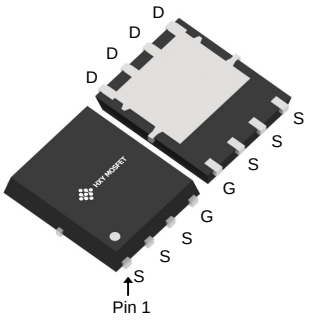
# RJK0393DPA-00#J5A

N-Channel Enhancement Mode MOSFET

## Description

The RJK0393DPA-00#J5A 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.

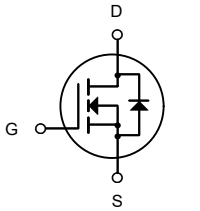



DFN5X6-8L

## General Features

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

$R_{DS(ON)}$ < 2.6mΩ $V_{GS}$=10V




N-Channel MOSFET

## Application

Battery protection

Load switch

Uninterruptible power supply

## Package Marking and Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|---|---|---|---|
| RJK0393DPA-00#J5A | DFN5X6-8L | HXY MOSFET | 5000 |

## Absolute Maximum Ratings ($T_C$=25°C unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 30 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_C$=25℃ | Continuous Drain Current, $V_{GS}$ @ 10V | 120 | A |
| $I_D$@$T_C$=100℃ | 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[4] | 115 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 175 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 175 | ℃ |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient | 62 | ℃/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case[2] | 1.3 | ℃/W |

## Electrical Characteristics ($T_J$=25°C, unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Sourtce Breakdown Voltage | $V_{GS}$=0V,$I_D$=250μA | 30 | --- | --- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{GS}$=0V, $V_{DS}$=30V | --- | --- | 1 | μA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V, $V_{DS}$=0A | --- | --- | ±100 | nA |
| $V_{GS(th)}$ | GateSource Threshold Voltage | $V_{GS}$=$V_{DS}$, $I_D$=250μ A | 1 | 1.6 | 2.5 | V |
| $R_{DS(ON)}$ | Drain-Source On Resistance[2] | $V_{GS}$=10V,$I_D$=20A | --- | 2.6 | 3.3 | mΩ |
| | | $V_{GS}$=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 [3,4] | $V_{DD}$=15V,$I_D$=15A, $R_G$=3.3Ω $V_{GS}$=10V | --- | 12.6 | --- | ns |
| $t_r$ | Rise Time[3,4] | | --- | 19.5 | --- | ns |
| $t_{d(off)}$ | Turn-Off Delay Time [3,4] | | --- | 42.8 | --- | ns |
| $t_f$ | Fall Time[3,4] | | --- | 13.2 | --- | ns |
| $Q_g$ | Total Gate Charge [3,4] | $V_{GS}$=4.5V, $V_{DS}$=15V, $I_D$=20A | --- | 24 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge [3,4] | | --- | 4.2 | --- | nC |
| $Q_{gd}$ | Gate-Drain “Miller” Charge [3,4] | | --- | 13 | --- | nC |
| $V_{SD}$ | Source-Drain Diode Forward Voltage[3] | $V_{GS}$=0V,$I_S$=1A | --- | --- | 1 | V |
| IS | Continuous Source Current | $V_G$=$V_D$=0V , Force Current | --- | --- | 120 | A |
| ISM | Pulsed Source Current | | --- | --- | 360 | A |
| Trr | Reverse Recovery Time | $V_{GS}$=30V,Is=1A , di/dt=100A/μs $T_J$=25°C | --- | 258 | --- | NS |
| Qrr | Reverse Recovery Charge | | --- | 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.,$R_G$=25Ω ,Starting $T_J$=25°C.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

## Typical Characteristics

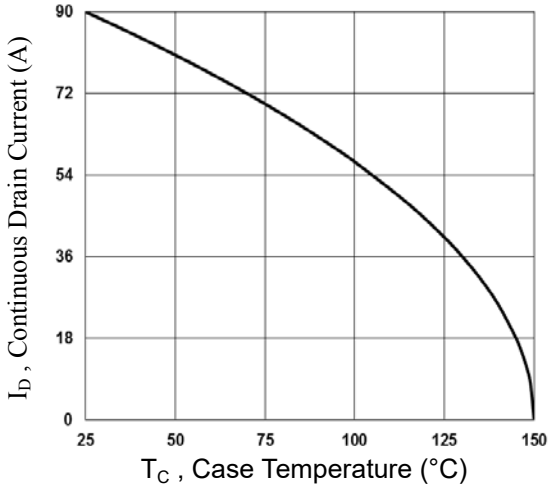



**Fig.1 Continuous Drain Current vs. $T_C$**

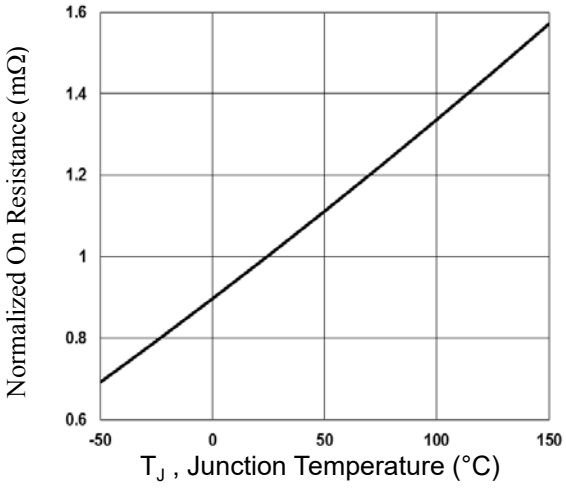



**Fig.2 Normalized RDSON vs. $T_J$**

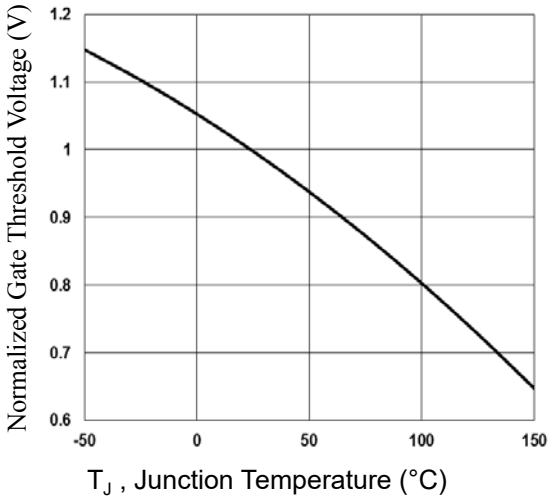



**Fig.3 Normalized $V_{th}$ vs. $T_J$**

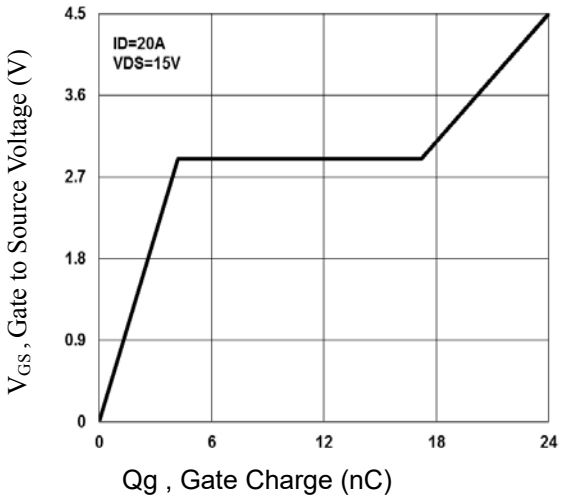



**Fig.4 Gate Charge Waveform**

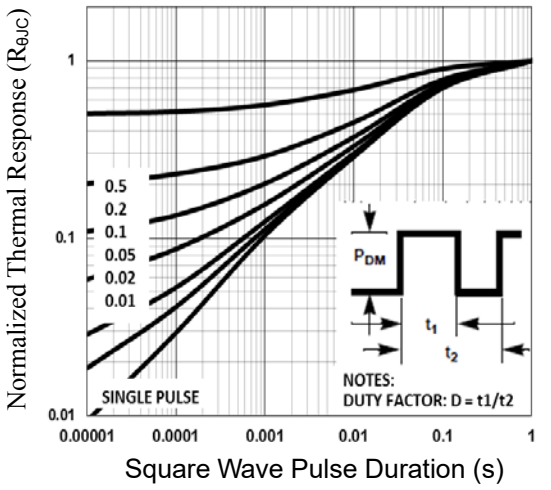



**Fig.5 Normalized Transient Impedance**

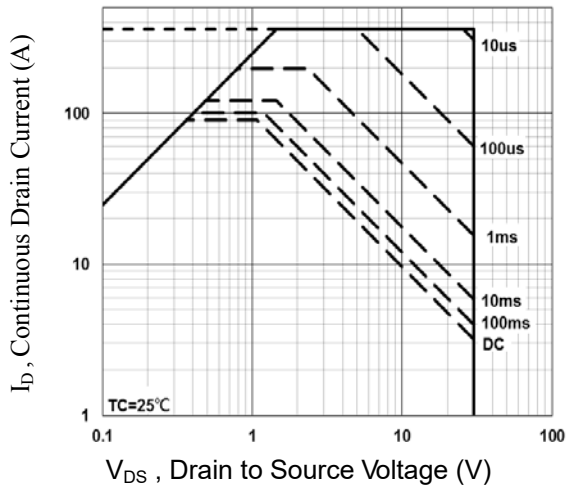



**Fig.6 Maximum Safe Operation Area**

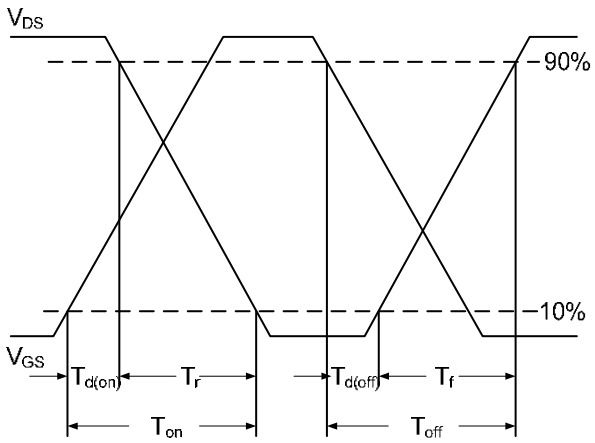



**Fig.7 Switching Time Waveform**

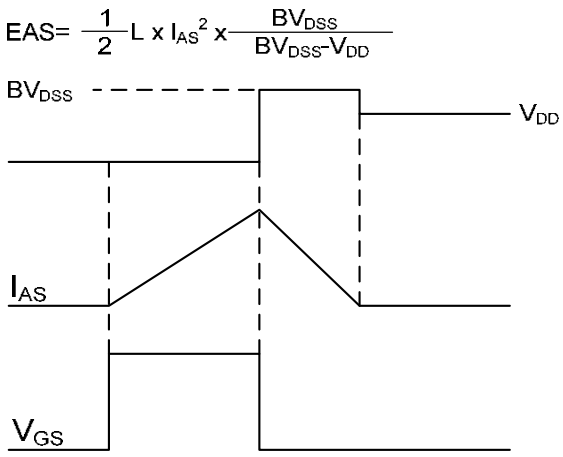
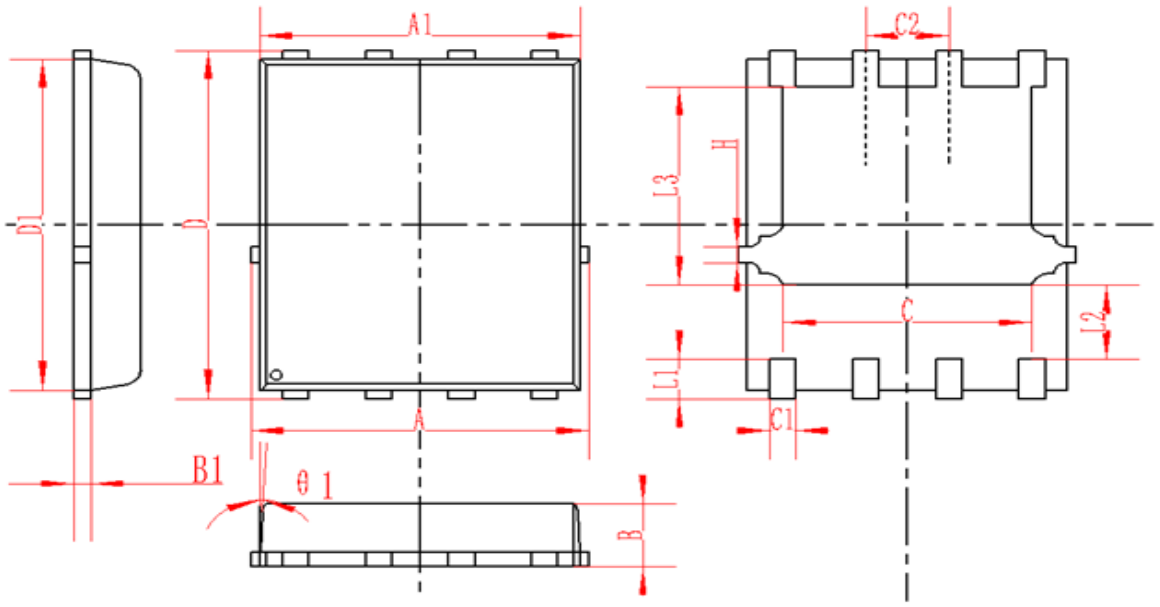



**Fig.8 EAS Waveform**

## 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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HXY2300MI HXY8205ES HAD8542ARZ HT7150 US2M HMCP602-I/SN MAX487ESA P6SMB36CA
SQJA04EP-T1_BE3 SS10100 SS1045 HOPA2340UA SS5150B TPSMB28A-VR BZT52C13 DTC143ZE
IRLML6246PBF P6SMB33CA SD15C SS510C MMBT3904T TPSMB100CA-VR HXY2101EI