Elektronische Bauelemente

# SSD10N20-400D-C

**9.2A, 200V, $R_{DS(ON)}$ 400mΩ**
**N-Ch Enhancement Mode Power MOSFET**

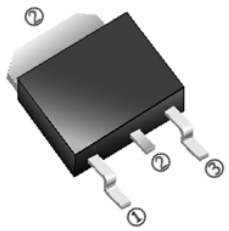
RoHS Compliant Product
A suffix of "-C" specifies halogen free

## DESCRIPTION

These miniature surface mount MOSFETs utilize a high cell density trench process to provide Low $R_{DS(on)}$ and to ensure minimal power loss and heat dissipation.

Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

**TO-252(D-Pack)**

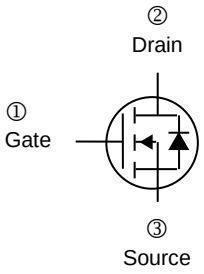


## FEATURES

- Low $R_{DS(on)}$ provides higher efficiency and extends battery life.
- Low thermal impedance copper lead frame DPAK saves board space.
- Fast switching speed.
- High performance trench technology.

## PACKAGE INFORMATION

| Package | MPQ | Leader Size |
|---|---|---|
| TO-252 | 2.5K | 13 inch |




## ORDER INFORMATION

| Part Number | Type |
|---|---|
| SSD10N20-400D-C | Lead (Pb)-free and Halogen-free |

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

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 200 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $T_C$=25°C | $I_D$ | 9.2 | A |
| Pulsed Drain Current [2] | | $I_{DM}$ | 50 | A |
| Continuous Source Current (Diode Conduction) | | $I_S$ | 45 | A |
| Total Power Dissipation | $T_C$=25°C | $P_D$ | 50 | W |
| Operating Junction & Storage Temperature Range | | $T_J$, $T_{STG}$ | -55~175 | °C |
| **Thermal Resistance Rating** | | | | |
| Maximum Thermal Resistance from Junction-Ambient [1] | | $R_{\theta JA}$ | 50 | °C / W |
| Maximum Thermal Resistance from Junction-Case | | $R_{\theta JC}$ | 3 | °C / W |

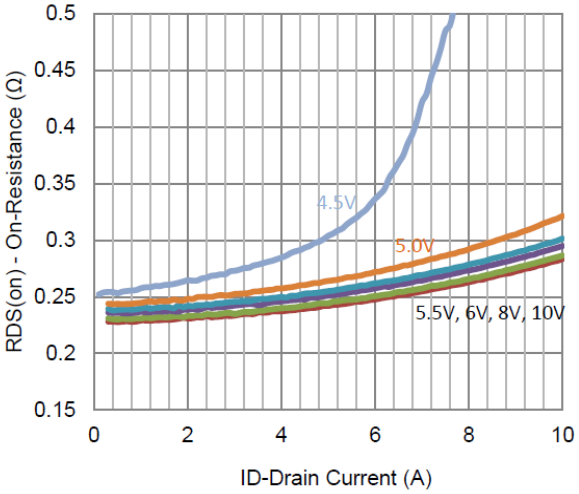
Notes:
1. The surface of the device is mounted on a 1" x 1" FR4 Board.
2. The pulse width is limited by the maximum junction temperature.

## ELECTRICAL CHARACTERISTICS ($T_A$=25°C unless otherwise specified)

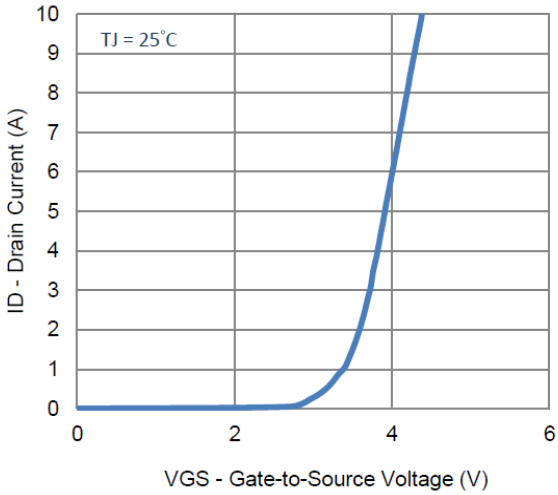
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Gate-Threshold Voltage | $V_{GS(th)}$ | 1 | - | 3.5 | V | $V_{DS}$=$V_{GS}$, $I_D$=250μA |
| Gate-Body Leakage Current | $I_{GSS}$ | - | - | ±10 | μA | $V_{DS}$=0V, $V_{GS}$= ±20V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | - | - | 1 | μA | $V_{DS}$=160V, $V_{GS}$=0 |
| | | - | - | 25 | | $V_{DS}$=160V, $V_{GS}$=0, $T_J$=55°C |
| On-State Drain Current [1] | $I_{D(on)}$ | 34 | - | - | A | $V_{DS}$=5V, $V_{GS}$=10V |
| Drain-Source On-Resistance [1] | $R_{DS(ON)}$ | - | - | 400 | mΩ | $V_{GS}$=10V, $I_D$=4A |
| | | - | - | 450 | | $V_{GS}$=5.5V, $I_D$=3.5A |
| Forward Transconductance [1] | $g_{fs}$ | - | 10 | - | S | $V_{DS}$=15V, $I_D$=4A |
| Diode Forward Voltage | $V_{SD}$ | - | 0.95 | - | V | $I_S$=23A, $V_{GS}$=0 |
| Input Capacitance | $C_{iss}$ | - | 409 | - | pF | $V_{GS}$=0<br>$V_{DS}$=15V<br>f =1MHz |
| Output Capacitance | $C_{oss}$ | - | 59 | - | | |
| Reverse Transfer Capacitance | $C_{rss}$ | - | 10 | - | | |
| Total Gate Charge | $Q_g$ | - | 6 | - | nC | $V_{DS}$=100V<br>$V_{GS}$=5.5V<br>$I_D$=4A |
| Gate-Source Charge | $Q_{gs}$ | - | 2 | - | | |
| Gate-Drain Charge | $Q_{gd}$ | - | 3.3 | - | | |
| Turn-on Delay Time | $T_{d(on)}$ | - | 5.7 | - | nS | $V_{DD}$=100V<br>$V_{GEN}$=10V<br>$R_L$=5Ω<br>$R_{GEN}$=6Ω |
| Rise Time | $T_r$ | - | 29 | - | | |
| Turn-off Delay Time | $T_{d(off)}$ | - | 10.8 | - | | |
| Fall Time | $T_f$ | - | 35.8 | - | | |

Note:
1. Pulse test：Pulse width≦ 300μs, duty cycle≦ 2%.

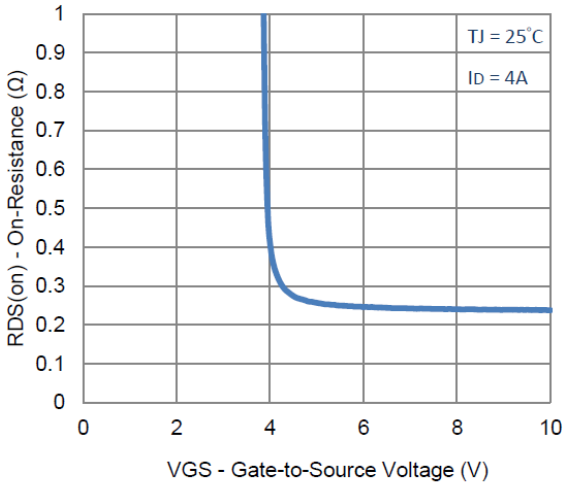
## CHARACTERISTIC CURVE



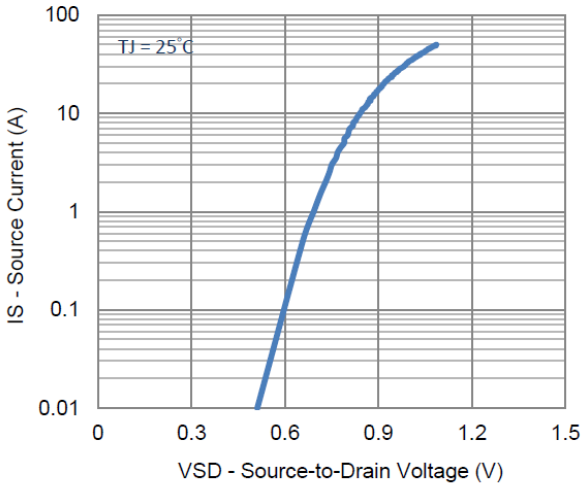

**1. On-Resistance vs. Drain Current**



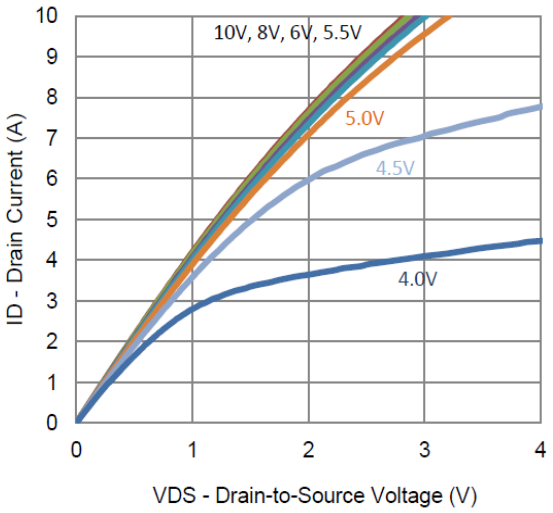

**2. Transfer Characteristics**



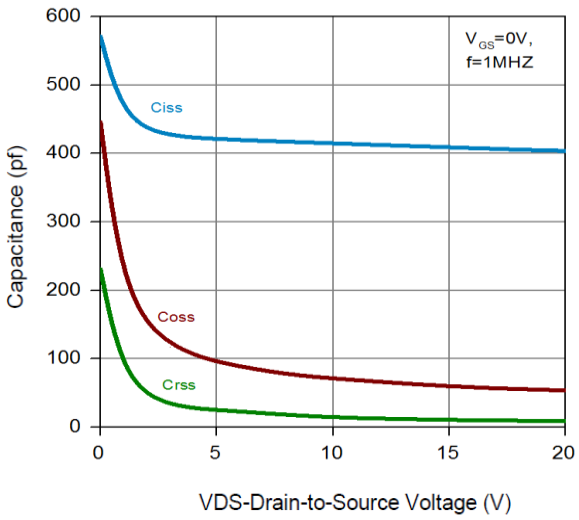

**3. On-Resistance vs. Gate-to-Source Voltage**




**4. Drain-to-Source Forward Voltage**

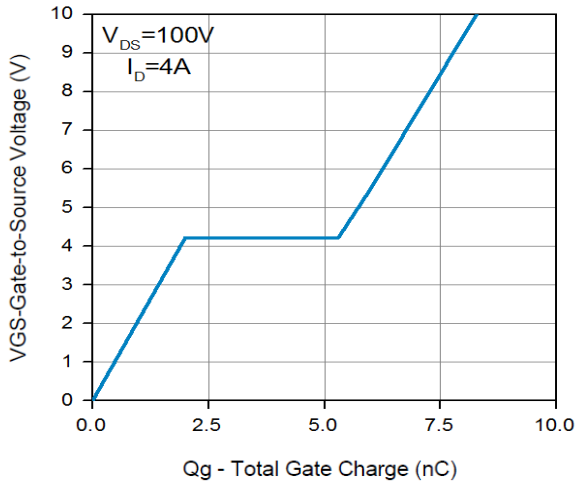



**5. Output Characteristics**

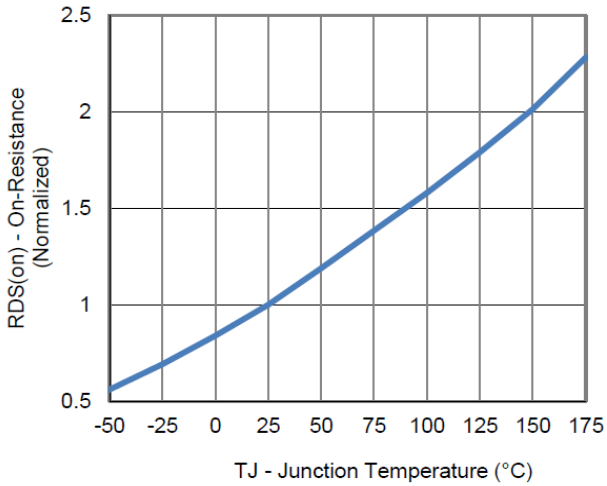



**6. Capacitance**

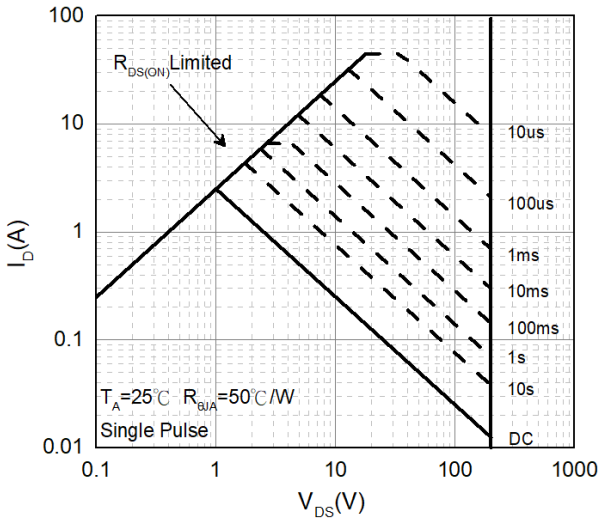
## CHARACTERISTIC CURVE



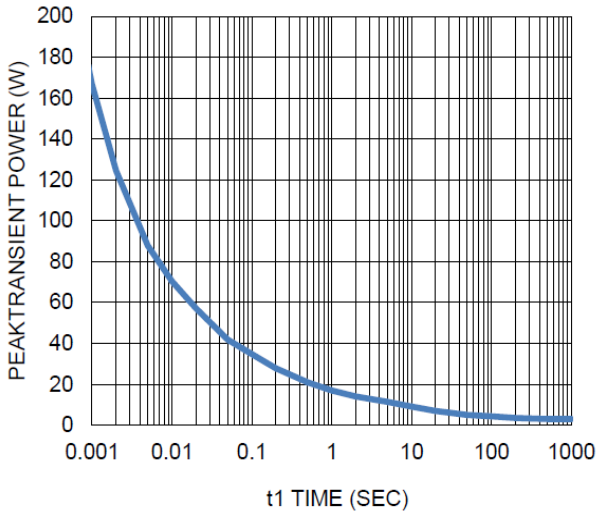

**7. Gate Charge**



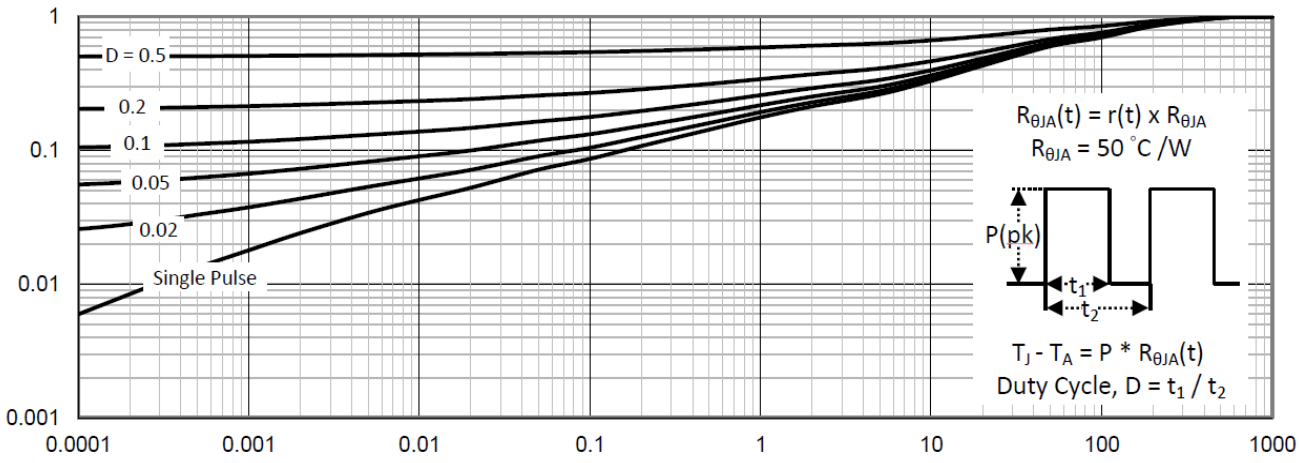

**8. Normalized On-Resistance Vs Junction Temperature**




**9. Safe Operating Area**



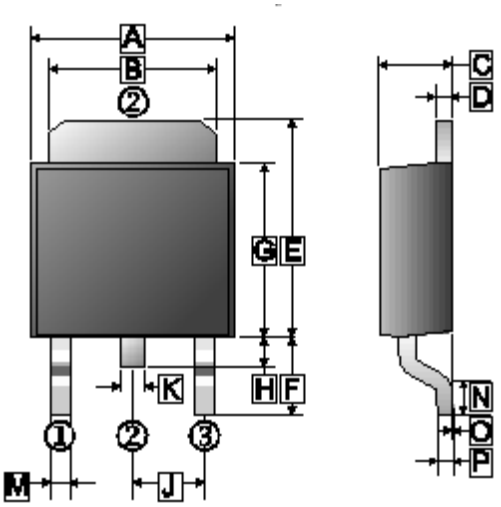

**10. Single Pulse Maximum Power Dissipation**




**11. Normalized Thermal Transient Junction to Ambient**

## PACKAGE OUTLINE DIMENSIONS

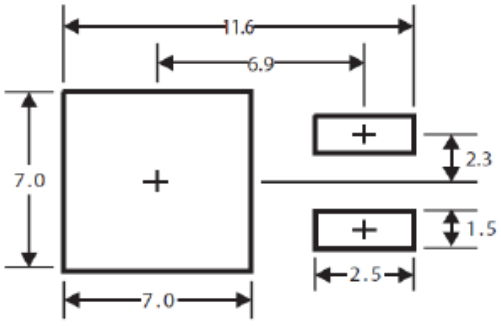
**TO-252**




| REF. | Millimeter | |
|---|---|---|
| | Min. | Max. |
| A | 6.30 | 6.90 |
| B | 4.95 | 5.53 |
| C | 2.10 | 2.50 |
| D | 0.40 | 0.90 |
| E | 6.00 | 7.70 |
| F | 2.90 REF. | |
| G | 5.40 | 6.40 |
| H | 0.60 | 1.20 |
| J | 2.30 REF. | |
| K | 0.89 REF. | |
| M | 0.45 | 1.14 |
| N | 1.55 TYP. | |
| O | 0 | 0.15 |
| P | 0.58 REF. | |

## MOUNTING PAD LAYOUT

**TO-252**




*Dimensions in millimeters