## General Description

The WST05P06 is the highest performance trench P-Ch MOSFET with extreme high cell density , which provide excellent $R_{DSON}$ and gate charge for most of the synchronous buck converter applications .

The WST05P06 meet the RoHS and Green Product requirement , with full function reliability approved.

## Features

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

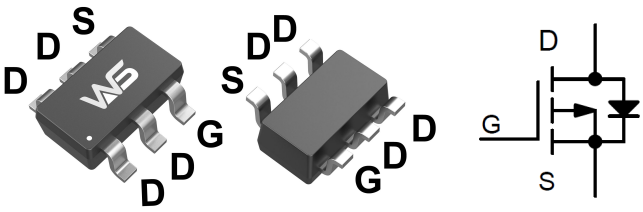
## Product Summery

| BVDSS | RDSON | ID |
|---|---|---|
| -60V | 68mΩ | -4.9A |

## Applications

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch

## SOT- 23-6L Pin Configuration




## Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | -60 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_C$=25℃ | Continuous Drain Current, $V_{GS}$ @ -4.5V[1] | -4.9 | A |
| $I_D$@$T_C$=70℃ | Continuous Drain Current, $V_{GS}$ @ -4.5V[1] | -3.3 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | -11 | A |
| $P_D$@$T_A$=25℃ | Total Power Dissipation[3] | 1.3 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |

## Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient [1] | --- | 125 | ℃/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case[1] | --- | 80 | ℃/W |

## 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 | -60 | --- | --- | V |
| $\triangle BV_{DSS}/\triangle T_J$ | $BV_{DSS}$ Temperature Coefficient | Reference to 25℃ , $I_D$=-1mA | --- | -0.014 | --- | V/℃ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=-10V , $I_D$=-4.9A | --- | 68 | 85 | mΩ |
| | | $V_{GS}$=-4.5V , $I_D$=-2.5A | --- | 80 | 110 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =-250uA | -0.5 | -0.8 | -1.2 | V |
| $\triangle V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | 3.95 | --- | mV/℃ |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=-48V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | -1 | uA |
| | | $V_{DS}$=-48V , $V_{GS}$=0V , $T_J$=55℃ | --- | --- | -5 | |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| gfs | Forward Transconductance | $V_{DS}$=-5V , $I_D$=-2.9A | --- | 11 | --- | S |
| $Q_g$ | Total Gate Charge (-4.5V) | $V_{DS}$=-30V , $V_{GS}$=-4.5V , $I_D$=-2.9A | --- | 11 | 15.4 | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 1.4 | 2.1 | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 2.4 | 3.2 | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=-30V , $V_{GS}$=-4.5V , $R_G$=3.3Ω, $I_D$=-2.9A | --- | 8.5 | 16 | ns |
| $T_r$ | Rise Time | | --- | 5.8 | 11 | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 36 | 65 | |
| $T_f$ | Fall Time | | --- | 5.6 | 11 | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=-30V , $V_{GS}$=0V , f=1MHz | --- | 430 | 560 | pF |
| $C_{oss}$ | Output Capacitance | | --- | 41 | 66 | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 25 | 35 | |

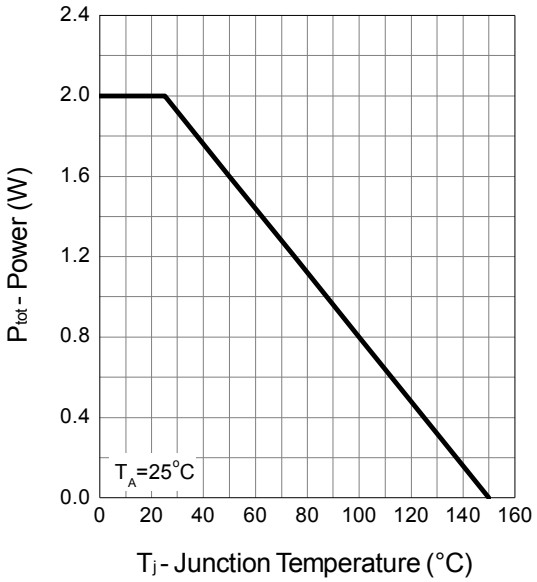
## Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current[1,4] | $V_G$=$V_D$=0V , Force Current | --- | --- | -4.9 | A |
| $I_{SM}$ | Pulsed Source Current[2,4] | | --- | --- | -11 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=-1A , $T_J$=25℃ | --- | --- | -1 | V |
| $t_{rr}$ | Reverse Recovery Time | IF=-2.9A , dI/dt=100A/μs , $T_J$=25℃ | --- | 20 | --- | nS |
| $Q_{rr}$ | Reverse Recovery Charge | | --- | 19 | --- | nC |

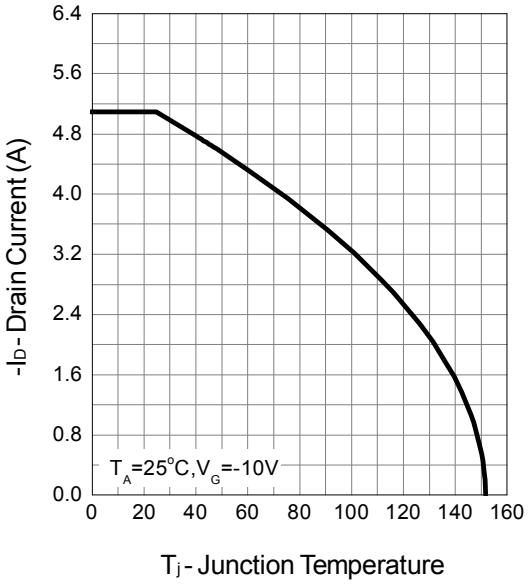
Note :
1.The data tested by surface mounted on a 1 inch$^2$ FR-4 board with 2OZ copper,t<10sec.
2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3.The power dissipation is limited by 150℃ junction temperature
4.The data is theoretically the same as $I_D$ and $I_{DM}$ , in real applications , should be limited by total power dissipation.

## Typical Characteristics

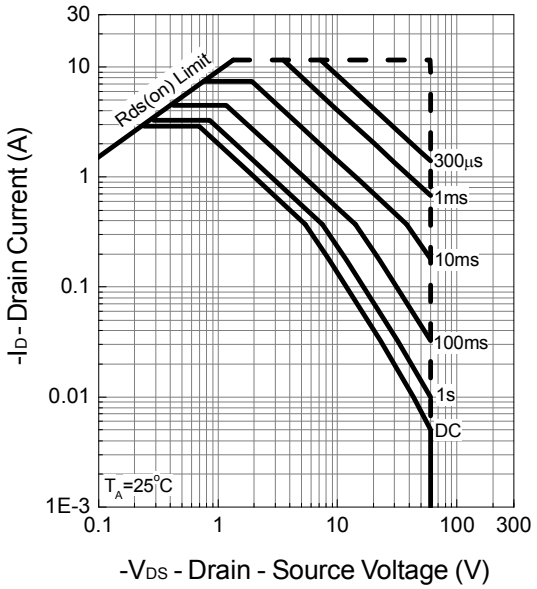
### Power Dissipation



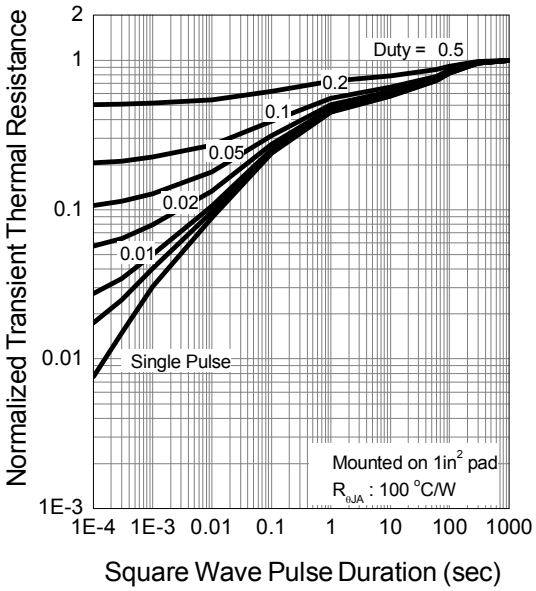

### Drain Current




### Safe Operation Area

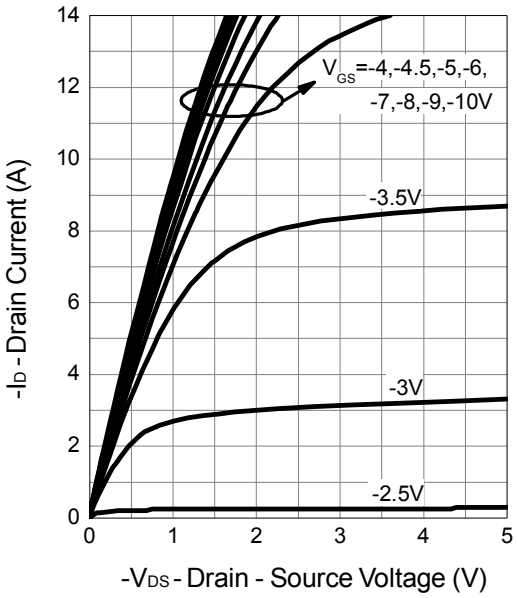



### Thermal Transient Impedance

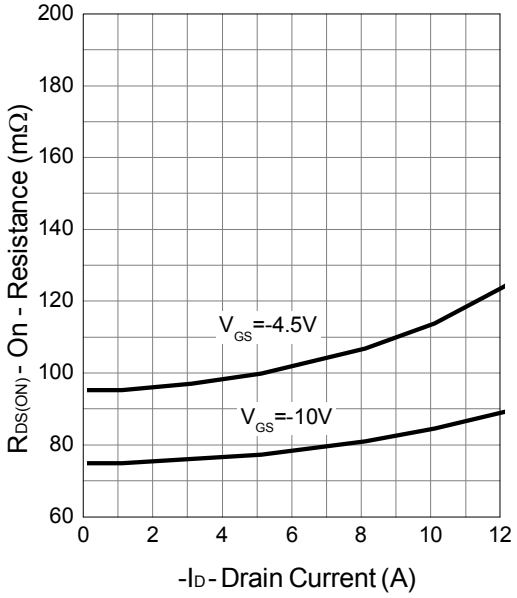


## Typical Characteristics

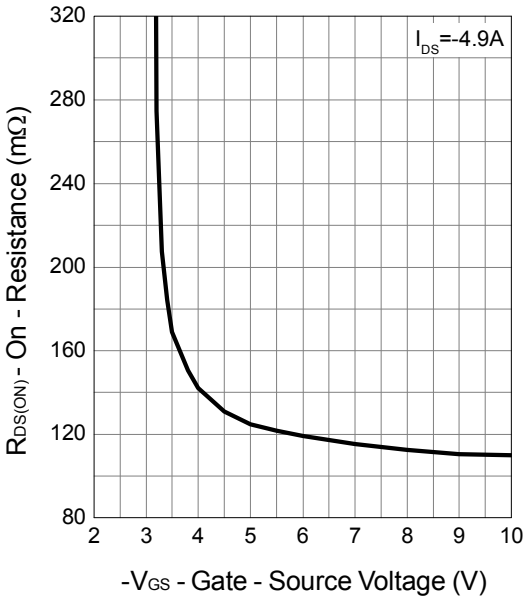
### Output Characteristics



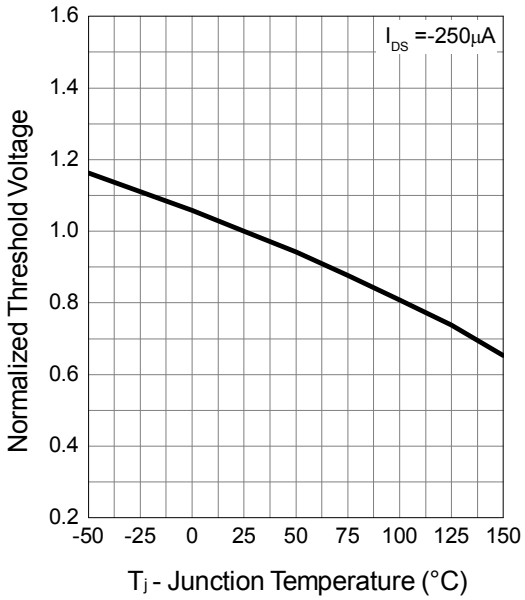

### Drain-Source On Resistance




### Gate-Source On Resistance

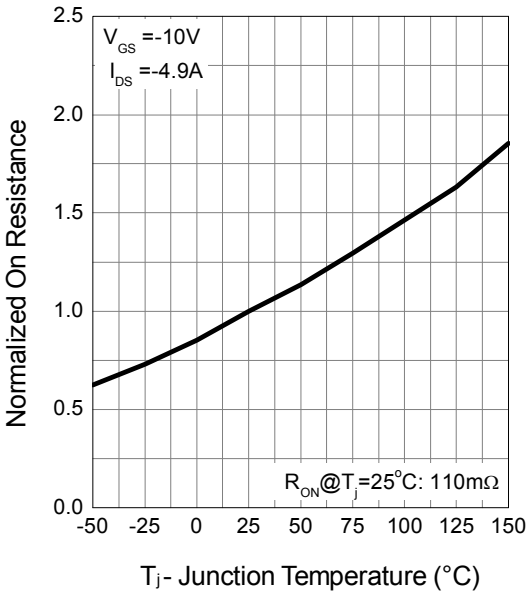



### Gate Threshold Voltage

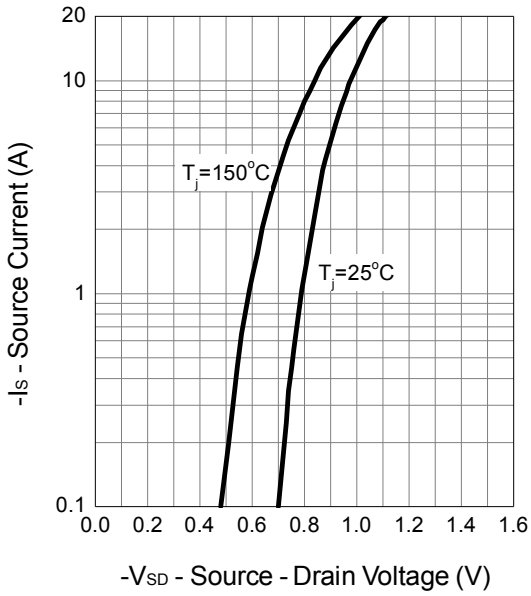


## Typical Characteristics

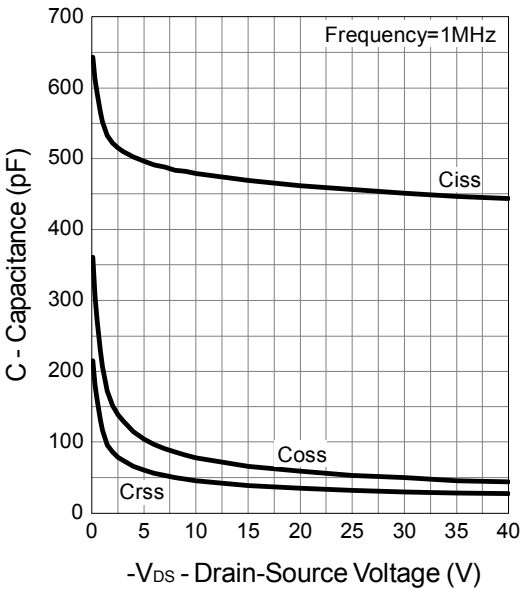
### Drain-Source On Resistance



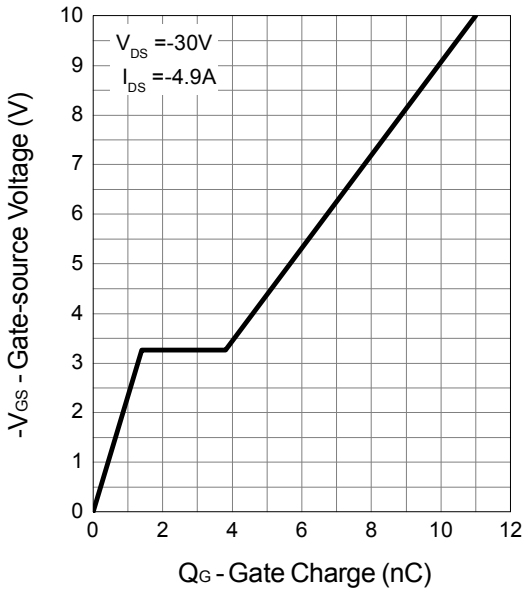

### Source-Drain Diode Forward




### Capacitance

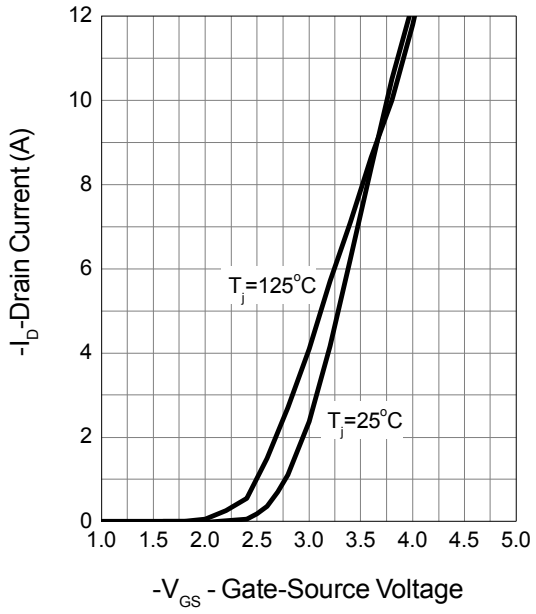



### Gate Charge



## Typical Characteristics

**Transfer Characteristics**



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