Elektronische Bauelemente

# SSD40P04J

**-40A, -40V, $R_{DS(ON)}$ 14 mΩ**
**P-Ch Enhancement Mode Power MOSFET**

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

## DESCRIPTION

SSD40P04J uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge.

This device is well suited for high current load applications.

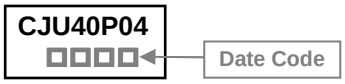
## FEATURES

- High density cell design for ultra low $R_{DS(ON)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high $E_{AS}$
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

## APPLICATIONS

- Power switching applications
- Hard switched and high frequency circuits
- Uninterruptible power supply

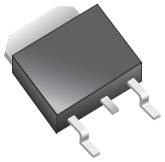
## MARKING

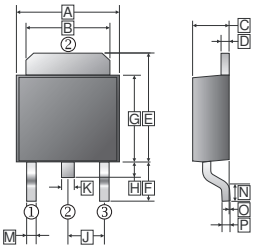



## PACKAGE INFORMATION

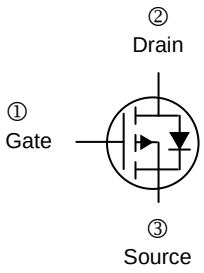
| Package | MPQ | Leader Size |
|---|---|---|
| TO-252 | 2.5K | 13 inch |

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






| REF. | Millimeter | | REF. | Millimeter | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. |
| A | 6.35 | 6.90 | J | 2.336 REF. | |
| B | 4.95 | 5.50 | K | 0.89 REF. | |
| C | 2.10 | 2.50 | M | 0.50 | 1.14 |
| D | 0.43 | 0.9 | N | 1.3 | 1.8 |
| E | 6.0 | 7.5 | O | 0 | 0.13 |
| F | 2.90 REF | | P | 0.58 REF. | |
| G | 5.40 | 6.40 | | | |
| H | 0.60 | 1.20 | | | |




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

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -40 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $I_D$ | -40 | A |
| Pulsed Drain Current | $I_{DM}$ | -160 | A |
| Single Pulsed Avalanche Energy [1] | $E_{AS}$ | 544 | mJ |
| Power Dissipation | $P_D$ | 1.25 | W |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 100 | ℃ / W |
| Lead Temperature for Soldering Purposes@ 1/8'' from case for 10s | $T_L$ | 260 | ℃ |
| Junction and Storage Temperature Range | $T_J$, $T_{STG}$ | 150, -55~150 | ℃ |

Notes:
1. $E_{AS}$ condition: $V_{DD}$=20V, L=1mH, $R_G$=25Ω, Starting $T_J$=25℃

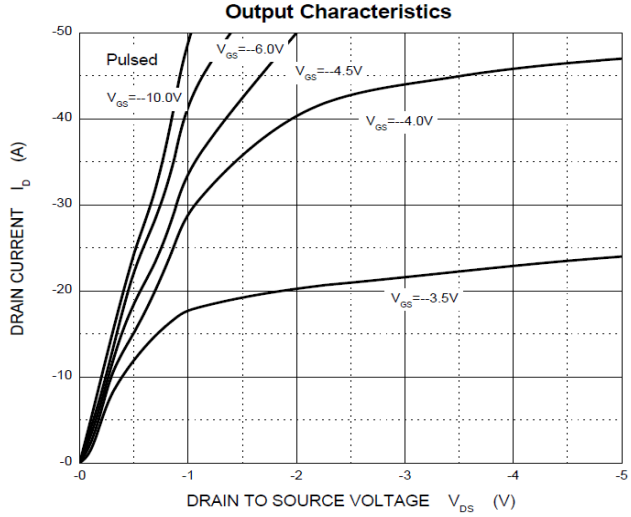
## ELECTRICAL CHARACTERISTICS ($T_A$=25℃ unless otherwise specified)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | -40 | - | - | V | $V_{GS}$=0, $I_D$= -250μA |
| Drain-Source Leakage Current | $I_{DSS}$ | - | - | -1 | μA | $V_{DS}$= -40V, $V_{GS}$=0 |
| Gate-Source Leakage Current | $I_{GSS}$ | - | - | ±100 | nA | $V_{DS}$=0V, $V_{GS}$= ±20V |
| **On Characteristics** [1] | | | | | | |
| Gate-Threshold Voltage | $V_{GS(th)}$ | -1.5 | -1.85 | -3 | V | $V_{DS}$=$V_{GS}$, $I_D$= -250μA |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | - | 12 | 14 | mΩ | $V_{GS}$= -10V, $I_D$= -12A |
| Forward Transconductance | $g_{fs}$ | 34 | - | - | S | $V_{DS}$= -5V, $I_D$= -12A |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | - | 2960 | - | pF | $V_{DS}$= -20V<br>$V_{GS}$=0V<br>f=1MHz |
| Output Capacitance | $C_{oss}$ | - | 370 | - | | |
| Reverse Transfer Capacitance | $C_{rss}$ | - | 310 | - | | |
| **Switching Characteristics** | | | | | | |
| Total Gate Charge | $Q_g$ | - | 72 | - | nC | $V_{DS}$= -20V<br>$V_{GS}$= -10V<br>$I_D$= -12A |
| Gate-Source Charge | $Q_{gs}$ | - | 14 | - | | |
| Gate-Drain (“Miller”) Charge | $Q_{gd}$ | - | 15 | - | | |
| Turn-on Delay Time | $T_{d(on)}$ | - | 10 | - | nS | $V_{DD}$= -20V<br>$V_{GS}$= -10V<br>$R_G$=3Ω<br>$I_D$= -20A |
| Rise Time | $T_r$ | - | 18 | - | | |
| Turn-off Delay Time | $T_{d(off)}$ | - | 38 | - | | |
| Fall Time | $T_f$ | - | 24 | - | | |
| **Source-Drain Diode Characteristics** | | | | | | |
| Drain-Source Diode Forward Voltage [1] | $V_{SD}$ | - | - | -1.2 | V | $I_S$= -20A, $V_{GS}$=0 |
| Continuous Drain-Source Diode Forward Current [2] | $I_S$ | - | - | -40 | A | |
| Pulsed Drain-Source Diode Forward Current | $I_{SM}$ | - | - | -160 | A | |

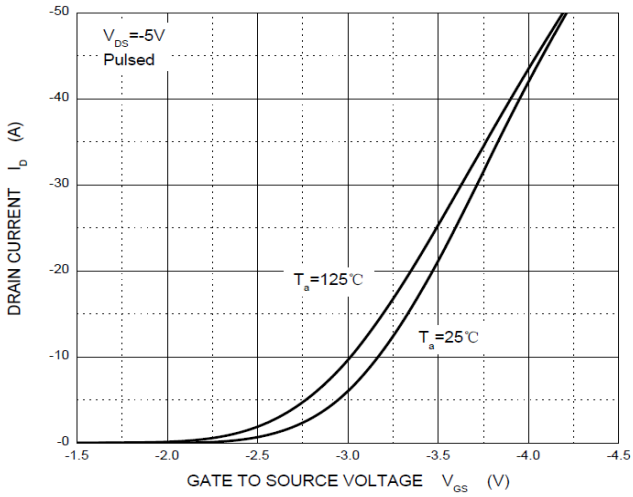
Notes:
1. Pulse Test: Pulse width≦300μs, duty cycle≦2%.
2. The surface of the device is mounted on a FR4 board, t≦10sec.

## CHARACTERISTIC CURVE

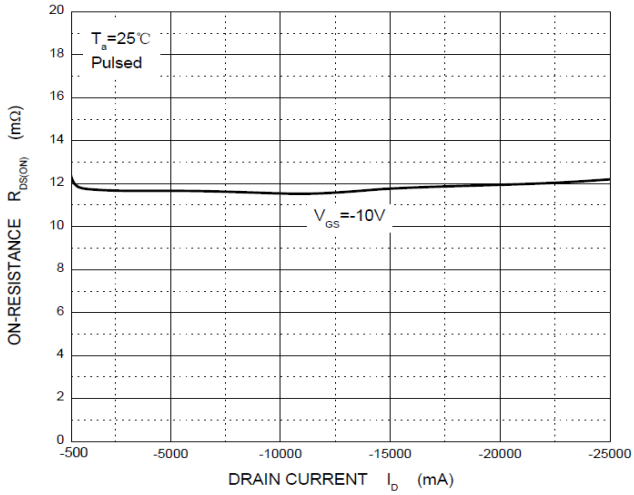
**Output Characteristics**



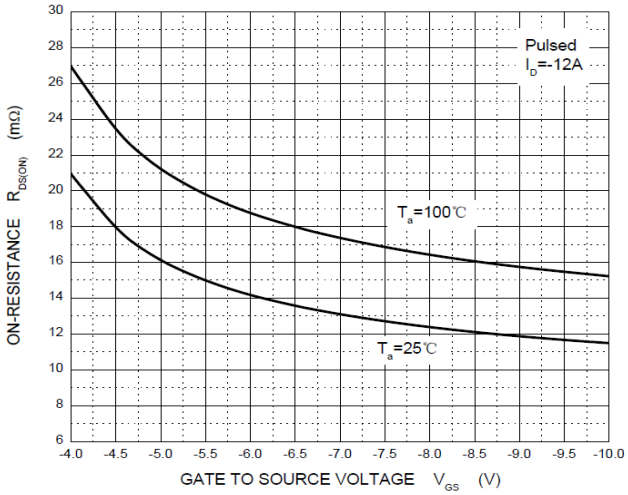

**Transfer Characteristics**



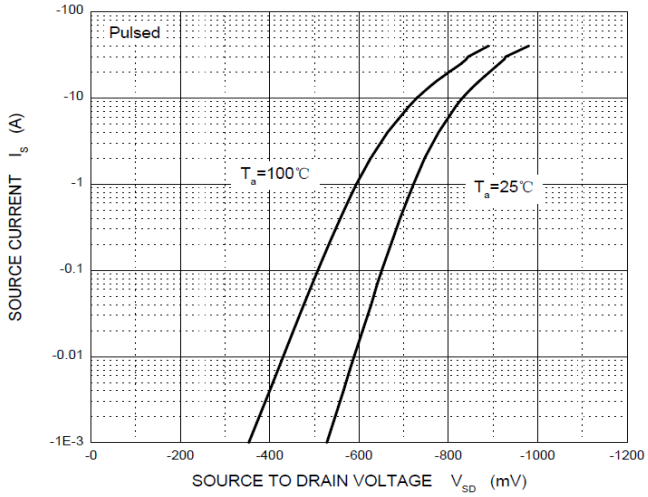

**$R_{DS(ON)}$ —— $I_D$**




**$R_{DS(ON)}$ —— $V_{GS}$**




**$I_S$ —— $V_{SD}$**




**Threshold Voltage**