



## Description

The RJK0351DPA-00#J0 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

## General Features

$V_{DS} = 30V$   $I_D = 120A$

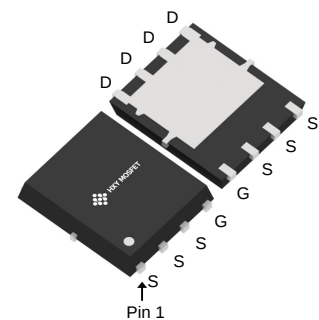
$R_{DS(ON)} < 2.6m\Omega$   $V_{GS}=10V$

## Application

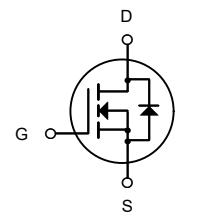
Battery protection

Load switch

Uninterruptible power supply



DFN5X6-8L



N-Channel MOSFET

## Package Marking and Ordering Information

| Product ID       | Pack      | Brand      | Qty(PCS) |
|------------------|-----------|------------|----------|
| RJK0351DPA-00#J0 | DFN5X6-8L | HXY MOSFET | 5000     |

## Absolute Maximum Ratings ( $T_c=25^\circ C$ unless otherwise noted)

| Symbol                | Parameter                                     | Rating     | Units        |
|-----------------------|-----------------------------------------------|------------|--------------|
| $V_{DS}$              | Drain-Source Voltage                          | 30         | V            |
| $V_{GS}$              | Gate-Source Voltage                           | $\pm 20$   | V            |
| $I_D@T_c=25^\circ C$  | Continuous Drain Current, $V_{GS} @ 10V$      | 120        | A            |
| $I_D@T_c=100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$      | 57         | A            |
| $I_{DM}$              | Pulsed Drain Current                          | 360        | A            |
| EAS                   | Single Pulse Avalanche Energy                 | 125        | mJ           |
| $P_D$                 | Total Power Dissipation <sup>4</sup>          | 115        | W            |
| $T_{STG}$             | Storage Temperature Range                     | -55 to 175 | $^\circ C$   |
| $T_J$                 | Operating Junction Temperature Range          | -55 to 175 | $^\circ C$   |
| $R_{\theta JA}$       | Thermal Resistance Junction-Ambient           | 62         | $^\circ C/W$ |
| $R_{\theta JC}$       | Thermal Resistance Junction-Case <sup>2</sup> | 1.3        | $^\circ C/W$ |



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

| Symbol       | Parameter                                       | Conditions                                       | Min | Typ  | Max       | Units      |
|--------------|-------------------------------------------------|--------------------------------------------------|-----|------|-----------|------------|
| $BV_{DSS}$   | Drain-Source Breakdown Voltage                  | $V_{GS}=0V, I_D=250\mu A$                        | 30  | ---  | ---       | V          |
| $I_{DSS}$    | Zero Gate Voltage Drain Current                 | $V_{GS}=0V, V_{DS}=30V$                          | --- | ---  | 1         | $\mu A$    |
| $I_{GSS}$    | Gate-Source Leakage Current                     | $V_{GS}=\pm 20V, V_{DS}=0A$                      | --- | ---  | $\pm 100$ | nA         |
| $V_{GS(th)}$ | Gate-Source Threshold Voltage                   | $V_{GS}=V_{DS}, I_D=250\mu A$                    | 1   | 1.6  | 2.5       | V          |
| $R_{DS(on)}$ | Drain-Source On Resistance <sup>2</sup>         | $V_{GS}=10V, I_D=20A$                            | --- | 2.6  | 3.3       | m $\Omega$ |
|              |                                                 | $V_{GS}=4.5V, I_D=10A$                           | --- | 3.8  | 5         |            |
| $C_{iss}$    | Input Capacitance                               | $V_{DS}=25V, V_{GS}=0V, f=1MHz$                  | --- | 2218 | ---       | pF         |
| $C_{oss}$    | Output Capacitance                              |                                                  | --- | 480  | ---       |            |
| $C_{rss}$    | Reverse Transfer Capacitance                    |                                                  | --- | 340  | ---       |            |
| $t_{d(on)}$  | Turn-On Delay Time <sup>3,4</sup>               | $V_{DD}=15V, I_D=15A, R_G=3.3\Omega, V_{GS}=10V$ | --- | 12.6 | ---       | ns         |
| $t_r$        | Rise Time <sup>3,4</sup>                        |                                                  | --- | 19.5 | ---       | ns         |
| $t_{d(off)}$ | Turn-Off Delay Time <sup>3,4</sup>              |                                                  | --- | 42.8 | ---       | ns         |
| $t_f$        | Fall Time <sup>3,4</sup>                        |                                                  | --- | 13.2 | ---       | ns         |
| $Q_g$        | Total Gate Charge <sup>3,4</sup>                | $V_{GS}=4.5V, V_{DS}=15V, I_D=20A$               | --- | 24   | ---       | nC         |
| $Q_{gs}$     | Gate-Source Charge <sup>3,4</sup>               |                                                  | --- | 4.2  | ---       | nC         |
| $Q_{gd}$     | Gate-Drain "Miller" Charge <sup>3,4</sup>       |                                                  | --- | 13   | ---       | nC         |
| $V_{SD}$     | Source-Drain Diode Forward Voltage <sup>3</sup> | $V_{GS}=0V, I_S=1A$                              | --- | ---  | 1         | V          |
| $I_S$        | Continuous Source Current                       | $V_G=V_D=0V, \text{Force Current}$               | --- | ---  | 120       | A          |
| $I_{SM}$     | Pulsed Source Current                           |                                                  | --- | ---  | 360       | A          |
| $T_{rr}$     | Reverse Recovery Time                           | $V_{GS}=30V, I_S=1A, di/dt=100A/\mu s$           | --- | 258  | ---       | NS         |
| $Q_{rr}$     | Reverse Recovery Charge                         | $T_J=25^{\circ}\text{C}$                         | --- | 324  | ---       | NC         |

**Notes:**

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=50A, R_G=25\Omega$ , Starting  $T_J=25^{\circ}\text{C}$ .
3. The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.



## Typical Characteristics

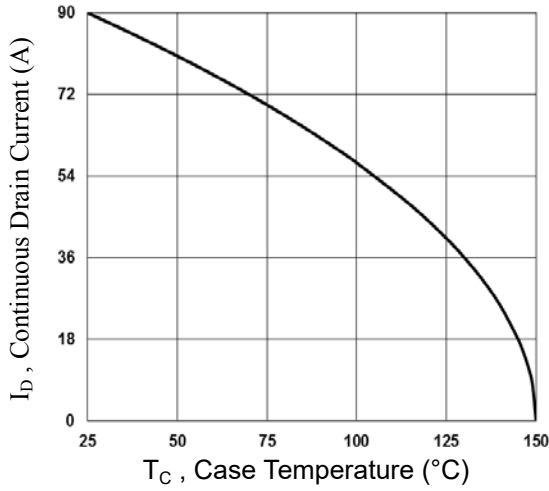


Fig.1 Continuous Drain Current vs.  $T_C$

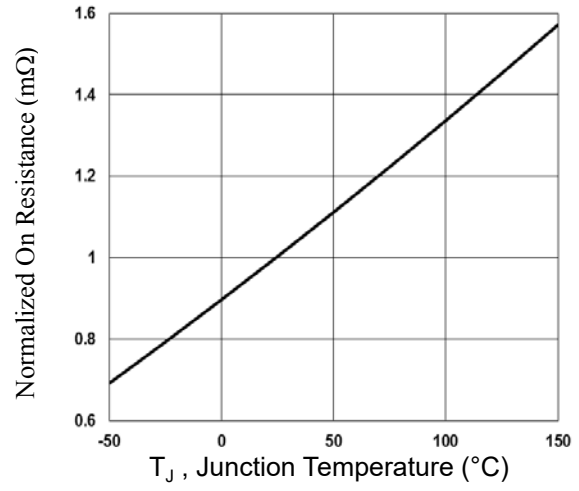


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$

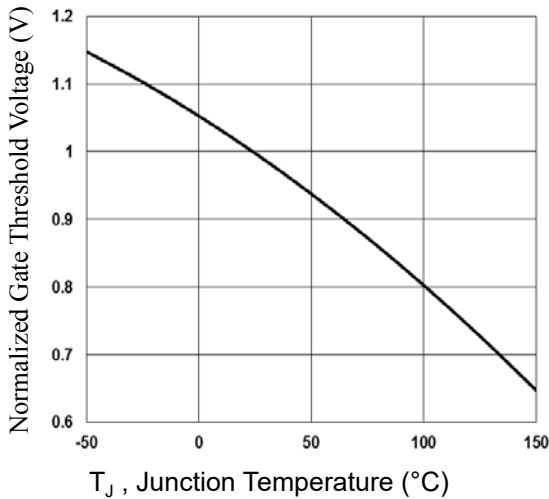


Fig.3 Normalized  $V_{th}$  vs.  $T_J$

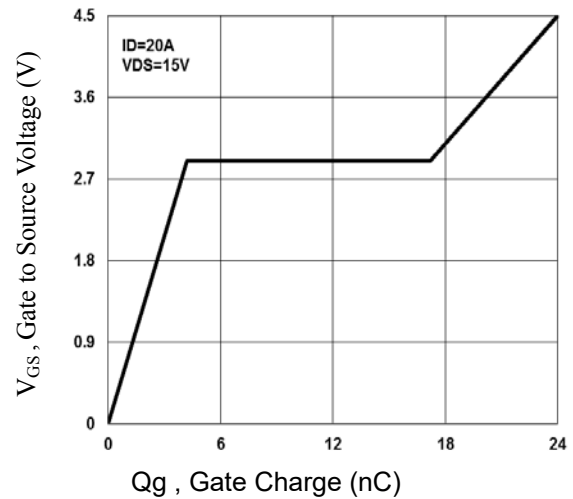


Fig.4 Gate Charge Waveform

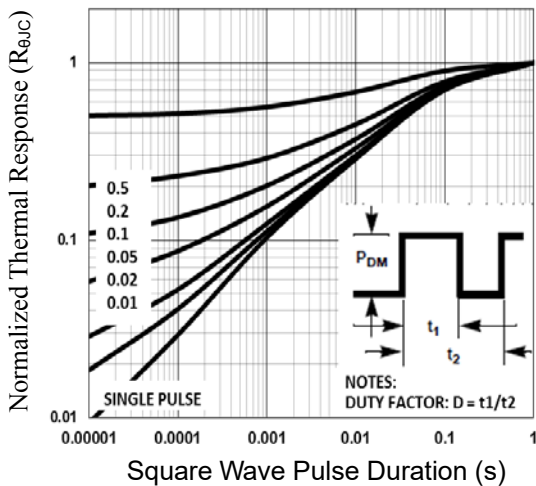


Fig.5 Normalized Transient Impedance

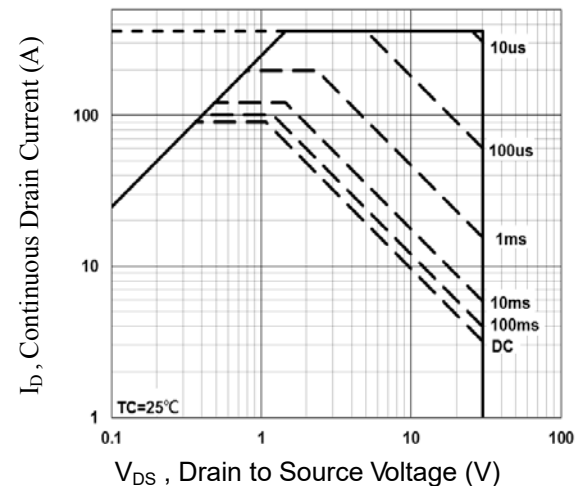


Fig.6 Maximum Safe Operation Area

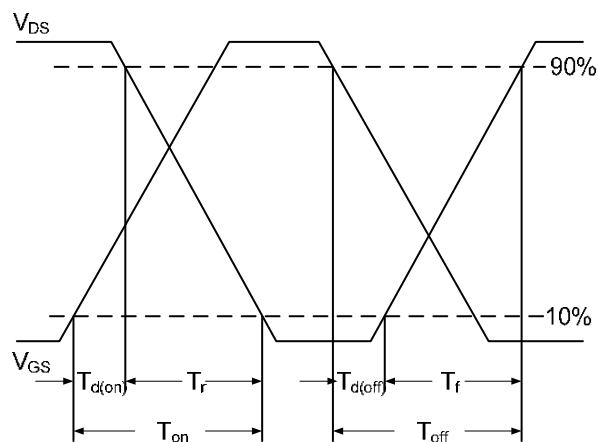


Fig.7 Switching Time Waveform

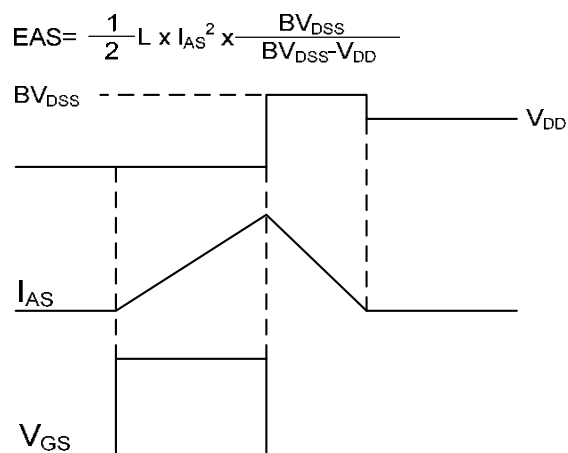


Fig.8 EAS Waveform



## DFN5X6-8L Package Information



| SYMBOL | MM       |      |       | INCH     |       |       |
|--------|----------|------|-------|----------|-------|-------|
|        | MIN      | NOM  | MAX   | MIN      | NOM   | MAX   |
| A      | 5.3      | 5.5  | 5.7   | 0.208    | 0.216 | 0.224 |
| A1     | 5.1      | 5.2  | 5.3   | 0.2      | 0.204 | 0.209 |
| D      | 5.98     | 6    | 6.02  | 0.235    | 0.236 | 0.237 |
| D1     | 5.85     | 6.05 | 6.25  | 0.23     | 0.238 | 0.246 |
| B      | 0.85     | 0.95 | 1.05  | 0.033    | 0.037 | 0.041 |
| B1     | 0.254REF |      |       | 0.010REF |       |       |
| C      | 3.95     | 4    | 4.05  | 0.156    | 0.157 | 0.159 |
| C1     | 0.35     | 0.4  | 0.45  | 0.014    | 0.016 | 0.018 |
| C2     | 1.27TYP  |      |       | 0.5TYP   |       |       |
| θ1     | 8°       | 10°  | 12°   | 8°       | 10°   | 12°   |
| L1     | 0.63     | 0.64 | 0.65  | 0.025    | 0.025 | 0.026 |
| L2     | 1.2      | 1.3  | 1.4   | 0.047    | 0.051 | 0.055 |
| L3     | 3.415    | 3.42 | 3.425 | 0.134    | 0.135 | 0.135 |
| H      | 0.24     | 0.25 | 0.26  | 0.009    | 0.010 | 0.010 |



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