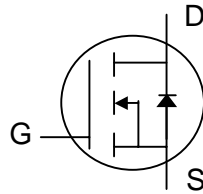


# N-channel Enhancement-mode Power MOSFET

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

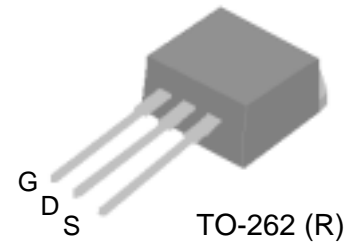
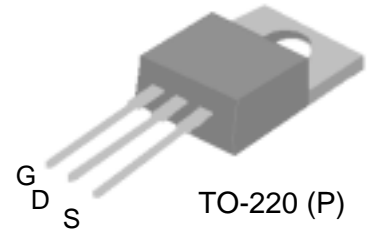


$BV_{DSS}$  675V  
 $R_{DS(ON)}$  1.2Ω  
 $I_D$  7A

## DESCRIPTION

The SSM07N70C series is specially designed as a main switching device for universal 90~265VAC off-line AC/DC converter applications. Both TO-220 and TO-262 type provide high blocking voltage to overcome voltage surge and sag in the toughest power system with the best combination of fast switching, ruggedized design and cost-effectiveness.

The TO-220 and TO-262 packages are widely preferred for all commercial and industrial applications. The device is well suited for switch-mode power supplies, AC-DC converters and high-current high-speed switching circuits.



## ABSOLUTE MAXIMUM RATINGS

| Symbol                        | Parameter                                       | Rating     | Units |
|-------------------------------|---|------------|-------|
| $V_{DS}$                      | Drain-Source Voltage                            | 675        | V     |
| $V_{GS}$                      | Gate-Source Voltage                             | ± 30       | V     |
| $I_D @ T_C=25^\circ\text{C}$  | Continuous Drain Current, $V_{GS} @ 10\text{V}$ | 7          | A     |
| $I_D @ T_C=100^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ 10\text{V}$ | 4.4        | A     |
| $I_{DM}$                      | Pulsed Drain Current <sup>1</sup>               | 18         | A     |
| $P_D @ T_C=25^\circ\text{C}$  | Total Power Dissipation                         | 89         | W     |
|                               | Linear Derating Factor                          | 0.7        | W/°C  |
| $E_{AS}$                      | Single Pulse Avalanche Energy <sup>2</sup>      | 140        | mJ    |
| $I_{AR}$                      | Avalanche Current                               | 7          | A     |
| $E_{AR}$                      | Repetitive Avalanche Energy                     | 7          | mJ    |
| $T_{STG}$                     | Storage Temperature Range                       | -55 to 150 | °C    |
| $T_J$                         | Operating Junction Temperature Range            | -55 to 150 | °C    |

## THERMAL DATA

| Symbol | Parameter                           | Value    | Unit |
|--------|-------------------------------------|----------|------|
| Rthj-c | Thermal Resistance Junction-case    | Max. 1.4 | °C/W |
| Rthj-a | Thermal Resistance Junction-ambient | Max. 62  | °C/W |

**Electrical Characteristics @T<sub>j</sub>=25°C(unless otherwise specified)**

| Symbol                              | Parameter  | Test Conditions  | Min. | Typ. | Max. | Units |
|-------------------------------------|--|--|------|------|------|-------|
| BV <sub>DSS</sub>                   | Drain-Source Breakdown Voltage                       | V <sub>GS</sub> =0V, I <sub>D</sub> =1mA                 | 675  | -    | -    | V     |
| ΔBV <sub>DSS</sub> /ΔT <sub>j</sub> | Breakdown Voltage Temperature Coefficient            | Reference to 25°C, I <sub>D</sub> =1mA                   | -    | 0.6  | -    | V/°C  |
| R <sub>DS(ON)</sub>                 | Static Drain-Source On-Resistance                    | V <sub>GS</sub> =10V, I <sub>D</sub> =3.5A               | -    | -    | 1.2  | Ω     |
| V <sub>GS(th)</sub>                 | Gate Threshold Voltage                               | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA | 2    | -    | 4    | V     |
| g <sub>fs</sub>                     | Forward Transconductance                             | V <sub>DS</sub> =10V, I <sub>D</sub> =3.5A               | -    | 4.5  | -    | S     |
| I <sub>DSS</sub>                    | Drain-Source Leakage Current (T <sub>j</sub> =25°C)  | V <sub>DS</sub> =675V, V <sub>GS</sub> =0V               | -    | -    | 10   | uA    |
|                                     | Drain-Source Leakage Current (T <sub>j</sub> =150°C) | V <sub>DS</sub> =480V, V <sub>GS</sub> =0V               | -    | -    | 100  | uA    |
| I <sub>GSS</sub>                    | Gate-Source Leakage                                  | V <sub>GS</sub> = ± 30V                                  | -    | -    | ±100 | nA    |
| Q <sub>g</sub>                      | Total Gate Charge <sup>3</sup>                       | I <sub>D</sub> =7A                                       | -    | 32   | -    | nC    |
| Q <sub>gs</sub>                     | Gate-Source Charge                                   | V <sub>DS</sub> =480V                                    | -    | 8.6  | -    | nC    |
| Q <sub>gd</sub>                     | Gate-Drain ("Miller") Charge                         | V <sub>GS</sub> =10V                                     | -    | 9    | -    | nC    |
| t <sub>d(on)</sub>                  | Turn-on Delay Time <sup>3</sup>                      | V <sub>DD</sub> =300V                                    | -    | 17   | -    | ns    |
| t <sub>r</sub>                      | Rise Time  | I <sub>D</sub> =7A                                       | -    | 15   | -    | ns    |
| t <sub>d(off)</sub>                 | Turn-off Delay Time                                  | R <sub>G</sub> =10Ω, V <sub>GS</sub> =10V                | -    | 35   | -    | ns    |
| t <sub>f</sub>                      | Fall Time  | R <sub>D</sub> =43Ω                                      | -    | 18   | -    | ns    |
| C <sub>iss</sub>                    | Input Capacitance                                    | V <sub>GS</sub> =0V                                      | -    | 2075 | -    | pF    |
| C <sub>oss</sub>                    | Output Capacitance                                   | V <sub>DS</sub> =25V                                     | -    | 120  | -    | pF    |
| C <sub>rss</sub>                    | Reverse Transfer Capacitance                         | f=1.0MHz   | -    | 8    | -    | pF    |

**Source-Drain Diode**

| Symbol          | Parameter   | Test Conditions   | Min. | Typ. | Max. | Units |
|-----------------|---|---|------|------|------|-------|
| I <sub>S</sub>  | Continuous Source Current ( Body Diode )          | V <sub>D</sub> =V <sub>G</sub> =0V , V <sub>S</sub> =1.5V     | -    | -    | 7    | A     |
| I <sub>SM</sub> | Pulsed Source Current ( Body Diode ) <sup>1</sup> |   | -    | -    | 18   | A     |
| V <sub>SD</sub> | Forward On Voltage <sup>3</sup>                   | T <sub>j</sub> =25°C, I <sub>S</sub> =7A, V <sub>GS</sub> =0V | -    | -    | 1.5  | V     |

**Notes:**

- 1.Pulse width limited by safe operating area.
- 2.Starting T<sub>j</sub>=25°C , V<sub>DD</sub>=50V , L=5mH , R<sub>G</sub>=25Ω , I<sub>AS</sub>=7A.
- 3.Pulse width ≤300us , duty cycle ≤2%.

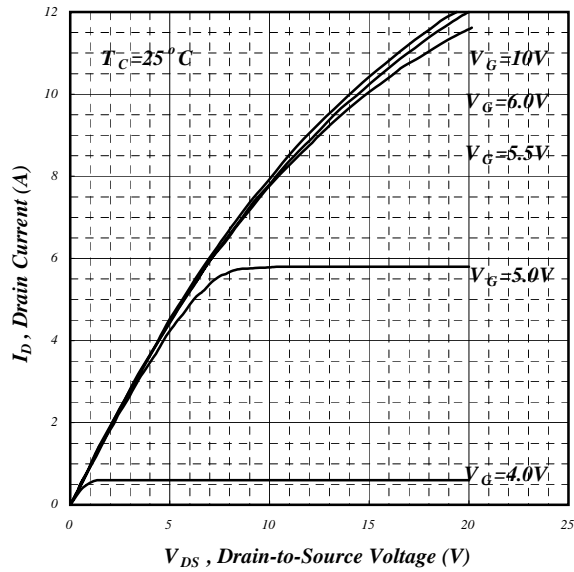


Fig 1. Typical Output Characteristics

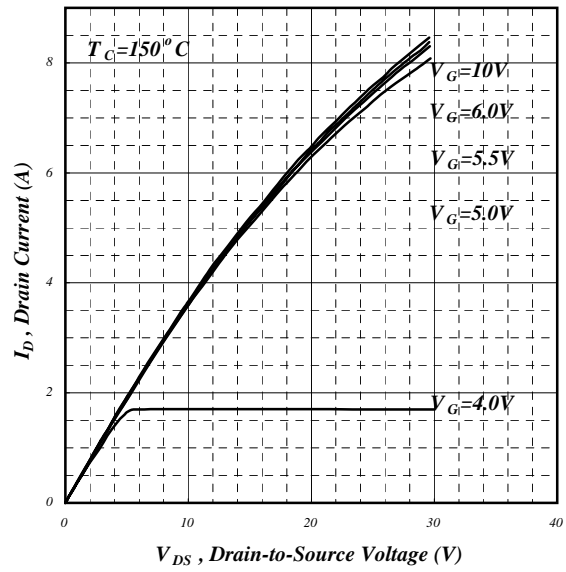


Fig 2. Typical Output Characteristics

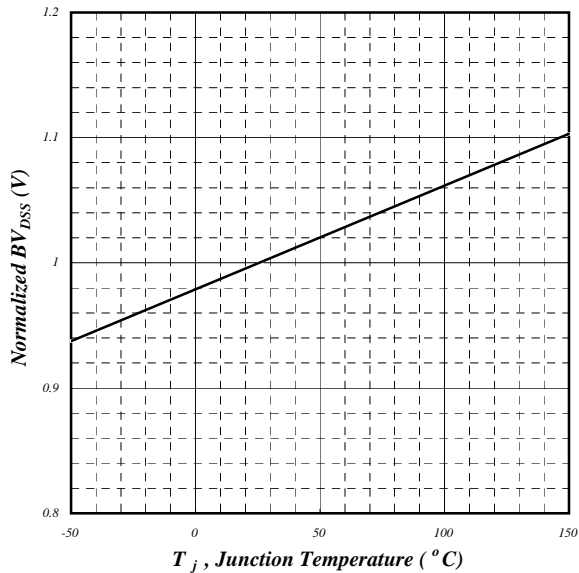


Fig 3. Normalized  $BV_{DSS}$  vs. Junction Temperature

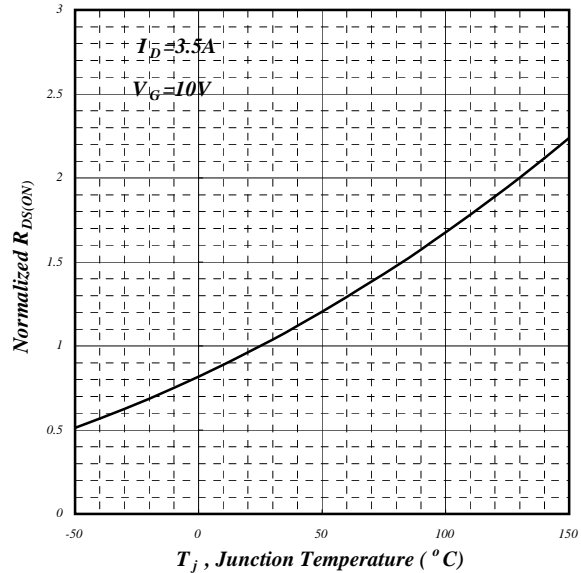


Fig 4. Normalized On-Resistance vs. Junction Temperature

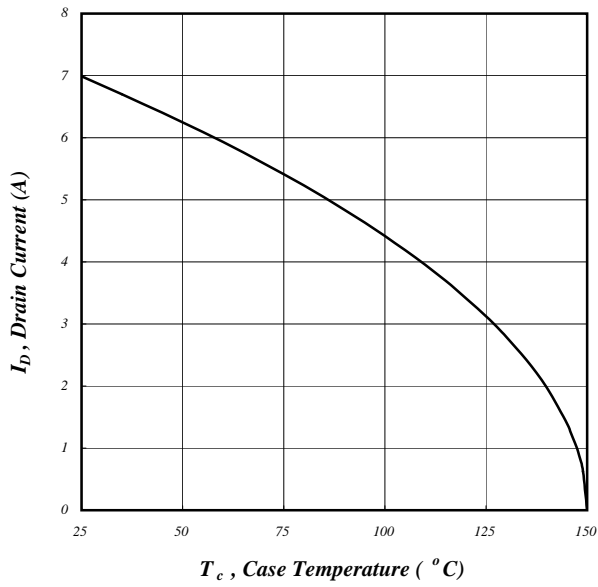


Fig 5. Maximum Drain Current vs. Case Temperature

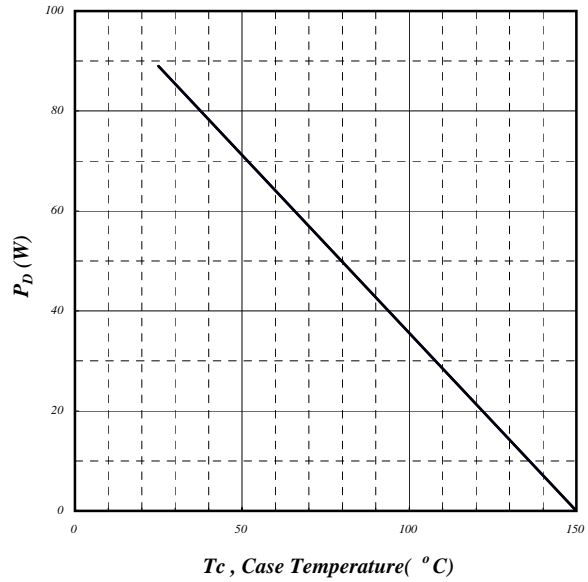


Fig 6. Typical Power Dissipation

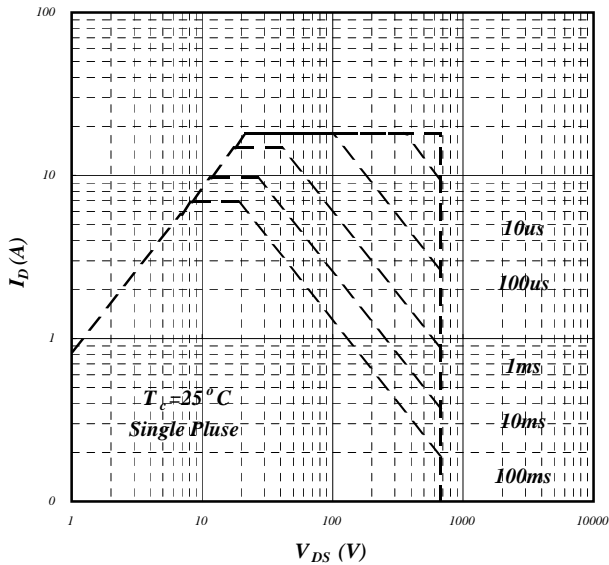


Fig 7. Maximum Safe Operating Area

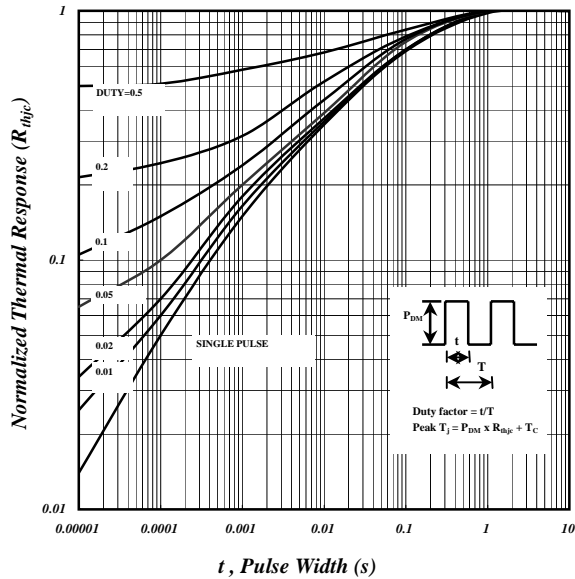


Fig 8. Effective Transient Thermal Impedance

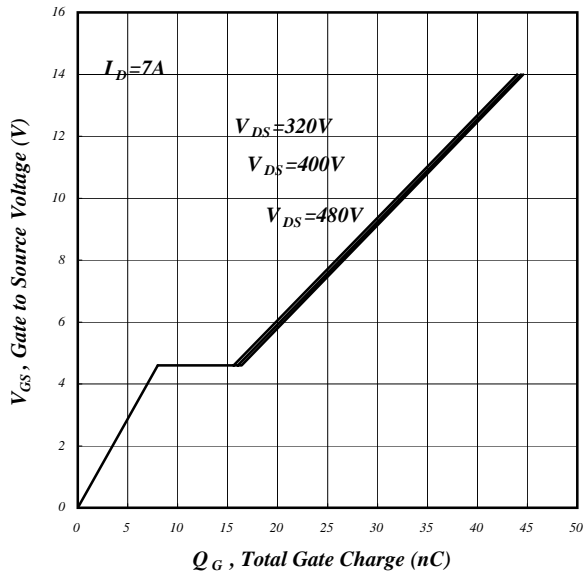


Fig 9. Gate Charge Characteristics

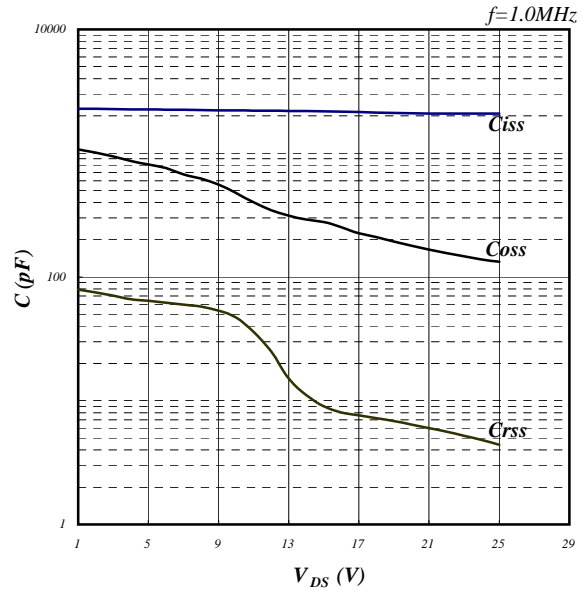


Fig 10. Typical Capacitance Characteristics

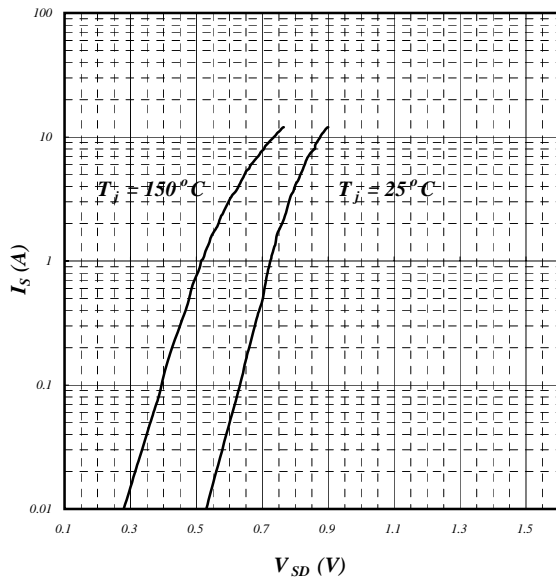


Fig 11. Forward Characteristic of Reverse Diode

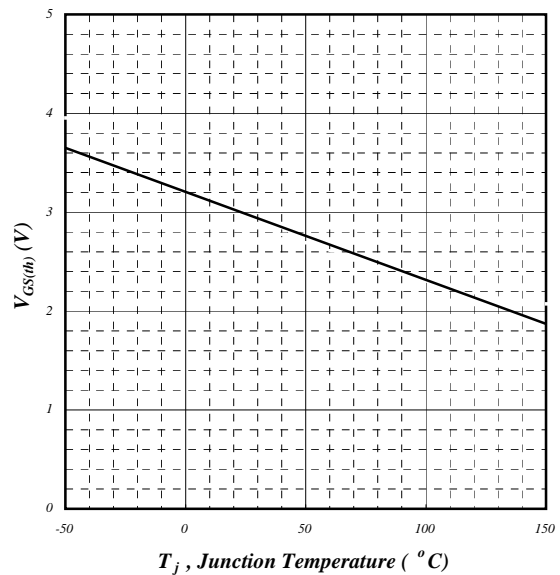


Fig 12. Gate Threshold Voltage vs. Junction Temperature

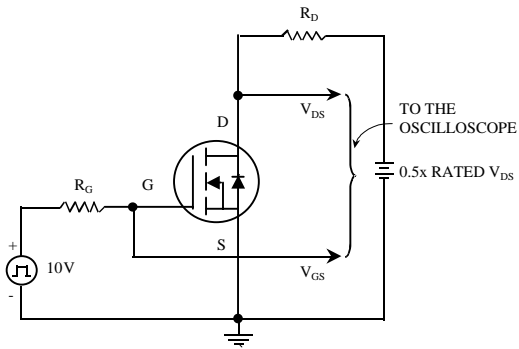


Fig 13. Switching Time Circuit

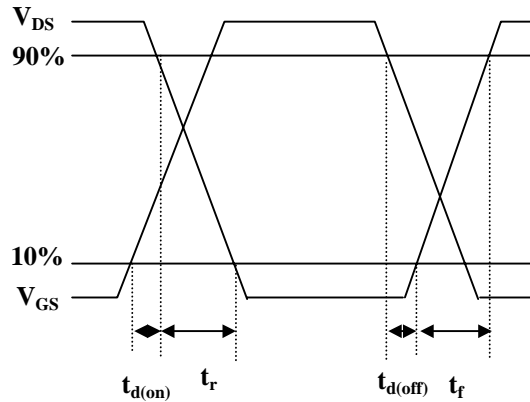


Fig 14. Switching Time Waveform

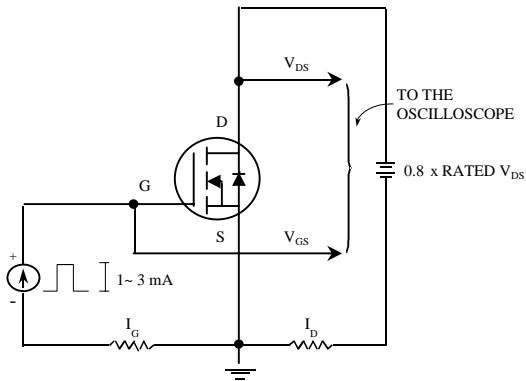


Fig 15. Gate Charge Circuit

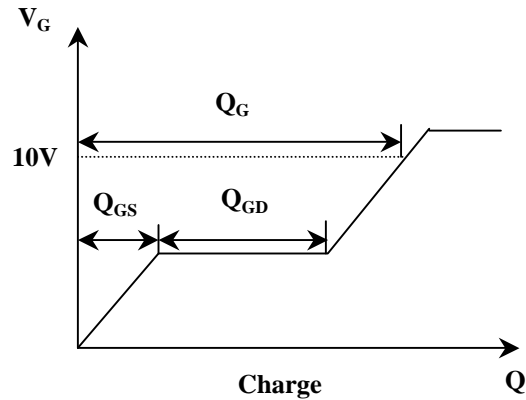


Fig 16. Gate Charge Waveform

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