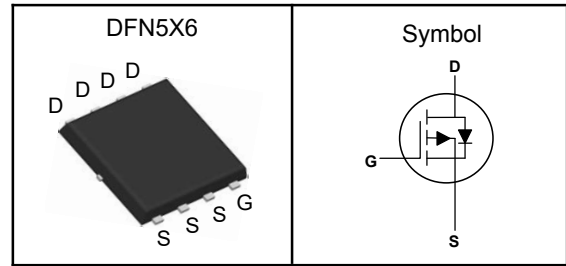


**P-Channel Enhancement Mode MOSFET**
**Features**

- Fast switching speed
- ROHS Compliant & Halogen-Free
- 100% UIS and Rg Tested

**Applications**

- Motor drivers
- DC - DC Converter

**Pin Description**


|                  |      |            |
|------------------|------|------------|
| $V_{DSS}$        | -100 | V          |
| $R_{DS(ON)-Typ}$ | 20   | m $\Omega$ |
| $I_D$            | -55  | A          |

**Absolute Maximum Ratings** ( $T_J=25^\circ\text{C}$ , Unless Otherwise Noted)

| Symbol       | Parameter                      | Rating                 | Unit             |
|--------------|--------------------------------|------------------------|------------------|
| $V_{DSS}$    | Drain-Source Voltage           | -100                   | V                |
| $V_{GSS}$    | Gate-Source Voltage            | $\pm 20$               | V                |
| $T_J$        | Maximum Junction Temperature   | -55 to 150             | $^\circ\text{C}$ |
| $T_{STG}$    | Storage Temperature Range      | -55 to 150             | $^\circ\text{C}$ |
| $I_{DM}^{①}$ | Pulse Drain Current Tested     | -220                   | A                |
| $I_D$        | Continuous Drain Current       | $T_C=25^\circ\text{C}$ | A                |
| $P_D$        | Maximum Power Dissipation      | $T_C=25^\circ\text{C}$ | W                |
| $E_{AS}$     | Avalanche Energy, Single pulse | 670                    | mJ               |

**Thermal Characteristics**

| Symbol          | Parameter                              | Rating | Unit                      |
|-----------------|--|--------|---------------------------|
| $R_{\theta JA}$ | Thermal Resistance-Junction to Ambient | 40     | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case    | 0.89   | $^\circ\text{C}/\text{W}$ |

Note ① : Max. current is limited by bonding wire.

Note ② : UIS tested and pulse width are limited by maximum junction temperature  $150^\circ\text{C}$ .

Note ③ : Surface Mounted on  $1\text{in}^2$  FR-4 board with 1oz.



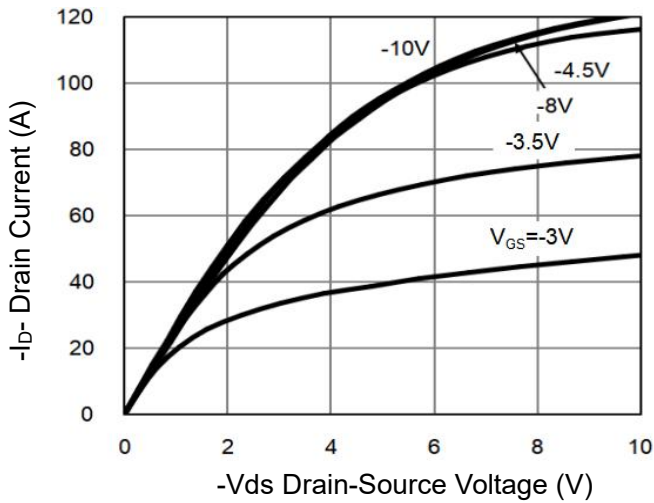
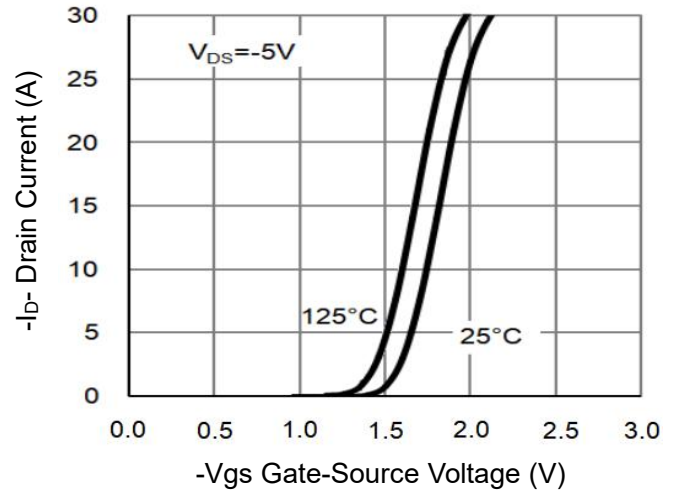
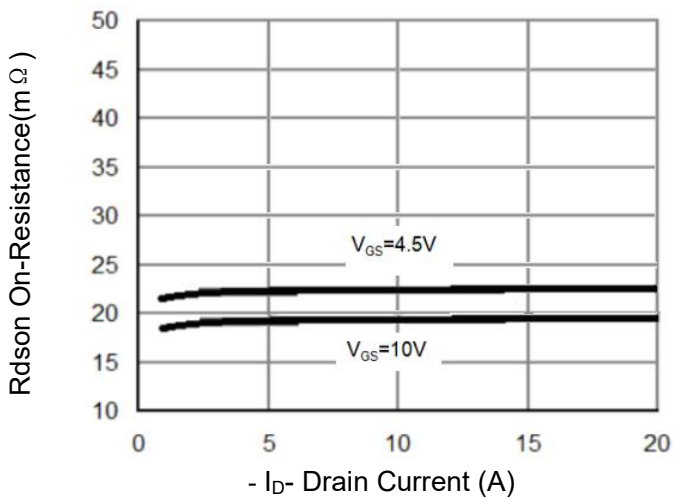
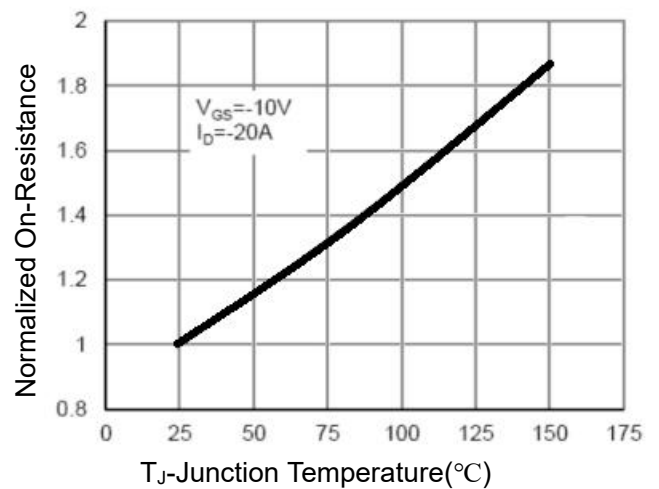
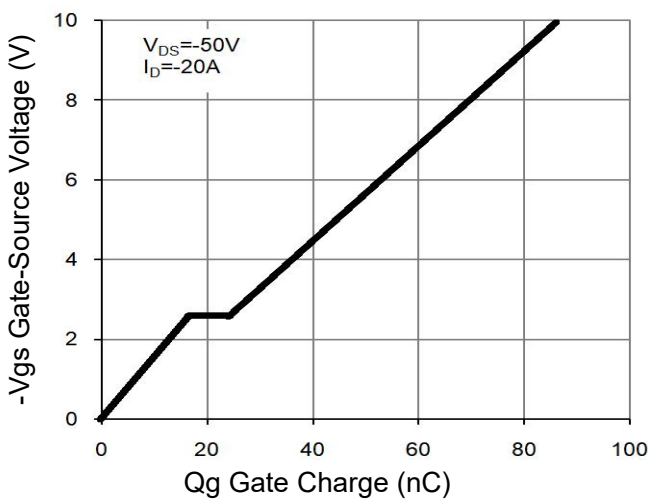
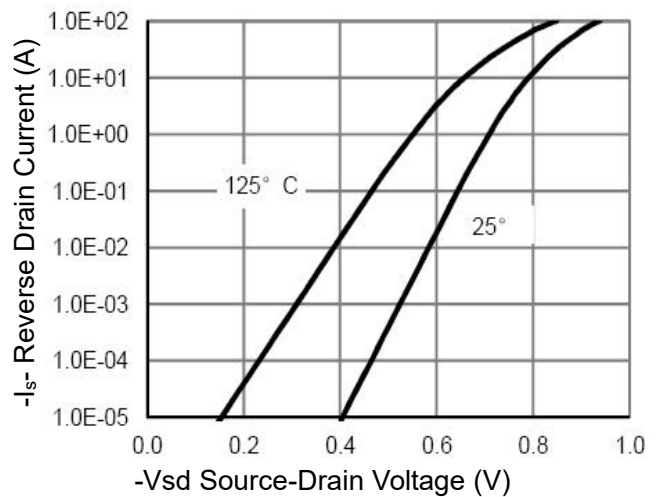
**P-Channel Enhancement Mode MOSFET**

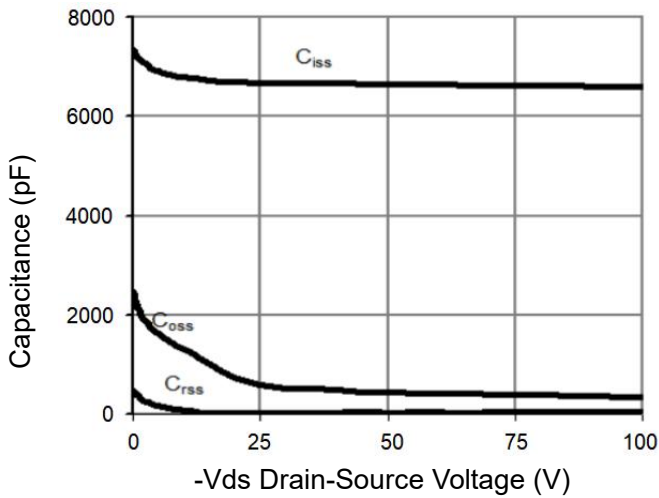
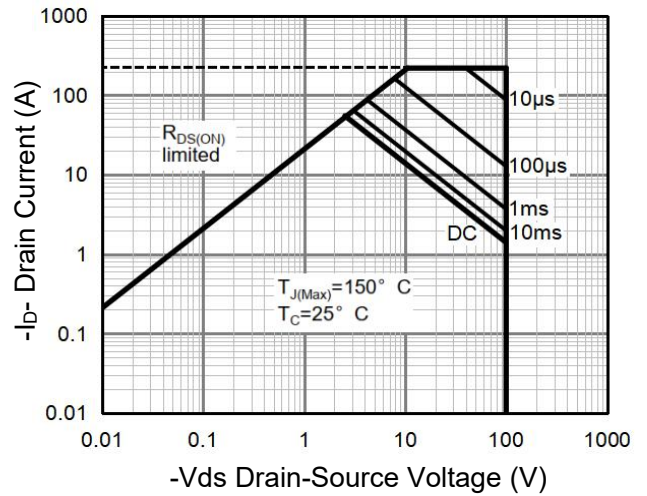
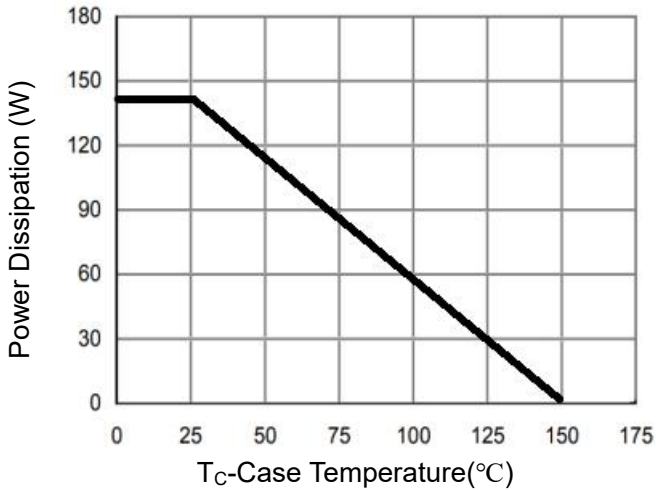
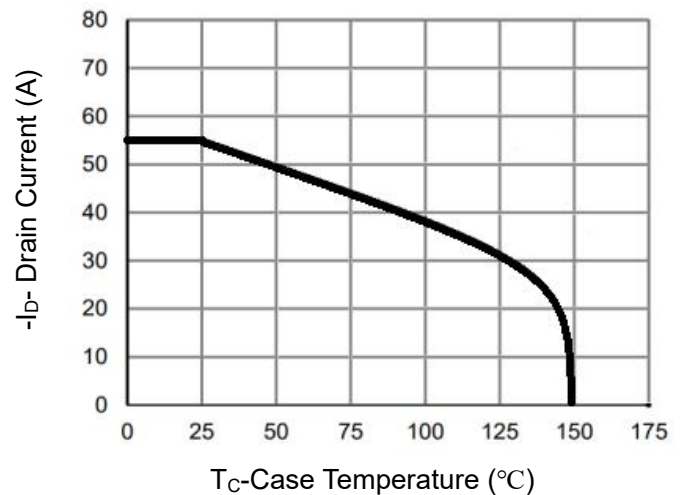
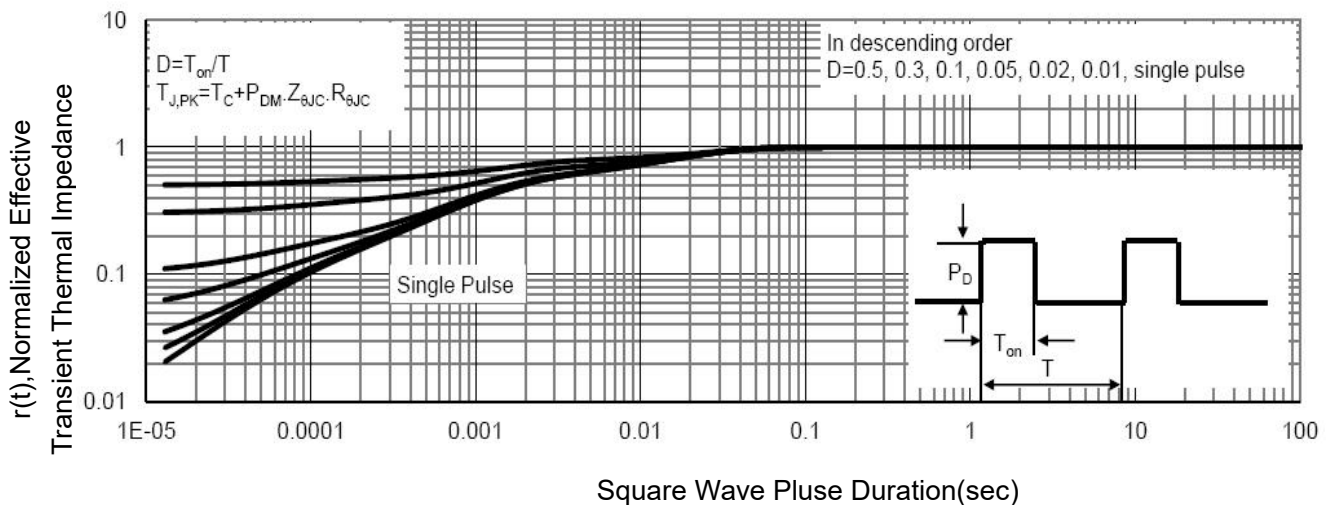
**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$ , Unless Otherwise Noted)

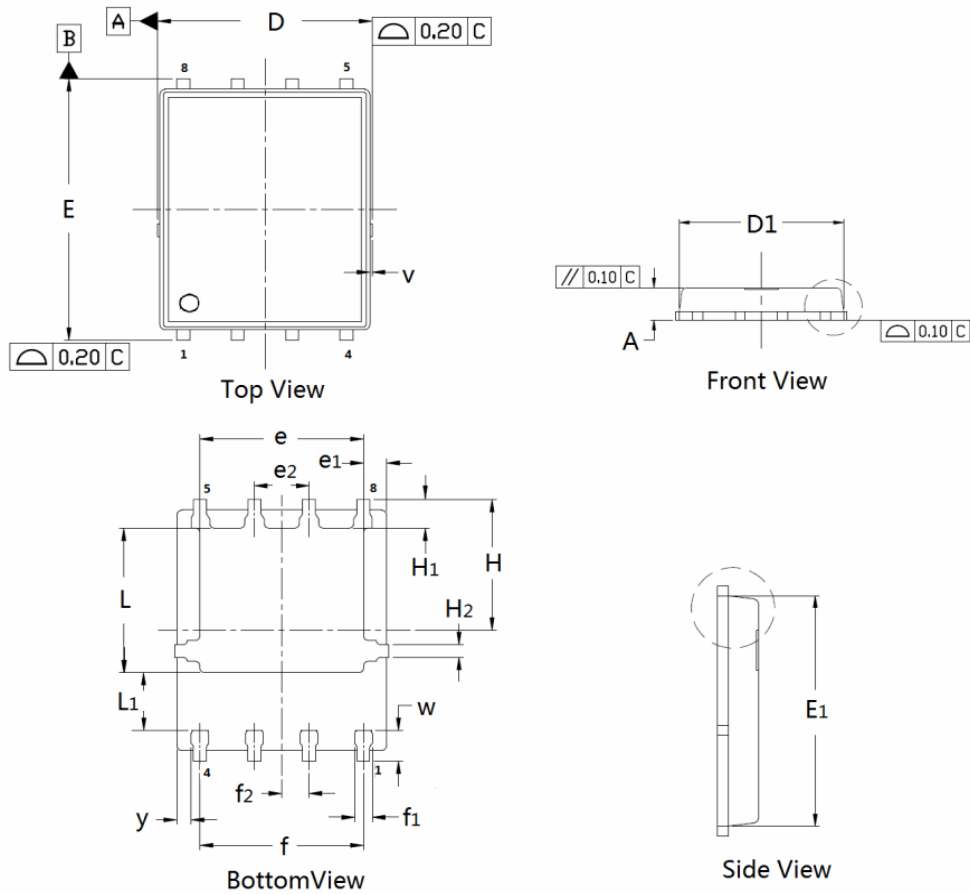
| Symbol                                      | Parameter                        | Test Conditions                                     | Min  | Typ  | Max       | Unit       |
|---|----------------------------------|---|------|------|-----------|------------|
| <b>Static Electrical Characteristics</b>    |                                  |   |      |      |           |            |
| $BV_{DSS}$                                  | Drain-Source Breakdown Voltage   | $V_{GS}=0V, I_D=-250\mu A$                          | -100 | ---  | ---       | V          |
| $I_{DSS}$                                   | Zero Gate Voltage Drain Current  | $V_{DS}=-100V, V_{GS}=0V$                           | ---  | ---  | -1        | $\mu A$    |
| $V_{GS(th)}$                                | Gate Threshold Voltage           | $V_{DS}=V_{GS}, I_D=-250\mu A$                      | -1.2 | ---  | -2.5      | V          |
| $I_{GSS}$                                   | Gate Leakage Current             | $V_{GS}=\pm 20V, V_{DS}=0V$                         | ---  | ---  | $\pm 100$ | nA         |
| $R_{DS(ON)}$                                | Drain-Source On-state Resistance | $V_{GS}=-10V, I_D=-20A$                             | ---  | 20   | 28        | m $\Omega$ |
|   |                                  | $V_{GS}=-4.5V, I_D=-20A$                            | ---  | 22.5 | 30        |            |
| <b>Dynamic Characteristics</b> <sup>⑤</sup> |                                  |   |      |      |           |            |
| $C_{iss}$                                   | Input Capacitance                | $V_{GS}=0V, V_{DS}=-50V, \text{Freq.}=1\text{MHz}$  | ---  | 6900 | ---       | pF         |
| $C_{oss}$                                   | Output Capacitance               |   | ---  | 430  | ---       |            |
| $C_{rSS}$                                   | Reverse Transfer Capacitance     |   | ---  | 10.5 | ---       |            |
| $T_{d(on)}$                                 | Turn-on Delay Time               | $V_{GS}=-10V, V_{DS}=-50V, I_D=-20A, R_G=1.6\Omega$ | ---  | 15   | ---       | nS         |
| $T_r$                                       | Turn-on Rise Time                |   | ---  | 18   | ---       |            |
| $T_{d(off)}$                                | Turn-off Delay Time              |   | ---  | 50   | ---       |            |
| $T_f$                                       | Turn-off Fall Time               |   | ---  | 18   | ---       |            |
| $Q_g$                                       | Total Gate Charge                | $V_{GS}=-10V, V_{DS}=-50V, I_D=-20A$                | ---  | 86.5 | ---       | nC         |
| $Q_{gs}$                                    | Gate-Source Charge               |   | ---  | 16.6 | ---       |            |
| $Q_{gd}$                                    | Gate-Drain Charge                |   | ---  | 9    | ---       |            |
| <b>Source-Drain Characteristics</b>         |                                  |   |      |      |           |            |
| $V_{SD}$ <sup>④</sup>                       | Diode Forward Voltage            | $I_S=-20A, V_{GS}=0V$                               | ---  | ---  | -1.2      | V          |
| $t_{rr}$                                    | Reverse Recovery Time            | $I_F=-20A, di_F/dt=100A/\mu s$                      | ---  | 55   | ---       | nS         |
| $Q_{rr}$                                    | Reverse Recovery Charge          |   | ---  | 101  | ---       | nC         |

Note ④: Pulse test (pulse width $\leq 300\mu s$ , duty cycle $\leq 2\%$ ).

Note ⑤: Guaranteed by design, not subject to production testing.

**P-Channel Enhancement Mode MOSFET**
**Typical Characteristics**

**Figure 1 Output Characteristics**

**Figure 2 Transfer Characteristics**

**Figure 3 Rdson- Drain Current**

**Figure 4 Rdson-Junction Temperature**

**Figure 5 Gate Charge**

**Figure 6 Source- Drain Diode Forward**

**P-Channel Enhancement Mode MOSFET**

**Figure 7 Capacitance vs Vds**

**Figure 8 Safe Operation Area**

**Figure 9 Power De-rating**

**Figure 10 Current De-rating**

**Figure 11 Normalized Maximum Transient Thermal Impedance**

**P-Channel Enhancement Mode MOSFET**
**DFN5×6 Package Outline Data**

**DIMENSIONS ( unit : mm )**

| Symbol         | Min  | Typ  | Max  | Symbol         | Min  | Typ  | Max  |
|----------------|------|------|------|----------------|------|------|------|
| A              | 0.90 | 1.02 | 1.10 | D              | 4.90 | 4.98 | 5.10 |
| D <sub>1</sub> | 4.80 | 4.89 | 5.10 | E              | 5.90 | 6.11 | 6.25 |
| E <sub>1</sub> | 5.65 | 5.74 | 5.95 | e              | 3.72 | 3.80 | 3.92 |
| e <sub>1</sub> | --   | 0.5  | --   | e <sub>2</sub> | --   | 1.   | --   |
| f              | --   | 3.8  | --   | f <sub>1</sub> | 0.31 | 0.37 | 0.51 |
| f <sub>2</sub> | --   | 0.6  | --   | H              | --   | 3.   | --   |
| H <sub>1</sub> | 0.59 | 0.63 | 0.79 | H <sub>2</sub> | 0.26 | 0.28 | 0.32 |
| L              | 3.35 | 3.45 | 3.65 | L <sub>1</sub> | --   | 1.   | --   |
| v              | --   | 0.1  | --   | w              | 0.64 | 0.68 | 0.84 |
| y              | --   | 0.3  | --   |                |      |      |      |