

## P-Channel Enhancement Mode MOSFET

### 1. Product Information

#### 1.1 Features

- ☒ Advanced trench cell design
- ☒ Low Thermal Resistance

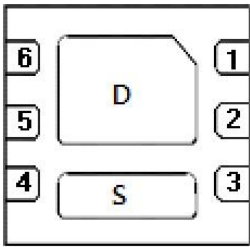
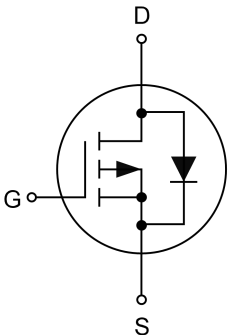
#### 1.2 Applications

- ☒ Motor drives
- ☒ DC-DC Converter

#### 1.3 Quick reference

- ☒  $BV \leq -12\text{ V}$
- ☒  $R_{DS(ON)} \leq 18\text{ m}\Omega @V_{GS}=-4.5\text{ V}$
- ☒  $P_D \leq 1.6\text{ W}$
- ☒  $R_{DS(ON)} \leq 19\text{ m}\Omega @V_{GS}=-2.5\text{ V}$
- ☒  $I_D \leq -12\text{ A}$

### 2. Pin Description

| Pin     | Description | Simplified Outline                                                                                                     | Symbol                                                                                |
|---------|-------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1,2,5,6 | Drain (D)   |  <p>Bottom View<br/>DFN 2x2-6L</p> |  |
| 3       | Gate (G)    |                                                                                                                        |                                                                                       |
| 4       | Source (S)  |                                                                                                                        |                                                                                       |

## 3. Limiting Values

| Symbol          | Parameter                              | Conditions                              | Min | Max      | Unit          |
|-----------------|----------------------------------------|-----------------------------------------|-----|----------|---------------|
| $V_{DS}$        | Drain-Source Voltage                   | $T_C=25^{\circ}C$                       | -12 | -        | V             |
| $V_{GS}$        | Gate-Source Voltage                    | $T_C=25^{\circ}C$                       | -   | $\pm 12$ | V             |
| $I_D$           | Drain Current                          | $T_C=25^{\circ}C, V_{GS}=-4.5\text{ V}$ | -   | -12      | A             |
| $I_{DM}^*$      | Pulsed Source Current                  | $T_C=25^{\circ}C, V_{GS}=-4.5\text{ V}$ | -   | -16      | A             |
| $P_{tot}^*$     | Total Power Dissipation                | $T_C=25^{\circ}C$                       | -   | 1.6      | W             |
| $T_{stg}$       | Storage Temperature                    |                                         | -55 | 150      | $^{\circ}C$   |
| $T_J$           | Junction Temperature                   |                                         | -   | 150      | $^{\circ}C$   |
| $I_S$           | Diode Forward Current                  | $T_C=25^{\circ}C$                       | -   | -12      | A             |
| $R_{\theta JC}$ | Thermal Resistance-Junction to Ambient |                                         | -   | 78       | $^{\circ}C/W$ |

Notes :

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

## 4. Marking Information

| Product Name | Marking                                                                                                                           |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------|
| KJ1216N2     | <div style="background-color: black; color: white; padding: 5px; display: inline-block;">           1216<br/>XXXXX         </div> |

## 5. Ordering Code

| Product Name | Package    | Reel size | Tape width | Quantity (pcs) |
|--------------|------------|-----------|------------|----------------|
| KJ1216N2     | DFN 2x2-6L | 7"        | 12 mm      | 3000           |

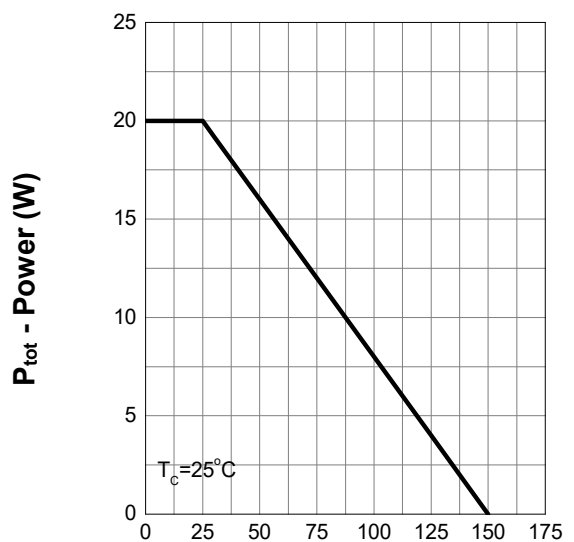
Note: KJ1216N2 defines "Green" as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC/JEDEC J-STD-020C)

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

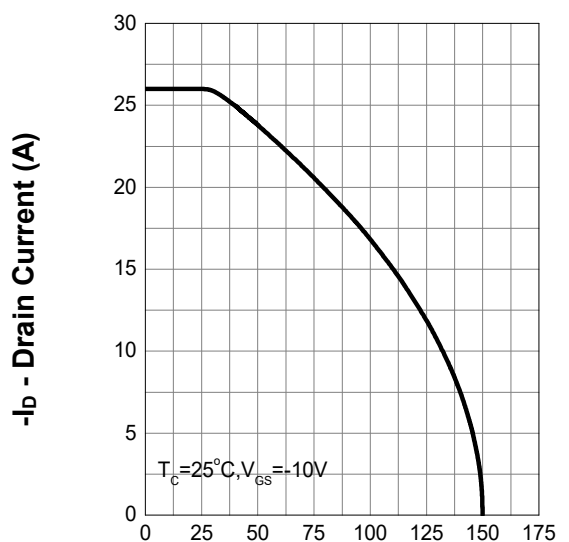
| Symbol                      | Parameter                                            | Conditions                                                                                         | Min  | Typ  | Max   | Unit |
|-----------------------------|------------------------------------------------------|----------------------------------------------------------------------------------------------------|------|------|-------|------|
| Static Characteristics      |                                                      |                                                                                                    |      |      |       |      |
| BV <sub>DSS</sub>           | Drain-Source Breakdown Voltage                       | V <sub>GS</sub> =0 V, I <sub>D</sub> =-250 μA                                                      | -12  | -    | -     | V    |
| V <sub>GS(th)</sub>         | Gate Threshold Voltage                               | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250 μA                                        | -0.4 | -0.7 | -1.0  | V    |
| I <sub>DSS</sub>            | Zero Gate Voltage Source Current                     | V <sub>DS</sub> =-12 V, V <sub>GS</sub> =0 V                                                       | -    | -    | -1    | μA   |
|                             |                                                      | T <sub>J</sub> =85°C                                                                               | -    | -    | -30   | μA   |
| I <sub>GSS</sub>            | Gate Leakage Current                                 | V <sub>GS</sub> =±12 V, V <sub>DS</sub> =0 V                                                       | -    | -    | ± 100 | nA   |
| R <sub>DS(ON)</sub>         | Drain-Source On-State Resistance                     | V <sub>GS</sub> =-4.5 V, I <sub>D</sub> =-8 A                                                      | -    | 15   | 18    | mΩ   |
|                             |                                                      | V <sub>GS</sub> =-2.5 V, I <sub>D</sub> =-5 A                                                      | -    | 16   | 19    | mΩ   |
| Diode Characteristics       |                                                      |                                                                                                    |      |      |       |      |
| V <sub>SD</sub>             | Diode Forward Voltage                                | I <sub>SD</sub> =-2.6 A, V <sub>GS</sub> =0 V                                                      | -    | -    | -1.2  | V    |
| I <sub>SM</sub>             | Maximum Pulsed Drain to Source Diode Forward Current |                                                                                                    | -    | -8   | -     | A    |
| V <sub>SD</sub>             | Drain to Source Diode Forward Voltage                | V <sub>GS</sub> =0 V, I <sub>S</sub> =-8 A                                                         | -    | -32  | -     | A    |
| Dynamic Characteristics     |                                                      |                                                                                                    |      |      |       |      |
| C <sub>iss</sub>            | Input Capacitance                                    | V <sub>GS</sub> =0 V, V <sub>DS</sub> =-10 V<br>Frequency=1 MHz                                    | -    | 2700 | -     | pF   |
| C <sub>oss</sub>            | Output Capacitance                                   |                                                                                                    | -    | 680  | -     |      |
| C <sub>rss</sub>            | Reverse Transfer Capacitance                         |                                                                                                    | -    | 590  | -     |      |
| t <sub>d(on)</sub>          | Turn-on Delay Time                                   | V <sub>DS</sub> =-6 V, V <sub>GEN</sub> =-4.5 V,<br>R <sub>G</sub> =2.5 Ω,<br>I <sub>D</sub> =-4 A | -    | 11   | -     | ns   |
| t <sub>r</sub>              | Turn-on Rise Time                                    |                                                                                                    | -    | 35   | -     |      |
| t <sub>d(off)</sub>         | Turn-off Delay Time                                  |                                                                                                    | -    | 30   | -     |      |
| t <sub>f</sub>              | Turn-off Fall Time                                   |                                                                                                    | -    | 10   | -     |      |
| Gate Charge Characteristics |                                                      |                                                                                                    |      |      |       |      |
| Q <sub>g</sub>              | Total Gate Charge                                    | V <sub>GS</sub> =-6V, V <sub>DS</sub> =-4.5V,<br>I <sub>DS</sub> =-8A                              | -    | 35   | -     | nC   |
| Q <sub>gs</sub>             | Gate-Source Charge                                   |                                                                                                    | -    | 5    | -     |      |
| Q <sub>gd</sub>             | Gate-Drain Charge                                    |                                                                                                    | -    | 10   | -     |      |

## 7. Typical Characteristics

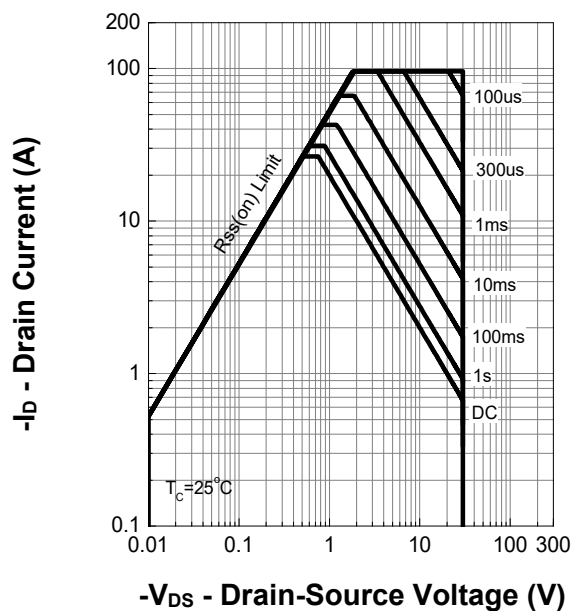
**Power Capability**



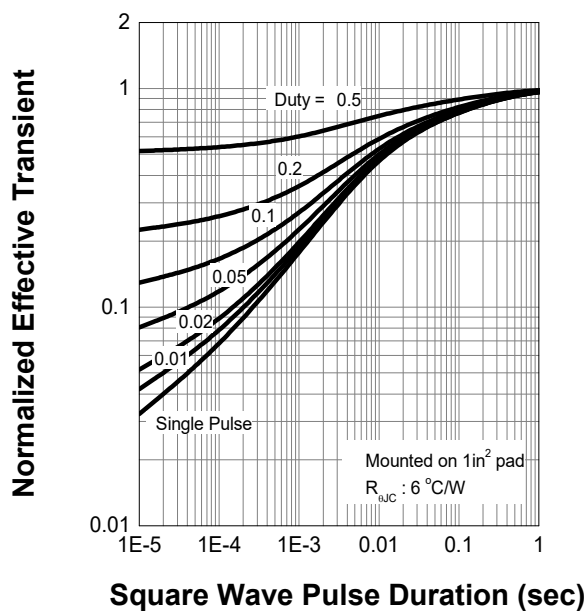
**Current Capability**



**Safe Operation Area**

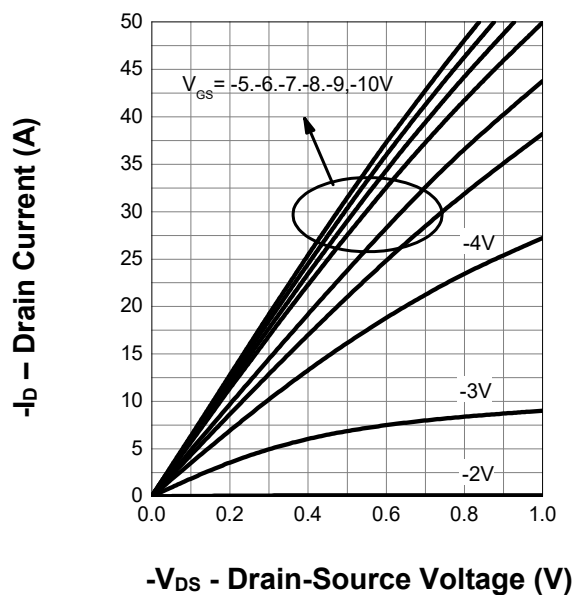


**Thermal Transient Impedance**

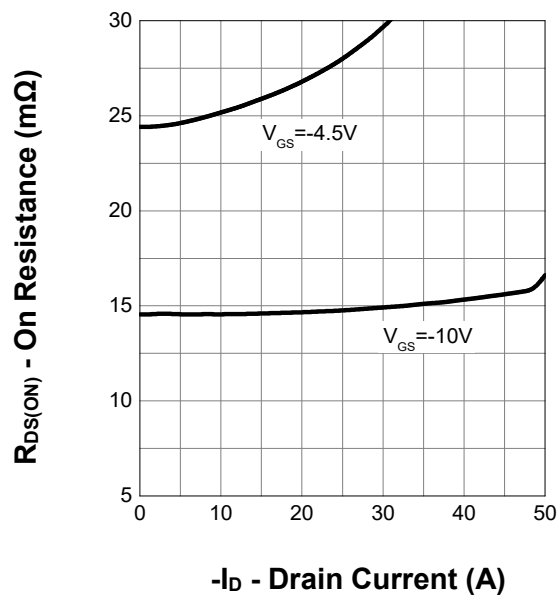


## 7. Typical Characteristics (cont.)

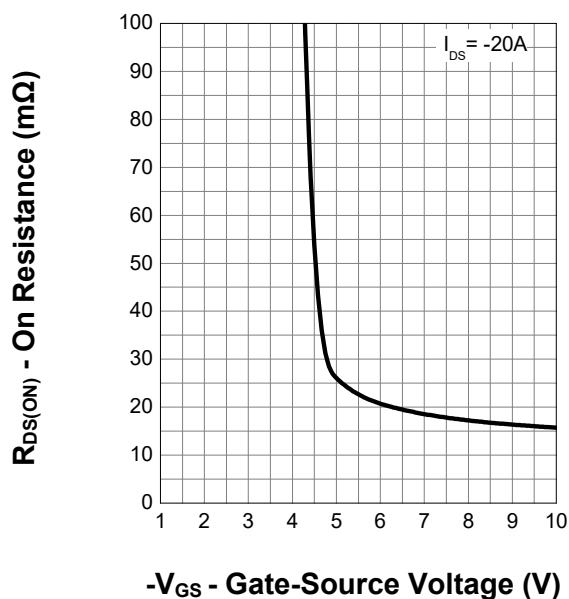
**Output Characteristics**



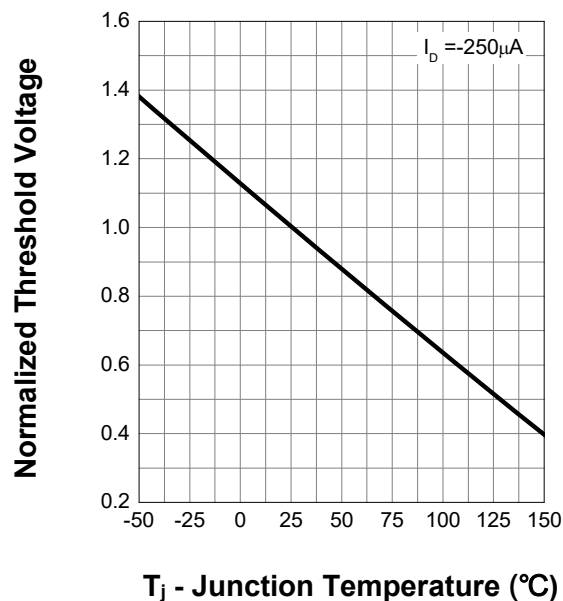
**Drain-Source On Resistance**



**Transfer Characteristics**

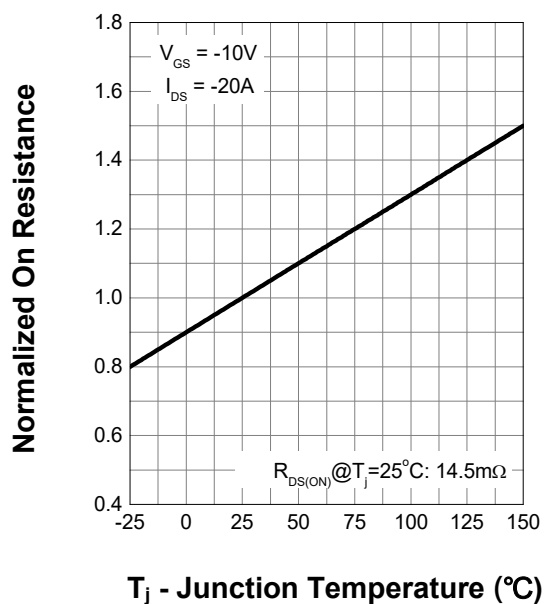


**Gate Threshold Voltage**

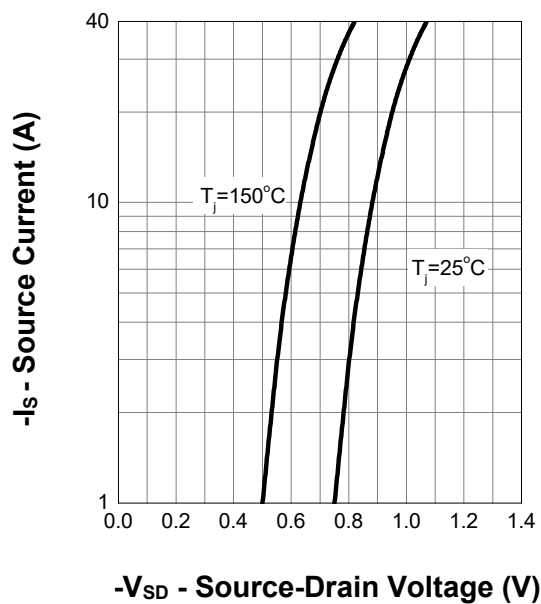


## 7. Typical Characteristics (cont.)

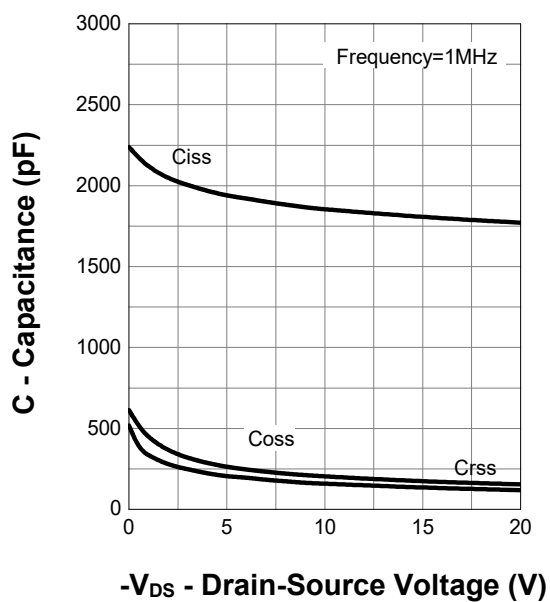
### Drain-Source On Resistance



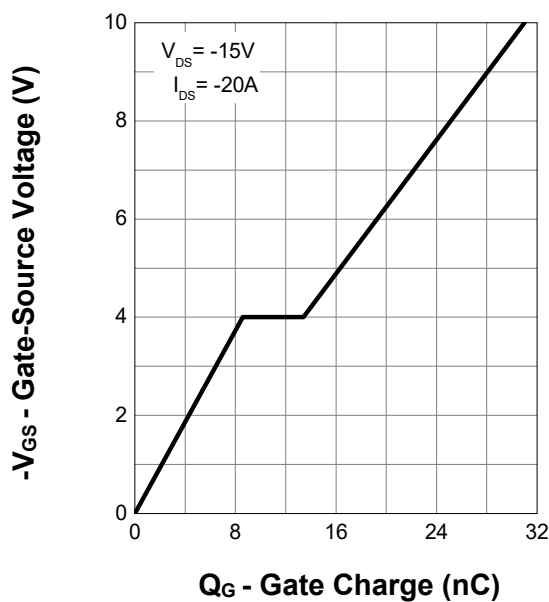
### Body Diode Characteristics



### Capacitance

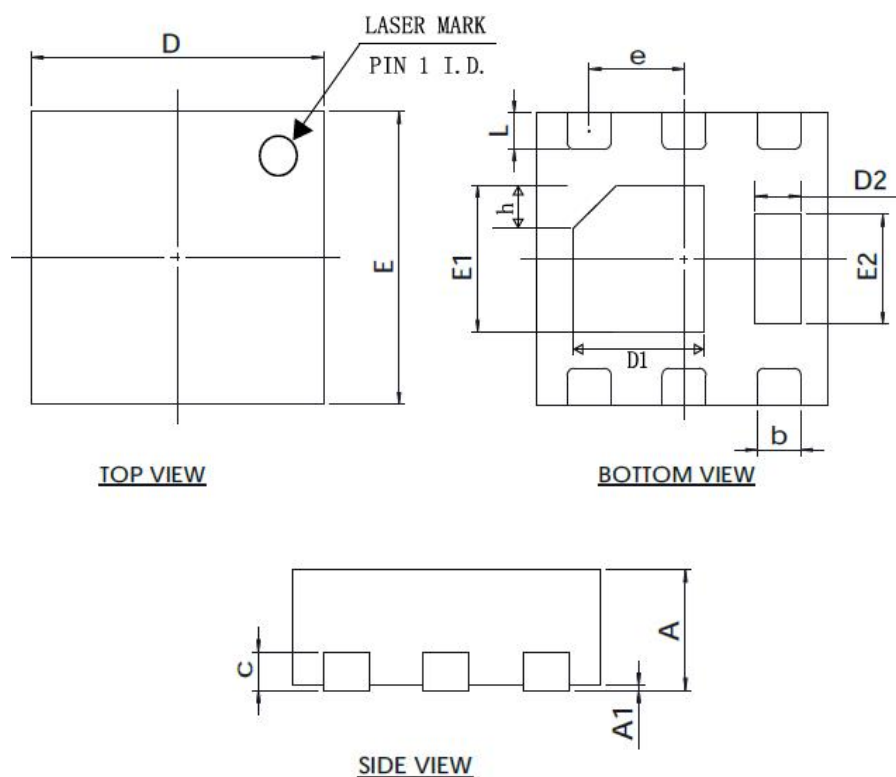


### Gate Charge



## 8.Package Dimensions

DFN 2x2-6L



| Symbol | MIN     | NOM  | MAX  |
|--------|---------|------|------|
| A      | 0.70    | 0.75 | 0.80 |
| A1     | NA      | 0.02 | 0.05 |
| b      | 0.20    | 0.27 | 0.34 |
| c      | 0.18    | 0.20 | 0.25 |
| D      | 1.95    | 2.00 | 2.07 |
| E      | 1.95    | 2.00 | 2.07 |
| D1     | 0.80    | 0.90 | 1.00 |
| E1     | 0.90    | 1.00 | 1.10 |
| D2     | 0.20    | 0.30 | 0.40 |
| E2     | 0.65    | 0.75 | 0.85 |
| L      | 0.20    | 0.25 | 0.35 |
| h      | 0.20    | 0.25 | 0.30 |
| e      | 0.65BSC |      |      |