

| | |
|---------------------|------|
| V_{DSS} | 650V |
| $R_{DS(on)}$ (Typ.) | 22mΩ |
| I_D | 93A |
| P_D | 339W |

●Features

- 1) Low on-resistance
- 2) Fast switching speed
- 3) Fast reverse recovery
- 4) Easy to parallel
- 5) Simple to drive
- 6) Pb-free lead plating ; RoHS compliant

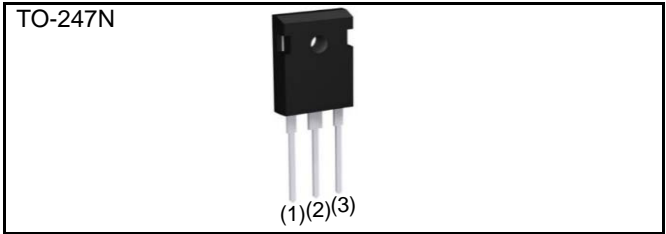
●Application

- Solar inverters
- DC/DC converters
- Switch mode power supplies
- Induction heating
- Motor drives

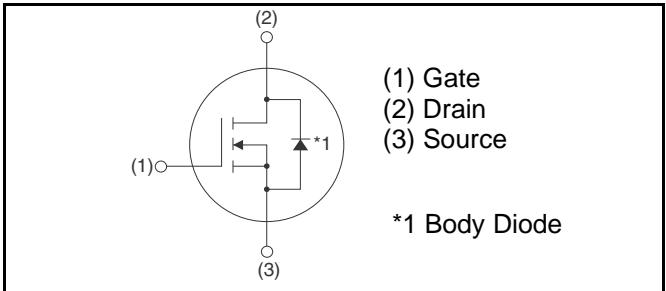
●Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Value | Unit | |
|------------------------------|---------------------------|-------------|------|---|
| Drain - Source voltage | V_{DSS} | 650 | V | |
| Continuous drain current | $T_c = 25^\circ\text{C}$ | I_D^{*1} | 93 | A |
| | $T_c = 100^\circ\text{C}$ | I_D^{*1} | 65 | A |
| Pulsed drain current | $I_{D,pulse}^{*2}$ | 232 | A | |
| Gate - Source voltage | V_{GSS} | -4 to 22 | V | |
| Gate-Source Surge Voltage | V_{GSS_surge} | -4 to 22 | V | |
| Recommended Drive Voltage | V_{GS_op} | 0 / 18 | V | |
| Junction temperature | T_j | 175 | °C | |
| Range of storage temperature | T_{stg} | -55 to +175 | °C | |

●Outline



●Inner circuit



●Packaging specifications

| Type | Packing | Tube |
|------|---------------------------|-----------|
| | Reel size (mm) | - |
| | Tape width (mm) | - |
| | Basic ordering unit (pcs) | 30 |
| | Taping code | C11 |
| | Marking | SCT3022AL |

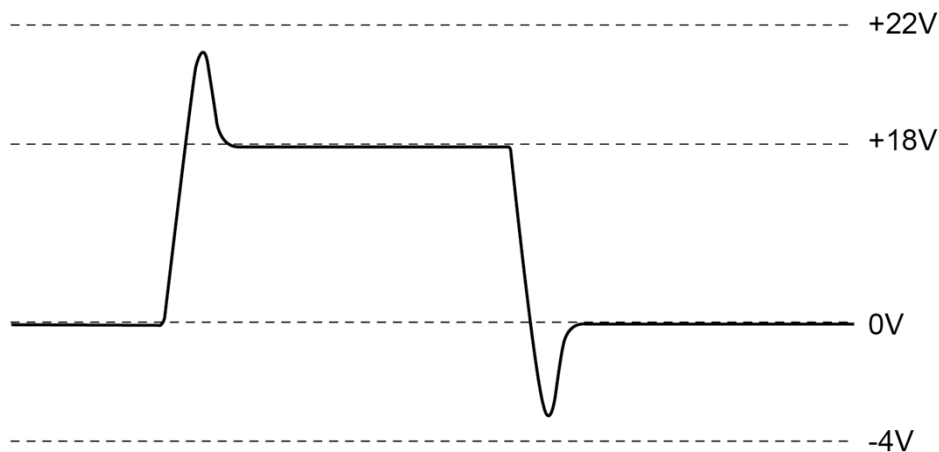
●Thermal resistance

| Parameter | Symbol | Values | | | Unit |
|-------------------------------------|------------|--------|------|------|------|
| | | Min. | Typ. | Max. | |
| Thermal resistance, junction - case | R_{thJC} | - | 0.34 | 0.44 | °C/W |

●Electrical characteristics ($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Conditions | Values | | | Unit |
|---|-------------------|--|--------|------|------|------------------|
| | | | Min. | Typ. | Max. | |
| Drain - Source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS} = 0\text{V}, I_D = 1\text{mA}$ | 650 | - | - | V |
| Zero gate voltage drain current | I_{DSS} | $V_{DS} = 650\text{V}, V_{GS} = 0\text{V}$ $T_j = 25^\circ\text{C}$ | - | 1 | 10 | μA |
| | | $T_j = 150^\circ\text{C}$ | - | 2 | - | |
| Gate - Source leakage current | I_{GSS+} | $V_{GS} = +22\text{V}, V_{DS} = 0\text{V}$ | - | - | 100 | nA |
| Gate - Source leakage current | I_{GSS-} | $V_{GS} = -4\text{V}, V_{DS} = 0\text{V}$ | - | - | -100 | nA |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS} = 10\text{V}, I_D = 18.2\text{mA}$ | 2.7 | - | 5.6 | V |
| Static drain - source on - state resistance | $R_{DS(on)}^{*3}$ | $V_{GS} = 18\text{V}, I_D = 36\text{A}$ $T_j = 25^\circ\text{C}$ | - | 22 | 28.6 | $\text{m}\Omega$ |
| | | $T_j = 125^\circ\text{C}$ | - | 29 | - | |
| Gate input resistance | R_G | $f = 1\text{MHz}, \text{open drain}$ | - | 5 | - | Ω |

●Example of acceptable Vgs waveform



●Electrical characteristics (T_a = 25°C)

| Parameter | Symbol | Conditions | Values | | | Unit |
|--|-----------------------------------|---|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Transconductance | g_{fs}^{*3} | V _{DS} = 10V, I _D = 36A | - | 12.2 | - | S |
| Input capacitance | C _{iss} | V _{GS} = 0V | - | 2208 | - | pF |
| Output capacitance | C _{oss} | V _{DS} = 500V | - | 118 | - | |
| Reverse transfer capacitance | C _{rss} | f = 1MHz | - | 52 | - | |
| Effective output capacitance, energy related | C _{o(er)} | V _{GS} = 0V V _{DS} = 0V to 300V | - | 303 | - | pF |
| Turn - on delay time | t _{d(on)} ^{*3} | V _{DD} = 300V, I _D = 18A | - | 25 | - | ns |
| Rise time | t _r ^{*3} | V _{GS} = 18V/0V | - | 53 | - | |
| Turn - off delay time | t _{d(off)} ^{*3} | R _L = 17Ω | - | 61 | - | |
| Fall time | t _f ^{*3} | R _G = 0Ω | - | 35 | - | |
| Turn - on switching loss | E _{on} ^{*3} | V _{DD} = 300V, I _D =36A V _{GS} = 18V/0V | - | 252 | - | μJ |
| Turn - off switching loss | E _{off} ^{*3} | R _G = 0Ω L=100μH *E _{on} includes diode reverse recovery | - | 201 | - | |

●Gate Charge characteristics (T_a = 25°C)

| Parameter | Symbol | Conditions | Values | | | Unit |
|----------------------|-------------------------------|--|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Total gate charge | Q _g ^{*3} | V _{DD} = 300V | - | 133 | - | nC |
| Gate - Source charge | Q _{gs} ^{*3} | I _D = 36A | - | 31 | - | |
| Gate - Drain charge | Q _{gd} ^{*3} | V _{GS} = 18V | - | 53 | - | |
| Gate plateau voltage | V _(plateau) | V _{DD} = 300V, I _D = 36A | - | 9.6 | - | V |

*1 Limited only by maximum temperature allowed.

*2 PW ≤ 10μs, Duty cycle ≤ 1%

*3 Pulsed

●Body diode electrical characteristics (Source-Drain) ($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Conditions | Values | | | Unit |
|---|----------------|---|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Inverse diode continuous, forward current | I_S^{*1} | $T_c = 25^\circ\text{C}$ | - | - | 93 | A |
| Inverse diode direct current, pulsed | I_{SM}^{*2} | | - | - | 232 | A |
| Forward voltage | V_{SD}^{*3} | $V_{GS} = 0\text{V}, I_S = 36\text{A}$ | - | 3.2 | - | V |
| Reverse recovery time | t_{rr}^{*3} | $I_F = 36\text{A}, V_R = 300\text{V}$ $di/dt = 1100\text{A}/\mu\text{s}$ | - | 27 | - | ns |
| Reverse recovery charge | Q_{rr}^{*3} | | - | 146 | - | nC |
| Peak reverse recovery current | I_{rrm}^{*3} | | - | 10 | - | A |

●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

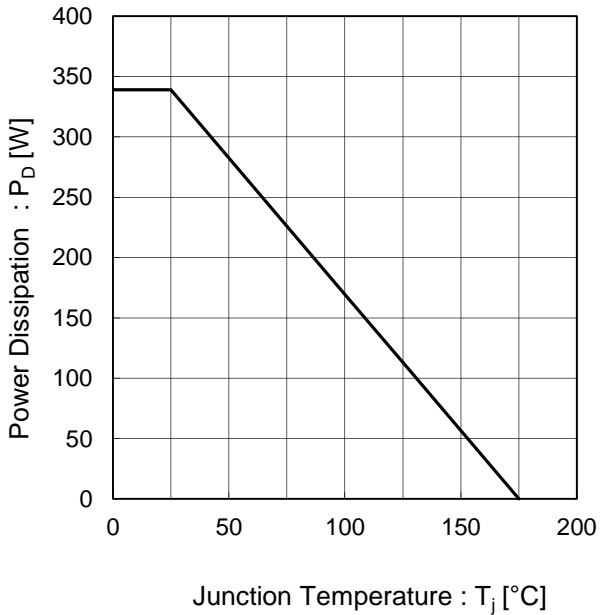


Fig.2 Maximum Safe Operating Area

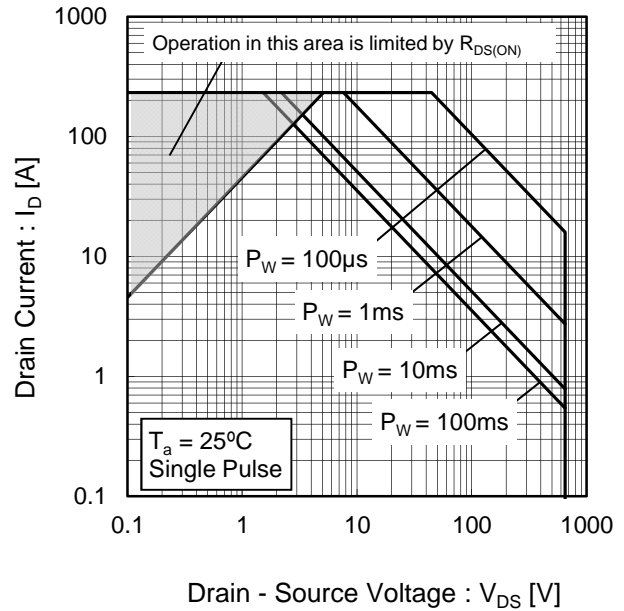
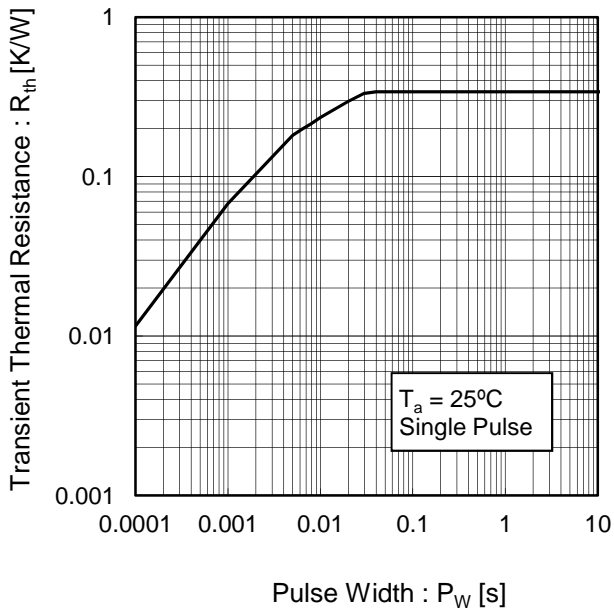


Fig.3 Typical Transient Thermal Resistance vs. Pulse Width



●Electrical characteristic curves

Fig.4 Typical Output Characteristics(I)

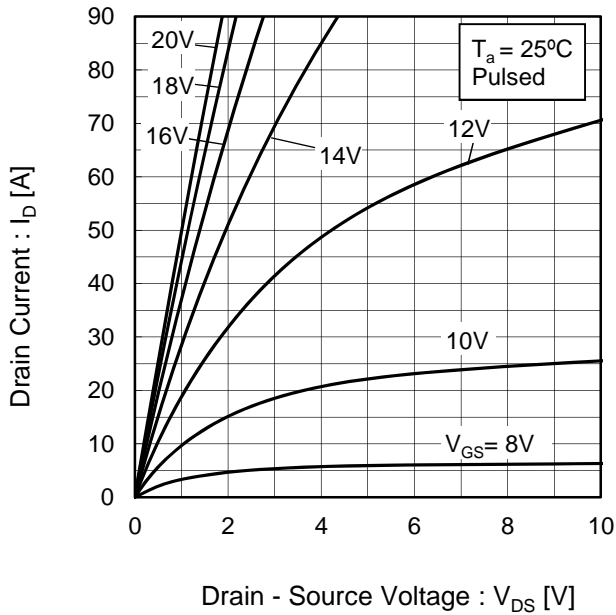


Fig.5 Typical Output Characteristics(II)

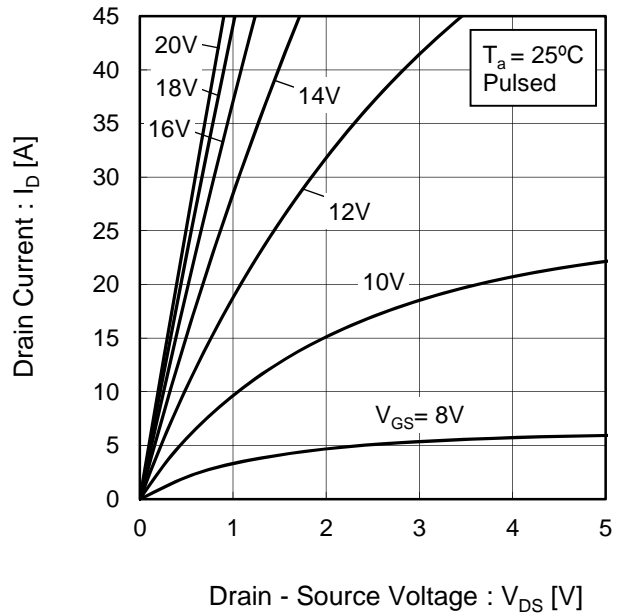


Fig.6 $T_j = 150^\circ\text{C}$ Typical Output Characteristics(I)

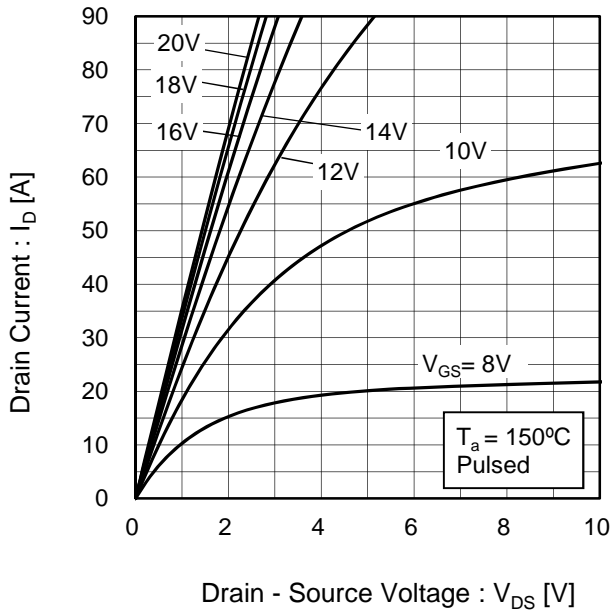
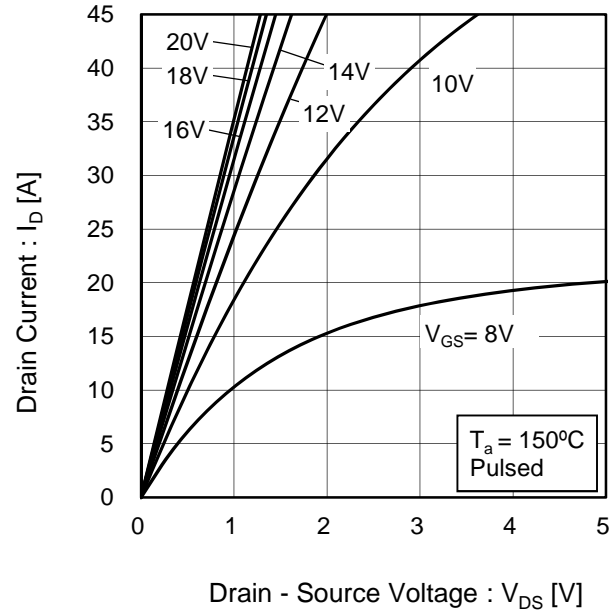


Fig.7 $T_j = 150^\circ\text{C}$ Typical Output Characteristics(II)



●Electrical characteristic curves

Fig.8 Typical Transfer Characteristics (I)

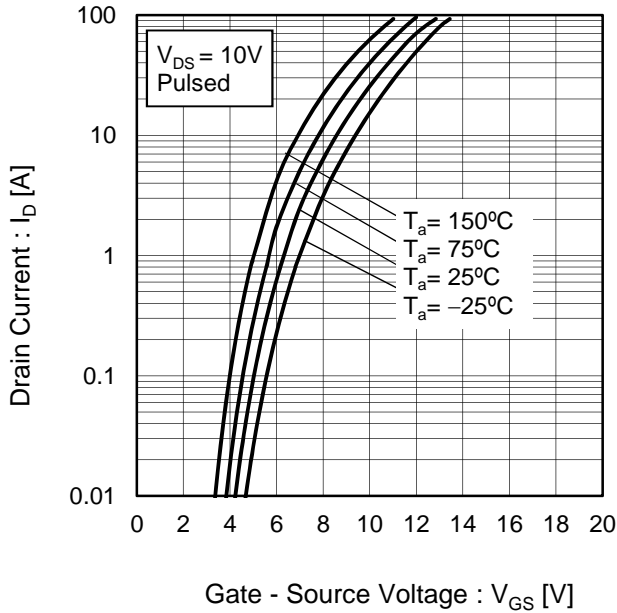


Fig.9 Typical Transfer Characteristics (II)

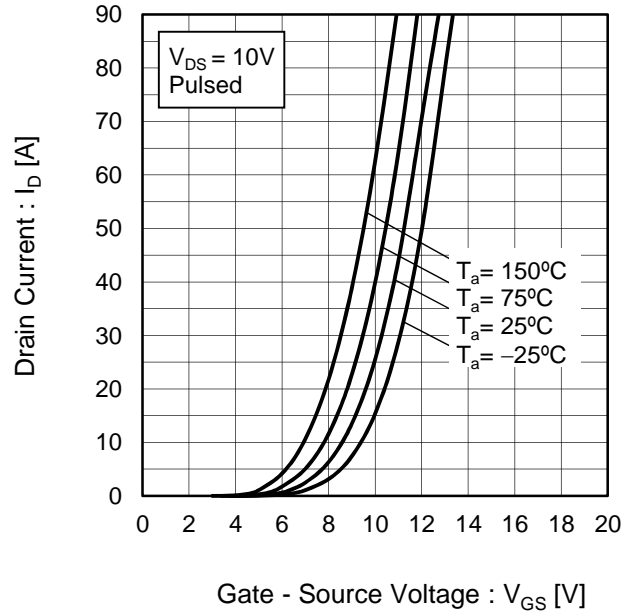


Fig.10 Gate Threshold Voltage vs. Junction Temperature

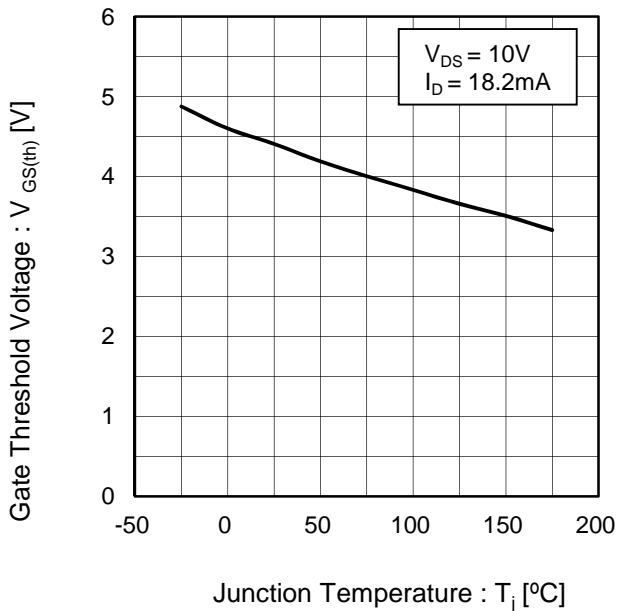
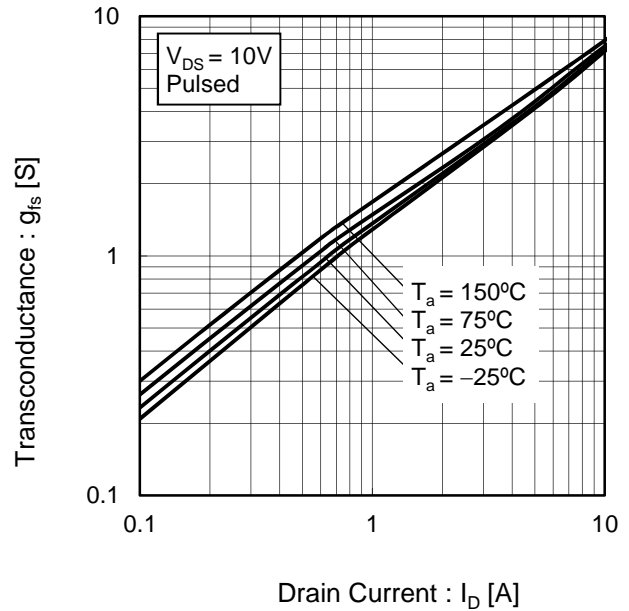


Fig.11 Transconductance vs. Drain Current



●Electrical characteristic curves

Fig.12 Static Drain - Source On - State Resistance vs. Gate - Source Voltage

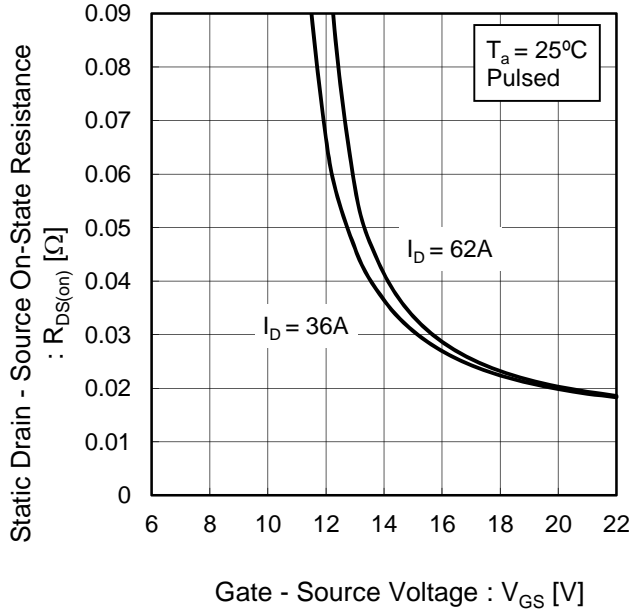


Fig.13 Static Drain - Source On - State Resistance vs. Junction Temperature

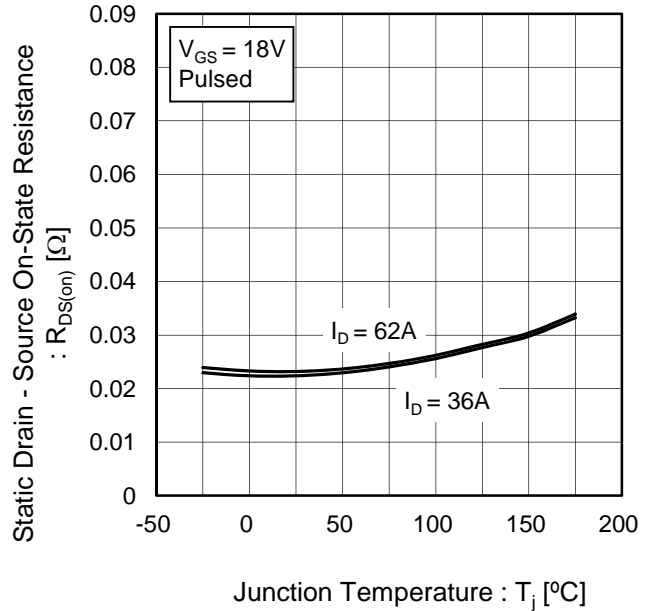
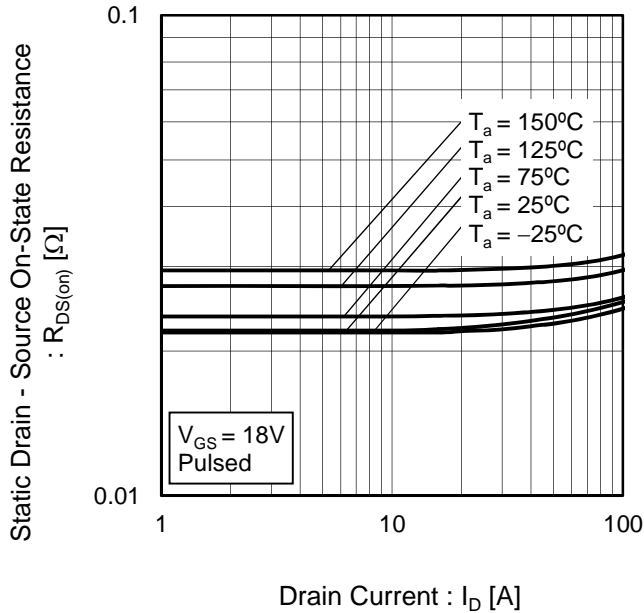


Fig.14 Static Drain - Source On - State Resistance vs. Drain Current



●Electrical characteristic curves

Fig.15 Typical Capacitance vs. Drain - Source Voltage

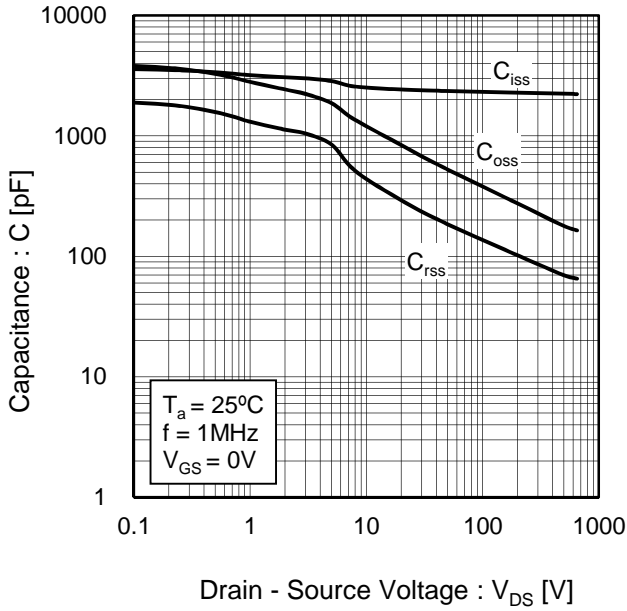


Fig.16 Coss Stored Energy

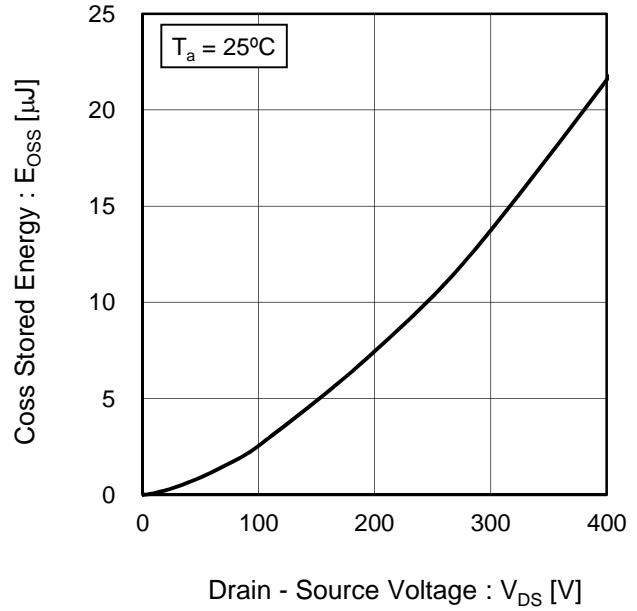


Fig.17 Switching Characteristics

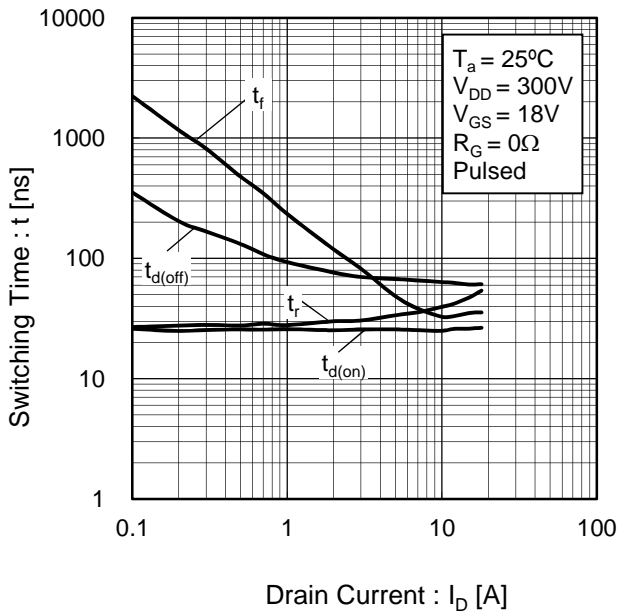
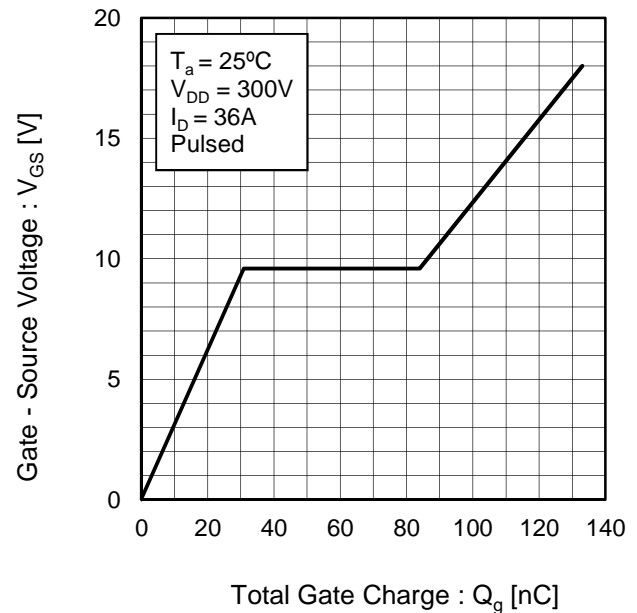


Fig.18 Dynamic Input Characteristics



●Electrical characteristic curves

Fig.19 Typical Switching Loss vs. Drain - Source Voltage

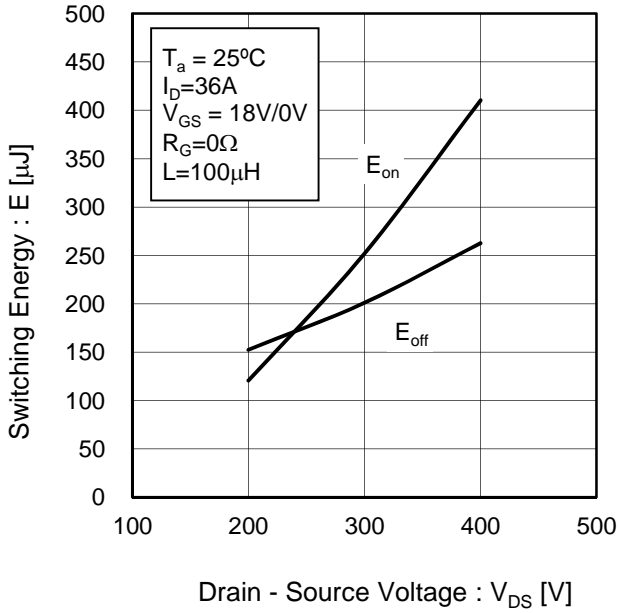


Fig.20 Typical Switching Loss vs. Drain Current

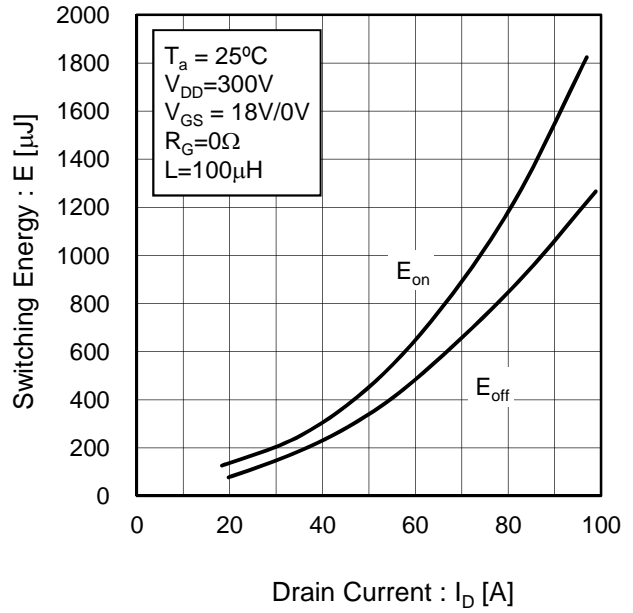
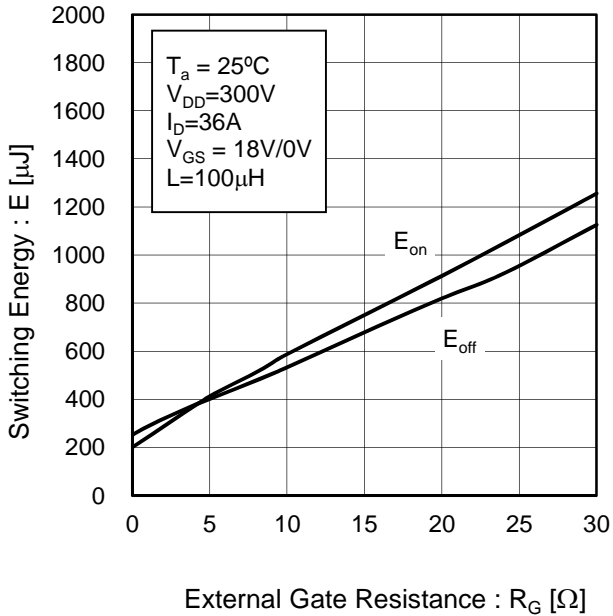


Fig.21 Typical Switching Loss vs. External Gate Resistance



●Electrical characteristic curves

Fig.22 Inverse Diode Forward Current vs. Source - Drain Voltage

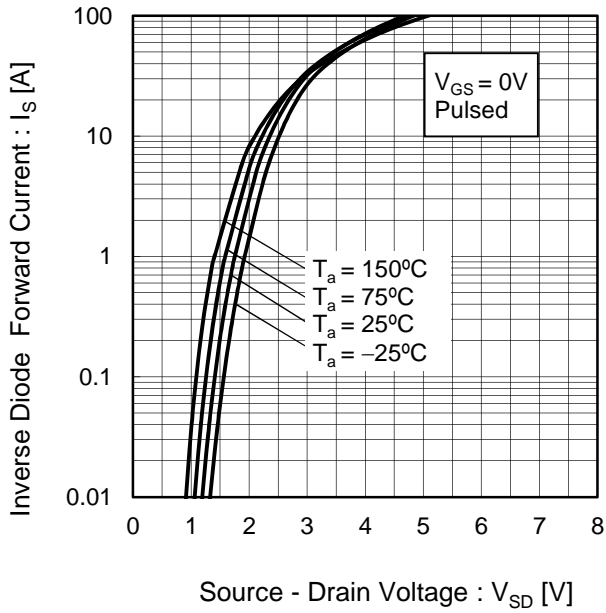
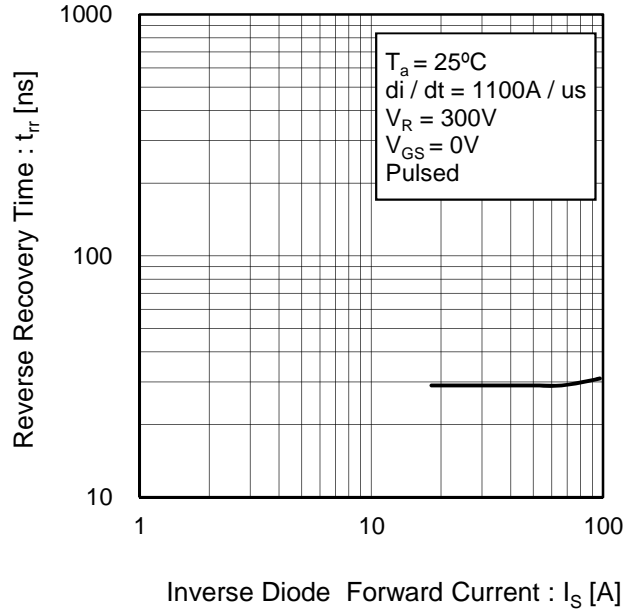


Fig.23 Reverse Recovery Time vs. Inverse Diode Forward Current



●Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

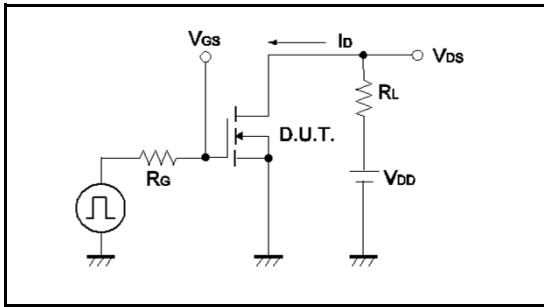


Fig.1-2 Switching Waveforms

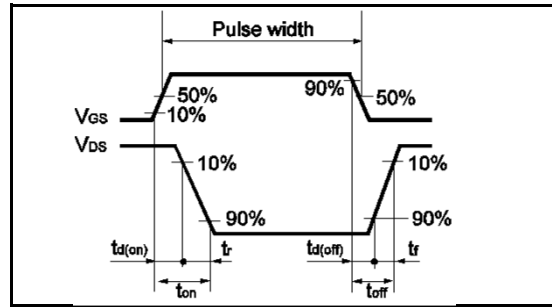


Fig.2-1 Gate Charge Measurement Circuit

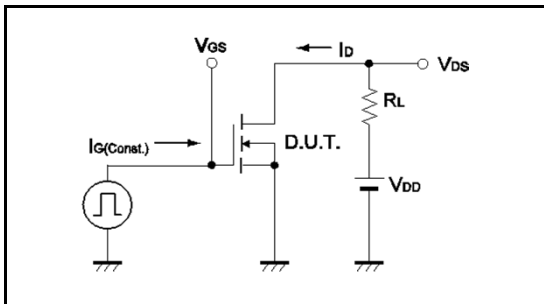


Fig.2-2 Gate Charge Waveform

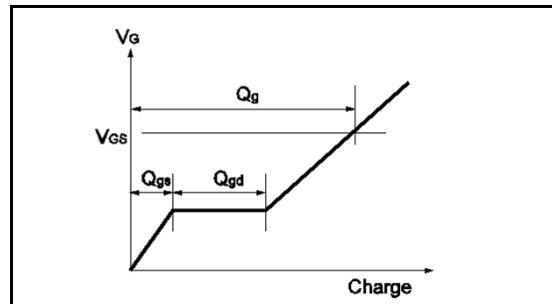


Fig.3-1 Switching Energy Measurement Circuit

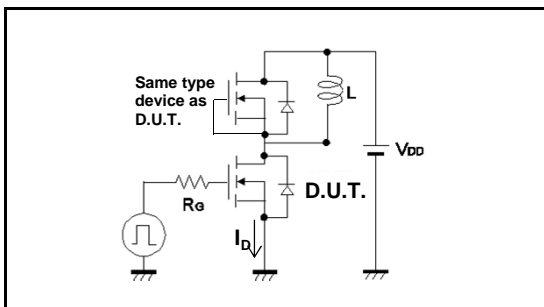


Fig.3-2 Switching Waveforms

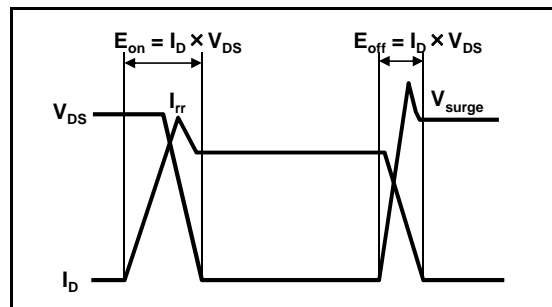


Fig.4-1 Reverse Recovery Time Measurement Circuit

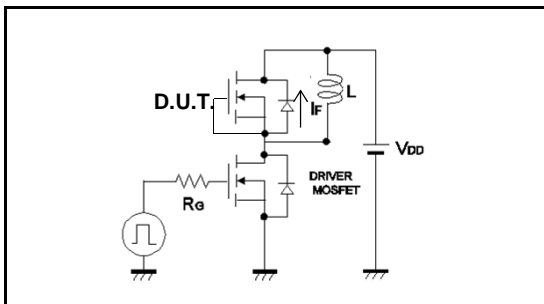
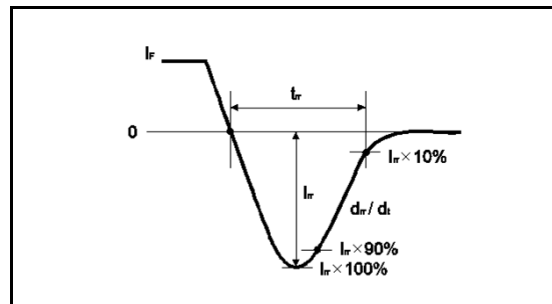


Fig.4-2 Reverse Recovery Waveform



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| Minimum Package Quantity | 30 |
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| Constitution Materials List | inquiry |
| RoHS | Yes |