

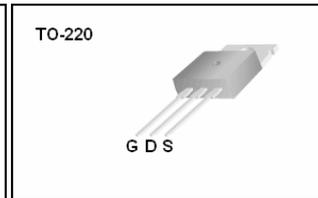
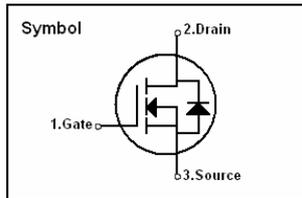


SSP5N60/SSF5N60C

600V N-Channel MOSFET

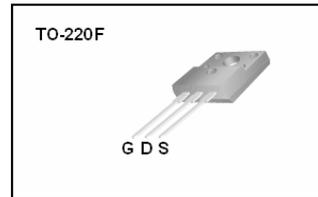
Features

- 4.5A,600v,RDS(on)=2.5Ω@VGS=10V
- Gate charge (Typical 27nC)
- High ruggedness
- Fast switching
- 100% AvalancheTested
- Improved dv/dt capability



General Description

This Power MOSFET is produced using Sourcesemi's advanced planar stripe, DMOS technology. This latest technology has been especially designed to minimize on-state resistance, have a high rugged avalanche characteristics, such as fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics. This power MOSFET is usually used at AC adaptors, on the battery charger and SMPS



Absolute Maximum Ratings

| Symbol | Parameter | SSP5N60C | SSF5N60C | Units |
|----------|--|-----------|----------|-------|
| VDSS | Drain to Source Voltage | 600 | | V |
| ID | Continuous Drain Current(@TC = 25°C) | 4.5 | 4.5* | A |
| | Continuous Drain Current(@TC = 100°C) | 2.5 | 2.5* | A |
| IDM | Drain Current Pulsed (Note 1) | 16 | 16* | A |
| VGS | Gate to Source Voltage | ±30 | | V |
| EAS | Single Pulsed Avalanche Energy (Note 2) | 240 | | mJ |
| EAR | Repetitive Avalanche Energy (Note 1) | 10 | | mJ |
| dv/dt | Peak Diode Recovery dv/dt (Note 3) | 5.0 | | V/ns |
| PD | Total Power Dissipation(@TC = 25 °C) | 100 | 33 | W |
| | Derating Factor above 25 °C | 0.8 | 0.26 | W/ °C |
| TSTG, TJ | Operating Junction Temperature & Storage Temperature | -55 ~ 150 | | °C |
| TL | Maximum Lead Temperature for soldering purpose, 1/8 from Case for 5 seconds. | 300 | | °C |

Thermal Characteristics

| Symbol | Parameter | SSP5N60C | SSF5N60C | Units |
|--------|---|----------|----------|-------|
| RθJC | Thermal Resistance, Junction-to-Case | 1.25 | 3.79 | °C/W |
| RθCS | Thermal Resistance, Case-to-Sink Typ | 0.5 | 0.5 | °C/W |
| RθJA | Thermal Resistance, Junction-to-Ambient | 62.5 | 62.5 | °C/W |

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Electrical Characteristics (TC = 25 °C unless otherwise noted)

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|--------------------------------|---|---|-----|------|------|-------|
| Off Characteristics | | | | | | |
| BVDSS | Drain-Source Breakdown Voltage | V _{GS} = 0V, I _D = 250uA | 600 | -- | -- | V |
| Δ BVDSS / Δ T _J | Breakdown Voltage Temperature coefficient | I _D = 250uA, referenced to 25 °C | -- | 0.65 | -- | V/°C |
| IDSS | Drain-Source Leakage Current | V _{DS} = 600V, V _{GS} = 0V | -- | -- | 10 | uA |
| | | V _{DS} = 480V, T _C = 125 °C | -- | -- | 100 | uA |
| IGSS | Gate-Source Leakage, Forward | V _{GS} = 30V, V _{DS} = 0V | -- | -- | 100 | nA |
| | Gate-source Leakage, Reverse | V _{GS} = -30V, V _{DS} = 0V | -- | -- | -100 | nA |
| On Characteristics | | | | | | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} = V _{GS} , I _D = 250uA | 2.0 | -- | 4.0 | V |
| R _{DS(ON)} | Static Drain-Source On-state Resistance | V _{GS} = 10 V, I _D = 2.A | -- | 2.0 | 2.5 | Ω |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{GS} = 0 V, V _{DS} = 25V, f = 1MHz | -- | 710 | 920 | pF |
| C _{oss} | Output Capacitance | | -- | 65 | 85 | |
| C _{rss} | Reverse Transfer Capacitance | | -- | 14 | 19 | |
| Dynamic Characteristics | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{DD} = 300V, I _D = 4.5A, R _G = 25Ω (Note 4, 5) | -- | 20 | 50 | ns |
| t _r | Rise Time | | -- | 55 | 120 | |
| t _{d(off)} | Turn-off Delay Time | | -- | 70 | 150 | |
| t _f | Fall Time | | -- | 55 | 120 | |
| Q _g | Total Gate Charge | V _{DS} = 480V, V _{GS} = 10V, I _D = 4.5A (Note 4, 5) | -- | 27 | 30 | nC |
| Q _{gs} | Gate-Source Charge | | -- | 3.6 | -- | |
| Q _{gd} | Gate-Drain Charge(Miller Charge) | | -- | 13.1 | -- | |

Source-Drain Diode Ratings and Characteristics

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit. |
|-----------------|---------------------------|--|------|------|------|-------|
| I _S | Continuous Source Current | Integral Reverse p-n Junction | -- | -- | 4.5 | A |
| I _{SM} | Pulsed Source Current | Diode in the MOSFET | -- | -- | 16 | |
| V _{SD} | Diode Forward Voltage | I _S = 4.5A, V _{GS} = 0V | -- | -- | 1.4 | V |
| t _{rr} | Reverse Recovery Time | I _S = 4.5A, V _{GS} = 0V, di/dt = 100A/us | -- | 330 | -- | ns |
| Q _{rr} | Reverse Recovery Charge | I _S = 4.5A, V _{GS} = 0V, di/dt = 100A/us | -- | 2.67 | -- | uC |

※ NOTES

1. Repeatability rating : pulse width limited by junction temperature
2. L = 25.0mH, I_{AS} = 4.0A, V_{DD} = 50V, R_G = 25Ω , Starting T_J = 25°C
3. I_{SD} ≤ 4.0A, di/dt ≤ 200A/us, V_{DD} ≤ BVDSS, Starting T_J = 25°C
4. Pulse Test : Pulse Width ≤ 300us, Duty Cycle ≤ 2%
5. Essentially independent of operating temperature

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Fig 1. On-State Characteristics

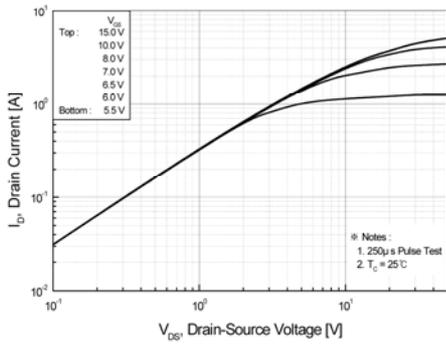


Fig 2. Transfer Characteristics

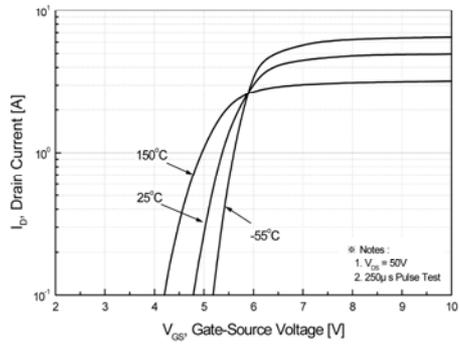


Fig 3. On Resistance Variation vs. Drain Current and Gate Voltage

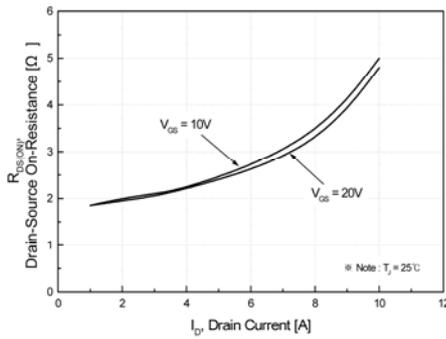


Fig 4. On State Current vs. Allowable Case Temperature

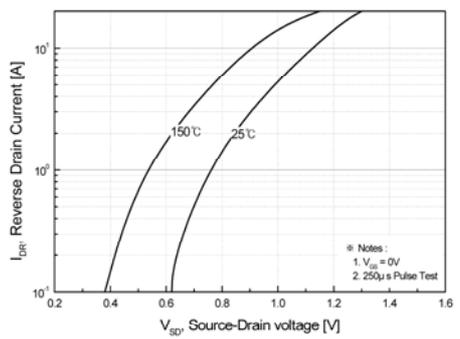


Fig 5. Capacitance Characteristics (Non-Repetitive)

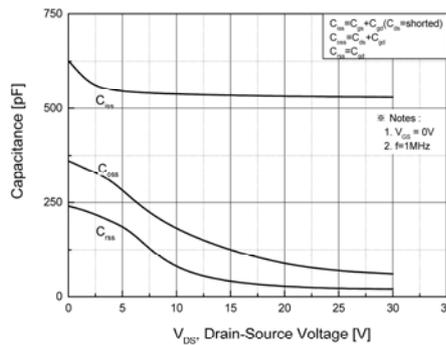
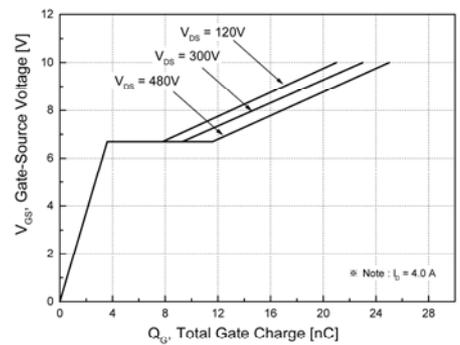


Fig 6. Gate Charge Characteristics



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Fig 7. Breakdown Voltage Variation vs. Junction Temperature

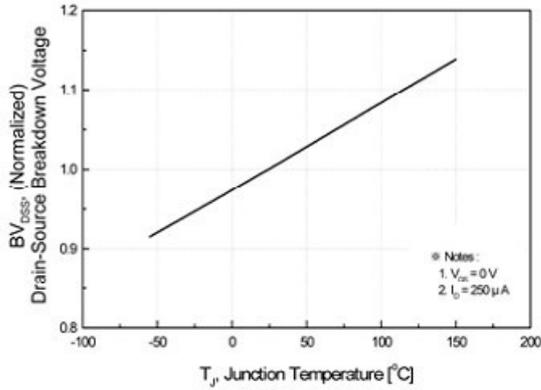


Fig 8. On-Resistance Variation vs. Junction Temperature

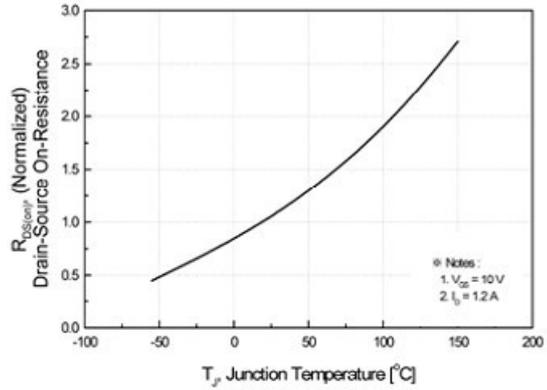


Fig 9-1. Maximum Safe Operating Area for SSP5N60C

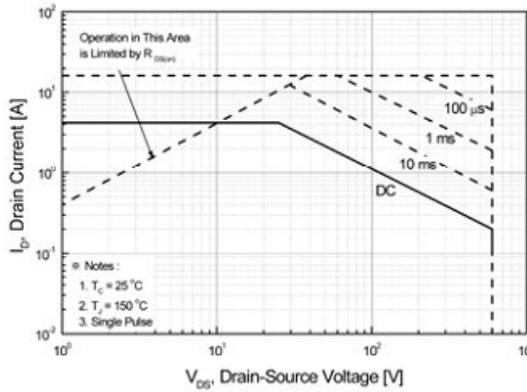


Fig 9-2. Maximum Safe Operating Area for SSF5N60C

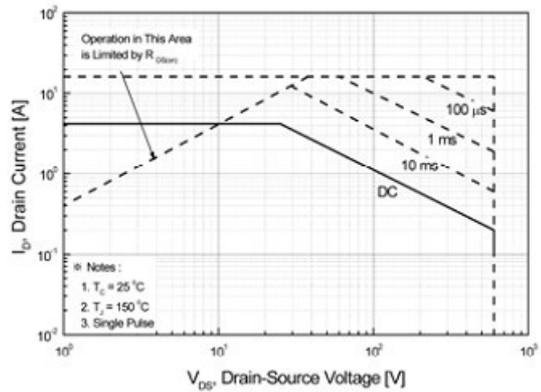
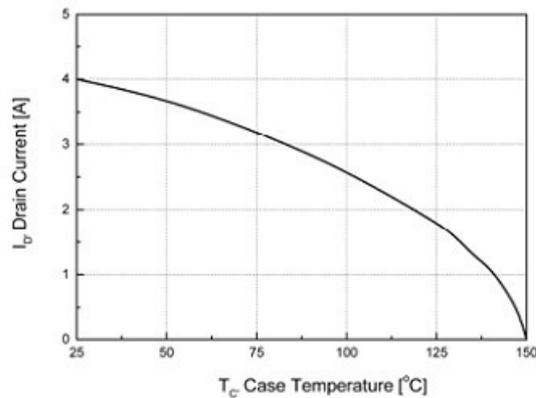


Fig 10. Maximum Drain Current vs. Case Temperature



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Fig 11-1. Transient Thermal Response Curve for SSP5N60C

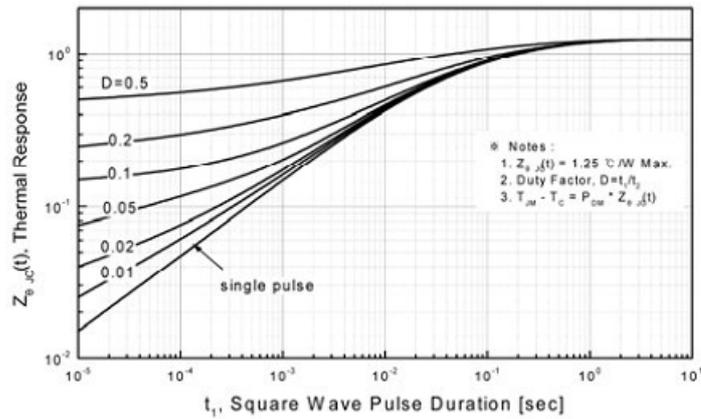
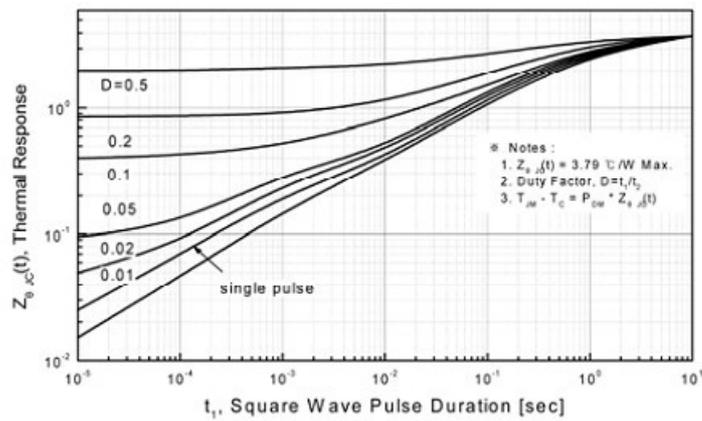


Fig 11-2. Transient Thermal Response Curve for SSF5N60C



SSP5N60/SSF5N60C

Fig. 12. Gate Charge Test Circuit & Waveforms

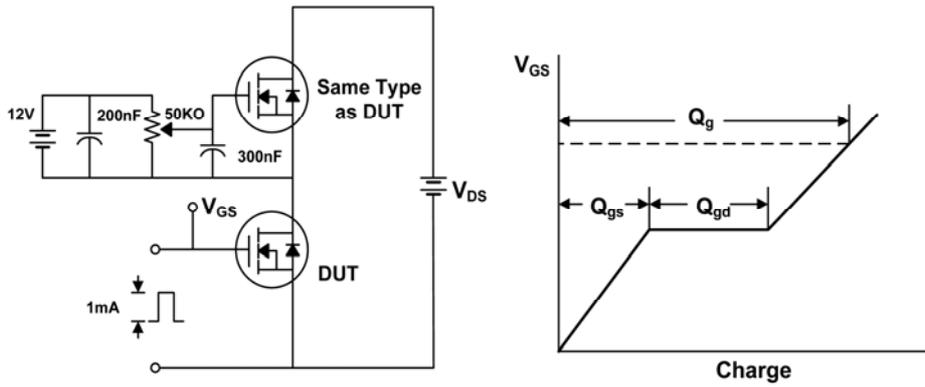


Fig. 13. Switching Time Test Circuit & Waveforms

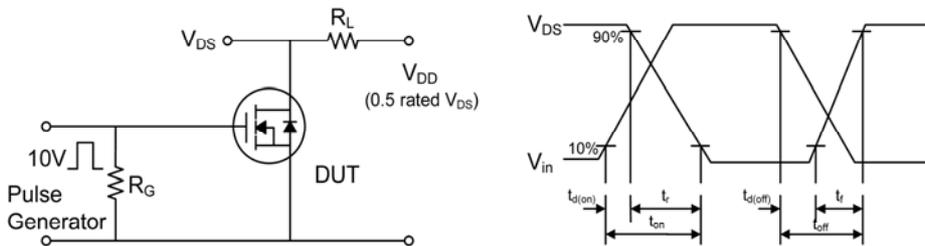


Fig. 14. Unclamped Inductive Switching Test Circuit & Waveforms

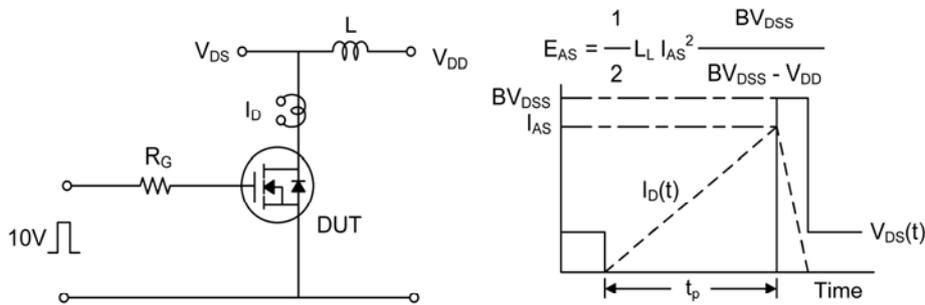


Fig. 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

