

## Super-Junction Power Mosfet

### 1. Product Information

#### Features

- Low FOM  $R_{DS(ON)} \times Q_G$
- Fast switching capability
- Lead free product is acquired

#### Applications

- Power supply
- Charger
- Solar/UPS-Micro inverter system

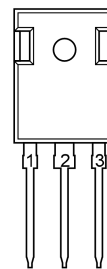
#### Quick reference

- $V_{DS} \geq 650\text{ V}$
- $I_D \leq 84\text{ A}$
- $R_{DS(ON)} \leq 37\text{ m}\Omega @ V_{GS} = 10\text{ V}$  (Type 31 m $\Omega$ )

#### Pin Description

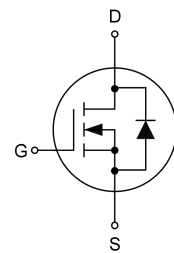
| Pin | Description |
|-----|-------------|
| 1   | Gate(G)     |
| 2   | Drain(D)    |
| 3   | Source(S)   |

#### Simplified Outline



Top View  
TO-247

#### Symbol



#### Package Marking and Ordering Information

| Part number | Marking     | Package | Packaging                                | Quantity | Reel size | Tape width |
|-------------|-------------|---------|------------------------------------------|----------|-----------|------------|
| KJCF65R037P | KJCF65R037P | TO-247  | <input type="checkbox"/> Tape & Reel     | N/A      | N/A       | N/A        |
|             |             |         | <input checked="" type="checkbox"/> Tube | 600 PCS  | N/A       | N/A        |

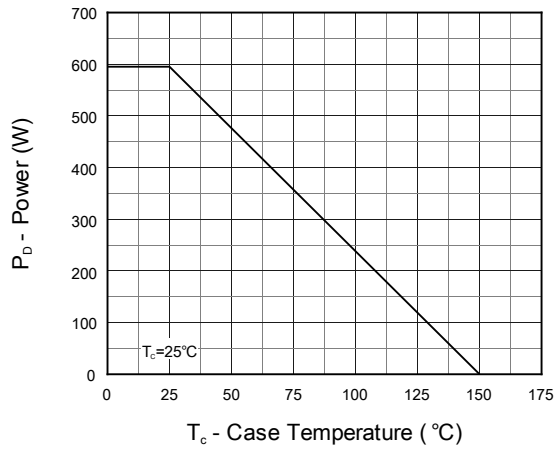
### 2. Absolute Maximum Ratings ( $T_C=25^\circ\text{C}$ unless otherwise noted)

| Symbol          | Parameter                                            | Values     | Unit               |
|-----------------|------------------------------------------------------|------------|--------------------|
| $V_{DS}$        | Drain-Source Voltage                                 | 650        | V                  |
| $V_{GS}$        | Gate-Source Voltage                                  | $\pm 30$   | V                  |
| $I_D$           | Continuous Drain Current ( $T_C=25^\circ\text{C}$ )  | 84         | A                  |
|                 | Continuous Drain Current ( $T_C=100^\circ\text{C}$ ) | 53         | A                  |
| $I_{DM}$        | Pulsed Drain Current                                 | 252        | A                  |
| $E_{AS}$        | Single Pulsed Avalanche Energy (L=30 mH)             | 1500       | mJ                 |
| $P_D$           | Power Dissipation                                    | 595        | W                  |
| $T_J, T_{stg}$  | Operating Junction and Storage Temperature Range     | -55 to 150 | $^\circ\text{C}$   |
| $R_{\theta JA}$ | Thermal Resistance, Junction-Ambient                 | 45         | $^\circ\text{C/W}$ |
| $R_{\theta JC}$ | Thermal Resistance, Junction-Case                    | 0.21       | $^\circ\text{C/W}$ |

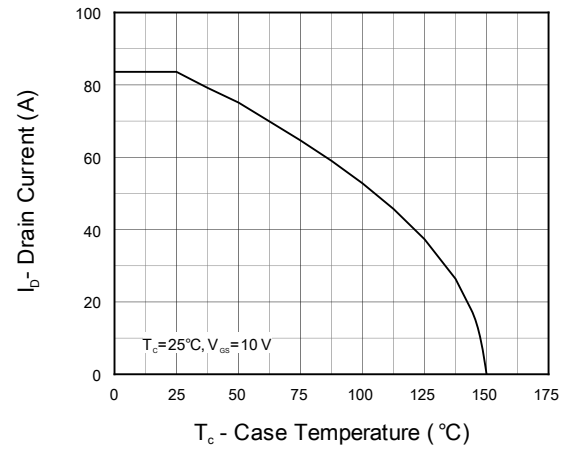
## 3. Electrical Characteristics (T<sub>J</sub>=25℃, unless otherwise noted)

| Symbol                             | Parameter                          | Test Conditions                                                                           | Min | Type | Max  | Unit |
|------------------------------------|------------------------------------|-------------------------------------------------------------------------------------------|-----|------|------|------|
| Static Characteristics             |                                    |                                                                                           |     |      |      |      |
| BV <sub>DSS</sub>                  | Drain-Source Breakdown Voltage     | V <sub>GS</sub> =0 V, I <sub>D</sub> =250 μA                                              | 650 | -    | -    | V    |
| I <sub>DSS</sub>                   | Zero Gate Voltage Drain Current    | V <sub>DS</sub> =650 V, V <sub>GS</sub> =0 V                                              | -   | -    | 5    | μA   |
|                                    |                                    | V <sub>DS</sub> =650 V, T <sub>C</sub> =150℃                                              | -   | 1000 | -    | μA   |
| I <sub>GSS</sub>                   | Gate-Body Leakage Current          | V <sub>GS</sub> =±30 V, V <sub>DS</sub> =0 V                                              | -   | -    | ±100 | nA   |
| V <sub>GS(th)</sub>                | Gate Threshold Voltage             | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250 μA                                 | 3.5 | -    | 4.5  | V    |
| R <sub>DS(ON)</sub>                | Drain-Source On-State Resistance   | V <sub>GS</sub> =10 V, I <sub>D</sub> =40 A                                               | -   | 31   | 37   | mΩ   |
| Dynamic Characteristics            |                                    |                                                                                           |     |      |      |      |
| C <sub>iss</sub>                   | Input Capacitance                  | V <sub>DS</sub> =100 V, V <sub>GS</sub> =0 V, f=1 MHz                                     | -   | 6050 | -    | pF   |
| C <sub>oss</sub>                   | Output Capacitance                 |                                                                                           | -   | 336  | -    | pF   |
| C <sub>rss</sub>                   | Reverse Transfer Capacitance       |                                                                                           | -   | 15   | -    | pF   |
| Switching Characteristics          |                                    |                                                                                           |     |      |      |      |
| t <sub>d(on)</sub>                 | Turn-on Delay Time                 | V <sub>DS</sub> =400 V, I <sub>D</sub> =40 A, R <sub>G</sub> =27 Ω, V <sub>GS</sub> =10 V | -   | 165  | -    | ns   |
| t <sub>r</sub>                     | Turn-on Rise Time                  |                                                                                           | -   | 115  | -    | ns   |
| t <sub>d(off)</sub>                | Turn-off Delay Time                |                                                                                           | -   | 340  | -    | ns   |
| t <sub>f</sub>                     | Turn-off Fall Time                 |                                                                                           | -   | 92   | -    | ns   |
| R <sub>g</sub>                     | Gate resistance                    | f=1 MHz                                                                                   | -   | 1    | -    | Ω    |
| Q <sub>g</sub>                     | Total Gate Charge                  | V <sub>DS</sub> =480 V, I <sub>D</sub> =40 A, V <sub>GS</sub> =10 V                       | -   | 168  | -    | nC   |
| Q <sub>gs</sub>                    | Gate-Source Charge                 |                                                                                           | -   | 55   | -    | nC   |
| Q <sub>gd</sub>                    | Gate-Drain Charge                  |                                                                                           | -   | 90   | -    | nC   |
| Source-Drain Diode Characteristics |                                    |                                                                                           |     |      |      |      |
| V <sub>SD</sub>                    | Drain-Source Diode Forward Voltage | V <sub>GS</sub> =0 V, I <sub>F</sub> =40 A                                                | -   | 0.87 | 1.2  | V    |
| Q <sub>rr</sub>                    | Reverse Recovery Time              | V <sub>R</sub> =400 V, I <sub>F</sub> =40 A, di/dt=100 A/μs                               | -   | 1.5  | -    | μC   |
| T <sub>rr</sub>                    | Reverse Recovery Charge            |                                                                                           | -   | 195  | -    | ns   |

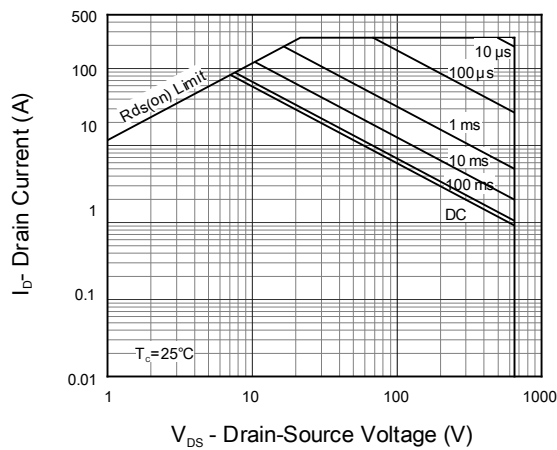
## 4. Electrical Characteristics



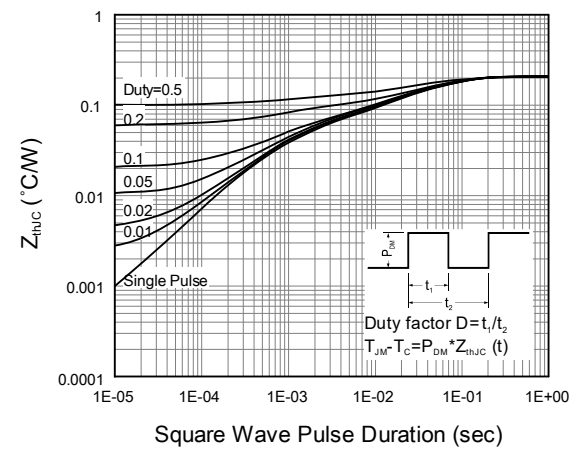
**Fig 1. Power Capability**



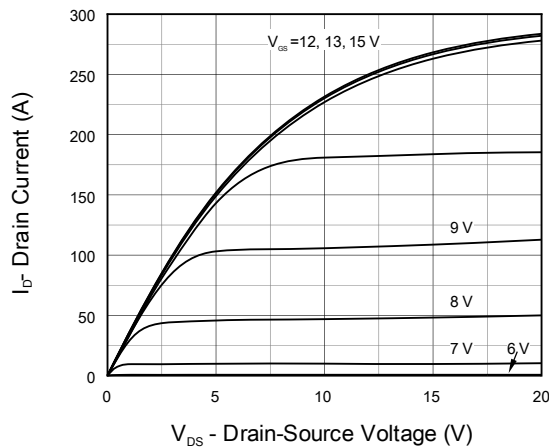
**Fig 2. Current Capability**



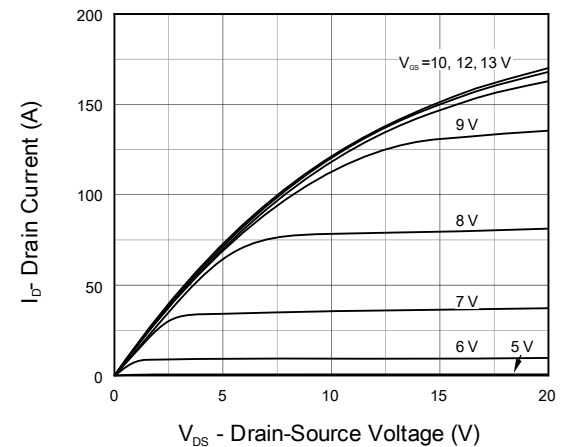
**Fig 3. Safe Operation Area**



**Fig 4. Transient Thermal Impedance**

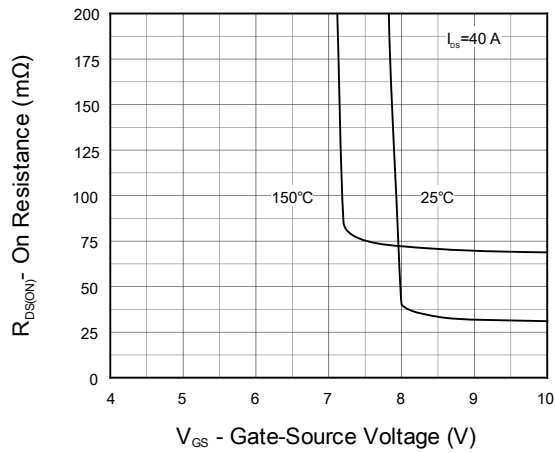


**Fig 5. Output Characteristics**  
 $T_j = 25^\circ\text{C}$

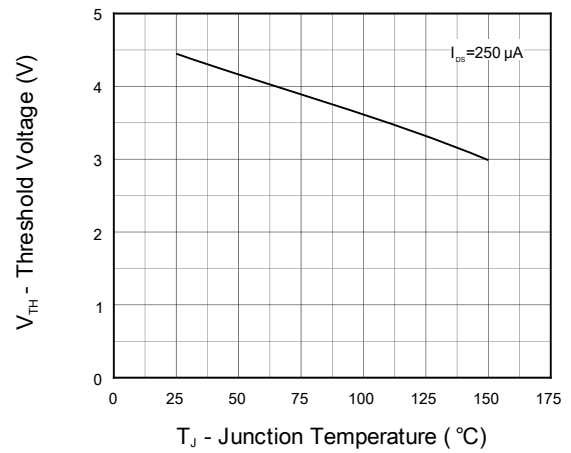


**Fig 6. Output Characteristics**  
 $T_j = 150^\circ\text{C}$

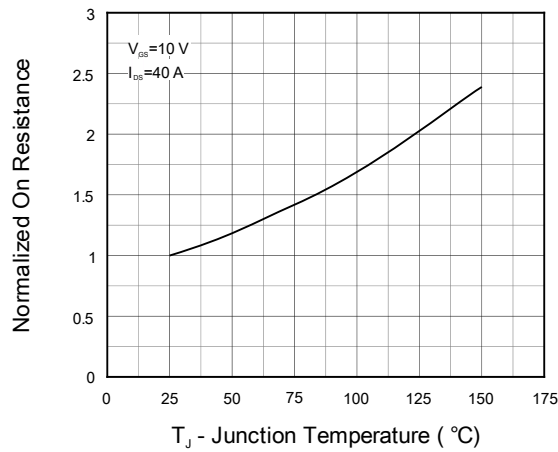
## 5. Electrical Characteristics (cont.)



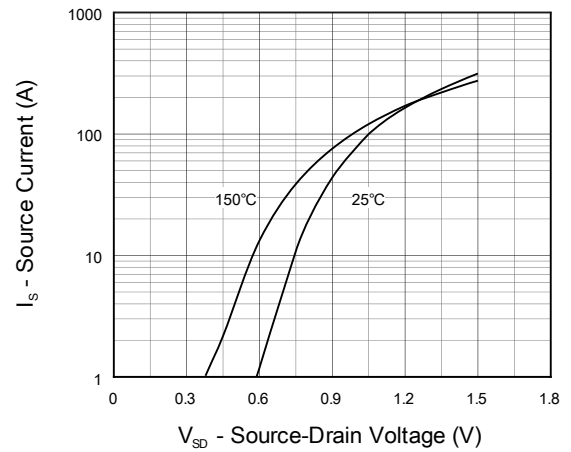
**Fig 7.  $R_{DS(ON)}$  vs. Gate Voltage**



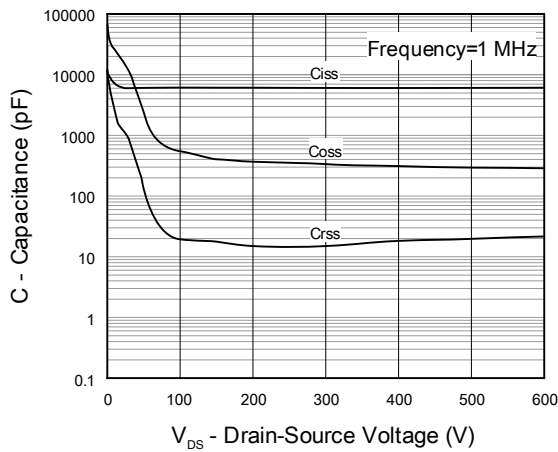
**Fig 8.  $V_{TH}$  vs. Junction Temperature**



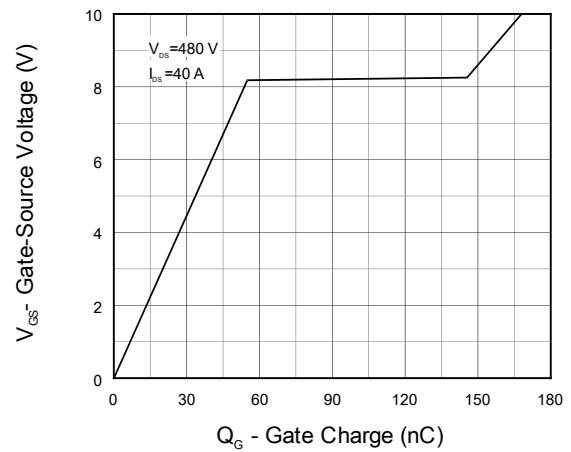
**Fig 9. Normalized On Resistance**



**Fig 10. Diode Forward Current**



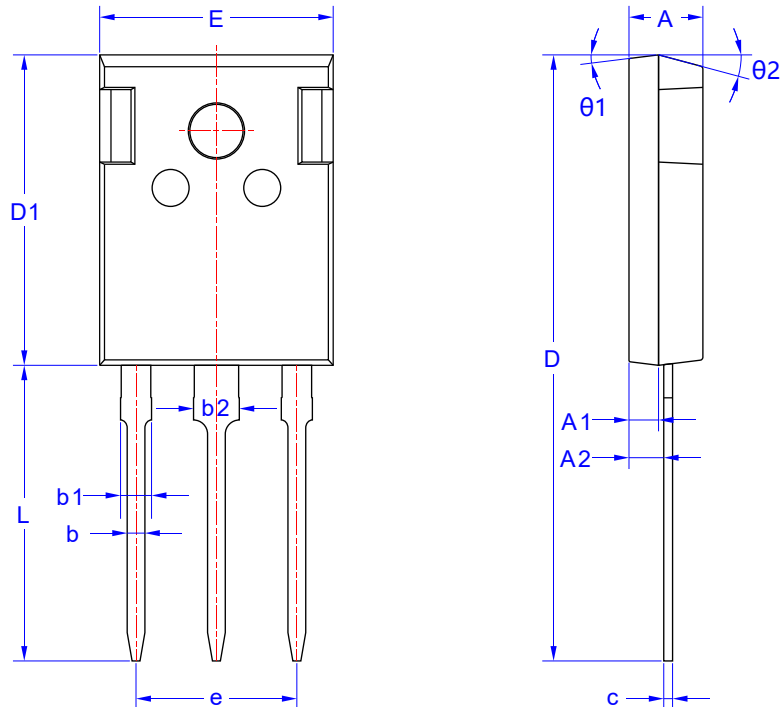
**Fig 11. Capacitance**



**Fig 12. Gate Charge**

## 5. Package Mechanical Data

### TO-247 Package



| Symbol | Dimensions in Millimeters |       |       |
|--------|---------------------------|-------|-------|
|        | MIN                       | NOM   | MAX   |
| A      | 4.90                      | 5.00  | 5.10  |
| A1     | 1.90                      | 2.00  | 2.10  |
| A2     | 2.25                      | 2.35  | 2.45  |
| b      |                           | 1.20  |       |
| b1     |                           | 2.10  |       |
| b2     |                           | 3.10  |       |
| c      |                           | 0.60  |       |
| D      | 40.00                     | 41.00 | 42.00 |
| D1     | 20.80                     | 21.00 | 21.20 |
| E      | 15.60                     | 15.80 | 16.00 |
| e      |                           | 10.88 |       |
| L      | 19.80                     | 20.00 | 20.20 |
| θ1     |                           | 7°    |       |
| θ2     |                           | 15°   |       |