Elektronische Bauelemente

# SPR14P10

**-14A , -100V , $R_{DS(ON)}$ 90 mΩ**
**P-Channel Enhancement Mode Power MOSFET**

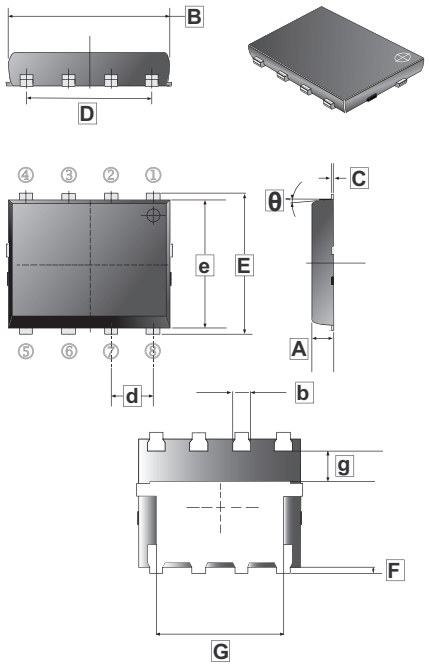
RoHS Compliant Product
A suffix of "-C" specifies halogen & lead-free

## DESCRIPTION

The SPR14P10 is the highest performance trench P-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 SPR14P10 meet the RoHS and Green Product requirement with full function reliability approved.

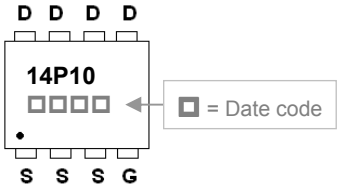
**PR-8PP**




## FEATURES

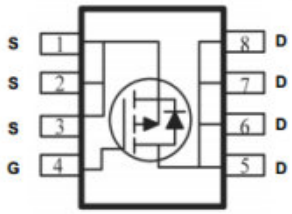
- $R_{DS(on)} \leqq 90m\Omega$ @$V_{GS}$= -10V
- $R_{DS(on)} \leqq 110m\Omega$ @$V_{GS}$= -4.5V
- Advanced High Cell Density Technology
- Super Low Gate Charge
- Green Device Available

## MARKING




## PACKAGE INFORMATION

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




| REF. | Millimeter Min. | Millimeter Max. | REF. | Millimeter Min. | Millimeter Max. |
|---|---|---|---|---|---|
| A | 0.9 | 1.1 | θ | 0° | 12° |
| B | 4.9 | 5.1 | b | 0.33 | 0.51 |
| C | 0.2 | 0.3 | d | 1.27 BSC | |
| D | 3.81 | 4 | e | 5.7 | 5.9 |
| E | 5.95 | 6.2 | g | 1.1 | 1.4 |
| F | 0.1 | 0.2 | | | |
| G | 3.81 | 4 | | | |

## ABSOLUTE MAXIMUM RATINGS

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -100 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current [1] @$V_{GS}$=10V | $T_C$=25°C | $I_D$ | -14 | A |
| | $T_C$=100°C | | -10 | |
| Pulsed Drain Current [2] | | $I_{DM}$ | -56 | A |
| Total Power Dissipation [1] | $T_C$=25°C | $P_D$ | 42 | W |
| Operating Junction & Storage Temperature | | $T_J$, $T_{STG}$ | -55~175 | °C |
| **Thermal Resistance Rating** | | | | |
| Thermal Resistance Junction-Ambient [1] (Max). | | $R_{\theta JA}$ | t≦10s, 50 | °C / W |
| | | | Steady State, 83 | |
| Thermal Resistance Junction-Ambient (Max). | | | 125 | |
| Thermal Resistance Junction-Case [1] (Max). | | $R_{\theta JC}$ | 3.6 | °C / W |

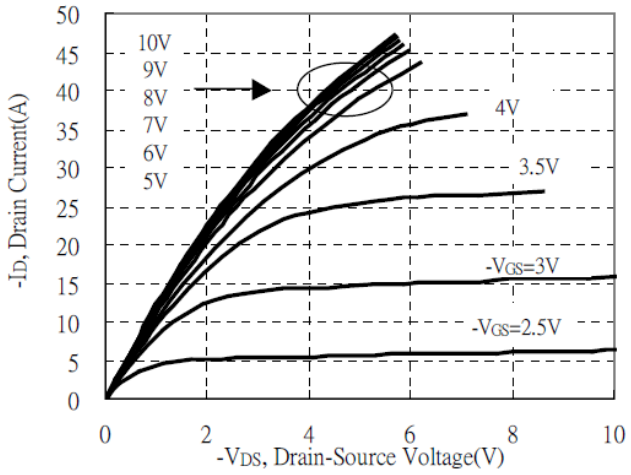
## ELECTRICAL CHARACTERISTICS ($T_J$=25°C unless otherwise specified)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Teat Conditions |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | -100 | - | - | V | $V_{GS}$=0, $I_D$= -250μA |
| Gate-Threshold Voltage | $V_{GS(th)}$ | -1 | - | -2.5 | V | $V_{DS}$=$V_{GS}$, $I_D$= -250μA |
| Forward Transfer conductance | gfs | - | 11 | - | S | $V_{DS}$= -10V, $I_D$= -4A |
| Gate-Source Leakage Current | $I_{GSS}$ | - | - | ±100 | nA | $V_{GS}$=±20V |
| Drain-Source Leakage Current | $I_{DSS}$ | - | - | -1 | μA | $V_{DS}$= -80V, $V_{GS}$=0, $T_J$=25°C |
| | | - | - | -25 | | $V_{DS}$= -80V, $V_{GS}$=0, $T_J$=125°C |
| Static Drain-Source On-Resistance [3] | $R_{DS(ON)}$ | - | - | 90 | mΩ | $V_{GS}$= -10V, $I_D$= -4.5A |
| | | - | - | 110 | | $V_{GS}$= -4.5V, $I_D$= -4A |
| Total Gate Charge($V_{GS}$= -4.5V) | $Q_g$ | - | 13.3 | - | nC | $I_D$= -14A<br>$V_{DS}$= -80V<br>$V_{GS}$= -10V |
| Total Gate Charge | $Q_g$ | - | 29.2 | - | | |
| Gate-Source Charge | $Q_{gs}$ | - | 4 | - | | |
| Gate-Drain Change | $Q_{gd}$ | - | 8.5 | - | | |
| Turn-on Delay Time | $T_{d(on)}$ | - | 8.8 | - | nS | $V_{DD}$= -50V<br>$I_D$= -1A<br>$V_{GS}$= -10V<br>$R_G$=6Ω |
| Rise Time | $T_r$ | - | 17.2 | - | | |
| Turn-off Delay Time | $T_{d(off)}$ | - | 86.2 | - | | |
| Fall Time | $T_f$ | - | 63 | - | | |
| Input Capacitance | $C_{iss}$ | - | 1726 | - | pF | $V_{GS}$=0<br>$V_{DS}$= -25V<br>f=1.0MHz |
| Output Capacitance | $C_{oss}$ | - | 104 | - | | |
| Reverse Transfer Capacitance | $C_{rss}$ | - | 71 | - | | |
| **Source-Drain Diode** | | | | | | |
| Continuous Source Current [1] | $I_S$ | - | - | -14 | A | |
| Pulsed Source Current [2] | $I_{SM}$ | - | - | -56 | A | |
| Diode Forward Voltage [3] | $V_{SD}$ | - | - | -1.2 | V | $I_S$= -2A, $V_{GS}$=0V |
| Reverse Recovery Time | $t_{rr}$ | - | 28.8 | - | nS | $I_F$= -14A, dI/dt=100A/μs,<br>$T_J$=25°C |
| Reverse Recovery Charge | $Q_{rr}$ | - | 40.9 | - | nC | |

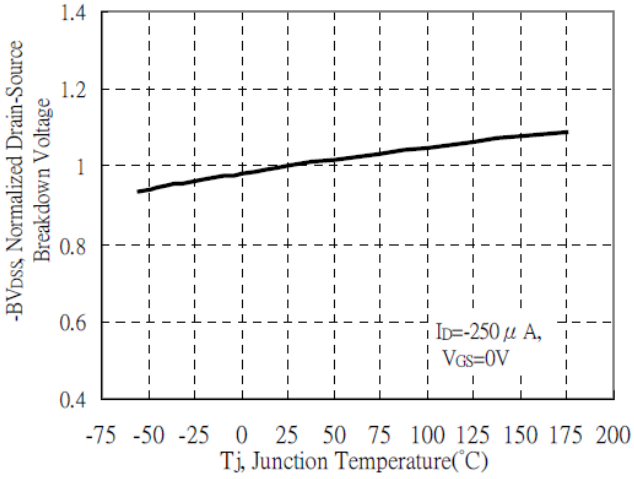
Notes:
1. The data tested by surface mounted on a 1 inch$^2$ FR-4 board with 2OZ copper.
2. The power dissipation is limited by 150°C junction temperature.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.

## CHARACTERISTIC CURVES

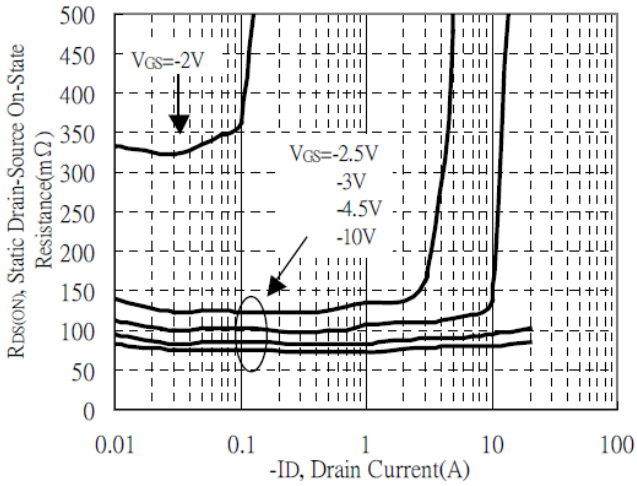
Typical Output Characteristics



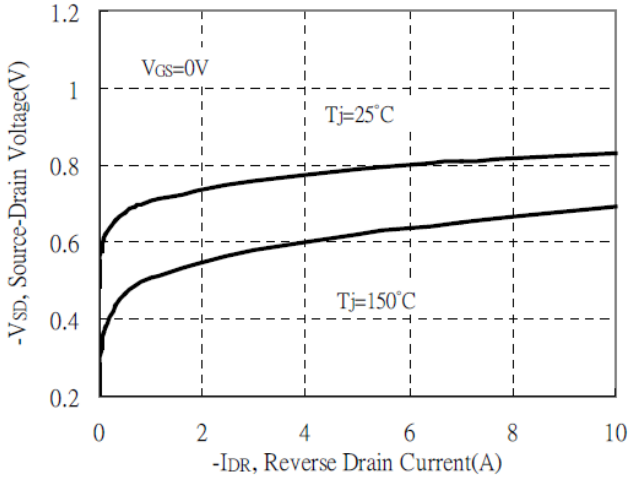

Brekdown Voltage vs Ambient Temperature



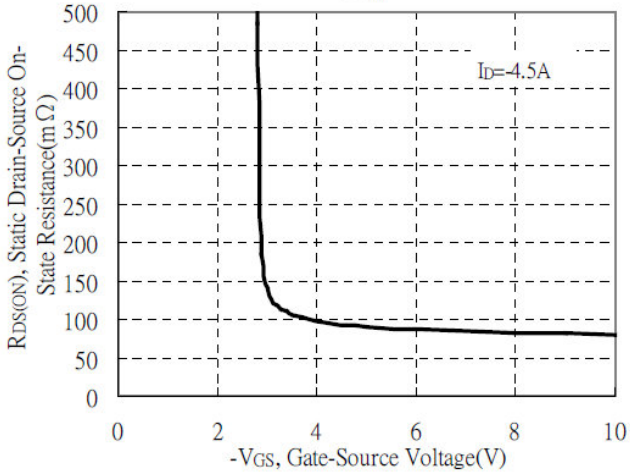

Static Drain-Source On-State resistance vs Drain Current



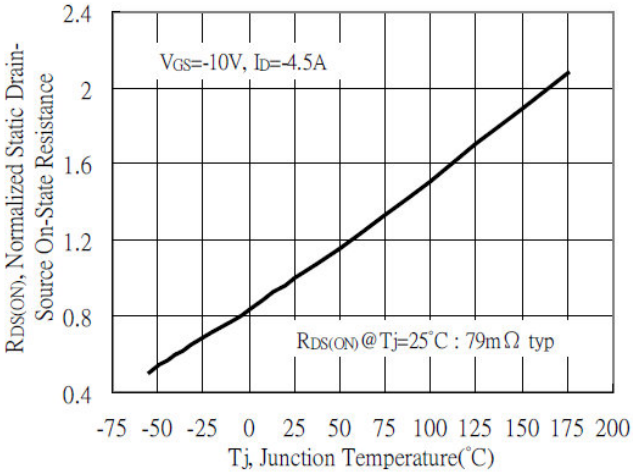

Reverse Drain Current vs Source-Drain Voltage




Static Drain-Source On-State Resistance vs Gate-Source Voltage

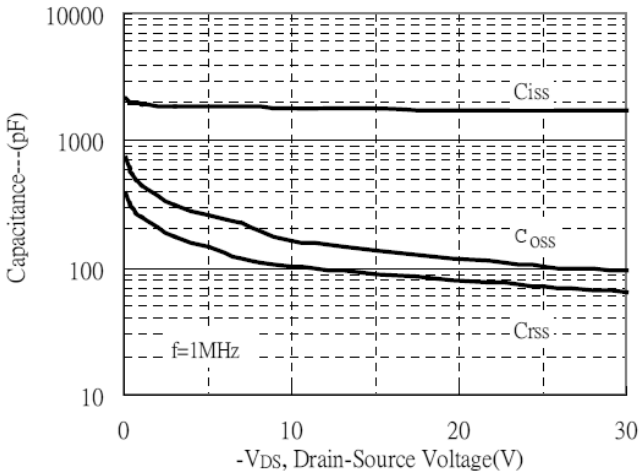



Drain-Source On-State Resistance vs Junction Tempearture

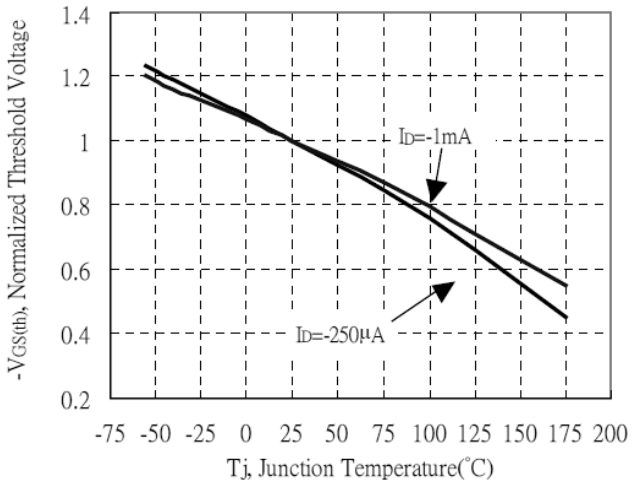


## CHARACTERISTIC CURVES

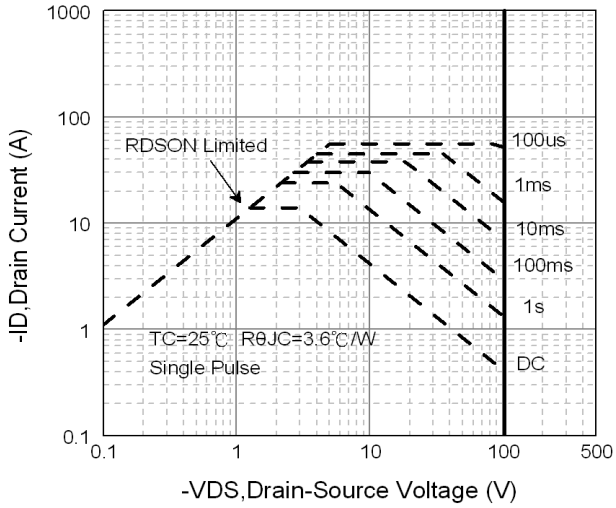
Capacitance vs Drain-to-Source Voltage



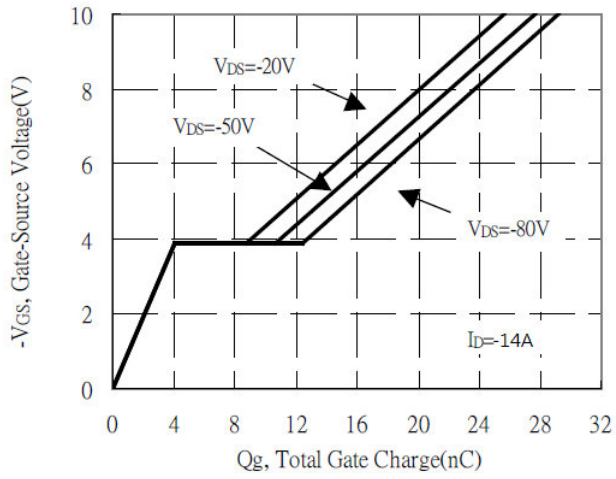

Threshold Voltage vs Junction Tempearture




Maximum Safe Operating Area




Gate Charge Characteristics




Transient Thermal Response Curves