Product Standards
PGA26E34HA

<table>
<thead>
<tr>
<th>Type</th>
<th>GaN-Tr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>For power switching</td>
</tr>
<tr>
<td>Structure</td>
<td>N-channel enhancement mode FET</td>
</tr>
<tr>
<td>Equivalent Circuit</td>
<td>Figure 1</td>
</tr>
<tr>
<td>Outline</td>
<td>DFN 4X6</td>
</tr>
</tbody>
</table>

### A. ABSOLUTE MAXIMUM RATINGS (Tj = 25°C, unless otherwise specified)

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Symbol</th>
<th>Values</th>
<th>Unit</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Drain-source voltage (DC) *1</td>
<td>VDSS</td>
<td>-</td>
<td>-</td>
<td>650 V</td>
</tr>
<tr>
<td>2</td>
<td>Drain-source voltage (pulse) *2</td>
<td>VDSP</td>
<td>-</td>
<td>-</td>
<td>750 V</td>
</tr>
<tr>
<td>3</td>
<td>Gate-source voltage (DC) *1</td>
<td>VGSS</td>
<td>-10</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*VGSS+ is given by IG ratings</td>
</tr>
<tr>
<td>4</td>
<td>Gate current (DC) *1</td>
<td>IG</td>
<td>-</td>
<td>-</td>
<td>9.5 mA</td>
</tr>
<tr>
<td>5</td>
<td>Gate current (pulse) *3,4</td>
<td>IGP</td>
<td>-</td>
<td>-</td>
<td>0.3 A</td>
</tr>
<tr>
<td>6</td>
<td>Electric gate charge (pulse)</td>
<td>QGP</td>
<td>-</td>
<td>-</td>
<td>6.0 nC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*f=200kHz</td>
</tr>
<tr>
<td>7</td>
<td>Drain current (DC) (Tc = 25°C) *1</td>
<td>ID</td>
<td>-</td>
<td>-</td>
<td>9.4 A</td>
</tr>
<tr>
<td>8</td>
<td>Drain reverse current (DC) (Tc = 25°C) *1</td>
<td>IDR</td>
<td>-</td>
<td>-</td>
<td>9.4 A</td>
</tr>
<tr>
<td>9</td>
<td>Drain current (pulse) *5 (Tc = 25°C) *1</td>
<td>ID pulse</td>
<td>-</td>
<td>-</td>
<td>12 A</td>
</tr>
<tr>
<td>10</td>
<td>Drain reverse current (pulse) *5 (Tc = 25°C) *1</td>
<td>IDR pulse</td>
<td>-</td>
<td>-</td>
<td>12 A</td>
</tr>
<tr>
<td>11</td>
<td>Power dissipation (Tc = 25°C)</td>
<td>PD</td>
<td>-</td>
<td>-</td>
<td>62 W</td>
</tr>
<tr>
<td>12</td>
<td>Junction temperature</td>
<td>Tj</td>
<td>-55</td>
<td>-</td>
<td>150 °C</td>
</tr>
<tr>
<td>13</td>
<td>Storage temperature</td>
<td>Tstg</td>
<td>-</td>
<td>-</td>
<td>150 °C</td>
</tr>
<tr>
<td>14</td>
<td>Drain-source voltage slope</td>
<td>dv/dt</td>
<td>-</td>
<td>-</td>
<td>200 V/ns</td>
</tr>
</tbody>
</table>

[Special instructions]

*1: Please use this product to meet a condition of Tj within 150 °C.
*2: Spike duty cycle D < 0.1, spike duration < 1us, total spike time < 1hour.
*3: IGP is defined as (Vcc - Vplateau) / Rgon, as shown in Figure A.
*4: Please use this product to meet both a maximum gate current and a maximum gate pulse charge of IGP(0.3A) and Q(6nC) respectively, as shown in Figure H.
*5: Please use this product to meet a condition of Tj within 150 °C.
### B. ELECTRICAL CHARACTERISTICS  \( (T_j = 25 ^\circ C, \text{unless otherwise specified}) \)

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Symbol</th>
<th>Measurement Condition</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Drain cut-off current</td>
<td>IDSS</td>
<td>VDS=650 V, VGS=0 V, Tj=25 ^\circ C</td>
<td>-</td>
<td>-</td>
<td>40</td>
<td>μA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>VDS=650 V, VGS=0 V, Tj=150 ^\circ C</td>
<td>-</td>
<td>40</td>
<td>-</td>
<td>μA</td>
</tr>
<tr>
<td>2</td>
<td>Gate-source leakage current</td>
<td>IGSS</td>
<td>VGS=-3 V</td>
<td>-1</td>
<td>-</td>
<td>-</td>
<td>μA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>VDS=0 V</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>μA</td>
</tr>
<tr>
<td>3</td>
<td>Gate forward voltage</td>
<td>VGSF</td>
<td>IGS=5 mA open drain</td>
<td>2.8</td>
<td>3.5</td>
<td>4.2</td>
<td>V</td>
</tr>
<tr>
<td>4</td>
<td>Gate threshold voltage</td>
<td>VTH</td>
<td>VDS=10 V</td>
<td>0.9</td>
<td>1.2</td>
<td>1.6</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IDS=0.5 mA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Drain-source on-state resistance</td>
<td>RDS(on)</td>
<td>IGS=5 mA, IDS=2.5 A, Tj=25 ^\circ C</td>
<td>-</td>
<td>270</td>
<td>340</td>
<td>mΩ</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IGS=5 mA, IDS=2.5 A, Tj=150 ^\circ C</td>
<td>-</td>
<td>560</td>
<td>-</td>
<td>mΩ</td>
</tr>
<tr>
<td>6</td>
<td>Gate resistance</td>
<td>RG</td>
<td>f=100MHz open drain</td>
<td>-</td>
<td>1.0</td>
<td>-</td>
<td>Ω</td>
</tr>
<tr>
<td>7</td>
<td>Transfer conductance</td>
<td>gfs</td>
<td>VDS=8 V</td>
<td>-</td>
<td>6.7</td>
<td>-</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IDS=2.5A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Input capacitance</td>
<td>Ciss</td>
<td>VDS=400 V</td>
<td>-</td>
<td>80</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>9</td>
<td>Output capacitance</td>
<td>Coss</td>
<td>VGS=0 V</td>
<td>-</td>
<td>14</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>f=1 MHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Reverse transfer capacitance</td>
<td>Crss</td>
<td>-</td>
<td>-</td>
<td>0.1</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>11</td>
<td>Turn-on delay time</td>
<td>td(on)</td>
<td>VDD=400 V</td>
<td>-</td>
<td>3.0</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IDS=2.5 A (Figure A, Figure B)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Rise time</td>
<td>tr</td>
<td>VCC=12 V</td>
<td>-</td>
<td>4.1</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rgon=30 Ω, Rgoff=4.7Ω, Rig=3000 Ω, Cs=330 pF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Turn-off delay time</td>
<td>td(off)</td>
<td>VDD=400 V</td>
<td>-</td>
<td>5.5</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>14</td>
<td>Fall time</td>
<td>tf</td>
<td>VDD=400 V</td>
<td>-</td>
<td>6.1</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>15</td>
<td>Effective output capacitance (energy related)</td>
<td>Co(er)</td>
<td>VDS=0-480 V</td>
<td>-</td>
<td>16</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>16</td>
<td>Effective output capacitance (time related)</td>
<td>Co(tr)</td>
<td>VDS=0-480 V</td>
<td>-</td>
<td>20</td>
<td>-</td>
<td>pF</td>
</tr>
</tbody>
</table>
### C. GATE CHARGE CHARACTERISTICS ( \( T_j = 25 \degree C \), unless otherwise specified )

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Symbol</th>
<th>Measurement Condition</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gate charge</td>
<td>Qg</td>
<td>VDD=400 V, IDS=2.5 A</td>
<td>-</td>
<td>1.0</td>
<td>-</td>
<td>nC</td>
</tr>
<tr>
<td>2</td>
<td>Gate-source charge</td>
<td>Qgs</td>
<td>(Figure C, Figure D)</td>
<td>-</td>
<td>0.2</td>
<td>-</td>
<td>nC</td>
</tr>
<tr>
<td>3</td>
<td>Gate-drain charge</td>
<td>Qgd</td>
<td>VDD=400 V, IDS=2.5 A</td>
<td>-</td>
<td>0.5</td>
<td>-</td>
<td>nC</td>
</tr>
<tr>
<td>4</td>
<td>Gate plateau voltage</td>
<td>Vp</td>
<td>VDD=400 V, IDS=2.5 A</td>
<td>-</td>
<td>1.9</td>
<td>-</td>
<td>V</td>
</tr>
</tbody>
</table>

### D. REVERSE CONDUCTING CHARACTERISTICS ( \( T_j = 25 \degree C \), unless otherwise specified )

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Symbol</th>
<th>Measurement Condition</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Source-drain forward voltage</td>
<td>VSD</td>
<td>VGS=0 V, ISD=2.5 A</td>
<td>-</td>
<td>2.6</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>2</td>
<td>Reverse recovery charge</td>
<td>Qrr</td>
<td>VDD=400 V, ISD=2.5 A</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>nC</td>
</tr>
<tr>
<td>3</td>
<td>Reverse recovery time</td>
<td>trr</td>
<td>VDD=400 V, ISD=2.5 A</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>4</td>
<td>Peak reverse recovery current</td>
<td>Irm</td>
<td>VDD=400 V, ISD=2.5 A</td>
<td>-</td>
<td>0</td>
<td>-</td>
<td>A</td>
</tr>
<tr>
<td>5</td>
<td>Output charge</td>
<td>Qoss</td>
<td>VDD=400 V, ISD=2.5 A</td>
<td>-</td>
<td>8.5</td>
<td>-</td>
<td>nC</td>
</tr>
</tbody>
</table>

### E. THERMAL RESISTANCE CHARACTERISTICS

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Symbol</th>
<th>Measurement Condition</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Thermal resistance (junction to case)</td>
<td>Rth(j-c)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2.0</td>
<td>°C/W</td>
</tr>
<tr>
<td>2</td>
<td>Thermal resistance (junction to ambient) *1</td>
<td>Rth(j-a)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>55</td>
<td>°C/W</td>
</tr>
<tr>
<td>3</td>
<td>Reflow soldering temperature</td>
<td>Tsold</td>
<td>reflow MSL2</td>
<td>-</td>
<td>-</td>
<td>260</td>
<td>°C</td>
</tr>
</tbody>
</table>

[Notes]
*1 : Device mounted on four layers epoxy PCB (6.45 cm² copper area and 70 µm thickness).

Established: 2019-01-15
Revised: 2019-02-07
 PGA26E34HA

Equivalent circuit / Electrical characteristics

1,2,3,4 : Drain
5,6,9 : Source
7 : Kelvin Source
8 : Gate

Notice:
Please connect SK pin to gate driver.

[Figure 1: Pin layout / Equivalent circuit]

[Figure 2: Max. power dissipation]

[Figure 3: Transient thermal impedance]

[Figure 4: Safe operating area Tc = 25 °C]

[Figure 5: Safe operating area Tc = 125 °C]
Maintenance/Discontinued includes following four Product lifecycle stage.
(planed maintenance type, maintenance type, planed discontinued typed, discontinued type)
Maintenance/Discontinued includes the following four product lifecycle stages:

- Planned maintenance type
- Maintenance type
- Planned discontinued type
- Discontinued type
Maintenance/Discontinued includes the following four product lifecycle stages:

- Planned maintenance type
- Maintenance type
- Planned discontinued type
- Discontinued type

**Figure 18: Output capacitance stored energy**

**Figure 19: Output charge**

**Figure 20: Threshold voltage (VTH-Tj)**

**Figure 21: Drain-source on-state resistance (RDS(on)-Tj)**

**Figure 22: Drain-source leakage current (Tc=25°C)**
Maintenance/Discontinued includes following four Product lifecycle stage.

- Planned maintenance type
- Maintenance type
- Planned discontinued type
- Discontinued type

Figure A: Switching time measurement

Figure B: Switching waveform

Figure C: Gate charge measurement

Figure D: Gate charge waveform

Figure E: Reverse bias safe operating area (dv/dt measurement circuit)

Figure F: Reverse bias safe operating area (dv/dt wave form)

Figure G: di/dt measurement circuit

Figure H: IGP wave form
[Precautions for Use]

1) The product has risks for break-down or burst or giving off smoke in following conditions. Avoid the following use. Fuse should be added at the input side or connect zener diode between Gate pin and GND, etc as a countermeasure to pass regulatory Safety Standard. Concrete countermeasure could be provided individually. However, customer should make the final judgment.

   (1) Reverse the Drain pin and gate pin connection to the power supply board.
   (2) Drain pin short to Source pin and Kelvin Source pin.
   (3) Drain pin short to Gate pin.
   (4) Gate pin open.
Maintenance/Discontinued

Maintenance/Discontinued includes following four Product lifecycle stage:
- Planned maintenance type
- Maintenance type
- Planned discontinued type
- Discontinued type

Unit: mm

Established: 2019-01-15
Revised: 2019-02-07
Request for your special attention and precautions in using the technical information and semiconductors described in this book

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(6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. We do not guarantee quality for disassembled products or the product re-mounted after removing from the mounting board. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.

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