

## Dual N-Channel Enhancement Mode MOSFET

### 1. Product Information

#### 1.1 Features

- ☒ Surface-mounted package
- ☒ Low gate charge

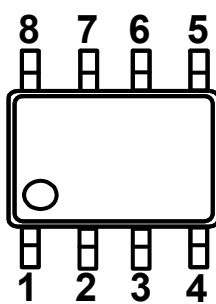
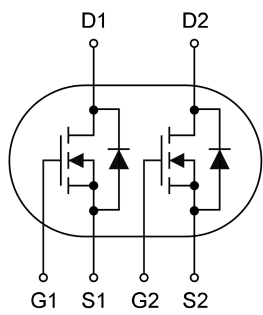
#### 1.2 Applications

- ☒ Motor driver appliances
- ☒ High power inverter system
- ☒ Adapter appliances

#### 1.3 Quick reference

- ☒  $BV \geq 40\text{ V}$
- ☒  $P_D \leq 3.6\text{ W}$
- ☒  $I_D \leq 14\text{ A}$
- ☒  $R_{DS(ON)} \leq 11\text{ m}\Omega @ V_{GS} = 10\text{ V}$
- ☒  $R_{DS(ON)} \leq 14\text{ m}\Omega @ V_{GS} = 6\text{ V}$

### 2. Pin Description

| Pin  | Description | Simplified Outline                                                                                            | Symbol                                                                                |
|------|-------------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1    | Source (S1) |  <p>Top View<br/>SOP8</p> |  |
| 2    | Gate (G1)   |                                                                                                               |                                                                                       |
| 3    | Source (S2) |                                                                                                               |                                                                                       |
| 4    | Gate (G2)   |                                                                                                               |                                                                                       |
| 5, 6 | Drain (D2)  |                                                                                                               |                                                                                       |
| 7, 8 | Drain (D1)  |                                                                                                               |                                                                                       |

## 3. Limiting Values

| Symbol          | Parameter                                        | Conditions                                    | Min | Max      | Unit                 |
|-----------------|--------------------------------------------------|-----------------------------------------------|-----|----------|----------------------|
| $V_{DS}$        | Drain-Source Voltage                             | $T_A=25^{\circ}\text{C}$                      | 40  | -        | V                    |
| $V_{GS}$        | Gate-Source Voltage                              | $T_A=25^{\circ}\text{C}$                      | -   | $\pm 20$ | V                    |
| $I_D$           | Drain Current                                    | $T_A=25^{\circ}\text{C}, V_{GS}=10\text{ V}$  | -   | 14       | A                    |
| $I_D$           | Drain Current                                    | $T_A=100^{\circ}\text{C}, V_{GS}=10\text{ V}$ | -   | 9        | A                    |
| $I_{DM}^*$      | Pulsed Drain Current                             | $T_A=25^{\circ}\text{C}, V_{GS}=10\text{ V}$  | -   | 56       | A                    |
| $P_D$           | Total Power Dissipation                          | $T_A=25^{\circ}\text{C}$                      | -   | 3.6      | W                    |
| $T_J, T_{stg}$  | Operating Junction and Storage Temperature Range |                                               | -55 | 150      | $^{\circ}\text{C}$   |
| $R_{\theta JA}$ | Thermal Resistance-Junction to Ambient           |                                               | -   | 62.5     | $^{\circ}\text{C/W}$ |
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case              |                                               | -   | 35       | $^{\circ}\text{C/W}$ |

Notes:

- \* Pulse width  $\leq 10\text{ }\mu\text{s}$ , duty cycle  $\leq 1\%$ .
- \*\* Surface mounted on 1 in<sup>2</sup> pad area,  $t \leq 10\text{ sec}$ .
- \*\*\* Limited by bonding wire.

## 4. Marking Information

| Product Name | Marking          |
|--------------|------------------|
| KJ4010DS     | 4010DS<br>XXXXXX |

## 5. Ordering Code

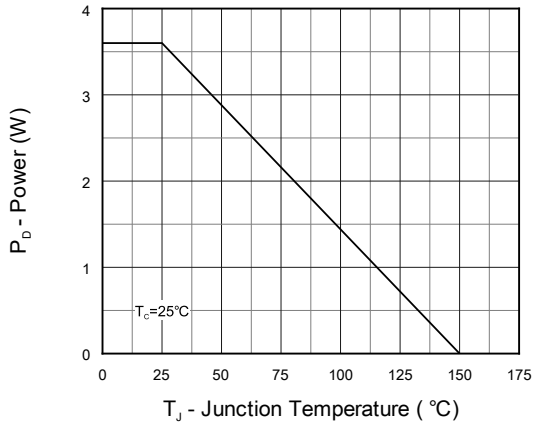
| Product Name | Package | Reel size | Tape width | Quantity (pcs) |
|--------------|---------|-----------|------------|----------------|
| KJ4010DS     | SOP8    | 13"       | 12 mm      | 3000           |

Note: KUAJIEXIN defines "Green" as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC/JEDEC J-STD-020C)

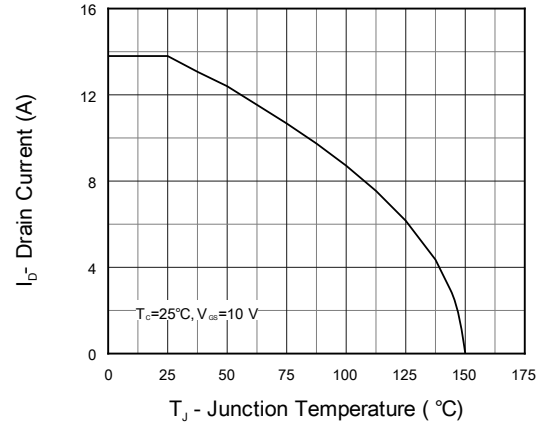
## 6. Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

| Symbol                      | Parameter                      | Conditions                                                                              | Min | Typ  | Max  | Unit |
|-----------------------------|--------------------------------|-----------------------------------------------------------------------------------------|-----|------|------|------|
| Static Characteristics      |                                |                                                                                         |     |      |      |      |
| BV <sub>DSS</sub>           | Drain-Source Breakdown Voltage | V <sub>GS</sub> =0V, I <sub>DS</sub> =250 μA                                            | 40  | -    | -    | V    |
| V <sub>GS(th)</sub>         | Gate Threshold Voltage         | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250 μA                              | 2   | -    | 3    | V    |
| I <sub>DSS</sub>            | Drain Leakage Current          | V <sub>DS</sub> =40 V, V <sub>GS</sub> =0 V                                             | -   | -    | 1    | μA   |
| I <sub>GSS</sub>            | Gate Leakage Current           | V <sub>GS</sub> =±20 V, V <sub>DS</sub> =0 V                                            | -   | -    | ±100 | nA   |
| R <sub>DS(ON)</sub>         | Channel On-State Resistance    | V <sub>GS</sub> =10 V, I <sub>D</sub> =20 A                                             | -   | 10.5 | 11   | mΩ   |
|                             | Channel On-State Resistance    | V <sub>GS</sub> =4.5 V, I <sub>D</sub> =10 A                                            | -   | 11.5 | 14   |      |
| Diode Characteristics       |                                |                                                                                         |     |      |      |      |
| V <sub>SD</sub>             | Diode Forward Voltage          | I <sub>SD</sub> =20 A, V <sub>GS</sub> =0 V                                             | -   | -    | 1.2  | V    |
| t <sub>rr</sub>             | Reverse Recovery Time          | I <sub>SD</sub> =20 A, dI <sub>SD</sub> /dt=100 A/μs                                    | -   | 26   | -    | ns   |
| Q <sub>rr</sub>             | Reverse Recovery Charge        |                                                                                         | -   | 48   | -    | nC   |
| Dynamic Characteristics     |                                |                                                                                         |     |      |      |      |
| C <sub>iss</sub>            | Input Capacitance              | V <sub>GS</sub> =0 V, V <sub>DS</sub> =20 V, Frequency=1 MHz                            | -   | 2105 | -    | pF   |
| C <sub>oss</sub>            | Output Capacitance             |                                                                                         | -   | 156  | -    |      |
| C <sub>rss</sub>            | Reverse Transfer Capacitance   |                                                                                         | -   | 130  | -    |      |
| t <sub>d(on)</sub>          | Turn-on Delay Time             | V <sub>DS</sub> =20 V, V <sub>GEN</sub> =10 V, R <sub>G</sub> =3 Ω, R <sub>L</sub> =1 Ω | -   | 9    | -    | ns   |
| t <sub>r</sub>              | Turn-on Rise Time              |                                                                                         | -   | 7    | -    |      |
| t <sub>d(off)</sub>         | Turn-off Delay Time            |                                                                                         | -   | 39   | -    |      |
| t <sub>f</sub>              | Turn-off Fall Time             |                                                                                         | -   | 9    | -    |      |
| Gate Charge Characteristics |                                |                                                                                         |     |      |      |      |
| Q <sub>g</sub>              | Total Gate Charge              | V <sub>GS</sub> =10 V, V <sub>DS</sub> =20 V, I <sub>DS</sub> =20 A                     | -   | 40   | -    | nC   |
| Q <sub>gs</sub>             | Gate-Source Charge             |                                                                                         | -   | 6    | -    |      |
| Q <sub>gd</sub>             | Gate-Drain Charge              |                                                                                         | -   | 8    | -    |      |

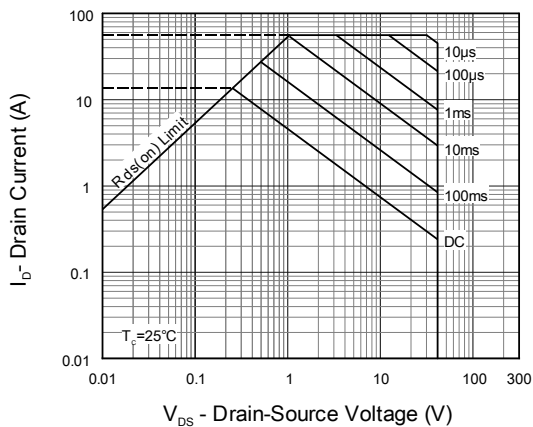
## 7. Typical Characteristics



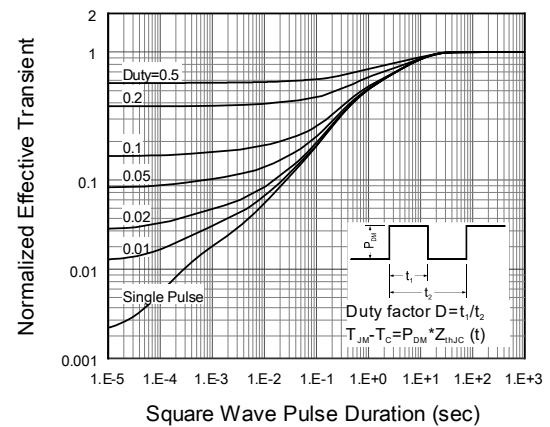
**Figure 1. Power Capability**



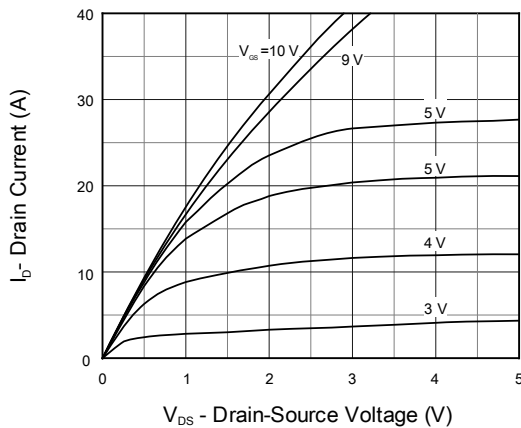
**Figure 2. Current Capability**



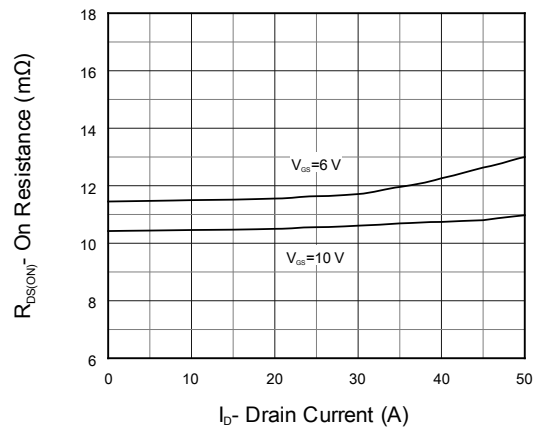
**Figure 3. Safe Operation Area**



**Figure 4. Transient Thermal Impedance**

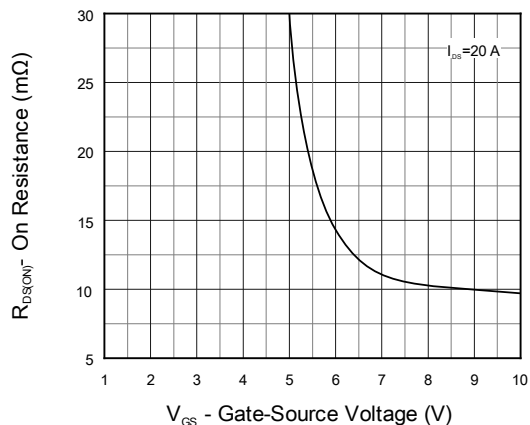


**Figure 5. Output Characteristics**

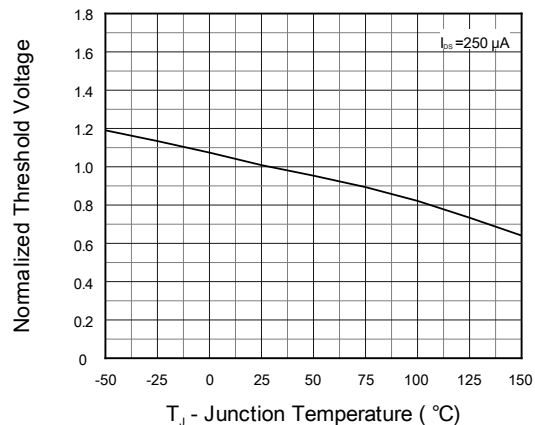


**Figure 6. On Resistance**

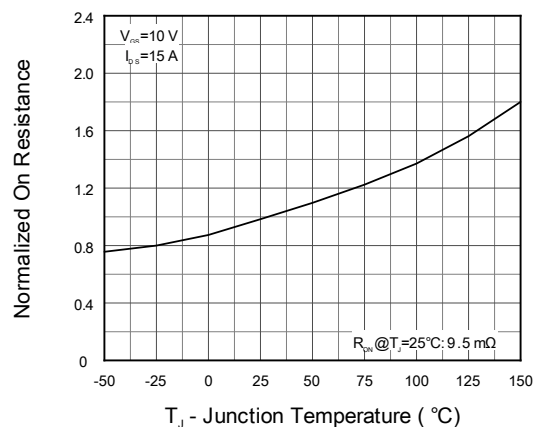
## 7. Typical Characteristics (cont.)



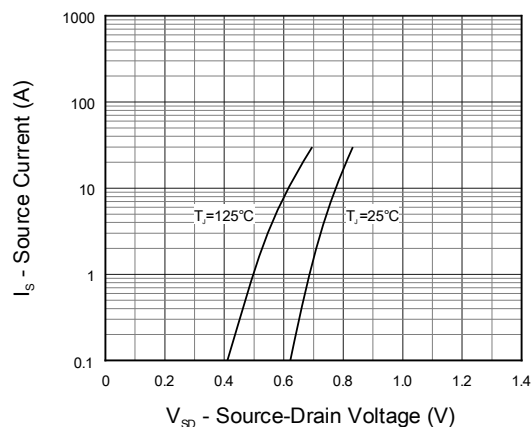
**Figure 7. Transfer Characteristics**



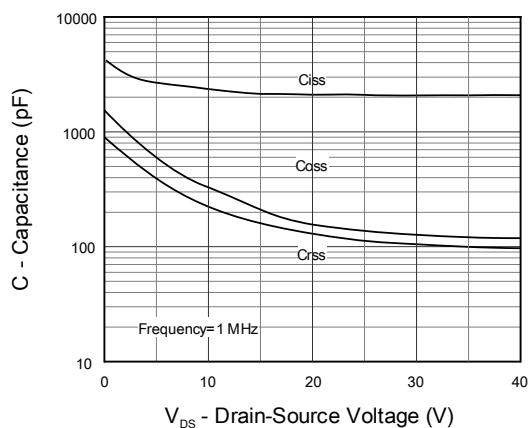
**Figure 8. Normalized Threshold Voltage**



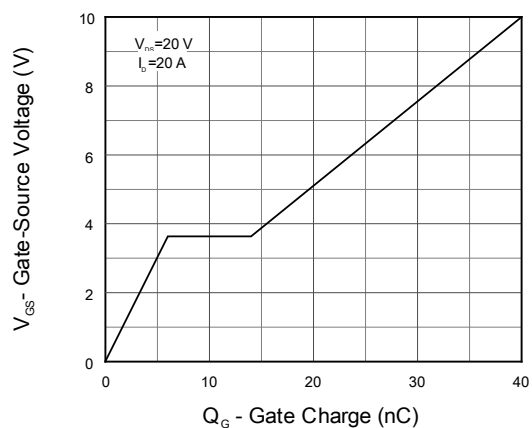
**Figure 9. Normalized On Resistance**



**Figure 10. Diode Forward Current**



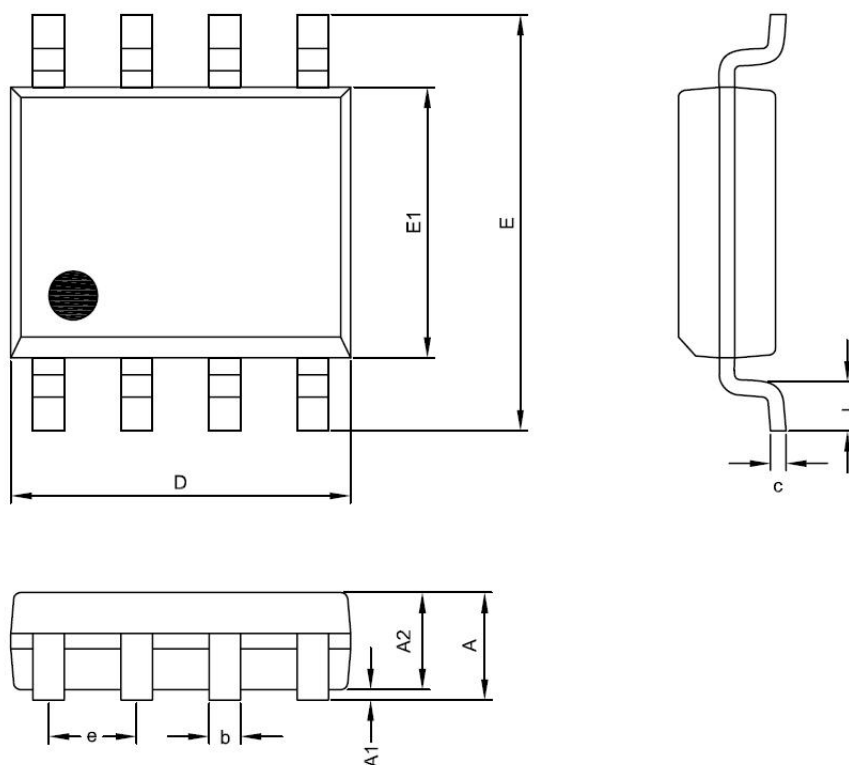
**Figure 11. Capacitance**



**Figure 12. Gate Charge**

## 8. Package Dimensions

### SOP8 Package



| Symbol | Dimensions in Millimeters |      |
|--------|---------------------------|------|
|        | MIN.                      | MAX. |
| A      | 1.35                      | 1.75 |
| A1     | 0.00                      | 0.25 |
| A2     | 1.15                      | 1.50 |
| D      | 4.80                      | 5.00 |
| E      | 5.80                      | 6.20 |
| E1     | 3.80                      | 4.00 |
| c      | 0.19                      | 0.27 |
| b      | 0.33                      | 0.53 |
| e      | 1.27 BSC                  |      |
| L      | 0.40                      | 1.27 |