

TN180N40DN

N-Channel Enhancement Mode Power MOSFET

Product Summary

- $V_{DS} = 40V, I_D = 180A$
- $R_{DS(on)} < 3.1m\Omega @ V_{GS} = 10V$

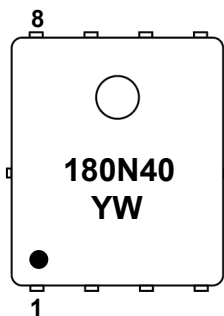
Features

- Advanced Trench Technology
- 100% Avalanche Tested
- RoHS Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 3

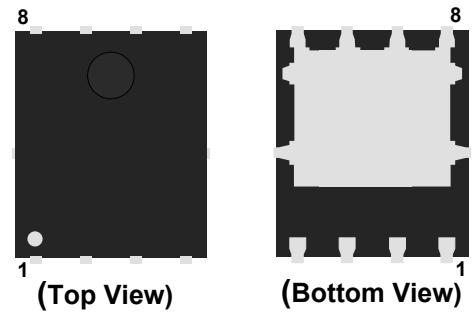
Application

- Consumer electronic power supply
- Synchronous-rectification
- Isolated DC

Marking Code

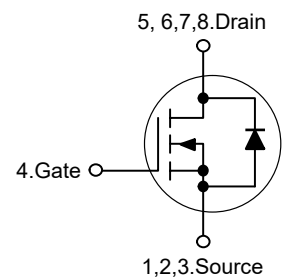


PDFN5x6-8L



| Pin | Description |
|---------|-------------|
| 1,2,3 | Source |
| 4 | Gate |
| 5,6,7,8 | Drain |

Schematic Diagram



Absolute Maximum Ratings

Ratings at 25°C case temperature unless otherwise specified.

| Parameter | Symbol | Limit | Unit |
|--|-----------------------|----------|------|
| Drain-Source Voltage | V_{DS} | 40 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current | $I_D^{(1)}$ | 180 | A |
| Pulsed Drain Current | $I_{DM}^{(1)(2)}$ | 720 | A |
| Single Pulsed Avalanche Energy | $E_{AS}^{(3)}$ | 520 | mJ |
| Power Dissipation | $P_D^{(1)}$ | 96 | W |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}^{(5)}$ | 62.5 | °C/W |
| Thermal Resistance from Junction to Case | $R_{\theta JC}^{(1)}$ | 1.3 | °C/W |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55~+150 | °C |

Thermal Characteristics

| | | | |
|--------------------------------------|-----------------|---|------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 1 | °C/W |
|--------------------------------------|-----------------|---|------|

Electrical Characteristics

(T_J=25°C unless otherwise specified)

| Parameter | Symbol | Test Condition | | Min | Typ | Max | Unit |
|---|----------------------|--|----------------------|-----|------|------|------|
| Off characteristics | | | | | | | |
| Drain-source breakdown voltage | V _{(BR)DSS} | V _{GS} = 0V, I _D =1mA | | 40 | - | - | V |
| Zero gate voltage drain current | I _{DSS} | V _{DS} =32V, V _{GS} =0V | T _J =25℃ | - | - | 1.0 | μA |
| | | | T _J =125℃ | - | - | 100 | |
| Gate-body leakage current | I _{GSS} | V _{DS} =0V, V _{GS} =±20V | | - | - | ±100 | nA |
| On characteristics ④ | | | | | | | |
| Gate-threshold voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250μA | | 1.0 | 1.7 | 2.5 | V |
| Static drain-source on-sate resistance | R _{DS(on)} | V _{GS} =10V, I _D =30A | | - | 1.2 | 1.5 | mΩ |
| | | V _{GS} =4.5V, I _D =30A | | - | 1.8 | 2.8 | mΩ |
| Dynamic characteristics | | | | | | | |
| Input capacitance | C _{iss} | V _{DS} =20V, V _{GS} =0V, f =100kHz | | - | 3900 | - | pF |
| Output capacitance | C _{oss} | | | - | 1390 | - | |
| Reverse transfer capacitance | C _{rss} | | | - | 58 | - | |
| Gate resistance | R _g | f =1MHz | | - | 5.2 | - | Ω |
| Switching characteristics | | | | | | | |
| Total gate charge | Q _g | V _{GS} =4.5V, V _{DS} =20V, I _D =75A | | - | 26 | - | nC |
| Total gate charge | Q _g | V _{GS} =10V, V _{DS} =20V, I _D =75A | | - | 57.8 | - | |
| Gate-source charge | Q _{gs} | | | - | 9.9 | - | |
| Gate-drain charge | Q _{gd} | | | - | 11.7 | - | |
| Turn-on delay time | t _{d(on)} | V _{DS} =20V, V _{GS} =10V, R _L =0.8Ω , R _g =4.8Ω | | - | 4.7 | - | ns |
| Turn-on rise time | t _r | | | - | 9.8 | - | |
| Turn-off delay time | t _{d(off)} | | | - | 85 | - | |
| Turn-off fall time | t _f | | | - | 45 | - | |
| Drain-Source Diode Characteristics | | | | | | | |
| Drain-source diode forward voltage | V _{SD} ④ | V _{GS} =0V, I _S =30A | | - | - | 1.3 | V |
| Continuous drain-source diode forward current | I _S ① | | | - | - | 180 | A |
| Pulsed drain-source diode forward current | I _{SM} ①② | | | - | - | 720 | A |
| Reverse recovery time | t _{rr} | di _S /dt = 100A/μs, I _S = 30A, V _{DD} = 30V | | - | 78 | - | ns |
| Reverse recovery charge | Q _{rr} | | | - | 138 | - | nC |

Notes:

1. T_C = 25°C.

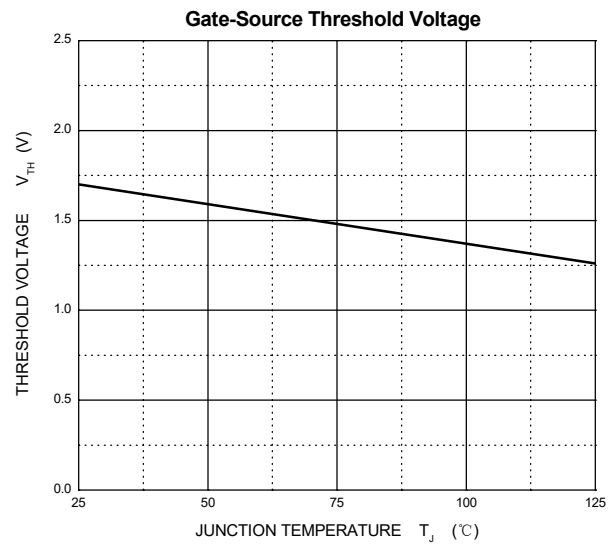
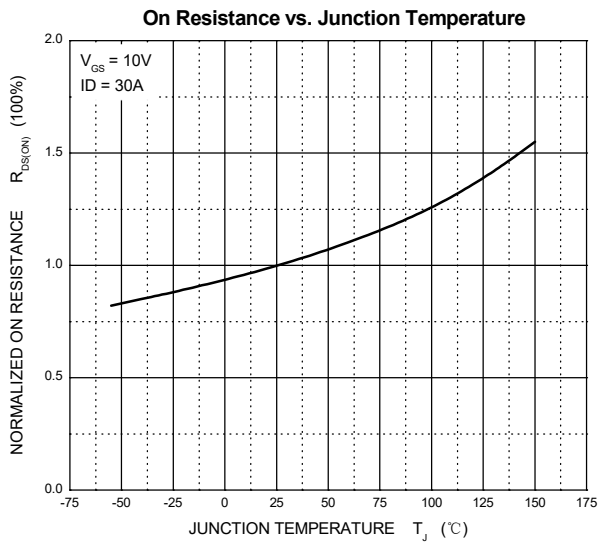
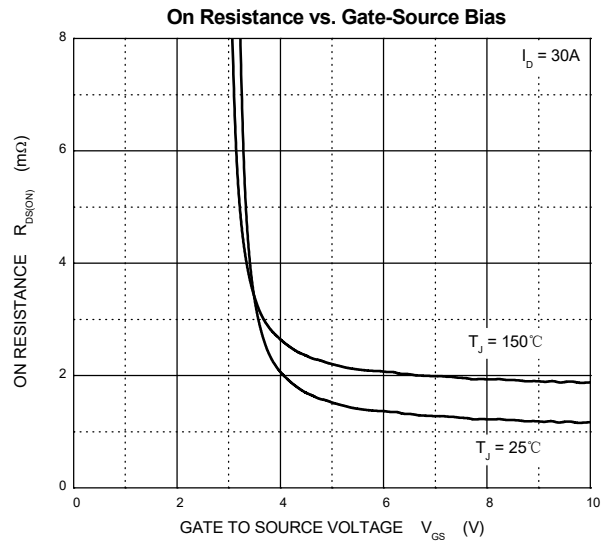
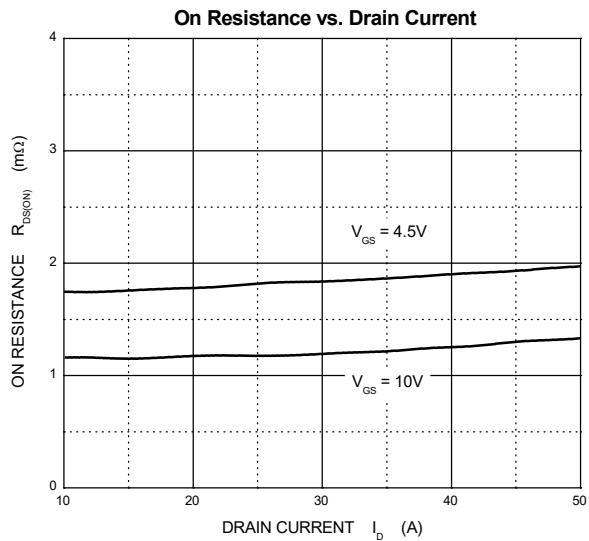
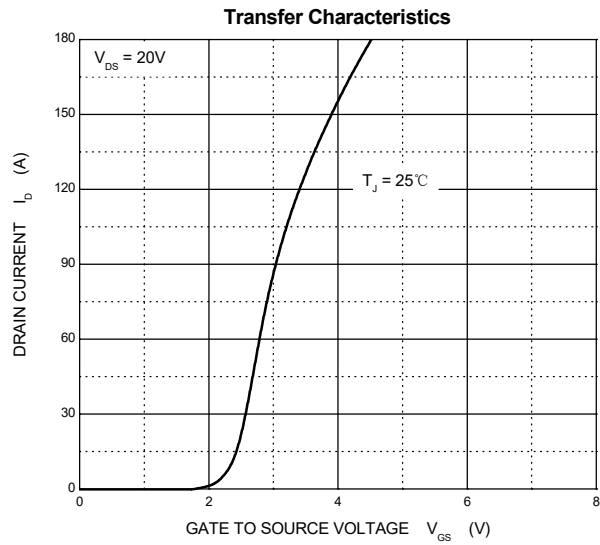
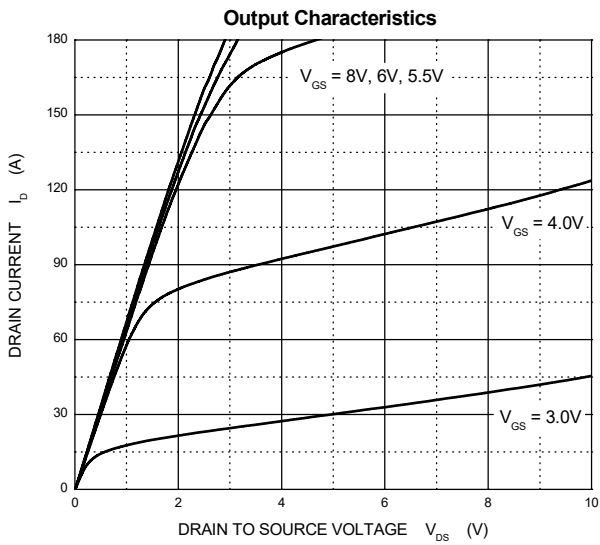
2. Limited only by maximum temperature allowed.

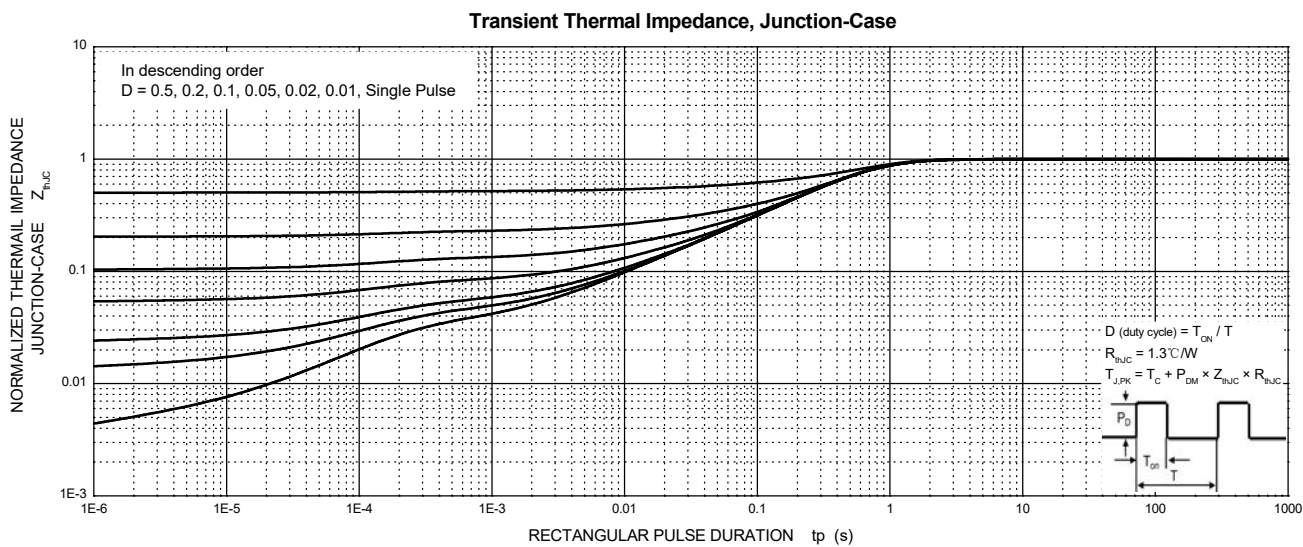
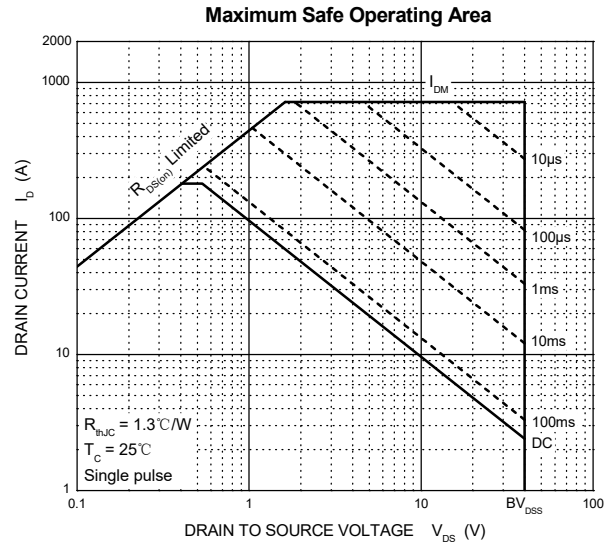
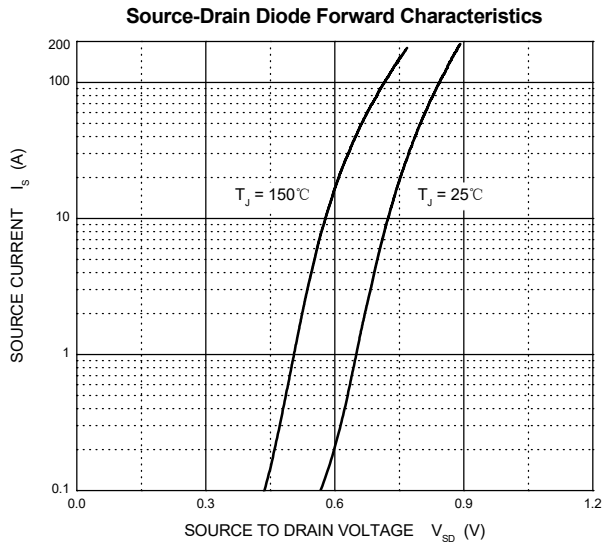
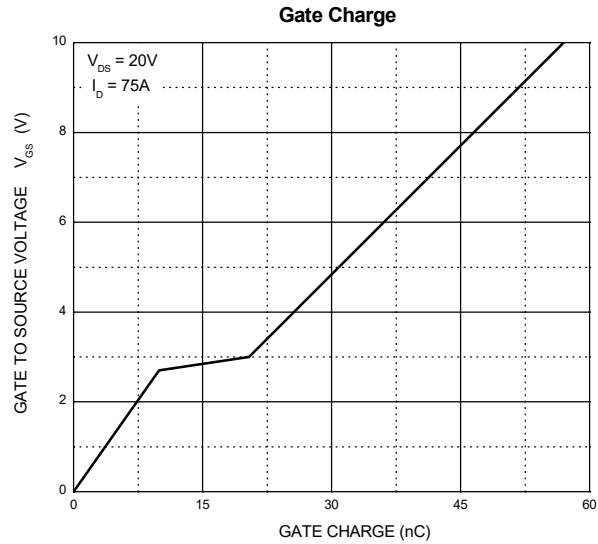
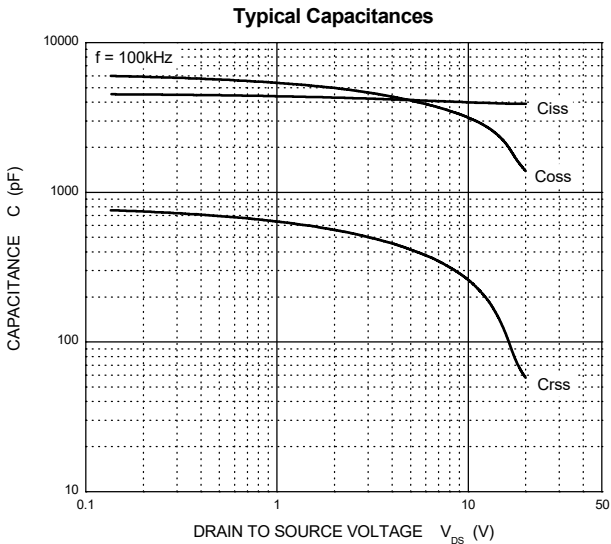
3. V_{DD} = 20V, V_{GS} = 10V, L = 0.5mH, R_g = 25Ω Starting T_J = 25°C.

4. Pulse Test : Pulse Width ≤ 380μs, duty cycle ≤ 2%.

5. Device mounted on 1 in² FR-4 board with 2oz. single-sided Copper, in a still air environment with T_A = 25°C.

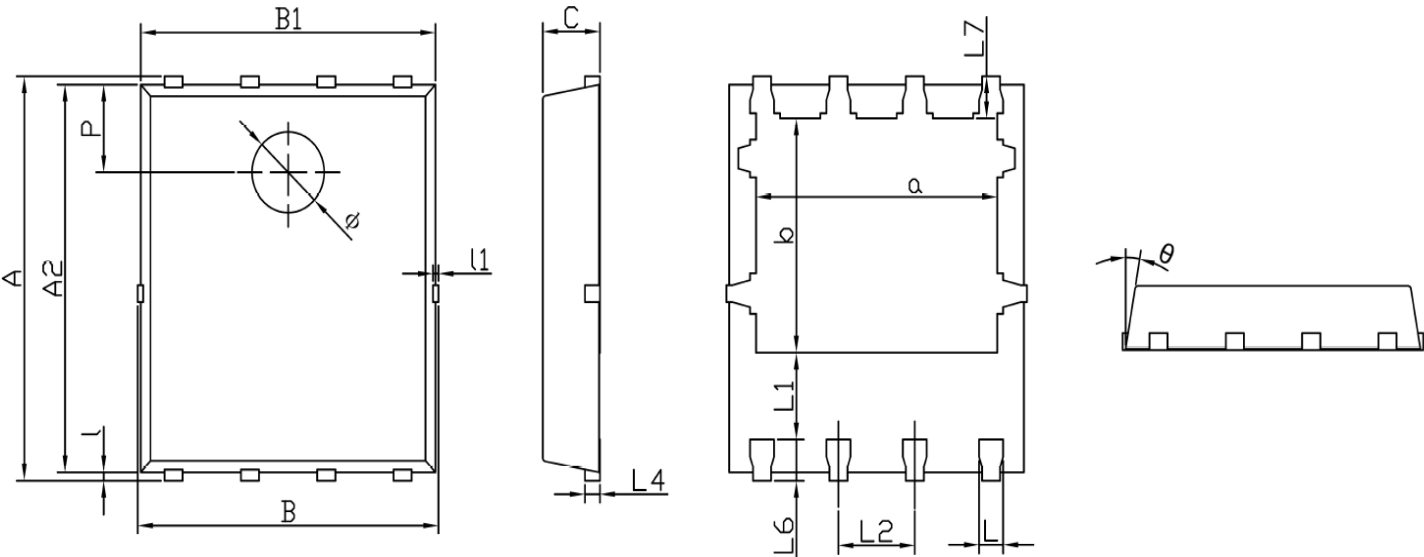
Typical Characteristic Curves





Package Outline

PDFN5x6-8L Dimensions in mm




| Symbol | Dimensions | | Symbol | Dimensions | |
|--------|------------|-------|--------|------------|------|
| | Min. | Max. | | Min. | Max. |
| A | 5.90 | 6.10 | L1 | 1.10 | - |
| a | 3.91 | 4.11 | l1 | - | 0.10 |
| A2 | 5.70 | 5.80 | L2 | 1.17 | 1.37 |
| B | 4.90 | 5.10 | L4 | 0.21 | 0.34 |
| b | 3.375 | 3.575 | L6 | 0.51 | 0.71 |
| B1 | 4.80 | 5.00 | L7 | 0.51 | 0.71 |
| C | 0.90 | 1.00 | P | 1.15 | 1.45 |
| L | 0.30 | 0.50 | θ | 8° | 12° |
| l | 0.06 | 0.20 | Φ | 1.10 | 1.30 |

Contact Information

TANI website: <http://www.tanisemi.com> Email:tani@tanisemi.com

For additional information, please contact your local Sales Representative.

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