Elektronische Bauelemente

# SSQF04N60J

**4A, 600V, $R_{DS(ON)}$ 3Ω**

**N-Ch Enhancement Mode Power MOSFET**

RoHS Compliant Product
A suffix of "-C" specifies halogen free

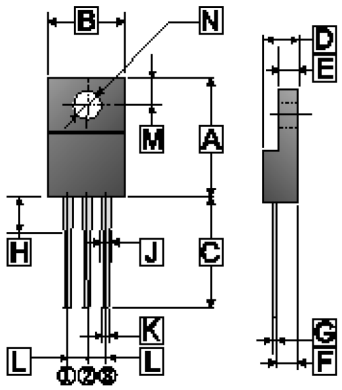
## DESCRIPTION

This advanced high voltage MOSFET is designed to withstand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode with fast recovery time. Designed for high voltage, high speed switching applications such as power supplies, converters, power motor controls and bridge circuits

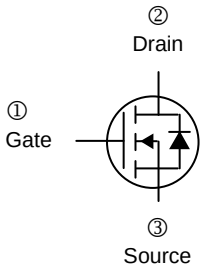
## FEATURES

- High current rating
- Lower $R_{DS(ON)}$
- Lower capacitance
- Lower total gate charge
- Tighter VSD specifications
- Specified avalanche energy

**ITO-220J**




| REF. | Millimeter | | REF. | Millimeter | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. |
| A | 14.80 | 15.20 | H | 3.60 | 4.00 |
| B | 9.96 | 10.36 | J | 1.30 REF. | |
| C | 13.20 REF. | | K | 0.50 | 0.75 |
| D | 4.30 | 4.70 | L | 2.54 REF. | |
| E | 2.80 | 3.20 | M | 2.70 REF. | |
| F | 2.50 | 2.90 | N | ϕ 3.5 REF. | |
| G | 0.50 | 0.75 | | | |




## ABSOLUTE MAXIMUM RATINGS ($T_A$=25℃ unless otherwise specified)

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 600 | V |
| Gate-Source Voltage | $V_{GS}$ | ±30 | V |
| Continuous Drain Current | $I_D$ | 4 | A |
| Continuous Drain-Source Diode Forward Current | $I_S$ | 4 | A |
| Single Pulsed Avalanche Energy [1] | $E_{AS}$ | 260 | mJ |
| Maximum Lead Temperature for Soldering Purposes@ 1/8'' from case for 5 seconds | $T_L$ | 260 | ℃ |
| Operating Junction and Storage Temperature Range | $T_J$, $T_{STG}$ | -55~150 | ℃ |
| **Thermal Resistance Rating** | | | |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 62.5 | ℃/ W |

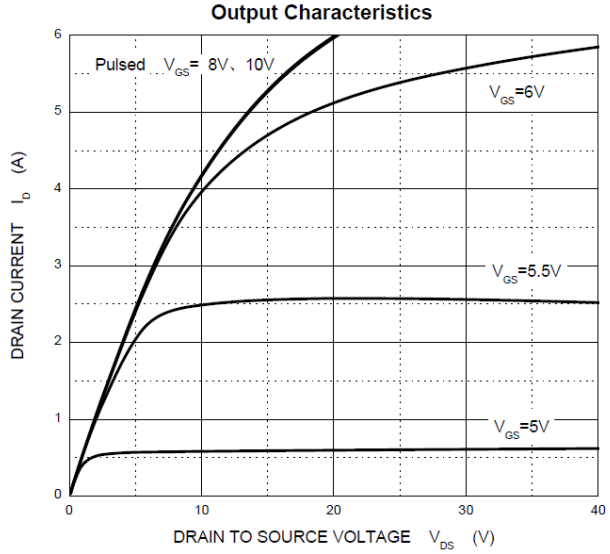
## ELECTRICAL CHARACTERISTICS ($T_J$=25℃ unless otherwise specified)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $B_{VDSS}$ | 600 | - | - | V | $V_{GS}$=0, $I_D$=250μA |
| Diode Forward Voltage [2] | $V_{SD}$ | - | - | 1.5 | V | $V_{GS}$=0, $I_S$=4A |
| Drain-Source Leakage Current | $I_{DSS}$ | - | - | 25 | μA | $V_{DS}$=600V, $V_{GS}$=0 |
| Gate-Source Forward | $I_{GSSF}$ | - | - | 100 | nA | $V_{DS}$=0V, $V_{GS}$=30V |
| Gate-Source Reverse | $I_{GSSR}$ | - | - | -100 | nA | $V_{DS}$=0V, $V_{GS}$= -30V |
| **On Characteristics [2]** | | | | | | |
| Gate-Threshold Voltage | $V_{GS(th)}$ | 2 | - | 4 | V | $V_{DS}$=$V_{GS}$, $I_D$=250μA |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | - | 2 | 3 | Ω | $V_{GS}$=10V, $I_D$=2A |
| Forward Transconductance | $g_{FS}$ | 2 | 2.6 | - | S | $V_{DS}$=50V, $I_D$=2A |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | - | 540 | - | pF | $V_{DS}$=25V<br>$V_{GS}$=0<br>f=1MHz |
| Output Capacitance | $C_{oss}$ | - | 125 | - | | |
| Reverse Transfer Capacitance | $C_{rss}$ | - | 8 | - | | |
| **Switching Characteristics** | | | | | | |
| Total Gate Charge | $Q_g$ | - | 5 | - | nC | $V_{DS}$=480V<br>$V_{GS}$=10V<br>$I_D$=4A |
| Gate-Source Charge | $Q_{gs}$ | - | 2.7 | - | | |
| Gate-Drain Charge | $Q_{gd}$ | - | 2 | - | | |
| Turn-on Delay Time | $T_{d(on)}$ | - | 12 | - | nS | $V_{DD}$=300V<br>$V_{GS}$=10V<br>$R_G$=9.1Ω<br>$I_D$=4A |
| Rise Time | $T_r$ | - | 7 | - | | |
| Turn-off Delay Time | $T_{d(off)}$ | - | 19 | - | | |
| Fall Time | $T_f$ | - | 10 | - | | |

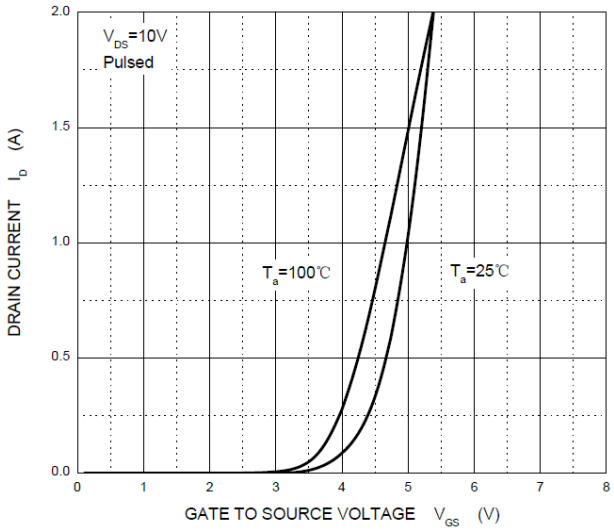
Notes:
1. $E_{AS}$ condition : L=30mH, $I_L$=4A, $V_{DD}$=100V, $V_{GS}$=10V, $R_G$=25Ω, Starting $T_J$=25℃.
2. Pulse Test : Pulse width≦300μS, duty cycle≦2%.

## CHARACTERISTIC CURVES

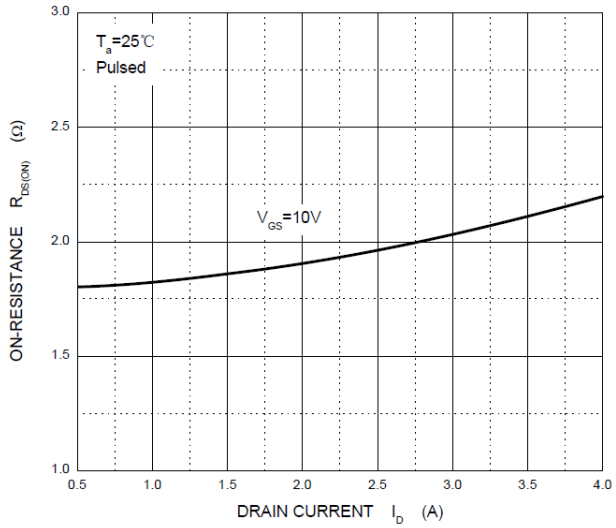
Output Characteristics



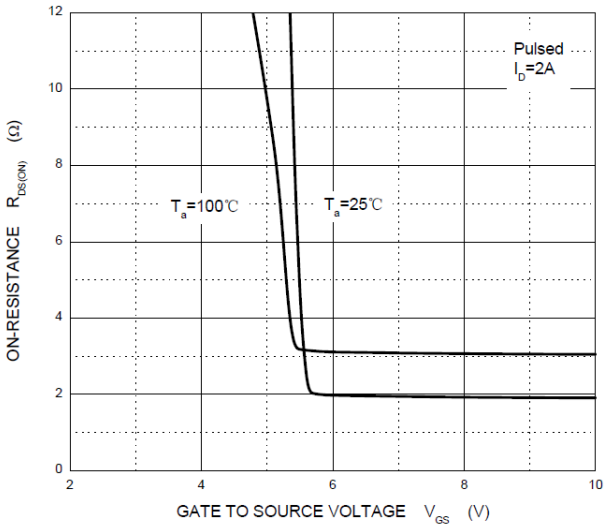

Transfer Characteristics



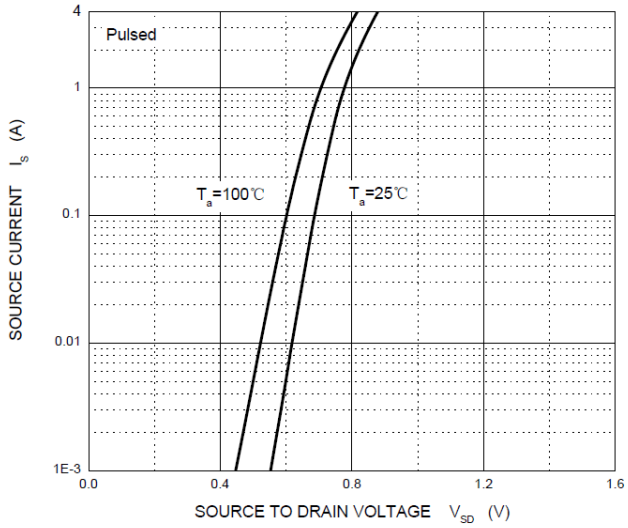

$R_{DS(ON)}$ —— $I_D$




$R_{DS(ON)}$ —— $V_{GS}$




$I_S$ —— $V_{SD}$




Threshold Voltage