## Features

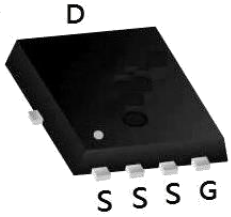
- N-Channel，*Low $R_{DS(on)}$ @$V_{GS}$=10V*
- *5V Logic Level Control*
- *100% UIS Tested*
- *Pb−Free, RoHS Compliant*

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ Typ | $I_D$ Max |
|---|---|---|
| 20V | 4.2mΩ @ 10V | 60A |
| | 5.8mΩ @ 4.5V | |

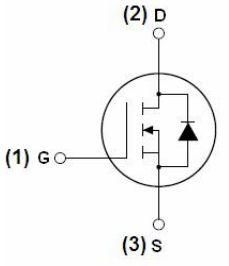
## Applications

- Primary Side Switch
- *Load Switch*
- *Optimized for Power Management Applications for Portable Products, such as H-bridge, Inverters Car Charger and Others*

PDFN 5*6




**pin assignment**




**Schematic diagram**

## Order Information

| Product | Package | Marking | Packing | Min Unit Quantity |
|---|---|---|---|---|
| ZX 8020X | PDFN5*6 | 8020 | 5000PCS/Reel | 5000PCS |

## Absolute Maximum Ratings

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

| Symbol | Parameter | | Rating | Unit |
|---|---|---|---|---|
| **Common Ratings ($T_j$=25°C Unless Otherwise Noted)** | | | | |
| $V_{GS}$ | Gate-Source Voltage | | ±12 | V |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | | 20 | V |
| $T_{STG}$ $T_J$ | Storage and operating temperature range | | -50 to 150 | °C |
| Mounted on Large Heat Sink | | | | |
| $I_{DM}$ | Pulse Drain Current Tested① | $T_C$=25°C | 240 | A |
| $I_S$ | Diode continuous forward current | $T_C$=25°C | 60 | A |
| $I_D$ | Continuous Drain Current($V_{GS}$=10V) | $T_C$=25°C | 50 | A |
| | | $T_C$=70°C | 42 | |
| $P_D$ | Maximum Power Dissipation | $T_C$=25°C | 52 | W |
| EAS | Avalanche energy, single pulsed ② | | 109 | mJ |
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case | | 2.4 | °C/W |

| Symbol | Parameter | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Electrical Characteristics @ $T_J$ = 25°C (unless otherwise stated)** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V $I_D$=250μA | 20 | -- | -- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current($T_C$=25℃) | $V_{DS}$=20V, $V_{GS}$=0V | -- | -- | 1 | μA |
| | Zero Gate Voltage Drain Current($T_C$=125℃) | $V_{DS}$=16V, $V_{GS}$=0V | -- | -- | 100 | uA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{GS}$=±12V, $V_{DS}$=0V | -- | -- | ±100 | nA |
| $V_{GS(TH)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 0.6 | 0.8 | 1.2 | V |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance③ | $V_{GS}$=10V, $I_D$=30A | -- | 4.2 | 4.8 | Ω |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance③ | $V_{GS}$=7V, $I_D$=30A | -- | 4.8 | 5.5 | mΩ |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance③ | $V_{GS}$=4.5V, $I_D$=20A | -- | 5.8 | 7.6 | mΩ |
| **Dynamic Electrical Characteristics @ $T_J$ = 25°C (unless otherwise stated)** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=15V, $V_{GS}$=0V, f=1MHz | -- | 1335 | -- | pF |
| $C_{oss}$ | Output Capacitance | | -- | 210 | -- | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 140 | -- | pF |
| $R_g$ | Gate Resistance | f=1MHz | | 11 | | Ω |
| $Q_g$ | Total Gate Charge | $V_{DS}$=15V $I_D$=30A, $V_{GS}$=10V | -- | 23.5 | -- | nC |
| $Q_{gs}$ | Gate Source Charge | | -- | 3.3 | -- | nC |
| $Q_{gd}$ | Gate Drain Charge | | -- | 4.8 | -- | nC |
| **Switching Characteristics @ $T_J$ = 25°C (unless otherwise stated)** | | | | | | |
| $t_{d(on)}$ | Turn on Delay Time | $V_{DD}$=15V, $I_D$=15A, $R_G$=3.3Ω, $V_{GS}$=10V | -- | 11 | -- | ns |
| $t_r$ | Turn on Rise Time | | -- | 30 | -- | ns |
| $t_{d(off)}$ | Turn Off Delay Time | | - | 24 | -- | ns |
| $t_f$ | Turn Off Fall Time | | -- | 6 | -- | ns |
| **Source Drain Diode Characteristics @ $T_J$ = 25°C (unless otherwise stated)** | | | | | | |
| $V_{SD}$ | Forward on voltage③ | $I_{SD}$=20A,$V_{GS}$=0V | -- | 0.83 | 1.2 | V |

Notes: ① Pulse width limited by maximum allowable junction temperature

② Limited by TJmax, starting TJ = 25°C, L = 0.3mH,RG = 25Ω, IAS = 27A, VGS =10V. Part not recommended for use above this value

③ Pulse width ≤ 300μs; duty cycle≤ 2%.

## Typical Characteristics

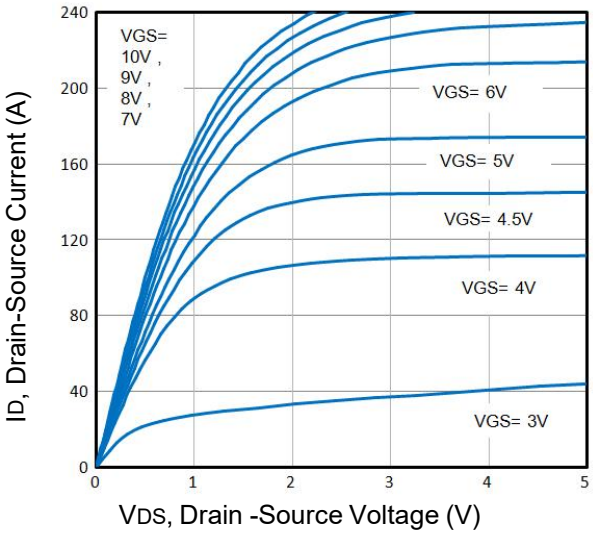



**Fig1.** Typical Output Characteristics

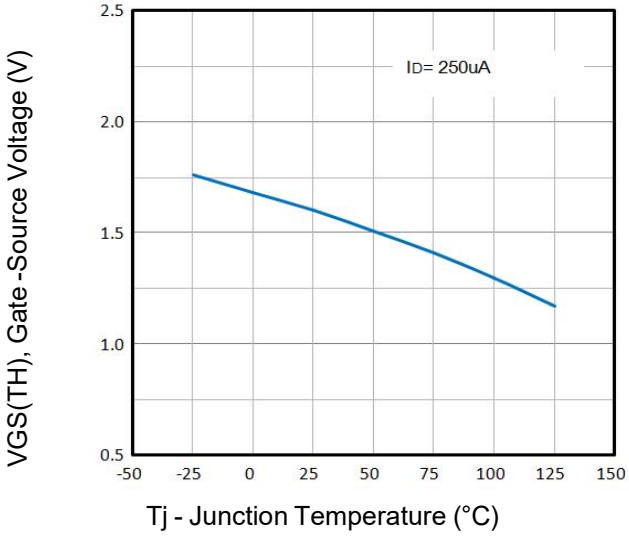



**Fig2.** VGS(TH) Voltage Vs. Temperature

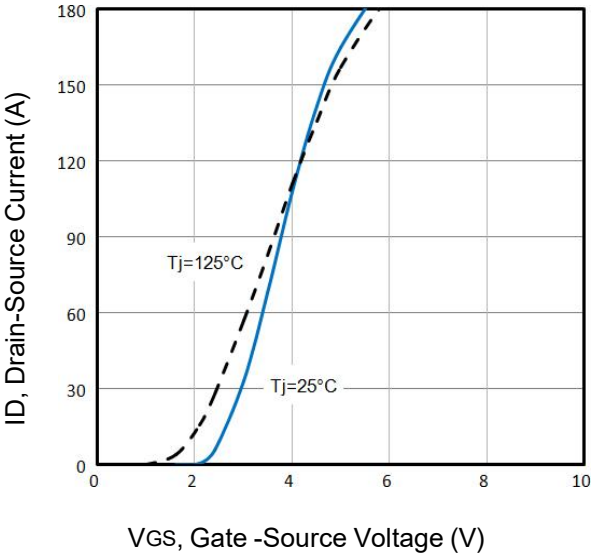



**Fig3.** Typical Transfer Characteristics

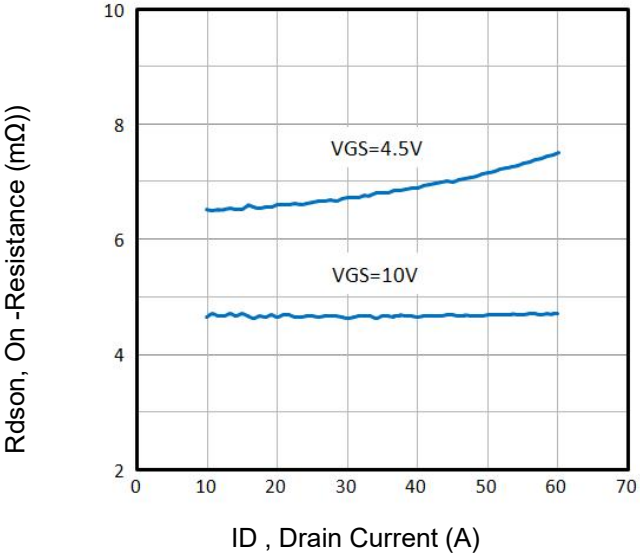



**Fig4.** On-Resistance vs. Drain Current and Gate Voltage

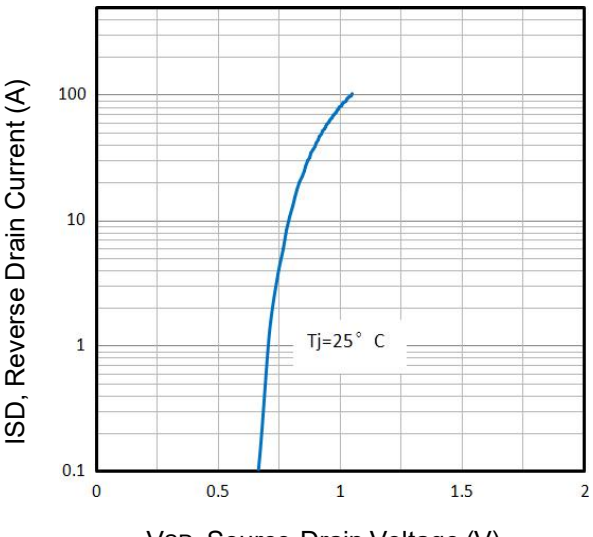



**Fig5.** Typical Source-Drain Diode Forward Voltage

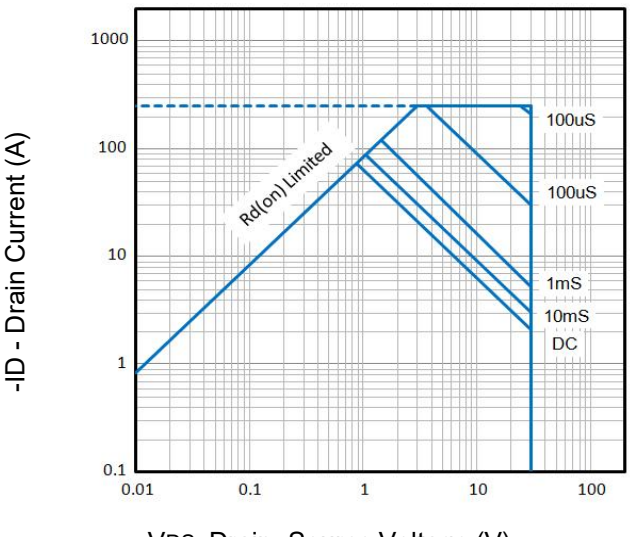



**Fig6.** Maximum Safe Operating Area

## Typical Characteristics

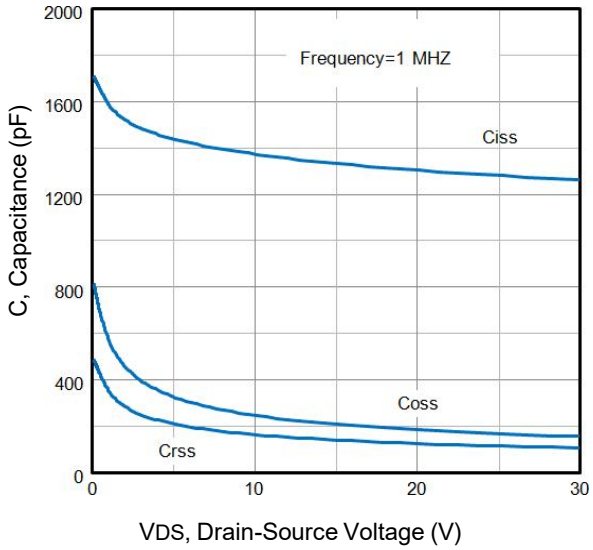



**Fig7.** Typical Capacitance Vs. Drain-Source Voltage

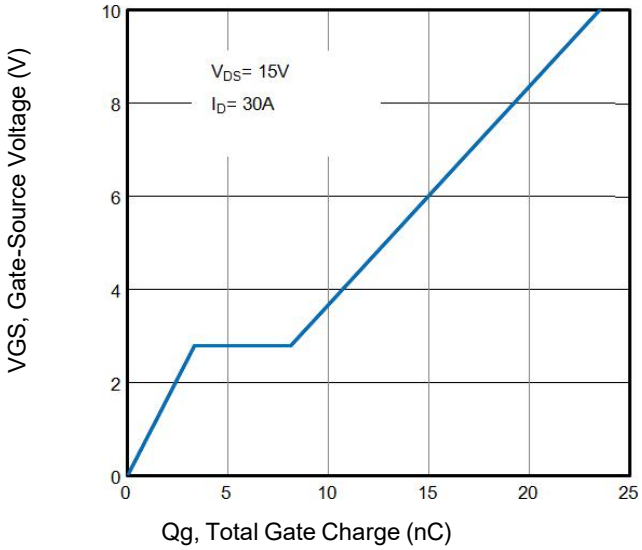



**Fig8.** Typical Gate Charge Vs. Gate-Source Voltage

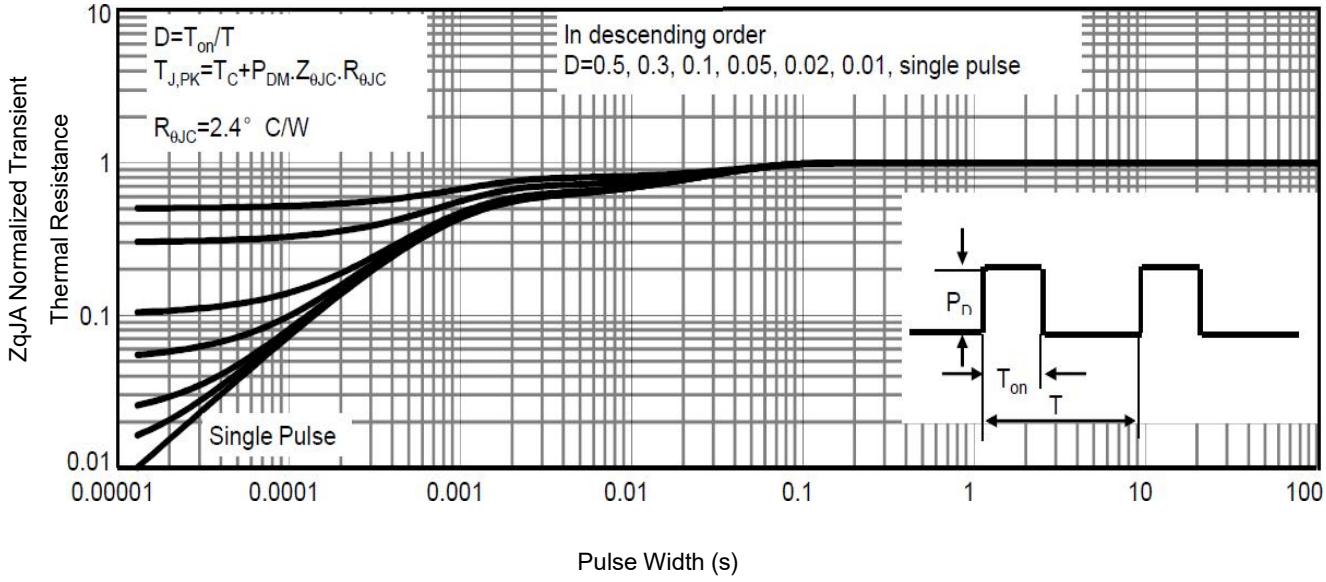



**Fig9.** Normalized Maximum Transient Thermal Impedance

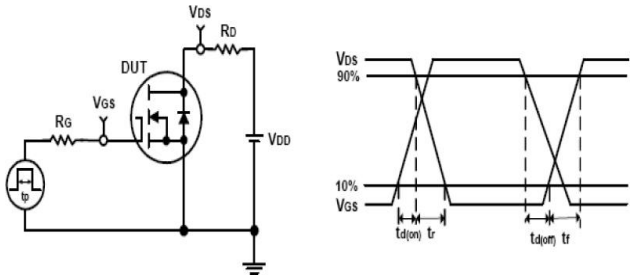



**Fig10.** Switching Time Test Circuit and waveforms

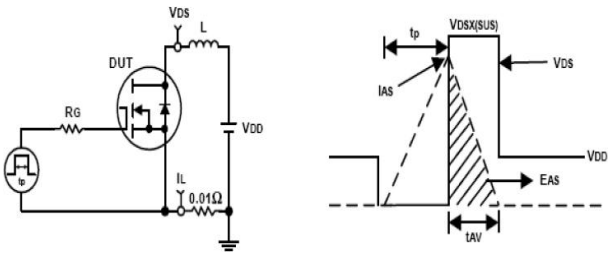
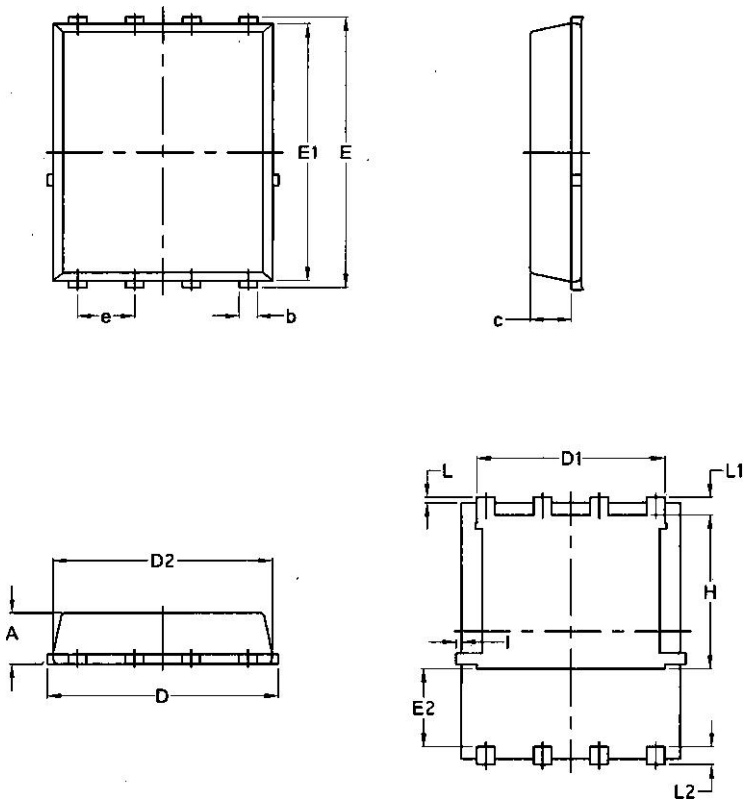



**Fig11.** Unclamped Inductive Test Circuit and waveforms

## Package Mechanical Data-DFN5*6-8L-JQ Single




| Symbol | Common | | | |
|---|---|---|---|---|
| | mm | | Inch | |
| | Mim | Max | Min | Max |
| A | 1.03 | 1.17 | 0.0406 | 0.0461 |
| b | 0.34 | 0.48 | 0.0134 | 0.0189 |
| c | 0.824 | 0.0970 | 0.0324 | 0.082 |
| D | 4.80 | 5.40 | 0.1890 | 0.2126 |
| D1 | 4.11 | 4.31 | 0.1618 | 0.1697 |
| D2 | 4.80 | 5.00 | 0.1890 | 0.1969 |
| E | 5.95 | 6.15 | 0.2343 | 0.2421 |
| E1 | 5.65 | 5.85 | 0.2224 | 0.2303 |
| E2 | 1.60 | / | 0.0630 | / |
| e | 1.27 BSC | | 0.05 BSC | |
| L | 0.05 | 0.25 | 0.0020 | 0.0098 |
| L1 | 0.38 | 0.50 | 0.0150 | 0.0197 |
| L2 | 0.38 | 0.50 | 0.0150 | 0.0197 |
| H | 3.30 | 3.50 | 0.1299 | 0.1378 |
| I | / | 0.18 | / | 0.0070 |