

**ZVP1320F**
**200V P-CHANNEL ENHANCEMENT MODE VERTICAL DMOS FET IN SOT23**
**Features and Benefits**

- $V_{(BR)DSS} > -200V$
- $R_{DS(on)} \leq 80\Omega @ V_{GS} = -10V$
- Maximum continuous drain current  $I_D = -35mA$
- "Lead Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free. "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

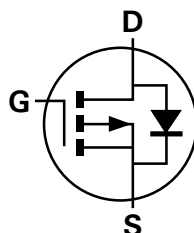
**Mechanical Data**

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.001 grams (approximate)

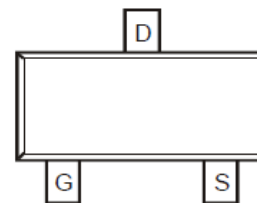
SOT23



Top View



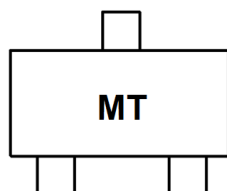
Device symbol


 Pin-Out  
 Top View

**Ordering Information** (Note 3)

| Part Number | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|---------|--------------------|-----------------|-------------------|
| ZVP1320FTA  | MT      | 7                  | 8               | 3000              |

- Notes:
1. No purposefully added lead
  2. Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>.
  3. For packaging details, go to our website at <http://www.diodes.com>.

**Marking Information**


MT = Product Type Marking Code

## Maximum Ratings @T<sub>A</sub> = 25°C unless otherwise specified

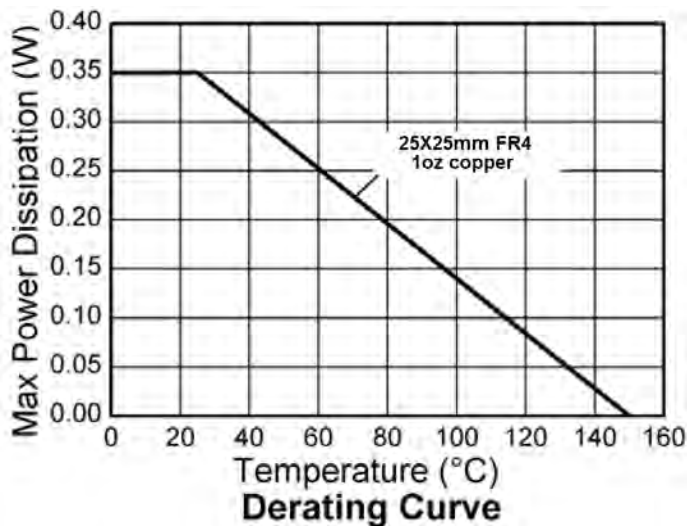
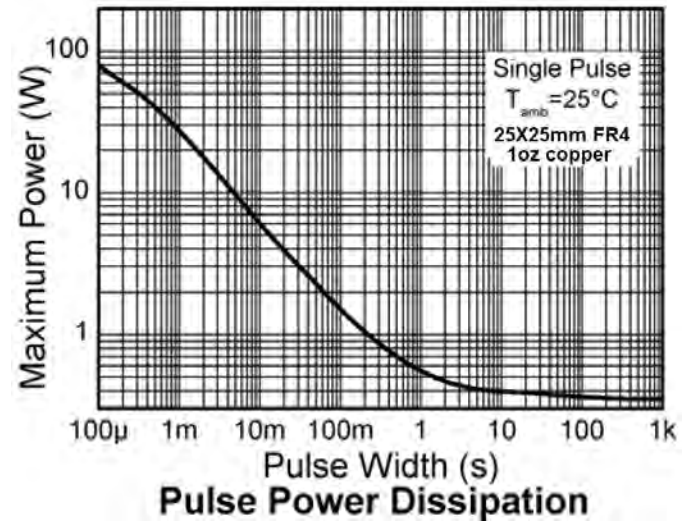
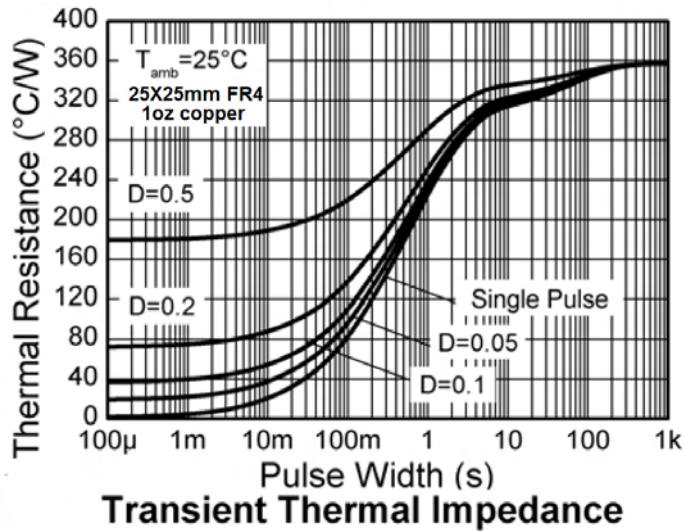
| Characteristic                | Symbol           | Value | Unit |
|-------------------------------|------------------|-------|------|
| Drain-Source Voltage          | V <sub>DSS</sub> | -200  | V    |
| Gate-Source Voltage           | V <sub>GSS</sub> | ±20   | V    |
| Continuous Drain Current      | I <sub>D</sub>   | -35   | mA   |
| Pulsed Drain Current (Note 5) | I <sub>DM</sub>  | -400  | mA   |

## Thermal Characteristics @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                                   | Symbol                            | Value       | Unit |
|--------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation (Note 4)                       | P <sub>D</sub>                    | 350         | mW   |
| Thermal Resistance, Junction to Ambient (Note 4) | R <sub>θJA</sub>                  | 357         | °C/W |
| Operating and Storage Temperature Range          | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

- Notes:
4. For a device mounted on 25mm X 25mm X 1.6mm FR-4 PCV with high coverage of single sided 1oz copper, in still air condition.
  5. Device mounted on minimum recommended pad layout test board, 10μs pulse duty cycle = 1%.

## Thermal Characteristics

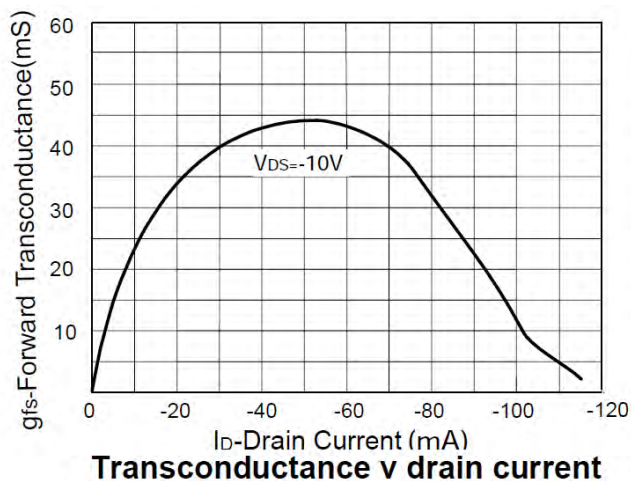
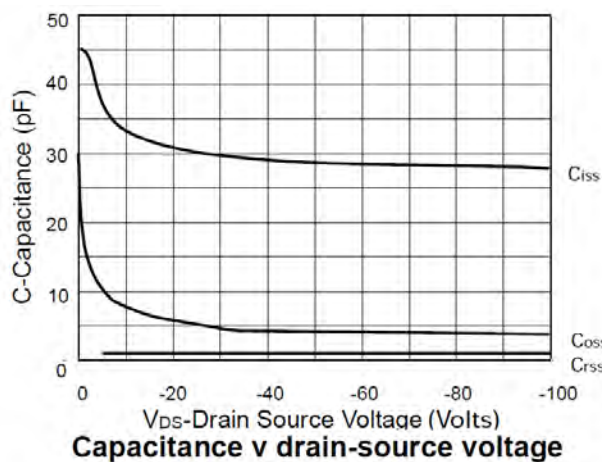
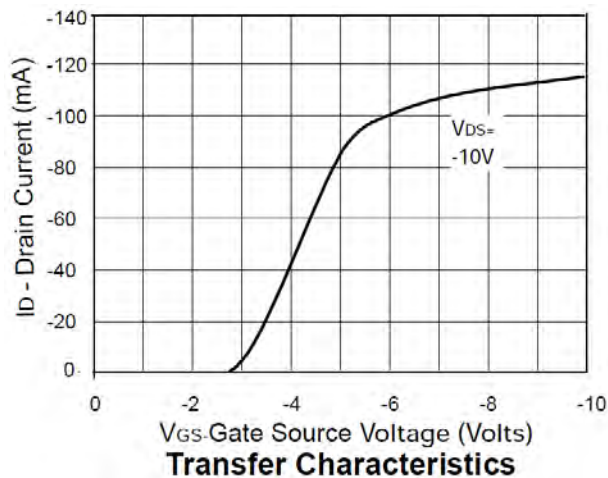
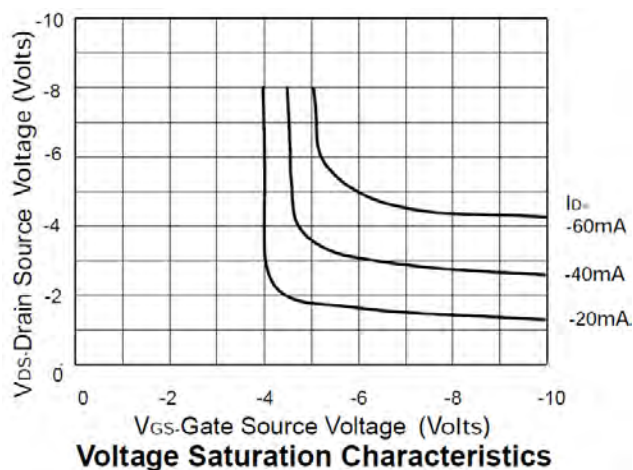
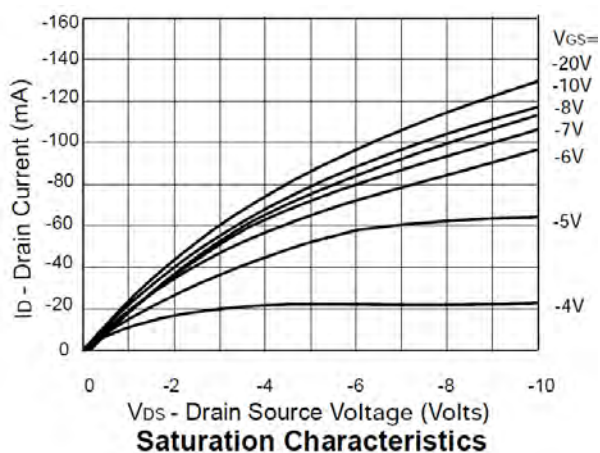
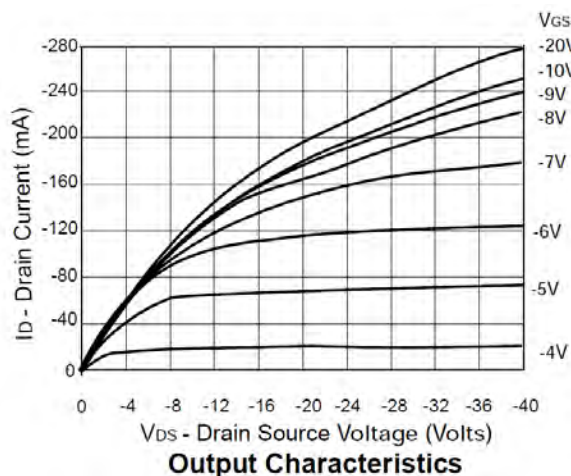


# Electrical Characteristics @T<sub>A</sub> = 25°C unless otherwise specified

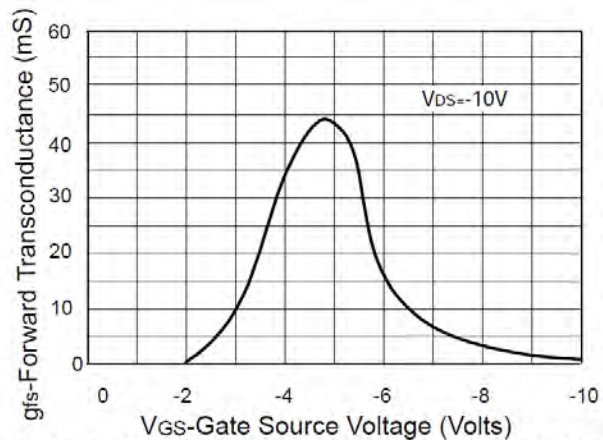
| Characteristic                                        | Symbol              | Min  | Typ | Max       | Unit | Test Condition                                                                                                         |
|-------------------------------------------------------|---------------------|------|-----|-----------|------|------------------------------------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS (Note 6)</b>                   |                     |      |     |           |      |                                                                                                                        |
| Drain-Source Breakdown Voltage                        | BV <sub>DSS</sub>   | -200 | -   | -         | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = -1mA                                                                            |
| Zero Gate Voltage Drain Current T <sub>J</sub> = 25°C | I <sub>DSS</sub>    | -    | -   | -1<br>-20 | μA   | V <sub>DS</sub> = -200V, V <sub>GS</sub> = 0V<br>V <sub>DS</sub> = -160V, V <sub>GS</sub> = 0V, T <sub>A</sub> = 125°C |
| Gate-Source Leakage                                   | I <sub>GSS</sub>    | -    | -   | ±20       | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                                                           |
| On-State Drain Current                                | I <sub>D(on)</sub>  | -100 | -   | -         | mA   | V <sub>GS</sub> = -10V, V <sub>DS</sub> = -15V                                                                         |
| <b>ON CHARACTERISTICS (Note 6)</b>                    |                     |      |     |           |      |                                                                                                                        |
| Gate Threshold Voltage                                | V <sub>GS(th)</sub> | -1.5 | -   | -3.5      | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -1mA                                                              |
| Static Drain-Source On-Resistance                     | R <sub>DS(on)</sub> | -    | -   | 80        | Ω    | V <sub>GS</sub> = -10V, I <sub>D</sub> = -50mA                                                                         |
| Forward Transconductance                              | g <sub>fs</sub>     | 25   | -   | -         | mS   | V <sub>DS</sub> = -15V, I <sub>D</sub> = -50mA                                                                         |
| <b>DYNAMIC CHARACTERISTICS (Note 6)</b>               |                     |      |     |           |      |                                                                                                                        |
| Input Capacitance                                     | C <sub>iss</sub>    | -    | -   | 50        | pF   | V <sub>DS</sub> = -25V, V <sub>GS</sub> = 0V,<br>f = 1.0MHz                                                            |
| Output Capacitance                                    | C <sub>oss</sub>    | -    | -   | 15        | pF   |                                                                                                                        |
| Reverse Transfer Capacitance                          | C <sub>rss</sub>    | -    | -   | 5         | pF   |                                                                                                                        |
| Turn-On Delay Time                                    | t <sub>D(on)</sub>  | -    | -   | 8         | ns   | V <sub>DS</sub> = -25V, I <sub>D</sub> = -50mA                                                                         |
| Turn-On Rise Time                                     | t <sub>r</sub>      | -    | -   | 8         | ns   |                                                                                                                        |
| Turn-Off Delay Time                                   | t <sub>D(off)</sub> | -    | -   | 8         | ns   |                                                                                                                        |
| Turn-Off Fall Time                                    | t <sub>f</sub>      | -    | -   | 16        | ns   |                                                                                                                        |

Notes: 6. Short duration pulse test used to minimize self-heating effect.

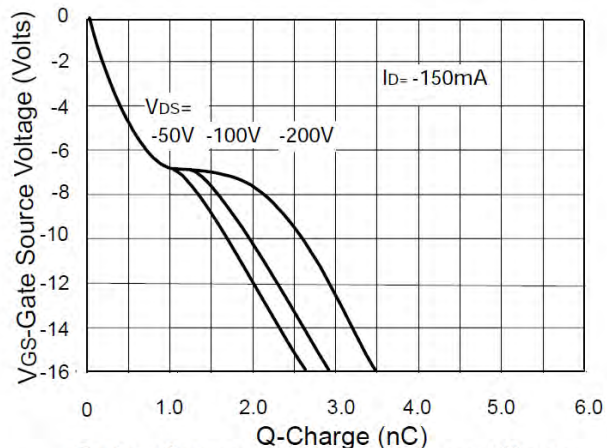
## Electrical Characteristics



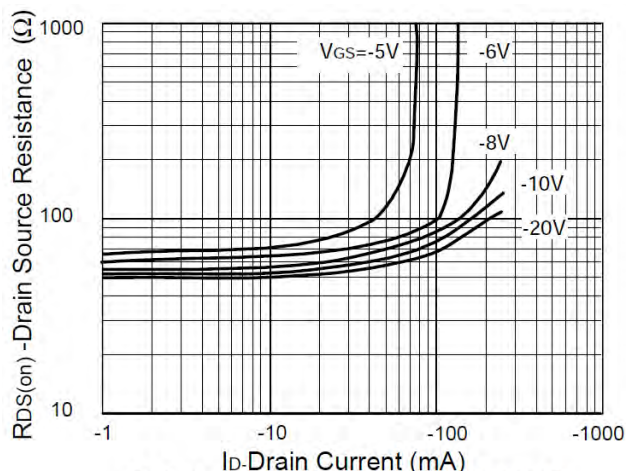
## Electrical Characteristics (cont.)



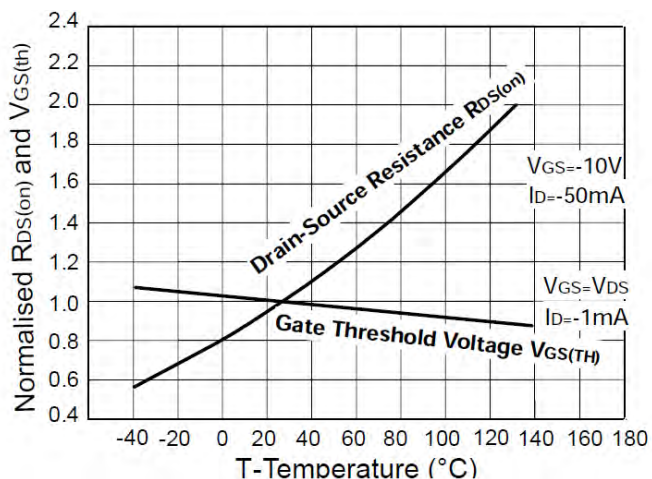
**Transconductance v gate-source voltage**



**Gate charge v gate-source voltage**



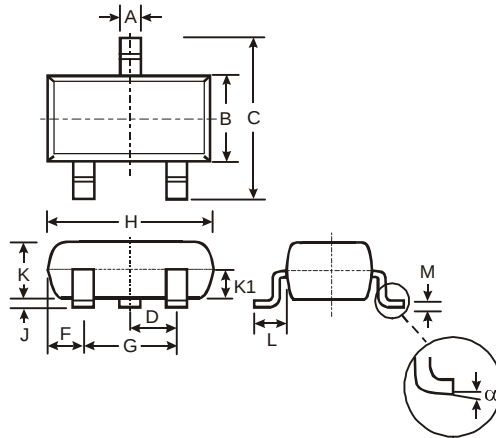
**On-resistance v drain current**



**Normalised  $R_{DS(on)}$  and  $V_{GS(th)}$  vs Temperature**

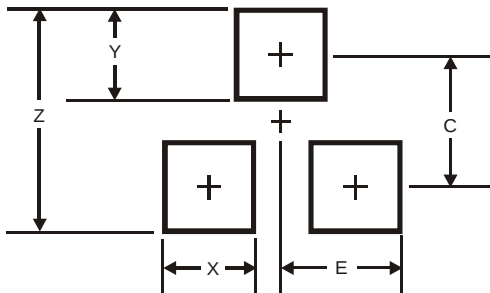
**ZVP1320F**

## Package Outline Dimensions



| SOT23                |       |      |       |
|----------------------|-------|------|-------|
| Dim                  | Min   | Max  | Typ   |
| A                    | 0.37  | 0.51 | 0.40  |
| B                    | 1.20  | 1.40 | 1.30  |
| C                    | 2.30  | 2.50 | 2.40  |
| D                    | 0.89  | 1.03 | 0.915 |
| F                    | 0.45  | 0.60 | 0.535 |
| G                    | 1.78  | 2.05 | 1.83  |
| H                    | 2.80  | 3.00 | 2.90  |
| J                    | 0.013 | 0.10 | 0.05  |
| K                    | 0.903 | 1.10 | 1.00  |
| K1                   | -     | -    | 0.400 |
| L                    | 0.45  | 0.61 | 0.55  |
| M                    | 0.085 | 0.18 | 0.11  |
| α                    | 0°    | 8°   | -     |
| All Dimensions in mm |       |      |       |

## Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 2.9           |
| X          | 0.8           |
| Y          | 0.9           |
| C          | 2.0           |
| E          | 1.35          |

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