

### Product Summary

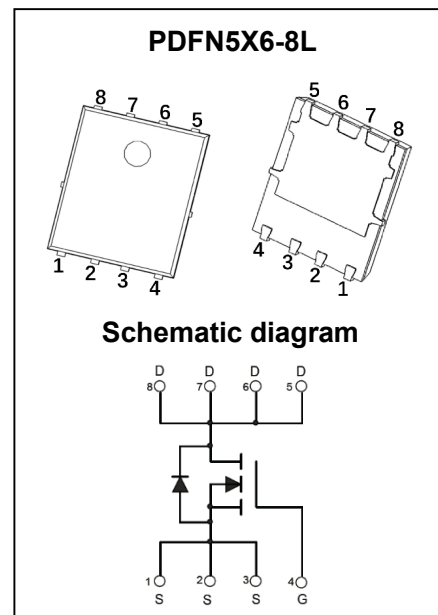
| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$    | $I_D$ |
|---------------|--------------------|-------|
| 40V           | 3.3m $\Omega$ @10V | 85A   |

### Feature

- Split Gate Trench Technology
- Low  $R_{DS(on)}$
- Low Gate Charge
- Low Gate Resistance
- 100% UIS Tested
- 100%  $\Delta V_{DS}$  Tested

### Application

- Power Switching Application
- DC/DC Converter



### MARKING:



T033N04N = Device Code  
XX = Date Code  
Solid Dot = Green Indicator

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Parameter                                                | Symbol                    | Value     | Unit               |
|----------------------------------------------------------|---------------------------|-----------|--------------------|
| Drain - Source Voltage                                   | $V_{DS}$                  | 40        | V                  |
| Gate - Source Voltage                                    | $V_{GS}$                  | $\pm 20$  | V                  |
| Continuous Drain Current <sup>1</sup>                    | $T_C = 25^\circ\text{C}$  | $I_D$     | 85                 |
|                                                          | $T_C = 100^\circ\text{C}$ | $I_D$     | 55                 |
| Pulsed Drain Current <sup>2</sup>                        | $I_{DM}$                  | 340       | A                  |
| Single Pulsed Avalanche Current <sup>3</sup>             | $I_{AS}$                  | 31        | A                  |
| Single Pulsed Avalanche Energy <sup>3</sup>              | $E_{AS}$                  | 240       | mJ                 |
| Power Dissipation <sup>5</sup>                           | $T_C = 25^\circ\text{C}$  | $P_D$     | 63                 |
| Thermal Resistance from Junction to Ambient <sup>6</sup> | $R_{\theta JA}$           | 58        | $^\circ\text{C/W}$ |
| Thermal Resistance from Junction to Case                 | $R_{\theta JC}$           | 2         | $^\circ\text{C/W}$ |
| Junction Temperature                                     | $T_J$                     | 150       | $^\circ\text{C}$   |
| Storage Temperature                                      | $T_{STG}$                 | -55~ +150 | $^\circ\text{C}$   |

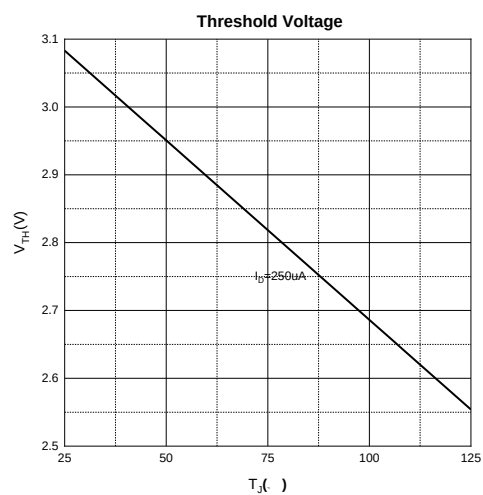
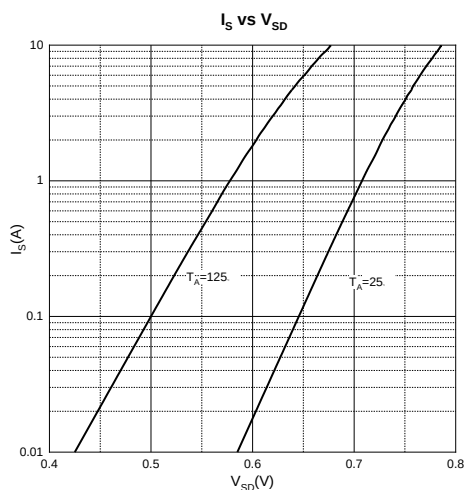
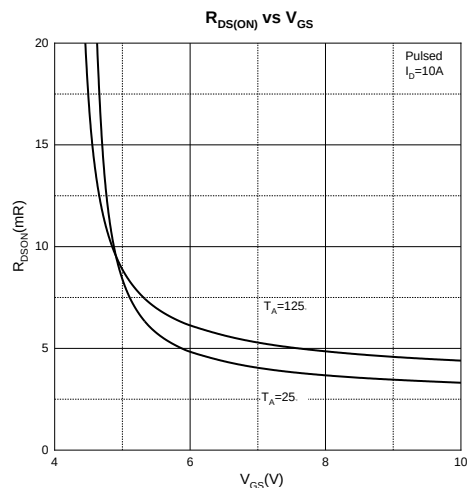
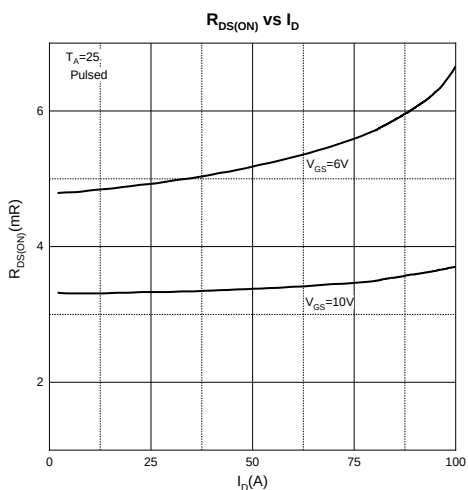
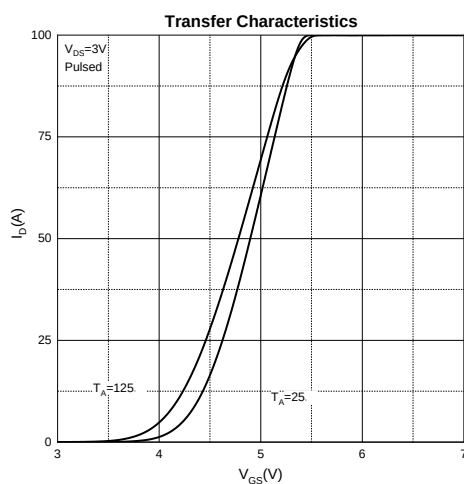
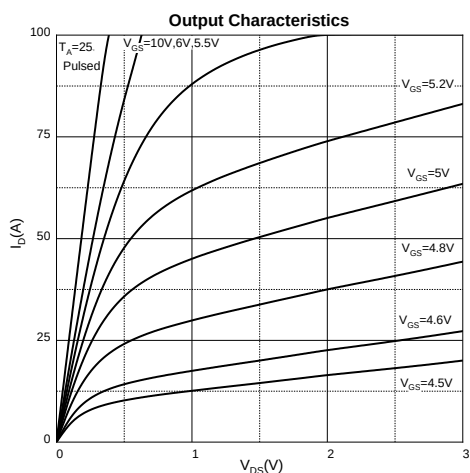
**MOSFET ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$  unless otherwise noted)**

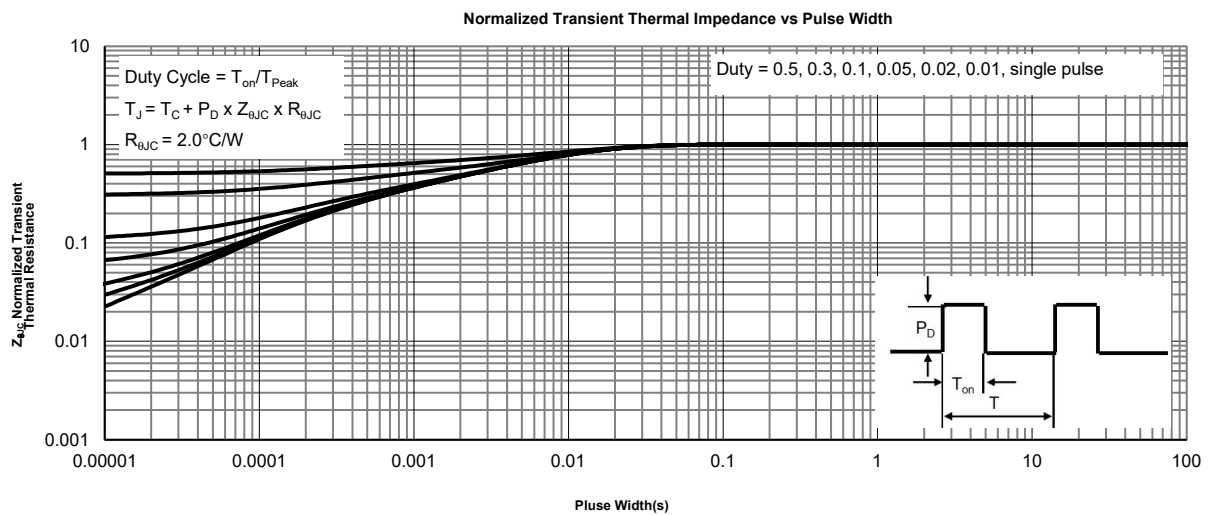
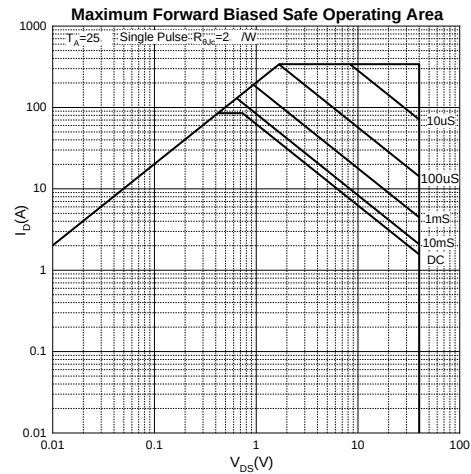
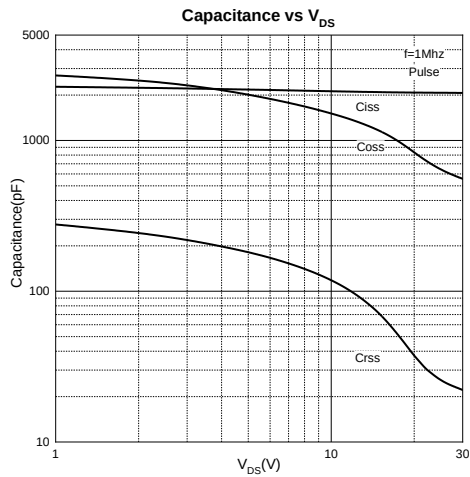
| Parameter                            | Symbol        | Test Condition                                           | Min | Type | Max       | Unit       |
|--------------------------------------|---------------|----------------------------------------------------------|-----|------|-----------|------------|
| Off Characteristics                  |               |                                                          |     |      |           |            |
| Drain - Source Breakdown Voltage     | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$                            | 40  |      |           | V          |
| Zero Gate Voltage Drain Current      | $I_{DSS}$     | $V_{DS} = 40V, V_{GS} = 0V$                              |     |      | 1         | $\mu A$    |
| Gate - Body Leakage Current          | $I_{GSS}$     | $V_{GS} = \pm 20V, V_{DS} = 0V$                          |     |      | $\pm 100$ | nA         |
| On Characteristics <sup>4</sup>      |               |                                                          |     |      |           |            |
| Gate Threshold Voltage               | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = 250\mu A$                        | 2   | 3    | 4         | V          |
| Drain-source On-resistance           | $R_{DS(on)}$  | $V_{GS} = 10V, I_D = 10A$                                |     | 3.3  | 4.3       | m $\Omega$ |
| Dynamic Characteristics              |               |                                                          |     |      |           |            |
| Input Capacitance                    | $C_{iss}$     | $V_{DS} = 20V, V_{GS} = 0V, f = 1MHz$                    |     | 2088 |           | pF         |
| Output Capacitance                   | $C_{oss}$     |                                                          |     | 877  |           |            |
| Reverse Transfer Capacitance         | $C_{rss}$     |                                                          |     | 46   |           |            |
| Gate Resistance                      | $R_g$         | $V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$                     |     | 3.7  |           | $\Omega$   |
| Switching Characteristics            |               |                                                          |     |      |           |            |
| Total Gate Charge                    | $Q_g$         | $V_{DS} = 20V, V_{GS} = 10V, I_D = 10A$                  |     | 31   |           | nC         |
| Gate-source Charge                   | $Q_{gs}$      |                                                          |     | 9.2  |           |            |
| Gate-drain Charge                    | $Q_{gd}$      |                                                          |     | 5.5  |           |            |
| Turn-on Delay Time                   | $t_{d(on)}$   | $V_{DD} = 20V, V_{GS} = 10V, R_G = 1.6\Omega, I_D = 20A$ |     | 8.5  |           | ns         |
| Turn-on Rise Time                    | $t_r$         |                                                          |     | 4.9  |           |            |
| Turn-off Delay Time                  | $t_{d(off)}$  |                                                          |     | 38   |           |            |
| Turn-off Fall Time                   | $t_f$         |                                                          |     | 8.5  |           |            |
| Source - Drain Diode Characteristics |               |                                                          |     |      |           |            |
| Diode Forward Voltage <sup>4</sup>   | $V_{SD}$      | $V_{GS} = 0V, I_S = 10A$                                 |     |      | 1.2       | V          |

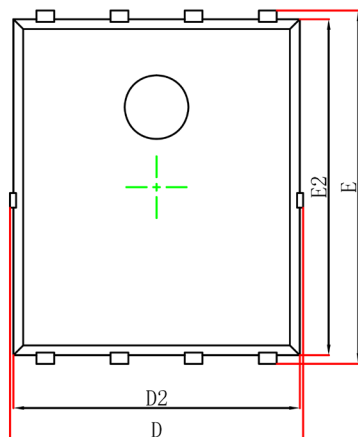
Notes :

- 1.The maximum current rating is limited by package.And device mounted on a large heatsink
- 2.Pulse Test : Pulse Width  $\leq 10\mu s$ , duty cycle  $\leq 1\%$ .
- 3.EAS condition:  $V_{DD} = 20V, V_{GS} = 10V, L = 0.5mH, R_G = 25\Omega$  Starting  $T_J = 25^\circ\text{C}$ .
- 4.Pulse Test : Pulse Width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
- 5.The power dissipation  $P_D$  is limited by  $T_{J(MAX)} = 40^\circ\text{C}$ .And device mounted on a large heatsink
- 6.Device mounted on  $1in^2$  FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ .

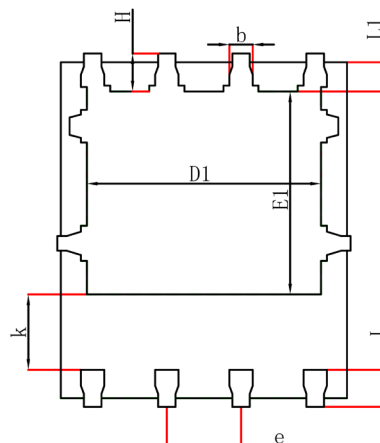
## Typical Characteristics



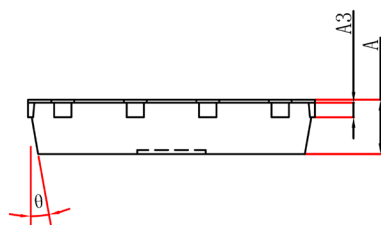


**PDFN5X6-8L Package Information**


Top View  
[顶视图]



Bottom View  
[背视图]



Side View  
[侧视图]

| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.900                     | 1.10  | 0.035                | 0.043 |
| A3     | 0.254REF                  |       | 0.010REF             |       |
| D      | 4.700                     | 5.260 | 0.185                | 0.207 |
| E      | 5.750                     | 6.250 | 0.226                | 0.246 |
| D1     | 3.560                     | 4.500 | 0.140                | 0.177 |
| E1     | 3.180                     | 3.660 | 0.125                | 0.144 |
| D2     | 4.700                     | 5.100 | 0.185                | 0.201 |
| E2     | 5.600                     | 6.000 | 0.220                | 0.236 |
| k      | 1.100                     | -     | 0.043                | -     |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| e      | 1.270TYP                  |       | 0.050TYP             |       |
| L      | 0.510                     | 0.710 | 0.020                | 0.028 |
| L1     | 0.424                     | 0.576 | 0.017                | 0.023 |
| H      | 0.510                     | 0.710 | 0.020                | 0.028 |
| θ      | 8°                        | 12°   | 8°                   | 12°   |