# CONSONANCE

## P-Channel Enhancement Mode Power MOSFET
# CN30P14

## General Description:

The CN30P14 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.5V. This device is suitable for use as a load switch or in PWM applications.
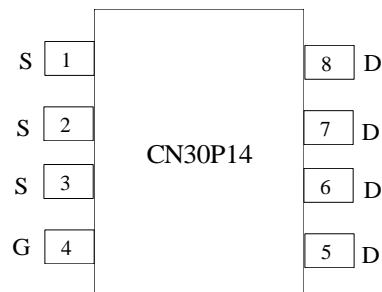
## Applications:

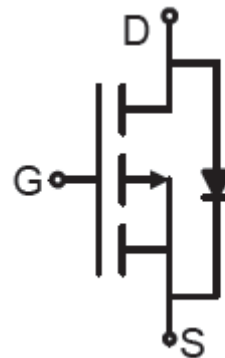- Battery protection
- Load switch
- Power management

## Features:

- $V_{DS}$ = -30V, $I_D$ = -14A
  $R_{DS(ON)} < 12.5m\Omega$ @ $V_{GS}$=-4.5V
  $R_{DS(ON)} < 8.5m\Omega$ @ $V_{GS}$=-10V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package
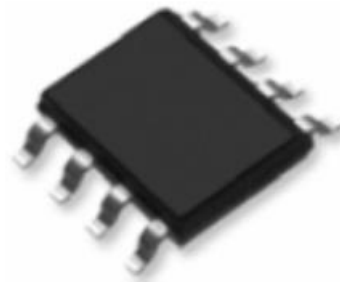- Available in SOP8 Package
- Pb-free, rohs compliant and halogen free

## Pin Assignment



| S | 1 |   | 8 | D |
| S | 2 | CN30P14 | 7 | D |
| S | 3 |   | 6 | D |
| G | 4 |   | 5 | D |

## Schematic diagram



## Top view



## Ordering Information

| Part Number | Device Marking | Package | Operating Ambient Temperature |
|:---:|:---:|:---:|:---:|
| CN30P14 | 30P14 | SOP8 | −40℃ to 85℃ |

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## Absolute Maximum Ratings (T$_A$=25℃ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Drain-Source Voltage | V$_{DS}$ | -30 | V |
| Gate-Source Voltage | V$_{GS}$ | ±20 | V |
| Drain Current-Continuous | I$_D$ | -14 | A |
| Drain Current-Pulsed (Note 1) | I$_{DM}$ | -50 | A |
| Maximum Power Dissipation | P$_D$ | 3.1 | W |
| Operating Junction and Storage Temperature Range | T$_J$,T$_{STG}$ | -55 to 150 | ℃ |

## Thermal Characteristic

| | | | |
|---|---|---|---|
| Thermal Resistance, Junction-to-Ambient (Note 2) | R$_{\theta JA}$ | 40 | ℃/W |

## Electrical Characteristics (T$_A$=25℃ unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | B$_{VDSS}$ | V$_{GS}$=0V I$_D$=-250μA | -30 | -32 | - | V |
| Zero Gate Voltage Drain Current | I$_{DSS}$ | V$_{DS}$=-30V,V$_{GS}$=0V | - | - | -100 | nA |
| Gate-Body Leakage Current | I$_{GSS}$ | V$_{GS}$=±20V,V$_{DS}$=0V | - | - | ±100 | nA |
| **On Characteristics** (Note 3) | | | | | | |
| Gate Threshold Voltage | V$_{GS(th)}$ | VDS=VGS,ID=-250μA | -1.0 | -1.5 | -1.9 | V |
| Drain-Source On-State Resistance | R$_{DS(ON)}$ | VGS=-10V, ID=-8A | - | 12.5 | 15 | mΩ |
| | | VGS=-4.5V, ID=-4A | - | 14.5 | 18 | mΩ |
| Forward Transconductance | g$_{FS}$ | VDS=-5V,ID=-14A | - | 15 | - | A/V |
| **Dynamic Characteristics** (Note4) | | | | | | |
| Input Capacitance | C$_{ISS}$ | V$_{DS}$=-15V,V$_{GS}$=0V, F=1.0MHz | - | 2500 | - | PF |
| Output Capacitance | Coss | | - | 400 | - | PF |
| Reverse Transfer Capacitance | Crss | | - | 260 | - | PF |
| **Switching Characteristics** (Note 4) | | | | | | |
| Turn-on Delay Time | td(on) | V$_{DD}$=-15V,I$_D$=-10A , V$_{GEN}$=-10V,R$_g$=3Ω | - | 14 | - | nS |
| Turn-on Rise Time | tr | | - | 10 | - | nS |
| Turn-Off Delay Time | td(off) | | - | 40 | - | nS |
| Turn-Off Fall Time | tf | | - | 20 | - | nS |
| Total Gate Charge | Qg | V$_{DS}$=-15V,I$_D$=-10A, V$_{GS}$=-10V | - | 46 | - | nC |
| Gate-Source Charge | Qgs | | - | 10 | - | nC |
| Gate-Drain Charge | Qgd | | - | 12 | - | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage (Note 3) | V$_{SD}$ | VGS=0V,IS=-2A | - | - | -1.2 | V |

## Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.

2. R$_{\theta JA}$ is measured with the device mounted on 1 in$^2$ FR4 board with 2oz. copper, in a still air environment

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with $T_A=25℃$，t ≤ 10 sec. The value in any given application depends on the user's specific board design.

3. Pulse Test: Pulse Width ≤ 300us, Duty Cycle ≤ 2%.

4. Guaranteed by design, not subject to production

## Typical Electrical and Thermal Characteristics
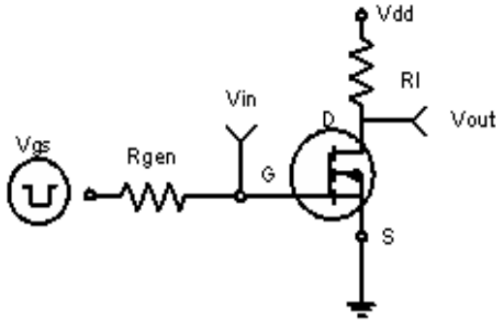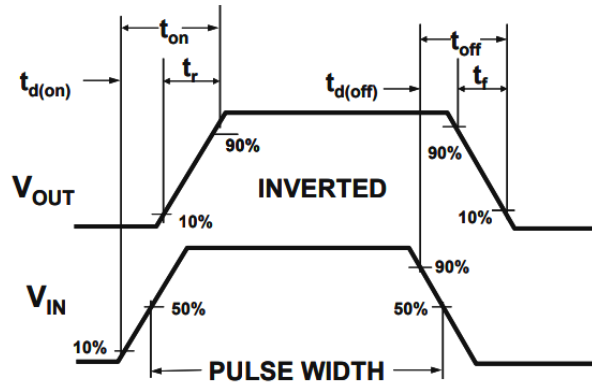


**Figure 1     Switching Test Circuit**
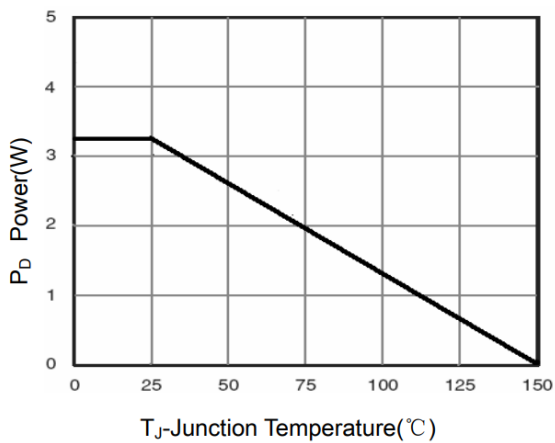


**Figure 2    Switching Waveforms**



**Figure 3    Power Dissipation**
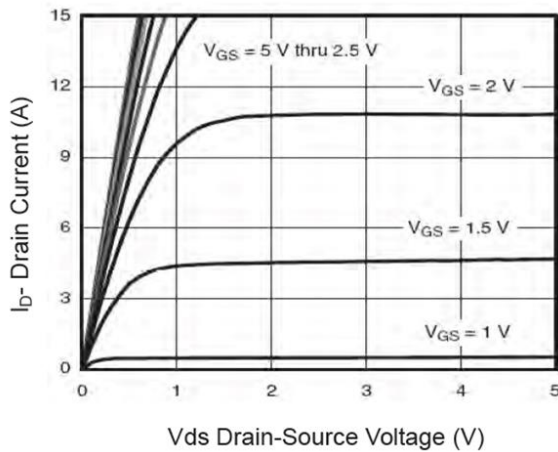


**Figure 4 Output Characteristics**
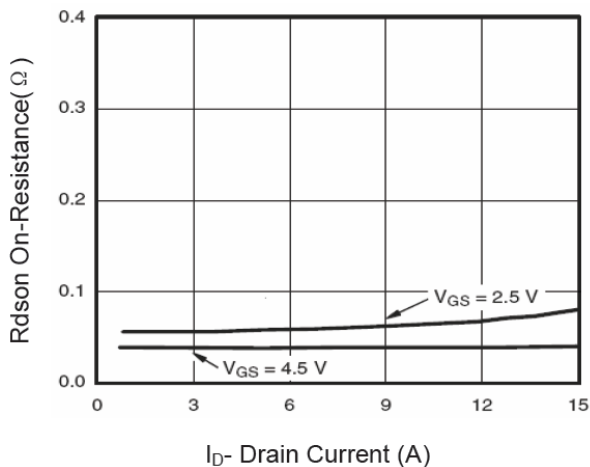


**Figure 5 Drain-Source On-Resistance**
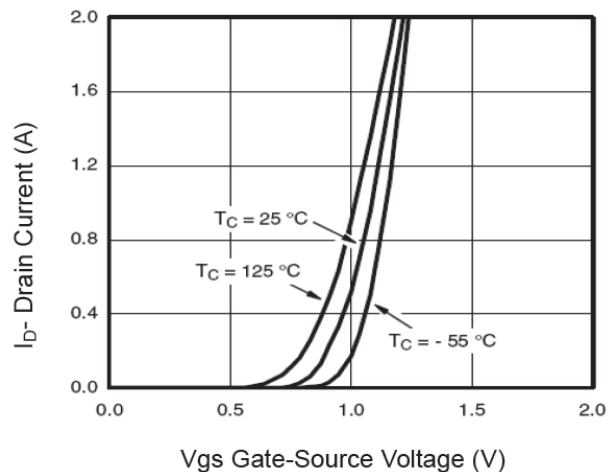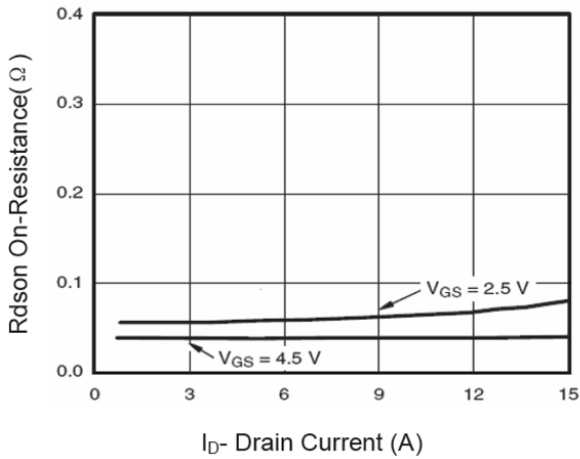


**Figure 6 Transfer Characteristics**
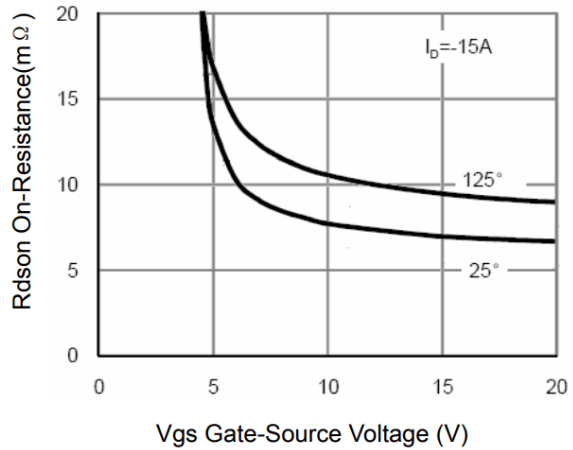
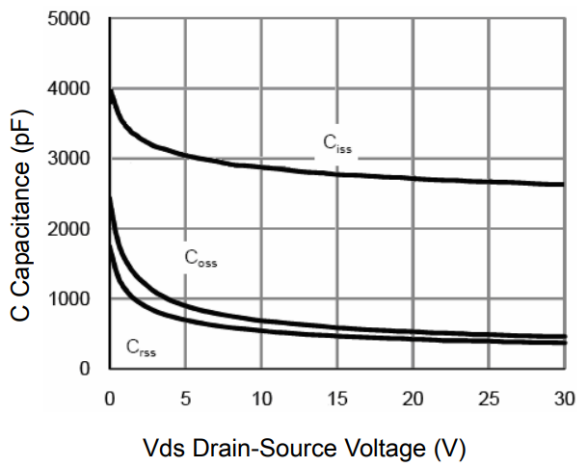**Figure 7 Drain-Source On-Resistance**



**Figure 8 Rdson vs Vgs**



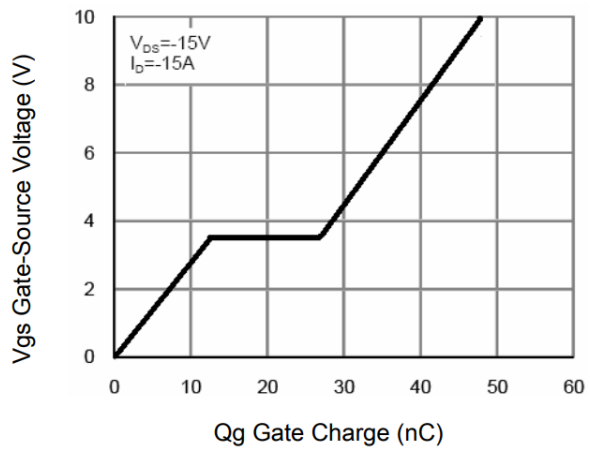**Figure 9 Capacitance vs Vds**



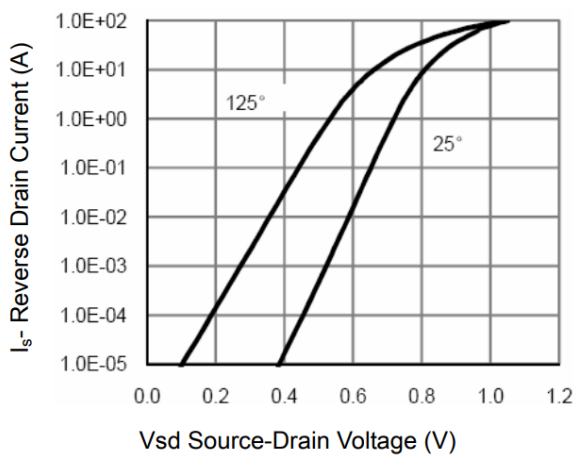**Figure 10 Gate Charge**



**Figure 11 Source- Drain Diode Forward**
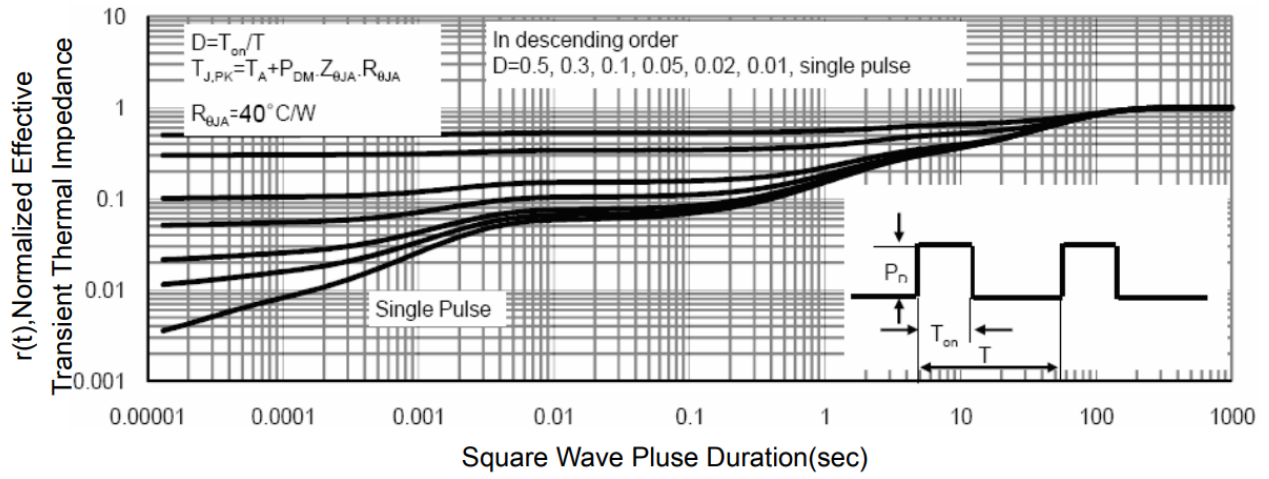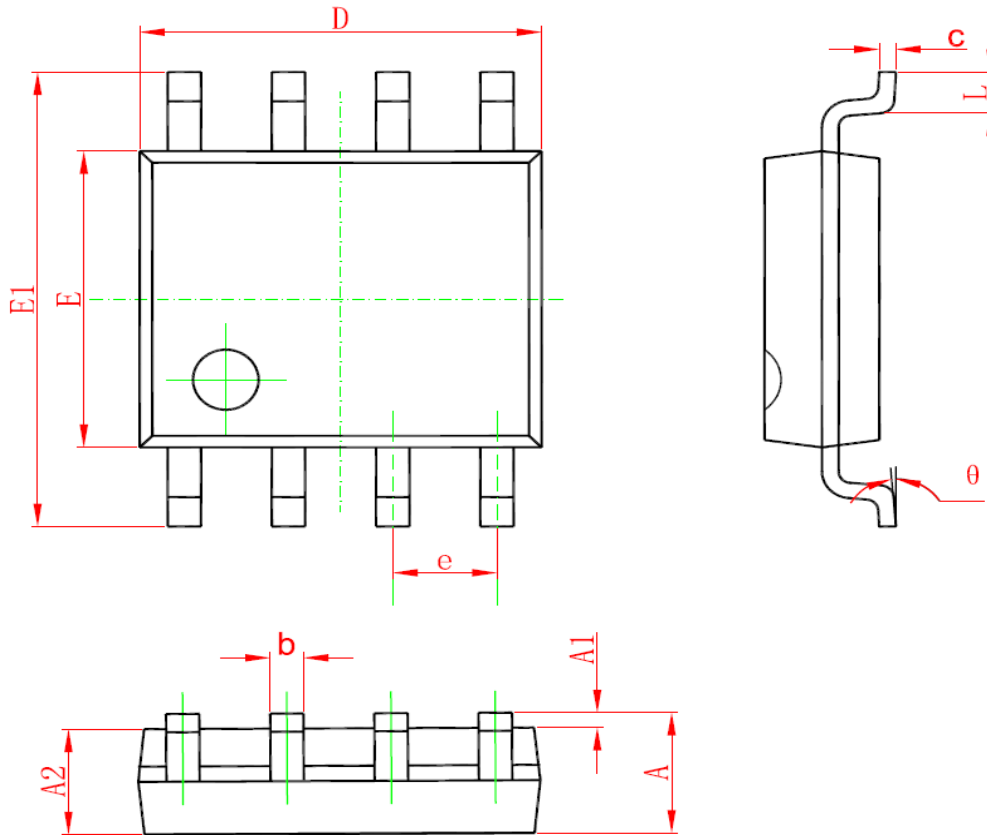
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**Figure 12 Normalized Maximum Transient Thermal Impedance**

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## Package Information

### SOP8 PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|------|------|------|------|
| | Min | Max | Min | Max |
| A | 1.350 | 1.750 | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | 0.013 | 0.020 |
| c | 0.170 | 0.250 | 0.006 | 0.010 |
| D | 4.700 | 5.100 | 0.185 | 0.200 |
| E | 3.800 | 4.000 | 0.150 | 0.157 |
| E1 | 5.800 | 6.200 | 0.228 | 0.244 |
| e | 1.270 (BSC) | | 0.050 (BSC) | |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |

*Consonance Electronics does not assume any responsibility for use of any circuitry described. Consonance reserves the right to change the circuitry and specifications without notice at any time.*