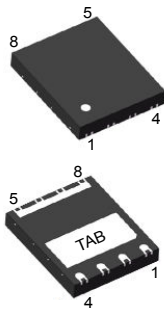
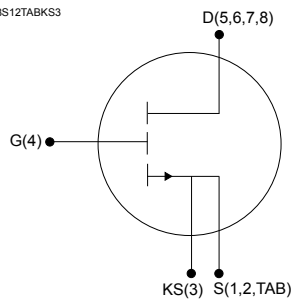


## 700 V, 97 mΩ typ., 16 A, e-mode PowerGaN transistor



**PowerFLAT 5x6 HV  
for PowerGaN**

G4D5678S12TABKS3



### Features

| Order code   | $V_{DS}$ | $R_{DS(on)}$ max. | $I_D$ | Series |
|--------------|----------|-------------------|-------|--------|
| SGT130R70FDC | 700 V    | 130 mΩ            | 16 A  | G-HEMT |

- Enhancement mode normally off transistor
- Very high switching speed
- High power management capability
- Extremely low capacitances
- Zero reverse recovery charge
- ESD safeguard

### Applications

- AC-DC converters
- DC-DC converters
- USB type-C PD adapters and quick chargers
- Wireless charging

### Description

The SGT130R70FDC is a 700 V, 16 A e-mode PowerGaN transistor. The resulting device provides extremely low conduction losses, high current capability and ultra-fast switching operation to enable high power density and unbeatable efficiency performances.

#### Product status link

[SGT130R70FDC](#)

#### Product summary

|            |                               |
|------------|-------------------------------|
| Order code | SGT130R70FDC                  |
| Marking    | 130R70F                       |
| Package    | PowerFLAT 5x6 HV for PowerGaN |
| Packing    | Tape and reel                 |

## 1 Electrical ratings

$T_C = 25\text{ °C}$  unless otherwise specified.

**Table 1. Absolute maximum ratings**

| Symbol    | Parameter                                                         | Value                  | Unit |
|-----------|-------------------------------------------------------------------|------------------------|------|
| $V_{DS}$  | Drain-source voltage                                              | 700 <sup>(1)</sup>     | V    |
|           | Drain-source voltage (transient, $t_p < 200\text{ }\mu\text{s}$ ) | 800                    |      |
| $V_{GS}$  | Gate-source voltage                                               | -6 to 7 <sup>(2)</sup> | V    |
| $I_D$     | Drain current (continuous)                                        | 16 <sup>(3)</sup>      | A    |
| $I_{DM}$  | Pulse drain current ( $t_p = 10\text{ }\mu\text{s}$ )             | 32                     | A    |
| $P_{TOT}$ | Total power dissipation at $T_C = 25\text{ °C}$                   | 86                     | W    |
| $T_{stg}$ | Storage temperature range                                         | -55 to 150             | °C   |
| $T_J$     | Operating junction temperature range                              |                        | °C   |

1. Recommended continuous maximum bus voltage during switching operations should not exceed 450 V.
2. Refer to AN6268: GaN transistors gate driving solutions.
3. Limited by design.

**Table 2. Thermal data**

| Symbol                    | Parameter                               | Value | Unit |
|---------------------------|-----------------------------------------|-------|------|
| $R_{thJC}$                | Thermal resistance, junction-to-case    | 1.46  | °C/W |
| $R_{thJA}$ <sup>(1)</sup> | Thermal resistance, junction-to-ambient | 69.81 | °C/W |

1. When mounted on a standard 1 inch<sup>2</sup> area of FR-4 PCB with 2-oz copper.

### Related links

[AN6268: GaN transistors gate driving solutions.](#)

## 2 Electrical characteristics

$T_C = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

**Table 3. Static**

| Symbol       | Parameter                         | Test conditions                                                                 | Min. | Typ. | Max. | Unit             |
|--------------|-----------------------------------|---------------------------------------------------------------------------------|------|------|------|------------------|
| $I_{DSS}$    | Drain-source leakage current      | $V_{GS} = 0\text{ V}, V_{DS} = 700\text{ V}$                                    | -    | 0.6  | 37.5 | $\mu\text{A}$    |
|              |                                   | $V_{GS} = 0\text{ V}, V_{DS} = 700\text{ V}, T_J = 125\text{ }^{\circ}\text{C}$ | -    | 6    | -    |                  |
| $I_{GSS}$    | Gate-source leakage current       | $V_{DS} = 0\text{ V}, V_{GS} = 6\text{ V}$                                      | -    | 40   | -    | $\mu\text{A}$    |
| $V_{GS(th)}$ | Gate threshold voltage            | $V_{DS} = V_{GS}, I_D = 14.3\text{ mA}$                                         | 1.1  | 1.7  | 2.5  | V                |
| $R_{DS(on)}$ | Static drain-source on-resistance | $V_{GS} = 6\text{ V}, I_D = 5\text{ A}$                                         | -    | 97   | 130  | $\text{m}\Omega$ |
|              |                                   | $V_{GS} = 6\text{ V}, I_D = 5\text{ A}, T_J = 125\text{ }^{\circ}\text{C}$      | -    | 188  | -    |                  |

**Table 4. Dynamic**

| Symbol            | Parameter                                    | Test conditions                                                            | Min. | Typ. | Max. | Unit     |
|-------------------|----------------------------------------------|----------------------------------------------------------------------------|------|------|------|----------|
| $C_{iss}$         | Input capacitance                            | $V_{GS} = 0\text{ V}, V_{DS} = 400\text{ V}, f = 100\text{ kHz}$           | -    | 98   | -    | pF       |
| $C_{oss}$         | Output capacitance                           |                                                                            | -    | 35.3 | -    | pF       |
| $C_{rss}$         | Reverse transfer capacitance                 |                                                                            | -    | 1.8  | -    | pF       |
| $C_{o(er)}^{(1)}$ | Equivalent output capacitance energy related | $V_{GS} = 0\text{ V}, V_{DS} = 0\text{ to }400\text{ V}$                   | -    | 51   | -    | pF       |
| $C_{o(tr)}^{(2)}$ | Equivalent output capacitance time related   |                                                                            | -    | 62   | -    | pF       |
| $R_g$             | Intrinsic gate resistance                    | $f = 5\text{ MHz}, I_D = 0\text{ A}$                                       | -    | 7    | -    | $\Omega$ |
| $V_{plat}$        | Gate plateau voltage                         | $V_{DS} = 400\text{ V}, I_D = 5\text{ A}$                                  | -    | 2.7  | -    | V        |
| $Q_g$             | Total gate charge                            | $V_{GS} = 0\text{ to }6\text{ V}, V_{DS} = 400\text{ V}, I_D = 5\text{ A}$ | -    | 2.2  | -    | nC       |
| $Q_{gs}$          | Gate-source charge                           |                                                                            | -    | 0.67 | -    | nC       |
| $Q_{gd}$          | Gate-drain charge                            |                                                                            | -    | 0.65 | -    | nC       |
| $Q_{rr}$          | Reverse recovery charge                      | $V_{GS} = 0\text{ V}, V_{DS} = 400\text{ V}$                               | -    | 0    | -    | nC       |
| $Q_{oss}$         | Output charge                                |                                                                            | -    | 27.3 | -    | nC       |

- $C_{o(er)}$  is a constant capacitance value that gives the same stored energy as  $C_{oss}$  while  $V_{DS}$  is rising from 0 to the stated value.
- $C_{o(tr)}$  is a constant capacitance value that gives the same charging time as  $C_{oss}$  while  $V_{DS}$  is rising from 0 to the stated value.

**Table 5. Reverse conduction**

| Symbol   | Parameter                    | Test conditions                            | Min. | Typ. | Max. | Unit |
|----------|------------------------------|--------------------------------------------|------|------|------|------|
| $V_{SD}$ | Source-drain reverse voltage | $V_{GS} = 0\text{ V}, I_{SD} = 5\text{ A}$ | -    | 2.5  | -    | V    |

**Table 6. Switching times**

| Symbol       | Parameter           | Test conditions                                                                                                                                                          | Min. | Typ. | Max. | Unit |
|--------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|
| $t_{d(on)}$  | Turn-on delay time  | $V_{DS} = 400\text{ V}$ , $I_D = 5\text{ A}$ , $V_{GS} = 6\text{ V}$ ,<br>$R_{G(on)} = 10\text{ }\Omega$ , $R_{G(off)} = 2\text{ }\Omega$ , $L = 170\text{ }\mu\text{H}$ | -    | 5.13 | -    | ns   |
| $t_r$        | Rise time           |                                                                                                                                                                          | -    | 4.79 | -    | ns   |
| $t_{d(off)}$ | Turn-off delay time |                                                                                                                                                                          | -    | 3.85 | -    | ns   |
| $t_f$        | Fall time           |                                                                                                                                                                          | -    | 5.10 | -    | ns   |

## 2.1 Electrical characteristics (curves)

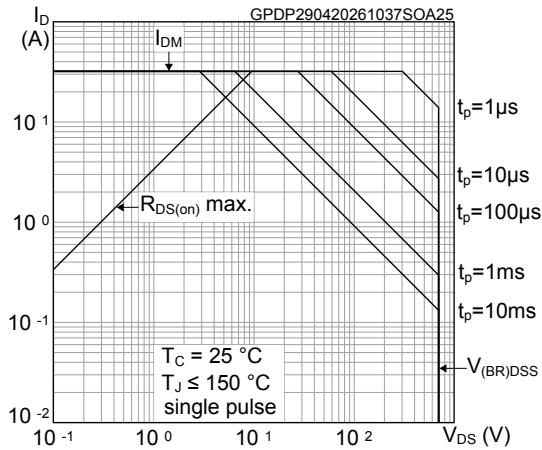
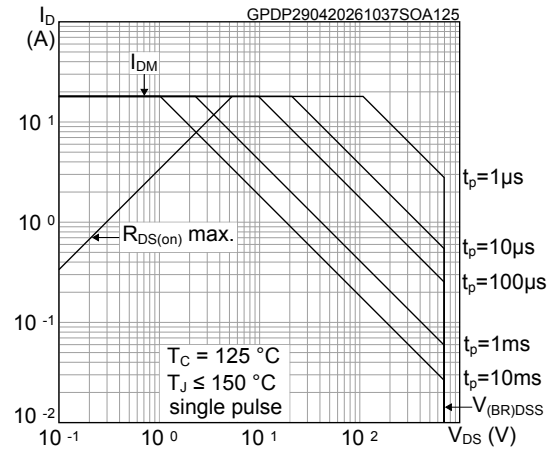
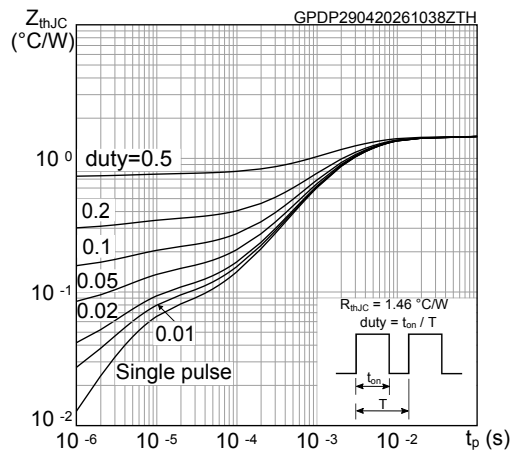
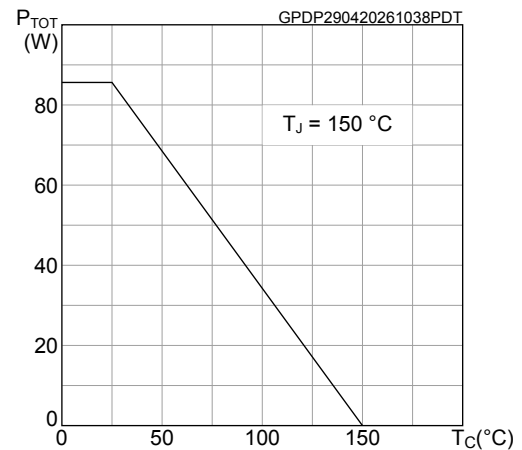
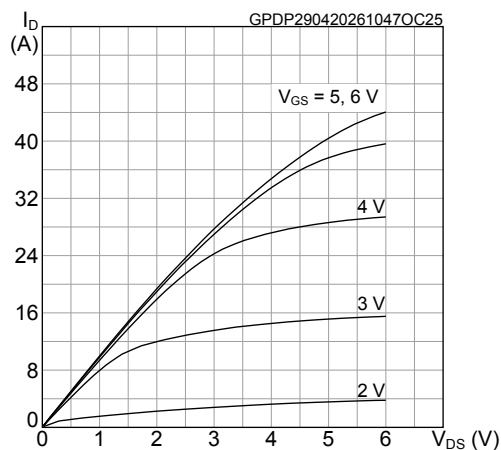
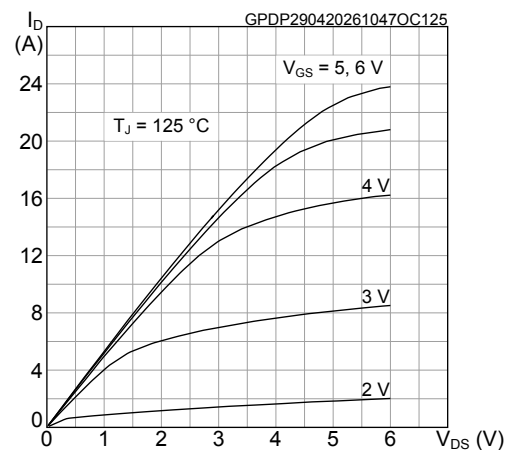
**Figure 1. Safe operating area ( $T_C = 25\text{ }^{\circ}\text{C}$ )**

**Figure 2. Safe operating area ( $T_C = 125\text{ }^{\circ}\text{C}$ )**

**Figure 3. Maximum transient thermal impedance**

**Figure 4. Total power dissipation**

**Figure 5. Typical output characteristics ( $T_J = 25\text{ }^{\circ}\text{C}$ )**

**Figure 6. Typical output characteristics ( $T_J = 125\text{ }^{\circ}\text{C}$ )**


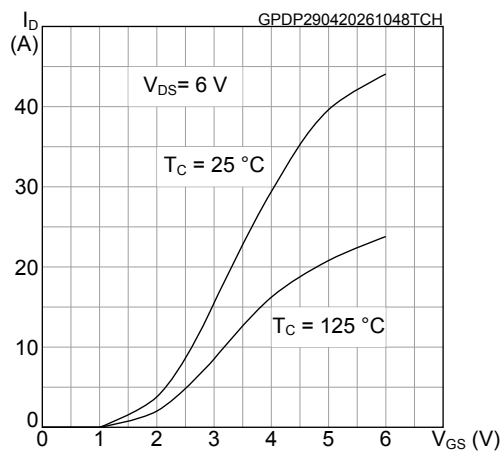
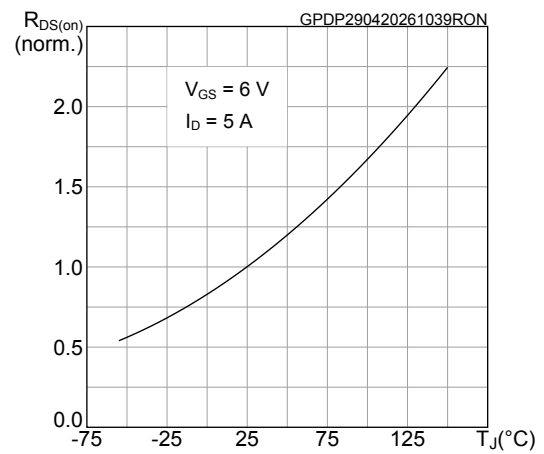
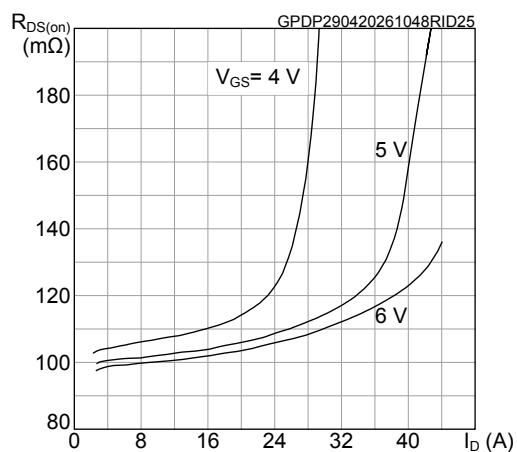
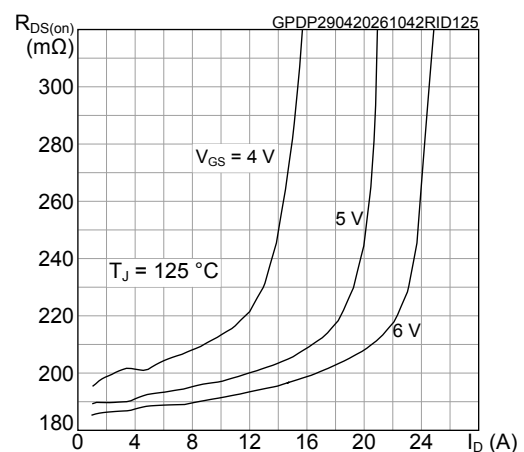
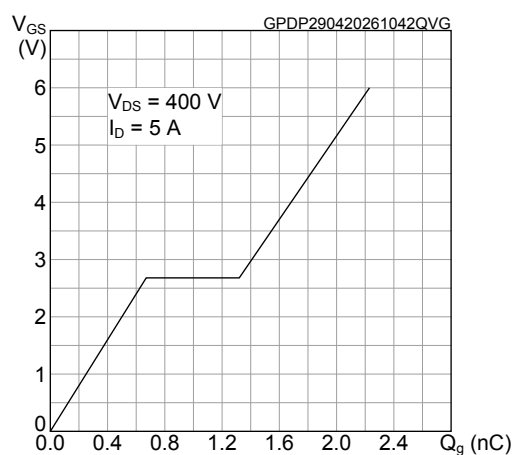
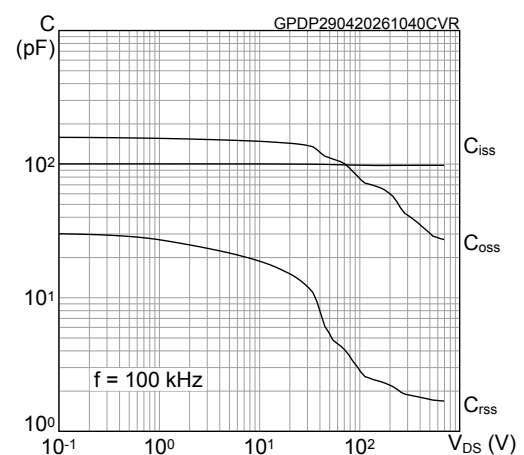
**Figure 7. Typical transfer characteristics**

**Figure 8. Normalized on-resistance vs temperature**

**Figure 9. Typical drain-source on-resistance ( $T_J = 25\text{ }^{\circ}\text{C}$ )**

**Figure 10. Typical drain-source on-resistance ( $T_J = 125\text{ }^{\circ}\text{C}$ )**

**Figure 11. Typical gate charge characteristics**

**Figure 12. Typical capacitance characteristics**


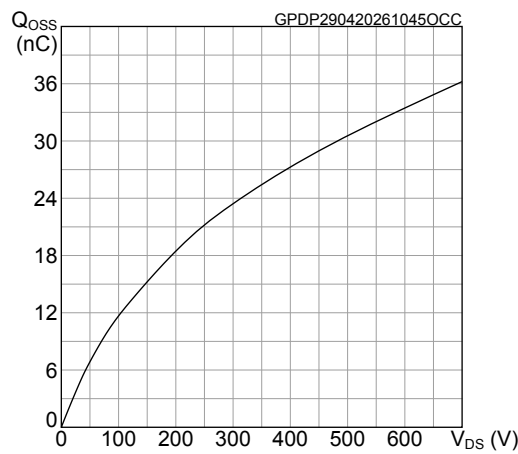
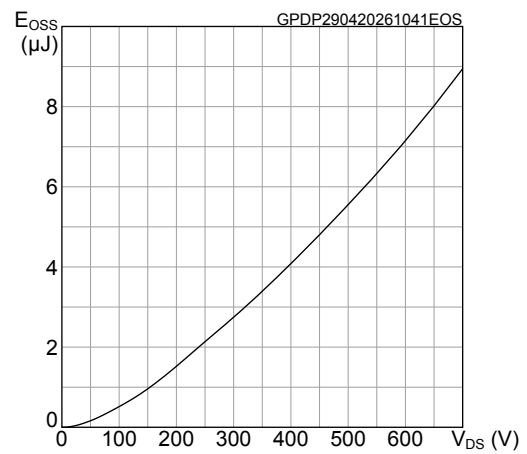
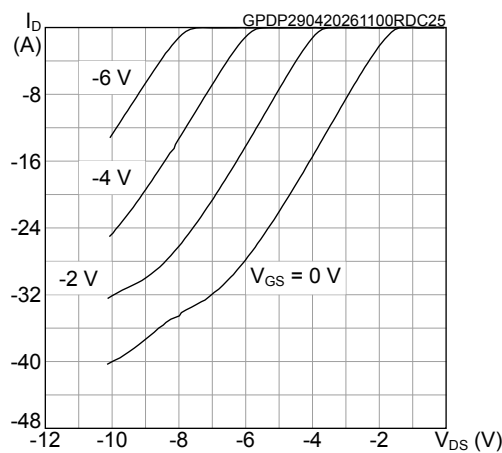
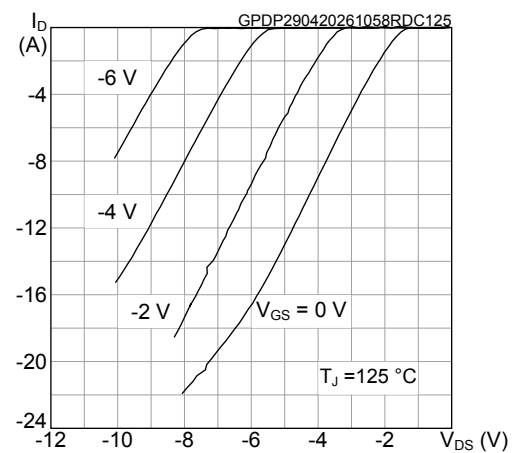
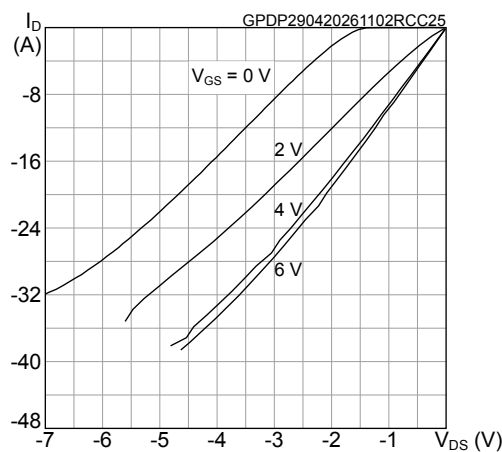
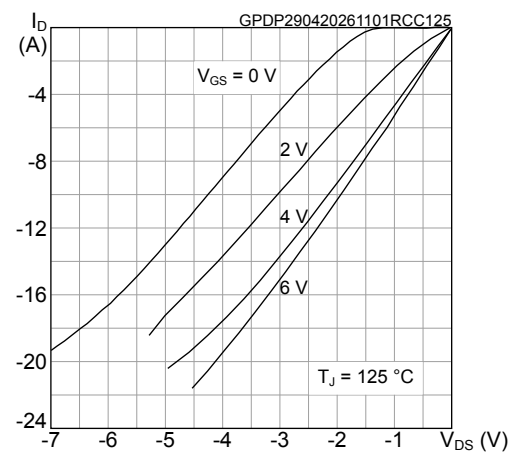
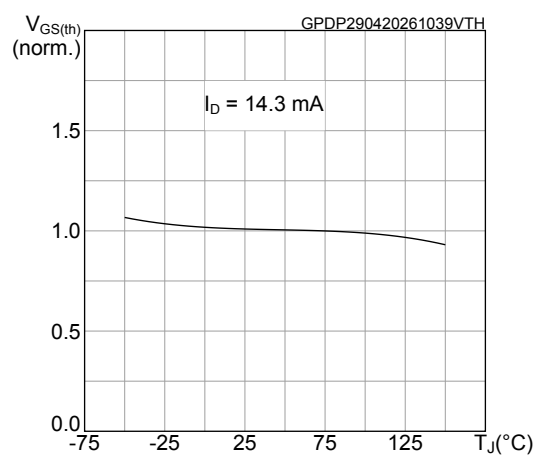
**Figure 13. Typical output capacitance charge**

**Figure 14. Typical output capacitance stored energy**

**Figure 15. Typical diode reverse conduction characteristics ( $T_J = 25\text{ °C}$ )**

**Figure 16. Typical diode reverse conduction characteristics ( $T_J = 125\text{ °C}$ )**

**Figure 17. Typical reverse conduction characteristics ( $T_J = 25\text{ °C}$ )**

**Figure 18. Typical reverse conduction characteristics ( $T_J = 125\text{ °C}$ )**


**Figure 19. Normalized gate threshold vs temperature**



### 3 Test circuits

**Figure 20. Test circuit for inductive load switching times**

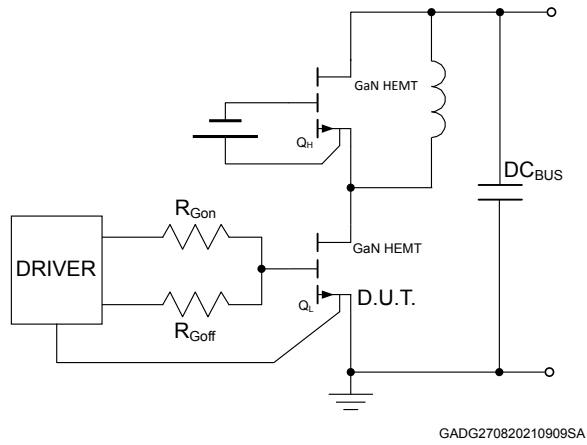
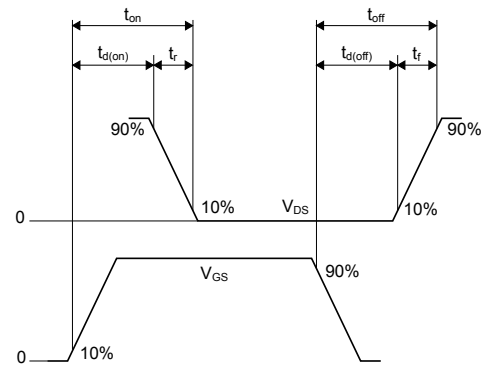


**Figure 21. Switching time waveforms**



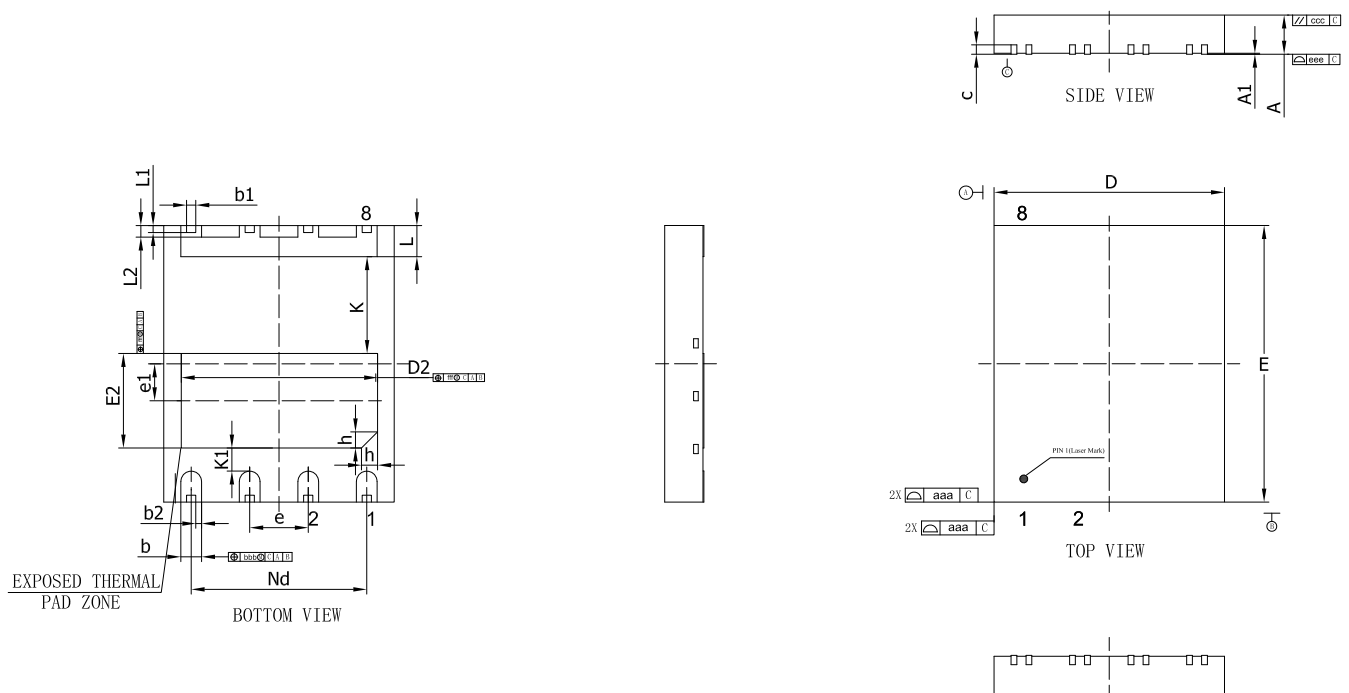
AM01473v1

## 4 Package information

To meet environmental requirements, ST offers these devices in different grades of **ECOPACK** packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions, and product status are available at: [www.st.com](http://www.st.com). ECOPACK is an ST trademark.

### 4.1 PowerFLAT 5x6 HV for PowerGaN package information

**Figure 22. PowerFLAT 5x6 HV for PowerGaN package outline**

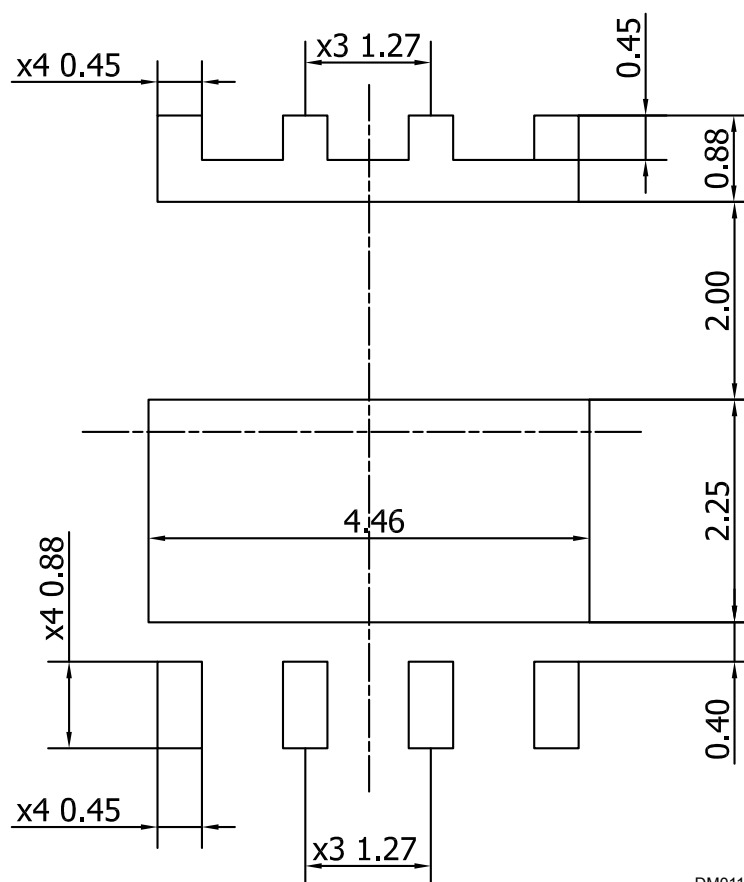


DM01190469\_PowerFLAT\_5x6\_HV\_for\_GaN\_2

**Table 7. PowerFLAT 5x6 HV for PowerGaN mechanical data**

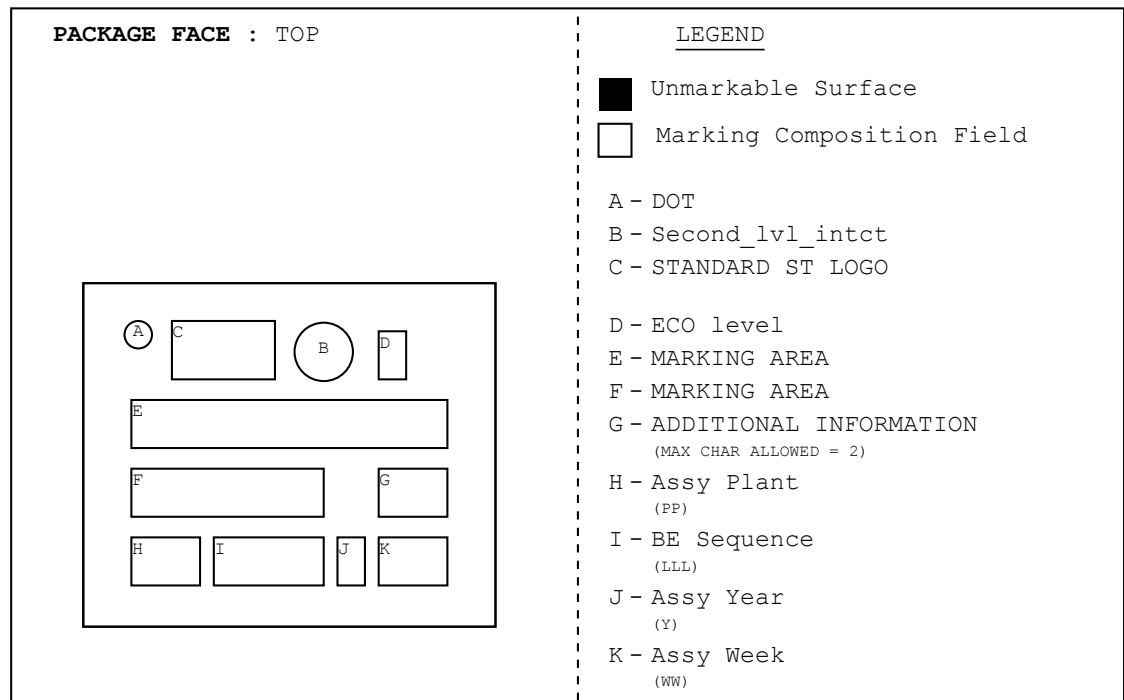
| Dim. | mm       |       |       |
|------|----------|-------|-------|
|      | Min.     | Typ.  | Max.  |
| A    | 0.80     | 0.85  | 0.90  |
| A1   | 0.00     | 0.02  | 0.05  |
| b    | 0.40     | 0.45  | 0.50  |
| b1   | 0.20REF  |       |       |
| b2   | 0.125REF |       |       |
| c    | 0.203REF |       |       |
| D    | 4.90     | 5.00  | 5.10  |
| D2   | 4.16     | 4.26  | 4.36  |
| e    | 1.27BSC  |       |       |
| e1   | 0.80BSC  |       |       |
| Nd   | 3.81BSC  |       |       |
| E    | 5.90     | 6.00  | 6.10  |
| E2   | 1.95     | 2.05  | 2.15  |
| L    | 0.625    | 0.675 | 0.725 |
| L1   | 0.15REF  |       |       |
| L2   | 0.25REF  |       |       |
| h    | 0.30     | 0.35  | 0.40  |
| K    | 2.10REF  |       |       |
| K1   | 0.50REF  |       |       |
| aaa  | 0.10     |       |       |
| bbb  | 0.07     |       |       |
| ccc  | 0.10     |       |       |
| eee  | 0.08     |       |       |
| fff  | 0.10     |       |       |

**Figure 23. PowerFLAT 5x6 HV for PowerGaN recommended footprint (dimensions are in mm)**



DM01190469\_Rev\_2\_footprint\_for\_GaN

**Figure 24. Marking composition for PowerFLAT 5x6 HV for PowerGaN**



DM01207361\_rev.3

### Engineering samples

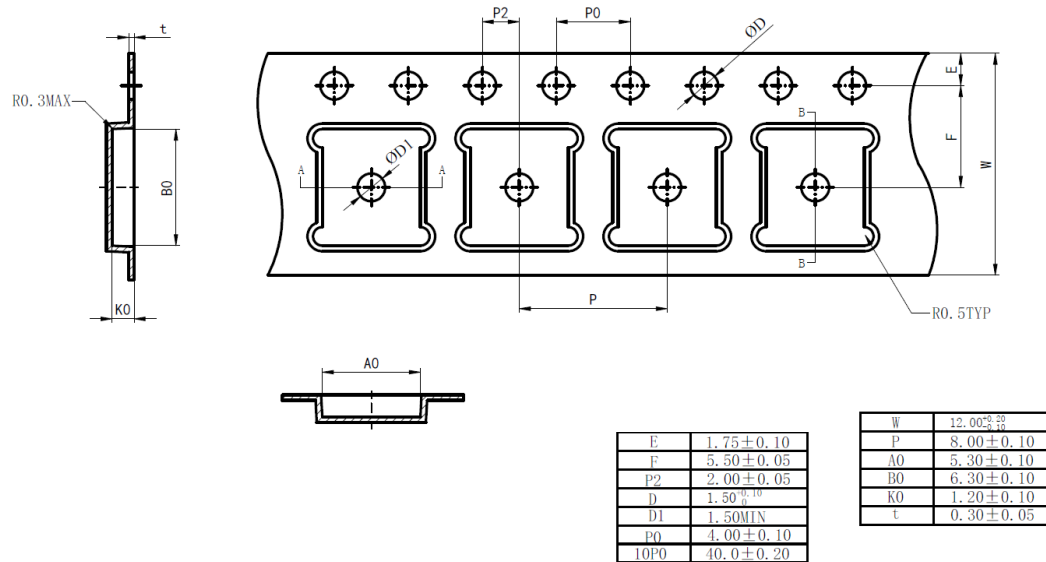
These samples are clearly identified by "ES" digits in the marking additional information field of each unit. These samples are intended to be used for electrical compatibility evaluation only; usage for any other purpose may be agreed only upon written authorization by ST. ST is not liable for any customer usage in production and/or in reliability qualification trials.

### Commercial samples

Fully qualified parts from ST standard production with no limitations of use or special identification marking.

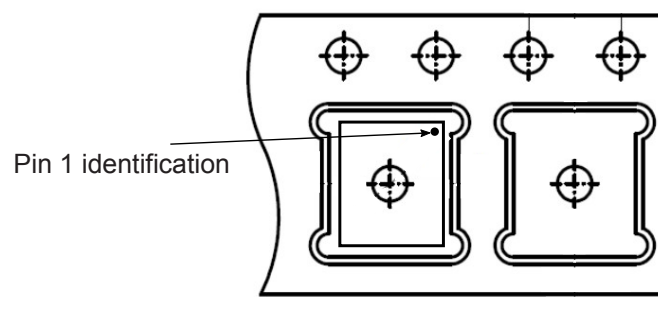
## 4.2 PowerFLAT 5x6 HV for PowerGaN packing information

**Figure 25. PowerFLAT 5x6 HV for PowerGaN tape (dimensions are in mm)**



Tape\_PowerFLAT5x6\_HV\_GaN

**Figure 26. PowerFLAT 5x6 HV for PowerGaN package orientation in carrier tape**



## Revision history

**Table 8. Document revision history**

| Date        | Revision | Changes                                                                                                           |
|-------------|----------|-------------------------------------------------------------------------------------------------------------------|
| 12-May-2026 | 1        | First release.                                                                                                    |
| 16-Jul-2026 | 2        | Added footnote in <a href="#">Table 1. Absolute maximum ratings</a> and updated <a href="#">Table 3. Static</a> . |

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