Elektronische Bauelemente

# SSG4410

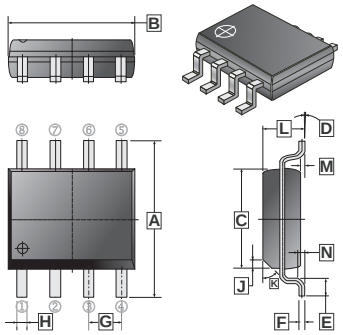
**10 A, 30V, $R_{DS(ON)}$ 13.5 mΩ**
**N-Ch Enhancement Mode Power MOSFET**

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

## DESCRIPTION

The SSG4410 provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness. The SOP-8 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

**SOP-8**

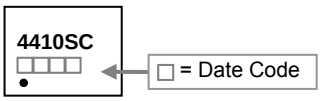



| REF. | Millimeter | | REF. | Millimeter | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. |
| A | 5.80 | 6.20 | H | 0.35 | 0.49 |
| B | 4.80 | 5.00 | J | 0.375 REF. | |
| C | 3.80 | 4.00 | K | 45° | |
| D | 0° | 8° | L | 1.35 | 1.75 |
| E | 0.40 | 0.90 | M | 0.10 | 0.25 |
| F | 0.19 | 0.25 | N | 0.25 REF. | |
| G | 1.27 TYP. | | | | |

## FEATURES

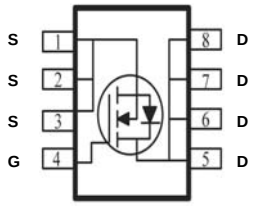
- Dynamic dv/dt Rating
- Simple Drive Requirement
- Repetitive Avalanche Rated
- Fast Switching

## MARKING




## PACKAGE INFORMATION

| Package | MPQ | LeaderSize |
|---|---|---|
| SOP-8 | 3K | 13' inch |




## MAXIMUM RATINGS ($T_A$ = 25°C unless otherwise specified)

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current, $V_{GS}$ @ 10V | $I_D$ @ $T_A$ = 25°C | 10 | A |
| | $I_D$ @ $T_A$ = 70°C | 8 | A |
| Pulsed Drain Current [1] | $I_{DM}$ | 50 | A |
| Total Power Dissipation | $P_D$ | 2.5 | W |
| Linear Derating Factor | | 0.02 | W / °C |
| Operating Junction & Storage Temperature Range | $T_J$, $T_{STG}$ | -55 ~ 150 | °C |
| **Thermal Resistance Ratings** | | | |
| Thermal Resistance Junction-ambient (Max.) | $R_{\theta JA}$ | 50 | °C / W |

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

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Teat Conditions |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | 30 | - | - | V | $V_{GS}$=0V, $I_D$ =250uA |
| Breakdown Voltage Temperature Coefficient | $\triangle BV_{DSS} / \triangle T_J$ | - | 0.037 | - | V / °C | Reference to 25°C, $I_D$=1mA |
| Gate Threshold Voltage | $V_{GS(th)}$ | 1.0 | - | 3.0 | V | $V_{DS}$=$V_{GS}$, $I_D$ =250uA |
| Forward Transconductance | $g_{fs}$ | - | 20 | - | S | $V_{DS}$=15V, $I_D$ =10A |
| Gate-Source Leakage Current | $I_{GSS}$ | - | - | ±100 | nA | $V_{GS}$=±20V |
| Drain-Source Leakage Current($T_J$=25°C) | $I_{DSS}$ | - | - | 1 | μA | $V_{DS}$=30V, $V_{GS}$=0V |
| Drain-Source Leakage Current($T_J$=55°C) | | - | - | 25 | μA | $V_{DS}$=24V, $V_{GS}$=0V |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | - | 11.5 | 13.5 | mΩ | $V_{GS}$=10V, $I_D$=10A |
| | | - | 16.5 | 20 | | $V_{GS}$=4.5V, $I_D$=5A |
| Total Gate Charge [2] | $Q_g$ | - | 20 | - | nC | $V_{DS}$=15V, $I_D$ =10A, $V_{GS}$=5V |
| Gate-Source Chagre | $Q_{gs}$ | - | 3 | - | | |
| Gate-Drain (“Miller”) Change | $Q_{gd}$ | - | 11 | - | | |
| Turn-on Delay Time [2] | $T_{d(ON)}$ | - | 7.5 | - | nS | $V_{DS}$=25V, $V_{GS}$=5V<br>$I_D$=1A, $R_D$=25Ω, $R_G$=3.3Ω |
| Rise Time | $T_r$ | - | 10.2 | - | | |
| Turn-off Delay Time | $T_{d(OFF)}$ | - | 29 | - | | |
| Fall Time | $T_f$ | - | 33 | - | | |
| Input Capacitance | $C_{ISS}$ | - | 955 | - | pF | $V_{DS}$=15V<br>$V_{GS}$=0V<br>f=1.0MHz |
| Output Capacitance | $C_{OSS}$ | - | 555 | - | | |
| Reverse Transfer Capacitance | $C_{RSS}$ | - | 204 | - | | |
| **Source-Drain Diode** | | | | | | |
| Forward On Voltage [2] | $V_{SD}$ | - | - | 1.3 | V | $I_S$=2.3A, $V_{GS}$= 0V, $T_J$=25°C |
| Continuous Source Current (Body Diode) | $I_S$ | - | - | 2.3 | A | $V_D$ = $V_G$ = 0V, $V_S$= 1.3V |
| Pulsed Source Current (Body Diode) [1] | $I_{SM}$ | - | - | 50 | A | |

Notes:
1. Pulse width limited by safe operating area.
2. Pulse width ≦ 300 μs, duty cycle ≦ 2%.

## CHARACTERISTIC CURVES

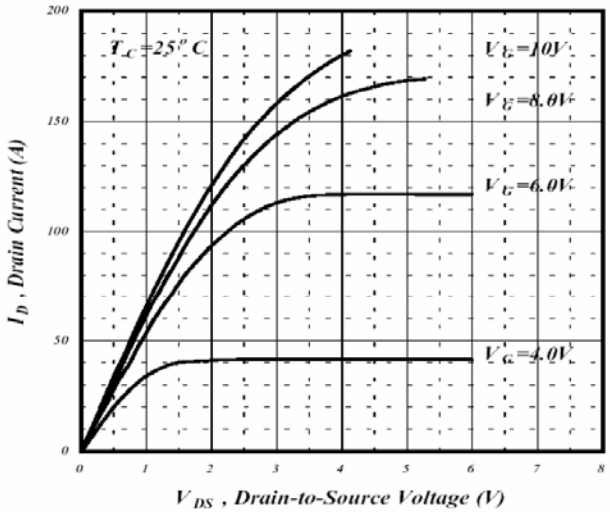



**Fig 1. Typical Output Characteristics**

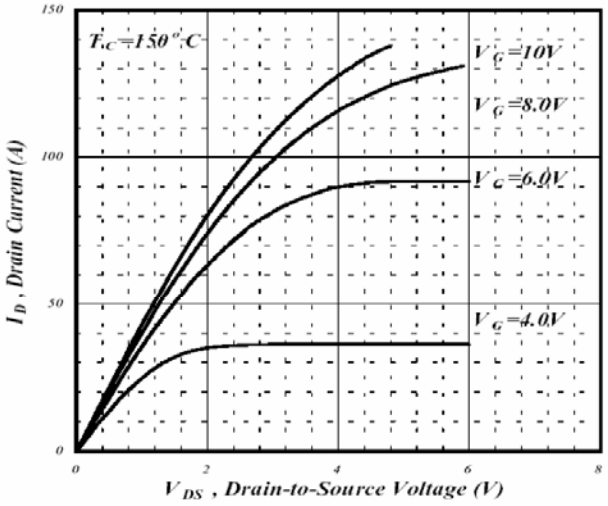



**Fig 2. Typical Output Characteristics**

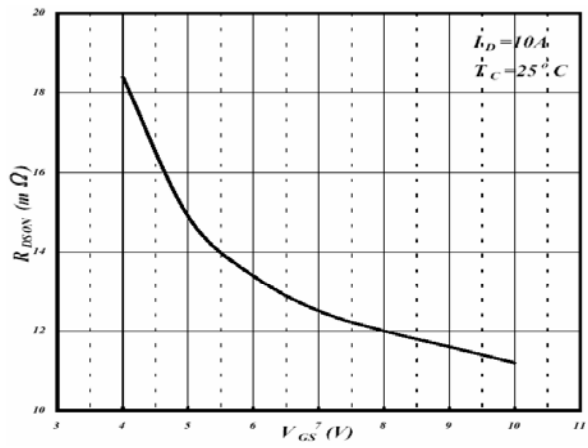



**Fig 3. On-Resistance v.s. Gate Voltage**

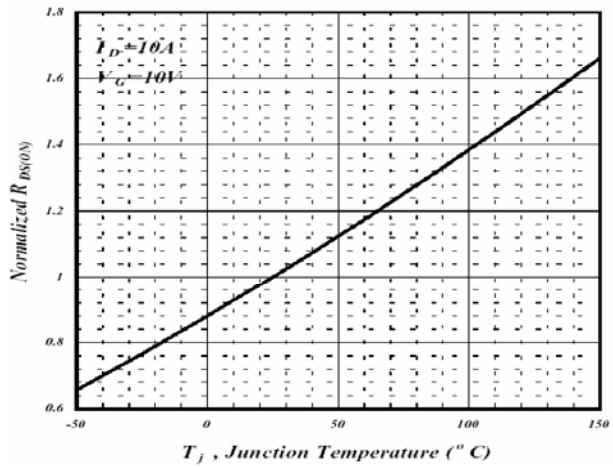



**Fig 4. Normalized On-Resistance v.s. Junction Temperature**

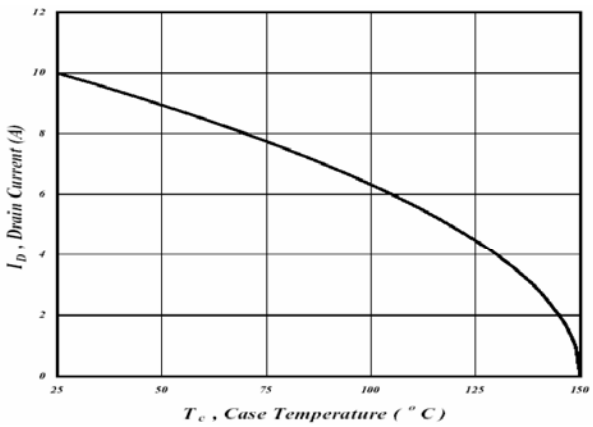



**Fig 5. Maximum Drain Current v.s. Case Temperature**

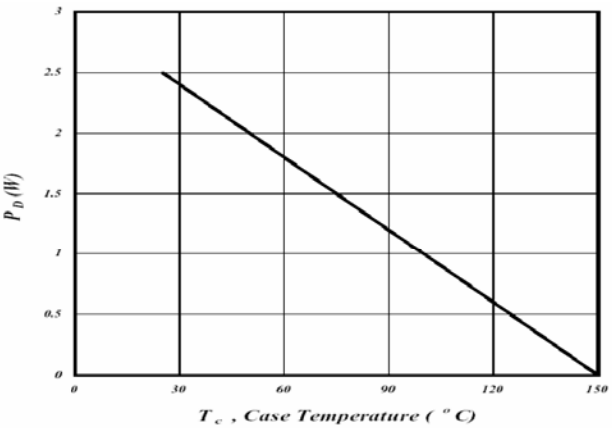



**Fig 6. Type Power Dissipation**

## CHARACTERISTIC CURVES

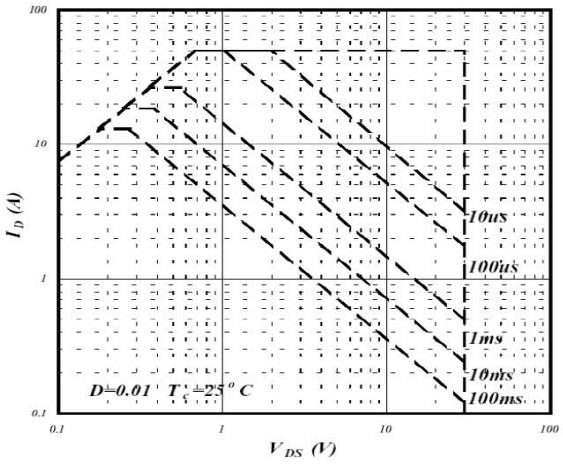



Fig 7. Maximum Safe Operating Area

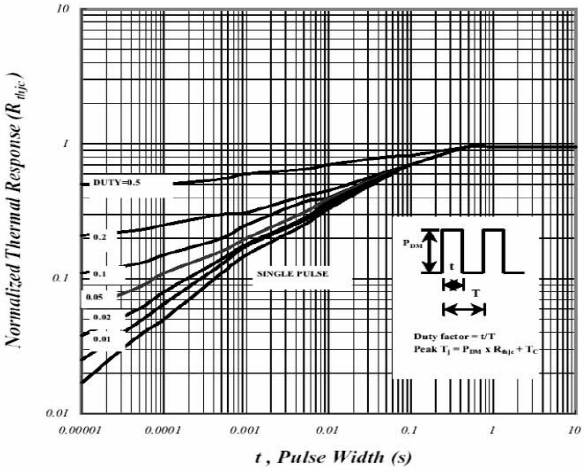



Fig 8. Effective Transient Thermal Impedance

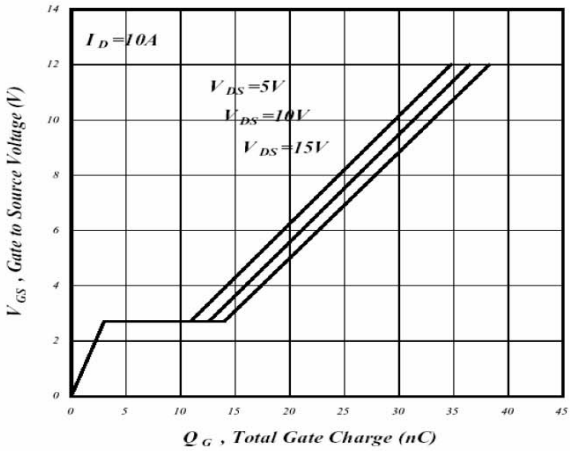



Fig 9. Gate Charge Characteristics

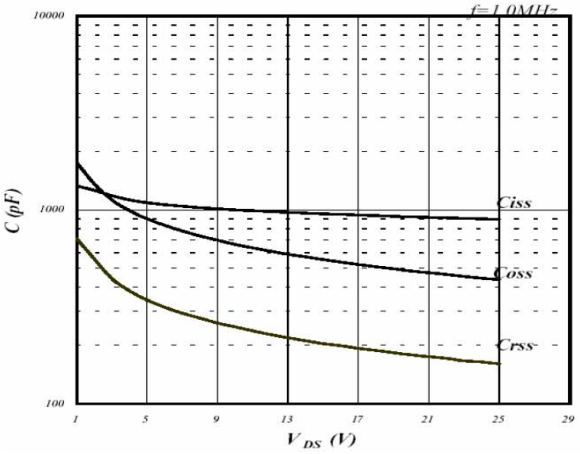



Fig 10. Typical Capacitance Characteristics

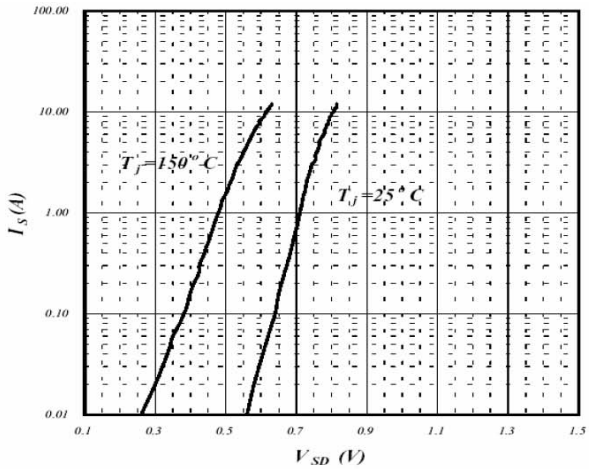



Fig 11. Forward Characteristics of Reverse Diode

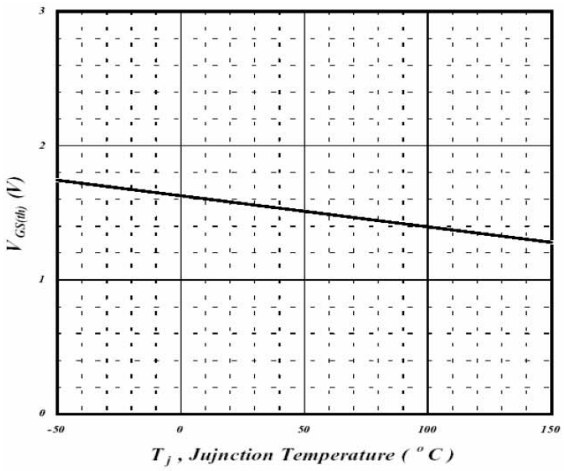



Fig 12. Gate Threshold Voltage v.s. Junction Temperature

## CHARACTERISTIC CURVES

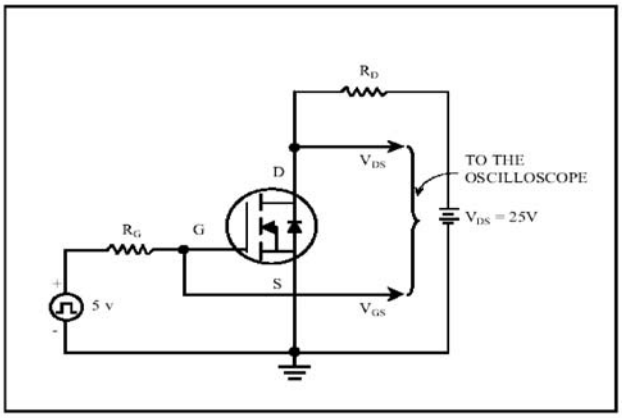



**Fig 13. Switching Time Circuit**

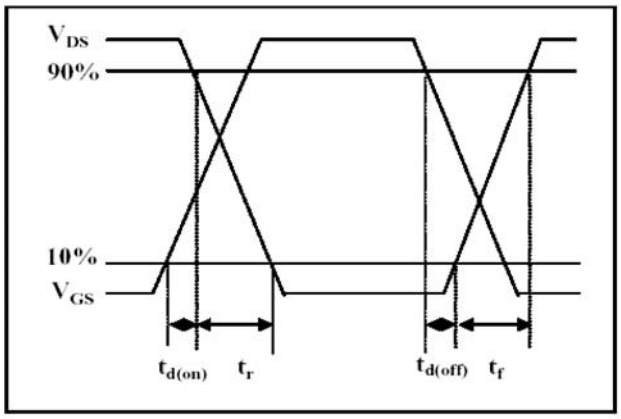



**Fig 14. Switching Time Waveform**

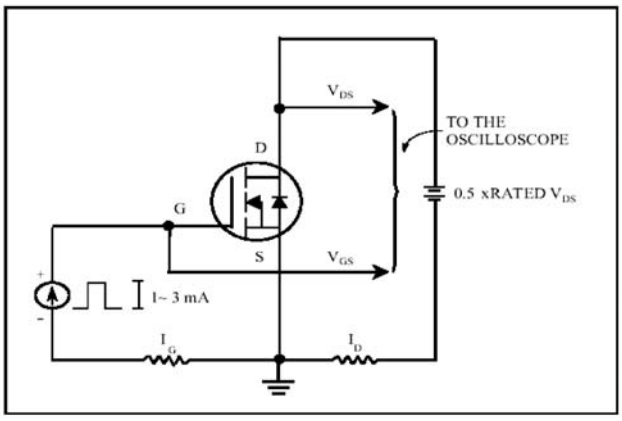



**Fig 15. Gate Charge Circuit**

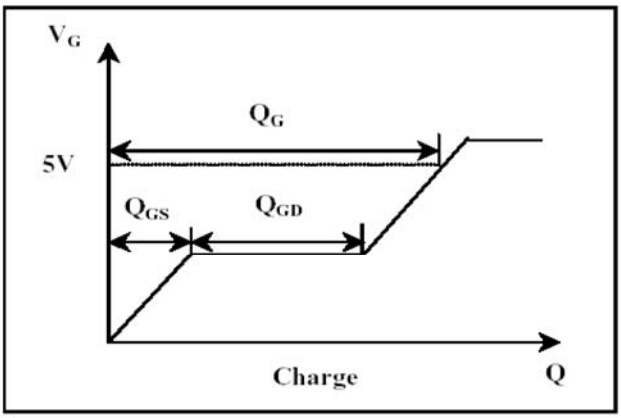



**Fig 16. Gate Charge Waveform**