Elektronische Bauelemente

# SSPR48P02-C

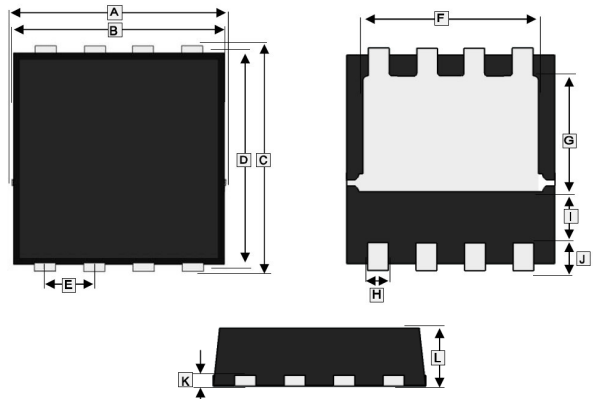
**-48A, -20V, $R_{DS(ON)}$ 10mΩ**
**P-Ch Enhancement Mode Power MOSFET**

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

## DESCRIPTION

The SSPR48P02-C provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness. The SPR-8PP package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

**SPR-8PP**

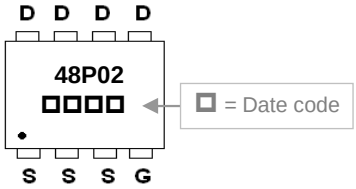



| REF. | Millimeter | | REF. | Millimeter | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. |
| A | 3.00 | 3.40 | G | 1.35 | 1.98 |
| B | 3.00 | 3.25 | H | 0.24 | 0.35 |
| C | 3.20 | 3.45 | I | 0.35 TYP. | |
| D | 3.00 | 3.20 | J | 0.60 TYP. | |
| E | 0.65 BSC. | | K | 0.10 | 0.25 |
| F | 2.39 | 2.60 | L | 0.70 | 0.90 |

## FEATURES

- Lower Gate Charge
- Simple Drive Requirement
- Fast Switching Characteristic

## MARKING

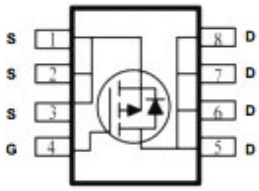



## PACKAGE INFORMATION

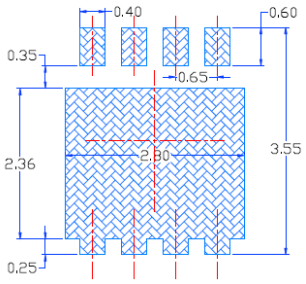
| Package | MPQ | Leader Size |
|---|---|---|
| SPR-8PP | 3K | 13 inch |

## ORDER INFORMATION

| Part Number | Type |
|---|---|
| SSPR48P02-C | Lead (Pb)-free and Halogen-free |




**Mounting Pad Layout**




*Dimensions in millimeters

## MAXIMUM RATINGS

| Parameter | | Symbol | Ratings | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -20 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±8 | V |
| Continuous Drain Current @$V_{GS}$= -4.5V [1] | $T_C$=25℃ | $I_D$ | -48 | A |
| | $T_C$=70℃ | | -38 | |
| Pulsed Drain Current [2] | | $I_{DM}$ | -100 | A |
| Total Power Dissipation [3] | $T_C$=25℃ | $P_D$ | 29 | W |
| Operating Junction & Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 ~ 150 | ℃ |
| **Thermal Resistance Ratings** | | | | |
| Thermal Resistance Junction-Ambient [1] | | $R_{\theta JA}$ | 75 | ℃/W |
| Thermal Resistance Junction-Ambient [1] | | | t≦10s, 40 | |
| Thermal Resistance Junction-Case [1] | | $R_{\theta JC}$ | 4.2 | |

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | -20 | - | - | V | $V_{GS}$=0, $I_D$=-250uA |
| Gate Threshold Voltage | $V_{GS(th)}$ | -0.3 | - | -1 | V | $V_{DS}$=$V_{GS}$, $I_D$= -250μA |
| Gate-Body Leakage | $I_{GSS}$ | - | - | ±100 | nA | $V_{DS}$=0V, $V_{GS}$= ±8V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | - | - | -1 | μA | $V_{DS}$= -16V, $V_{GS}$=0V, $T_J$=25℃ |
| Drain-Source On-Resistance [2] | $R_{DS(ON)}$ | - | - | 10 | mΩ | $V_{GS}$= -4.5V, $I_D$= -10A |
| | | - | - | 12.5 | | $V_{GS}$= -2.5V, $I_D$= -8A |
| | | - | - | 16 | | $V_{GS}$= -1.8V, $I_D$= -6A |
| Forward Transconductance | $g_{fs}$ | - | 43 | - | S | $V_{DS}$= -5V, $I_D$= -10A |
| Total Gate Charge | $Q_g$ | - | 63 | - | nC | $I_D$= -10A<br>$V_{DS}$= -15V<br>$V_{GS}$= -4.5V |
| Gate-Source Charge | $Q_{gs}$ | - | 9.1 | - | | |
| Gate-Drain Charge | $Q_{gd}$ | - | 13 | - | | |
| Turn-On Delay Time | $T_{d(on)}$ | - | 15.8 | - | nS | $V_{DD}$= -10V<br>$I_D$= -10A<br>$V_{GS}$= -4.5V<br>$R_G$=3.3Ω |
| Rise Time | $T_r$ | - | 76.8 | - | | |
| Turn-Off Delay Time | $T_{d(off)}$ | - | 193 | - | | |
| Fall Time | $T_f$ | - | 186.4 | - | | |
| Input Capacitance | $C_{iss}$ | - | 5783 | - | pF | $V_{DS}$= -15V<br>$V_{GS}$=0<br>f=1MHz |
| Output Capacitance | $C_{oss}$ | - | 509 | - | | |
| Reverse Transfer Capacitance | $C_{rss}$ | - | 431 | - | | |
| **Source-Drain Diode** | | | | | | |
| Continuous Source Current [1] | $I_S$ | - | - | -48 | A | |
| Pulsed Source Current [2] | $I_{SM}$ | - | - | -100 | A | |
| Diode Forward Voltage [2] | $V_{SD}$ | - | - | -1.2 | V | $V_{GS}$=0V, $I_S$= -1A, $T_J$=25℃ |
| Reverse Recovery Time | $t_{rr}$ | - | 27 | - | nS | $I_F$= -10A, dI/dt=100A/μs,<br>$T_J$=25℃ |
| Reverse Recovery Charge | $Q_{rr}$ | - | 17.8 | - | nC | |

Notes:
1. Surface mounted on a 1 inch$^2$ FR-4 board with 2oz copper.
2. The data tested by pulsed, Pulse Width≤300μs, Duty Cycle≤2%
3. Pulse width limited by maximum junction temperature, Pulse Width≤300μs, Duty Cycle≤2%

## CHARACTERISTIC CURVES

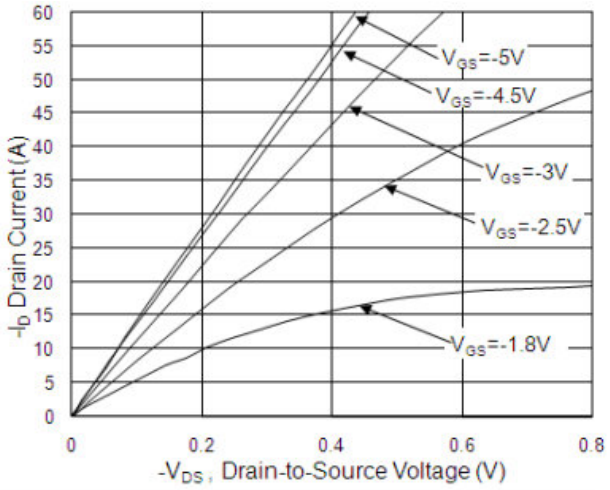



**Fig.1 Typical Output Characteristics**

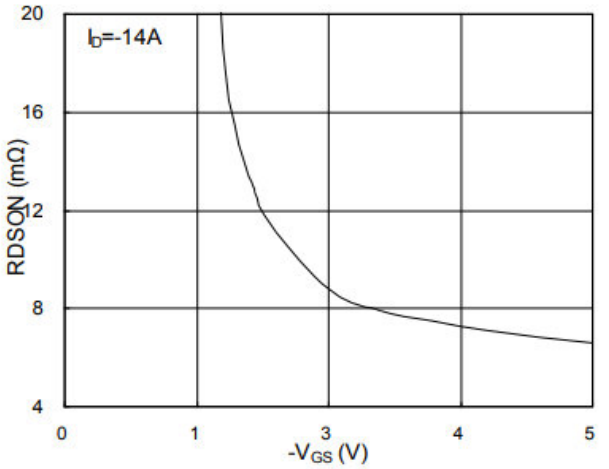



**Fig.2 On-Resistance vs. G-S Voltage**

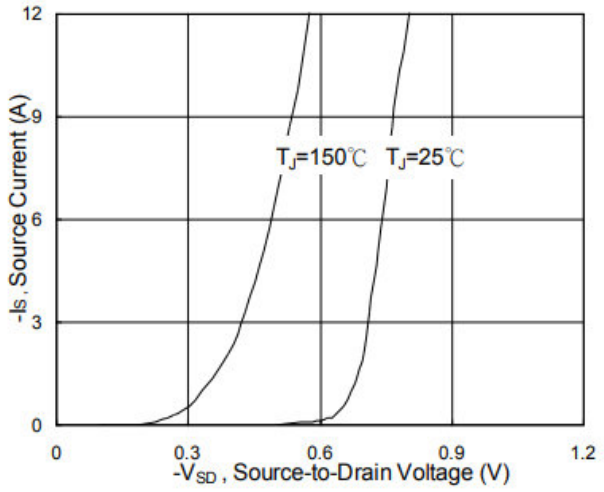



**Fig.3 Forward Characteristics of Reverse**

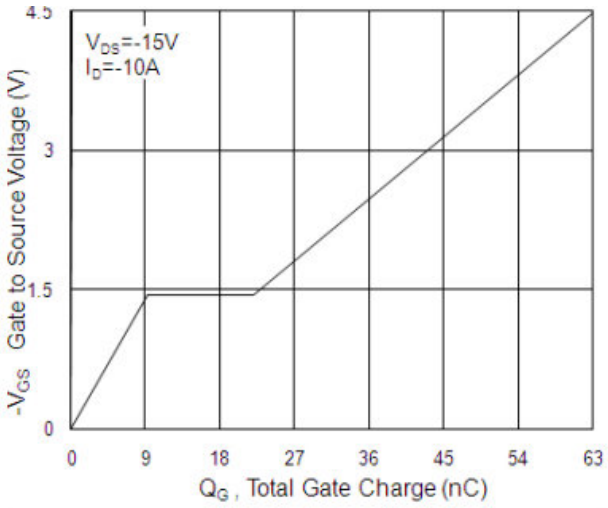



**Fig.4 Gate-charge Characteristics**

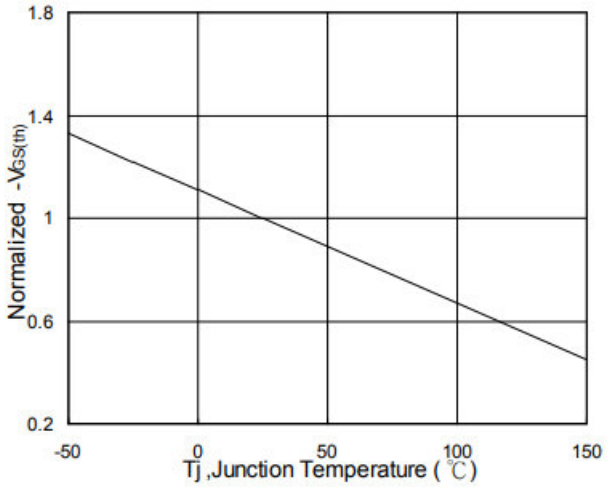



**Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$**

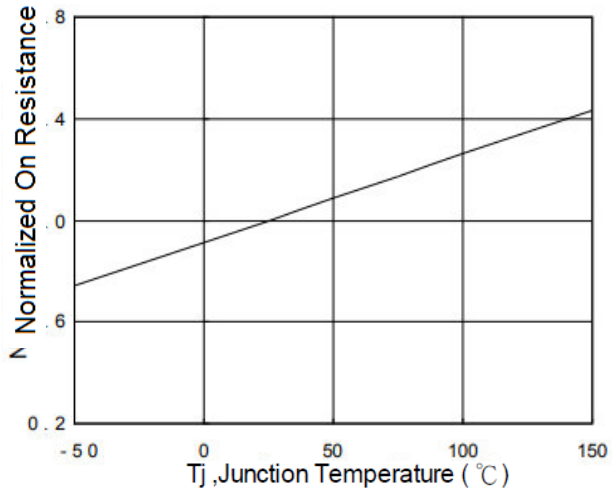



**Fig.6 Normalized $R_{DSON}$ vs. $T_J$**

## CHARACTERISTIC CURVES

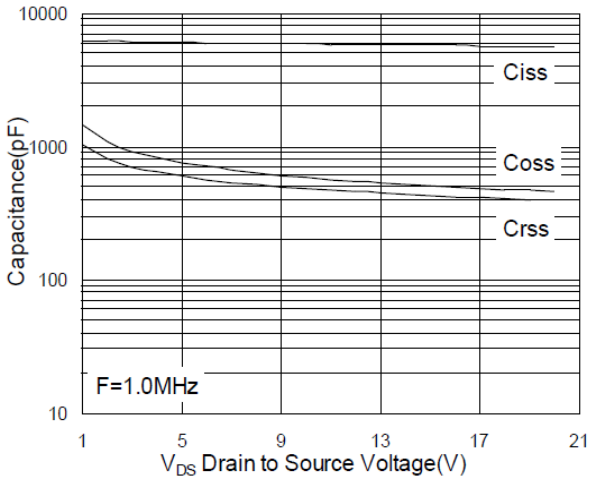



**Fig.7 Capacitance**

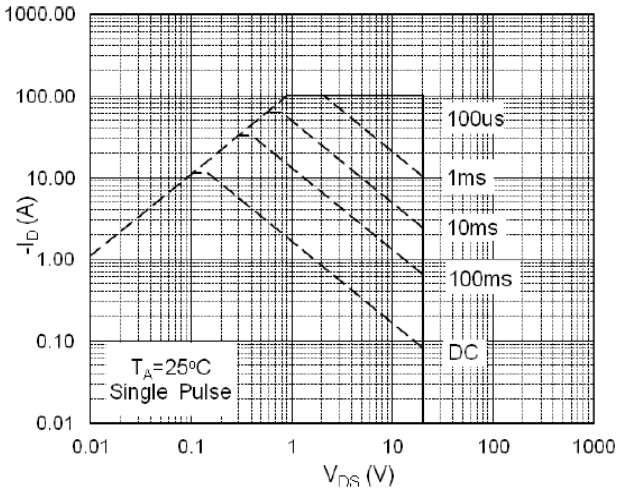



**Fig.8 Safe Operating Area**

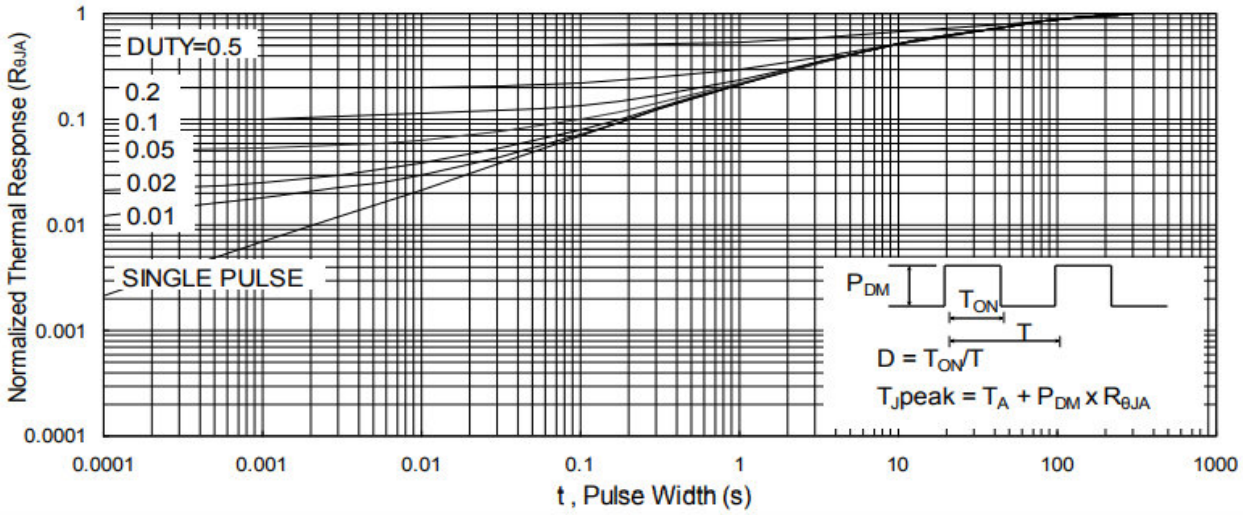



**Fig.9 Normalized Maximum Transient Thermal Impedance**

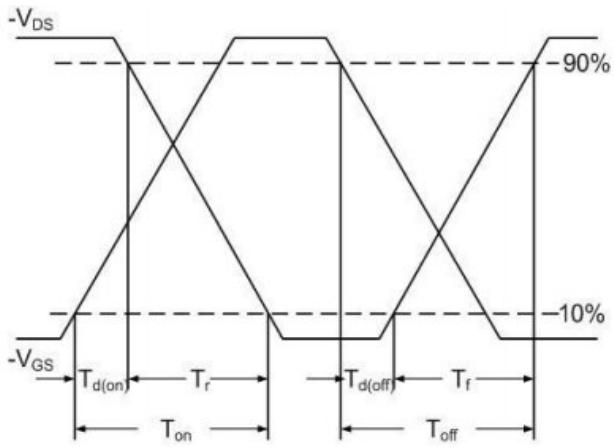



**Fig.10 Switching Time Waveform**

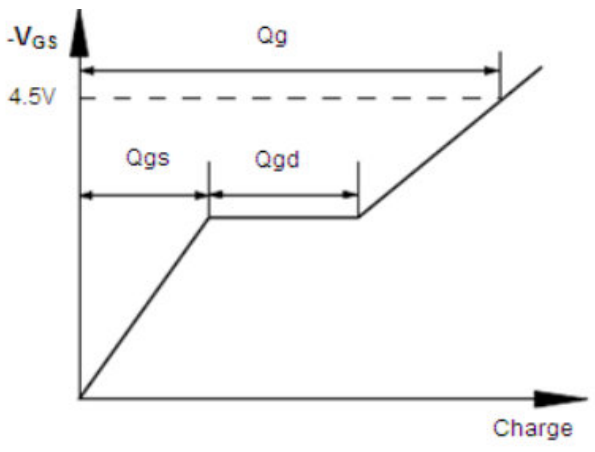



**Fig.11 Gate Charge Waveform**