# 64mΩ, 600V, Super Junction N-Channel Power MOSFET SRC60R064S

## General Description

The Sanrise SRC60R064S is a high voltage power MOSFET, fabricated using advanced super junction technology. The resulting device has extremely low on resistance, low gate charge and fast switching time, making it especially suitable for applications which require superior power density and outstanding efficiency.

The SRC60R064S break down voltage is 600V and it has a high rugged avalanche characteristics. The SRC60R064S is available in TO-263-2, TO-220F, TO-220C and TO-247 packages.

## Features

- Ultra Low $R_{DS(ON)}$ = 64mΩ @ $V_{GS}$ = 10V.
- Ultra Low Gate Charge, Qg=108nC typ.
- Fast switching capability
- Robust design with better EAS performance
- EMI Improved
- Non-automotive Qualified

## Application

- Telecom Power
- EV Charger
- High Power Application

## Symbol

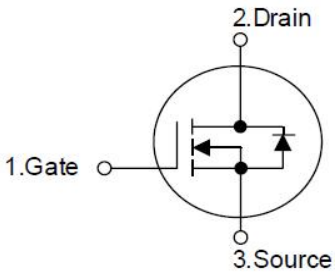


Figure 1 Symbol of SRC60R064S

## Package Type

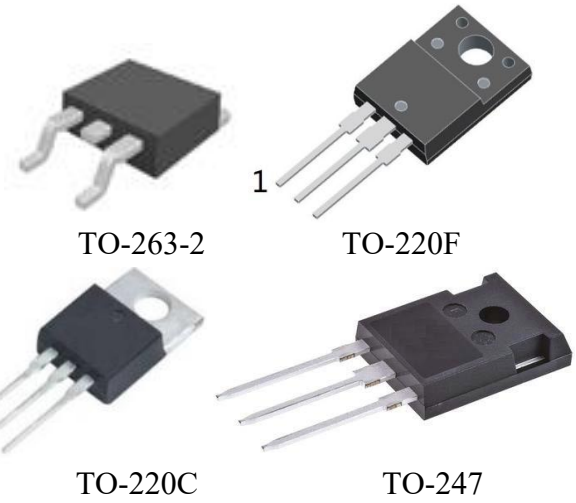


Figure 2 Package Types of SRC60R064S

## Ordering Information

SRC60R064S□□–□

Circuit Type

Package
T: TO-247
S2: TO-263-2
TF: TO-220F
TC: TO-220C

E: Lead Free
G: Green
Blank: Tube
TR: Tape & Reel

| Package | Part Number | Marking ID | Packing Type |
|---|---|---|---|
| TO-247 | SRC60R064ST-G | SRC60R064STG | Tube |
| TO-263-2 | SRC60R064SS2TR-G | SRC60R064SS2G | Tape & Reel |
| TO-220F | SRC60R064STF-G | SRC60R064STFG | Tube |
| TO-220C | SRC60R064STC-G | SRC60R064STCG | Tube |

# 64mΩ, 600V, Super Junction N-Channel Power MOSFET SRC60R064S

## Absolute Maximum Ratings[Note 1]

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 600 | V |
| Gate-Source Voltage(static) | | $V_{GSS}$ | ±30 | V |
| Gate-Source Voltage (dynamic), AC (f>1 Hz) | | $V_{GSS}$ | ±30 | V |
| Power Dissipation($T_C$=25ºC,TO-247,TO-220C,TO-263) | | $P_{tot}$ | 357 | W |
| Power Dissipation($T_C$=25ºC,TO-220F) | | $P_{tot}$ | 35.7 | W |
| Continuous Drain Current | $T_C$=25ºC | $I_D$ | 48 | A |
| | $T_C$=100ºC | | 30.4 | |
| | $T_C$=125ºC | | 21.5 | |
| Pulsed Drain Current (Note 2) | | $I_{DM}$ | 144 | A |
| Avalanche Energy, Single Pulse (Note 3) | | $E_{AS}$ | 400 | mJ |
| Avalanche Energy, Repetitive (Note 2) | | $E_{AR}$ | 0.6 | mJ |
| Avalanche Current, Repetitive (Note 2) | | $I_{AR}$ | 3.5 | A |
| Continuous Diode Forward Current | | $I_S$ | 48 | A |
| Diode Pulse Current | | $I_{S.PULSE}$ | 144 | A |
| MOSFET dv/dt Ruggedness, $V_{DS}$<=480V | | dv/dt | 50 | V/ns |
| Reverse Diode dv/dt, $V_{DS}$<=480V, $I_{SD}$<=$I_D$ | | dv/dt | 15 | V/ns |
| Operating Junction Temperature | | $T_J$ | 150 | ºC |
| Storage Temperature | | $T_{STG}$ | -55 to 150 | ºC |
| Lead Temperature (Soldering, 10 sec) | | $T_{LEAD}$ | 260 | ºC |

Note:

1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. $I_{AS}$ = 3.5A, $V_{DD}$ = 60V, $R_G$ = 25Ω, Starting $T_J$ = 25°C

## Thermal characteristics

| Parameter | | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Thermal resistance, Junction-to-Case | TO-220F | $R_{thJC}$ | | | 3.5 | ºC /W |
| | TO-247 | | | | 0.35 | |
| | TO-220C | | | | 0.35 | |
| | TO-263 | | | | 0.35 | |
| Thermal resistance, Junction-to-Ambient | TO-220F | $R_{thJA}$ | | | 70 | ºC /W |
| | TO-247 | | | | 58 | |
| | TO-220C | | | | 58 | |
| | TO-263 | | | | 58 | |

## Electrical Characteristics

$T_J$ = 25℃, unless otherwise specified.

| Parameter | | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| **Statistic Characteristics** | | | | | | | |
| Drain-Source Breakdown Voltage | | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$=250uA | 600 | | | V |
| Zero Gate Voltage Drain Current | | $I_{DSS}$ | $V_{DS}$=600V, $V_{GS}$=0V | | | 2 | uA |
| Gate-Body Leakage Current | Forward | $I_{GSSF}$ | $V_{GS}$=30V, $V_{DS}$=0V | | | 100 | nA |
| | Reverse | $I_{GSSR}$ | $V_{GS}$=-30V, $V_{DS}$=0V | | | -100 | |
| Gate Threshold Voltage | | $V_{GS(TH)}$ | $V_{DS}$=$V_{GS}$, $I_D$=1.0mA | 2.7 | 3.5 | 4.3 | V |
| Static Drain-Source On-Resistance | | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=24A | | 55 | 64 | mΩ |
| Gate Resistance | | $R_G$ | f=1MHz, Open Drain | | 1.0 | | Ω |
| **Dynamic Characteristics** | | | | | | | |
| Input Capacitance | | $C_{ISS}$ | $V_{DS}$=50V, $V_{GS}$=0V, f=1MHz | | 4.2 | | nF |
| Output Capacitance | | $C_{OSS}$ | | | 171 | | pF |
| Reverse Transfer Capacitance | | $C_{RSS}$ | | | 2.7 | | pF |
| Effective output capacitance, energy related NOTE5 | | $C_{O(er)}$ | $V_{GS}$=0V, $V_{DS}$=0…400V | | 94 | | pF |
| Effective output capacitance, time related NOTE6 | | $C_{O(tr)}$ | | | 550 | | |
| Turn-on Delay Time | | $t_{d(on)}$ | $V_{DD}$=400V, $I_D$=24A $R_G$=3.3Ω, $V_{GS}$=10V | | 16 | | ns |
| Rise Time | | $t_r$ | | | 6.0 | | |
| Turn-off Delay Time | | $t_{d(off)}$ | | | 98 | | |
| Fall Time | | $t_f$ | | | 4.0 | | |
| **Gate Charge Characteristics** | | | | | | | |
| Gate to Source Charge | | $Q_{gs}$ | $V_{DD}$=480V, $I_D$=24A $V_{GS}$=0 to 10V | | 25.4 | | nC |
| Gate to Drain Charge | | $Q_{gd}$ | | | 54.9 | | |
| Gate Charge Total | | $Q_g$ | | | 108 | | |
| Gate Plateau Voltage | | $V_{plateau}$ | | | 6.0 | | V |
| **Reverse Diode Characteristics** | | | | | | | |
| Drain-Source Diode Forward Voltage | | $V_{SD}$ | $V_{GS}$=0V, $I_{SD}$=24A | | 0.85 | 1.1 | V |
| Reverse Recovery Time | | $t_{rr}$ | $V_R$=400V, $I_F$=24A $dI_F/dt$=100A/us | | 310 | | ns |
| Reverse Recovery Charge | | $Q_{rr}$ | | | 4.2 | | uC |
| Peak Reverse Recovery Current | | $I_{rrm}$ | | | 27.0 | | A |

Note:

5. $C_{O(er)}$ is a fixed capacitance that gives the same stored energy as $C_{OSS}$ while $V_{DS}$ is rising from 0 to 480V

6. $C_{O(tr)}$ is a fixed capacitance that gives the same charging time as $C_{OSS}$ while $V_{DS}$ is rising from 0 to 480 V

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