## P-Ch 100V Fast Switching MOSFETs

- ★ Super Low Gate Charge
- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

### Product Summary

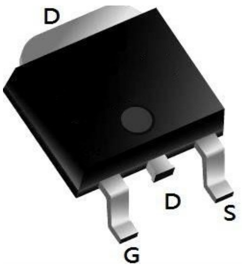
| BVDSS | RDSON | ID |
|---|---|---|
| -100V | 180mΩ | -10A |

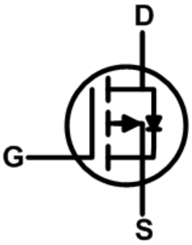
### Description

The XXW10P10 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The XXW10P10 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

### TO252 Pin Configuration





### Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | -100 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_C$=25˚C | Continuous Drain Current, $V_{GS}$ @ -10V[1] | -10 | A |
| $I_D$@$T_C$=100˚C | Continuous Drain Current, $V_{GS}$ @ -10V[1] | -4 | A |
| $I_D$@$T_A$=25˚C | Continuous Drain Current, $V_{GS}$ @ -10V[1] | -2.5 | A |
| $I_D$@$T_A$=70˚C | Continuous Drain Current, $V_{GS}$ @ -10V[1] | -2.0 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | -20 | A |
| EAS | Single Pulse Avalanche Energy[3] | 48.1 | mJ |
| $I_{AS}$ | Avalanche Current | -14 | A |
| $P_D$@$T_C$=25˚C | Total Power Dissipation[4] | 10 | W |
| $P_D$@$T_A$=25˚C | Total Power Dissipation[4] | 2 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ˚C |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ˚C |

### Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient [1] | --- | 72 | ˚C/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case[1] | --- | 8 | ˚C/W |

## P-Channel Electrical Characteristics ($T_J$=25 ℃, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=-250uA | -100 | --- | --- | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=-10V , $I_D$=-3A | --- | 180 | 220 | mΩ |
|  |  | $V_{GS}$=-4.5V , $I_D$=-2A | --- | 210 | 255 |  |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =-250uA | -1.2 | --- | -2.5 | V |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=-80V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | -1 | uA |
|  |  | $V_{DS}$=-80V , $V_{GS}$=0V , $T_J$=85℃ | --- | --- | -30 |  |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| $R_g$ | Gate Resistance | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 13 | --- | Ω |
| $Q_g$ | Total Gate Charge (-10V) | $V_{DS}$=-50V , $V_{GS}$=-10V , $I_D$=-2A | --- | 19 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge |  | --- | 3.4 | --- |  |
| $Q_{gd}$ | Gate-Drain Charge |  | --- | 2.9 | --- |  |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=-30V , $V_{GS}$=-10V , $R_G$=3.3Ω, $I_D$=-1A | --- | 9 | --- | ns |
| $T_r$ | Rise Time |  | --- | 6 | --- |  |
| $T_{d(off)}$ | Turn-Off Delay Time |  | --- | 39 | --- |  |
| $T_f$ | Fall Time |  | --- | 33 | --- |  |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=-30V , $V_{GS}$=0V , f=1MHz | --- | 1228 | --- | pF |
| $C_{oss}$ | Output Capacitance |  | --- | 41 | --- |  |
| $C_{rss}$ | Reverse Transfer Capacitance |  | --- | 29 | --- |  |

## Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current[1,5] | $V_G$=$V_D$=0V , Force Current | --- | --- | 10.0 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=-1A , $T_J$=25℃ | --- | --- | -1.2 | V |

Note :

1.The data tested by surface mounted on a 1 inch$^2$ FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The EAS data shows Max. rating . The test condition is $V_{DD}$=-25V,$V_{GS}$=-10V,L=0.5mH,$I_{AS}$=-14A

4.The power dissipation is limited by 150℃ junction temperature

5.The data is theoretically the same as $I_D$ and $I_{DM}$ , in real applications , should be limited by total power dissipation.

## P-Channel Typical Characteristics

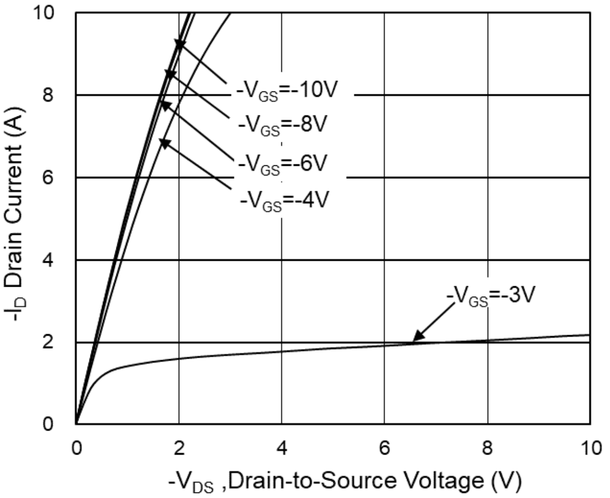


Fig.1 Typical Output Characteristics

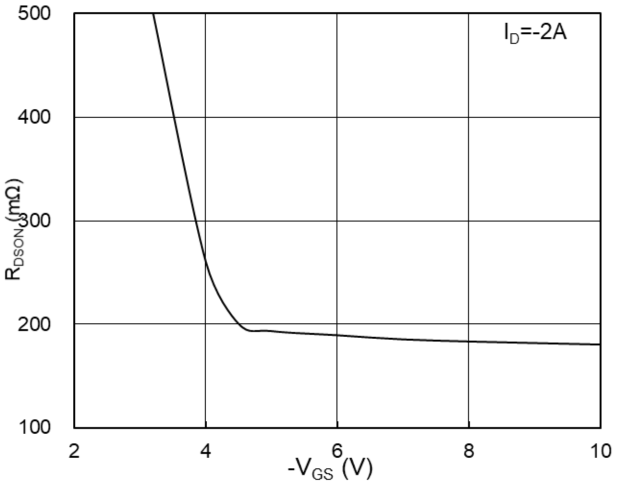


Fig.2 On-Resistance vs G-S Voltage

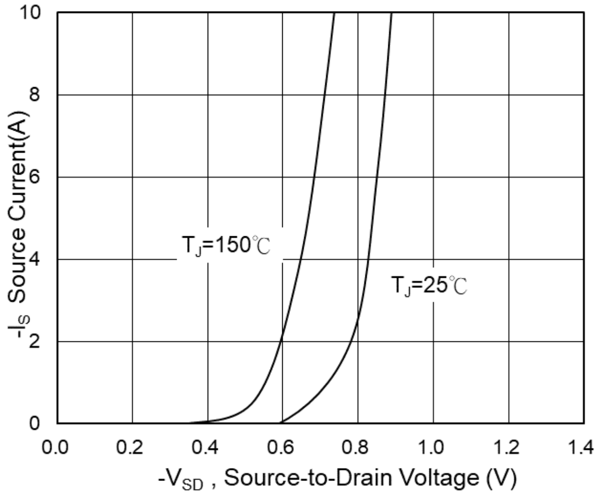


Fig.3 Source Drain Forward Characteristics

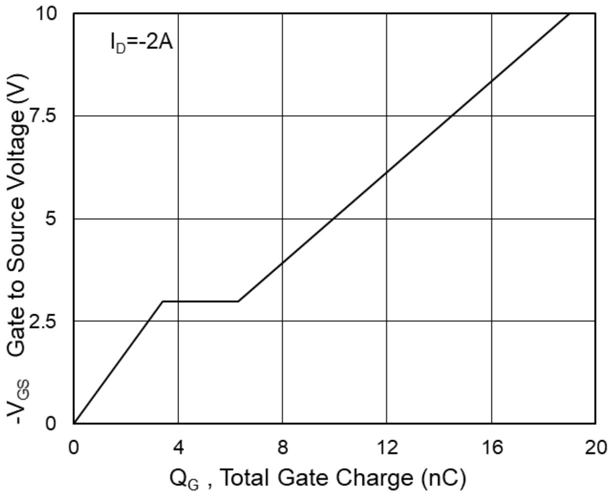


Fig.4 Gate-Charge Characteristics

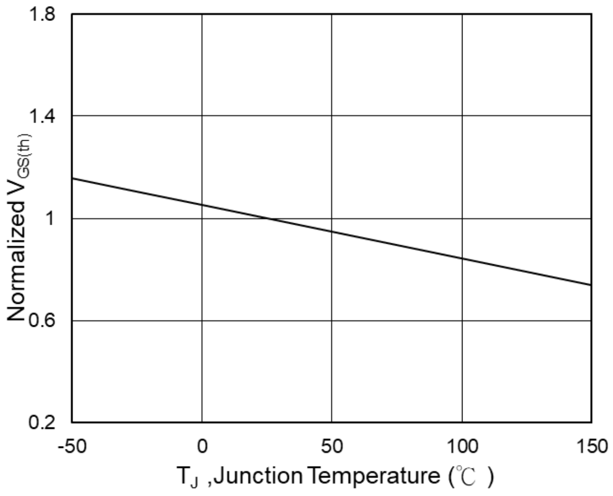


Fig.5 Normalized $V_{GS(th)}$ vs $T_J$

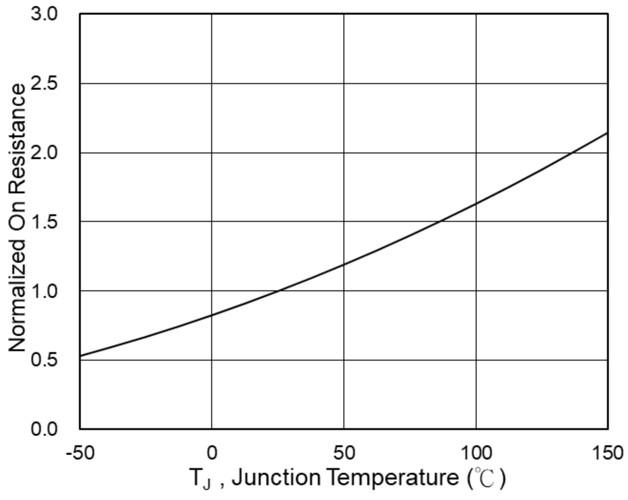


Fig.6 Normalized $R_{DSON}$ vs $T_J$

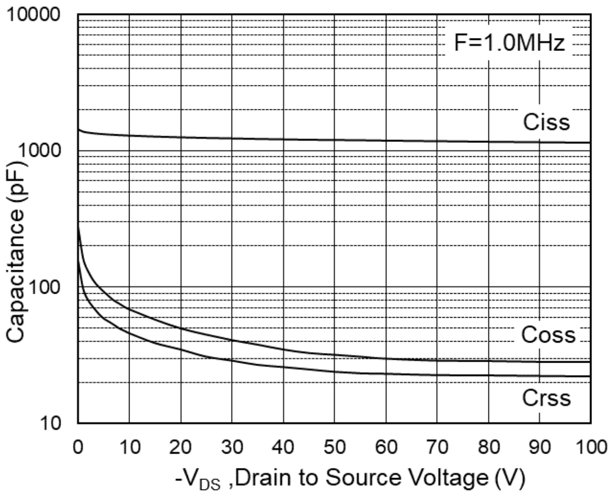


Fig.7 Capacitance

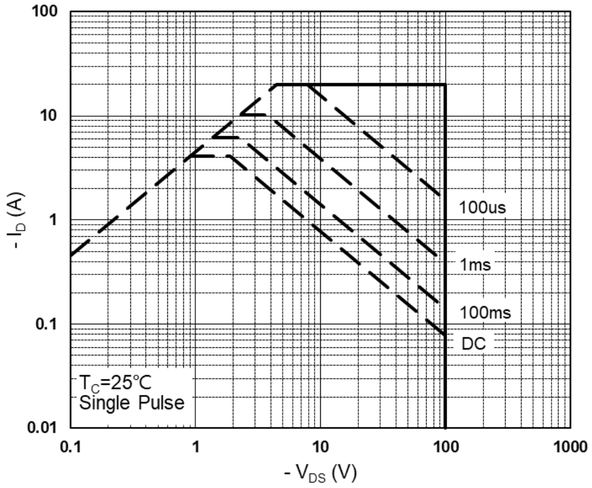


Fig.8 Safe Operating Area

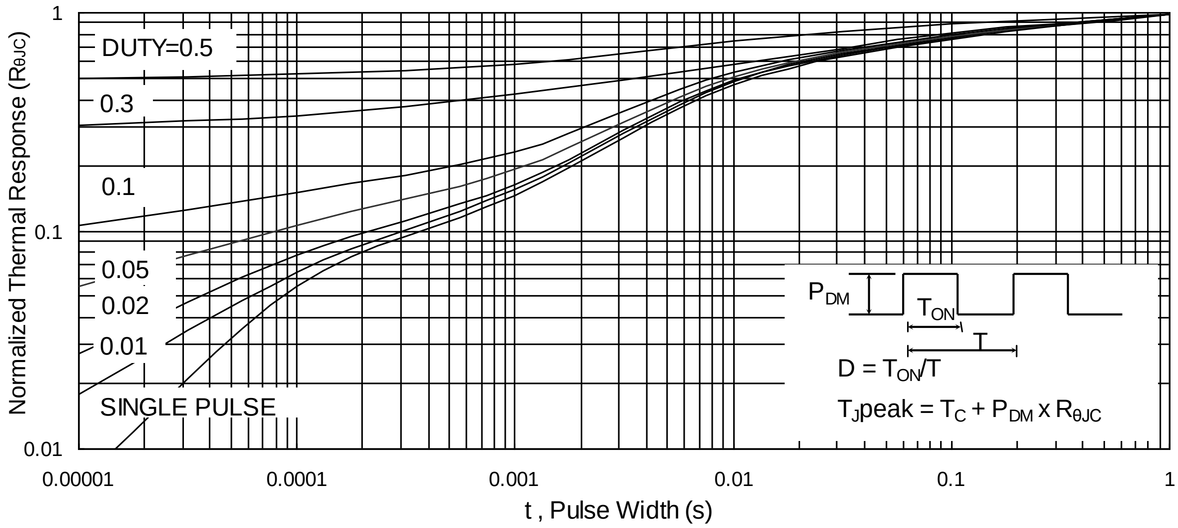


Fig.9 Normalized Maximum Transient Thermal Impedance

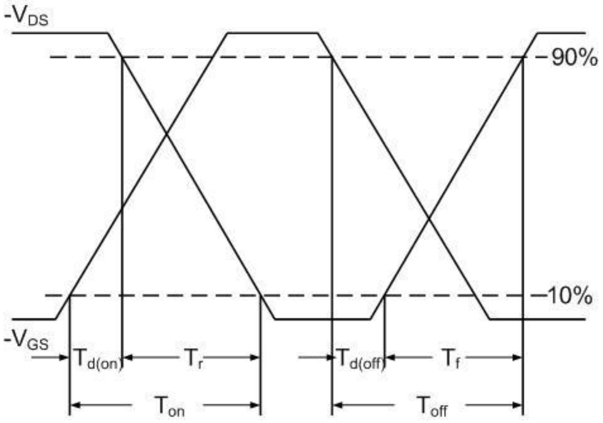


Fig.10 Switching Time Waveform

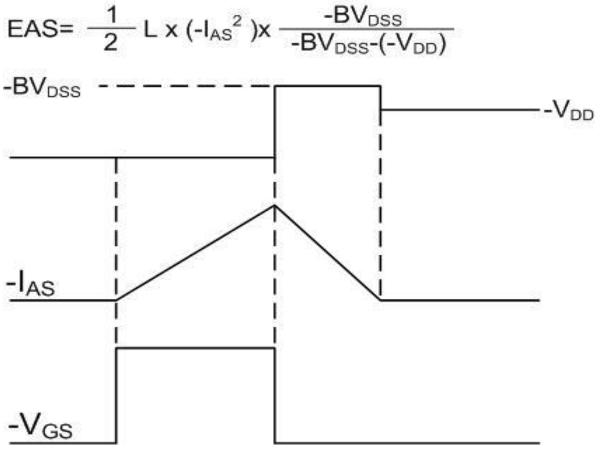
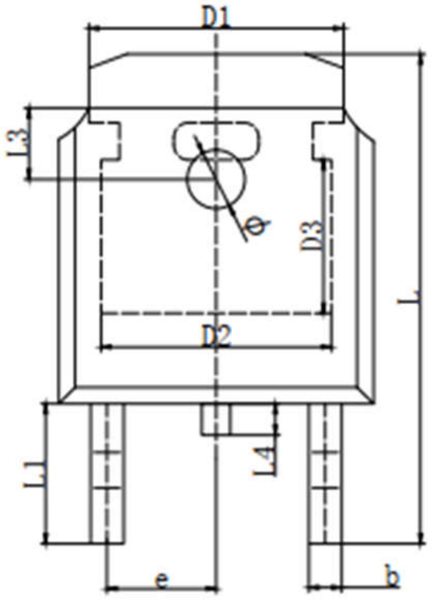
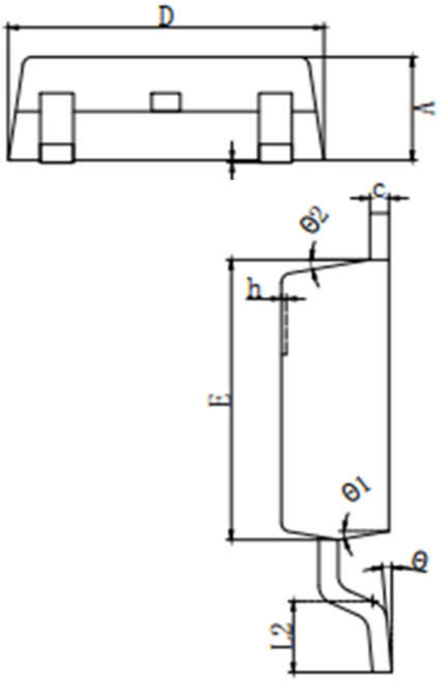


Fig.11 Unclamped Inductive Waveform

## TO-252 Package outline





| SYMBOL | MILLIMETER | | SYMBOL | MILLIMETER | |
|---|---|---|---|---|---|
| | MIN | MAX | | MIN | MAX |
| A | 2.200 | 2.400 | h | 0.000 | 0.200 |
| A1 | 0.000 | 0.127 | L | 9.900 | 10.30 |
| b | 0.640 | 0.740 | L1 | 2.888 REF | |
| c | 0.460 | 0.580 | L2 | 1.400 | 1.700 |
| D | 6.500 | 6.700 | L3 | 1.600 REF | |
| D1 | 5.334 REF | | L4 | 0.600 | 1.000 |
| D2 | 4.826 REF | | Φ | 1.100 | 1.300 |
| D3 | 3.166 REF | | θ | 0° | 8° |
| E | 6.000 | 6.200 | θ1 | 9° TYP2 | |
| e | 2.286 TYP | | θ2 | 9° TYP | |