Elektronische Bauelemente

# SSPS7331P-C

**-13.4A, -30V, $R_{DS(ON)}$ 13mΩ**
**P-Ch Enhancement Mode Power MOSFET**

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

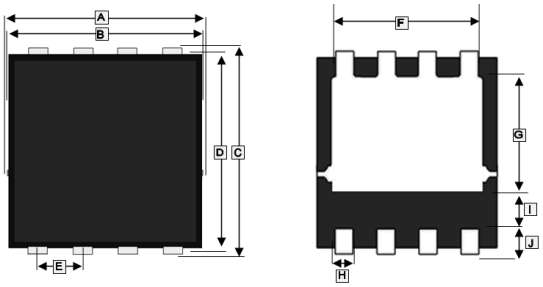
## FEATURES

- Low $R_{DS(ON)}$ provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe DFN3x3-8PP saves board space
- Fast switching speed
- High performance trench technology

## APPLICATION

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

**DFN3x3-8PP**




| REF. | Millimeter | | REF. | Millimeter | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. |
| A | 3.00 | 3.40 | G | 1.78 | 1.98 |
| B | 3.00 | 3.20 | H | 0.25 | 0.35 |
| C | 3.25 | 3.45 | I | 0.35 TYP. | |
| D | 3.00 | 3.20 | J | 0.60 TYP. | |
| E | 0.65 BSC. | | K | 0.10 | 0.25 |
| F | 2.39 | 2.59 | L | 0.70 | 0.80 |

## MARKING

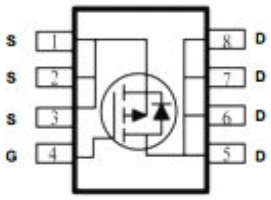
331□□□□ ← □ = Date code

## PACKAGE INFORMATION

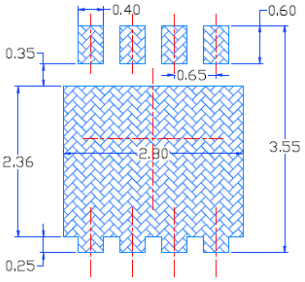
| Package | MPQ | Leader Size |
|---|---|---|
| DFN3x3-8PP | 3K | 13 inch |

## ORDER INFORMATION

| Part Number | Type |
|---|---|
| SSPS7331P-C | Lead (Pb)-free and Halogen-free |




**Mounting Pad Layout**




*Dimensions in millimeters

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

| Parameter | | Symbol | Ratings | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current [1] | $T_A$=25℃ | $I_D$ | -13.4 | A |
| | $T_A$=70℃ | | -10.2 | |
| Pulsed Drain Current [2] | | $I_{DM}$ | -50 | A |
| Continuous Source Current (Diode Conduction) [1] | | $I_S$ | -4.6 | A |
| Total Power Dissipation [1] | $T_A$=25℃ | $P_D$ | 3.5 | W |
| | $T_A$=70℃ | | 2 | |
| Operating Junction & Storage Temperature Range | | $T_J$, $T_{STG}$ | -55~150 | ℃ |
| **Thermal Resistance Ratings** | | | | |
| Thermal Resistance Junction-Ambient (Max.) [1] | t≦10sec | $R_{\theta JA}$ | 35 | ℃/W |
| | Steady State | | 81 | |

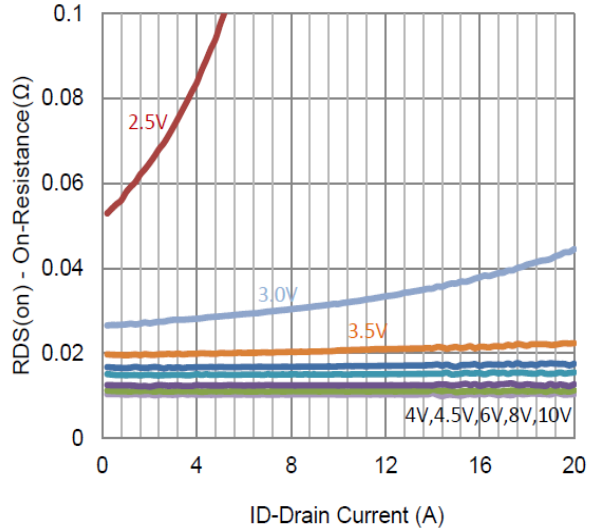
Notes:
1. Surface Mounted on 1" x 1" FR-4 Board.
2. Pulse width limited by maximum junction temperature.

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

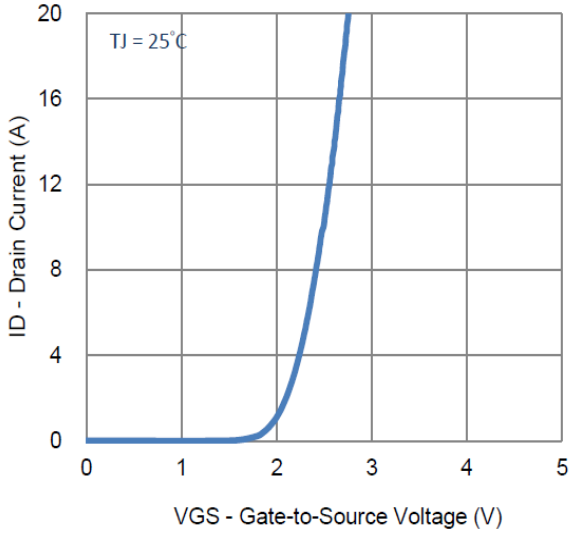
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Gate-Threshold Voltage | $V_{GS(th)}$ | -1 | - | - | V | $V_{DS}$=$V_{GS}$, $I_D$= -250μA |
| Gate-Body Leakage Current | $I_{GSS}$ | - | - | ±100 | nA | $V_{DS}$=0, $V_{GS}$= ±25V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | - | - | -1 | μA | $V_{DS}$= -24V, $V_{GS}$=0 |
| | | - | - | -25 | | $V_{DS}$= -24V, $V_{GS}$=0, $T_J$=55℃ |
| On-State Drain Current [1] | $I_{D(on)}$ | -6.7 | - | - | A | $V_{DS}$= -5V, $V_{GS}$= -10V |
| Drain-Source On-Resistance [1] | $R_{DS(ON)}$ | - | - | 13 | mΩ | $V_{GS}$= -10V, $I_D$= -10.7A |
| | | - | - | 19 | | $V_{GS}$= -4.5V, $I_D$= -8.9A |
| Forward Transconductance [1] | $g_{fs}$ | - | 25 | - | S | $V_{DS}$= -15V, $I_D$= -10.7A |
| Diode Forward Voltage | $V_{SD}$ | - | -0.75 | - | V | $I_S$= -2.3A, $V_{GS}$=0 |
| Input Capacitance | $C_{iss}$ | - | 2186 | - | pF | $V_{DS}$= -15V<br>$V_{GS}$=0V<br>f=1MHz |
| Output Capacitance | $C_{oss}$ | - | 373 | - | | |
| Reverse Transfer Capacitance | $C_{rss}$ | - | 336 | - | | |
| Total Gate Charge | $Q_g$ | - | 34 | - | nC | $V_{DS}$= -15V<br>$V_{GS}$= -4.5V<br>$I_D$= -10.7A |
| Gate-Source Charge | $Q_{gs}$ | - | 7.8 | - | | |
| Gate-Drain Charge | $Q_{gd}$ | - | 16 | - | | |
| Turn-On Delay Time | $T_{d(on)}$ | - | 8 | - | nS | $V_{DD}$= -15V<br>$I_D$= -10.7A<br>$V_{GEN}$= -10V<br>$R_{GEN}$=6Ω<br>$R_L$=1.5Ω |
| Rise Time | $T_r$ | - | 50 | - | | |
| Turn-Off Delay Time | $T_{d(off)}$ | - | 96 | - | | |
| Fall Time | $T_f$ | - | 59 | - | | |

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

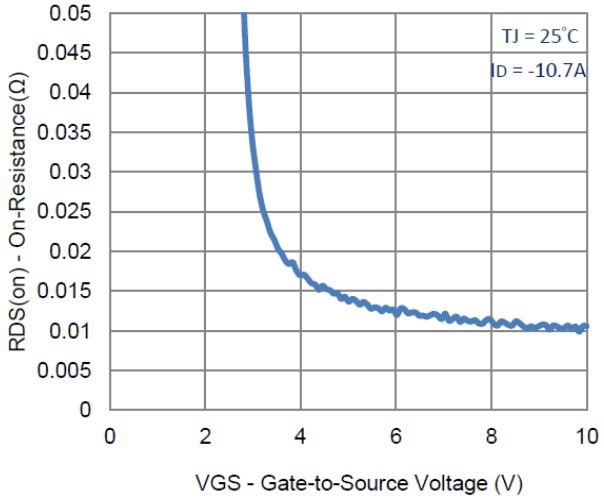
## CHARACTERISTIC CURVE



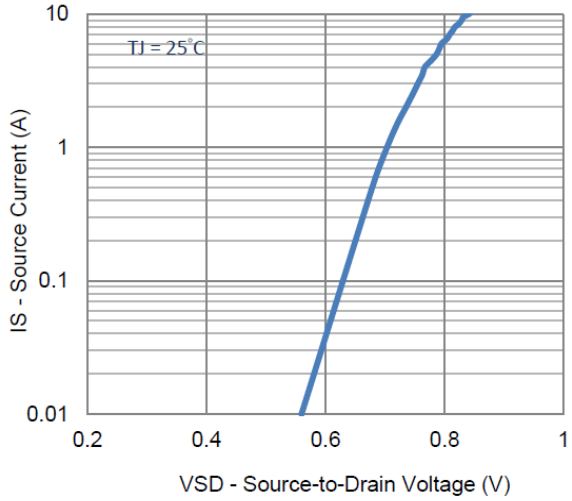

**1. On-Resistance vs. Drain Current**



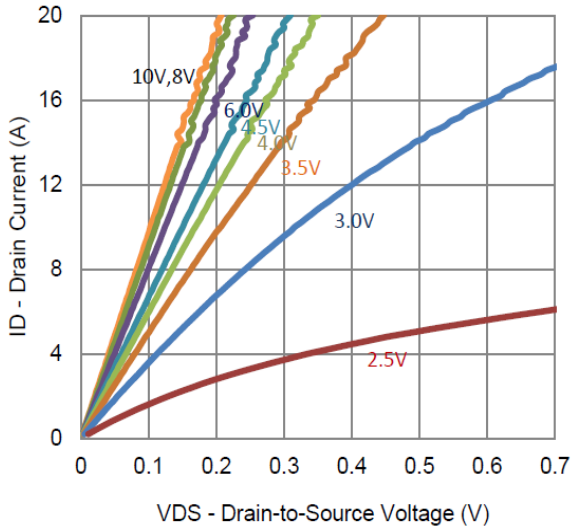

**2. Transfer Characteristics**



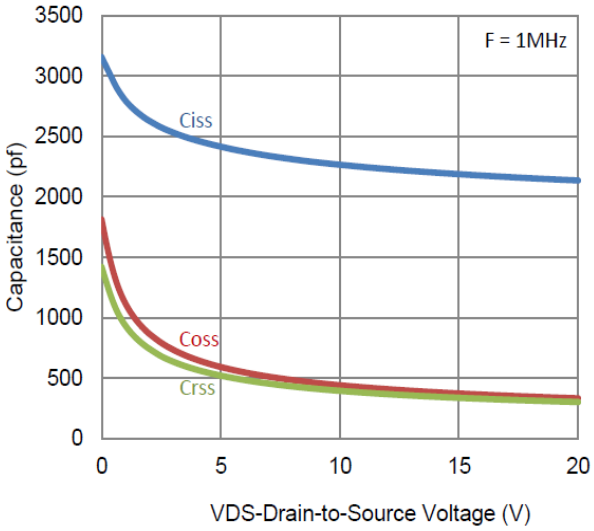

**3. On-Resistance vs. Gate-to-Source Voltage**




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

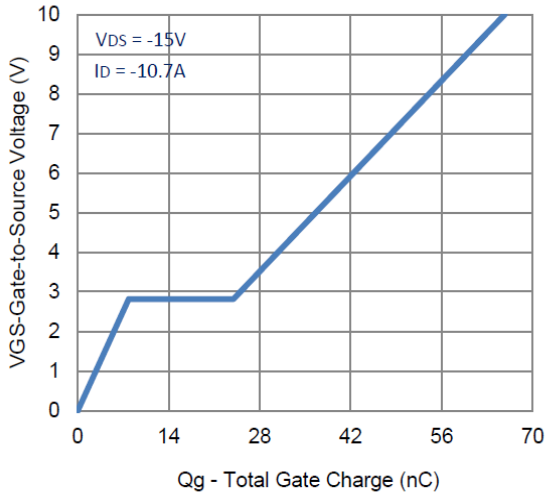



**5. Output Characteristics**

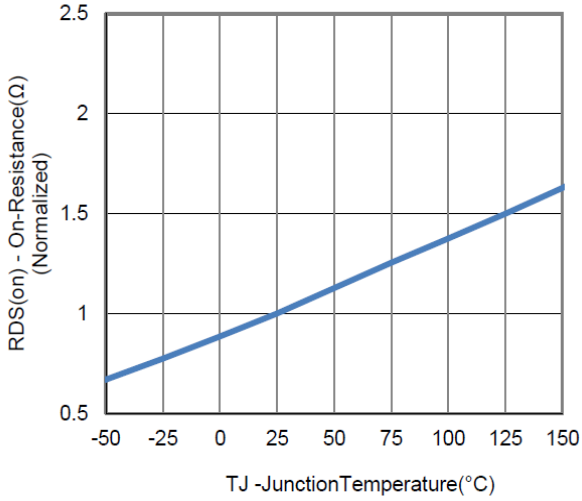



**6. Capacitance**

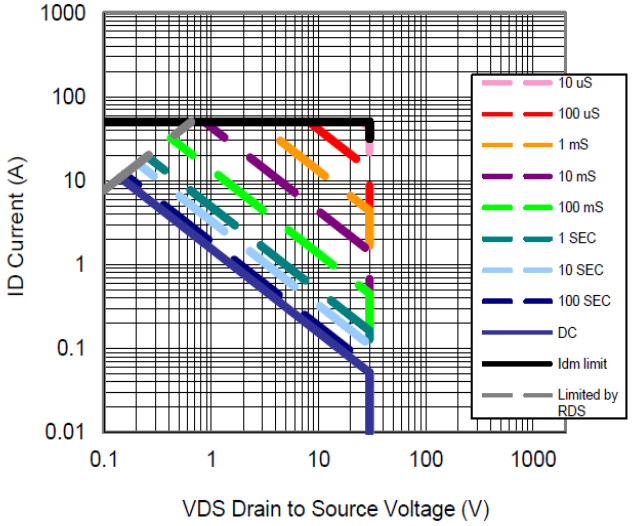
## CHARACTERISTIC CURVE



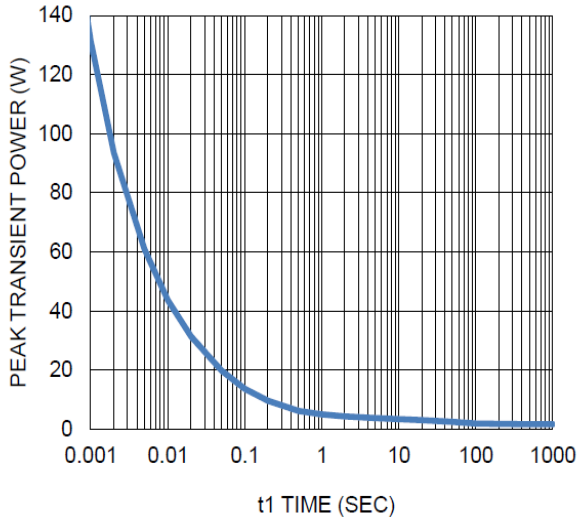

**7. Gate Charge**



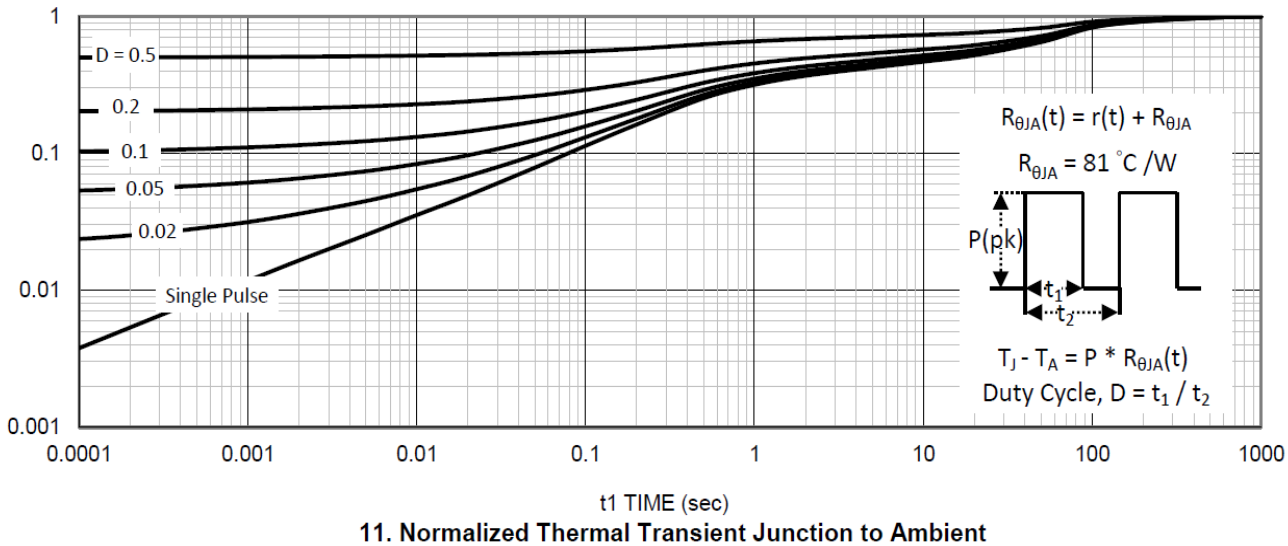

**8. Normalized On-Resistance Vs Junction Temperature**




**9. Safe Operating Area**




**10. Single Pulse Maximum Power Dissipation**




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