

## FEATURES

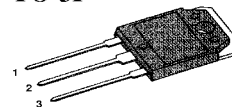
- Avalanche Rugged Technology
- Rugged Gate Oxide Technology
- Lower Input Capacitance
- Improved Gate Charge
- Extended Safe Operating Area
- 175°C Operating Temperature
- Lower Leakage Current : 10  $\mu$ A (Max.) @  $V_{DS} = 100V$
- Lower  $R_{DS(ON)}$  : 0.018  $\Omega$  (Typ.)

$$BV_{DSS} = 100 V$$

$$R_{DS(on)} = 0.023 \Omega$$

$$I_D = 70 A$$

## TO-3P



1.Gate 2. Drain 3. Source

## Absolute Maximum Ratings

| Symbol         | Characteristic                                                          | Value        | Units      |
|----------------|-------------------------------------------------------------------------|--------------|------------|
| $V_{DSS}$      | Drain-to-Source Voltage                                                 | 100          | V          |
| $I_D$          | Continuous Drain Current ( $T_C=25^\circ C$ )                           | 70           | A          |
|                | Continuous Drain Current ( $T_C=100^\circ C$ )                          | 49.2         |            |
| $I_{DM}$       | Drain Current-Pulsed ①                                                  | 280          | A          |
| $V_{GS}$       | Gate-to-Source Voltage                                                  | $\pm 20$     | V          |
| $E_{AS}$       | Single Pulsed Avalanche Energy ②                                        | 1633         | mJ         |
| $I_{AR}$       | Avalanche Current ①                                                     | 70           | A          |
| $E_{AR}$       | Repetitive Avalanche Energy ①                                           | 30           | mJ         |
| $dv/dt$        | Peak Diode Recovery $dv/dt$ ③                                           | 6.5          | V/ns       |
| $P_D$          | Total Power Dissipation ( $T_C=25^\circ C$ )                            | 300          | W          |
|                | Linear Derating Factor                                                  | 2.0          |            |
| $T_J, T_{STG}$ | Operating Junction and Storage Temperature Range                        | - 55 to +175 | $^\circ C$ |
| $T_L$          | Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5-seconds | 300          |            |

## Thermal Resistance

| Symbol          | Characteristic      | Typ. | Max. | Units        |
|-----------------|---------------------|------|------|--------------|
| $R_{\theta JC}$ | Junction-to-Case    | --   | 0.5  | $^\circ C/W$ |
| $R_{\theta CS}$ | Case-to-Sink        | 0.24 | --   |              |
| $R_{\theta JA}$ | Junction-to-Ambient | --   | 40   |              |

# SSH70N10A

N-CHANNEL  
POWER MOSFET

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

| Symbol              | Characteristic                          | Min. | Typ.  | Max.  | Units | Test Condition                                                                                         |
|---------------------|-----------------------------------------|------|-------|-------|-------|--------------------------------------------------------------------------------------------------------|
| BV <sub>DSS</sub>   | Drain-Source Breakdown Voltage          | 100  | --    | --    | V     | V <sub>GS</sub> =0V, I <sub>D</sub> =250 μA                                                            |
| ΔBV/ΔT <sub>J</sub> | Breakdown Voltage Temp. Coeff.          | --   | 0.12  | --    | V/°C  | I <sub>D</sub> =250 μA <b>See Fig 7</b>                                                                |
| V <sub>GS(th)</sub> | Gate Threshold Voltage                  | 2.0  | --    | 4.0   | V     | V <sub>DS</sub> =5V, I <sub>D</sub> =250 μA                                                            |
| I <sub>GSS</sub>    | Gate-Source Leakage , Forward           | --   | --    | 100   | nA    | V <sub>GS</sub> =20V                                                                                   |
|                     | Gate-Source Leakage , Reverse           | --   | --    | -100  |       | V <sub>GS</sub> =-20V                                                                                  |
| I <sub>DSS</sub>    | Drain-to-Source Leakage Current         | --   | --    | 10    | μA    | V <sub>DS</sub> =100V                                                                                  |
|                     |                                         | --   | --    | 100   |       | V <sub>DS</sub> =80V, T <sub>C</sub> =150°C                                                            |
| R <sub>DS(on)</sub> | Static Drain-Source On-State Resistance | --   | --    | 0.023 | Ω     | V <sub>GS</sub> =10V, I <sub>D</sub> =35A ④                                                            |
| g <sub>fs</sub>     | Forward Transconductance                | --   | 53.51 | --    | Ω     | V <sub>DS</sub> =40V, I <sub>D</sub> =35A ④                                                            |
| C <sub>iss</sub>    | Input Capacitance                       | --   | 3750  | 4870  | pF    | V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f = 1MHz<br><b>See Fig 5</b>                                |
| C <sub>oss</sub>    | Output Capacitance                      | --   | 850   | 980   |       |                                                                                                        |
| C <sub>rss</sub>    | Reverse Transfer Capacitance            | --   | 375   | 430   |       |                                                                                                        |
| t <sub>d(on)</sub>  | Turn-On Delay Time                      | --   | 22    | 60    | ns    | V <sub>DD</sub> =50V, I <sub>D</sub> =70A,<br>R <sub>G</sub> =5.3Ω<br><b>See Fig 13</b> ④⑤             |
| t <sub>r</sub>      | Rise Time                               | --   | 24    | 60    |       |                                                                                                        |
| t <sub>d(off)</sub> | Turn-Off Delay Time                     | --   | 112   | 240   |       |                                                                                                        |
| t <sub>f</sub>      | Fall Time                               | --   | 84    | 180   |       |                                                                                                        |
| Q <sub>g</sub>      | Total Gate Charge                       | --   | 151   | 195   | nC    | V <sub>DS</sub> =80V, V <sub>GS</sub> =10V,<br>I <sub>D</sub> =70A<br><b>See Fig 6 &amp; Fig 12</b> ④⑤ |
| Q <sub>gs</sub>     | Gate-Source Charge                      | --   | 31    | --    |       |                                                                                                        |
| Q <sub>gd</sub>     | Gate-Drain(" miller" ) Charge           | --   | 66    | --    |       |                                                                                                        |

## Source-Drain Diode Ratings and Characteristics

| Symbol          | Characteristic            | Min. | Typ. | Max. | Units | Test Condition                                                 |
|-----------------|---------------------------|------|------|------|-------|----------------------------------------------------------------|
| I <sub>S</sub>  | Continuous Source Current | --   | --   | 70   | A     | Integral reverse pn-diode in the MOSFET                        |
| I <sub>SM</sub> | Pulsed-Source Current ①   | --   | --   | 280  |       |                                                                |
| V <sub>SD</sub> | Diode Forward Voltage ④   | --   | --   | 1.6  | V     | T <sub>J</sub> =25°C, I <sub>S</sub> =70A, V <sub>GS</sub> =0V |
| t <sub>rr</sub> | Reverse Recovery Time     | --   | 143  | --   | ns    | T <sub>J</sub> =25°C, I <sub>F</sub> =70A                      |
| Q <sub>rr</sub> | Reverse Recovery Charge   | --   | 0.72 | --   | μC    | di <sub>F</sub> /dt=100A/μs ④                                  |

### Notes ;

- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ② L=0.5mH, I<sub>AS</sub>=70A, V<sub>DD</sub>=25V, R<sub>G</sub>=27Ω, Starting T<sub>J</sub>=25°C
- ③ I<sub>SD</sub> ≤ 70A, di/dt ≤ 530A/μs, V<sub>DD</sub> ≤ BV<sub>DSS</sub>, Starting T<sub>J</sub>=25°C
- ④ Pulse Test : Pulse Width = 250 μs, Duty Cycle ≤ 2%
- ⑤ Essentially Independent of Operating Temperature

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Fig 1. Output Characteristics

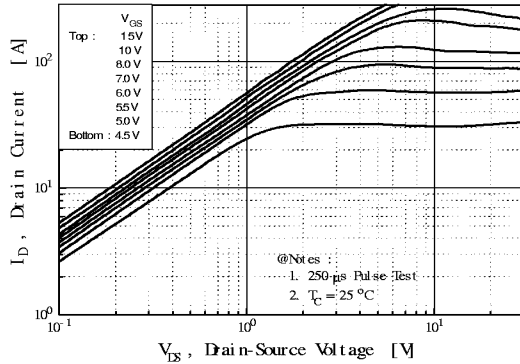


Fig 2. Transfer Characteristics

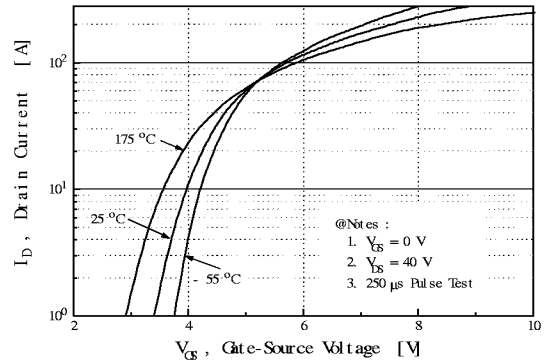


Fig 3. On-Resistance vs. Drain Current

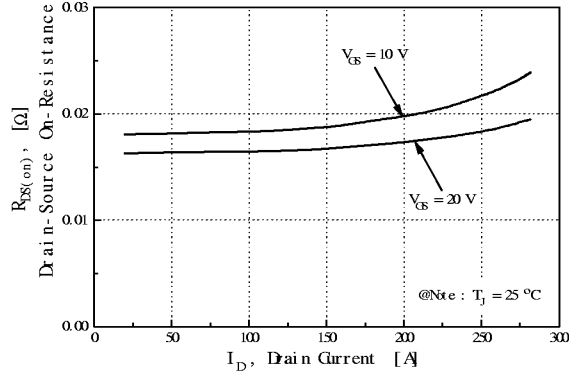


Fig 4. Source-Drain Diode Forward Voltage

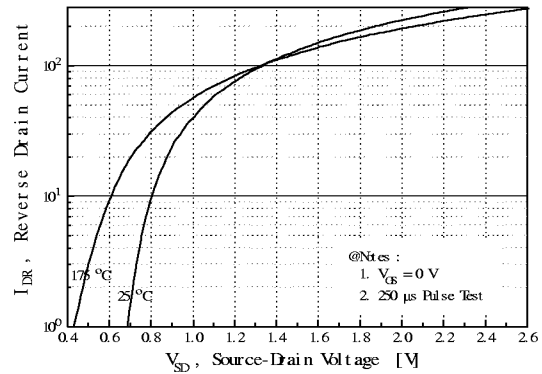


Fig 5. Capacitance vs. Drain-Source Voltage

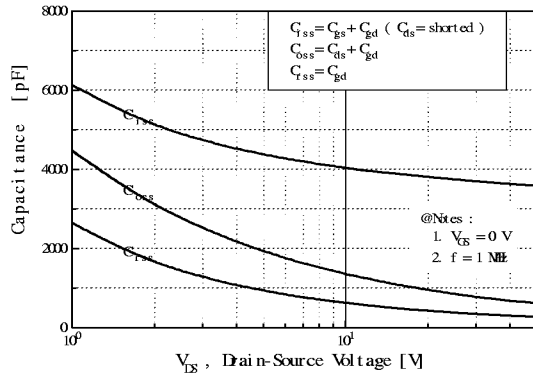
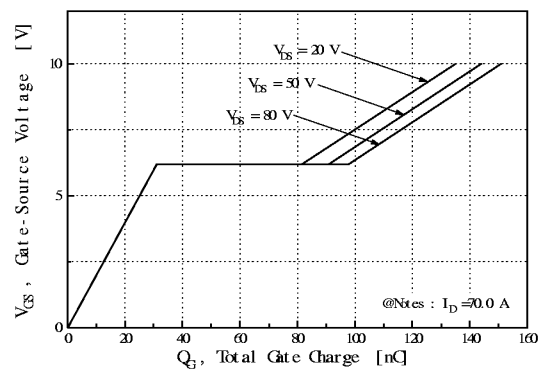
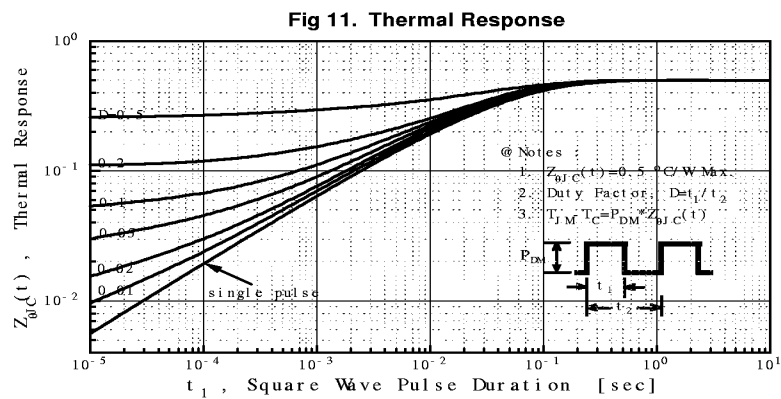
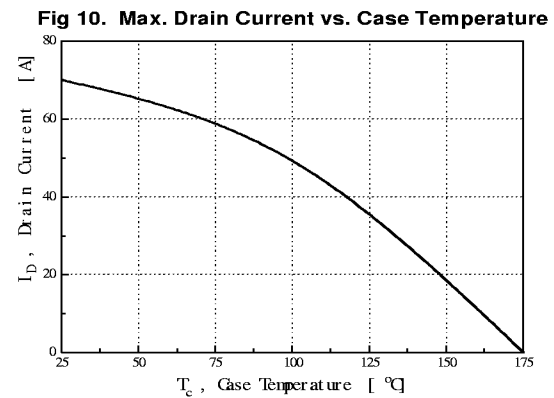
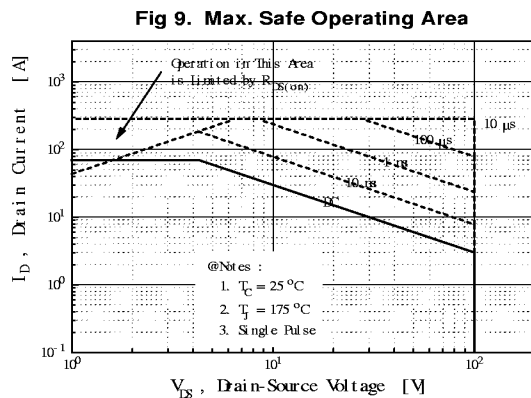
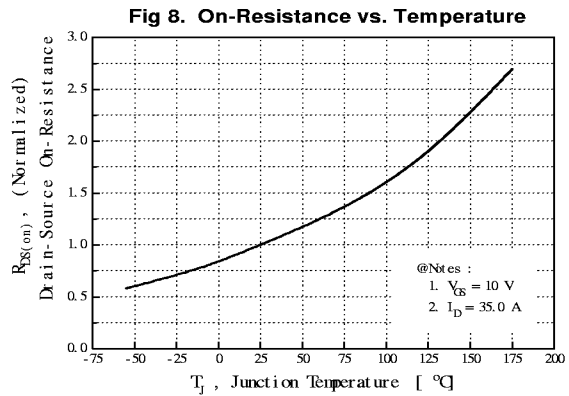
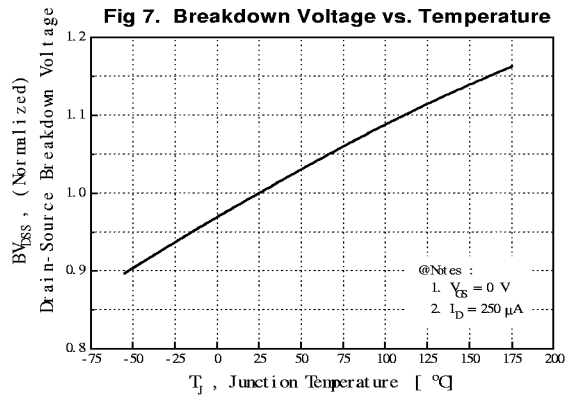


Fig 6. Gate Charge vs. Gate-Source Voltage



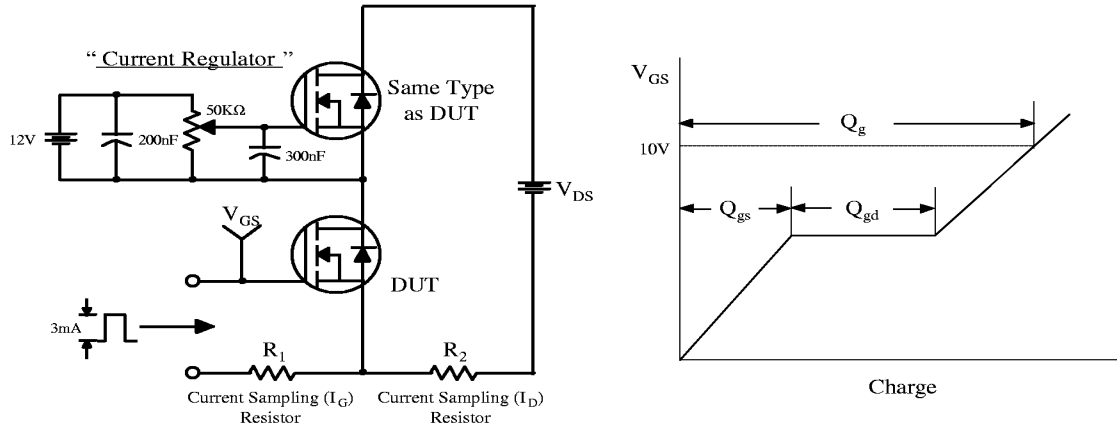
# SSH70N10A

## N-CHANNEL POWER MOSFET

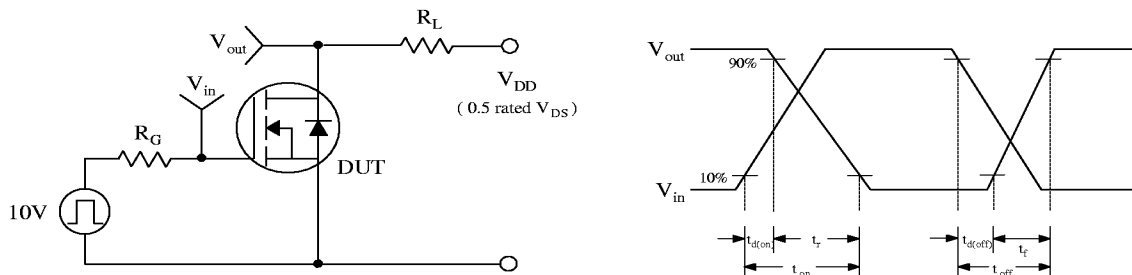


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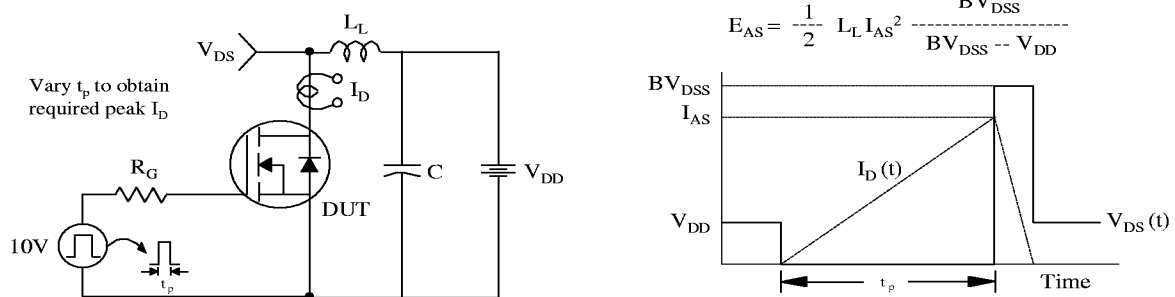
**Fig 12. Gate Charge Test Circuit & Waveform**



**Fig 13. Resistive Switching Test Circuit & Waveforms**



**Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms**



[illegible]