Elektronische Bauelemente

# SSE104N10-C

**104A, 100V, $R_{DS(ON)}$ 12mΩ**
**N-Ch Enhancement Mode Power MOSFET**

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

## DESCRIPTION

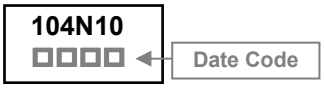
The SSE104N10-C is the highest performance trench N-Ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The SSE104N10-C meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

## FEATURES

- Advanced High Cell Density Trench Technology
- Super Low Gate Charge
- 100% EAS Guaranteed
- Green Device Available

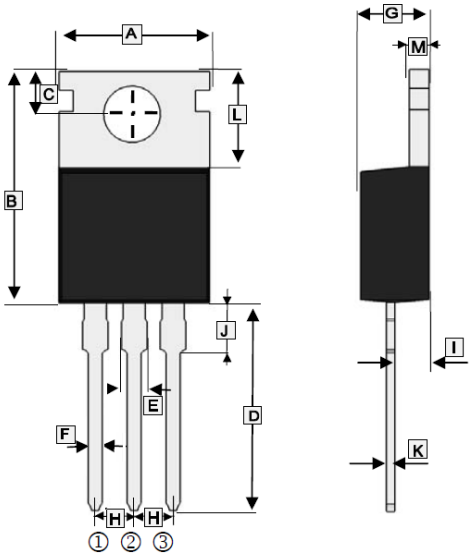
## MARKING

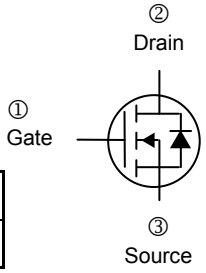



## ORDER INFORMATION

| Part Number | Type |
|---|---|
| SSE104N10-C | Lead (Pb)-free and Halogen-free |

**TO-220**




| REF. | Millimeter | | REF. | Millimeter | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. |
| A | 9.96 | 10.36 | H | 2.54 BSC. | |
| B | 14.7 | 16 | I | 2.04 | 2.92 |
| C | 2.74 BSC. | | J | 3.745 REF. | |
| D | 12.7 | 14.73 | K | 0.356 | 0.5 |
| E | 1.15 | 1.82 | L | 5.85 | 6.85 |
| F | 0.39 | 1.01 | M | 0.51 | 1.39 |
| G | 3.56 | 4.82 | | | |

## ABSOLUTE MAXIMUM RATINGS

| Parameter | | Symbol | Ratings | 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 | $I_D$ | 104 | A |
| | $T_C$=100°C | | 70 | |
| Pulsed Drain Current [2] | | $I_{DM}$ | 250 | A |
| Single Pulse Avalanche Energy [3] | | $E_{AS}$ | 180 | mJ |
| Avalanche Current | | $I_{AS}$ | 60 | A |
| Total Power Dissipation [4] | $T_C$=25°C | $P_D$ | 156 | W |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55~150 | °C |
| **Thermal Data** | | | | |
| Maximum Thermal Resistance Junction-Case [1] | | $R_{\theta JC}$ | 0.5 | °C/W |
| Maximum Thermal Resistance Junction-Ambient [1] | | $R_{\theta JA}$ | 62 | |

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

| Parameter | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | | $BV_{DSS}$ | 100 | - | - | V | $V_{GS}$=0, $I_D$=250μA |
| Gate Threshold Voltage | | $V_{GS(th)}$ | 2.5 | - | 4.5 | V | $V_{DS}$=$V_{GS}$, $I_D$=250μA |
| Forward Transconductance | | $g_{fs}$ | - | 50 | - | S | $V_{DS}$=5V, $I_D$=30A |
| Gate Resistance | | $R_g$ | - | 1.2 | - | Ω | f=1MHz |
| Gate-Source Leakage Current | | $I_{GSS}$ | - | - | ±100 | nA | $V_{GS}$= ±20V |
| Drain-Source Leakage Current | $T_J$=25°C | $I_{DSS}$ | - | - | 1 | μA | $V_{DS}$=80V, $V_{GS}$=0 |
| | $T_J$=55°C | | | | 5 | | $V_{DS}$=80V, $V_{GS}$=0 |
| Static Drain-Source On-Resistance [2] | | $R_{DS(ON)}$ | - | - | 12 | mΩ | $V_{GS}$=10V, $I_D$=15A |
| Total Gate Charge | | $Q_g$ | - | 84 | - | nC | $I_D$=30A<br>$V_{DS}$=80V<br>$V_{GS}$=10V |
| Gate-Source Charge | | $Q_{gs}$ | - | 28 | - | | |
| Gate-Drain Change | | $Q_{gd}$ | - | 26 | - | | |
| Turn-on Delay Time | | $T_{d(on)}$ | - | 36 | - | nS | $V_{DD}$=40V<br>$I_D$=30A<br>$V_{GS}$=10V<br>$R_G$=3.3Ω |
| Rise Time | | $T_r$ | - | 71 | - | | |
| Turn-off Delay Time | | $T_{d(off)}$ | - | 50 | - | | |
| Fall Time | | $T_f$ | - | 23 | - | | |
| Input Capacitance | | $C_{iss}$ | - | 5580 | - | pF | $V_{GS}$=0<br>$V_{DS}$=15V<br>f=1MHz |
| Output Capacitance | | $C_{oss}$ | - | 571 | - | | |
| Reverse Transfer Capacitance | | $C_{rss}$ | - | 278 | - | | |
| **Source-Drain Diode** | | | | | | | |
| Continuous Source Current [1] | | $I_S$ | - | - | 104 | A | |
| Pulsed Source Current [2] | | $I_{SM}$ | - | - | 250 | A | |
| Diode Forward Voltage [2] | | $V_{SD}$ | - | - | 1.25 | V | $I_S$=1A, $V_{GS}$=0 |
| Reverse Recovery Time | | $t_{rr}$ | - | 24 | - | nS | $I_F$=30A , dI/dt=100A/μs , $T_J$=25°C |
| Reverse Recovery Charge | | $Q_{rr}$ | - | 28 | - | nC | |

Notes:
1. The data tested by 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. The $E_{AS}$ data shows Max. rating. The test condition is $V_{DD}$=25V, $V_{GS}$=10V, L=0.1mH, $I_{AS}$=60A.
4. The power dissipation in limited by 150°C junction temperature.

## TYPICAL CHARACTERISTIC

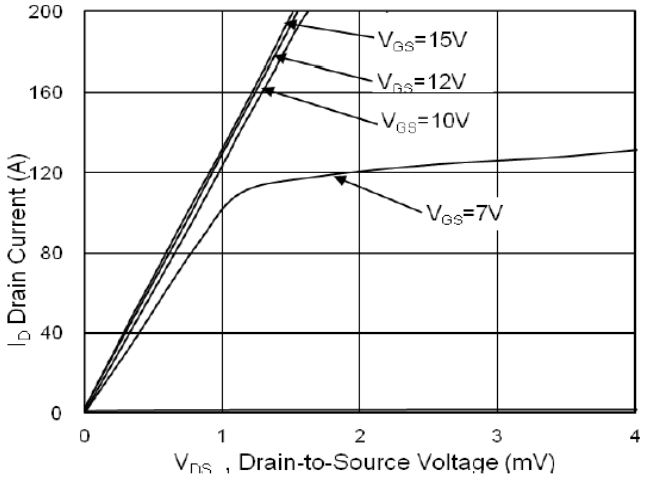



Fig.1 Typical Output Characteristics

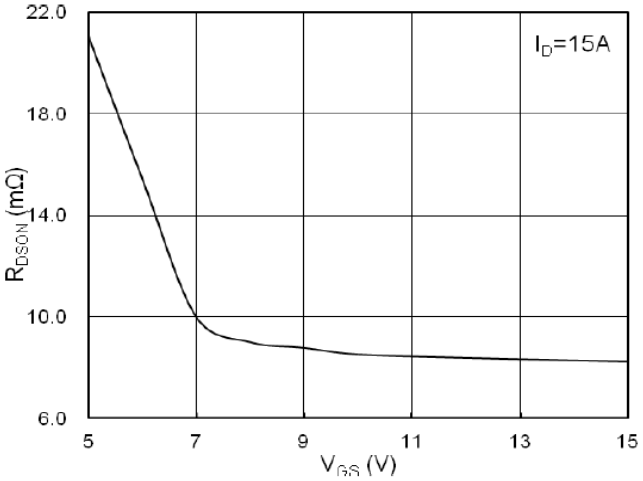



Fig.2 On-Resistance vs. G-S Voltage

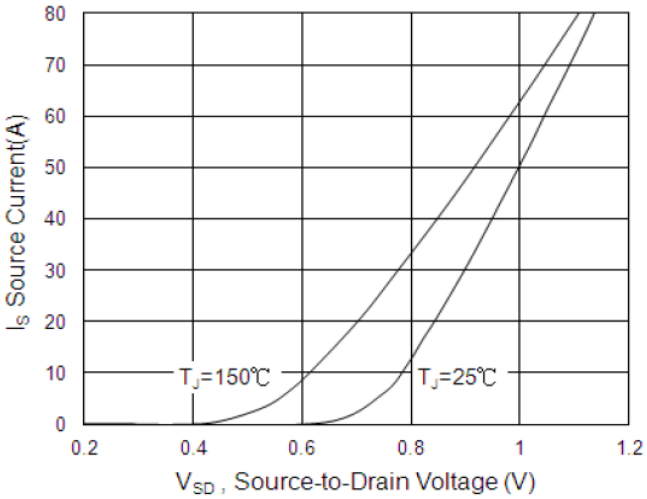



Fig.3 Source Drain Forward Characteristics

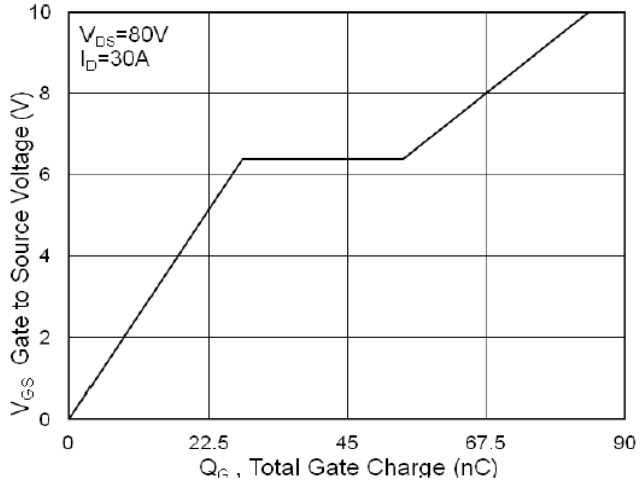



Fig.4 Gate-Charge Characteristics

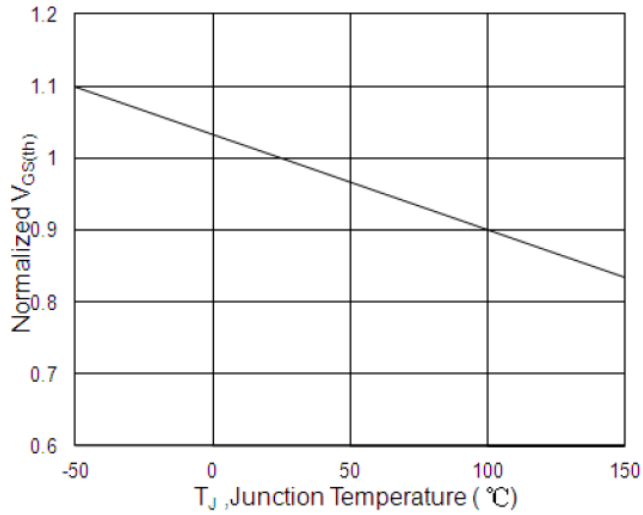



Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$

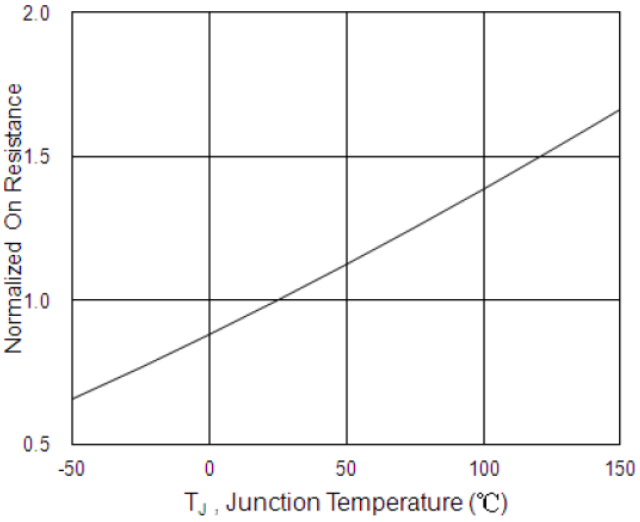



Fig.6 Normalized $R_{DSON}$ vs. $T_J$

## TYPICAL CHARACTERISTIC

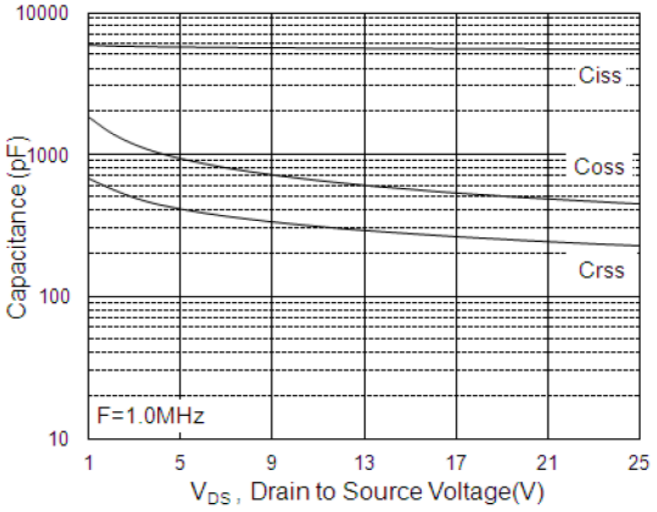



Fig.7 Capacitance

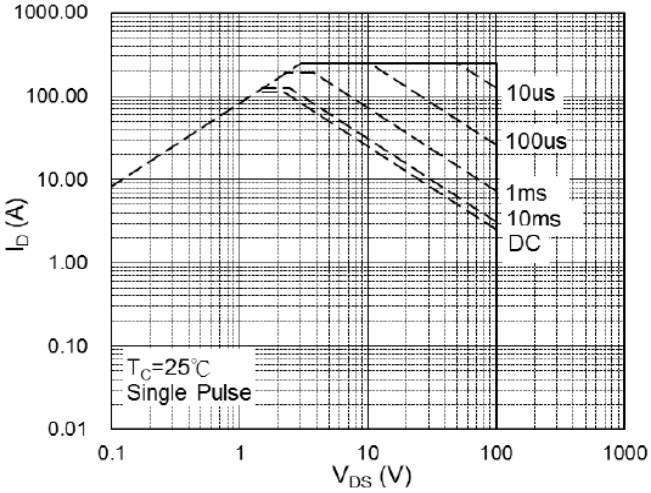



Fig.8 Safe Operating Area

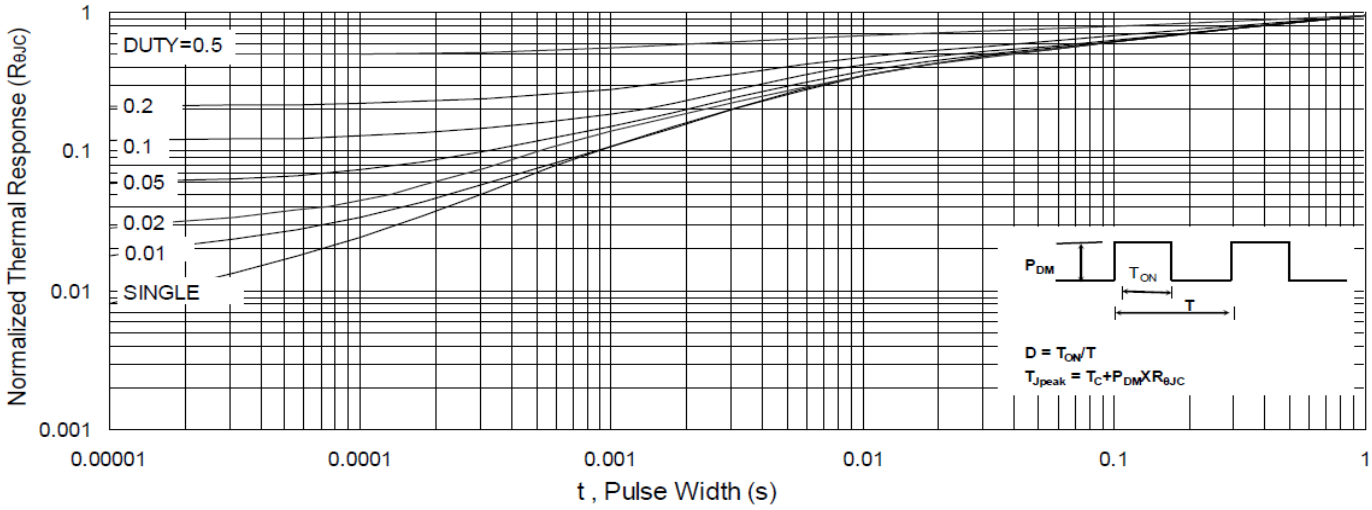



Fig.9 Normalized Maximum Transient Thermal Impedance

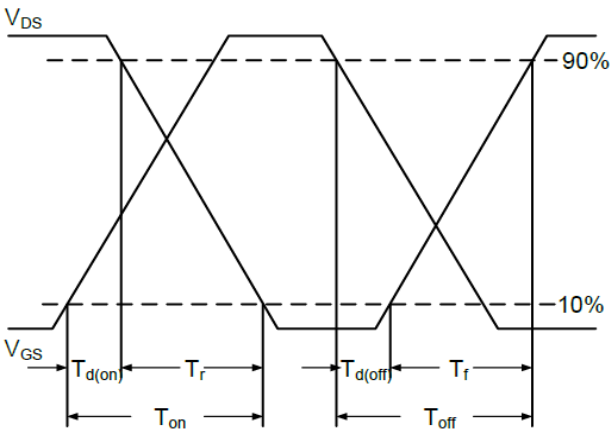



Fig.10 Switching Time Waveform

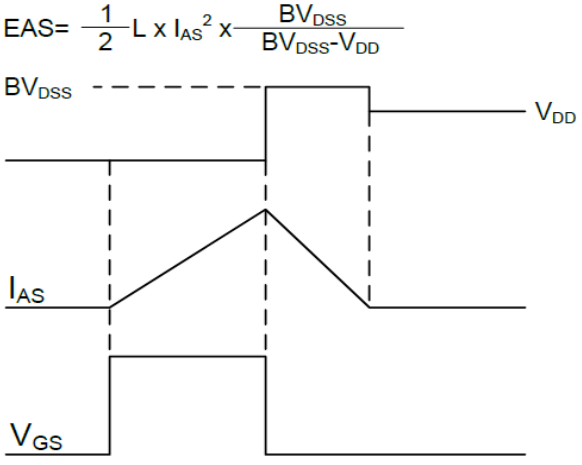



Fig.11 Unclamped Inductive Switching Waveform