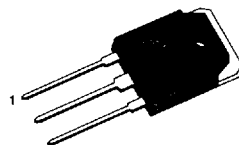


## FEATURES

- 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-3P



1. Gate 2. Drain 3. Source

## PRODUCT SUMMARY

| Part Number | $BV_{DS}$ | $R_{DS(on)}$  | $I_D$ |
|-------------|-----------|---------------|-------|
| SSH10N80    | 800V      | $1.2\ \Omega$ | 10.0A |
| SSH10N70    | 700V      | $1.2\ \Omega$ | 10.0A |

## ABSOLUTE MAXIMUM RATINGS

| Characteristic                                                                | Symbol         | SSH10N80        | SSH10N70 | Unit          |
|-------------------------------------------------------------------------------|----------------|-----------------|----------|---------------|
| Drain-Source Voltage (1)                                                      | $V_{DS}$       | 800             | 700      | Vdc           |
| Drain-Gate Voltage ( $R_{GS}=1.0M\ \Omega$ )(1)                               | $V_{DGR}$      | 800             | 700      | Vdc           |
| Gate-Source Voltage                                                           | $V_{GS}$       | $\pm 30$        |          | Vdc           |
| Continuous Drain Current $T_c=25^\circ C$                                     | $I_D$          | 10.0            |          | Adc           |
| Continuous Drain Current $T_c=100^\circ C$                                    | $I_D$          | 7.0             |          | Adc           |
| Drain Current - Pulsed (3)                                                    | $I_{DM}$       | 40.0            |          | Adc           |
| Single Pulsed Avalanche Energy (4)                                            | EAS            | 795             |          | mJ            |
| Avalanche Current                                                             | $I_{AS}$       | 10.0            |          | A             |
| Total Power Dissipation at $T_c=25^\circ C$                                   | $P_D$          | 230             |          | Watts         |
| Derate Above $25^\circ C$                                                     |                | 1.82            |          | W/ $^\circ C$ |
| Operating and Storage<br>Junction Temperature Range                           | $T_J, T_{STG}$ | $-55$ to $+150$ |          | $^\circ C$    |
| Maximum Lead Temp. for Soldering<br>Purposes, $1/8''$ from case for 5 seconds | $T_L$          | 300             |          | $^\circ C$    |

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

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

(4)  $L=15mH$ ,  $V_{dd}=50V$ ,  $R_G=25\ \Omega$ , Starting  $T_J=25^\circ C$ 

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**ELECTRICAL CHARACTERISTICS** (Tc=25°C unless otherwise specified)

| Symbol              | Characteristic                                     | Min | Typ  | Max  | Units | Test Conditions                                                                                                                                                       |
|---------------------|----------------------------------------------------|-----|------|------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BV <sub>DSS</sub>   | Drain-Source Breakdown Voltage                     |     |      |      |       |                                                                                                                                                                       |
|                     | SSH10N80                                           | 800 | -    | -    | V     | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                                                                                                            |
|                     | SSH10N70                                           | 700 | -    | -    | V     |                                                                                                                                                                       |
| V <sub>GS(th)</sub> | Gate Threshold Voltage                             | 2.0 | -    | 4.5  | 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> =150°C                                                                                          |
| R <sub>DS(on)</sub> | Static Drain-Source On-Resistance(2)               | -   | -    | 1.2  | Ω     | V <sub>GS</sub> =10V, I <sub>D</sub> =5.0A                                                                                                                            |
| g <sub>fs</sub>     | Forward Transconductance (2)                       | 7.0 | -    | -    | Ω     | V <sub>DS</sub> =15V, I <sub>D</sub> =5.0A                                                                                                                            |
| C <sub>iss</sub>    | Input Capacitance                                  | -   | 3700 | -    | pF    | V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1MHz                                                                                                                     |
| C <sub>oss</sub>    | Output Capacitance                                 | -   | 290  | -    | pF    |                                                                                                                                                                       |
| C <sub>rss</sub>    | Reverse Transfer Capacitance                       | -   | 82   | -    | pF    |                                                                                                                                                                       |
| t <sub>d(on)</sub>  | Turn-On Delay Time                                 | -   | -    | 130  | ns    | V <sub>DD</sub> =0.5 BV <sub>DSS</sub> , I <sub>D</sub> =10.0A, Z <sub>o</sub> =9.1Ω<br>(MOSFET switching times are essentially independent of operating temperature) |
| t <sub>r</sub>      | Rise Time                                          | -   | -    | 280  | ns    |                                                                                                                                                                       |
| t <sub>d(off)</sub> | Turn-Off Delay Time                                | -   | -    | 630  | ns    |                                                                                                                                                                       |
| t <sub>f</sub>      | Fall Time                                          | -   | -    | 210  | ns    |                                                                                                                                                                       |
| Q <sub>g</sub>      | Total Gate Charge<br>(Gate-Source Plus Gate-Drain) | -   | -    | 160  | nC    | V <sub>GS</sub> =10V, I <sub>D</sub> =10.0A, V <sub>DS</sub> =0.8 Max. Rating<br>(Gate charge is essentially independent of operating temperature)                    |
| Q <sub>gs</sub>     | Gate-Source Charge                                 | -   | 27   | -    | nC    |                                                                                                                                                                       |
| Q <sub>gd</sub>     | Gate-Drain ("Miller") Charge                       | -   | 66   | -    | nC    |                                                                                                                                                                       |

**THERMAL RESISTANCE**

| Symbol            | Characteristics     |     | All  | Units | Remark                |
|-------------------|---------------------|-----|------|-------|-----------------------|
| R <sub>thJC</sub> | Junction-to-Case    | MAX | 0.55 | K/W   |                       |
| R <sub>thCS</sub> | Case-to-Sink        | TYP | 0.24 | K/W   | Mounting surface flat |
| R <sub>thJA</sub> | Junction-to-Ambient | MAX | 40   | 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

## SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

| Symbol   | Characteristic                            | Min | Typ | Max  | Units | Test Conditions                                                                       |
|----------|-------------------------------------------|-----|-----|------|-------|---------------------------------------------------------------------------------------|
| $I_S$    | Continuous Source Current<br>(Body Diode) | -   | -   | 10.0 | A     | Modified MOSFET<br>symbol showing the<br>integral reverse<br>P-N junction rectifier   |
| $I_{SM}$ | Pulse Source Current<br>(Body Diode) (3)  | -   | -   | 40.0 | A     |                                                                                       |
| $V_{SD}$ | Diode Forward Voltage (2)                 | -   | -   | 2.5  | V     | $T_J = 25^\circ\text{C}$ , $I_S = 10.0\text{A}$ , $V_{GS} = 0\text{V}$                |
| $t_{rr}$ | Reverse Recovery Time                     | -   | 900 | -    | 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

