



STD26NF10

N-channel 100V - 0.033Ω - 25A - DPAK
Low gate charge STripFET™ II Power MOSFET

Features

| Type | V _{DSS} | R _{DS(on)} | I _D |
|-----------|------------------|---------------------|----------------|
| STD26NF10 | 100V | < 0.038Ω | 25A |

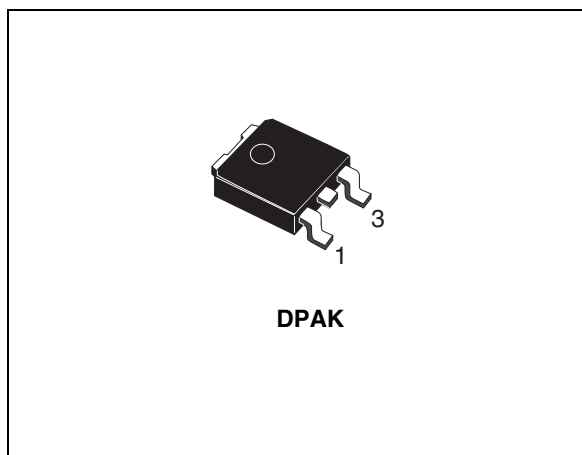
- Exceptional dv/dt capability
- Application oriented characterization
- 100% avalanche tested
- Application oriented characterization

Description

This Power MOSFET series realized with STMicroelectronics unique STripFET process has specifically been designed to minimize input capacitance and gate charge. It is intended for any application with low gate charge drive requirements.

Applications

- Switching application
 - Automotive



Internal schematic diagram



Order code

| Part number | Marking | Package | Packaging |
|-------------|---------|---------|-------------|
| STD26NF10 | D26NF10 | DPAK | Tape & reel |

Contents

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1 Electrical ratings

Table 1. Absolute maximum ratings

| Symbol | Parameter | Value | Unit |
|----------------|---|------------|---------------------|
| V_{DS} | Drain-source voltage ($V_{GS} = 0$) | 100 | V |
| V_{DGR} | Drain-gate voltage ($R_{GS} = 20\text{ k}\Omega$) | 100 | V |
| V_{GS} | Gate- source voltage | ± 20 | V |
| $I_D^{(1)}$ | Drain current (continuous) at $T_C = 25^\circ\text{C}$ | 25 | A |
| I_D | Drain current (continuous) at $T_C = 100^\circ\text{C}$ | 21 | A |
| $I_{DM}^{(2)}$ | Drain current (pulsed) | 100 | A |
| P_{tot} | Total dissipation at $T_C = 25^\circ\text{C}$ | 100 | W |
| | Derating Factor | 0.67 | W/ $^\circ\text{C}$ |
| $dv/dt^{(3)}$ | Peak diode recovery avalanche energy | 13 | V/ns |
| $E_{AS}^{(4)}$ | Single pulse avalanche energy | 480 | mJ |
| T_{stg} | Storage temperature | -55 to 175 | $^\circ\text{C}$ |
| T_j | Max. operating junction temperature | | |

1. Current limited by package
2. Pulse width limited by safe operating area.
3. $I_{SD} \leq 35\text{A}$, $di/dt \leq 300\text{A}/\mu\text{s}$, $V_{DD} = V_{(BR)DSS}$, $T_j \leq T_{JMAX}$
4. Starting $T_j = 25^\circ\text{C}$, $I_D = 12.5\text{A}$ $V_{DD} = 50\text{V}$

Table 2. Thermal data

| | | | |
|----------------|--|-----|---------------------------|
| $R_{thj-case}$ | Thermal resistance junction-case max | 1.5 | $^\circ\text{C}/\text{W}$ |
| $R_{thj-amb}$ | Thermal resistance junction-to ambient max | 100 | $^\circ\text{C}/\text{W}$ |
| T_J | Maximum lead temperature for soldering purpose | 300 | $^\circ\text{C}$ |

2 Electrical characteristics

($T_{CASE}=25^{\circ}C$ unless otherwise specified)

Table 3. On/off states

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|---------------|--|---|------|-------|-----------|--------------------|
| $V_{(BR)DSS}$ | Drain-source breakdown voltage | $I_D = 250\mu A, V_{GS} = 0$ | 100 | | | V |
| I_{DSS} | Zero gate voltage drain current ($V_{GS} = 0$) | $V_{DS} = \text{Max rating}$ $V_{DS} = \text{Max rating},$ $T_C = 125^{\circ}C$ | | | 1 10 | μA μA |
| I_{GSS} | Gate-body leakage current ($V_{DS} = 0$) | $V_{GS} = \pm 20V$ | | | ± 100 | nA |
| $V_{GS(th)}$ | Gate threshold voltage | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 2 | 3 | 4 | V |
| $R_{DS(on)}$ | Static drain-source on resistance | $V_{GS} = 10V, I_D = 12.5A$ | | 0.033 | 0.038 | Ω |

Table 4. Dynamic

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|---|---|---|------|----------------------|------|----------------------|
| $g_{fs}^{(1)}$ | Forward transconductance | $V_{DS} = 15V, I_D = 12.5A$ | | 20 | | S |
| C_{iss} C_{oss} C_{rss} | Input capacitance Output capacitance Reverse transfer capacitance | $V_{DS} = 25V, f = 1MHz,$ $V_{GS} = 0$ | | 1550 220 95 | | pF pF pF |
| $t_{d(on)}$ t_r $t_{d(off)}$ t_f | Turn-on delay time Rise time Turn-off delay time Fall time | $V_{DD} = 50V, I_D = 12.5A$ $R_G = 4.7\Omega, V_{GS} = 10V$ (see Figure 12) | | 17 60 60 15 | | ns ns ns ns |
| Q_g Q_{gs} Q_{gd} | Total gate charge Gate-source charge Gate-drain charge | $V_{DD} = 80V, I_D = 12.5A,$ $V_{GS} = 10V, R_G = 4.7\Omega$ (see Figure 13) | | 55 12 20 | | nC nC nC |

1. Pulsed: Pulse duration = 300 μs , duty cycle 1.5%.

Table 5. Source drain diode

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-----------------------------------|--|--|------|------------------|-----------|---------------|
| I_{SD} $I_{SDM}^{(1)}$ | Source-drain current Source-drain current (pulsed) | | | | 25 100 | A A |
| $V_{SD}^{(2)}$ | Forward on voltage | $I_{SD} = 25A, V_{GS} = 0$ | | | 1.5 | V |
| t_{rr} Q_{rr} I_{RRM} | Reverse recovery time Reverse recovery charge Reverse recovery current | $I_{SD} = 25A, di/dt = 100A/\mu s,$ $V_{DD} = 50V, T_j = 150^\circ C$ (see Figure 14) | | 88 317 7.2 | | ns nC A |

1. Pulse width limited by safe operating area.
2. Pulsed: Pulse duration = 300 μs , duty cycle 1.5%

2.1 Electrical characteristics (curves)

Figure 1. Safe operating area

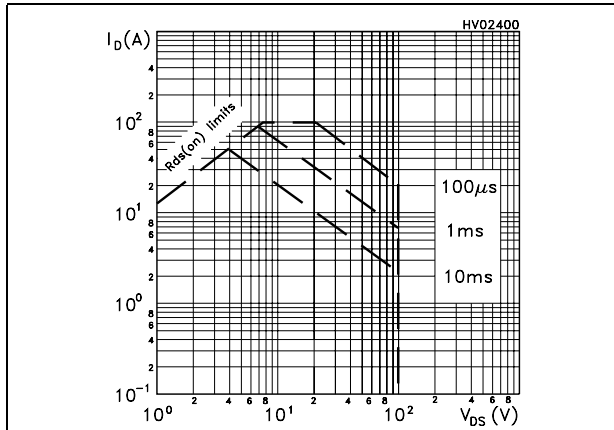


Figure 2. Thermal impedance



Figure 3. Output characteristics

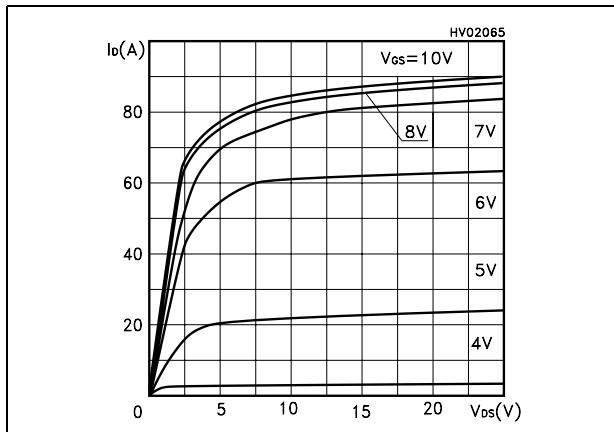


Figure 4. Transfer characteristics

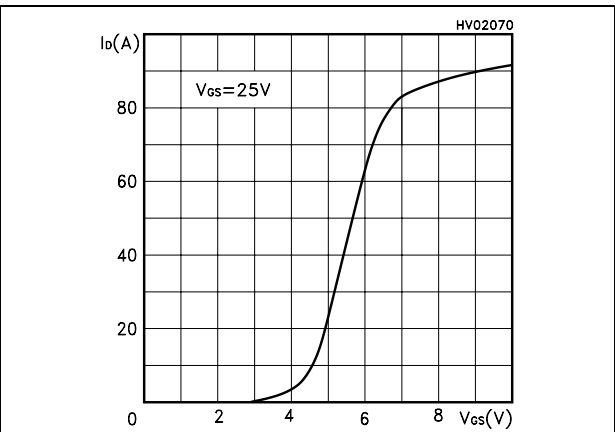


Figure 5. Transconductance

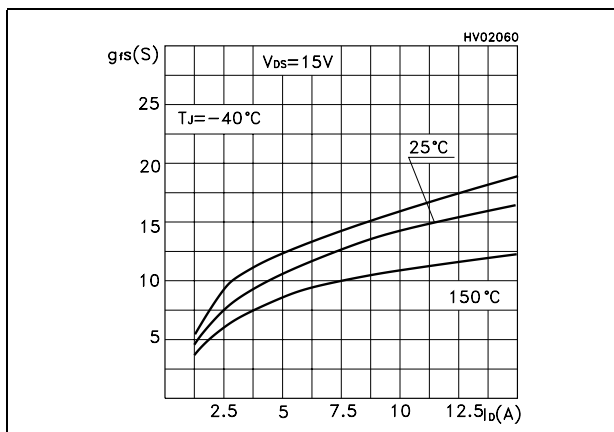


Figure 6. Static drain-source on resistance

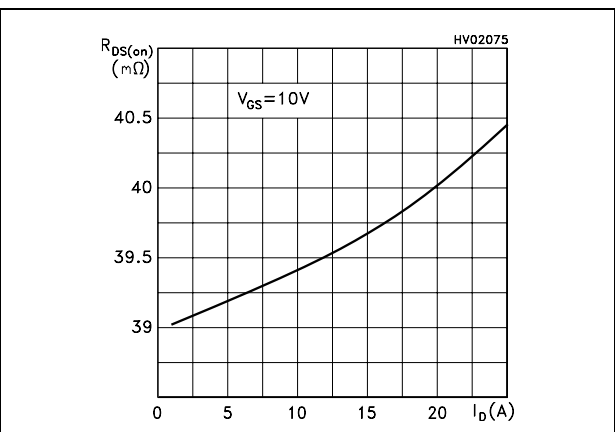


Figure 7. Gate charge vs. gate-source voltage Figure 8. Capacitance variations

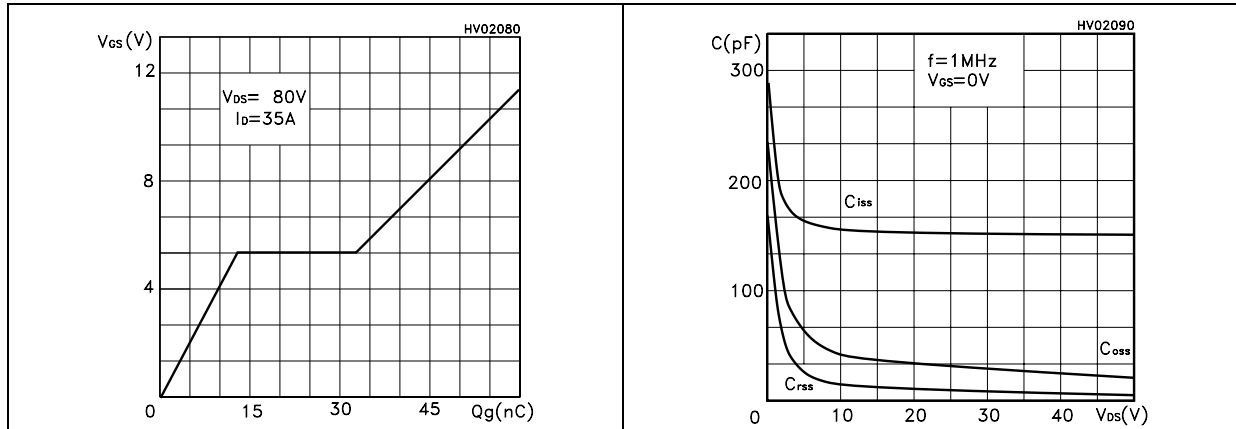


Figure 9. Normalized gate threshold voltage vs. temperature Figure 10. Normalized on resistance vs. temperature

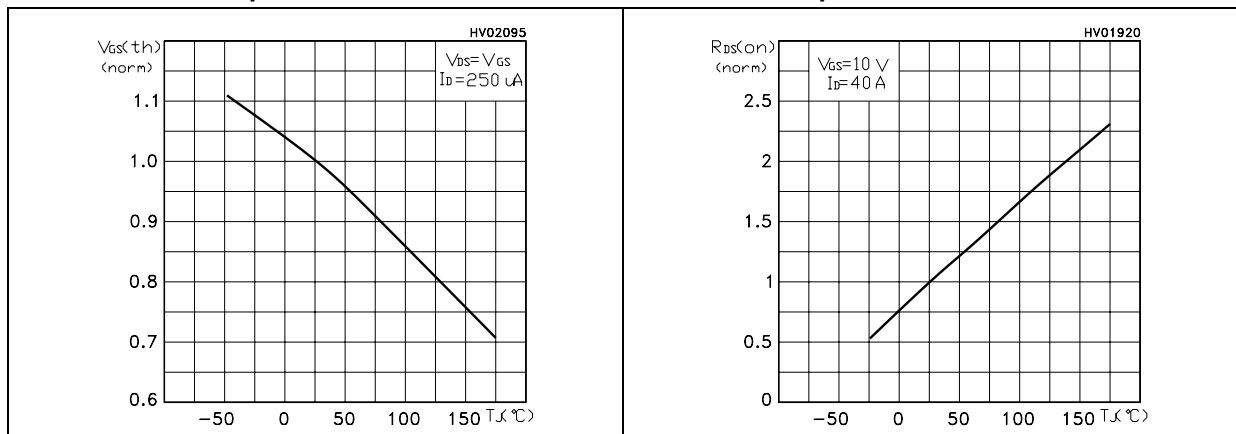
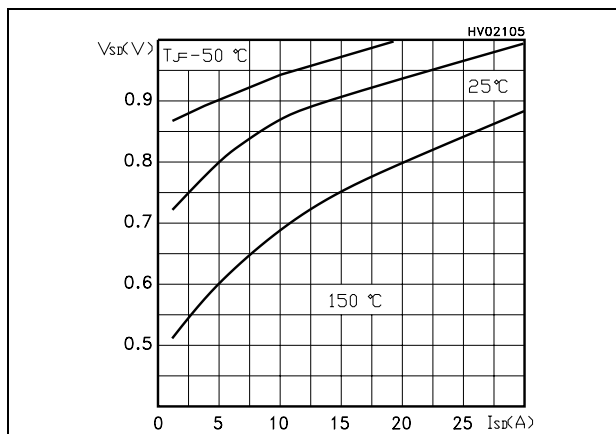


Figure 11. Source-drain diode forward characteristics



3 Test circuit

Figure 12. Switching times test circuit for resistive load



Figure 13. Gate charge test circuit

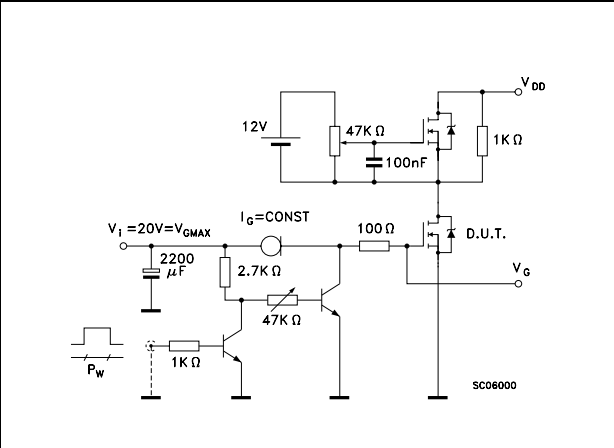


Figure 14. Test circuit for inductive load switching and diode recovery times



Figure 15. Unclamped Inductive load test circuit



Figure 16. Unclamped inductive waveform



Figure 17. Switching time waveform

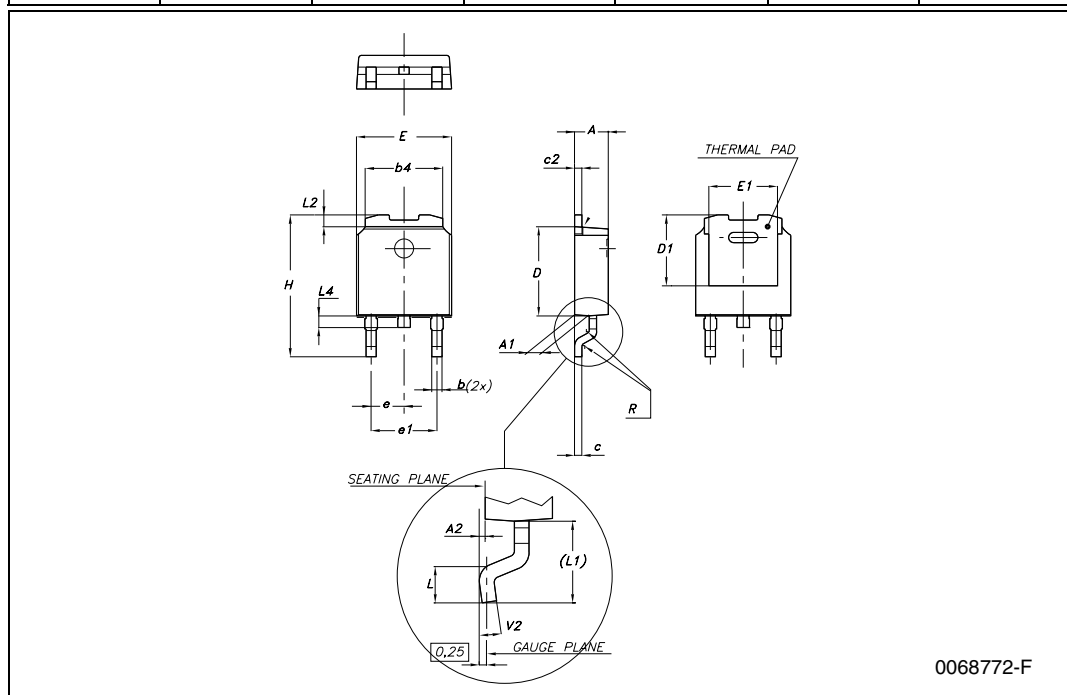


4 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com

DPAK MECHANICAL DATA

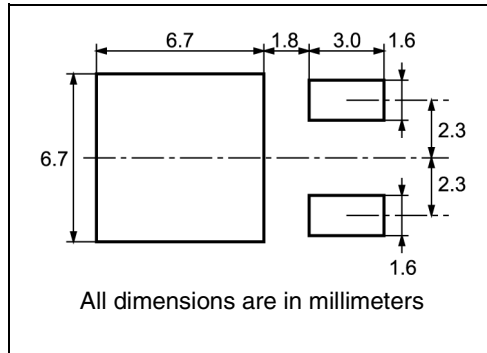
| DIM. | mm. | | | inch | | |
|------|------|------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 2.2 | | 2.4 | 0.086 | | 0.094 |
| A1 | 0.9 | | 1.1 | 0.035 | | 0.043 |
| A2 | 0.03 | | 0.23 | 0.001 | | 0.009 |
| B | 0.64 | | 0.9 | 0.025 | | 0.035 |
| b4 | 5.2 | | 5.4 | 0.204 | | 0.212 |
| C | 0.45 | | 0.6 | 0.017 | | 0.023 |
| C2 | 0.48 | | 0.6 | 0.019 | | 0.023 |
| D | 6 | | 6.2 | 0.236 | | 0.244 |
| D1 | | 5.1 | | | 0.200 | |
| E | 6.4 | | 6.6 | 0.252 | | 0.260 |
| E1 | | 4.7 | | | 0.185 | |
| e | | 2.28 | | | 0.090 | |
| e1 | 4.4 | | 4.6 | 0.173 | | 0.181 |
| H | 9.35 | | 10.1 | 0.368 | | 0.397 |
| L | 1 | | | 0.039 | | |
| (L1) | | 2.8 | | | 0.110 | |
| L2 | | 0.8 | | | 0.031 | |
| L4 | 0.6 | | 1 | 0.023 | | 0.039 |
| R | | 0.2 | | | 0.008 | |
| V2 | 0° | | 8° | 0° | | 8° |



0068772-F

5 Packing mechanical data

DPAK FOOTPRINT



TAPE AND REEL SHIPMENT

| REEL MECHANICAL DATA | | | | |
|----------------------|------|------|-------|--------|
| DIM. | mm | | inch | |
| | MIN. | MAX. | MIN. | MAX. |
| A | | 330 | | 12.992 |
| B | 1.5 | | 0.059 | |
| C | 12.8 | 13.2 | 0.504 | 0.520 |
| D | 20.2 | | 0.795 | |
| G | 16.4 | 18.4 | 0.645 | 0.724 |
| N | 50 | | 1.968 | |
| T | | 22.4 | | 0.881 |

| BASE QTY | | BULK QTY | |
|----------|--|----------|--|
| 2500 | | 2500 | |

| TAPE MECHANICAL DATA | | | | |
|----------------------|------|------|-------|-------|
| DIM. | mm | | inch | |
| | MIN. | MAX. | MIN. | MAX. |
| A0 | 6.8 | 7 | 0.267 | 0.275 |
| B0 | 10.4 | 10.6 | 0.409 | 0.417 |
| B1 | | 12.1 | | 0.476 |
| D | 1.5 | 1.6 | 0.059 | 0.063 |
| D1 | 1.5 | | 0.059 | |
| E | 1.65 | 1.85 | 0.065 | 0.073 |
| F | 7.4 | 7.6 | 0.291 | 0.299 |
| K0 | 2.55 | 2.75 | 0.100 | 0.108 |
| P0 | 3.9 | 4.1 | 0.153 | 0.161 |
| P1 | 7.9 | 8.1 | 0.311 | 0.319 |
| P2 | 1.9 | 2.1 | 0.075 | 0.082 |
| R | 40 | | 1.574 | |
| W | 15.7 | 16.3 | 0.618 | 0.641 |

6 Revision history

Table 6. Revision history

| Date | Revision | Changes |
|-------------|----------|---------------|
| 20-Apr-2007 | 1 | First release |

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