

100V N-SGT Enhancement Mode MOSFET

General Description

APG40N10NF use advanced SGT MOSFET technology to provide low RDS(ON), low gate charge, fast switching and excellent avalanche characteristics.

This device is specially designed to get better ruggedness and suitable to use in

Features

Low RDS(on) & FOM

Extremely low switching loss

Excellent stability and uniformity or Invertors

Applications

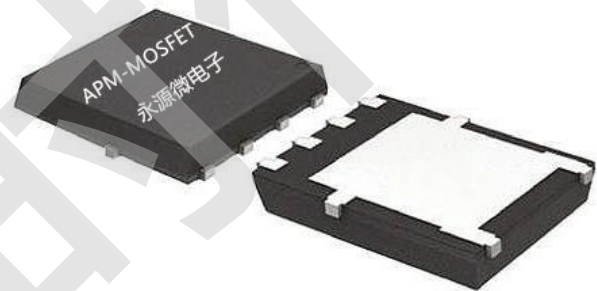
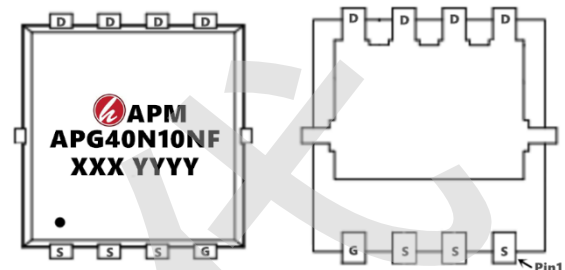
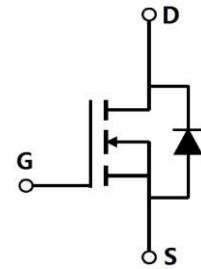
Consumer electronic power supply

Motor control

Synchronous-rectification

Isolated DC

Synchronous-rectification application



Package Marking and Ordering Information

| Product ID | Pack | Marking | Qty(PCS) |
|------------|------------|---------------------|----------|
| APG40N10NF | PDFN5*6-8L | APG40N10NF XXX YYYY | 5000 |

Absolute Maximum Ratings at T_j=25°C unless otherwise noted

| Parameter | Symbol | Value | Unit |
|--|-----------------------------------|------------|------|
| Drain source voltage | V _{DS} | 100 | V |
| Gate source voltage | V _{GS} | ±20 | V |
| Continuous drain current ¹⁾ , T _C =25 °C | I _D | 40 | A |
| Pulsed drain current ²⁾ , T _C =25 °C | I _{D, pulse} | 120 | A |
| Power dissipation ³⁾ , T _C =25 °C | P _D | 72 | W |
| Single pulsed avalanche energy ⁵⁾ | E _{AS} | 30 | mJ |
| Operation and storage temperature | T _{stg} , T _j | -55 to 150 | °C |
| Thermal resistance, junction-case | R _{θJC} | 1.74 | °C/W |

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| | | | |
|--|------------------|----|------|
| Thermal resistance, junction-ambient ⁴⁾ | R _{θJA} | 62 | °C/W |
|--|------------------|----|------|

Electrical Characteristics at T_j=25 °C unless otherwise specified

| Parameter | Symbol | Test condition | Min. | Typ. | Max. | Unit |
|----------------------------------|----------------------|---|---|--------|-------------|------|
| Drain-source breakdown voltage | BV _{DSS} | V _{GS} =0 V, I _D =250 μA | 100 | | | V |
| Gate threshold voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250 μA | 1.0 | | 2.5 | V |
| Drain-source on-state resistance | R _{DS(ON)} | V _{GS} =10 V, I _D =8 A | | 16 | 20 | mΩ |
| Drain-source on-state resistance | R _{DS(ON)} | V _{GS} =4.5 V, I _D =6 A | | | 26 | mΩ |
| Gate-source leakage current | I _{GSS} | V _{GS} =20 V | | | 100 -100 | nA |
| Drain-source leakage current | I _{DSS} | V _{DS} =100 V, V _{GS} =0 V | | | 1 | μA |
| Input capacitance | C _{iss} | V _{GS} =0 V, V _{DS} =50 V, f=1 MHz | | 1190.6 | | pF |
| Output capacitance | C _{oss} | | | 194.6 | | pF |
| Reverse transfer capacitance | C _{rss} | | | 4.1 | | pF |
| Turn-on delay time | t _{d(on)} | | | 17.8 | | ns |
| Rise time | t _r | V _{GS} =10 V, V _{DS} =50 V, R _G =2.2 Ω, I _D =10 A | | 3.9 | | ns |
| Turn-off delay time | t _{d(off)} | | | 33.5 | | ns |
| Fall time | t _f | | | 3.2 | | ns |
| Total gate charge | Q _g | | I _D =8 A, V _{DS} =50 V, V _{GS} =10 V | | 19.8 | |
| Gate-source charge | Q _{gs} | | | 2.4 | | nC |
| Gate-drain charge | Q _{gd} | | | 5.3 | | nC |
| Gate plateau voltage | V _{plateau} | | | 3.2 | | V |
| Diode forward current | I _S | V _{GS} <V _{th} | | | 40 | |
| Pulsed source current | I _{SP} | | | | 120 | A |
| Diode forward voltage | V _{SD} | I _S =8 A, V _{GS} =0 V | | | 1.3 | V |
| Reverse recovery time | t _{rr} | I _S =8 A, di/dt=100 A/μs | | 50.2 | | ns |
| Reverse recovery charge | Q _{rr} | | | | 95.1 | nC |
| Peak reverse recovery current | I _{rrm} | | | | 2.5 | A |

Note

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_d is based on max. junction temperature, using junction-case thermal resistance.
- 4) The value of R_{θJA} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.
- 5) V_{DD}=50 V, R_G=25 Ω, L=0.3 mH, starting T_j=25 °C.

Electrical Characteristics Diagrams

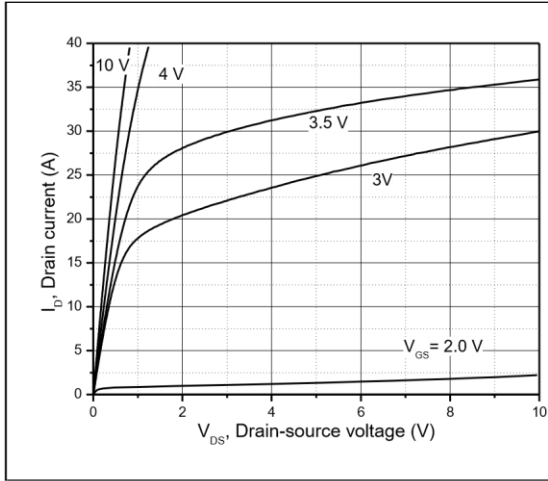


Figure 1, Typ. output characteristics

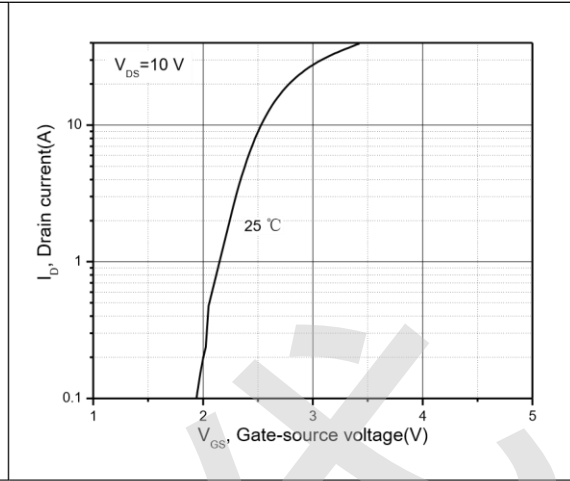


Figure 2, Typ. transfer characteristics

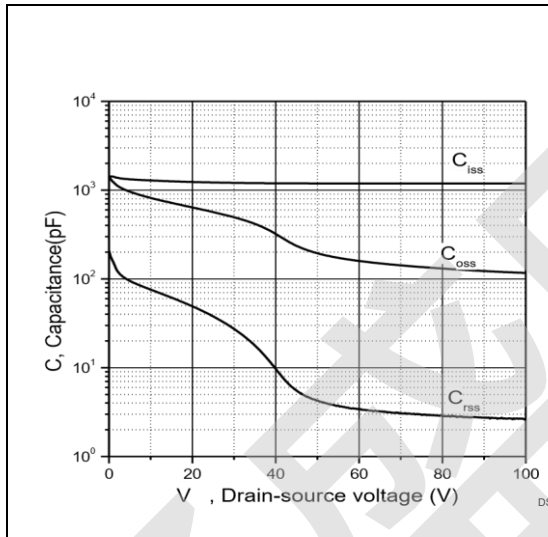


Figure 3, Typ. capacitances

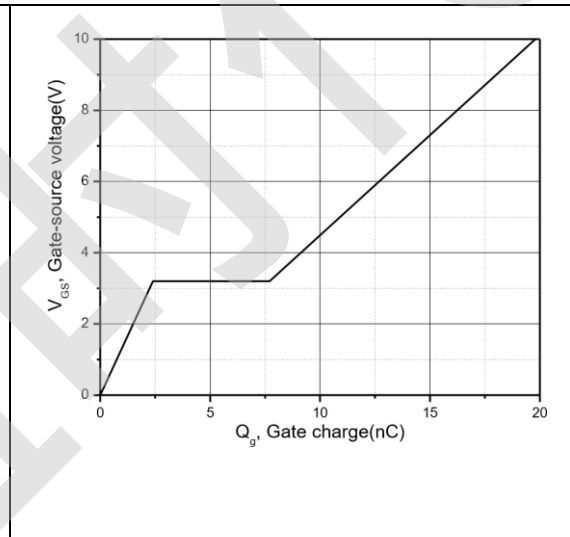


Figure 4, Typ. gate charge

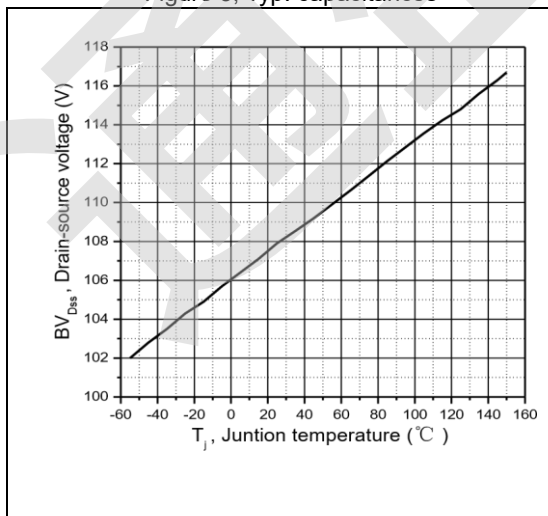


Figure 5, Drain-source breakdown voltage

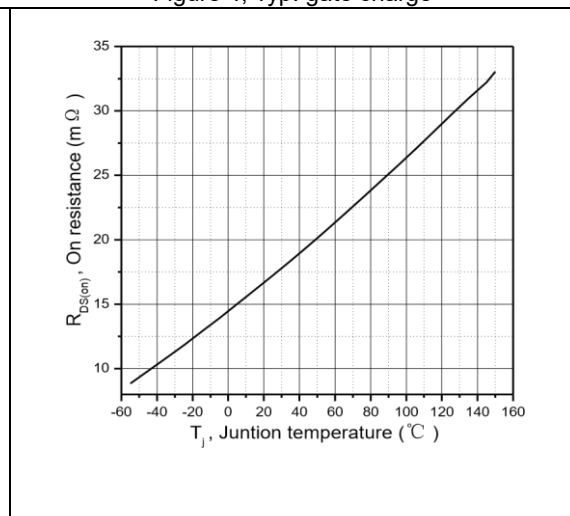


Figure 6, Drain-source on-state resistance

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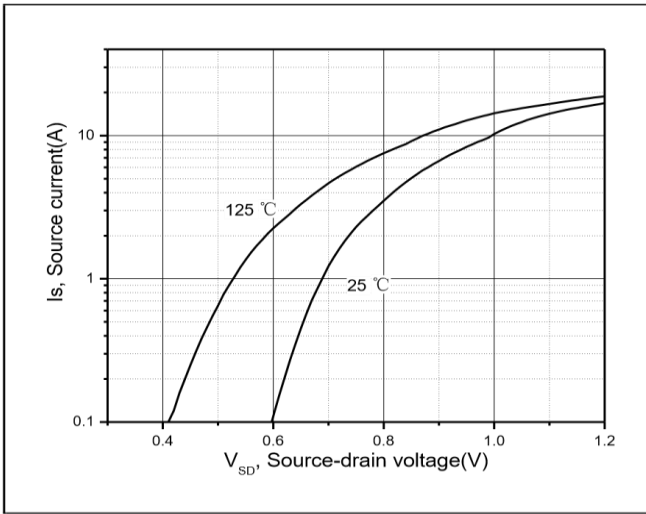


Figure 7, Forward characteristic of body diode

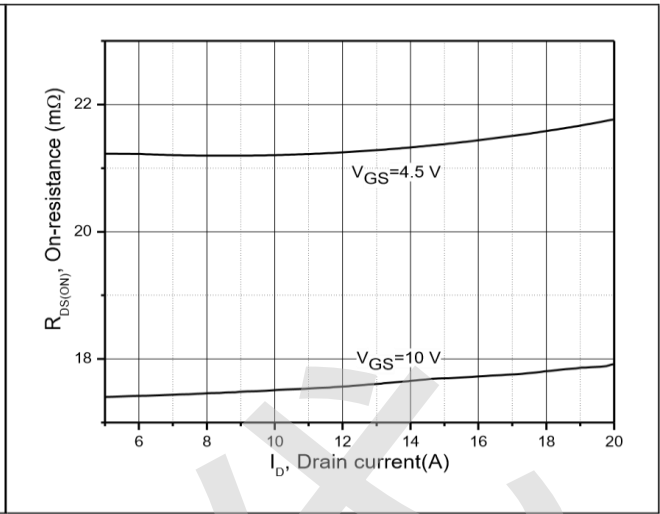


Figure 8, Drain-source on-state resistance

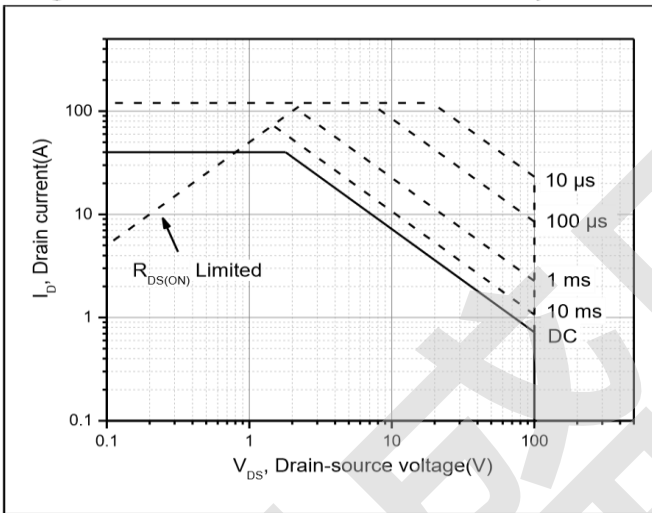
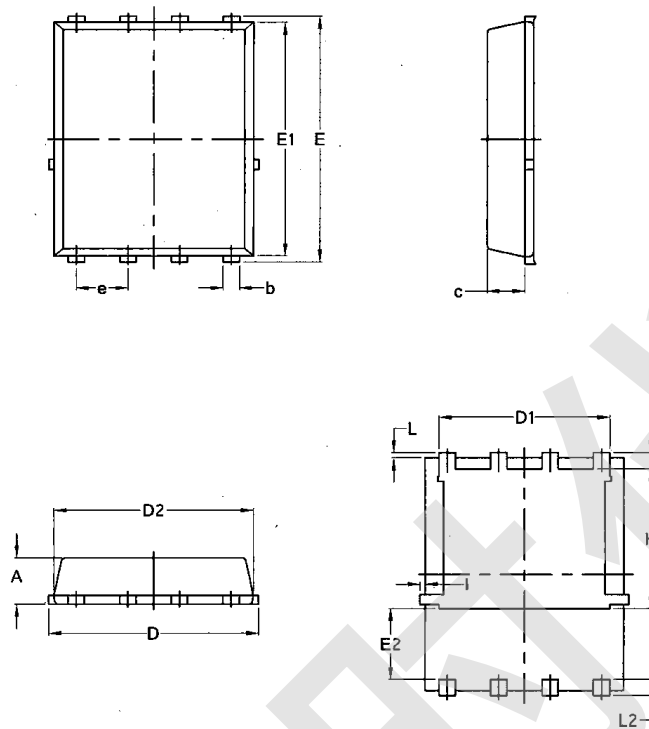


Figure 9, Safe operation area $T_C=25\text{ }^\circ\text{C}$

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Package Mechanical Data-DFN5*6-8L-JQ Single



| Symbol | Common | | | |
|--------|----------|--------|----------|--------|
| | mm | | Inch | |
| | Min | Max | Min | Max |
| A | 1.03 | 1.17 | 0.0406 | 0.0461 |
| b | 0.34 | 0.48 | 0.0134 | 0.0189 |
| c | 0.824 | 0.0970 | 0.0324 | 0.082 |
| D | 4.80 | 5.40 | 0.1890 | 0.2126 |
| D1 | 4.11 | 4.31 | 0.1618 | 0.1697 |
| D2 | 4.80 | 5.00 | 0.1890 | 0.1969 |
| E | 5.95 | 6.15 | 0.2343 | 0.2421 |
| E1 | 5.65 | 5.85 | 0.2224 | 0.2303 |
| E2 | 1.60 | / | 0.0630 | / |
| e | 1.27 BSC | | 0.05 BSC | |
| L | 0.05 | 0.25 | 0.0020 | 0.0098 |
| L1 | 0.38 | 0.50 | 0.0150 | 0.0197 |
| L2 | 0.38 | 0.50 | 0.0150 | 0.0197 |
| H | 3.30 | 3.50 | 0.1299 | 0.1378 |
| I | / | 0.18 | / | 0.0070 |

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| Edition | Date | Change |
|---------|-----------|-----------------|
| Rve3.8 | 2019/1/31 | Initial release |

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