



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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| | |
|---------------------|---------------|
| V_{DSS} | 1200V |
| $R_{DS(on)}$ (Typ.) | 280m Ω |
| I_D | 14A |
| P_D | 108W |

●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

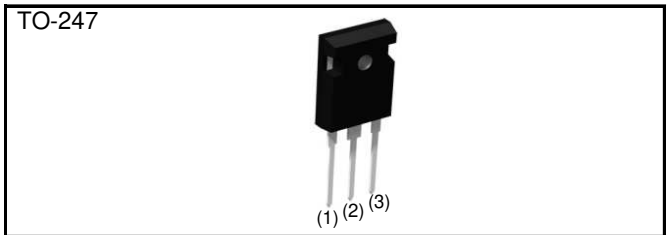
●Application

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

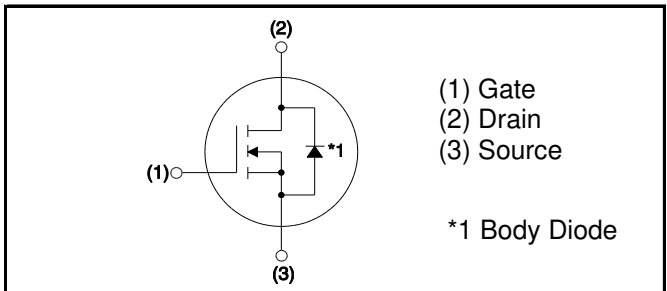
●Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

| Parameter | | Symbol | Value | Unit |
|--|---------------------------|----------------------|-------------|------------------|
| Drain - Source voltage | | V_{DSS} | 1200 | V |
| Continuous drain current | $T_c = 25^\circ\text{C}$ | I_D^{*1} | 14 | A |
| | $T_c = 100^\circ\text{C}$ | I_D^{*1} | 10 | A |
| Pulsed drain current | | $I_{D,pulse}^{*2}$ | 35 | A |
| Gate - Source voltage (DC) | | V_{GSS} | -6 to 22 | V |
| Gate - Source surge voltage ($T_{surge} < 300\text{nsec}$) | | $V_{GSS-surge}^{*3}$ | -10 to 26 | V |
| Power dissipation ($T_c = 25^\circ\text{C}$) | | P_D | 108 | W |
| Junction temperature | | T_j | 175 | $^\circ\text{C}$ |
| Range of storage temperature | | T_{stg} | -55 to +175 | $^\circ\text{C}$ |

●Outline



●Inner circuit



●Packaging specifications

| Type | Packaging | Tube |
|------|---------------------------|-----------|
| | Reel size (mm) | - |
| | Tape width (mm) | - |
| | Basic ordering unit (pcs) | 30 |
| | Packing code | C |
| | Marking | SCT2280KE |

●Thermal resistance

| Parameter | Symbol | Values | | | Unit |
|--|------------|--------|------|------|------|
| | | Min. | Typ. | Max. | |
| Thermal resistance, junction - case | R_{thJC} | - | 1.07 | 1.39 | °C/W |
| Thermal resistance, junction - ambient | R_{thJA} | - | - | 50 | °C/W |
| Soldering temperature, wavesoldering for 10s | T_{sold} | - | - | 265 | °C |

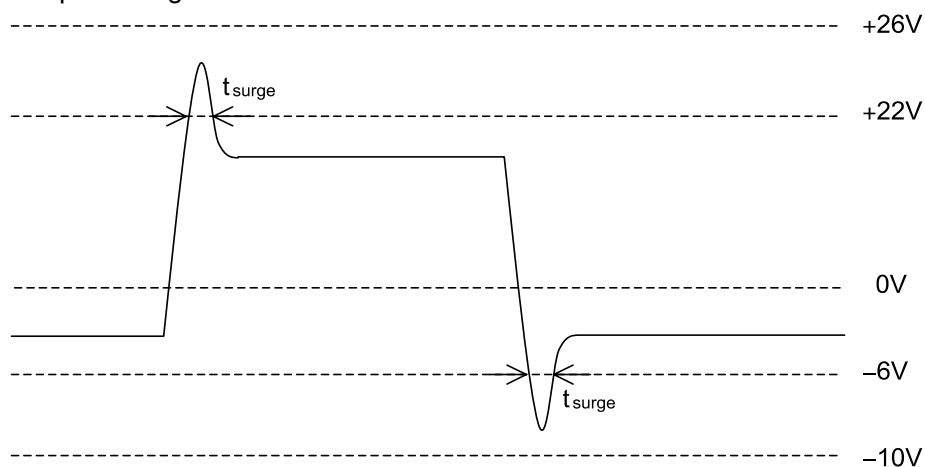
●Electrical characteristics ($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Conditions | Values | | | Unit |
|----------------------------------|---------------|--------------------------------|--------|------|------|---------------|
| | | | Min. | Typ. | Max. | |
| Drain - Source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 1mA$ | 1200 | - | - | V |
| Zero gate voltage drain current | I_{DSS} | $V_{DS} = 1200V, V_{GS} = 0V$ | - | 1 | 10 | μA |
| | | $T_j = 150^\circ\text{C}$ | - | 2 | - | |
| Gate - Source leakage current | I_{GSS+} | $V_{GS} = +22V, V_{DS} = 0V$ | - | - | 100 | nA |
| Gate - Source leakage current | I_{GSS-} | $V_{GS} = -6V, V_{DS} = 0V$ | - | - | -100 | nA |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 1.4mA$ | 1.6 | 2.8 | 4.0 | V |

*1 Limited only by maximum temperature allowed.

*2 $PW \leq 10\mu\text{s}$, Duty cycle $\leq 1\%$

*3 Example of acceptable Vgs waveform



*4 Pulsed

●Electrical characteristics (T_a = 25°C)

| Parameter | Symbol | Conditions | Values | | | Unit |
|--|-----------------------------------|---|--------|------------|----------|------|
| | | | Min. | Typ. | Max. | |
| Static drain - source on - state resistance | R _{DS(on)} ^{*4} | V _{GS} = 18V, I _D = 4A T _J = 25°C T _J = 125°C | - - | 280 388 | 364 - | mΩ |
| Gate input resistance | R _G | f = 1MHz, open drain | - | 17 | - | Ω |
| Transconductance | g _{fs} ^{*4} | V _{DS} = 10V, I _D = 4A | - | 1.4 | - | S |
| Input capacitance | C _{iss} | V _{GS} = 0V | - | 667 | - | pF |
| Output capacitance | C _{oss} | V _{DS} = 800V | - | 27 | - | |
| Reverse transfer capacitance | C _{rss} | f = 1MHz | - | 5 | - | |
| Effective output capacitance, energy related | C _{o(er)} | V _{GS} = 0V V _{DS} = 0V to 500V | - | 41 | - | pF |
| Turn - on delay time | t _{d(on)} ^{*4} | V _{DD} = 400V, V _{GS} = 18V | - | 19 | - | ns |
| Rise time | t _r ^{*4} | I _D = 4A | - | 19 | - | |
| Turn - off delay time | t _{d(off)} ^{*4} | R _L = 100Ω | - | 47 | - | |
| Fall time | t _f ^{*4} | R _G = 0Ω | - | 29 | - | |
| Turn - on switching loss | E _{on} ^{*4} | V _{DD} = 600V, I _D = 4A V _{GS} = 18V/0V R _G = 0Ω, L = 500μH | - | 57 | - | μJ |
| Turn - off switching loss | E _{off} ^{*4} | *E _{on} includes diode reverse recovery | - | 20 | - | |

●Gate Charge characteristics (T_a = 25°C)

| Parameter | Symbol | Conditions | Values | | | Unit |
|----------------------|-------------------------------|---|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Total gate charge | Q _g ^{*4} | V _{DD} = 400V | - | 36 | - | nC |
| Gate - Source charge | Q _{gs} ^{*4} | I _D = 4A | - | 9 | - | |
| Gate - Drain charge | Q _{gd} ^{*4} | V _{GS} = 18V | - | 12 | - | |
| Gate plateau voltage | V _(plateau) | V _{DD} = 400V, I _D = 4A | - | 9.8 | - | V |

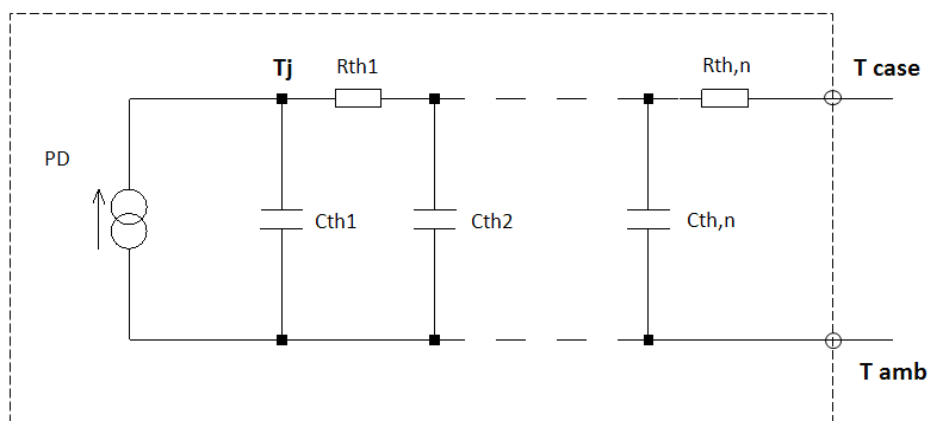
●Body diode electrical characteristics (Source-Drain) ($T_a = 25^\circ\text{C}$)

| Parameter | Symbol | Conditions | Values | | | Unit |
|---|----------------|---|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Inverse diode continuous, forward current | I_S^{*1} | $T_c = 25^\circ\text{C}$ | - | - | 14 | A |
| Inverse diode direct current, pulsed | I_{SM}^{*2} | | - | - | 35 | A |
| Forward voltage | V_{SD}^{*4} | $V_{GS} = 0\text{V}, I_S = 4\text{A}$ | - | 4.0 | - | V |
| Reverse recovery time | t_{rr}^{*4} | $I_F = 4\text{A}, V_R = 400\text{V}$ $di/dt = 160\text{A}/\mu\text{s}$ | - | 22 | - | ns |
| Reverse recovery charge | Q_{rr}^{*4} | | - | 21 | - | nC |
| Peak reverse recovery current | I_{rrm}^{*4} | | - | 2.0 | - | A |

●Typical Transient Thermal Characteristics

| Symbol | Value | Unit |
|-----------|-------|------|
| R_{th1} | 100m | K/W |
| R_{th2} | 662m | |
| R_{th3} | 304m | |

| Symbol | Value | Unit |
|-----------|-----------|------|
| C_{th1} | 861 μ | Ws/K |
| C_{th2} | 2.84m | |
| C_{th3} | 55.9m | |



●Electrical characteristic curves

Fig.1 Power Dissipation Derating Curve

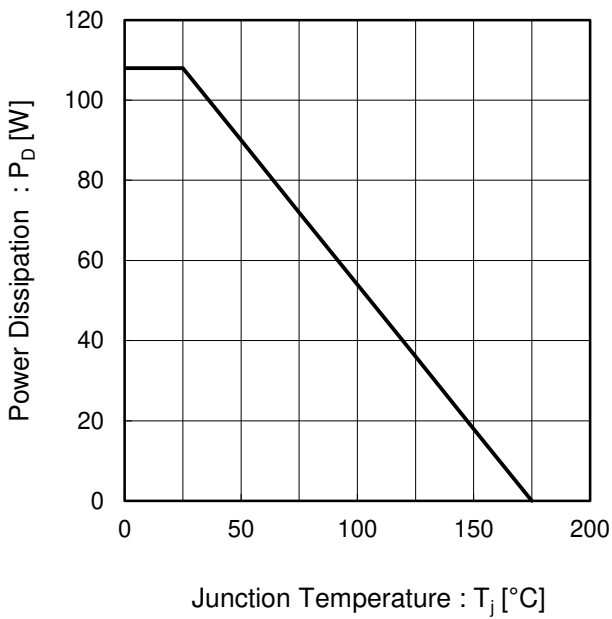


Fig.2 Maximum Safe Operating Area

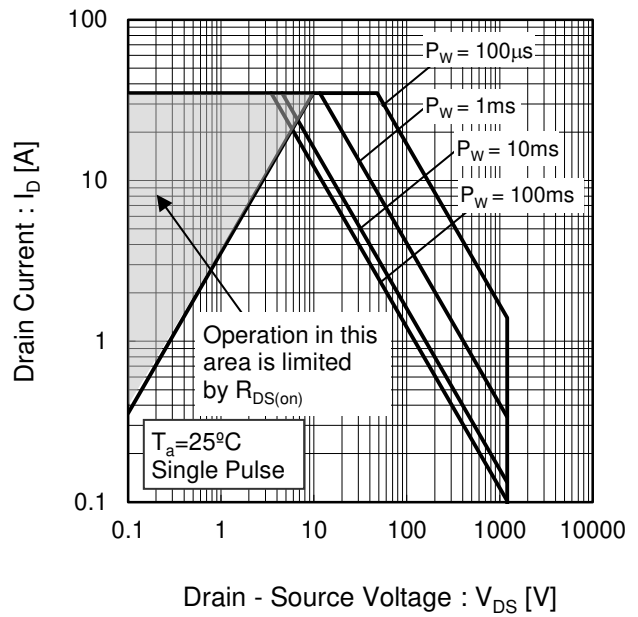
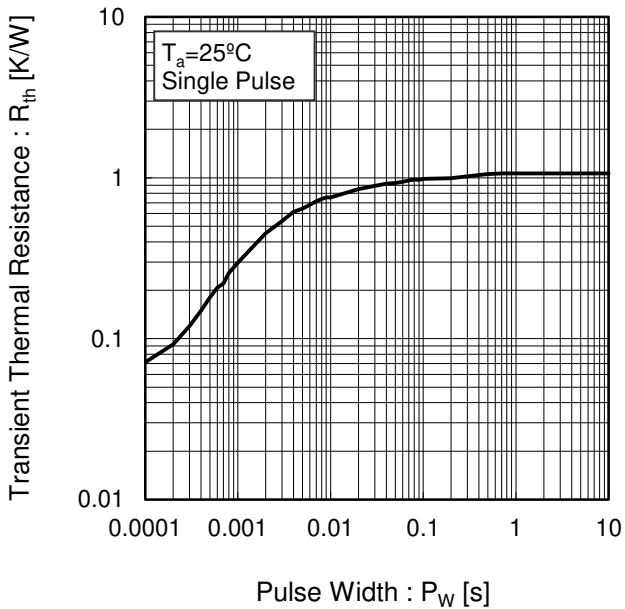


Fig.3 Typical Transient Thermal Resistance vs. Pulse Width



●Electrical characteristic curves

Fig.4 Typical Output Characteristics(I)

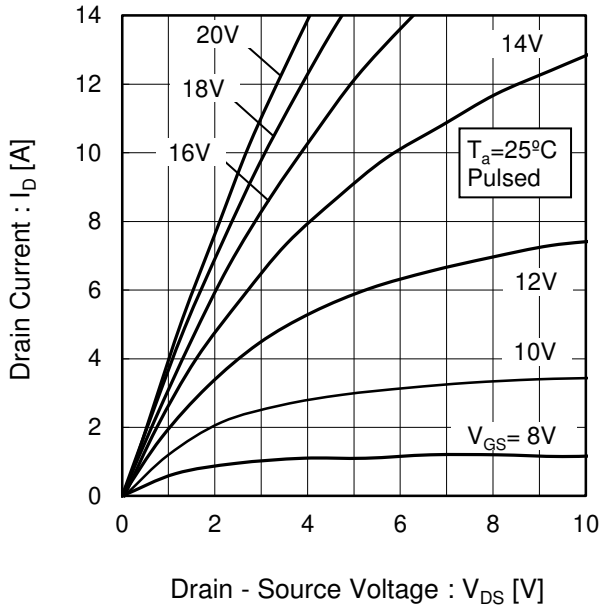


Fig.5 Typical Output Characteristics(II)

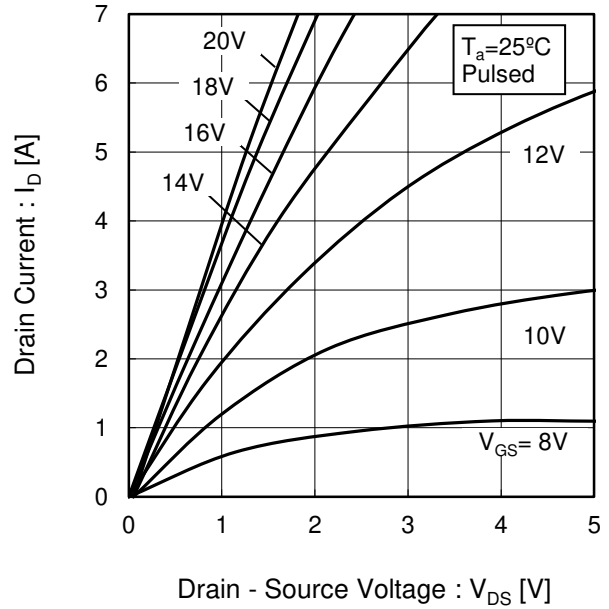


Fig.6 $T_j = 150^\circ\text{C}$ Typical Output Characteristics(I)

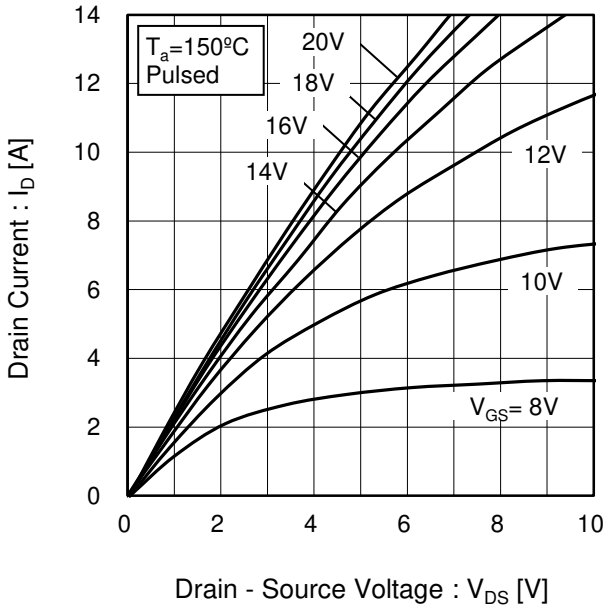
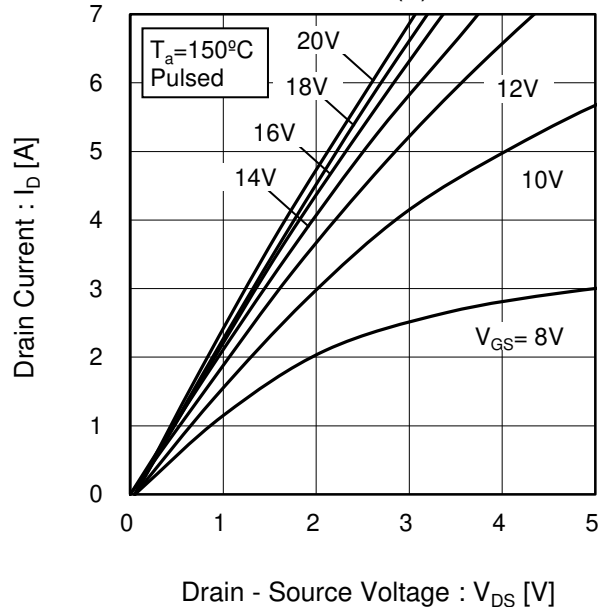


Fig.7 $T_j = 150^\circ\text{C}$ Typical Output Characteristics(II)



●Electrical characteristic curves

Fig.8 Typical Transfer Characteristics (I)

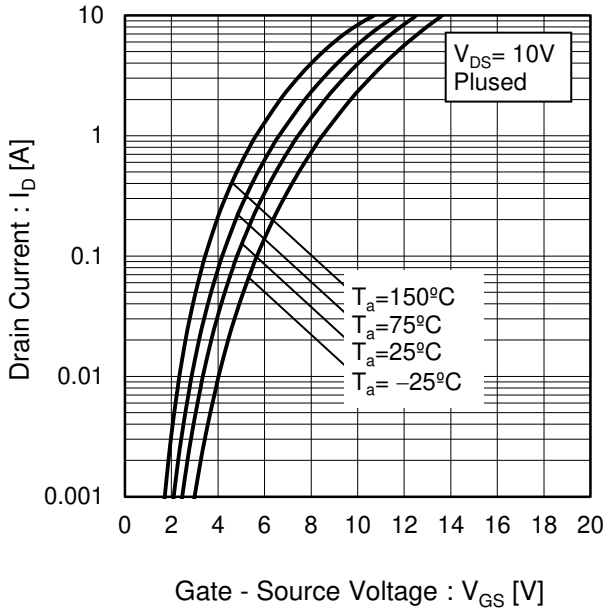


Fig.9 Typical Transfer Characteristics (II)

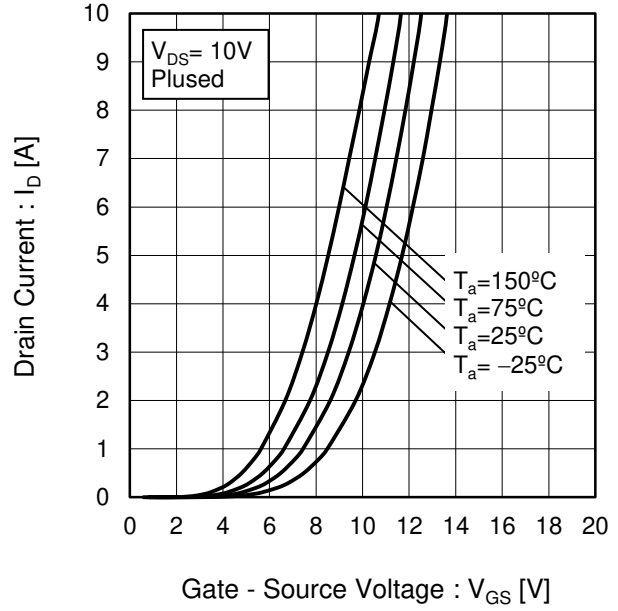


Fig.10 Gate Threshold Voltage vs. Junction Temperature

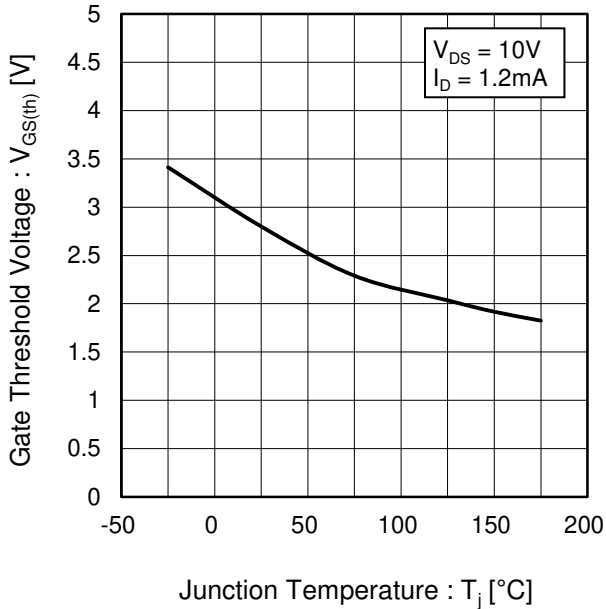
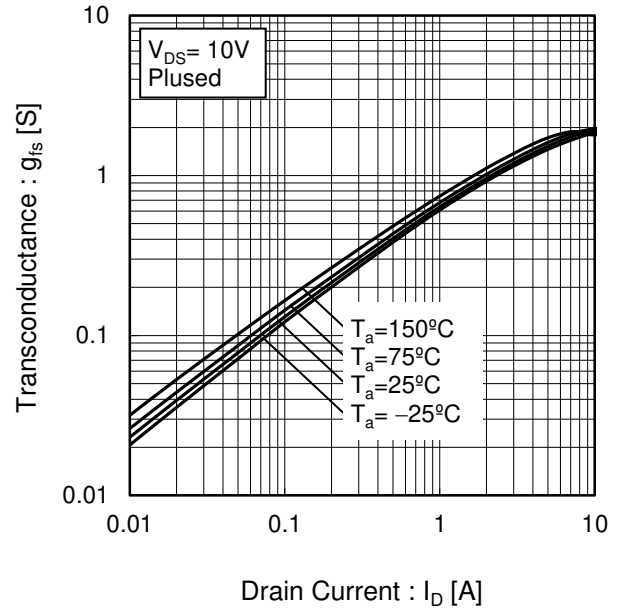


Fig.11 Transconductance vs. Drain Current



●Electrical characteristic curves

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

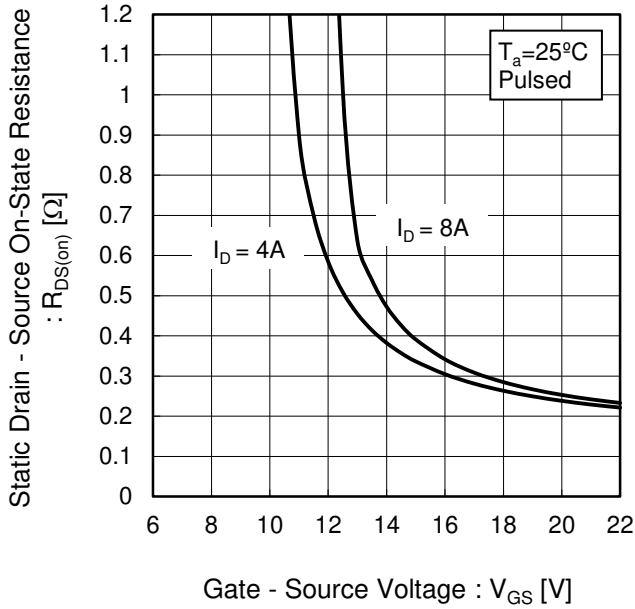


Fig.13 Static Drain - Source On - State Resistance vs. Junction Temperature

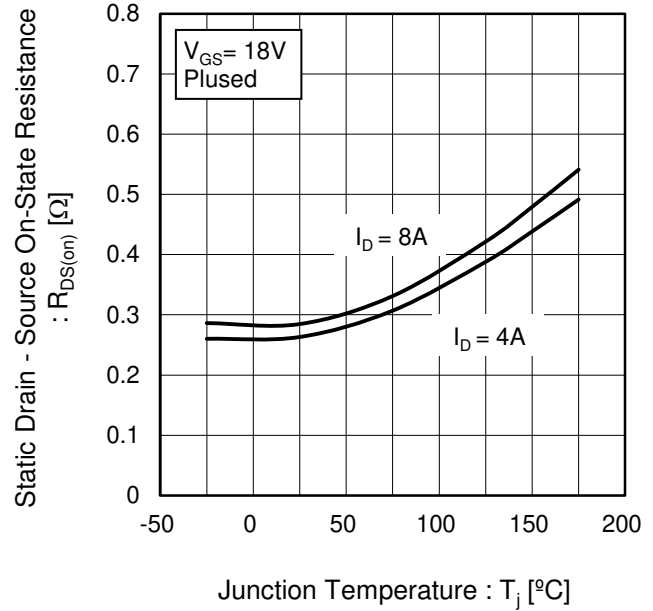
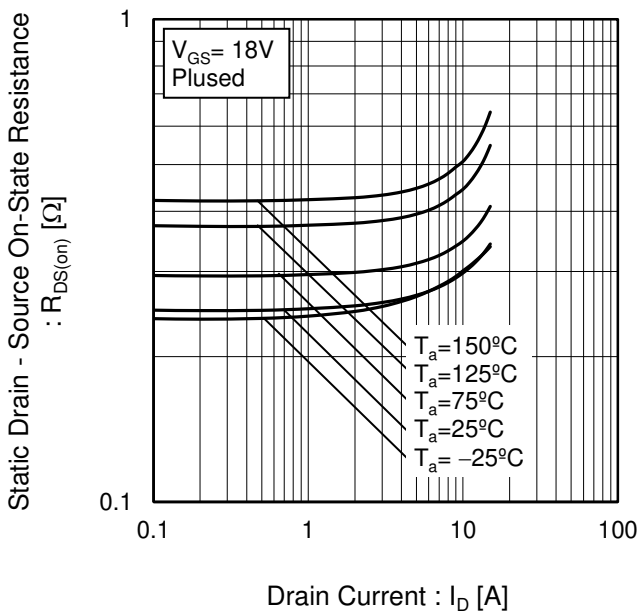


Fig.14 Static Drain - Source On - State Resistance vs. Drain Current



●Electrical characteristic curves

Fig.15 Typical Capacitance vs. Drain - Source Voltage

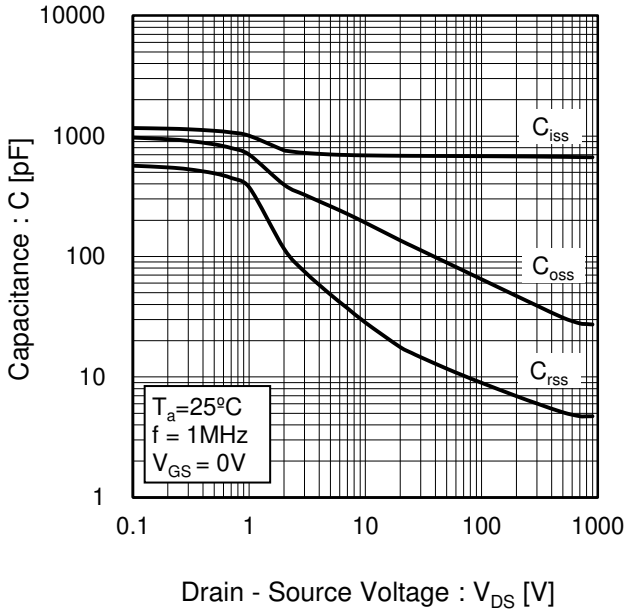


Fig.16 Coss Stored Energy

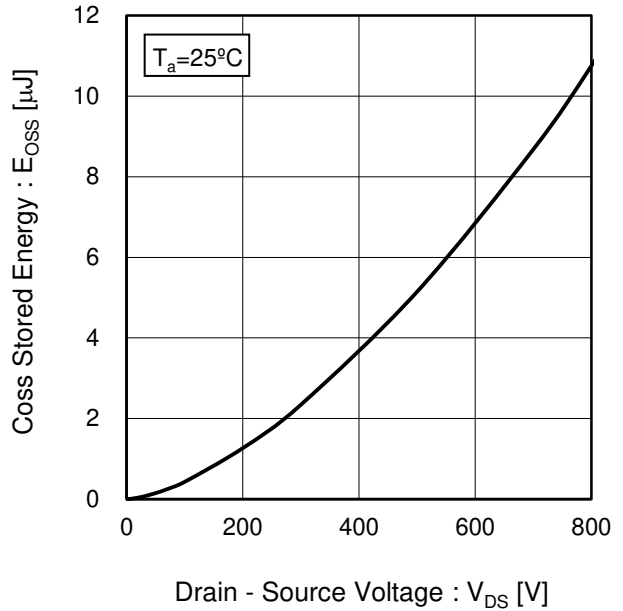


Fig.17 Switching Characteristics

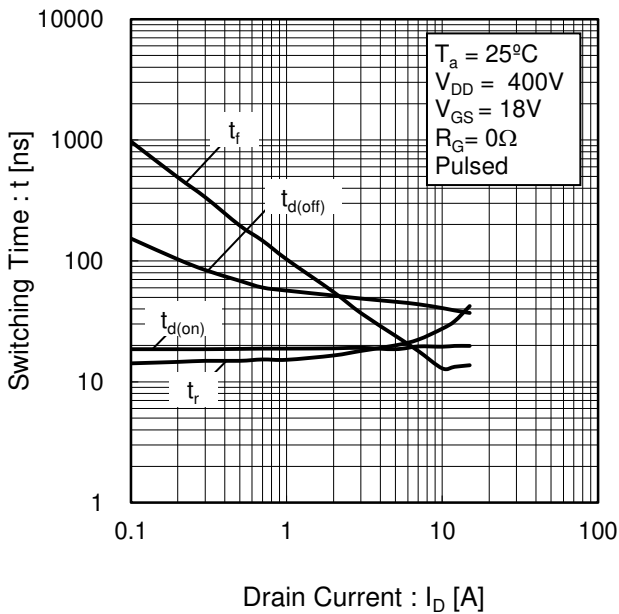
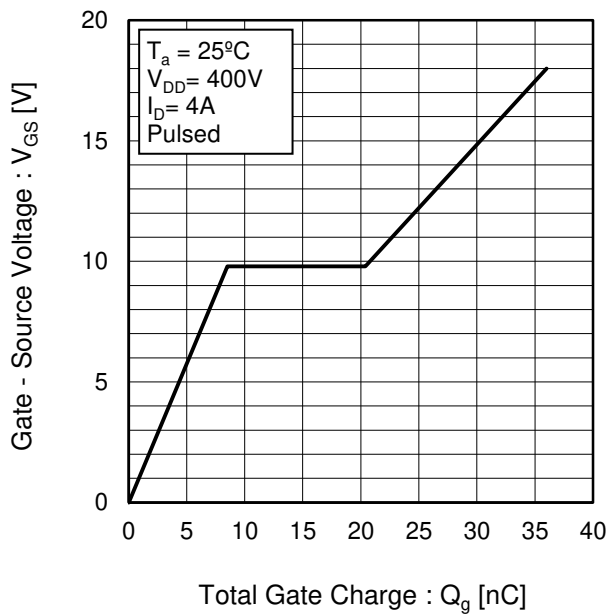


Fig.18 Dynamic Input Characteristics



●Electrical characteristic curves

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

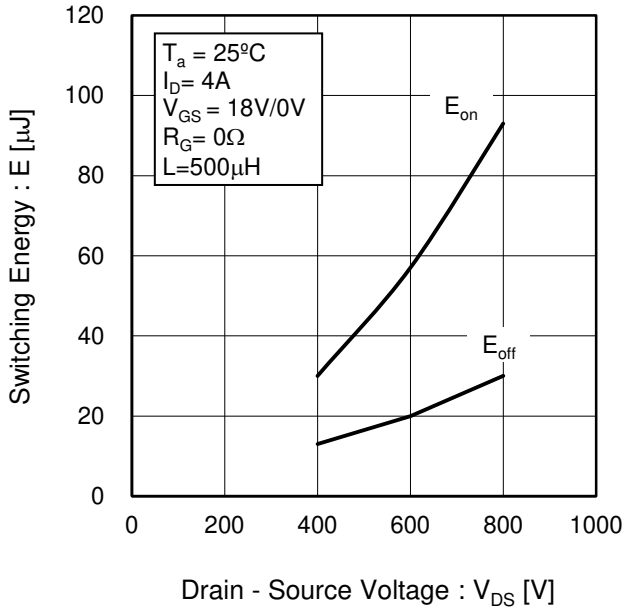


Fig.20 Typical Switching Loss vs. Drain Current

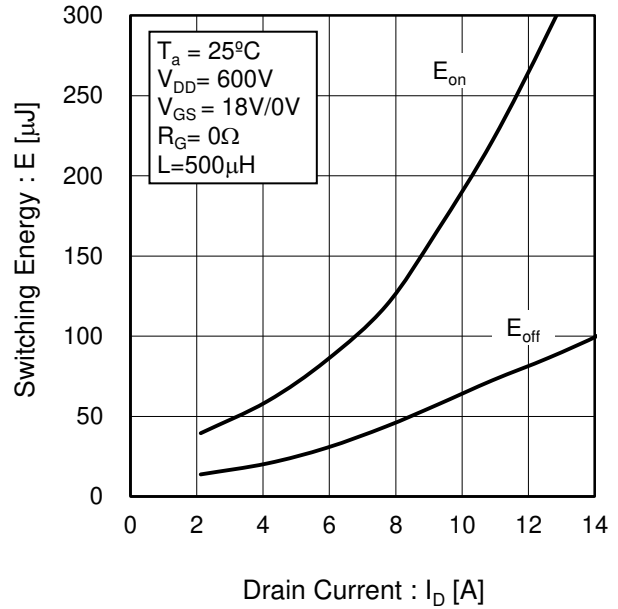
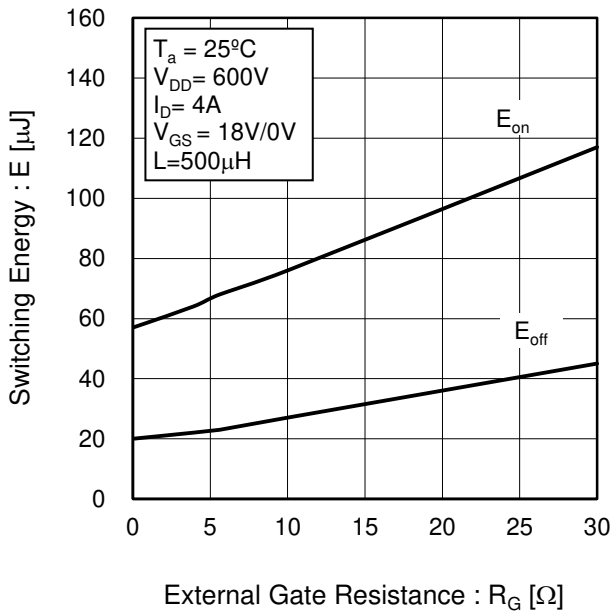


Fig.21 Typical Switching Loss vs. External Gate Resistance



●Electrical characteristic curves

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

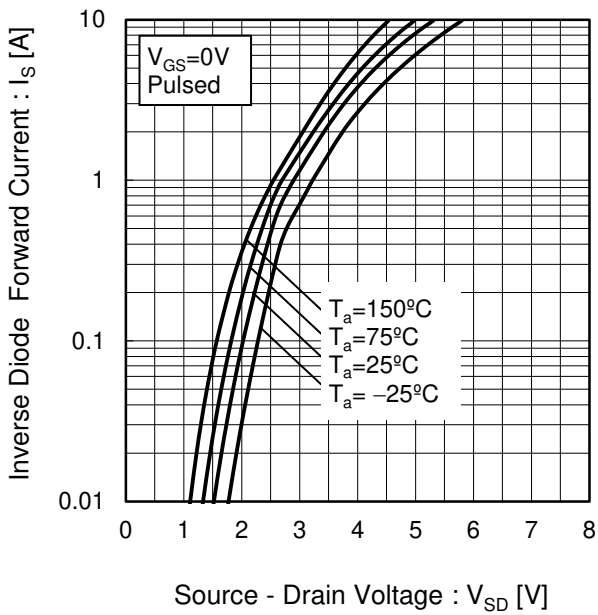
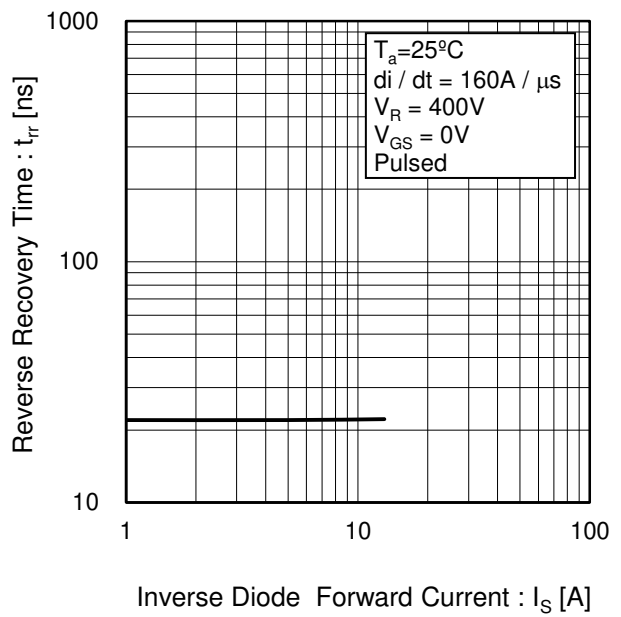


Fig.23 Reverse Recovery Time vs. Inverse Diode Forward Current



● Measurement circuits

Fig.1-1 Switching Time Measurement Circuit

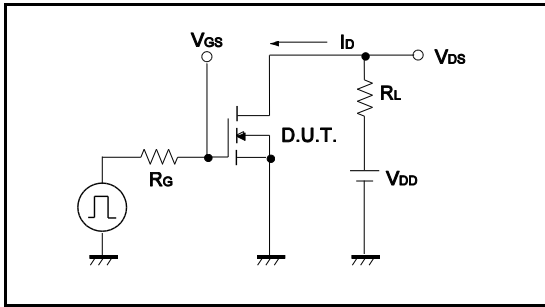


Fig.1-2 Switching Waveforms

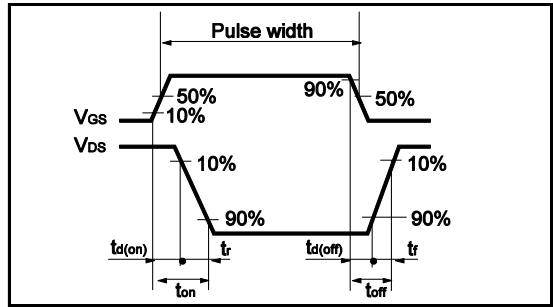


Fig.2-1 Gate Charge Measurement Circuit

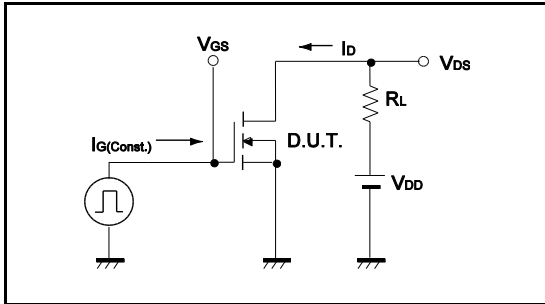


Fig.2-2 Gate Charge Waveform

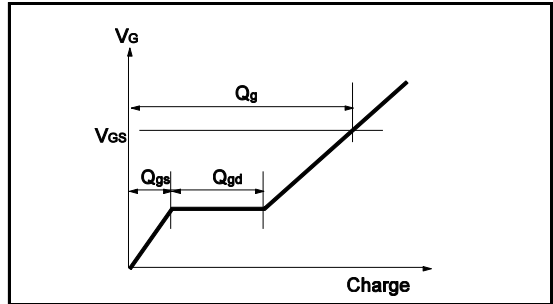


Fig.3-1 Switching Energy Measurement Circuit

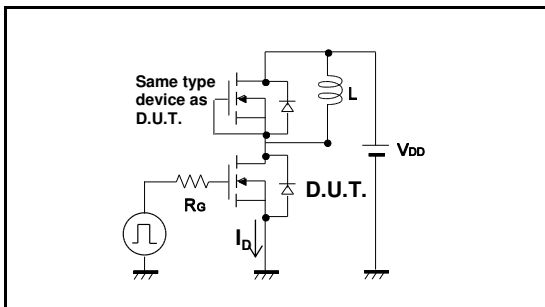


Fig.3-2 Switching Waveforms

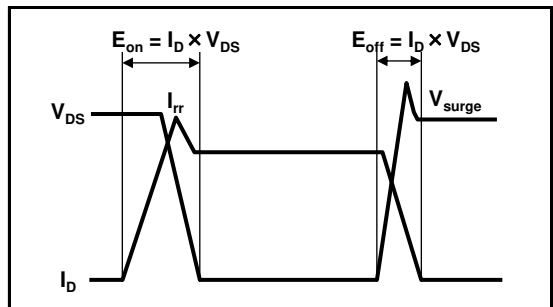


Fig.4-1 Reverse Recovery Time Measurement Circuit

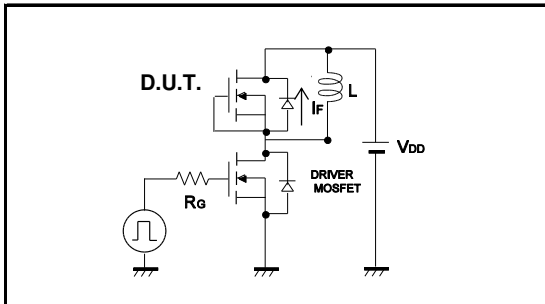
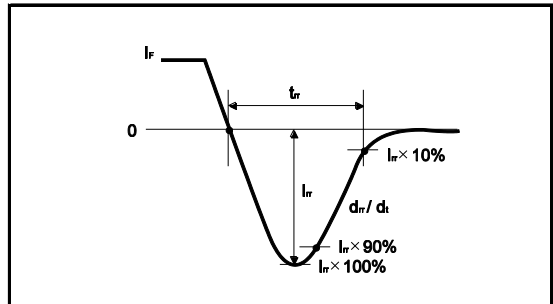
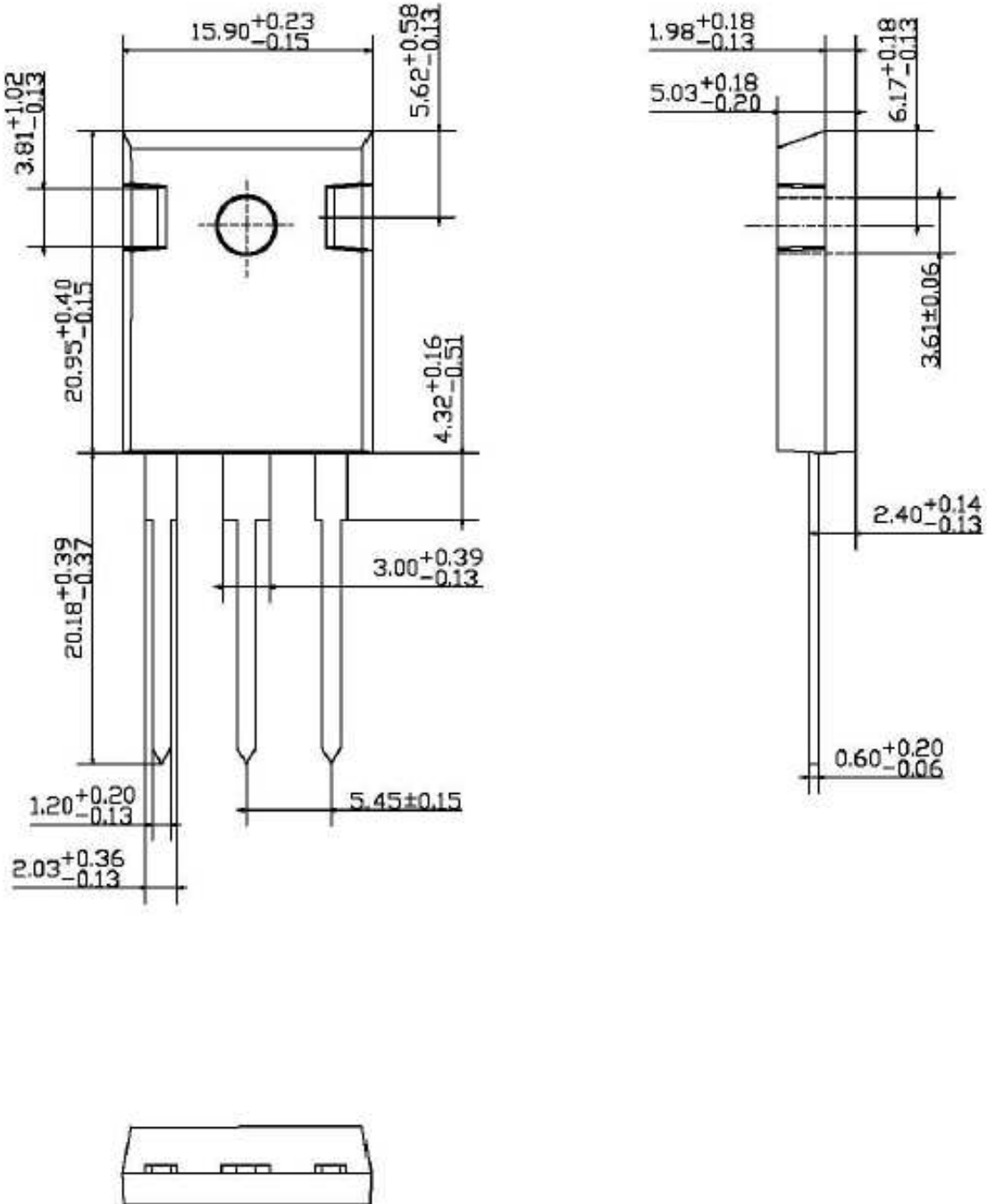


Fig.4-2 Reverse Recovery Waveform



●Dimensions (Unit : mm)

TO-247



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