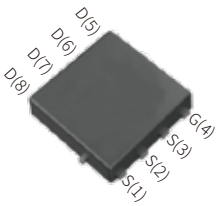
# FEATURES

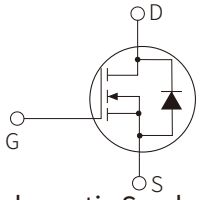
- $V_{DS}$=60V,$I_D$ =120A, $R_{DS(ON)}$ <6.3mΩ @ $V_{GS}$=10V
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation




PDFN5×6-8L

# APPLICATION

- PWM
- Load Switching




Schematic Symbol

# APPROVALS

| | |
|---|---|
| **RoHS** | Compliance with 2011/65/EU |
| **HF** | Compliance with IEC61249-2-21:2003 |

# ABSOLUTE MAXIMUM RATINGS ($T_A$=25°C )

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 60 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Drain Current-Continuous | $T_C$=25°C | $I_D$ | 120 | A |
| | $T_C$=100°C | | 95 | A |
| Pulsed Drain Current | | $I_{DM}$ | 395 | A |
| Maximum Power Dissipation | | $P_D$ | 52 | W |
| Derating factor | | | 0.41 | W/°C |
| Thermal Resistance, Junction to Case | | $R_{\theta JC}$ | 2.4 | °C/W |
| Operating and Storage Temperature Range | | $T_J$,$T_{STG}$ | -55 to +150 | °C |

# ELECTRICAL CHARACTERISTICS ($T_A$=25°C)

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristic** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V,$I_D$=250μA | 60 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=60V,$V_{GS}$=0V | | | 1 | μA |
| Gate to Body Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V ,$V_{DS}$=0V | | | ±100 | nA |
| **On Characteristics** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 2.4 | 3 | 3.6 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}$=10V,$I_D$=20A | | 4.9 | 6.3 | mΩ |
| **On Characteristics** (Note 3) | | | | | | |
| Input capacitance | $C_{iss}$ | $V_{GS}$=0V,$V_{DS}$=30V, f = 1.0MHz | | 3997 | | pF |
| Output capacitance | $C_{oss}$ | | | 285 | | pF |
| Reverse transfer capacitance | $C_{rss}$ | | | 210 | | pF |
| Total Gate Charge | $Q_g$ | $V_{DS}$=30V,$V_{GS}$=10V,$I_D$=20A | | 92 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 11 | | nC |
| Gate-Drain Charge | $Q_{gd}$ | | | 20 | | nC |
| **Switching Characteristics**(Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$=30V,$R_L$= 1Ω $V_{GS}$=10V,$R_G$= 3Ω | | 8.7 | | nS |
| Turn-on Rise Time | $t_r$ | | | 7.3 | | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 42 | | nS |
| Turn-Off Fall Time | $t_f$ | | | 17 | | nS |
| **Drain-Source Diode Characteristics and Maximum Ratings** | | | | | | |
| Maximum Continuous Drain to Source Diode Forward Current (Note 2) | $I_S$ | | | | 65 | A |
| Drain to Source Diode Forward Voltage (Note 3) | $V_{SD}$ | $V_{GS}$=0V, $I_S$=20A | | | 1.2 | V |
| Body Diode Reverse Recovery Time | $t_{rr}$ | $T_J$=25°C, $I_F$=20A, di/dt =100A/μs | | 32 | | ns |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | | | 45 | | nC |

Notes:
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ⩽ 10 sec.
3. Pulse Test: Pulse Width ⩽ 300μs, Duty Cycle ⩽ 2%.
4. Guaranteed by design, not subject to production

# CHARACTERISTIC CURVES

Figure 1: Output Characteristics

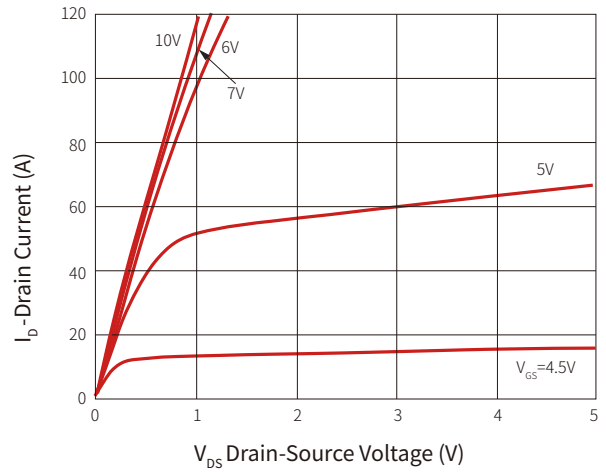



Figure 2: Transfer Characteristics

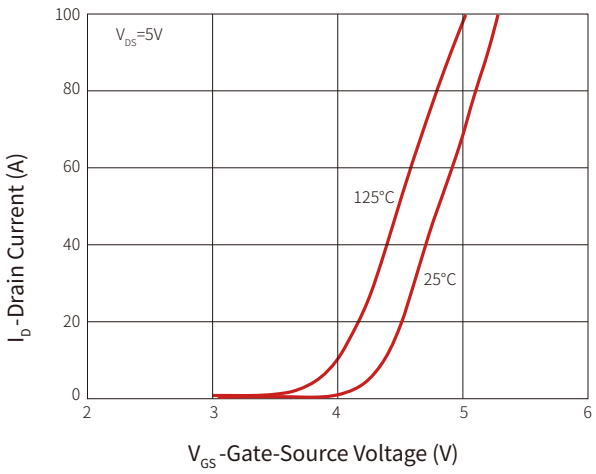



Figure 3: Rdson- Drain Current

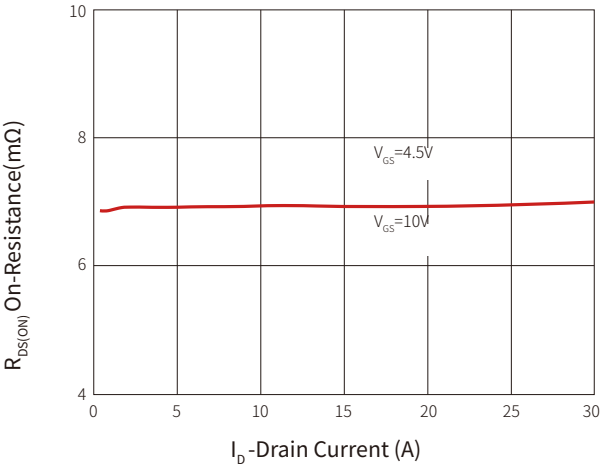
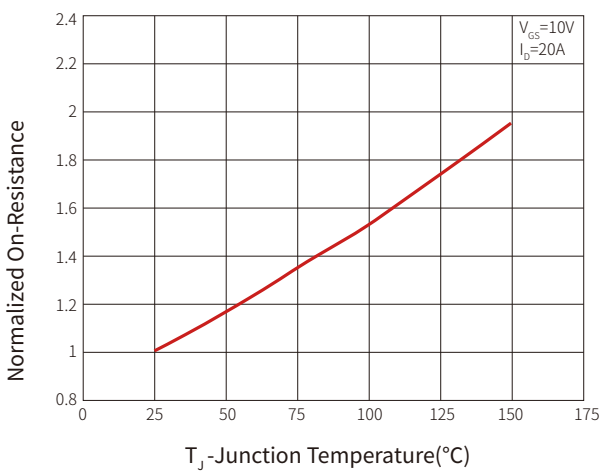
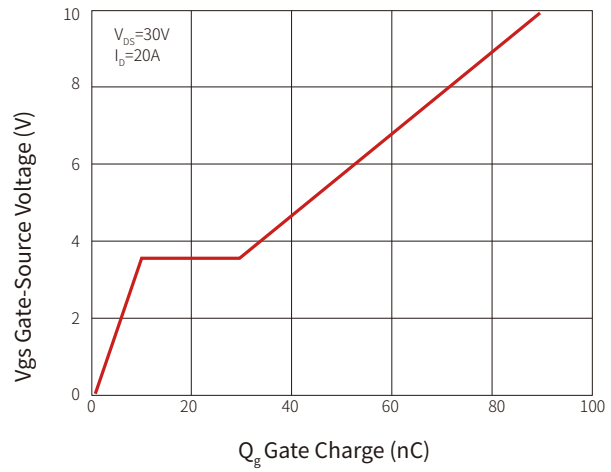


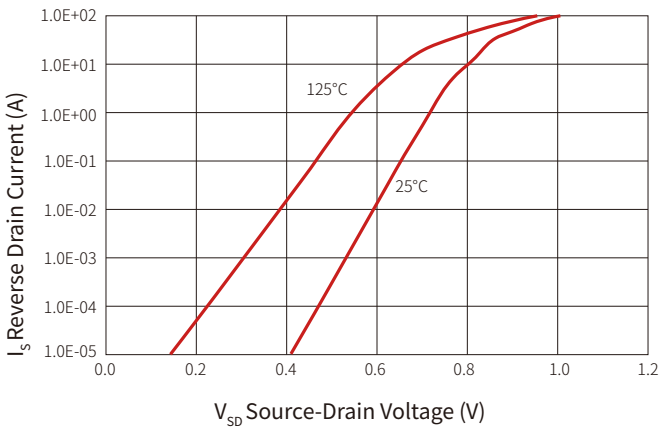

Figure 4: Rdson-JunctionTemperature



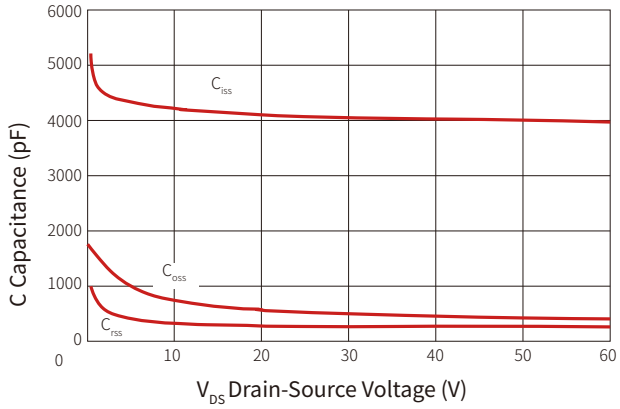
### Figure 5: Gate Charge



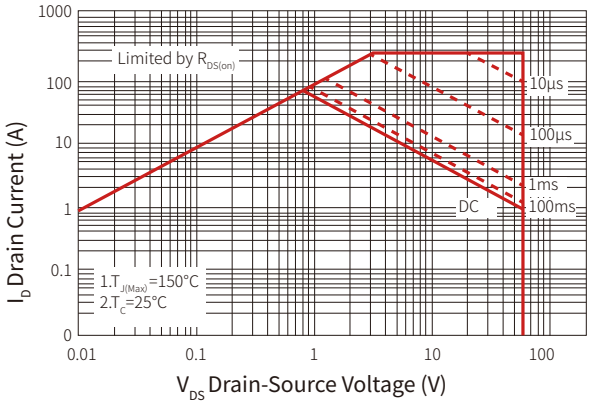

### Figure 6: Source- Drain Diode Forward



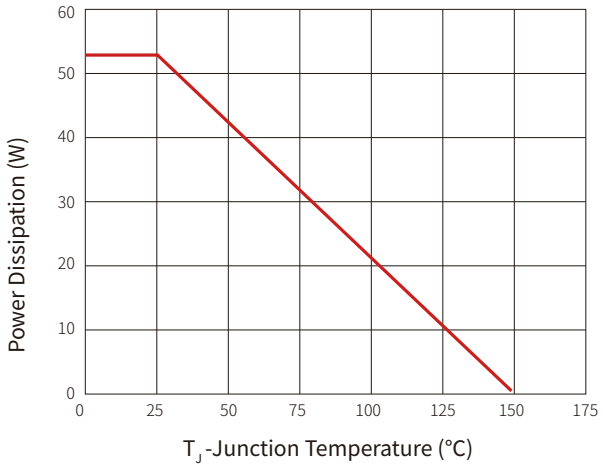

### Figure 7: Capacitance vs Vds




### Figure 8: Safe Operation Area




### Figure 9: Power De-rating




### Figure 10: $I_D$ Current- Junction Temperature

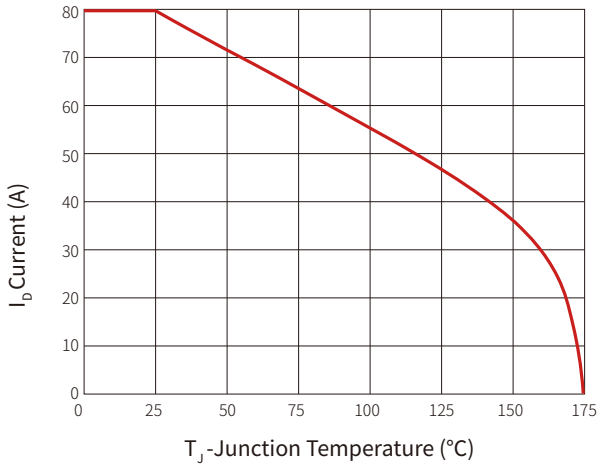
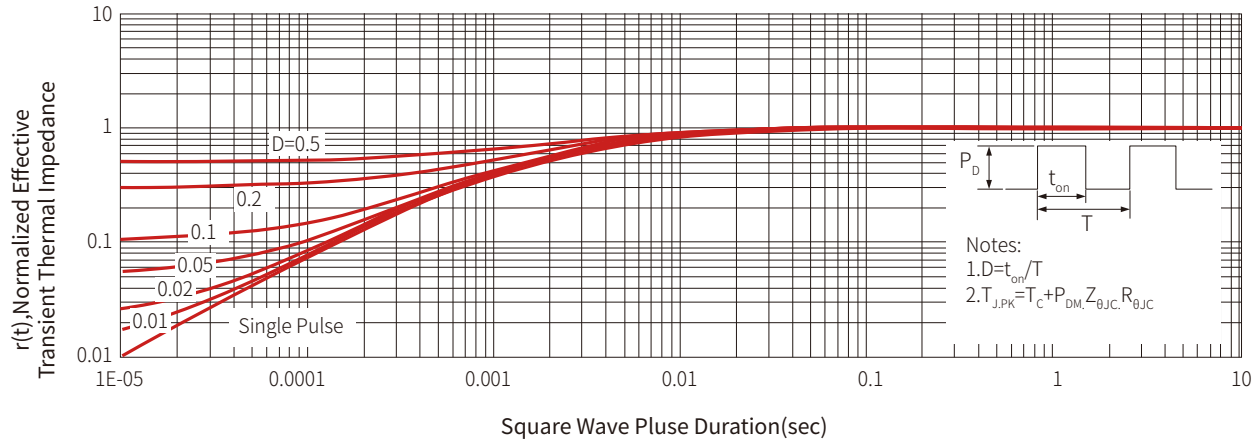
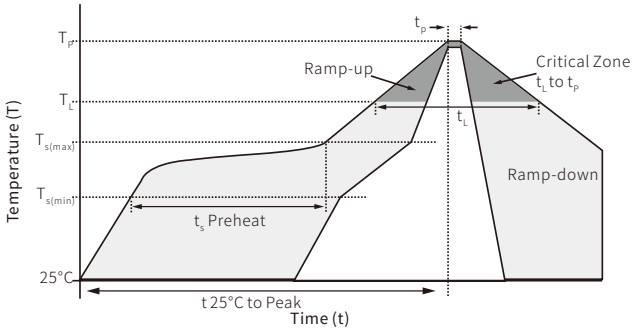


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

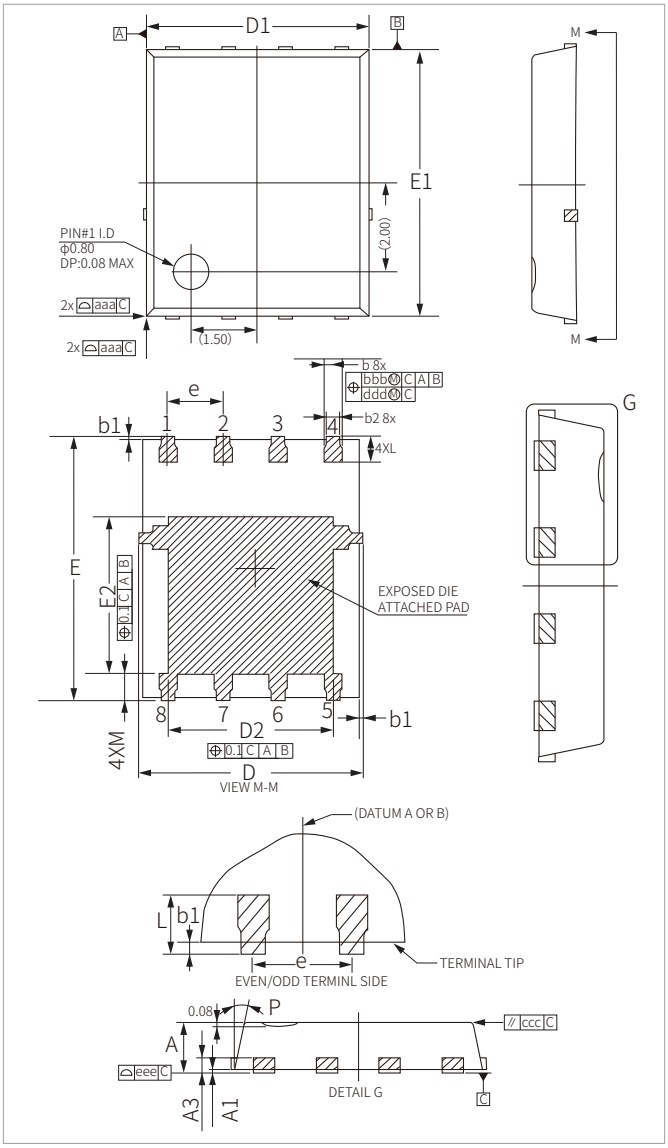



# SOLDERING PARAMETERS

| Reflow Condition | | Lead–free assembly |
|---|---|---|
| Pre Heat | Temperature Max ($T_{s(min)}$) | 150°C |
| | Temperature Max ($T_{s(max)}$) | 200°C |
| | Time (min to max) ($t_s$) | 60 – 180 secs |
| Average ramp up rate (Liquidus Temp ($T_L$) to peak | | 3°C/second max |
| | $T_{S(max)}$ to $T_L$ - Ramp-up Rate | 3°C/second max |
| Reflow | Temperature ($T_L$) (Liquidus) | 217°C |
| | Time (min to max) ($t_L$) | 60 – 150 seconds |
| Peak Temperature ($T_P$) | | 260°C |
| Time within 5°C of actual peak Temperature ($t_p$) | | 20 – 40 seconds |
| Ramp-down Rate | | 6°C/second max |
| Time 25°C to peak Temperature ($T_P$) | | 8 minutes max. |
| Do not exceed | | 260°C |



# PDFN5×6-8L PACKAGE INFORMATION




| Ref. | Millimeters | | Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 0.90 | 1.17 | 0.035 | 0.046 |
| A1 | 0.00 | 0.05 | 0.000 | 0.002 |
| A3 | 0.254REF | | 0.010REF | |
| b | 0.31 | 0.51 | 0.012 | 0.020 |
| b1 | 0.03 | 0.13 | 0.001 | 0.005 |
| b2 | 0.21 | 0.41 | 0.008 | 0.016 |
| D | 5.15BSC | | 0.203BSC | |
| D1 | 5.00BSC | | 0.197BSC | |
| D2 | 3.70 | 3.90 | 0.146 | 0.154 |
| E | 6.15BSC | | 0.242BSC | |
| E1 | 6.00BSC | | 0.236BSC | |
| E2 | 3.56 | 3.76 | 0.140 | 0.148 |
| e | 1.27BSC | | 0.050BSC | |
| L | 0.51 | 0.71 | 0.020 | 0.028 |
| M | 0.51 | 0.71 | 0.020 | 0.028 |
| P | 10° | 12° | 0.394° | 0.472° |
| aaa | 0.10 | | 0.004 | |
| bbb | 0.10 | | 0.004 | |
| ccc | 0.10 | | 0.004 | |
| ddd | 0.05 | | 0.002 | |
| eee | 0.08 | | 0.003 | |

# ORDERING INFORMATION

| Part Number | Component Package | Marking | QTY/Reel | Reel Size |
|---|---|---|---|---|
| SNM120N06G | PDFN5×6-8L | 120N06 XXXX | 5000PCS | 13” |

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