

## General Description

The WST3392 is the highest performance trench Dual N-Channel MOSFETs with extreme high cell density, which provide excellent  $R_{DS(ON)}$  and gate charge for most of the small power switching and load switch applications.

The WST3392 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

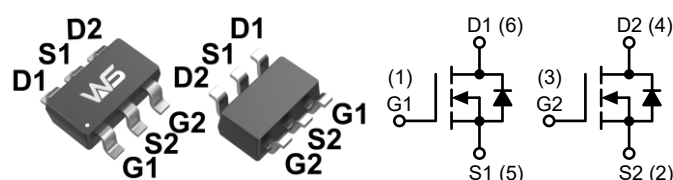
## Product Summary

| $BV_{DSS}$ | $R_{DS(ON)}$ | $I_D$ |
|------------|--------------|-------|
| 30V        | 46mΩ         | 3.7A  |

## Applications

- Power management in portable and battery operated products
- One cell battery pack protection

## SOT-23-6L Pin Configuration



## Absolute Maximum Ratings

| Symbol                   | Parameter  | Rating     | Units      |
|--------------------------|--|------------|------------|
| $V_{DS}$                 | Drain-Source Voltage                                   | 30         | V          |
| $V_{GS}$                 | Gate-Source Voltage                                    | $\pm 20$   |            |
| $I_D @ T_C = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 4.5V$ <sup>1</sup> | 3.7        | A          |
| $I_D @ T_C = 70^\circ C$ | Continuous Drain Current, $V_{GS} @ 4.5V$ <sup>1</sup> | 3.0        |            |
| $I_{DM}$                 | Pulsed Drain Current <sup>2</sup>                      | 20         |            |
| $P_D @ T_A = 25^\circ C$ | Power Dissipation <sup>3</sup>                         | 1.15       | W          |
| $T_{STG}$                | Storage Temperature Range                              | -55 to 150 | $^\circ C$ |
| $T_J$                    | Operating Junction Temperature Range                   | -55 to 150 |            |

## Thermal Data

| Symbol          | Parameter  | Typ. | Max. | Units        |
|-----------------|--|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient <sup>1</sup> | ---  | 110  | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case <sup>1</sup>    | ---  | 80   |              |

**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$ , Unless Otherwise Noted)

| Symbol             | Parameter                         | Conditions   | Min. | Typ.     | Max.       | Units            |
|--------------------|-----------------------------------|--|------|----------|------------|------------------|
| $BV_{DSS}$         | Drain-Source Breakdown Voltage    | $I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$  | 30   | ---      | ---        | V                |
| $I_{DSS}$          | Zero Gate Voltage Drain Current   | $V_{DS}=30\text{V}$ , $V_{GS}=0\text{V}$<br>$T_J=55^{\circ}\text{C}$             | ---  | ---      | 1.0<br>5.0 | $\mu\text{A}$    |
| $I_{GSS}$          | Gate-Body leakage current         | $V_{DS}=0\text{V}$ , $V_{GS}=\pm 12\text{V}$                                     | ---  | ---      | $\pm 100$  | nA               |
| $V_{GS(th)}$       | Gate Threshold Voltage            | $V_{GS}=V_{DS}$ , $I_D=250\mu\text{A}$   | 0.5  | 1.0      | 1.5        | V                |
| $I_{D(ON)}$        | On state drain current            | $V_{GS}=10\text{V}$ , $V_{DS}=5\text{V}$   | 20   | ---      | ---        | A                |
| $R_{DS(ON)}$       | Static Drain-Source On-Resistance | $V_{GS}=10\text{V}$ , $I_D=3.4\text{A}$<br>$T_J=125^{\circ}\text{C}$             | ---  | 46<br>73 | 60<br>88   | $\text{m}\Omega$ |
|                    |                                   | $V_{GS}=4.5\text{V}$ , $I_D=3\text{A}$   | ---  | 53       | 70         |                  |
|                    |                                   | $V_{GS}=2.5\text{V}$ , $I_D=2\text{A}$   | ---  | 65       | 90         |                  |
| $g_{fs}$           | Forward Transconductance          | $V_{DS}=5\text{V}$ , $I_D=3.4\text{A}$   | ---  | 14       | ---        | S                |
| $R_g$              | Gate Resistance                   | $V_{DS}=0\text{V}$ , $V_{GS}=0\text{V}$ , $f=1.0\text{MHz}$                      | ---  | 4.3      | ---        | $\Omega$         |
| $Q_g(10\text{V})$  | Total Gate Charge                 | $V_{GS}=10\text{V}$ , $V_{DS}=15\text{V}$ , $I_D=3.4\text{A}$                    | ---  | 10       | ---        | nC               |
| $Q_g(4.5\text{V})$ | Total Gate Charge                 |  | ---  | 4.7      | ---        |                  |
| $Q_{gs}$           | Gate-Source Charge                |  | ---  | 0.95     | ---        |                  |
| $Q_{gd}$           | Gate-Drain Charge                 |  | ---  | 1.6      | ---        |                  |
| $T_{d(on)}$        | Turn-On Delay Time                | $V_{GS}=10\text{V}$ , $V_{DS}=15\text{V}$ , $R_L=4.4\Omega$<br>$R_{GEN}=3\Omega$ | ---  | 3.5      | ---        | ns               |
| $T_r$              | Turn-On Rise Time                 |  | ---  | 1.5      | ---        |                  |
| $T_{d(off)}$       | Turn-Off Delay Time               |  | ---  | 17.5     | ---        |                  |
| $T_f$              | Turn-Off Fall Time                |  | ---  | 2.5      | ---        |                  |
| $C_{iss}$          | Input Capacitance                 | $V_{GS}=0\text{V}$ , $V_{DS}=15\text{V}$ , $f=1.0\text{MHz}$                     | ---  | 235      | ---        | pF               |
| $C_{oss}$          | Output Capacitance                |  | ---  | 35       | ---        |                  |
| $C_{rss}$          | Reverse Transfer Capacitance      |  | ---  | 18       | ---        |                  |

**Diode Characteristics**

| Symbol   | Parameter                             | Conditions  | Min. | Typ. | Max. | Units |
|----------|---------------------------------------|---|------|------|------|-------|
| $I_S$    | Maximum Body-Diode Continuous Current |   | ---  | ---  | 1.5  | A     |
| $V_{SD}$ | Diode Forward Voltage                 | $I_S=1\text{A}$ , $V_{GS}=0\text{V}$                | ---  | 0.75 | 1.0  | V     |
| $t_{rr}$ | Body Diode Reverse Recovery Time      | $I_F=3.4\text{A}$ , $dI/dt=100\text{A}/\mu\text{s}$ | ---  | 8.5  | ---  | ns    |
| $Q_{rr}$ | Body Diode Reverse Recovery Charge    |   | ---  | 2.55 | ---  | nC    |

**Note:**

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper.
2. The data tested by pulsed , pulse width  $\leq 300\mu\text{s}$  , duty cycle  $\leq 2\%$
3. The power dissipation is limited by  $150^{\circ}\text{C}$  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

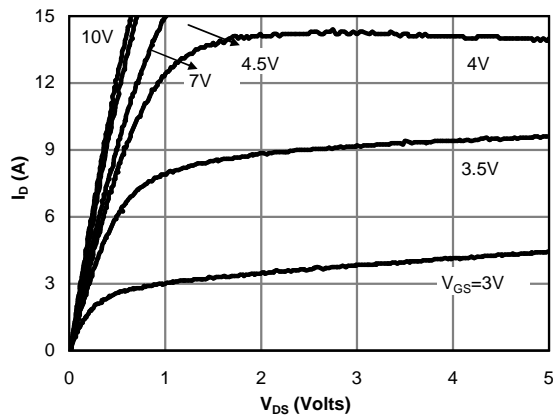


Fig 1: On-Region Characteristics (Note E)

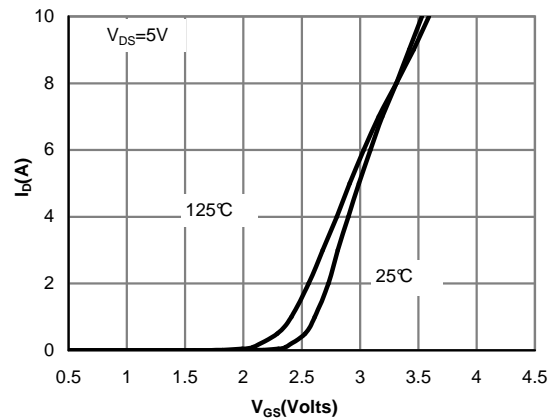


Figure 2: Transfer Characteristics (Note E)

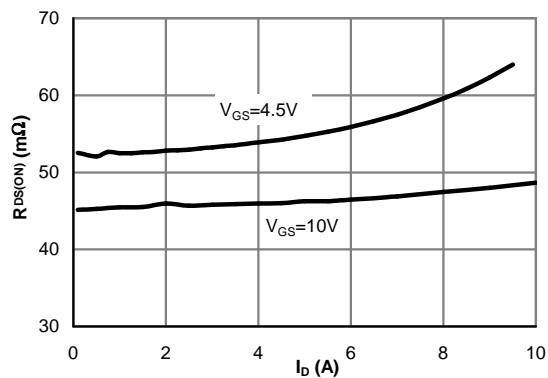


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

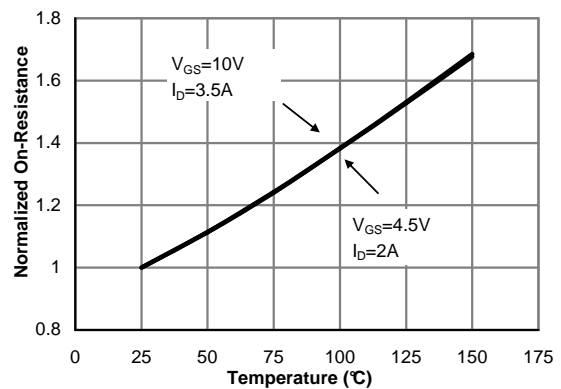


Figure 4: On-Resistance vs. Junction Temperature (Note E)

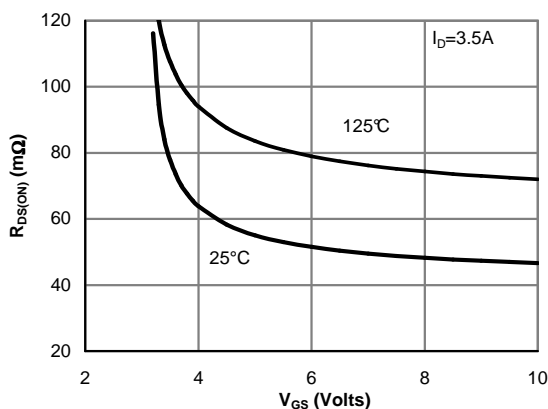


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

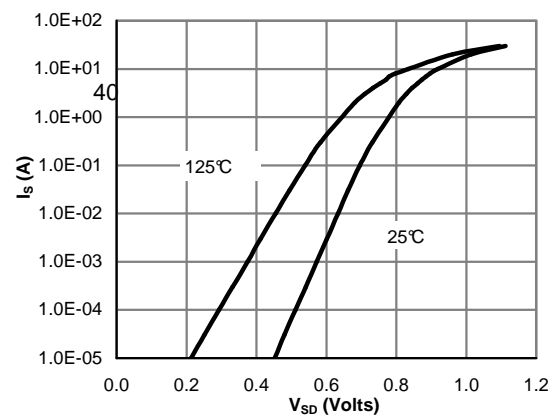


Figure 6: Body-Diode Characteristics (Note E)

## Typical Characteristics (Cont.)

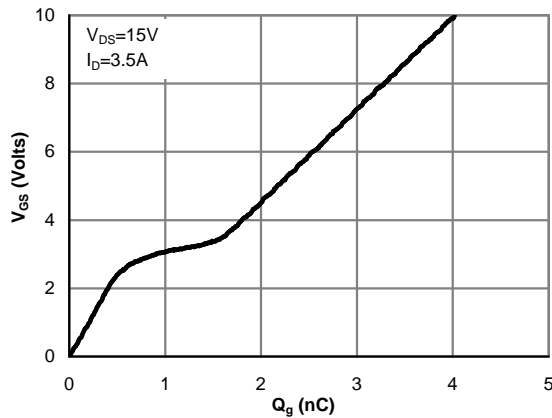


Figure 7: Gate-Charge Characteristics

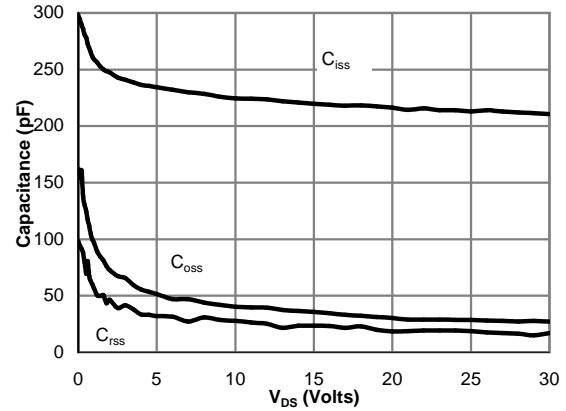


Figure 8: Capacitance Characteristics

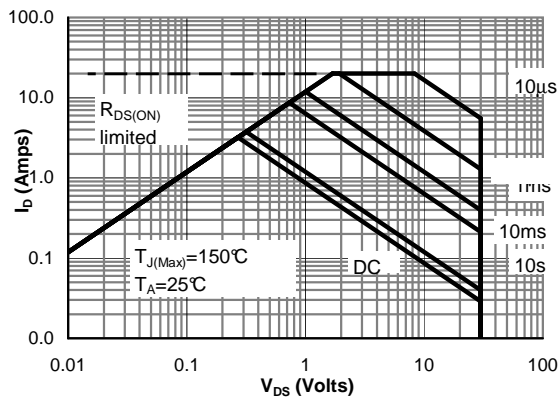


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

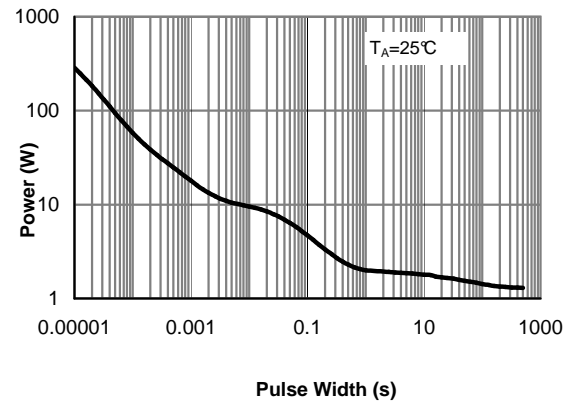


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

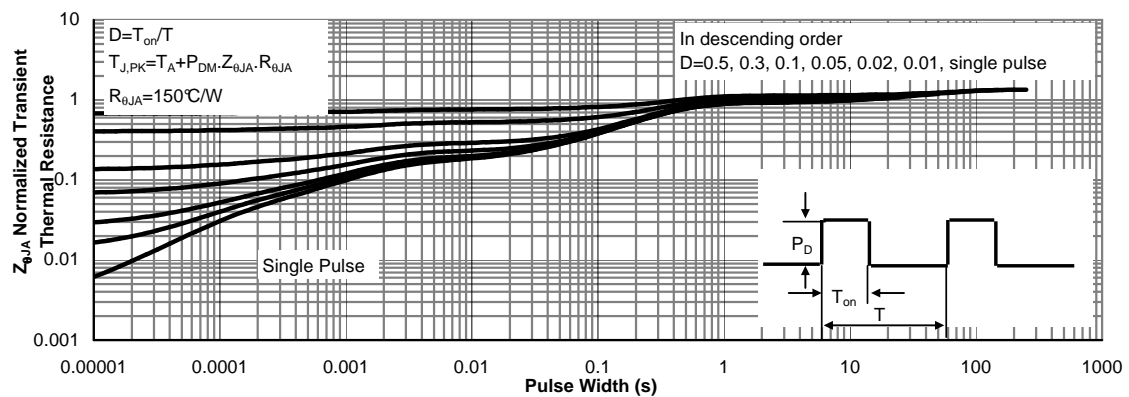
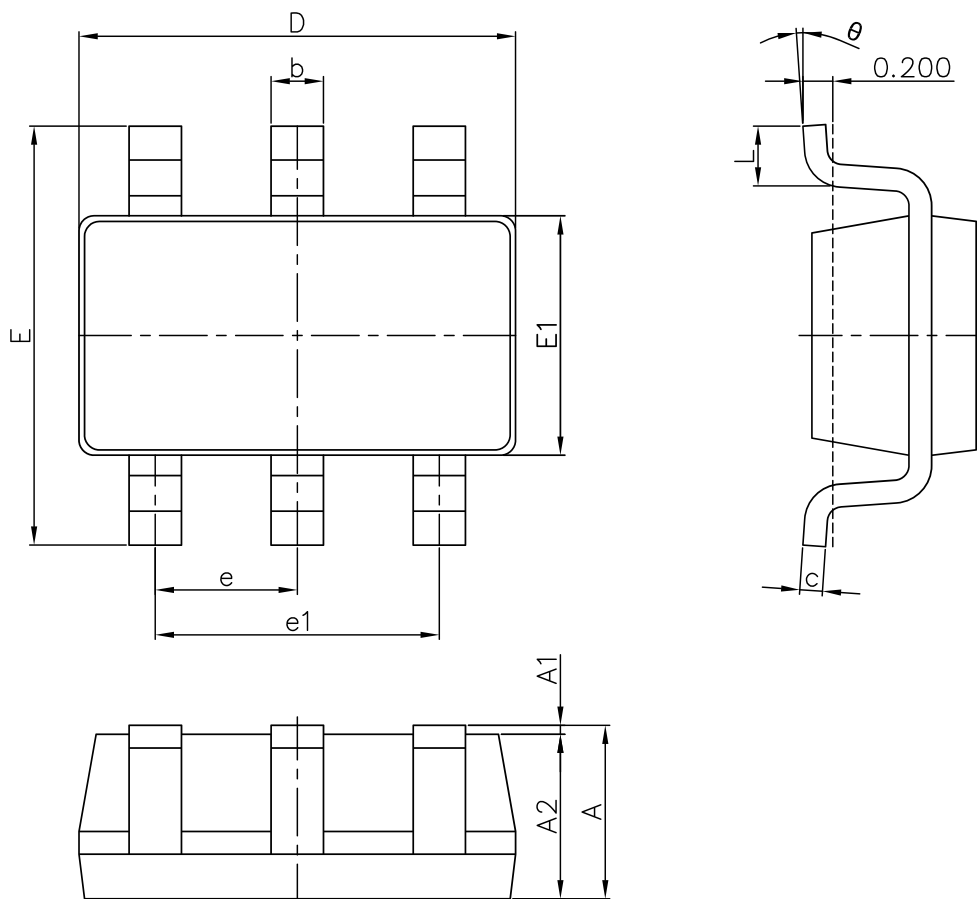


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

## Packaging information



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 1.050                     | 1.250 | 0.041                | 0.049 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 1.050                     | 1.150 | 0.041                | 0.045 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.100                     | 0.200 | 0.004                | 0.008 |
| D      | 2.820                     | 3.020 | 0.111                | 0.119 |
| E1     | 1.500                     | 1.700 | 0.059                | 0.067 |
| E      | 2.650                     | 2.950 | 0.104                | 0.116 |
| e      | 0.950 BSC                 |       | 0.037 BSC            |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.300                     | 0.600 | 0.012                | 0.024 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

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