

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

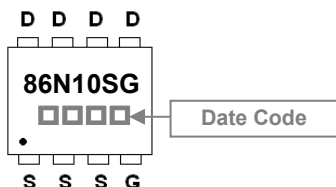
DESCRIPTION

The SPR86N10SG is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications. The SPR86N10SG meet the RoHS and Green Product with Function reliability approved.

FEATURES

- $R_{DS(on)} \leq 7.7m\Omega @ V_{GS}=10V$
- $R_{DS(on)} \leq 10m\Omega @ V_{GS}=4.5V$
- High speed power switching, Logic Level
- Enhanced Body diode dv/dt capability
- Enhanced Avalanche Ruggedness
- 100% UIS Tested, 100% Rg Tested
- PR-8PP Package

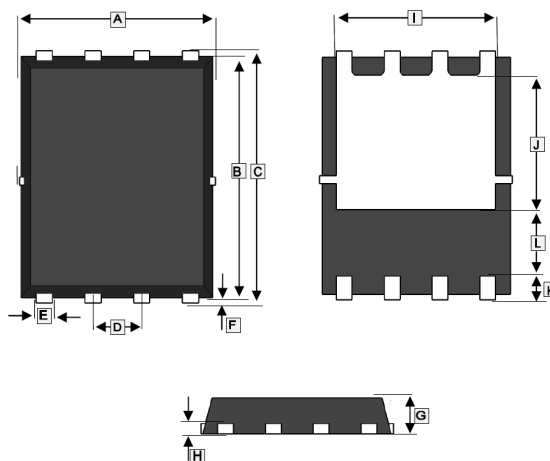
MARKING



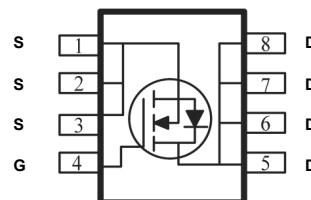
PACKAGE INFORMATION

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

PR-8PP



| REF. | Millimeter | | REF. | Millimeter | |
|------|------------|------|------|------------|------|
| | Min. | Max. | | Min. | Max. |
| A | 4.9 | 5.1 | G | 0.8 | 1.0 |
| B | 5.7 | 5.9 | H | 0.254 Ref. | |
| C | 5.95 | 6.2 | I | 4.0 Ref. | |
| D | 1.27 BSC. | | J | 3.4 Ref. | |
| E | 0.35 | 0.49 | K | 0.6 Ref. | |
| F | 0.1 | 0.2 | L | 1.4 Ref. | |



ABSOLUTE MAXIMUM RATINGS (T_J=25°C unless otherwise specified)

| Parameter | Symbol | Ratings | Unit |
|--|-----------------------------------|-----------------------|--------|
| Drain-Source Voltage | V _{DS} | 100 | V |
| Gate-Source Voltage | V _{GS} | ±20 | V |
| Continuous Drain Current (Silicon Limited) | I _D | T _C =25°C | 86 |
| | | T _C =100°C | 55 |
| Continuous Drain Current (Package Limited) | I _D | 60 | A |
| Pulsed Drain Current | I _{DM} | 350 | A |
| Avalanche Energy, Single Pulse, @L=0.3mH | E _{AS} | 240 | mJ |
| Power Dissipation | P _D | 104 | W |
| Operating Junction and Storage Temperature Range | T _J , T _{STG} | -55 ~ 150 | °C |
| Thermal Resistance Ratings | | | |
| Maximum Thermal Resistance Junction-Ambient | R _{θJA} | 50 | °C / W |
| Maximum Thermal Resistance Junction-Case | R _{θJC} | 1.2 | |

ELECTRICAL CHARACTERISTICS ($T_J=25^\circ C$ unless otherwise specified)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test conditions | |
|-----------------------------------|--------------|-------------------|------|-----------|------------|---|-------------------------|
| Drain-Source Breakdown Voltage | BV_{DSS} | 100 | - | - | V | $V_{GS}=0, I_D=250\mu A$ | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 1.4 | 1.9 | 2.4 | V | $V_{DS}=V_{GS}, I_D=250\mu A$ | |
| Forward Transfer conductance | g_{fs} | - | 75 | - | S | $V_{DS}=5V, I_D=20A$ | |
| Gate-Source Leakage Current | I_{GSS} | - | - | ± 100 | nA | $V_{GS}=\pm 20V$ | |
| Drain-Source Leakage Current | I_{DSS} | $T_J=25^\circ C$ | - | - | 1 | μA | $V_{DS}=100V, V_{GS}=0$ |
| | | $T_J=100^\circ C$ | - | - | 100 | | |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | - | 6.4 | 7.7 | m Ω | $V_{GS}=10V, I_D=20A$ | |
| | | - | 7.8 | 10 | m Ω | $V_{GS}=4.5V, I_D=20A$ | |
| Gate Resistance | R_G | - | 1.6 | - | Ω | $V_{GS}=0, V_{DS}=Open, f=1MHz$ | |
| Dynamic Characteristics | | | | | | | |
| Total Gate Charge | Q_g | - | 49 | - | nC | $V_{GS}=10V$ | |
| Total Gate Charge | Q_g | - | 21 | - | | $V_{GS}=4.5V$ | |
| Gate-Source Charge | Q_{gs} | - | 8 | - | | $I_D=20A$ | |
| Gate-Drain ("Miller") Change | Q_{gd} | - | 7 | - | | $V_{DD}=50V$ $V_{GS}=10V$ | |
| Turn-on Delay Time | $T_{d(on)}$ | - | 10 | - | nS | $V_{DD}=50V$ $I_D=20A$ $V_{GS}=10V$ $R_G=10\Omega$ | |
| Rise Time | T_r | - | 5 | - | | | |
| Turn-off Delay Time | $T_{d(off)}$ | - | 32 | - | | | |
| Fall Time | T_f | - | 6 | - | | | |
| Input Capacitance | C_{iss} | - | 3350 | - | pF | $V_{GS}=0$ $V_{DS}=50V$ $f=1.0MHz$ | |
| Output Capacitance | C_{oss} | - | 270 | - | | | |
| Reverse Transfer Capacitance | C_{rss} | - | 15 | - | | | |
| Source-Drain Diode | | | | | | | |
| Forward On Voltage | V_{SD} | - | 0.9 | 1.2 | V | $I_F=20A, V_{GS}=0$ | |
| Reverse Recovery Time | T_{rr} | - | 47 | - | nS | $V_R=50V, I_F=20A, di/dt=500A/\mu s$ | |
| Reverse Recovery Charge | Q_{rr} | - | 226 | - | nC | | |

TYPICAL CHARACTERISTICS CURVE

Fig 1. Typical Output Characteristics

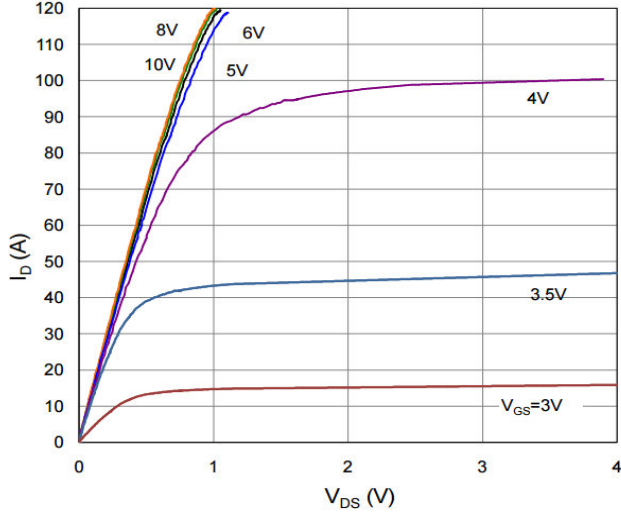


Figure 2. On-Resistance vs. Gate-Source Voltage

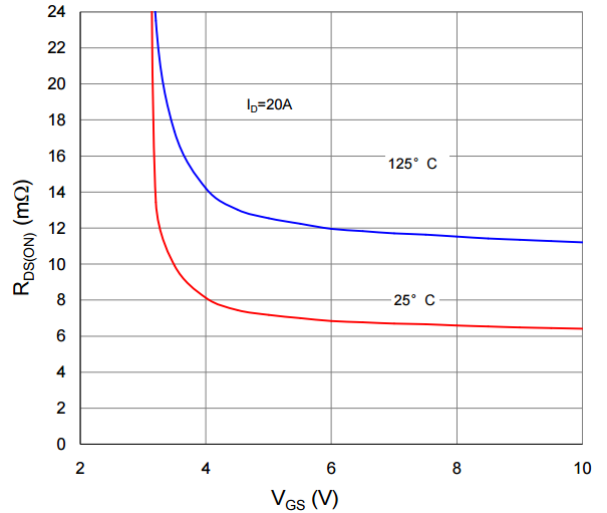


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

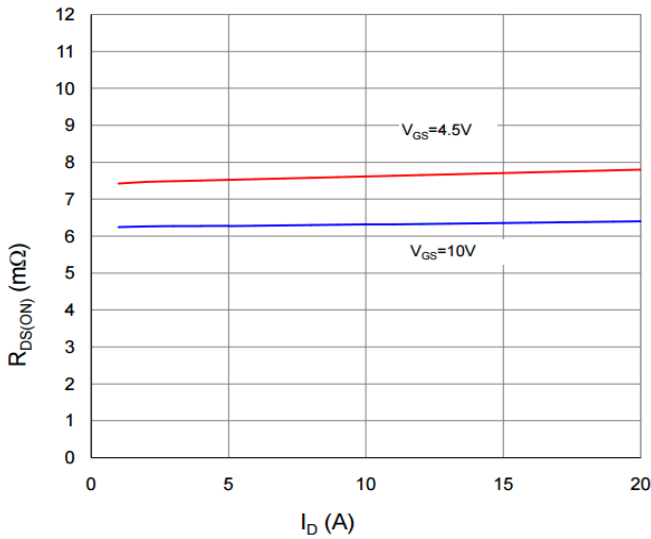


Figure 4. Normalized On-Resistance vs. Junction Temperature

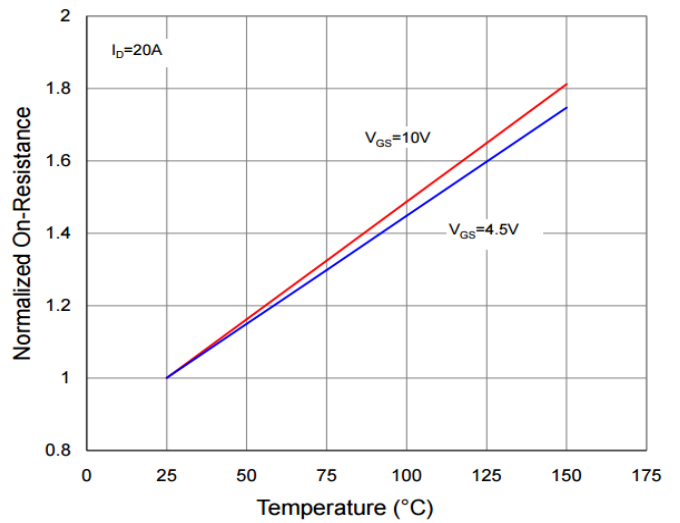


Figure 5. Typical Transfer Characteristics

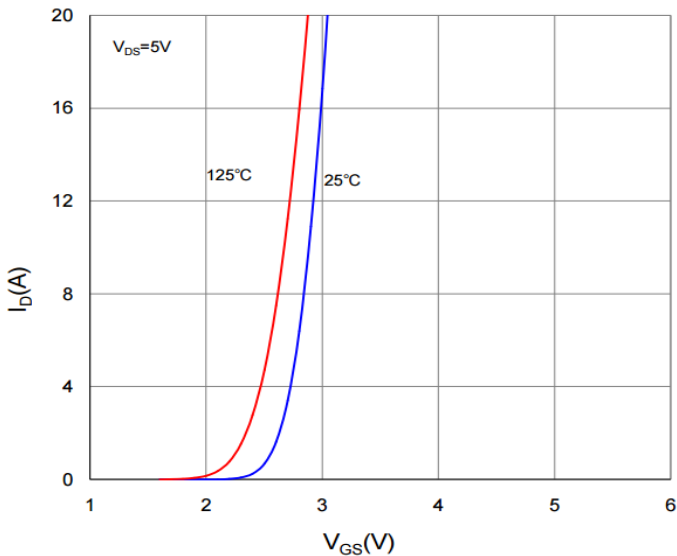
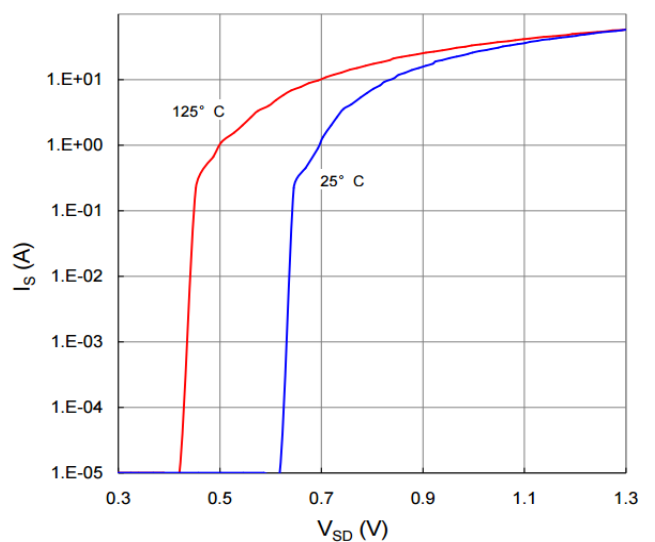


Figure 6. Typical Source-Drain Diode Forward Voltage



TYPICAL CHARACTERISTICS CURVE

Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

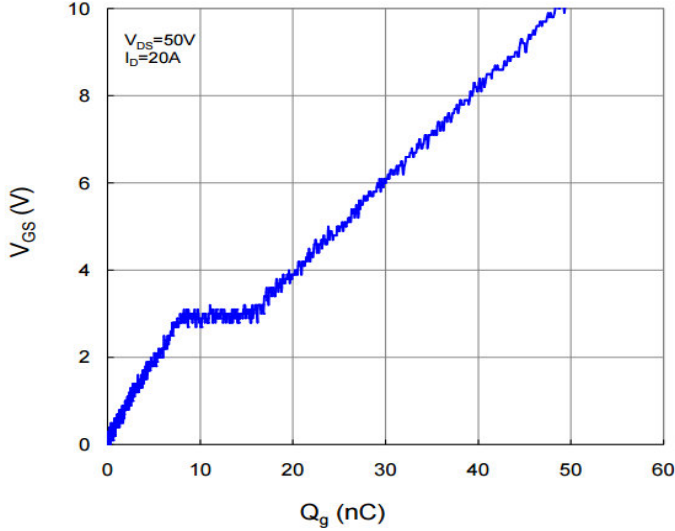


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

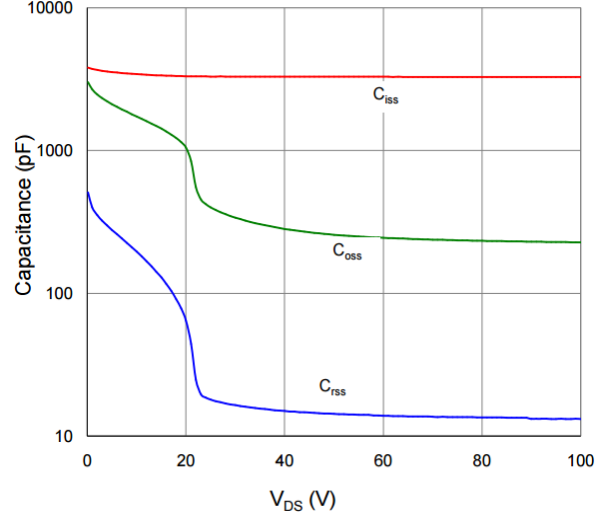


Figure 9. Maximum Safe Operating Area

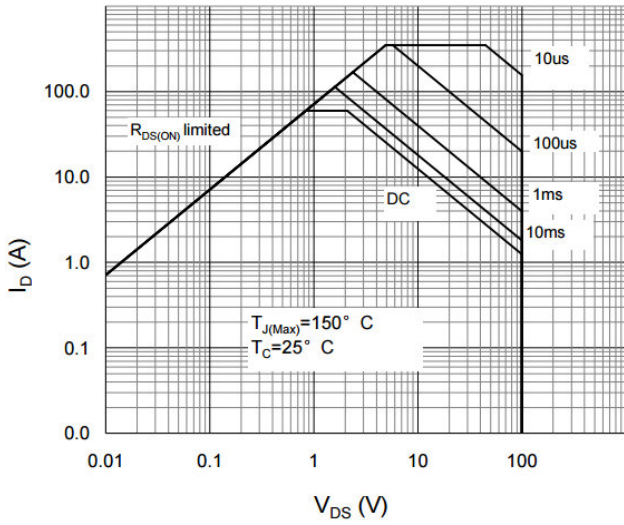


Figure 10. Maximum Drain Current vs. Case Temperature

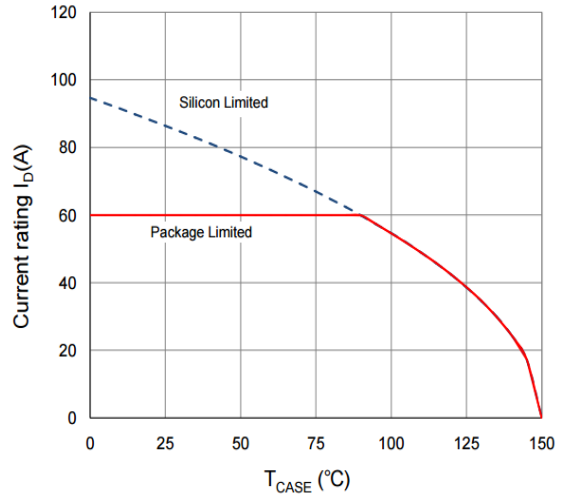


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case

