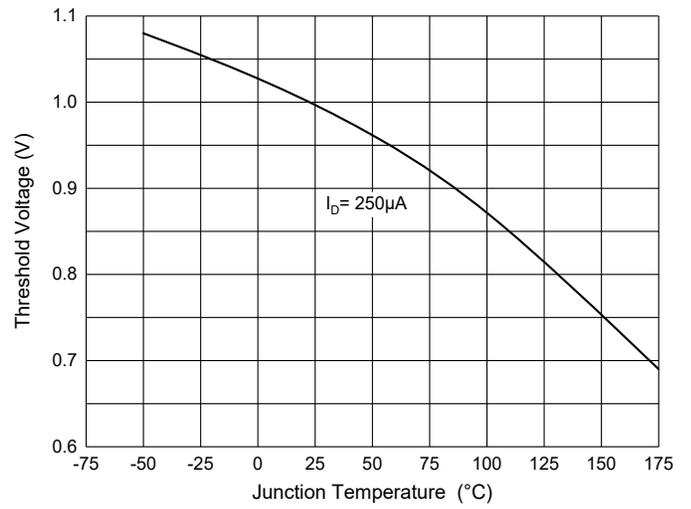


Fig. 4 - Threshold Voltage



## Ordering Information

| Device         | Packing              |
|----------------|----------------------|
| Part Number-TP | Tape&Reel:3Kpcs/Reel |

Note : Adding "-HF" Suffix For Halogen Free, eg. Part Number-TP-HF

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