CQAOS 重庆万国

Green Product

**CQZ65N12A**

**30V N-CHANNEL MOSFET**

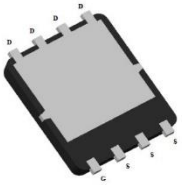
## Product Summary

| V(BR)DSS | RDS(ON) max | ID max |
|---|---|---|
| 30V | <1.6mΩ @ $V_{GS}$ = 10V | 181A |
| | <2.1mΩ @ $V_{GS}$ = 4.5V | |

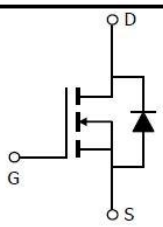
## Description and Applications

- Latest Trench Power MOSFET technology
- Very Low RDSON at 4.5V $V_{GS}$
- High Current Capability and Low Gate Charge
- RoHS and Halogen Free Complaint
- DC/DC Converters in Computer/Servers/POL
- Isolated DC/DC Converters in Telecom/Industrial
- 100% UIS Tested
- 100% RG Tested

## View and Internal Schematic Diagram



DFN5X6




Internal Schematic

## Marking Information

DFN5X6


NOTE:
LOGO - CQAOS
65N12A - Part number code
F - Fab location code
A - Assembly location code
Y - Year code
W - Week code
L&T - Assembly lot code

## Ordering Information

| Part Number | Case | Packaging |
|---|---|---|
| CQZ65N12A | DFN5X6 | 3,000/Tape & Reel |

## Maximum Ratings (@$T_A$ = 25°C unless otherwise specified.)

| Parameters | | Symbol | Max | Units |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $T_C$ = +25°C<br>$T_C$ = +100°C | $I_D$ | 181<br>114 | A |
| Pulsed Drain Current [C] | | $I_{DM}$ | 480 | A |
| Avalanche Current [C] | | $I_{AS}$ | 70 | A |
| Avalanche Energy [C] | L=0.05mH | $E_{AS}$ | 123 | mJ |
| Power Dissipation [B] | $T_C$ = +25°C<br>$T_C$ = +100°C | $P_D$ | 83<br>33 | W |
| Operating and Storage Temperature Range | | $T_J$, $T_G$ TSTG | -55 to+150 | °C |

## Thermal Characteristics

| Characteristic | | Symbol | Typ | Max | Unit |
|---|---|---|---|---|---|
| Maximum Junction-to-Ambient [A] | t ≤ 10s | $R_{\theta JA}$ | 16.6 | 20 | °C/W |
| Maximum Junction-to-Ambient [A D] | Steady-State | | 41 | 55 | °C/W |
| Maximum Junction-to-Case | Steady-State | $R_{\theta JC}$ | 1.27 | 1.5 | °C/W |

## Electrical Characteristics ($@T_J$ = +25°C unless otherwise specified.)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **STATIC PARAMETERS** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $I_D$=250μA, $V_{GS}$=0V | 30 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=30V, $V_{GS}$=0V | | | 1 | μA |
| | | $T_J$=55℃ | | | 5 | |
| $I_{GSS}$ | Gate-Body leakage current | $V_{DS}$=0V, $V_{GS}$= ±20V | | | ±100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$ $I_D$=250μA | 1.2 | 1.5 | 2 | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=10V, $I_D$=20A | | 1.1 | 1.6 | mΩ |
| | | $T_J$=125℃ | | 2 | 2.6 | |
| | | $V_{GS}$=4.5V, $I_D$=20A | | 1.5 | 2.1 | mΩ |
| $g_{FS}$ | Forward Trans conductance | $V_{DS}$=5V, $I_D$=20A | | 136 | | S |
| $V_{SD}$ | Diode Forward Voltage | $I_S$=1A,$V_{GS}$=0V | | 0.66 | 1 | V |
| $V_{SD}$ | Diode Forward Voltage | $I_S$=85A,$V_{GS}$=0V | | 0.84 | | V |
| $I_S$ | Maximum Body-Diode Continuous Current | | | | 126 | A |
| **DYNAMIC PARAMETERS** | | | | | | |
| Ciss | Input Capacitance | $V_{GS}$=0V, $V_{DS}$=15V, f=1MHz | | 4026 | | pF |
| Coss | Output Capacitance | | | 1657 | | pF |
| Crss | Reverse Transfer Capacitance | | | 173 | | pF |
| Rg | Gate resistance | f=1MHz | 0.3 | 1.2 | 1.6 | Ω |
| **SWITCHING PARAMETERS** | | | | | | |
| Qg(10V) | Total Gate Charge | $V_{GS}$=10V, $V_{DS}$=15V, $I_D$=20A | | 71 | | nC |
| Qgs | Gate Source Charge | | | 14.3 | | nC |
| Qgd | Gate Drain Charge | | | 13 | | nC |
| $t_{D(on)}$ | Turn-On Delay Time | $V_{GS}$=10V, $V_{DS}$=15V, $R_L$=0.75Ω, $R_{GEN}$=3Ω | | 15.2 | | ns |
| Tr | Turn-On Rise Time | | | 74.4 | | ns |
| tD(off) | Turn-Off Delay Time | | | 52.4 | | ns |
| Tf | Turn-Off Fall Time | | | 85.8 | | ns |
| $t_{rr}$ | Body Diode Reverse Recovery Time | $I_F$=20A, dI/dt=100A/μs | | 43 | | ns |
| Qrr | Body Diode Reverse Recovery Charge | $I_F$=20A, dI/dt=100A/μs | | 35 | | nC |

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in$^2$ FR-4 board with 1oz. Copper, in a still air environment with $T_A$ =25°C. The value in any given application depends on the user's specific board design.

B. The power dissipation $P_D$ is based on $T_{J(MAX)}$=150°C, using junction-to-case thermal resistance and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and duty cycles to keep initial $T_J$=25°C.

D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta Jc}$ and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a larger heatsink, assuming a maximum junction temperature of Tj(max)=150℃.The SOA curve provides a single pulse rating

G. The maximum current rating is package limited

## TYPICAL ELECTRICAL AND THERMAL CHARACTERIS

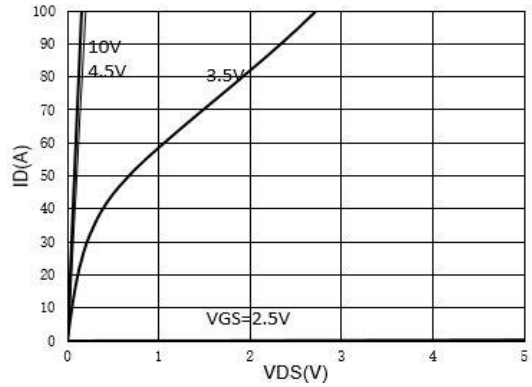



Figure1: On-Region Characteristics(Note E)

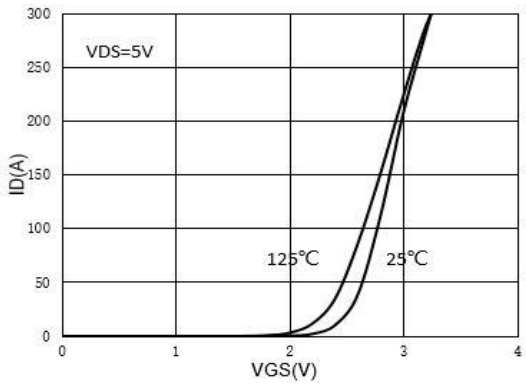
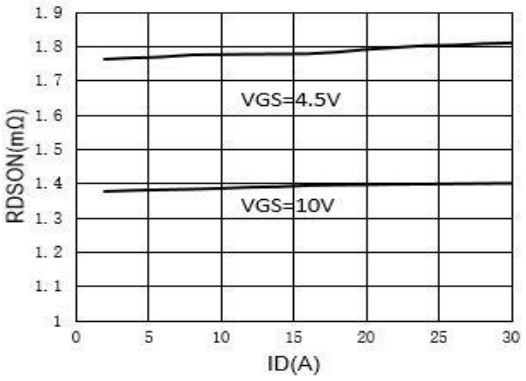



Figure 2:Transfer Characteristics(Note E)




Firgure3:On-Resistance vs. Drain Current and Gate Voltage(Note E)

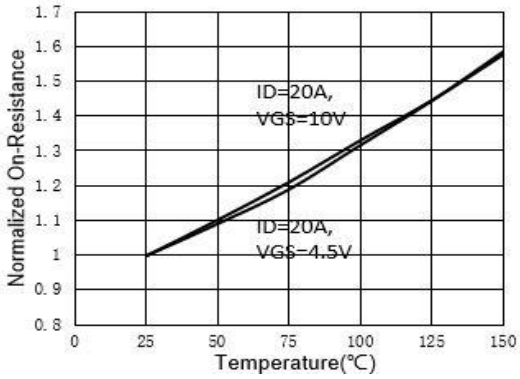
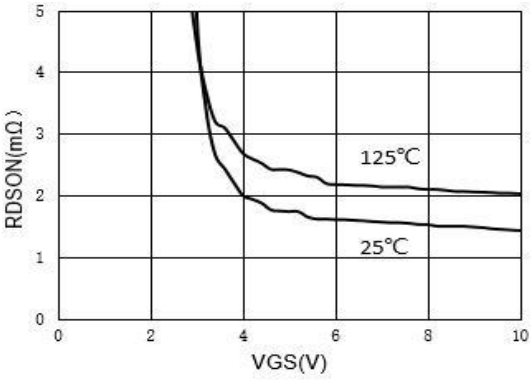



Figure 4:On-Resistance vs. Junction Temperature(Note E)




Firgure 5:On-Resistance vs. Gate-Source Voltage(Note E)

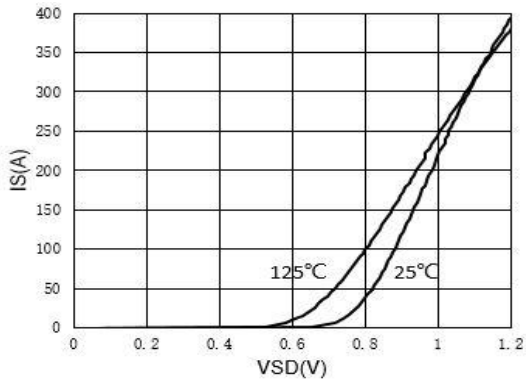



Figure 6: Body-Diode Characteristics (Note E)

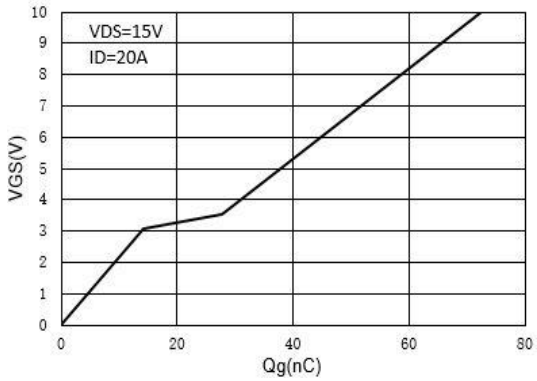



Figure 7:Gate-Charge Characteristics

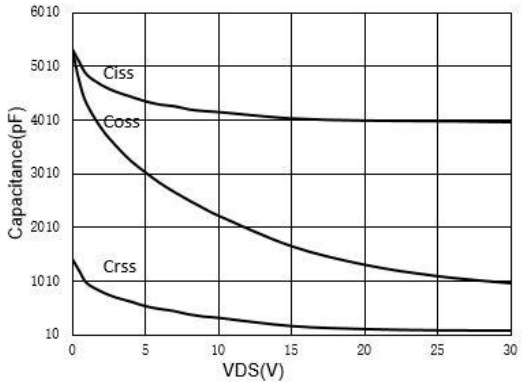



Figure 8:Capacitance Characteristics

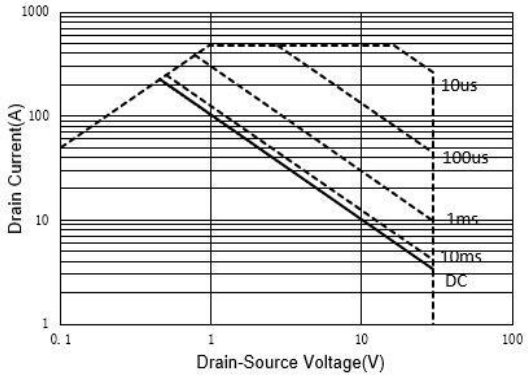



Figure 9:Maximum Forward Biased Safe Operating Area (Note F)

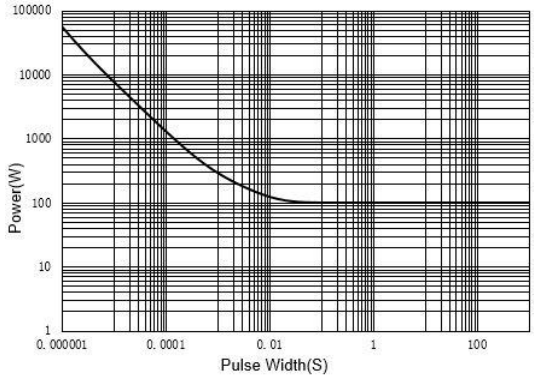



Figure 10:Single pulse Power Rating Junction-to-Case(Note F)

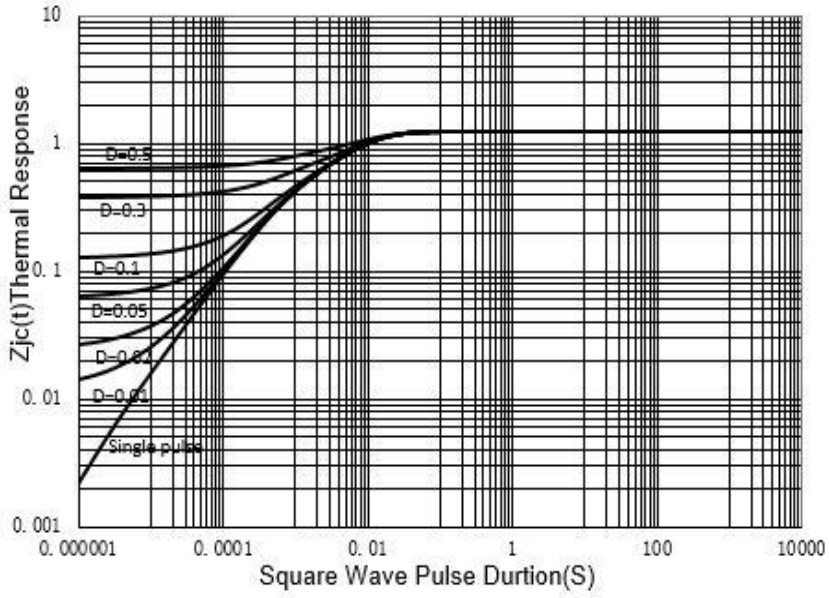
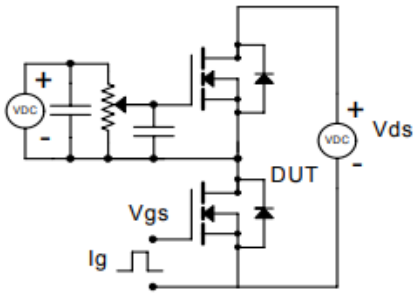
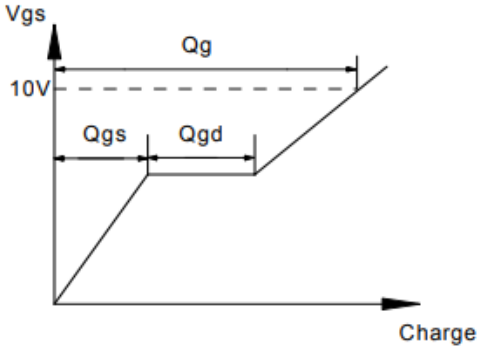


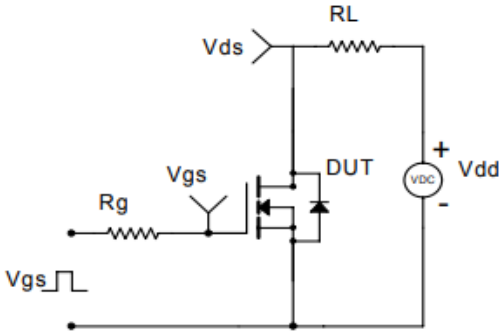

Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

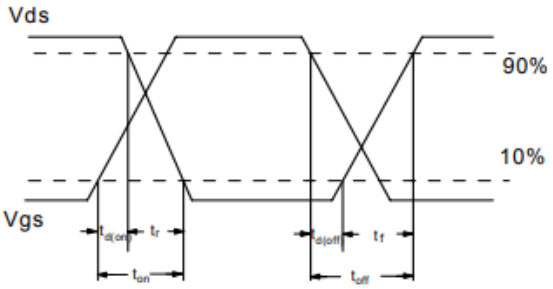
## Gate Charge Test Circuit & Waveform



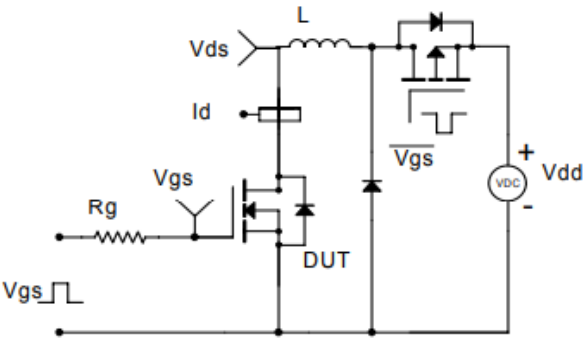



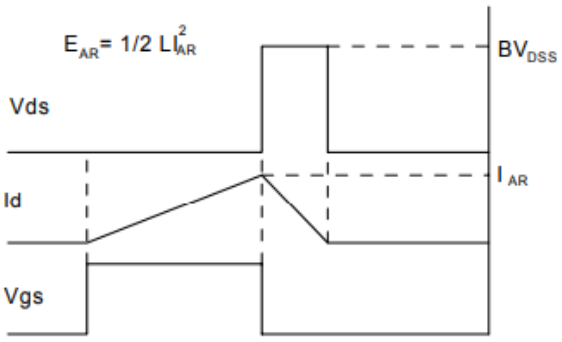

## Resistive Switching Test Circuit & Waveforms



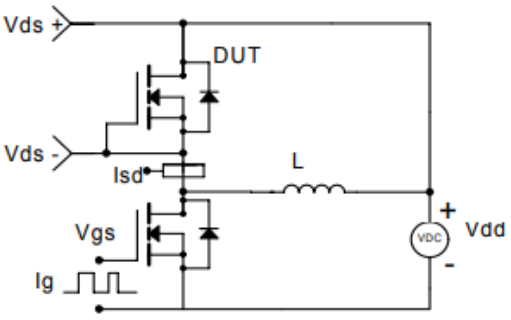



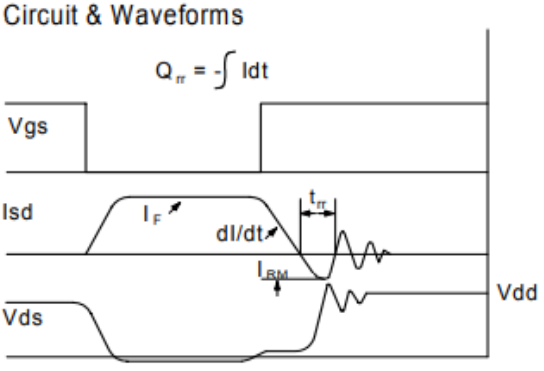

## Unclamped Inductive Switching (UIS) Test Circuit & Waveforms




## Diode Recovery Test Circuit & Waveforms



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