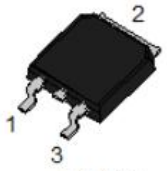
## GENERAL DESCRIPTION

The RZC30N06 is the high cell density trenched N-Channel MOSFET, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.
The RZC30N06 meet the ROHS and Green Product requirement with full function reliability approved.

## PIN CONFIGURATION



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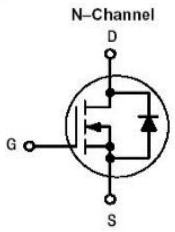
TO-251S




## FEATURES

- 60V/30A, $R_{DS(ON)}$ =23mΩ $V_{GS}$ = 10V (TYP.)
- High Density Cell Design for Ultra Low $R_{DS(ON)}$
- Full Characterized Avalanche Voltage and Current
- Good Stability and Uniformity with High EAS
- Excellent Package for Good Heat Dissipation
- Special Process Technology for High ESD Capability

## APPLICTIONS

- Load Switch
- Battery Powered System
- Hard Switch and High Frequency Circuits
- UPS.

## ORDERING INFORMATION

| Part Number | Package | Top Marking |
|---|---|---|
| RZC30N06 | TO-251 | 30N06A |
| RZC30N06 | TO-252 | 30N06A |

## MAXIMUM RATINGS (Ta = 25℃)

| Parameter | Symbol | | Value | Units |
|---|---|---|---|---|
| Drain to Source Voltage | $V_{DSS}$ | | 60 | V |
| Gate to Source Voltage | $V_{GSS}$ | | ±20 | V |
| Continuous Drain Current | 25℃ | $I_D$ | 30 | A |
| | 70℃ | | 20 | A |
| Pulsed Drain Current (note 1) | $I_{D(pulse)}$ | | 120 | A |
| Maximum Power Dissipation | 25℃ | $P_D$ | 50 | W |
| Single Pulse Avalanche Energy | $E_{AS}$ | | 144 | mJ |
| Operating Junction Temperature | $T_J$ | | 150 | °C |
| Storage Temperature | $T_{STG}$ | | -55-+150 | °C |
| Lead Temperature for Soldering Purposes (1/8″ from case for 10 s) | $T_L$ | | 260 | °C |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

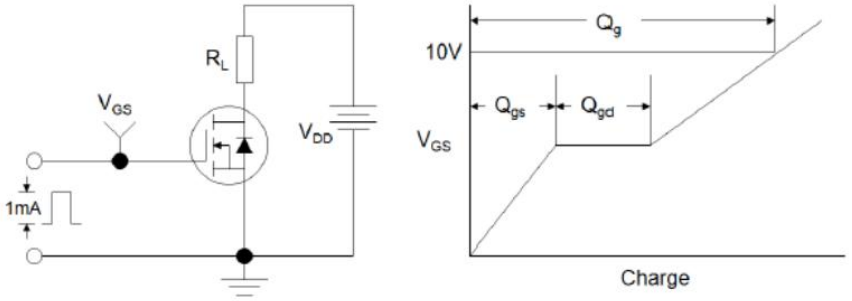
## ELECTRICAL CHARACTERISTICS (TA = 25℃)

| Parameter | Symbol | Test Conditions | MIN. | TYP. | MAX | Units |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_{DS}$=250uA | 60 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$= 48V,$V_{GS}$=0V $T_J$=25°C | | | 1 | uA |
| | | $V_{DS}$= 48V,$V_{GS}$=0V $T_J$=55°C | | | 5 | uA |
| Gate Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V,$V_{DS}$=0V | | | ±100 | nA |
| Gate threshold voltage | $V_{GS(TH)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 1.2 | 2.0 | 2.5 | V |
| Drain to Source On-state Resistance(note 2) | $R_{DS(ON)}$ | $V_{GS}$=10V,$I_D$=30A | | 23 | 35 | mΩ |
| Forward Transconductance | gfs | $I_D$=20A,$V_{DS}$=5V | | 30 | | S |
| Input Capacitance | $C_{ISS}$ | $V_{DS}$=30V , $V_{GS}$=0V , f=1MHz | | 1900 | | pF |
| Output Capacitance | $C_{OSS}$ | | | 130 | | pF |
| Reverse Transfer Capacitance | $C_{RSS}$ | | | 95 | | pF |
| Total Gate Charge (10V) | $Q_G$ | $V_{DD}$=30V , $V_{GS}$=10V , $I_D$=30A | | 30 | | nC |
| Gate-Source Charge | $Q_{GS}$ | | | 4.5 | | nC |
| Gate-Drain Charge | $Q_{GD}$ | | | 7.5 | | nC |
| Turn-On Delay Time | $T_{d(on)}$ | $V_{DD}$=30V, $V_{GS}$=10V,$R_L$=1.5Ω $R_G$=3Ω, | | 5 | | nS |
| Rise Time | Tr | | | 2.6 | | |
| Turn-Off Delay Time | $T_{d(off)}$ | | | 16 | | |
| Fall Time | Tf | | | 2.3 | | |
| Drain-Source Diode Forward Voltage | $V_{SD}$ | Is=30A,$V_{GS}$=0V, $T_C$=25℃ | | 1.1 | 1.4 | V |
| Maximum Continuous Drain-Source Diode Forward Current | $I_D$ | $T_C$=25℃ | | | 30 | A |
| Maximum Pulse Drain-Source Diode Forward Current | $I_{DSM}$ | | | | 120 | A |
| Reverse Recovery Time | trr | Is=30A,$T_J$=25℃ Di/Dt=100A/uS | | 35 | | nS |
| Reverse Recovery Charge | Qrr | | | 53 | | nC |

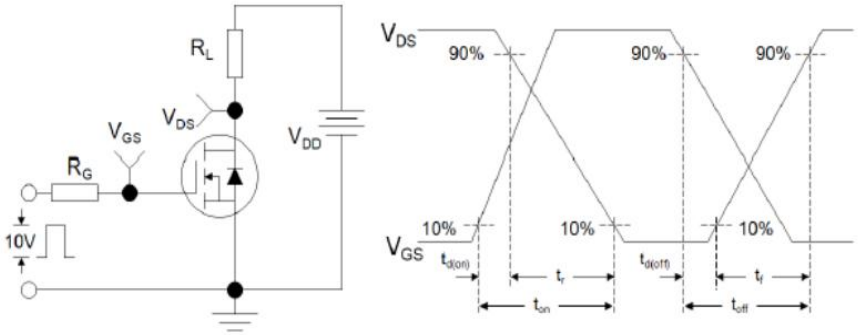
Note : 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2.Pulse test: pulse width <= 300us, duty cycle<= 2%.

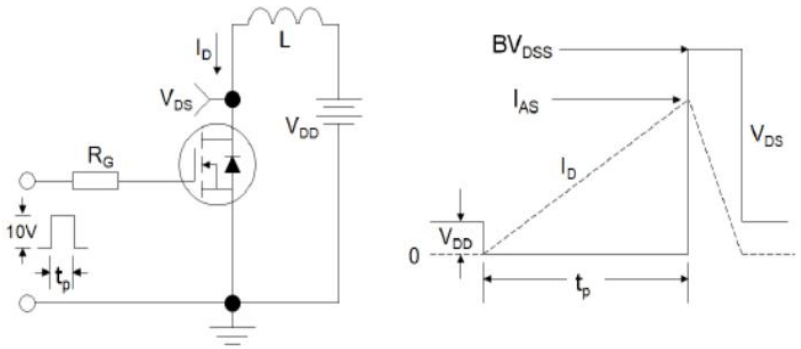
## Gate Charge Test Circuit and Waveform




## Resistive Switching Test Circuit and Waveform

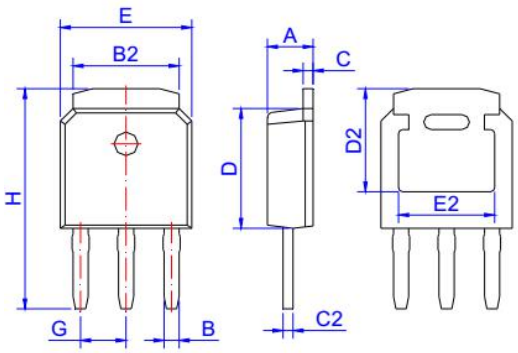



## Unclamped Inductive Switching Test Circuit and Waveform



## PACKAGE DIMENSIONS

TO-251S




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.10 | 2.30 | 2.50 | 0.083 | 0.091 | 0.098 |
| B | 0.66 | 0.76 | 0.86 | 0.026 | 0.030 | 0.034 |
| B2 | 5.15 | 5.33 | 5.48 | 0.203 | 0.210 | 0.216 |
| C | 0.44 | 0.51 | 0.58 | 0.017 | 0.020 | 0.023 |
| C2 | 0.44 | 0.51 | 0.58 | 0.017 | 0.020 | 0.023 |
| D | 5.90 | 6.10 | 6.30 | 0.232 | 0.240 | 0.248 |
| D2 | 5.30 REF | | | 0.209 REF | | |
| E | 6.40 | 6.60 | 6.80 | 0.252 | 0.260 | 0.268 |
| E2 | 4.83 REF | | | 0.190 REF | | |
| G | 2.19 | 2.29 | 2.39 | 0.086 | 0.090 | 0.094 |
| H | 10.60 | 11.20 | 11.80 | 0.417 | 0.441 | 0.465 |

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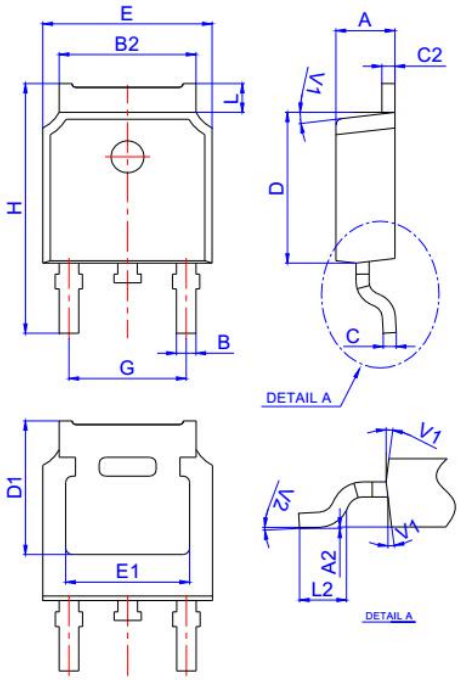


| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.10 | | 2.50 | 0.083 | | 0.098 |
| A2 | 0 | | 0.10 | 0 | | 0.004 |
| B | 0.66 | | 0.86 | 0.026 | | 0.034 |
| B2 | 5.18 | | 5.48 | 0.202 | | 0.216 |
| C | 0.40 | | 0.60 | 0.016 | | 0.024 |
| C2 | 0.44 | | 0.58 | 0.017 | | 0.023 |
| D | 5.90 | | 6.30 | 0.232 | | 0.248 |
| D1 | 5.30REF | | | 0.209REF | | |
| E | 6.40 | | 6.80 | 0.252 | | 0.268 |
| E1 | 4.63 | | | 0.182 | | |
| G | 4.47 | | 4.67 | 0.176 | | 0.184 |
| H | 9.50 | | 10.70 | 0.374 | | 0.421 |
| L | 1.09 | | 1.21 | 0.043 | | 0.048 |
| L2 | 1.35 | | 1.65 | 0.053 | | 0.065 |
| V1 | | 7° | | | 7° | |
| V2 | 0° | | 6° | 0° | | 6° |