

### Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---------------|-----------------|-------|
| -30V          | 2.0mΩ@-10V      | -110A |
|               | 2.6mΩ@-4.5V     |       |

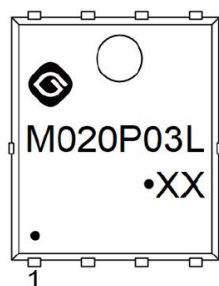
### Feature

- Trench Technology Power MOSFET
- Low  $R_{DS(ON)}$
- Low Gate Charge
- Low Gate Resistance
- 100% UIS Tested

### Application

- Power Switching Application

### MARKING:

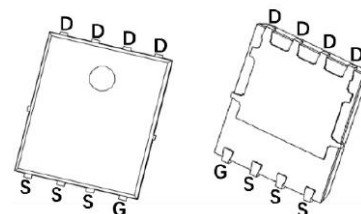


M020P03L = Device Code

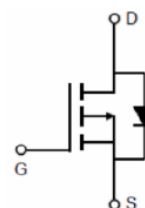
XX = Date Code

Solid Dot = Green Indicator

PDFN5X6-8L



Schematic diagram



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

| Parameter                                                |                           | Symbol          | Value     | Unit               |
|----------------------------------------------------------|---------------------------|-----------------|-----------|--------------------|
| Drain-Source Voltage                                     |                           | $V_{DS}$        | -30       | V                  |
| Gate-Source Voltage                                      |                           | $V_{GS}$        | ±20       | V                  |
| Continuous Drain Current <sup>1</sup>                    | $T_C = 25^\circ\text{C}$  | $I_D$           | -110      | A                  |
|                                                          | $T_C = 100^\circ\text{C}$ | $I_D$           | -70       | A                  |
| Pulsed Drain Current <sup>2</sup>                        |                           | $I_{DM}$        | -440      | A                  |
| Single Pulsed Avalanche Current <sup>3</sup>             |                           | $I_{AS}$        | -55       | A                  |
| Single Pulsed Avalanche Energy <sup>3</sup>              |                           | $E_{AS}$        | 756       | mJ                 |
| Power Dissipation <sup>5</sup>                           | $T_C = 25^\circ\text{C}$  | $P_D$           | 83        | W                  |
|                                                          |                           |                 |           |                    |
| Thermal Resistance from Junction to Ambient <sup>6</sup> |                           | $R_{\theta JA}$ | 55        | $^\circ\text{C/W}$ |
| Thermal Resistance from Junction to Case                 |                           | $R_{\theta JC}$ | 1.5       | $^\circ\text{C/W}$ |
| Junction Temperature                                     |                           | $T_J$           | 150       | $^\circ\text{C}$   |
| Storage Temperature                                      |                           | $T_{STG}$       | -55~ +150 | $^\circ\text{C}$   |

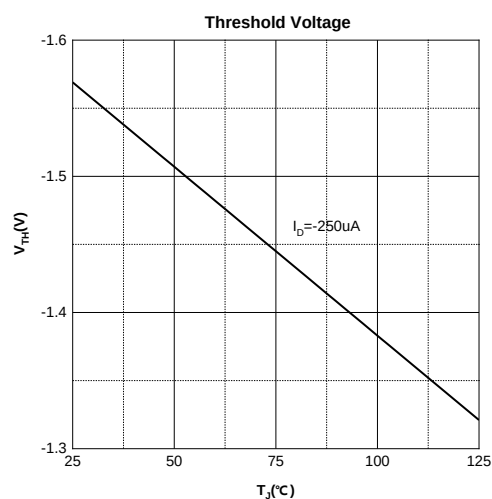
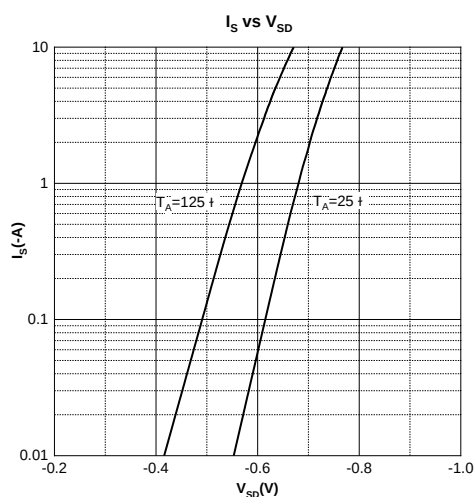
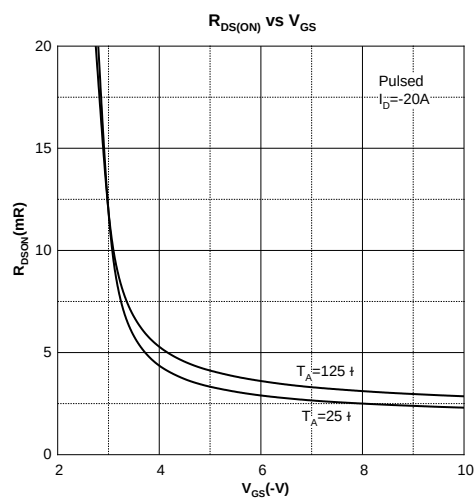
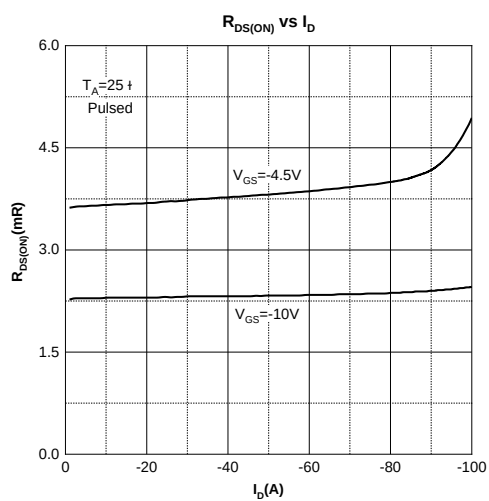
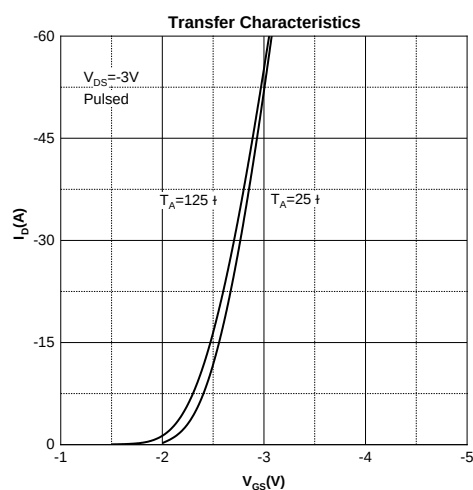
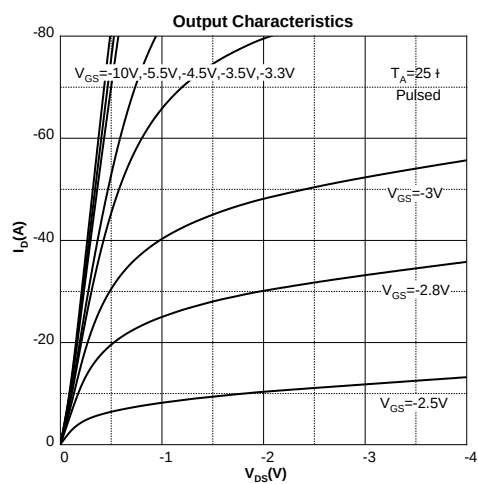
**MOSFET ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$  unless otherwise noted)**

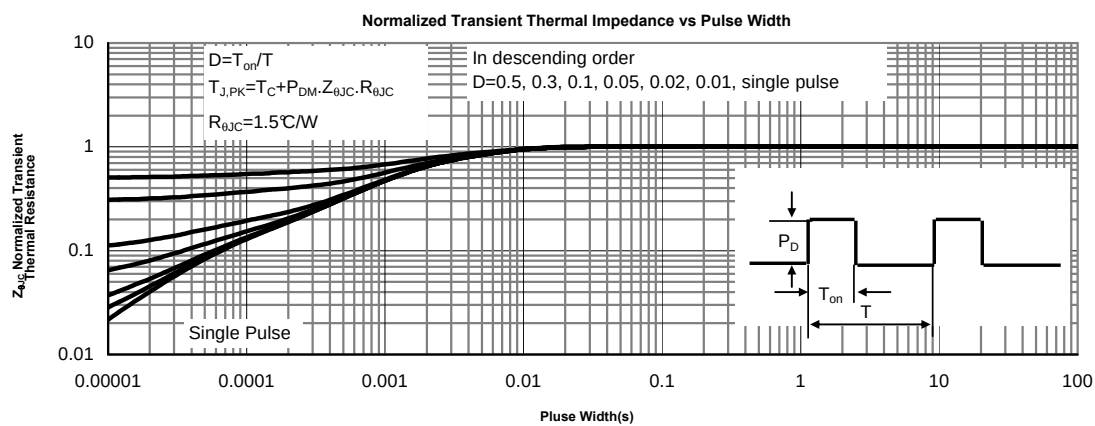
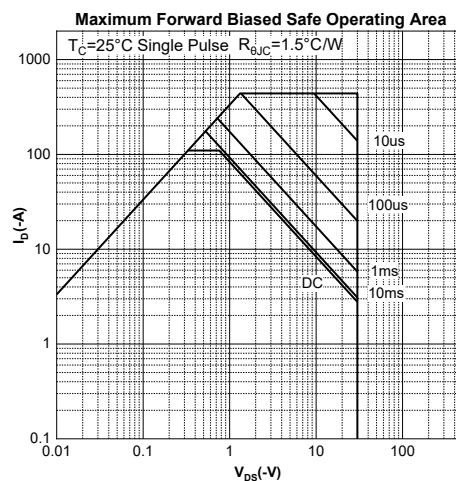
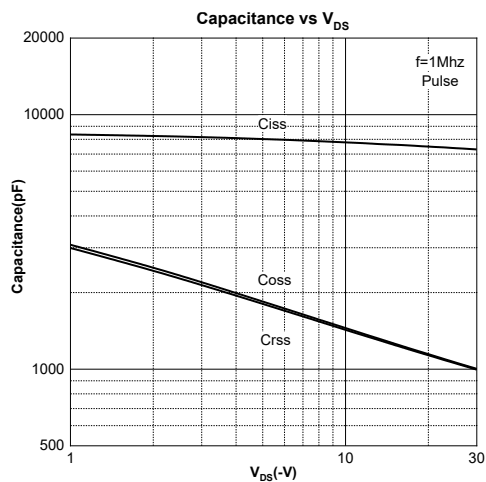
| Parameter                          | Symbol        | Test Condition                                                       | Min | Type | Max       | Unit       |
|------------------------------------|---------------|----------------------------------------------------------------------|-----|------|-----------|------------|
| Off Characteristics                |               |                                                                      |     |      |           |            |
| Drain-Source Breakdown Voltage     | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = -250\mu A$                                       | -30 |      |           | V          |
| Zero Gate Voltage Drain Current    | $I_{DSS}$     | $V_{DS} = -30V, V_{GS} = 0V$                                         |     |      | -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             | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = -250\mu A$                                   | -1  | -1.6 | -3        | V          |
| Drain-Source On-Resistance         | $R_{DS(on)}$  | $V_{GS} = -10V, I_D = -20A$                                          |     | 2.0  | 2.8       | m $\Omega$ |
|                                    |               | $V_{GS} = -4.5V, I_D = -20A$                                         |     | 2.6  | 4.0       |            |
| Dynamic Characteristics            |               |                                                                      |     |      |           |            |
| Input Capacitance                  | $C_{iss}$     | $V_{DS} = -15V, V_{GS} = 0V, f = 1MHz$                               |     | 7473 |           | pF         |
| Output Capacitance                 | $C_{oss}$     |                                                                      |     | 1029 |           |            |
| Reverse Transfer Capacitance       | $C_{rss}$     |                                                                      |     | 990  |           |            |
| Gate Resistance                    | $R_g$         | $V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$                                 |     | 3.2  |           | $\Omega$   |
| Switching Characteristics          |               |                                                                      |     |      |           |            |
| Total Gate Charge                  | $Q_g$         | $V_{DS} = -20V, V_{GS} = -10V, I_D = -15A$                           |     | 164  |           | nC         |
| Gate-Source Charge                 | $Q_{gs}$      |                                                                      |     | 14   |           |            |
| Gate-Drain Charge                  | $Q_{gd}$      |                                                                      |     | 42   |           |            |
| Turn-On Delay Time                 | $t_{d(on)}$   | $V_{DD} = -15V, V_{GS} = -10V,$<br>$R_L = 0.75\Omega, R_G = 3\Omega$ |     | 15   |           | ns         |
| Turn-On Rise Time                  | $t_r$         |                                                                      |     | 20   |           |            |
| Turn-Off Delay Time                | $t_{d(off)}$  |                                                                      |     | 135  |           |            |
| Turn-Off Fall Time                 | $t_f$         |                                                                      |     | 54   |           |            |
| Source-Drain Diode Characteristics |               |                                                                      |     |      |           |            |
| Diode Forward Voltage <sup>4</sup> | $V_{SD}$      | $V_{GS} = 0V, I_S = -20A$                                            |     |      | -1.2      | V          |

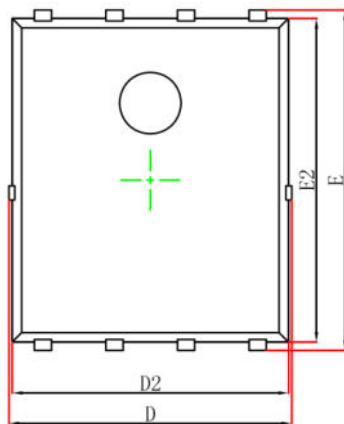
Notes :

- 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:  $V_{DD} = -30V, V_{GS} = -10V, L = 0.5mH, R_G = 25\Omega$  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  $T_{J(MAX)} = 150^\circ\text{C}$ . And device mounted on a large heatsink.
- 6.Device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ .

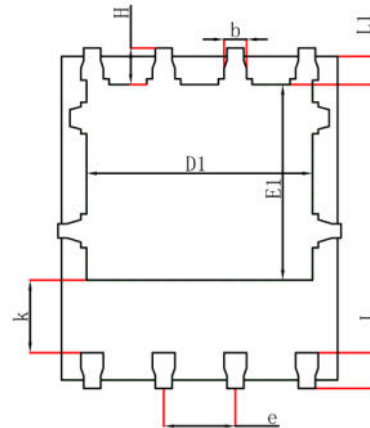
## Typical Characteristics



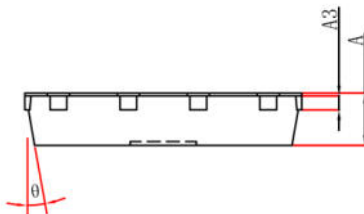


**PDFN5X6-8L Package Information**


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 |
| d      | 8Å                        | 12Å   | 8Å                   | 12Å   |

**Attention:**

- GreenPower Electronics reserves the right to improve product design function and reliability without notice.
- Any and all semiconductor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.
- GreenPower Electronics products belong to consumer electronics or other civilian electronic products.