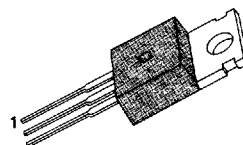


## FEATURES

- Lower  $R_{DS(on)}$
- Improved inductive ruggedness
- Fast switching times
- Rugged polysilicon gate cell structure
- Lower input capacitance
- Extended safe operating area
- Improved high temperature reliability

TO-220



1. Gate 2. Drain 3. Source

## PRODUCT SUMMARY

| Part Number | V <sub>DS</sub> | R <sub>DS(on)</sub> | I <sub>D</sub> |
|-------------|-----------------|---------------------|----------------|
| SSP6N60     | 600V            | 1.8Ω                | 6A             |
| SSP6N55     | 550V            | 1.8Ω                | 6A             |

## ABSOLUTE MAXIMUM RATINGS

| Characteristic                                                             | Symbol                            | SSP6N60     | SSP6N55 | Unit            |
|----------------------------------------------------------------------------|-----------------------------------|-------------|---------|-----------------|
| Drain-Source Voltage (1)                                                   | V <sub>DS</sub>                   | 600         | 550     | V <sub>DC</sub> |
| Drain-Gate Voltage (R <sub>GS</sub> =1.0MΩ)(1)                             | V <sub>DGR</sub>                  | 600         | 550     | V <sub>DC</sub> |
| Gate-Source Voltage                                                        | V <sub>GS</sub>                   | ±20         |         | V <sub>DC</sub> |
| Continuous Drain Current T <sub>C</sub> =25 °C                             | I <sub>D</sub>                    | 6.0         |         | A <sub>DC</sub> |
| Continuous Drain Current T <sub>C</sub> =100 °C                            | I <sub>D</sub>                    | 4.0         |         | A <sub>DC</sub> |
| Drain Current - Pulsed (3)                                                 | I <sub>DM</sub>                   | 24          |         | A <sub>DC</sub> |
| Gate Current - Pulsed                                                      | I <sub>GM</sub>                   | ±1.5        |         | A <sub>DC</sub> |
| Single Pulsed Avalanche Energy (4)                                         | E <sub>AS</sub>                   | 570         |         | mJ              |
| Avalanche Current                                                          | I <sub>AS</sub>                   | 6.0         |         | A               |
| Total Power Dissipation at T <sub>C</sub> =25 °C                           | P <sub>D</sub>                    | 125         |         | Watts           |
| Derate above 25 °C                                                         |                                   | 1.0         |         | W/°C            |
| Operating and Storage<br>Junction Temperature Range                        | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 |         | °C              |
| Maximum Lead Temp. for Soldering<br>Purposes, 1/8" from case for 5 seconds | T <sub>L</sub>                    | 300         |         | °C              |

Notes : (1) T<sub>J</sub>=25°C to 150°C

(2) Pulse test : Pulse width ≤ 300μs, Duty Cycle ≤ 2%

(3) Repetitive rating : Pulse width limited by max. junction temperature

(4) L=27mH, V<sub>GS</sub>=50V, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C

**ELECTRICAL CHARACTERISTICS** (T<sub>C</sub>=25°C unless otherwise specified)

| Symbol              | Characteristic                                     | Min | Typ  | Max  | Units | Test Conditions                                                                                                                                                      |
|---------------------|----------------------------------------------------|-----|------|------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BV <sub>DSS</sub>   | Drain-Source Breakdown Voltage                     |     |      |      |       |                                                                                                                                                                      |
|                     | SSP6N60                                            | 600 | -    | -    | V     | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                                                                                                           |
|                     | SSP6N55                                            | 550 | -    | -    | V     |                                                                                                                                                                      |
| V <sub>GS(th)</sub> | Gate Threshold Voltage                             | 2.0 | -    | 4.0  | V     | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                                                                                             |
| I <sub>GSS</sub>    | Gate-Source Leakage Forward                        | -   | -    | 100  | nA    | V <sub>GS</sub> =20V                                                                                                                                                 |
| I <sub>GSS</sub>    | Gate-Source Leakage Reverse                        | -   | -    | -100 | nA    | V <sub>GS</sub> =-20V                                                                                                                                                |
| I <sub>DSS</sub>    | Zero Gate Voltage Drain Current                    | -   | -    | 250  | μA    | V <sub>DS</sub> =Max. Rating, V <sub>GS</sub> =0V                                                                                                                    |
|                     |                                                    | -   | -    | 1000 | μA    | V <sub>DS</sub> =0.8 Max. Rating, V <sub>GS</sub> =0V, T <sub>C</sub> =125°C                                                                                         |
| I <sub>D(on)</sub>  | On-State Drain-Source Current(2)                   | 6.0 | -    | -    | A     | V <sub>DS</sub> ≥ 10V, I <sub>D</sub> =10V                                                                                                                           |
| R <sub>DS(on)</sub> | Static Drain-Source On Resistance(4)               | -   | -    | 1.8  | Ω     | V <sub>GS</sub> =10V, I <sub>D</sub> =3.0A                                                                                                                           |
|                     |                                                    |     |      | 1.2  | Ω     | V <sub>GS</sub> =10V, I <sub>D</sub> =3.0A                                                                                                                           |
| g <sub>fs</sub>     | Forward Transconductance (2)                       | 3.0 | 4.8  | -    | Ω     | V <sub>DS</sub> ≥ 50V, I <sub>D</sub> =3.0A                                                                                                                          |
| C <sub>iss</sub>    | Input Capacitance                                  | -   | 1800 | -    | pF    | V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1.0MHz                                                                                                                  |
| C <sub>oss</sub>    | Output Capacitance                                 | -   | 350  | -    | pF    |                                                                                                                                                                      |
| C <sub>rss</sub>    | Reverse Transfer Capacitance                       | -   | 150  | -    | pF    |                                                                                                                                                                      |
| t <sub>d(on)</sub>  | Turn-On Delay Time                                 | -   | 30   | -    | ns    | V <sub>DD</sub> =0.5 BV <sub>DSS</sub> , I <sub>D</sub> =6.0A, Z <sub>Θ</sub> =9.1Ω<br>(MOSFET switching times are essentially independent of operating temperature) |
| t <sub>r</sub>      | Rise Time                                          | -   | 75   | -    | ns    |                                                                                                                                                                      |
| t <sub>d(off)</sub> | Turn-Off Delay Time                                | -   | 100  | -    | ns    |                                                                                                                                                                      |
| t <sub>f</sub>      | Fall Time                                          | -   | 60   | -    | ns    |                                                                                                                                                                      |
| Q <sub>g</sub>      | Total Gate Charge<br>(Gate-Source Plus Gate-Drain) | -   | -    | 77   | nC    | V <sub>GS</sub> =10V, I <sub>D</sub> =6.0A, V <sub>DS</sub> =0.8 Max. Rating<br>(Gate charge is essentially independent of operating temperature)                    |
| Q <sub>gs</sub>     | Gate-Source Charge                                 | -   | 9.3  | -    | nC    |                                                                                                                                                                      |
| Q <sub>gd</sub>     | Gate-Drain ("Miller") Charge                       | -   | 29.3 | -    | nC    |                                                                                                                                                                      |

**THERMAL RESISTANCE**

| Symbol            | Characteristics     |     | All  | Units | Remark                                    |
|-------------------|---------------------|-----|------|-------|-------------------------------------------|
| R <sub>thJC</sub> | Junction-to-Case    | MAX | 1.0  | K/W   |                                           |
| R <sub>thCS</sub> | Case-to-Sink        | TYP | 0.5  | K/W   | Mounting surface flat smooth, and greased |
| R <sub>thJA</sub> | Junction-to-Ambient | MAX | 62.5 | K/W   | Free Air Operation                        |

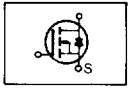
Notes : (1) T<sub>J</sub>=25°C to 150°C

(2) Pulse test : Pulse width ≤ 300μs, Duty Cycle ≤ 2%

(3) Repetitive rating : Pulse width limited by max. junction temperature

(4) For Ultra low "A" R<sub>DS(on)</sub>, device add "A" suffix to part number

## SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

| Symbol   | Characteristic                            | Min | Typ | Max  | Units | Test Conditions                                                                                                                                                           |
|----------|-------------------------------------------|-----|-----|------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $I_S$    | Continuous Source Current<br>(Body Diode) | -   | -   | 6.0  | A     | Modified MOSFET<br>symbol showing the<br>integral reverse<br>P-N junction rectifier<br> |
| $I_{SM}$ | Pulse Source Current<br>(Body Diode) (3)  | -   | -   | 24.0 | A     |                                                                                                                                                                           |
| $V_{SD}$ | Diode Forward Voltage (2)                 | -   | -   | 1.5  | V     | $T_J = 25^\circ\text{C}$ , $I_S = 10.0\text{A}$ , $V_{GS} = 0\text{V}$                                                                                                    |
| $t_{rr}$ | Reverse Recovery Time                     | -   | 450 | 940  | ns    | $T_J = 25^\circ\text{C}$ , $I_F = 10.0\text{A}$ , $dI_F/dt = 100\text{A}/\mu\text{S}$                                                                                     |

Notes : (1)  $T_J = 25^\circ\text{C}$  to  $150^\circ\text{C}$ (2) Pulse test : Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ 

(3) Repetitive rating : Pulse width limited by max. junction temperature

