

## N+P Channel Enhancement Mode MOSFET

### Product Information

| Channel | V <sub>DS</sub> | I <sub>D</sub> | R <sub>DS(ON)</sub> , TYP.   | Package     | Packaging   | Quantity (pcs) |
|---------|-----------------|----------------|------------------------------|-------------|-------------|----------------|
| N-Ch    | 30 V            | 47 A           | 8.6 mΩ@V <sub>GS</sub> =10V  | PDFN 5x6-8L | Tape & Reel | 5000           |
| P-Ch    | -30 V           | -47 A          | 8.8 mΩ@V <sub>GS</sub> =-10V |             |             |                |

Features

- Surface-mounted package
- Advanced SGT technology
- Low on-resistance

Applications

- Motor control and drive
- High-frequency switching and synchronous rectification
- DC/DC converter

D1

D1

D2

D2

8

7

6

5



KJ50D03G

XXXXXX

1

2

3

4

S1

G1

S2

G2

D1

D2

G1

S1

G2

S2

G: Gate

D: Drain

S: Source

1<sup>st</sup> Line: LOGO

2<sup>nd</sup> Line: Part number

3<sup>rd</sup> Line: LOT

RoHS & Halogen Free

### Absolute Maximum Ratings (T<sub>A</sub>=25°C unless otherwise noted)

#### ● N-Ch MOS

| Parameter                     | Symbol          | Conditions                                  | Value | Unit |
|-------------------------------|-----------------|---------------------------------------------|-------|------|
| Drain-Source Voltage          | V <sub>DS</sub> | T <sub>C</sub> =25°C                        | 30    | V    |
| Gate-Source Voltage           | V <sub>GS</sub> | T <sub>C</sub> =25°C                        | ±20   | V    |
| Continuous Drain Current (DC) | I <sub>D</sub>  | T <sub>C</sub> =25°C, V <sub>GS</sub> =10V  | 47    | A    |
|                               |                 | T <sub>C</sub> =100°C, V <sub>GS</sub> =10V | 30    | A    |
| Pulsed Drain Current          | I <sub>DM</sub> | T <sub>C</sub> =25°C, V <sub>GS</sub> =10V  | 94    | A    |
| Power Dissipation             | P <sub>D</sub>  | T <sub>C</sub> =25°C                        | 42    | W    |

#### ● P-Ch MOS

|                               |                 |                                              |     |   |
|-------------------------------|-----------------|----------------------------------------------|-----|---|
| Drain-Source Voltage          | V <sub>DS</sub> | T <sub>C</sub> =25°C                         | -30 | V |
| Gate-Source Voltage           | V <sub>GS</sub> | T <sub>C</sub> =25°C                         | ±20 | V |
| Continuous Drain Current (DC) | I <sub>D</sub>  | T <sub>C</sub> =25°C, V <sub>GS</sub> =-10V  | -47 | A |
|                               |                 | T <sub>C</sub> =100°C, V <sub>GS</sub> =-10V | -30 | A |
| Pulsed Drain Current          | I <sub>DM</sub> | T <sub>C</sub> =25°C, V <sub>GS</sub> =-10V  | -94 | A |
| Power Dissipation             | P <sub>D</sub>  | T <sub>C</sub> =25°C                         | 42  | W |

**Package Values**

| Parameter                                                    | Symbol         | Value      |       | Unit |
|--------------------------------------------------------------|----------------|------------|-------|------|
| Operating Junction and Storage Temperature Range             | $T_J, T_{stg}$ | -55 — +150 |       | °C   |
| Thermal Resistance, Junction to Ambient                      | $R_{thJA}$     | N: 63      | P: 68 | °C/W |
| Thermal Resistance, Junction to Case                         | $R_{thJC}$     | N: 3       | P: 3  | °C/W |
| Soldering temperature, wave and reflow soldering are allowed | $T_{sld}$      | 260        |       | °C   |

**Electrical Characteristics** ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

**• N-Ch MOS**

| Parameter                        | Symbol       | Conditions                                     | Min | Typ  | Max       | Unit       |
|----------------------------------|--------------|------------------------------------------------|-----|------|-----------|------------|
| Static Characteristic            |              |                                                |     |      |           |            |
| Drain-Source Breakdown Voltage   | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$                      | 30  |      |           | V          |
| Gate Threshold Voltage           | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$                  | 1.2 |      | 1.9       | V          |
| Drain-Source Leakage Current     | $I_{DSS}$    | $V_{GS}=0V, V_{DS}=30V$                        |     |      | 1         | $\mu A$    |
| Gate-Source Leakage Current      | $I_{GSS}$    | $V_{DS}=0V, V_{GS}=\pm 20V$                    |     |      | $\pm 100$ | nA         |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=15A$                          |     | 8.6  | 11        | m $\Omega$ |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=4.5V, I_D=10A$                         |     | 13   | 18        | m $\Omega$ |
| Dynamic Characteristic           |              |                                                |     |      |           |            |
| Gate Resistance                  | $R_G$        | f=1MHz                                         |     | 3    |           | $\Omega$   |
| Input Capacitance                | $C_{iss}$    | $V_{DS}=15V, V_{GS}=0V, f=1MHz$                |     | 1450 |           | pF         |
| Output Capacitance               | $C_{oss}$    |                                                |     | 178  |           | pF         |
| Reverse Transfer Capacitance     | $C_{rss}$    |                                                |     | 134  |           | pF         |
| Total Gate Charge                | $Q_g$        | $V_{DS}=15V, V_{GS}=10V, I_D=15A$              |     | 25   |           | nC         |
| Gate to Source Charge            | $Q_{gs}$     |                                                |     | 3    |           | nC         |
| Gate to Drain Charge             | $Q_{gd}$     |                                                |     | 6    |           | nC         |
| Turn-on Delay Time               | $t_{d(on)}$  | $V_{DD}=15V, V_{GS}=10V, R_G=3\Omega, I_D=15A$ |     | 18   |           | ns         |
| Turn-on Rise Time                | $t_r$        |                                                |     | 32   |           | ns         |
| Turn-off Delay Time              | $t_{d(off)}$ |                                                |     | 48   |           | ns         |
| Turn-off Fall Time               | $t_f$        |                                                |     | 32   |           | ns         |
| Body Diode Characteristics       |              |                                                |     |      |           |            |
| Diode Forward Voltage            | $V_{SD}$     | $V_{GS}=0V, I_S=15A$                           |     |      | 1.3       | V          |
| Reverse Recovery Time            | $t_{rr}$     | $I_S=15A, dI/dt=100A/\mu s$                    |     | 18   |           | ns         |
| Reverse Recovery Charge          | $Q_{rr}$     |                                                |     | 3.8  |           | nC         |

**Electrical Characteristics** ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

**• P-Ch MOS**

| Parameter                        | Symbol       | Conditions                                        | Min  | Typ  | Max       | Unit       |
|----------------------------------|--------------|---------------------------------------------------|------|------|-----------|------------|
| Static Characteristic            |              |                                                   |      |      |           |            |
| Drain-Source Breakdown Voltage   | $BV_{DSS}$   | $V_{GS}=0V, I_D=-250\mu A$                        | -30  |      |           | V          |
| Gate Threshold Voltage           | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$                    | -1.2 |      | -1.9      | V          |
| Drain-Source Leakage Current     | $I_{DSS}$    | $V_{GS}=0V, V_{DS}=-30V$                          |      |      | -1        | $\mu A$    |
| Gate-Source Leakage Current      | $I_{GSS}$    | $V_{DS}=0V, V_{GS}=\pm 20V$                       |      |      | $\pm 100$ | nA         |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=-10V, I_D=-15A$                           |      | 8.8  | 12        | m $\Omega$ |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=-4.5V, I_D=-10A$                          |      | 13   | 18        | m $\Omega$ |
| Dynamic Characteristic           |              |                                                   |      |      |           |            |
| Gate Resistance                  | $R_G$        | f=1MHz                                            |      | 12   |           | $\Omega$   |
| Input Capacitance                | $C_{iss}$    | $V_{DS}=-15V, V_{GS}=0V, f=1MHz$                  |      | 2250 |           | pF         |
| Output Capacitance               | $C_{oss}$    |                                                   |      | 305  |           | pF         |
| Reverse Transfer Capacitance     | $C_{rss}$    |                                                   |      | 220  |           | pF         |
| Total Gate Charge                | $Q_g$        | $V_{DS}=-15V, V_{GS}=-10V, I_D=-15A$              |      | 44   |           | nC         |
| Gate to Source Charge            | $Q_{gs}$     |                                                   |      | 8    |           | nC         |
| Gate to Drain Charge             | $Q_{gd}$     |                                                   |      | 11   |           | nC         |
| Turn-on Delay Time               | $t_{d(on)}$  | $V_{DD}=-15V, V_{GS}=-10V, R_G=3\Omega, I_D=-15A$ |      | 7    |           | ns         |
| Turn-on Rise Time                | $t_r$        |                                                   |      | 4    |           | ns         |
| Turn-off Delay Time              | $t_{d(off)}$ |                                                   |      | 91   |           | ns         |
| Turn-off Fall Time               | $t_f$        |                                                   |      | 55   |           | ns         |
| Body Diode Characteristics       |              |                                                   |      |      |           |            |
| Diode Forward Voltage            | $V_{SD}$     | $V_{GS}=0V, I_S=-15A$                             |      |      | -1.3      | V          |
| Reverse Recovery Time            | $t_{rr}$     | $I_S=-15A, dI/dt=100A/\mu s$                      |      | 16   |           | ns         |
| Reverse Recovery Charge          | $Q_{rr}$     |                                                   |      | 7.5  |           | nC         |

## Typical Characteristics

### • N-Ch MOS

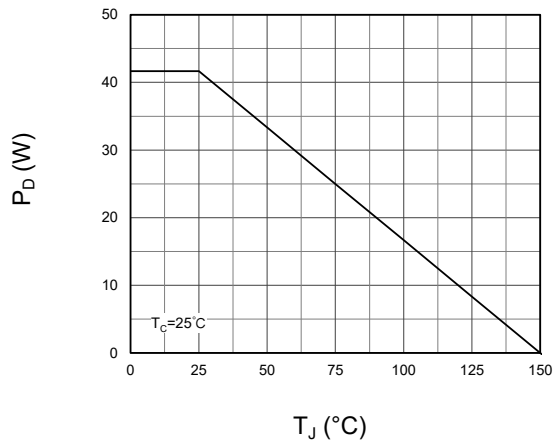


Fig 1. Power capability

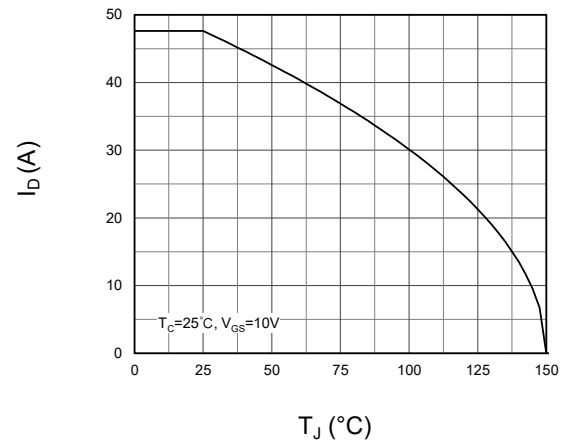


Fig 2. Current capability

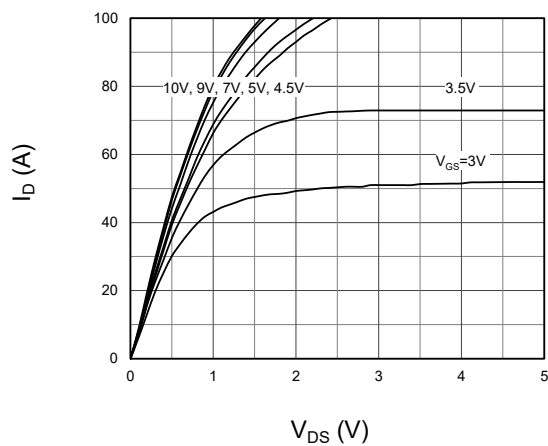


Fig 3. Output characteristics

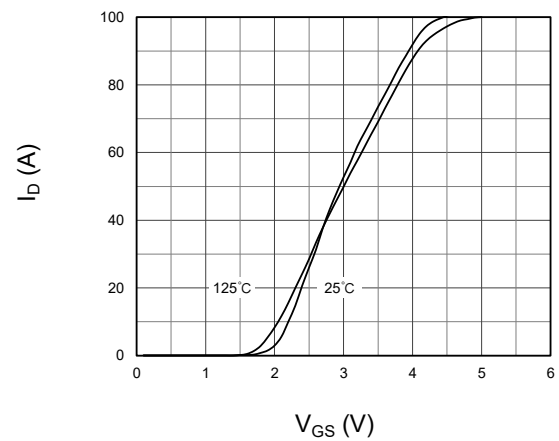


Fig 4. Typical Transfer Characteristics

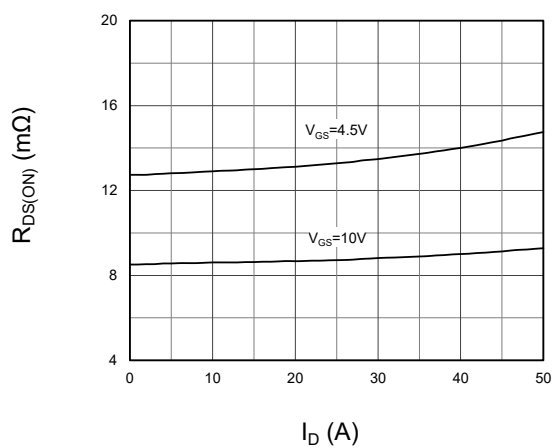


Fig 5. On-resistance vs. Drain current

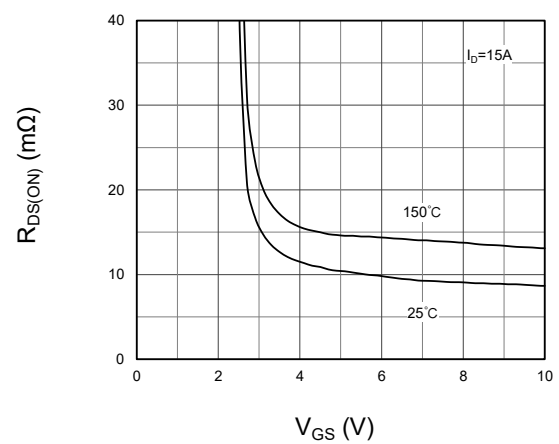
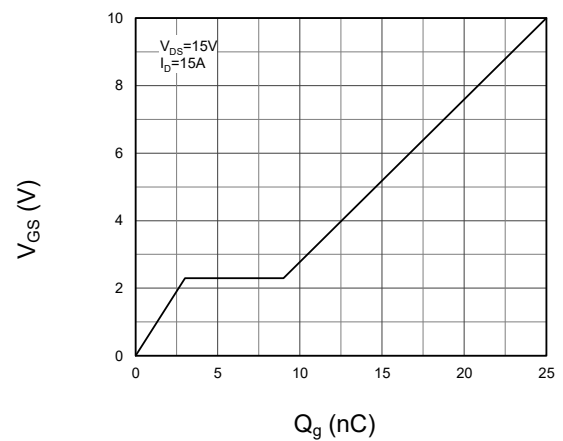
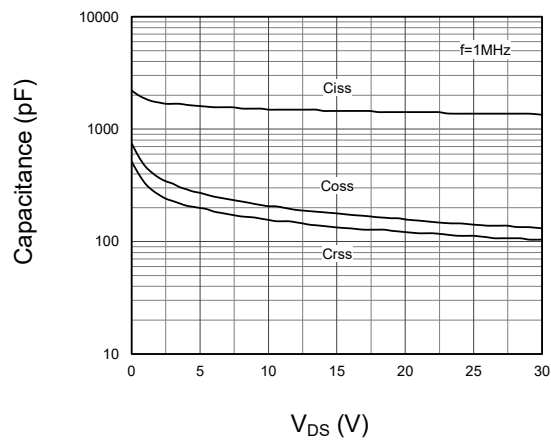
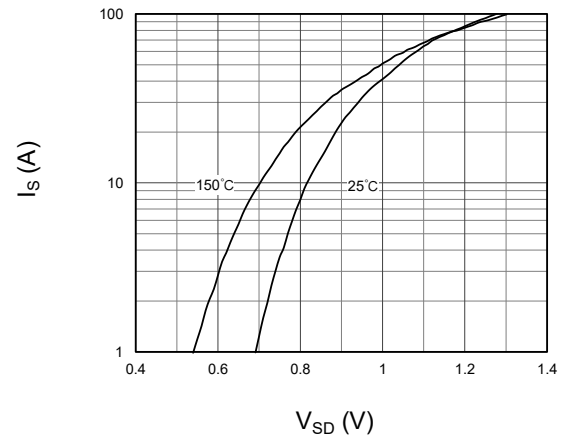
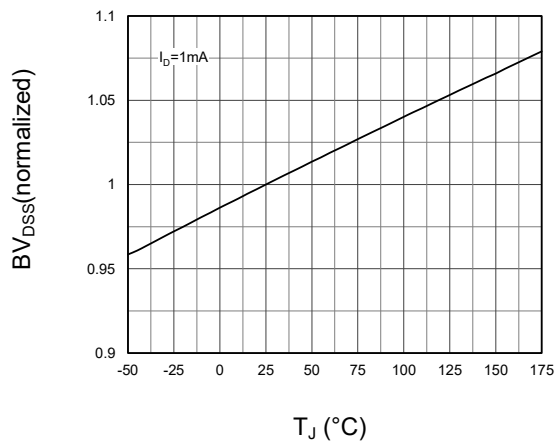
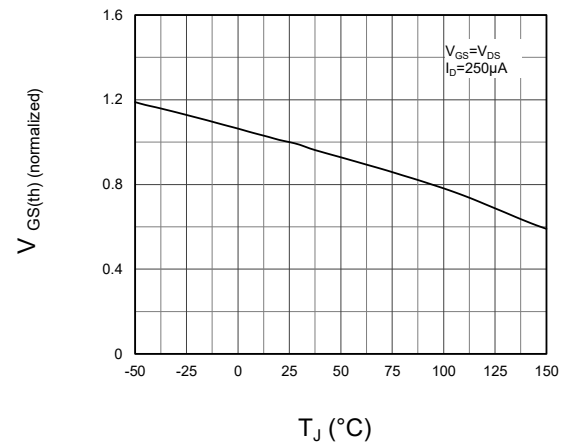
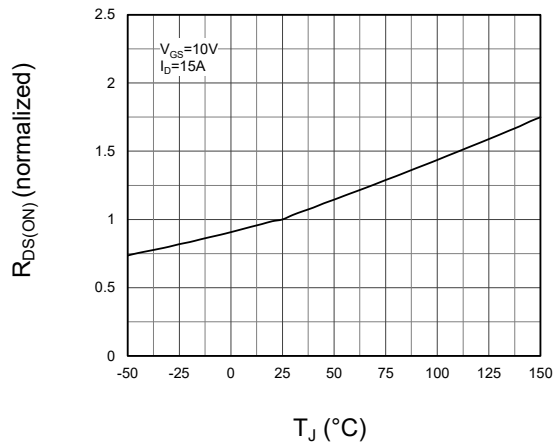


Fig 6. On-resistance vs.  $V_{GS}$



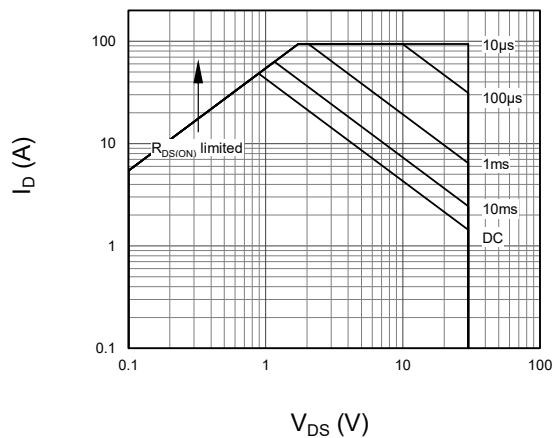


**Fig 13. Safe operating area**

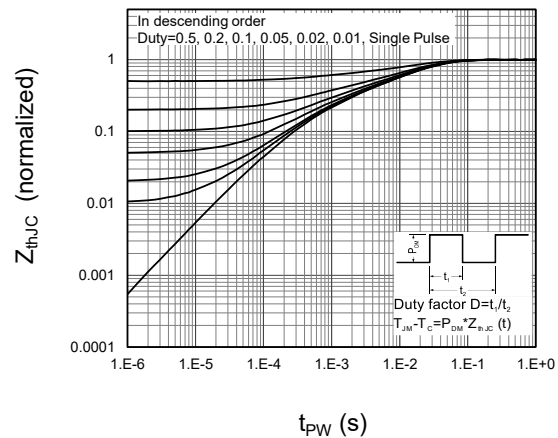
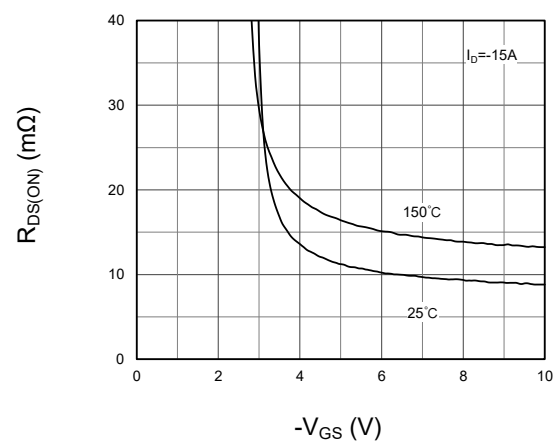
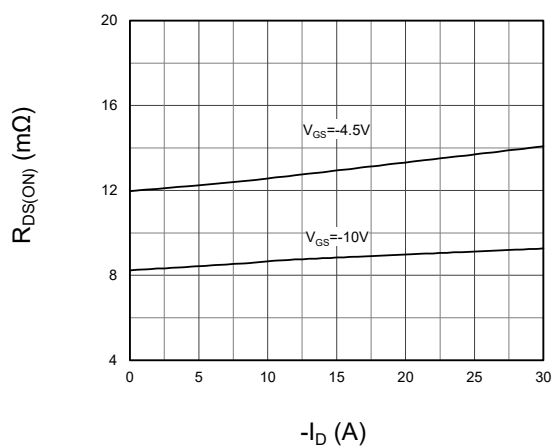
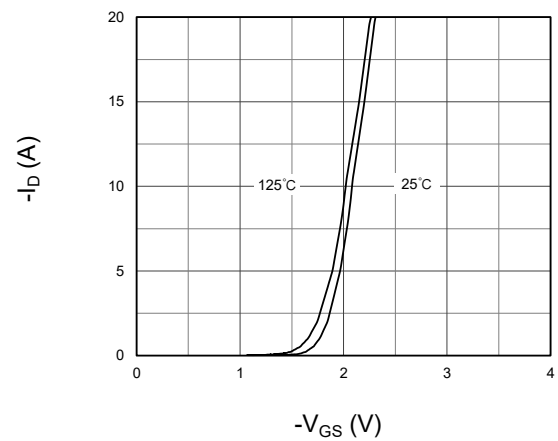
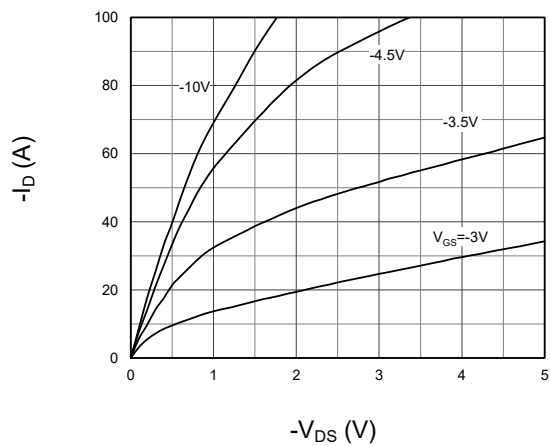
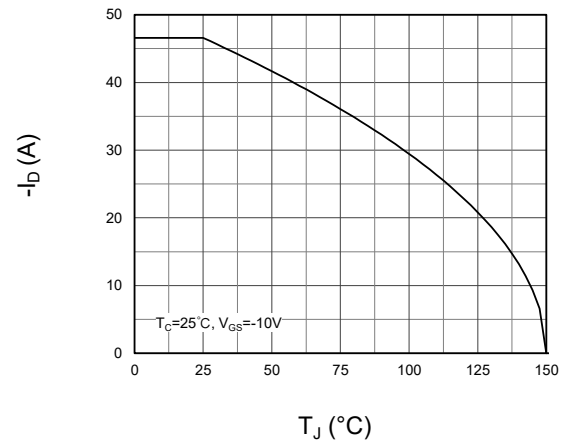
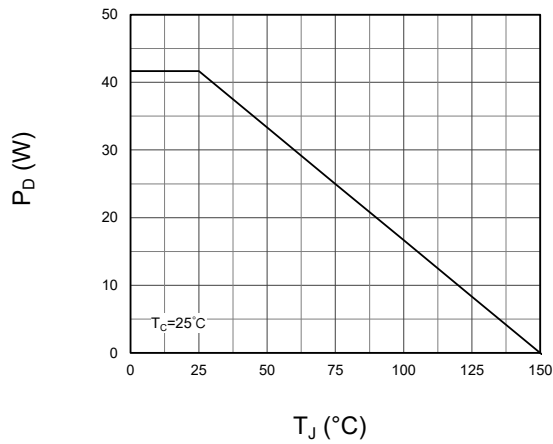
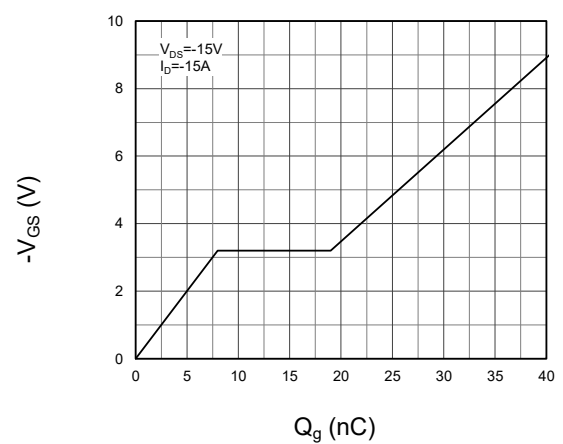
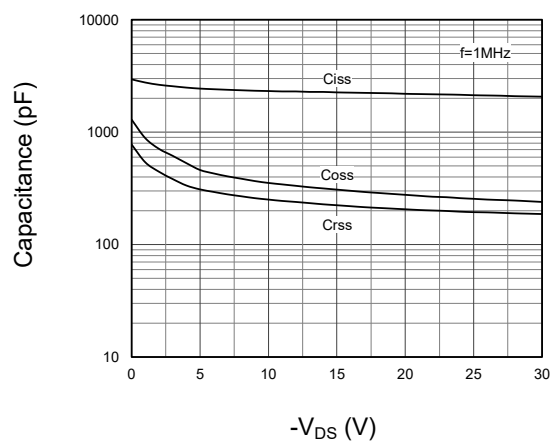
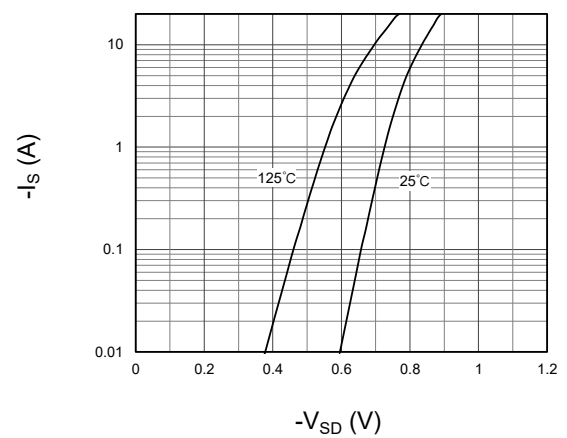
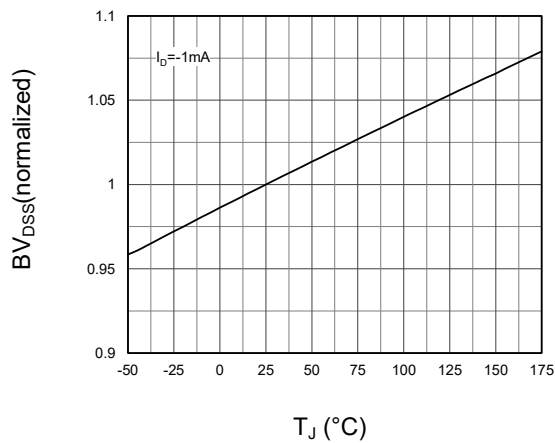
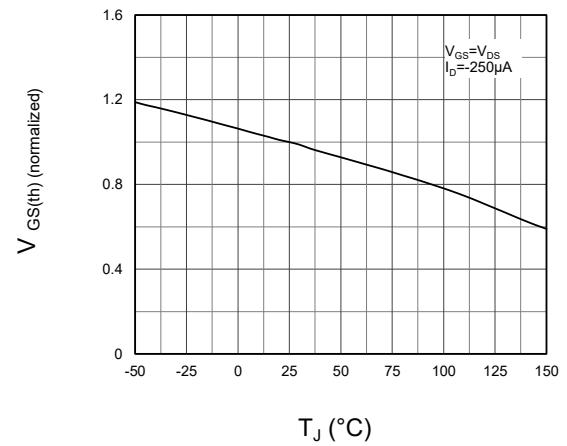
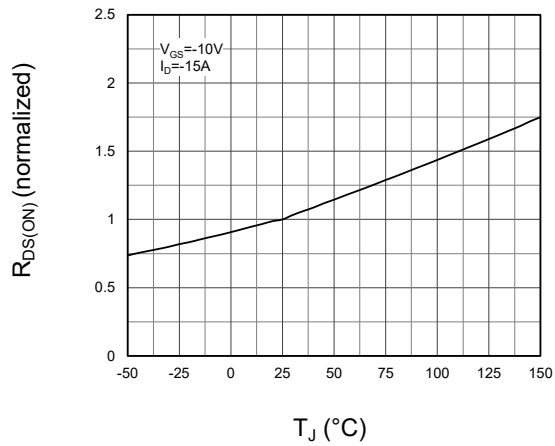


**Fig 14. Transient Thermal Impedance**

• P-Ch MOS





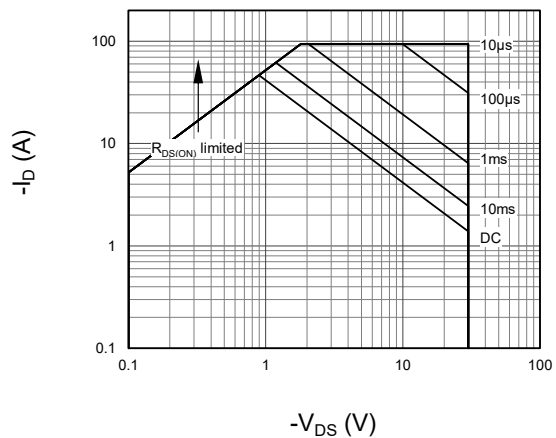


**Fig 27. Safe operating area**

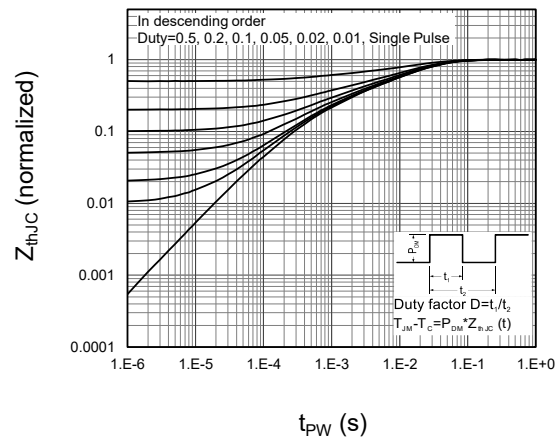
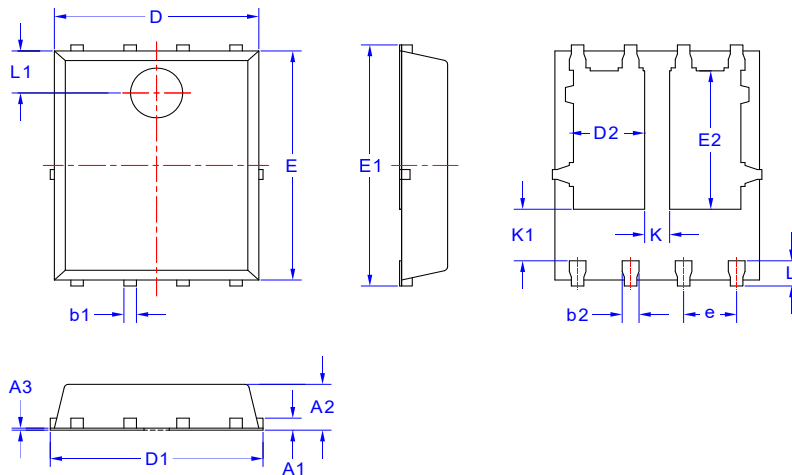


**Fig 28. Transient Thermal Impedance**

## Package Dimensions

PDFN 5x6-8L package



| Symbol | Dimensions in Millimeters |            |       |
|--------|---------------------------|------------|-------|
|        | MIN                       | NOM        | MAX   |
| A1     |                           | 0.254 BSC  |       |
| A2     | 1.00                      | 1.10       | 1.20  |
| A3     | 0.01                      |            | 0.02  |
| b1     | 0.25                      | 0.30       | 0.35  |
| b2     | 0.35                      | 0.40       | 0.45  |
| D      | 4.80                      | 4.90       | 5.00  |
| D1     | 5.00                      | 5.10       | 5.20  |
| D2     | 1.605                     | 1.705      | 1.805 |
| E      | 5.65                      | 5.75       | 5.85  |
| E1     | 5.95                      | 6.05       | 6.15  |
| E2     | 3.38                      | 3.48       | 3.58  |
| e      |                           | 1.270 TYPE |       |
| K      |                           | 0.600 REF  |       |
| K1     |                           | 1.235 REF  |       |
| L      | 0.53                      | 0.63       | 0.73  |
| L1     |                           | 1.000 REF  |       |

## Revision History

| Date       | Revision | Major change                                                   |
|------------|----------|----------------------------------------------------------------|
| 2025.8.11  | V0.1     | Formal version released.                                       |
| 2026.07.31 | V1.0     | Modified the style of the datasheet, updated data and figures. |

## Disclaimer

1. Unless otherwise specified in the datasheet, the product is designed and qualified as a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability, such as automotive, aviation/aerospace and life-support devices or systems.
2. 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.
3. KJX Semi reserves the right to improve product design, function and reliability without notice.