



# PJM50C30DN

## N and P-Channel Complementary Power MOSFET

### Product Summary

#### N-Channel

- $V_{DS} = 30V, I_D = 50A$
- $R_{DS(on)} < 8m\Omega @ V_{GS} = 10V$
- $R_{DS(on)} < 14m\Omega @ V_{GS} = 4.5V$

#### P-Channel

- $V_{DS} = -30V, I_D = -50A$
- $R_{DS(on)} < 13m\Omega @ V_{GS} = -10V$
- $R_{DS(on)} < 20m\Omega @ V_{GS} = -4.5V$

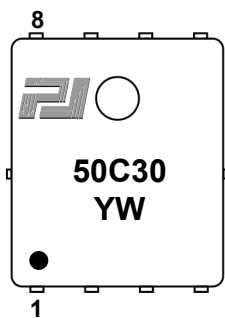
### Features

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

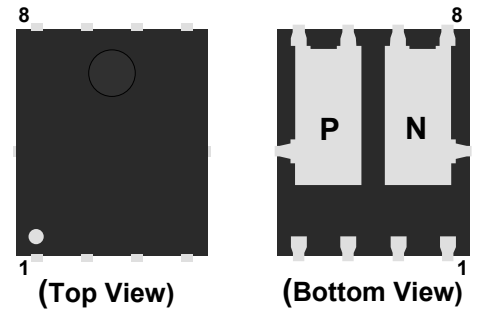
### Application

- Lithium Battery Protection
- Wireless Impact
- Mobile Phone Fast Charging

### Marking Code

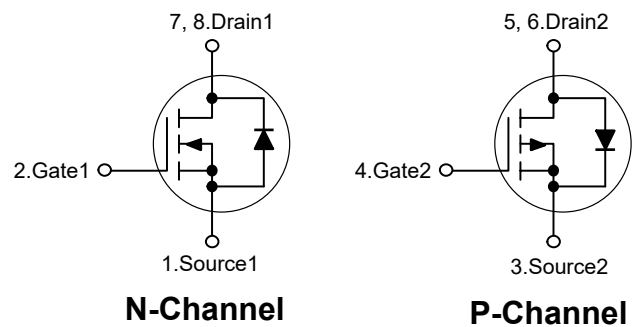


### PDFN5x6A-8L



| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | Source1     | 4   | Gate2       |
| 2   | Gate1       | 5,6 | Drain2      |
| 3   | Source2     | 7,8 | Drain1      |

### Schematic Diagram



### Absolute Maximum Ratings

Ratings at 25°C case temperature unless otherwise specified.

| Parameter                                      |                     | Symbol    | N-Channel   | P-Channel | Unit       |
|------------------------------------------------|---------------------|-----------|-------------|-----------|------------|
| Drain-Source Voltage                           |                     | $V_{DS}$  | 30          | -30       | V          |
| Gate-Source Voltage                            |                     | $V_{GS}$  | $\pm 20$    |           | V          |
| Drain Current-Continuous                       | $T_C = 25^\circ C$  | $I_D$     | 50          | -50       | A          |
|                                                | $T_C = 100^\circ C$ |           | 25          | -26       |            |
| Drain Current-Pulsed <sup>Note1</sup>          |                     | $I_{DM}$  | 125         | -140      | A          |
| Single Pulse Avalanche Energy <sup>Note2</sup> |                     | $E_{AS}$  | 55          | 84.5      | mJ         |
| Maximum Power Dissipation                      |                     | $P_D$     | 18          | 22        | W          |
| Junction Temperature                           |                     | $T_J$     | 150         |           | $^\circ C$ |
| Storage Temperature Range                      |                     | $T_{STG}$ | -55 to +150 |           | $^\circ C$ |

### Thermal Characteristics

|                                                       |                 |      |      |              |
|-------------------------------------------------------|-----------------|------|------|--------------|
| Thermal Resistance, Junction-to-Case <sup>Note3</sup> | $R_{\theta JC}$ | 6.95 | 5.68 | $^\circ C/W$ |
|-------------------------------------------------------|-----------------|------|------|--------------|



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## N and P-Channel Complementary Power MOSFET

### N-Channel

#### Electrical Characteristics

( $T_a=25^{\circ}\text{C}$  unless otherwise specified)

| Parameter                                   | Symbol        | Test Condition                                          | Min. | Typ. | Max.      | Unit       |
|---------------------------------------------|---------------|---------------------------------------------------------|------|------|-----------|------------|
| Static 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         |
| Gate Threshold Voltage <sup>Note4</sup>     | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=250\mu A$                           | 1    | 1.5  | 2.5       | V          |
| Drain-Source On-Resistance <sup>Note4</sup> | $R_{DS(on)}$  | $V_{GS}=10V, I_D=12A$                                   | --   | 6.2  | 8         | m $\Omega$ |
|                                             |               | $V_{GS}=4.5V, I_D=10A$                                  | --   | 9.8  | 14        | m $\Omega$ |
| Forward Transconductance <sup>Note4</sup>   | $g_{FS}$      | $V_{DS}=5V, I_D=3A$                                     | 5    | --   | --        | S          |
| Dynamic Characteristics                     |               |                                                         |      |      |           |            |
| Input Capacitance                           | $C_{iss}$     | $V_{DS}=15V, V_{GS}=0V, f=1MHz$                         | --   | 1300 | --        | pF         |
| Output Capacitance                          | $C_{oss}$     |                                                         | --   | 158  | --        | pF         |
| Reverse Transfer Capacitance                | $C_{rss}$     |                                                         | --   | 129  | --        | pF         |
| Gate Resistance                             | $R_g$         | $V_{DS}=0V, V_{GS}=0V, f=1MHz$                          | --   | 1.3  | --        | $\Omega$   |
| Total Gate Charge                           | $Q_g$         | $V_{DS}=20V, I_D=15A,$<br>$V_{GS}=10V$                  | --   | 23   | --        | nC         |
| Gate-Source Charge                          | $Q_{gs}$      |                                                         | --   | 4.5  | --        | nC         |
| Gate-Drain Charge                           | $Q_{gd}$      |                                                         | --   | 5.5  | --        | nC         |
| Switching Characteristics                   |               |                                                         |      |      |           |            |
| Turn-on Delay Time                          | $t_{d(on)}$   | $V_{DD}=15V, I_D=15A,$<br>$V_{GS}=10V, R_{GEN}=3\Omega$ | --   | 7    | --        | nS         |
| Turn-on Rise Time                           | $t_r$         |                                                         | --   | 15   | --        | nS         |
| Turn-off Delay Time                         | $t_{d(off)}$  |                                                         | --   | 25   | --        | nS         |
| Turn-off Fall Time                          | $t_f$         |                                                         | --   | 6    | --        | nS         |
| Source-Drain Diode Characteristics          |               |                                                         |      |      |           |            |
| Diode Forward Voltage <sup>Note4</sup>      | $V_{SD}$      | $V_{GS}=0V, I_S=30A$                                    | --   | --   | 1.2       | V          |
| Diode Forward Current                       | $I_S$         |                                                         | --   | --   | 50        | A          |

Note :

1. Repetitive Rating:Pulse width limited by maximum junction temperature
2. EAS condition:  $T_J=25^{\circ}\text{C}$ ,  $V_{DD}=25V$ ,  $V_{GS}=10V$ ,  $R_G=25\Omega$ ,  $L=1mH$ ,  $I_{AS}=10.5A$
3. Surface mounted on 1inch<sup>2</sup> FR-4 board with 2OZ copper
4. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycles $\leq 2\%$



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### P-Channel

#### Electrical Characteristics

( $T_a=25^{\circ}\text{C}$  unless otherwise specified)

| Parameter                                   | Symbol                | Test Condition                                                                             | Min. | Typ. | Max. | Unit |
|---------------------------------------------|-----------------------|--------------------------------------------------------------------------------------------|------|------|------|------|
| Static Characteristics                      |                       |                                                                                            |      |      |      |      |
| Drain-Source Breakdown Voltage              | -V <sub>(BR)DSS</sub> | V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA                                                | 30   | --   | --   | V    |
| Zero Gate Voltage Drain Current             | -I <sub>DSS</sub>     | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V                                                 | --   | --   | 1    | μA   |
| Gate-Body Leakage Current                   | I <sub>GSS</sub>      | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                                 | --   | --   | ±100 | nA   |
| Gate Threshold Voltage <sup>Note4</sup>     | -V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                                  | 1    | 1.5  | 2.5  | V    |
| Drain-Source On-Resistance <sup>Note4</sup> | R <sub>DS(on)</sub>   | V <sub>GS</sub> =-10V, I <sub>D</sub> =-10A                                                | --   | 9.2  | 13   | mΩ   |
|                                             |                       | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A                                                | --   | 14.3 | 20   | mΩ   |
| Forward Transconductance <sup>Note4</sup>   | g <sub>FS</sub>       | V <sub>DS</sub> =-5V, I <sub>D</sub> =-3A                                                  | 7    | --   | --   | S    |
| Dynamic Characteristics                     |                       |                                                                                            |      |      |      |      |
| Input Capacitance                           | C <sub>iss</sub>      | V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz                                         | --   | 1488 | --   | pF   |
| Output Capacitance                          | C <sub>oss</sub>      |                                                                                            | --   | 265  | --   | pF   |
| Reverse Transfer Capacitance                | C <sub>rss</sub>      |                                                                                            | --   | 215  | --   | pF   |
| Gate Resistance                             | R <sub>g</sub>        | V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz                                           | --   | 15.8 | --   | Ω    |
| Total Gate Charge                           | Q <sub>g</sub>        | V <sub>DS</sub> =-24V, I <sub>D</sub> =-1A,<br>V <sub>GS</sub> =-10V                       | --   | 22   | --   | nC   |
| Gate-Source Charge                          | Q <sub>gs</sub>       |                                                                                            | --   | 4    | --   | nC   |
| Gate-Drain Charge                           | Q <sub>gd</sub>       |                                                                                            | --   | 5.8  | --   | nC   |
| Switching Characteristics                   |                       |                                                                                            |      |      |      |      |
| Turn-on Delay Time                          | t <sub>d(on)</sub>    | V <sub>DD</sub> =-24V, I <sub>D</sub> =-1A,<br>V <sub>GS</sub> =-10V, R <sub>GEN</sub> =7Ω | --   | 9    | --   | nS   |
| Turn-on Rise Time                           | t <sub>r</sub>        |                                                                                            | --   | 13   | --   | nS   |
| Turn-off Delay Time                         | t <sub>d(off)</sub>   |                                                                                            | --   | 48   | --   | nS   |
| Turn-off Fall Time                          | t <sub>f</sub>        |                                                                                            | --   | 20   | --   | nS   |
| Source-Drain Diode Characteristics          |                       |                                                                                            |      |      |      |      |
| Diode Forward Voltage <sup>Note2</sup>      | -V <sub>SD</sub>      | V <sub>GS</sub> =0V, I <sub>S</sub> =-30A                                                  | --   | --   | 1.2  | V    |
| Diode Forward Current                       | -I <sub>S</sub>       |                                                                                            | --   | --   | 50   | A    |

Note :

1. Repetitive Rating:Pulse width limited by maximum junction temperature
2. EAS condition:  $T_J=25^{\circ}\text{C}$ ,  $V_{DD}=-25V$ ,  $V_{GS}=-10V$ ,  $R_G=25\Omega$ ,  $L=1\text{mH}$ ,  $I_{AS}=-13A$
3. Surface mounted on 1inch<sup>2</sup> FR-4 board with 2OZ copper
4. Pulse Test: Pulse Width $\leq 300\mu\text{s}$ , Duty Cycle $\leq 2\%$

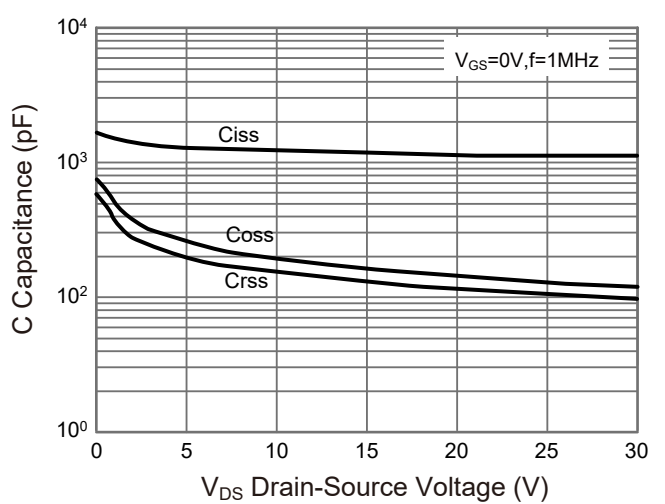
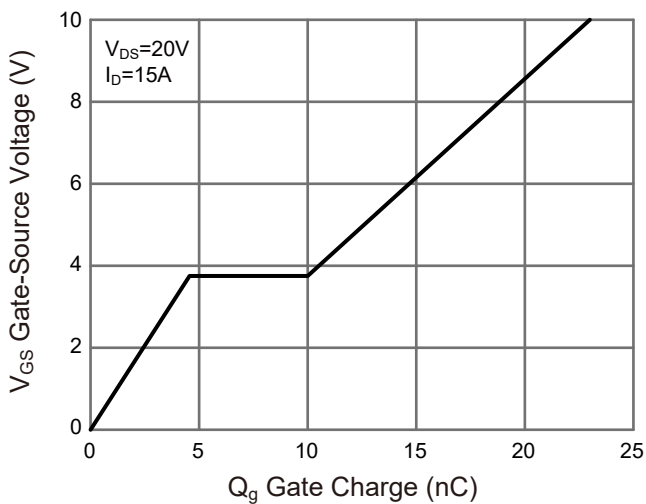
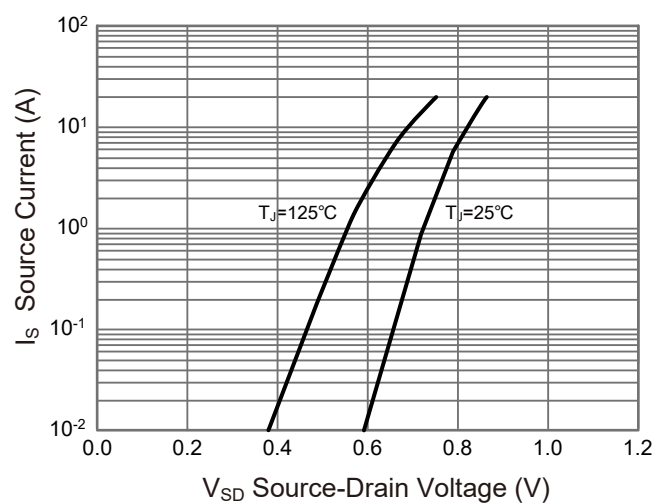
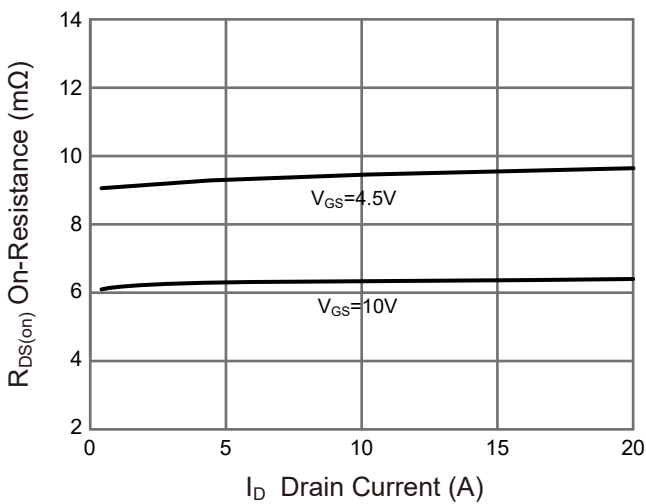
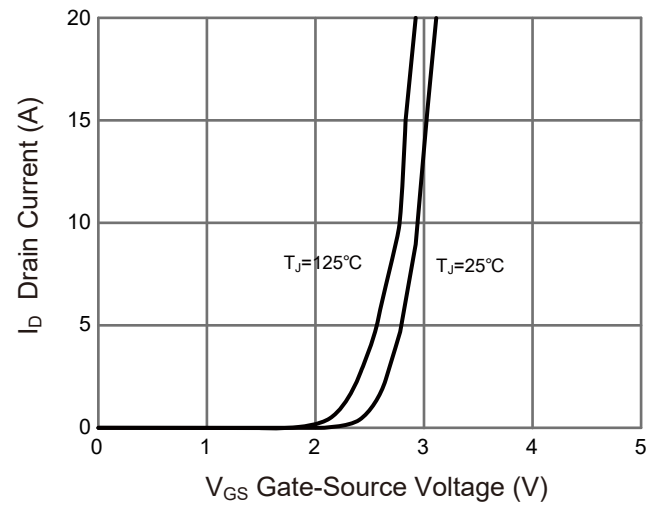
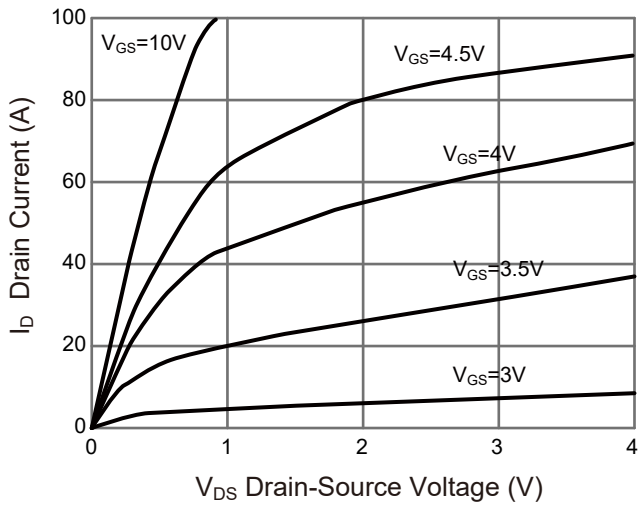


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### N-Channel

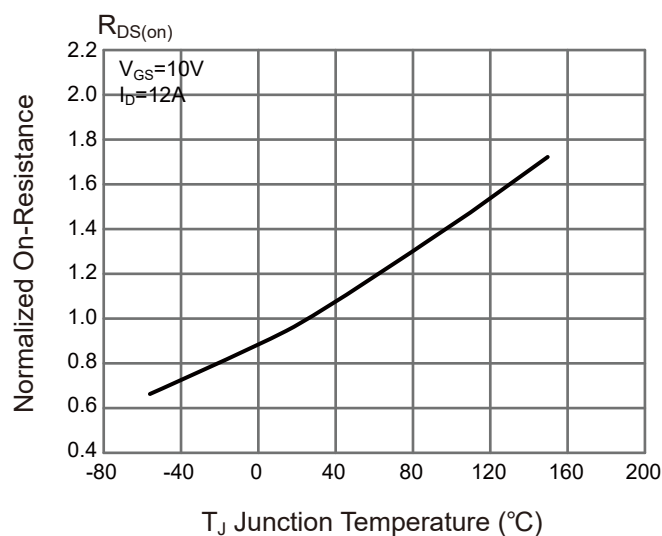
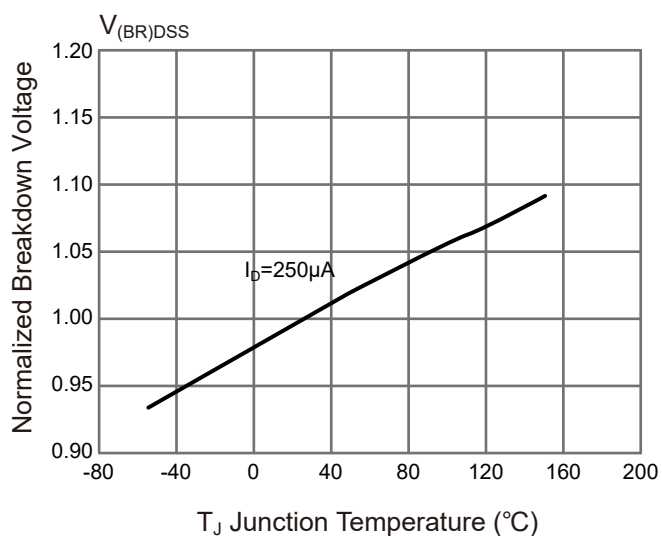
#### Typical Characteristics Curves





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## N and P-Channel Complementary Power MOSFET



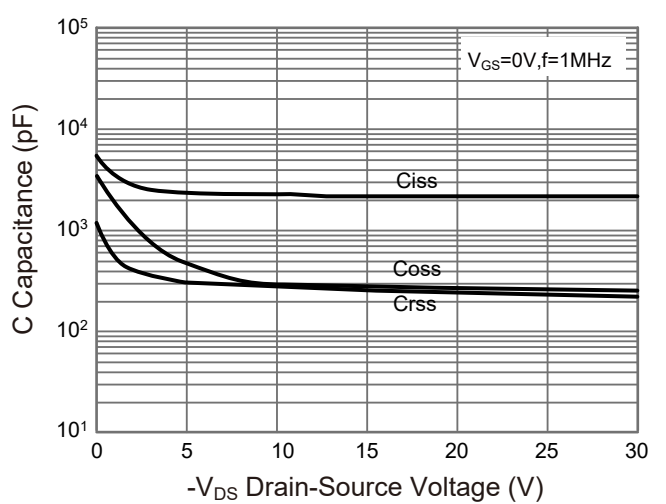
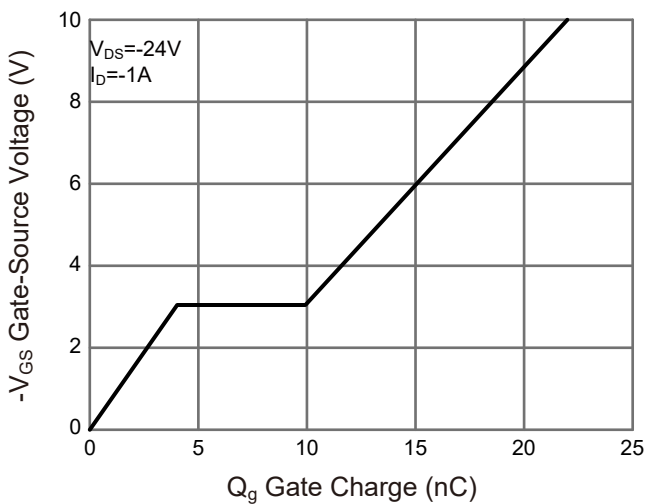
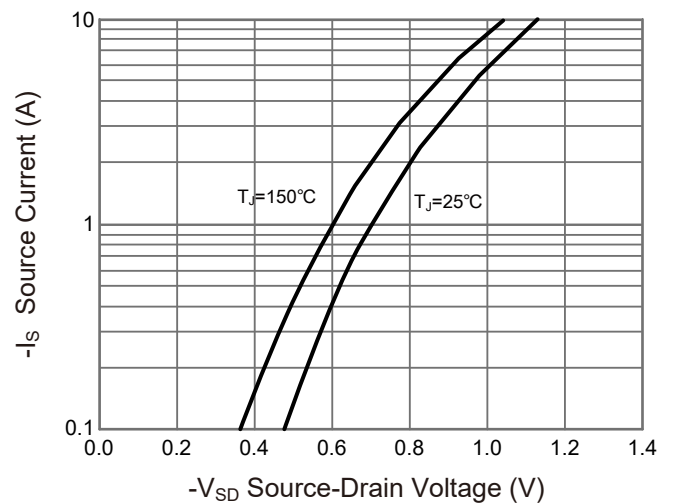
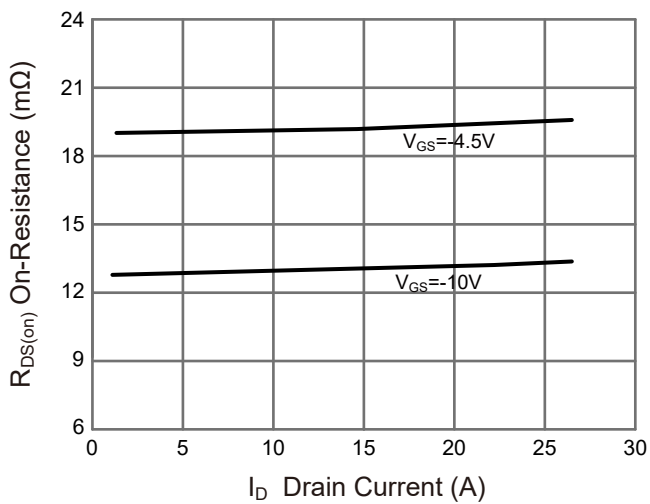
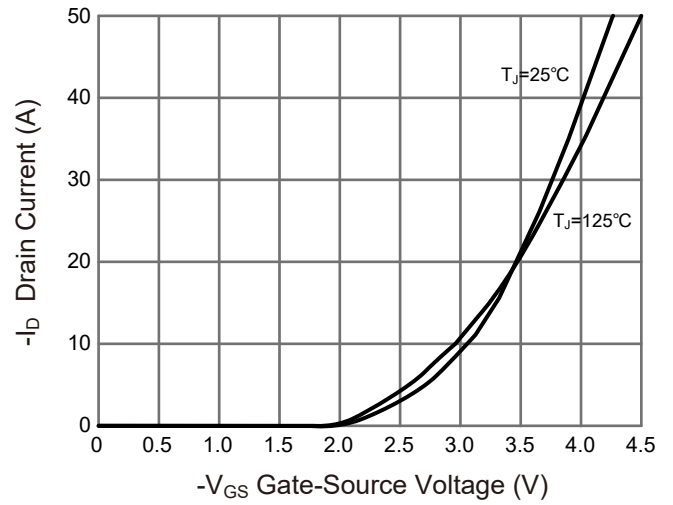
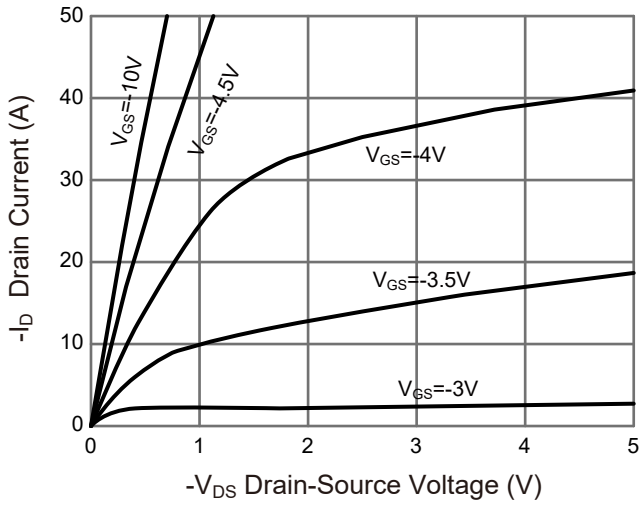


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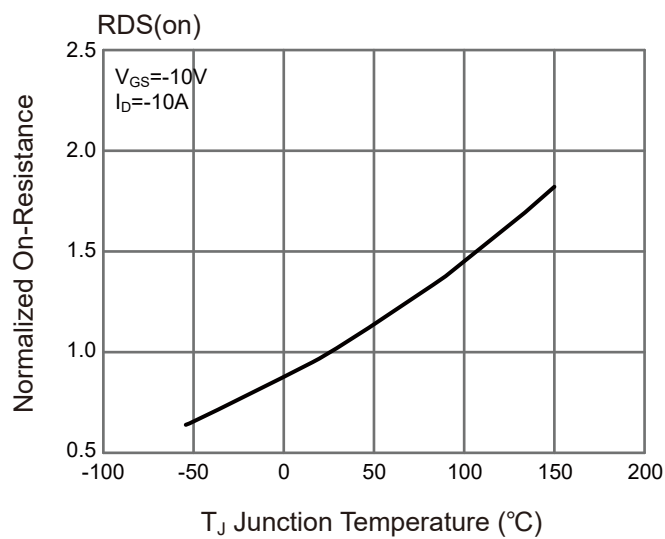
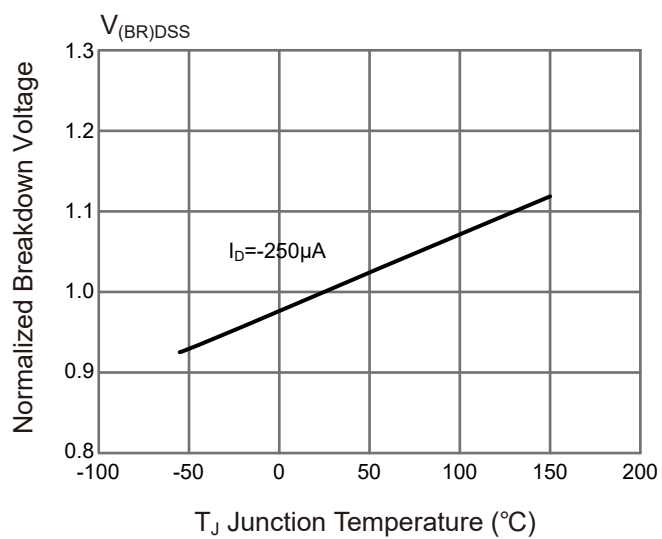
#### Typical Characteristics Curves





# PJM50C30DN

## N and P-Channel Complementary Power MOSFET





# PJM50C30DN

## N and P-Channel Complementary Power MOSFET

### Package Outline

PDFN5x6A-8L

Dimensions in mm

