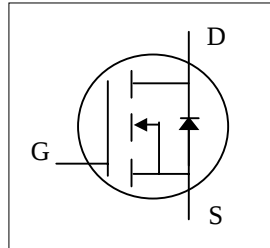
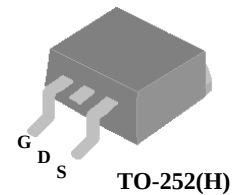


- ▼ 100% UIS Test
- ▼ Simple Drive Requirement
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free



|              |               |
|--------------|---------------|
| $BV_{DSS}$   | 650V          |
| $R_{DS(ON)}$ | $2.5\ \Omega$ |
| $I_D^3$      | 4A            |



## Description

XP65AN2K5 series are innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The TO-252 package is widely preferred for commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

## Absolute Maximum Ratings@ $T_j=25^\circ\text{C}$ (unless otherwise specified)

| Symbol                     | Parameter                                  | Rating     | Units            |
|----------------------------|--------------------------------------------|------------|------------------|
| $V_{DS}$                   | Drain-Source Voltage                       | 650        | V                |
| $V_{GS}$                   | Gate-Source Voltage                        | $\pm 30$   | V                |
| $I_D@T_C=25^\circ\text{C}$ | Drain Current, $V_{GS}$ @ $10V^3$          | 4          | A                |
| $I_{DM}$                   | Pulsed Drain Current <sup>1</sup>          | 12         | A                |
| $P_D@T_C=25^\circ\text{C}$ | Total Power Dissipation                    | 54.3       | W                |
| $P_D@T_A=25^\circ\text{C}$ | Total Power Dissipation <sup>5</sup>       | 2          | W                |
| $E_{AS}$                   | Single Pulse Avalanche Energy <sup>4</sup> | 8          | mJ               |
| $T_{STG}$                  | Storage Temperature Range                  | -55 to 150 | $^\circ\text{C}$ |
| $T_J$                      | Operating Junction Temperature Range       | -55 to 150 | $^\circ\text{C}$ |

## Thermal Data

| Symbol      | Parameter                                                             | Value | Units                     |
|-------------|-----------------------------------------------------------------------|-------|---------------------------|
| $R_{thj-c}$ | Maximum Thermal Resistance, Junction-case                             | 2.3   | $^\circ\text{C}/\text{W}$ |
| $R_{thj-a}$ | Maximum Thermal Resistance, Junction-ambient (PCB mount) <sup>5</sup> | 62.5  | $^\circ\text{C}/\text{W}$ |

**Electrical Characteristics@T<sub>j</sub>=25°C(unless otherwise specified)**

| Symbol              | Parameter                                      | Test Conditions                                          | Min. | Typ. | Max. | Units |
|---------------------|------------------------------------------------|----------------------------------------------------------|------|------|------|-------|
| BV <sub>DSS</sub>   | Drain-Source Breakdown Voltage                 | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA               | 650  | -    | -    | V     |
| R <sub>DS(ON)</sub> | Static Drain-Source On-Resistance <sup>2</sup> | V <sub>GS</sub> =10V, I <sub>D</sub> =2A                 | -    | -    | 2.5  | Ω     |
| V <sub>GS(th)</sub> | Gate Threshold Voltage                         | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA | 2    | -    | 4    | V     |
| g <sub>fs</sub>     | Forward Transconductance                       | V <sub>DS</sub> =20V, I <sub>D</sub> =2A                 | -    | 6    | -    | S     |
| I <sub>DSS</sub>    | Drain-Source Leakage Current                   | V <sub>DS</sub> =520V, V <sub>GS</sub> =0V               | -    | -    | 100  | uA    |
| I <sub>GSS</sub>    | Gate-Source Leakage                            | V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V               | -    | -    | ±1   | uA    |
| Q <sub>g</sub>      | Total Gate Charge                              | I <sub>D</sub> =2A                                       | -    | 15   | 24   | nC    |
| Q <sub>gs</sub>     | Gate-Source Charge                             | V <sub>DS</sub> =520V                                    | -    | 3    | -    | nC    |
| Q <sub>gd</sub>     | Gate-Drain ("Miller") Charge                   | V <sub>GS</sub> =10V                                     | -    | 6    | -    | nC    |
| t <sub>d(on)</sub>  | Turn-on Delay Time                             | V <sub>DD</sub> =300V                                    | -    | 13   | -    | ns    |
| t <sub>r</sub>      | Rise Time                                      | I <sub>D</sub> =2A                                       | -    | 15   | -    | ns    |
| t <sub>d(off)</sub> | Turn-off Delay Time                            | R <sub>G</sub> =50Ω                                      | -    | 75   | -    | ns    |
| t <sub>f</sub>      | Fall Time                                      | V <sub>GS</sub> =10V                                     | -    | 25   | -    | ns    |
| C <sub>iss</sub>    | Input Capacitance                              | V <sub>GS</sub> =0V                                      | -    | 560  | 896  | pF    |
| C <sub>oss</sub>    | Output Capacitance                             | V <sub>DS</sub> =100V                                    | -    | 28   | -    | pF    |
| C <sub>rss</sub>    | Reverse Transfer Capacitance                   | f=1.0MHz                                                 | -    | 10   | -    | pF    |
| R <sub>g</sub>      | Gate Resistance                                | f=1.0MHz                                                 | -    | 2    | 4    | Ω     |

**Source-Drain Diode**

| Symbol          | Parameter                       | Test Conditions                         | Min. | Typ. | Max. | Units |
|-----------------|---------------------------------|-----------------------------------------|------|------|------|-------|
| V <sub>SD</sub> | Forward On Voltage <sup>2</sup> | I <sub>S</sub> =2A, V <sub>GS</sub> =0V | -    | -    | 1.5  | V     |
| t <sub>rr</sub> | Reverse Recovery Time           | I <sub>S</sub> =2A, V <sub>GS</sub> =0V | -    | 280  | -    | ns    |
| Q <sub>rr</sub> | Reverse Recovery Charge         | di/dt=100A/μs                           | -    | 950  | -    | nC    |

**Notes:**

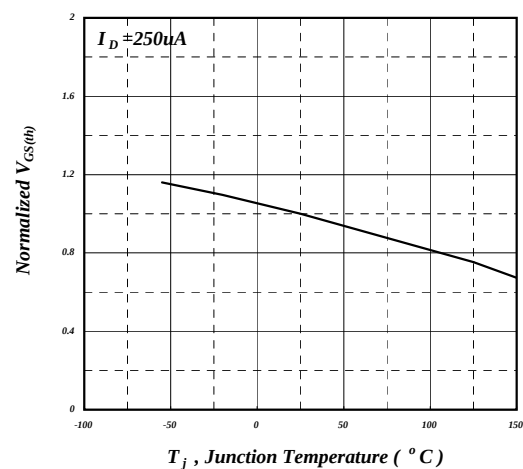
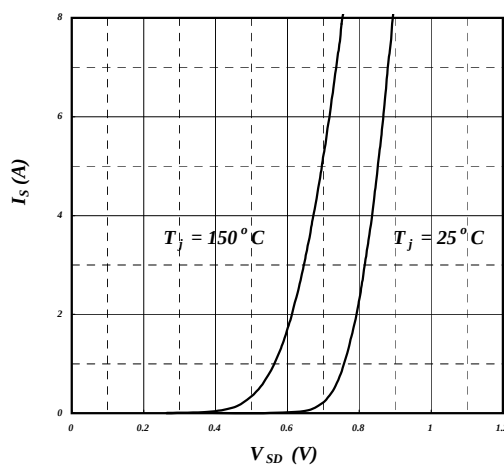
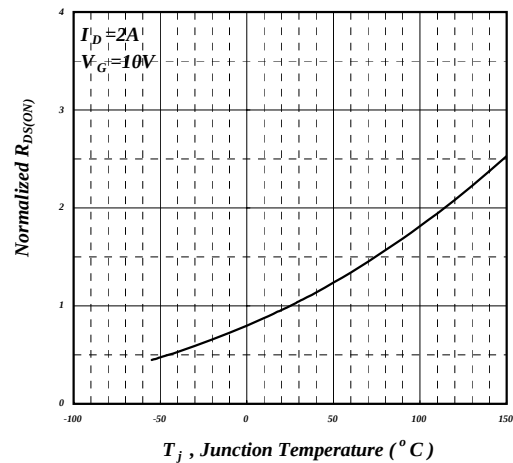
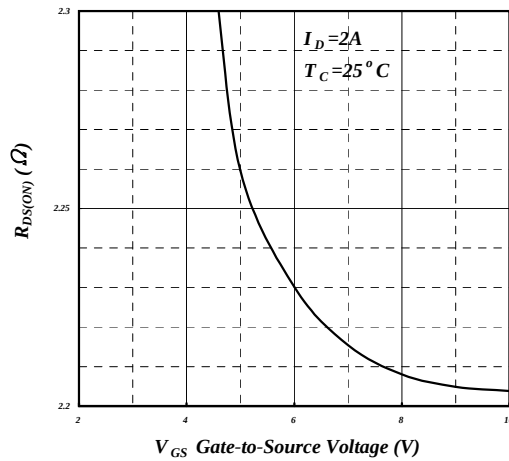
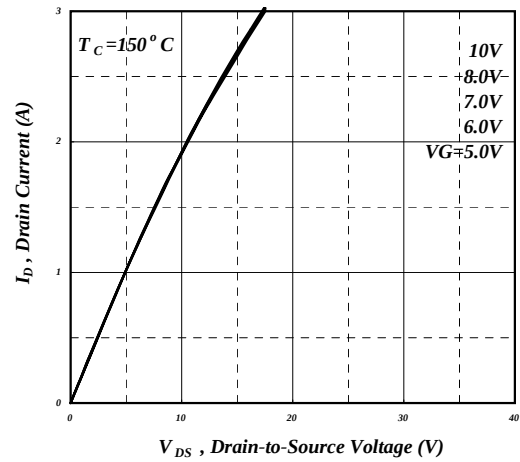
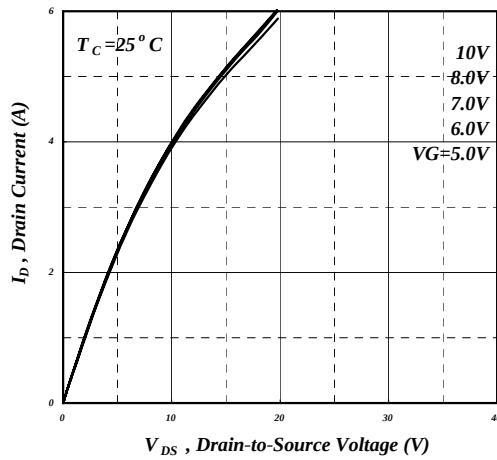
- 1.Pulse width limited by max. junction temperature.
- 2.Pulse test
- 3.Ensure that the junction temperature does not exceed T<sub>Jmax</sub>.
- 4.Starting T<sub>j</sub>=25°C , V<sub>DD</sub>=90V , L=1mH , R<sub>G</sub>=25Ω , V<sub>GS</sub>=10V
- 5.Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board

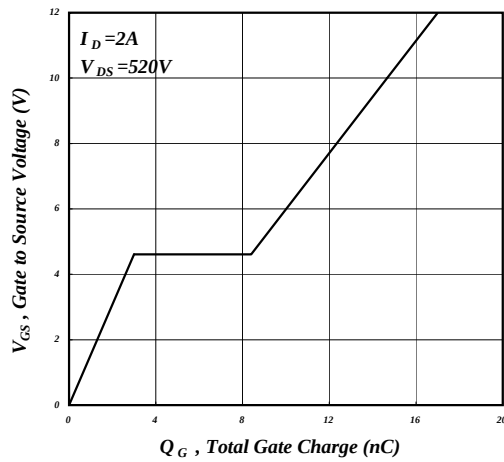
THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

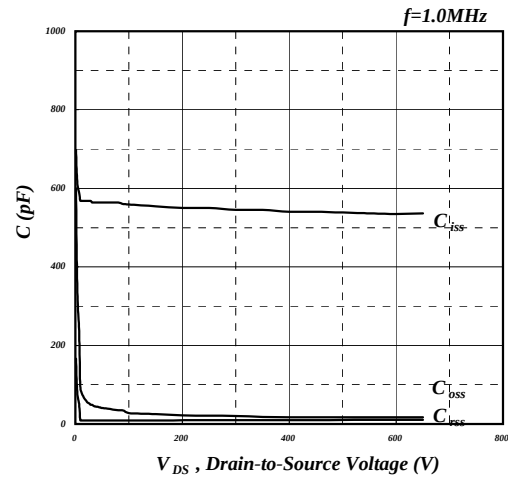
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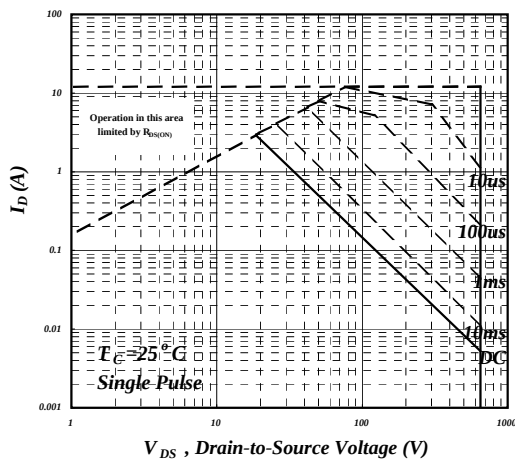




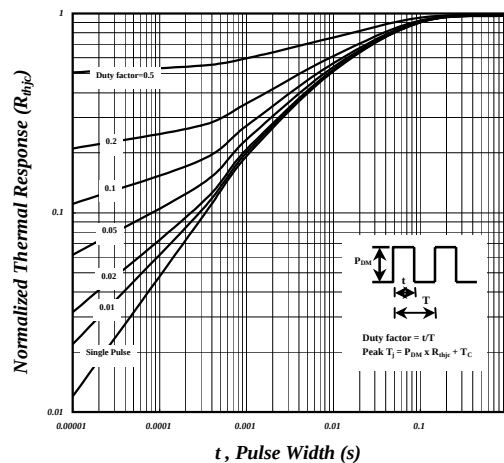
**Fig 7. Gate Charge Characteristics**



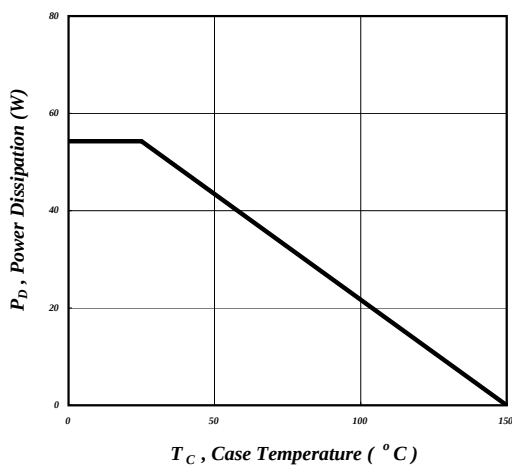
**Fig 8. Typical Capacitance Characteristics**



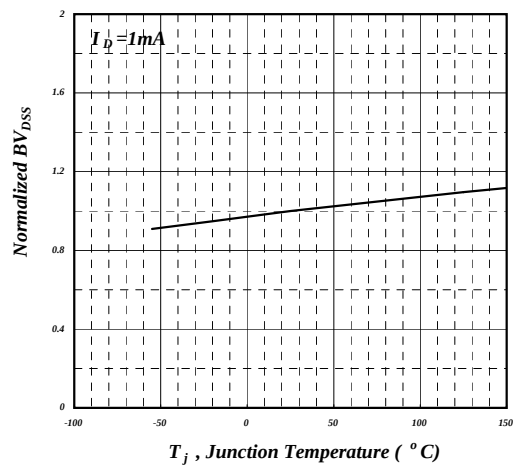
**Fig 9. Maximum Safe Operating Area**



**Fig10. Effective Transient Thermal Impedance**

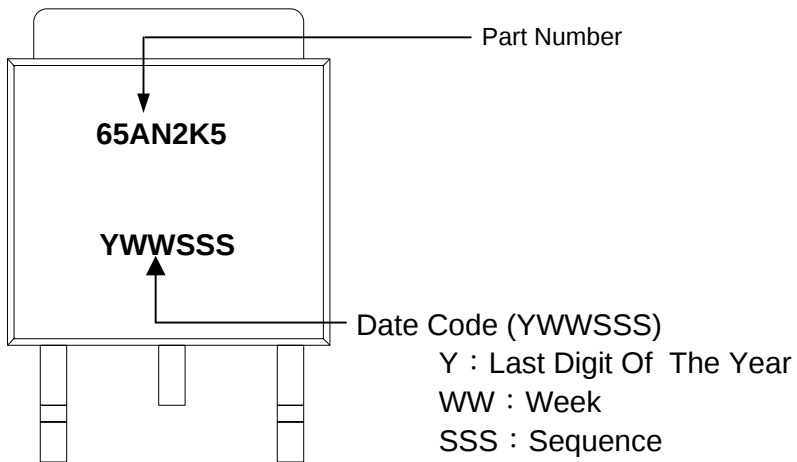


**Fig 11. Total Power Dissipation**



**Fig 12. Normalized  $BV_{DS}$  v.s. Junction Temperature**

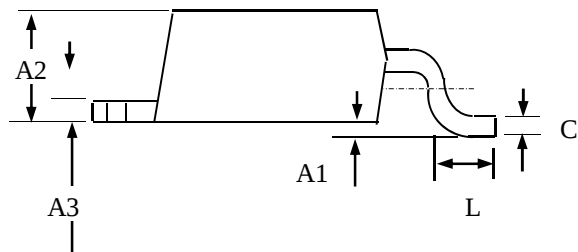
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**MARKING INFORMATION**

## Package Outline : TO-252



| SYMBOLS | Millimeters |       |      |
|---------|-------------|-------|------|
|         | MIN         | NOM   | MAX  |
| A2      | 2.18        | 2.30  | 2.40 |
| A3      | 0.40        | 0.50  | 0.65 |
| B       | 0.40        | 0.70  | 1.00 |
| B1      | 0.50        | 0.85  | 1.20 |
| D       | 6.00        | 6.50  | 6.80 |
| D1      | 4.80        | 5.35  | 5.90 |
| E3      | 4.00 (ref.) |       |      |
| F       | 2.00        | 2.63  | 3.05 |
| F1      | 0.50        | 0.85  | 1.20 |
| E1      | 5.00        | 5.70  | 6.30 |
| E2      | 0.50        | 1.10  | 1.80 |
| e       | 2.3 (ref)   |       |      |
| C       | 0.35        | 0.525 | 0.70 |
| A1      | 0.00        | —     | 0.25 |
| B2      | —           | —     | 1.25 |
| L       | 0.90        | 1.34  | 1.78 |



- 1.All Dimensions Are in Millimeters.
- 2.Dimension Does Not Include Mold Protrusions.
3. Thermal PAD, Body and Pin contour is for reference, it may has little difference by option.

**TO-252 FOOTPRINT :**

