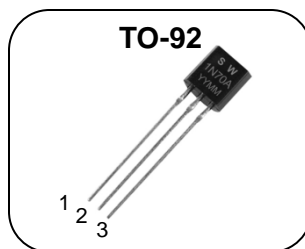


N-channel MOSFET

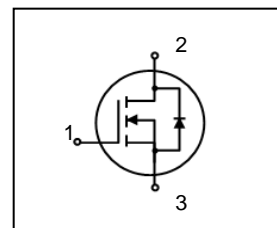
Features

- High ruggedness
- $R_{DS(ON)}$ (Max 15 Ω) @ $V_{GS}=10V$
- Gate Charge (Max 5nC)
- Improved dv/dt Capability
- 100% Avalanche Tested



1. Gate 2. Drain 3. Source

| | |
|----------------|-------|
| BV_{DSS} : | 700V |
| I_D : | 0.5A |
| $R_{DS(ON)}$: | 15ohm |



General Description

This power MOSFET is produced with advanced VDMOS technology of SAMWIN. This technology enable power MOSFET to have better 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 and SMPS.

Order Codes

| Item | Sales Type | Marking | Package | Packaging |
|------|------------|---------|---------|-----------|
| 1 | SW C 1N70A | SW1N70A | TO-92 | TAPE |

Absolute maximum ratings

| Symbol | Parameter | Value | Unit |
|----------------|--|-------------|------|
| V_{DSS} | Drain to Source Voltage | 700 | V |
| I_D | Continuous Drain Current (@ $T_C=25^\circ C$) | 0.5 | A |
| | Continuous Drain Current (@ $T_C=100^\circ C$) | 0.3 | A |
| I_{DM} | Drain current pulsed (note 1) | 2.0 | A |
| V_{GS} | Gate to Source Voltage | ± 30 | V |
| E_{AS} | Single pulsed Avalanche Energy (note 2) | 52 | mJ |
| E_{AR} | Repetitive Avalanche Energy (note 1) | 0.3 | mJ |
| dv/dt | Peak diode Recovery dv/dt (note 3) | 4.5 | V/ns |
| P_D | Total power dissipation (@ $T_C=25^\circ C$) | 3 | W |
| | Derating Factor above 25°C | 0.023 | W/°C |
| T_{STG}, T_J | Operating Junction Temperature & Storage Temperature | -55 ~ + 150 | °C |
| T_L | Maximum Lead Temperature for soldering purpose, 1/8 from Case for 5 seconds. | 300 | °C |

Thermal characteristics

| Symbol | Parameter | Value | Unit |
|------------|--|-------|------|
| R_{thCS} | Thermal resistance, Junction to Lead Max | 40 | °C/W |
| R_{thJA} | Thermal resistance, Junction to ambient | 120 | °C/W |

Electrical characteristic ($T_C = 25^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------------------------|---|--|------|------|------|----------|
| Off characteristics | | | | | | |
| BV_{DSS} | Drain to source breakdown voltage | $V_{GS}=0V, I_D=250\mu A$ | 700 | - | - | V |
| I_{DSS} | Drain to source leakage current | $V_{DS}=600V, V_{GS}=0V$ | - | - | 1 | μA |
| | | $V_{DS}=480V, T_C=125^\circ\text{C}$ | - | - | 10 | μA |
| I_{GSS} | Gate to source leakage current, forward | $V_{GS}=30V, V_{DS}=0V$ | - | - | 100 | nA |
| | Gate to source leakage current, reverse | $V_{GS}=-30V, V_{DS}=0V$ | - | - | -100 | nA |
| On characteristics | | | | | | |
| $V_{GS(TH)}$ | Gate threshold voltage | $V_{DS}=V_{GS}, I_D=50\mu A$ | 3.0 | - | 4.5 | V |
| $R_{DS(ON)}$ | Drain to source on state resistance | $V_{GS}=10V, I_D = 0.3A$ | | 13 | 15 | Ω |
| Dynamic characteristics | | | | | | |
| C_{ISS} | Input capacitance | $V_{GS}=0V, V_{DS}=25V, f=1\text{MHz}$ | - | 120 | 150 | pF |
| C_{OSS} | Output capacitance | | - | 18 | 25 | |
| C_{RSS} | Reverse transfer capacitance | | - | 4 | 6 | |
| $t_{d(on)}$ | Turn on delay time | $V_{DS}=350V, I_D=0.5A, R_G=25\Omega$ | - | 15 | 35 | ns |
| t_r | Rising time | | - | 75 | 140 | |
| $t_{d(off)}$ | Turn off delay time | | - | 30 | 60 | |
| t_f | Fall time | | - | 35 | 60 | |
| Q_g | Total gate charge | $V_{DS}=560V, V_{GS}=10V, I_D=0.5A$ | - | 7 | 10 | nC |
| Q_{gs} | Gate-source charge | | - | 1.3 | - | |
| Q_{gd} | Gate-drain charge | | - | 2.4 | - | |

Source to drain diode ratings characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|----------|-------------------------------|---|------|------|------|---------|
| I_S | Continuous source current | Integral reverse p-n Junction diode in the MOSFET | - | - | 0.5 | A |
| I_{SM} | Pulsed source current | | - | - | 2.0 | A |
| V_{SD} | Diode forward voltage drop. | $I_S=0.5A, V_{GS}=0V$ | - | - | 1.5 | V |
| T_{rr} | Reverse recovery time | $I_S=0.5A, V_{GS}=0V,$ | - | 150 | - | ns |
| Q_{rr} | Breakdown voltage temperature | $di_f/dt=100A/\mu s$ | - | 0.44 | - | μC |

※. Notes

1. Repeative rating : pulse width limited by junction temperature.
2. $L = 95\text{mH}, I_{AS} = 0.5A, V_{DD} = 50V, R_G=25\Omega,$ Starting $T_J = 25^\circ\text{C}$
3. $I_{SD} \leq 0.5A, di/dt = 300A/\mu s, V_{DD} \leq BV_{DSS},$ Starting $T_J = 25^\circ\text{C}$
4. Pulse Test : Pulse Width $\leq 300\mu s,$ duty cycle $\leq 2\%$
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

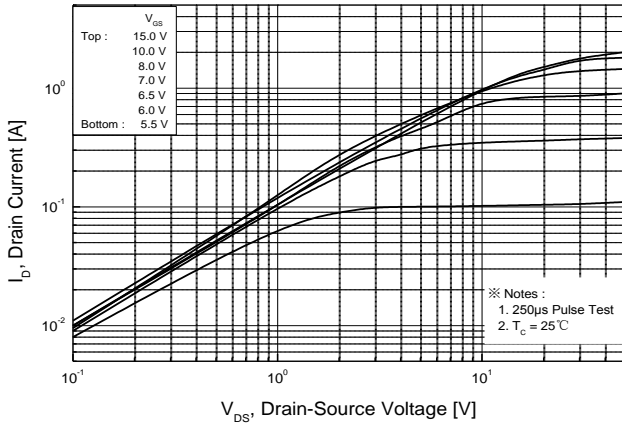


Fig. 2. Transfer characteristics

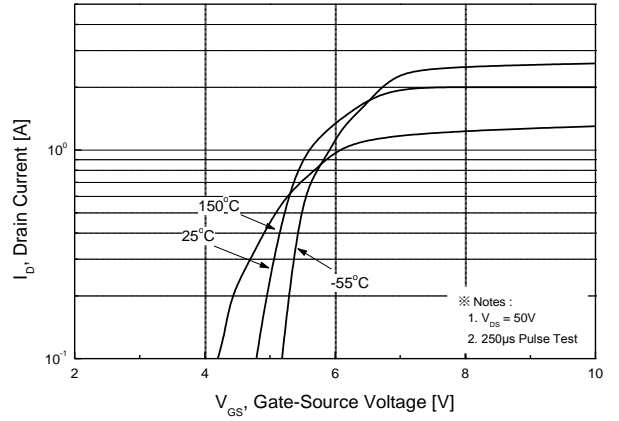


Fig. 3. On-resistance variation vs. drain current and gate voltage

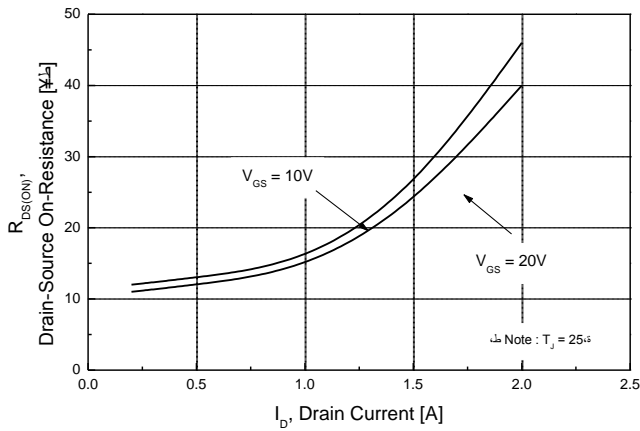


Fig. 4. On state current vs. diode forward voltage

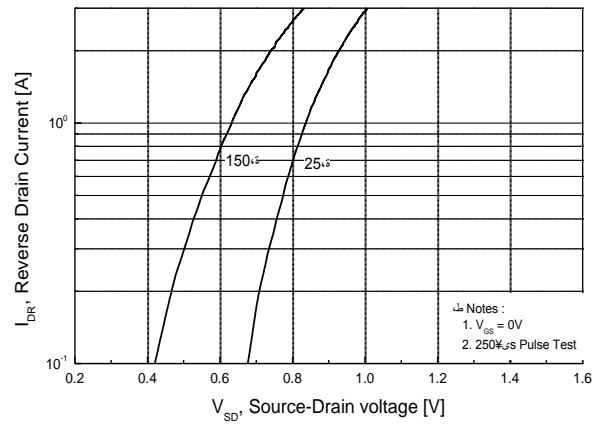


Fig. 5. Capacitance characteristics (Non-Repetitive)

Fig. 6. Gate charge characteristics

Fig 7. Breakdown Voltage Variation vs. Junction Temperature

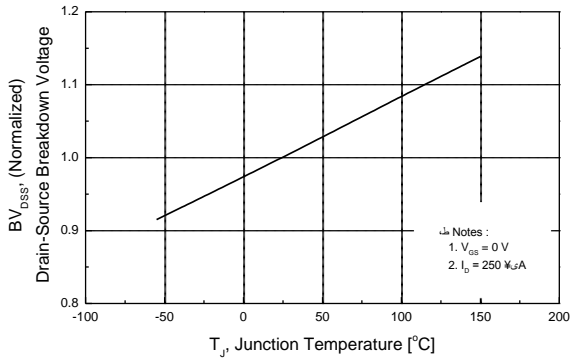


Fig. 8. On resistance variation vs. junction temperature

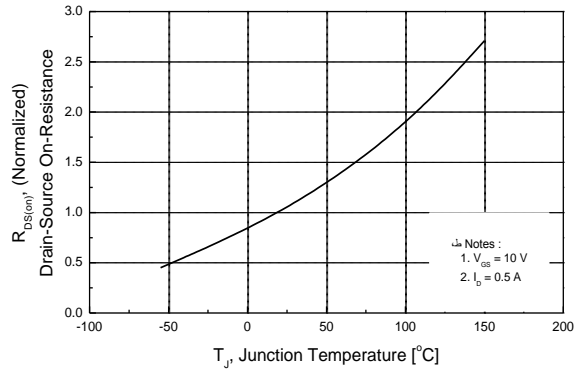


Fig. 9. Maximum drain current vs. case temperature.

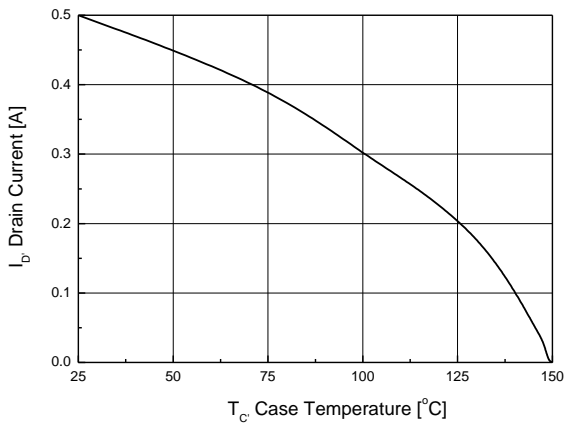


Fig. 10. Maximum safe operating area

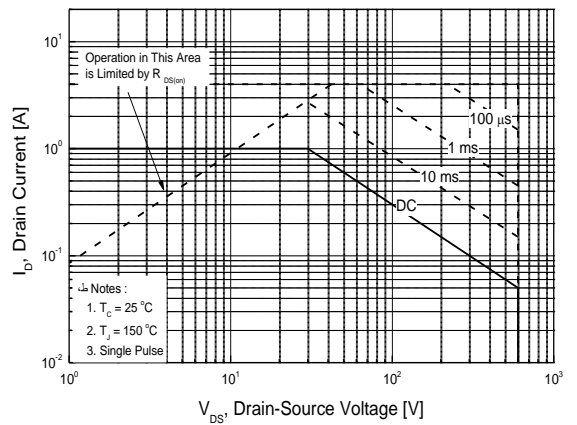


Fig. 11. Transient thermal response curve

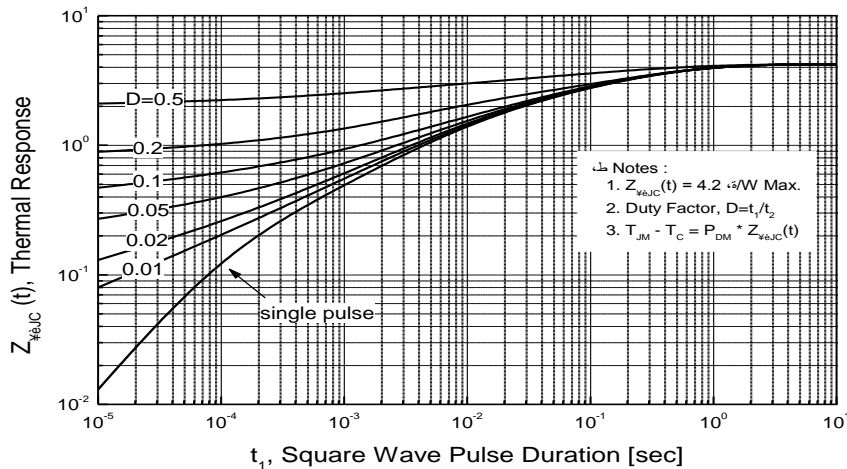


Fig. 12. Gate charge test circuit & waveform

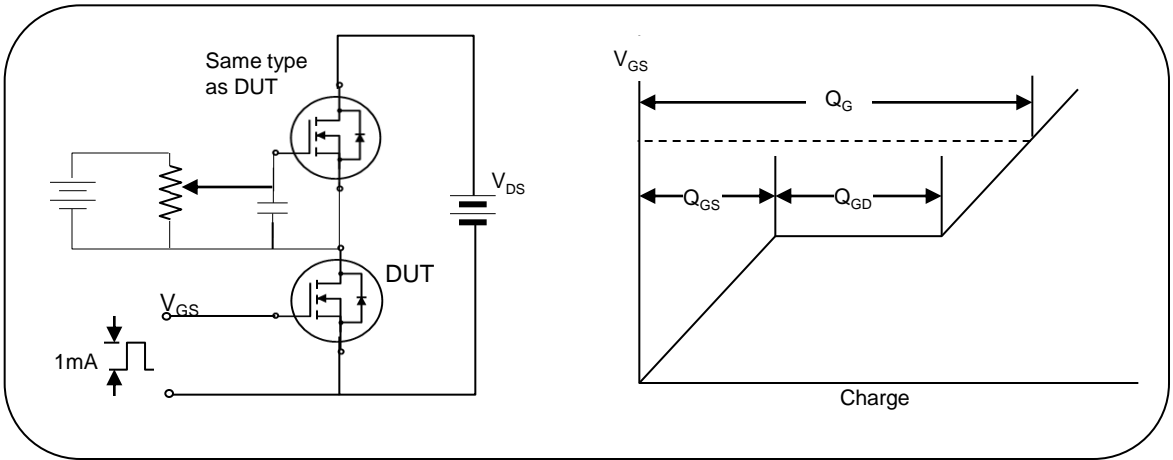


Fig. 13. Switching time test circuit & waveform

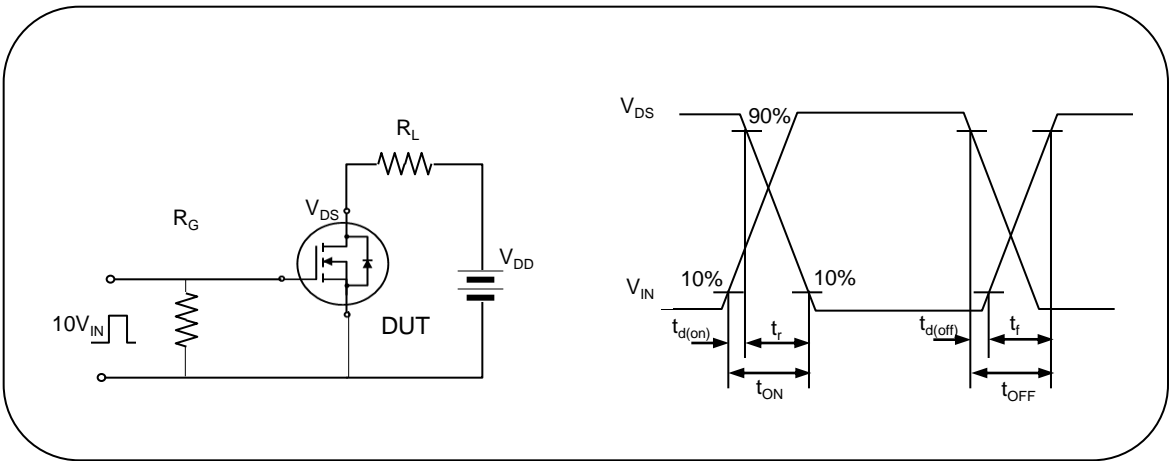


Fig. 14. Unclamped Inductive switching test circuit & waveform

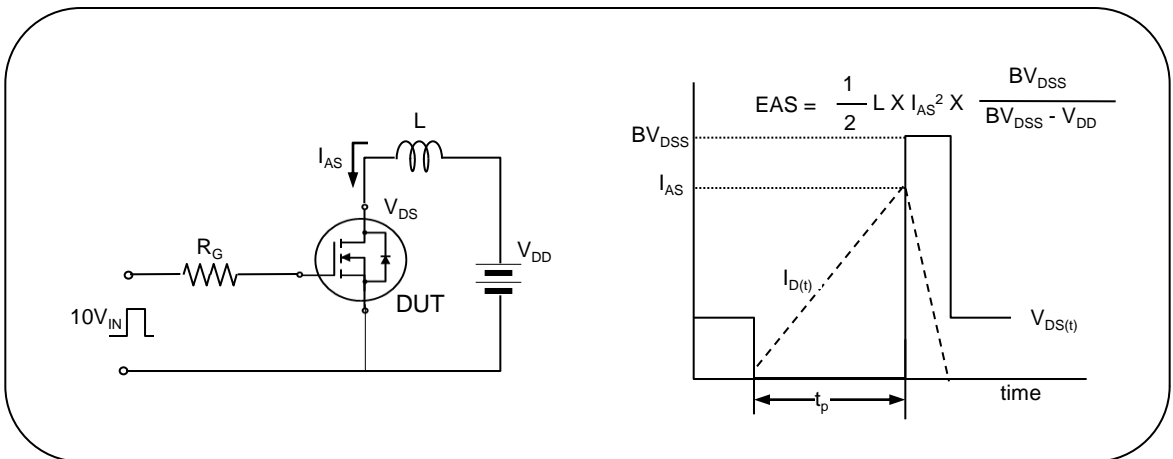
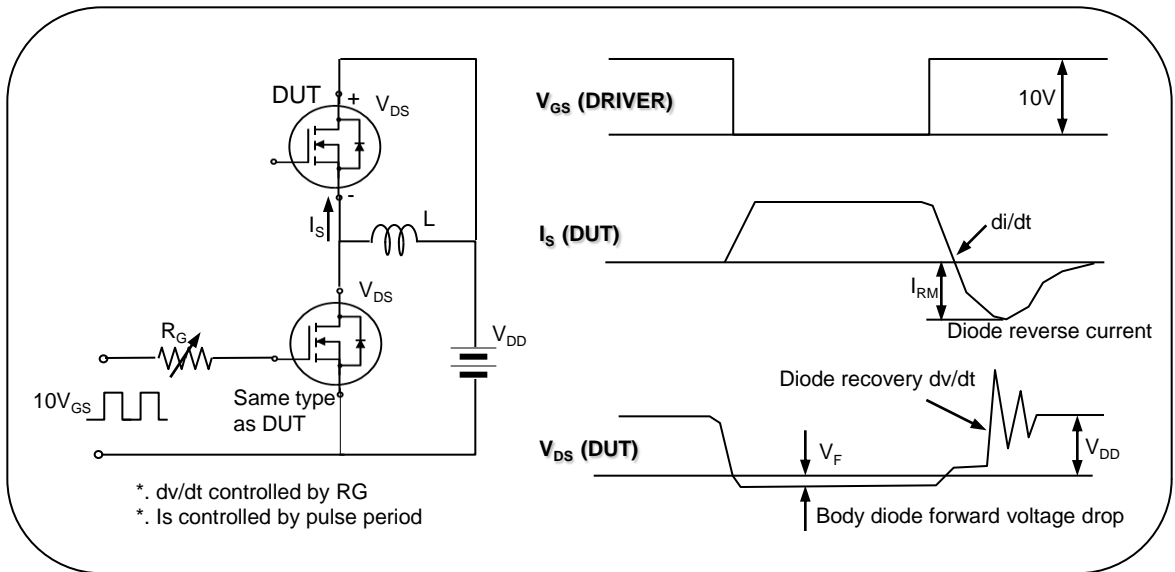


Fig. 15. Peak diode recovery dv/dt test circuit & waveform



REVISION HISTORY

| Revision No. | Changed Characteristics | Responsible | Date | Issuer |
|--------------|--|-------------|------------|--------|
| REV 1.0 | Origination, First Release | Alice Nie | 2007.12.05 | XZQ |
| REV 2.0 | Updated the format of datasheet and added Order Codes. | Alice Nie | 2011.03.24 | XZQ |

WWW.SEMIPOWER.COM.CN



芯派科技
SEMIPOWER

西安芯派电子科技有限公司

地址：西安市高新区高新一路25号创新大厦MF6

电话：029 - 88253717 传真：029 - 88251977



芯源科技

SAMWIN

深圳市南方芯源科技有限公司

地址：深圳市福田区天安数码城时代大厦A座2005

电话：0755 - 83981818 传真：0755 - 83476838