# KSN2207K

**-20V P-Channel MOSFET**

## General Description

The KSN2207K is the high cell density trenched P-ch MOSFET, which provides excellent $R_{DS}ON$ and efficiency for most of the small power switching and load switch applications.

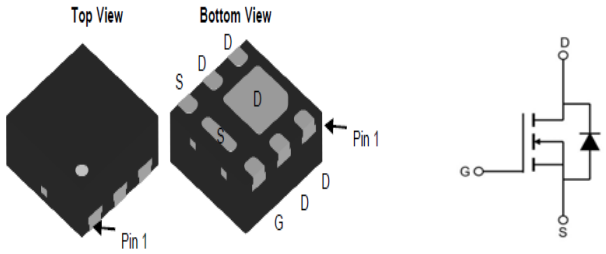
## Product Summary

| $V_{DS}$ (V) | $R_{DS(on)}$ (mΩ) | $I_D$ (A) |
|---|---|---|
| -20 | 16.5 at $V_{GS}$ = 4.5 V | -12 |
| | 20 at $V_{GS}$ = 2.5 V | -10 |

## Features

- High power and current handing capability
- Lead free product is acquired
- Surface mount package

## PDFN2*2 Pin Configuration




## Applications

- Battery protection
- Load switch
- Power management

## Absolute Maximum Ratings Tc=25℃ unless otherwise noted

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | -20 | V |
| $V_{GS}$ | Gate-Source Voltage | ±12 | V |
| $I_D$ | Drain Current – Continuous ($T_C$=25℃) | -12 | A |
| | Drain Current – Continuous ($T_C$=100℃) | -5.0 | A |
| $I_{DM}$ | Drain Current – Pulsed[1] | -28 | A |
| $P_D$ | Power Dissipation ($T_C$=25℃) | 1.3 | W |
| | Power Dissipation ($T_C$=100℃) | 0.03 | W/℃ |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |

## Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance Junction to ambient | --- | 61 | ℃/W |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | --- | 1.3 | ℃/W |

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

### Off Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | -20 | --- | --- | V |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=-20V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=-20V , $V_{GS}$=0V , $T_J$=125℃ | --- | --- | 10 | uA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±12V , $V_{DS}$=0V | --- | --- | ±100 | nA |

### On Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=-4.5V , $I_D$=-6.5A | --- | 16.5 | 20 | mΩ |
| | | $V_{GS}$=-2.5V , $I_D$=-5A | --- | 20 | 23 | mΩ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | -0.5 | -0.8 | -1.2 | V |
| gfs | Forward Transconductance | $V_{DS}$=-5V , $I_S$=-4A | --- | 10 | --- | S |

### Dynamic and switching Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| $Q_g$ | Total Gate Charge | $V_{DS}$=-10V , $V_{GS}$=-4.5V , $I_D$=-4A | --- | 15 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 1.6 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 4.2 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=-10V,$I_D$=-4A<br>$V_{GS}$=-4.5V,$R_G$=3.3Ω | --- | 17 | --- | ns |
| $T_r$ | Rise Time | | --- | 10 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 21 | --- | |
| $T_f$ | Fall Time | | --- | 31 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=-10V , $V_{GS}$=0V , F=1MHz | --- | 1287 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 213 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 78 | --- | |

### Drain-Source Diode Characteristics and Maximum Ratings

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current | $V_G$=$V_D$=0V , Force Current | --- | --- | -10 | A |
| $I_{SM}$ | Pulsed Source Current | | --- | --- | -20 | A |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V , $I_S$=-1A , $T_J$=25℃ | --- | --- | -1.2 | V |

Note :

**1.** Repetitive Rating: Pulse width limited by maximum junction temperature.
**2.** Surface Mounted on FR4 Board, t ≤ 10 sec.
**3.** Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
**4.** Guaranteed by design, not subject to production

## Typical Electrical and Thermal Characteristics (Curves)

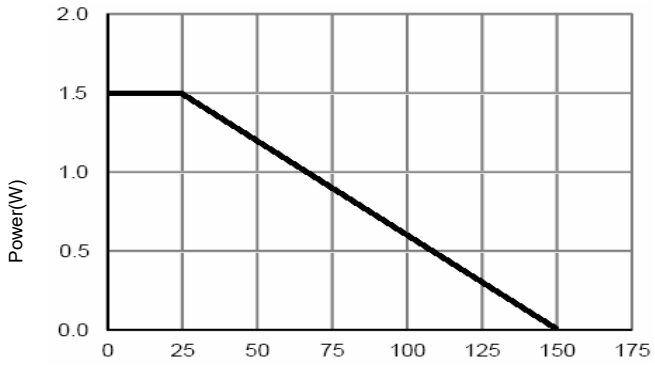



Figure 1 Power Dissipation

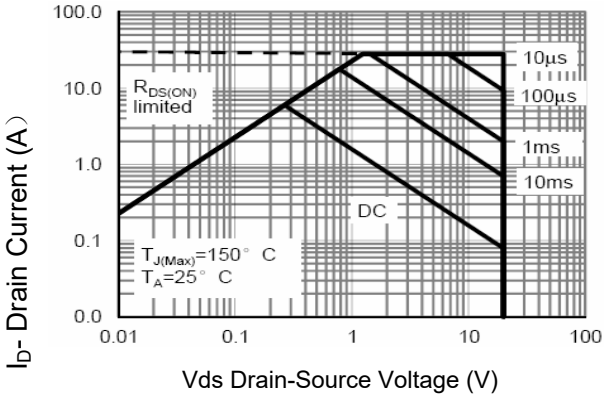



Figure 2 Safe Operation Area

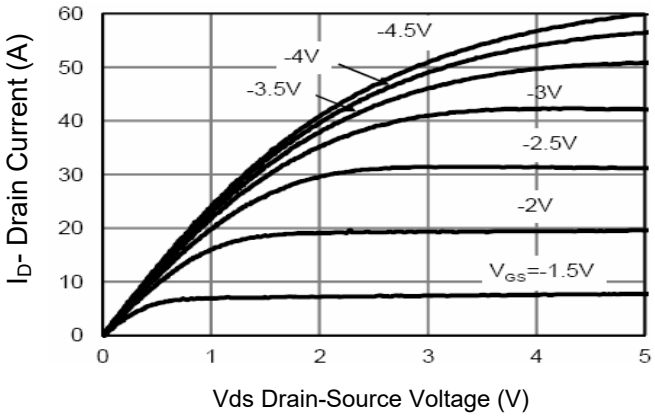



Figure 3 Output Characteristics

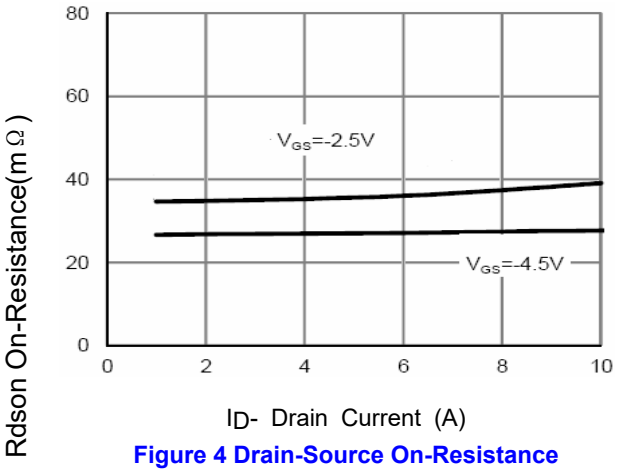



Figure 4 Drain-Source On-Resistance

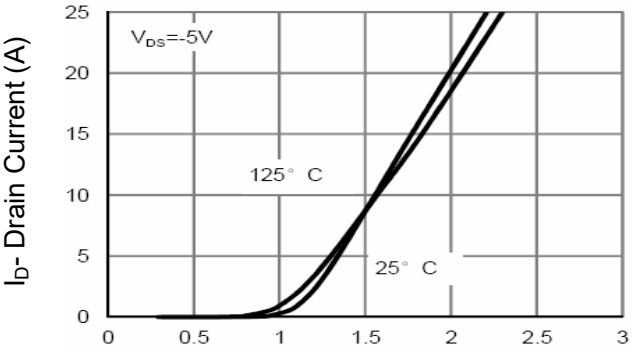



Figure 5 Transfer Characteristics

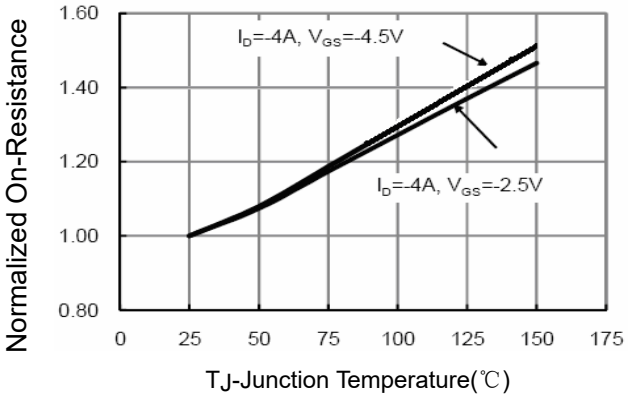



Figure 6 Drain-Source On-Resistance

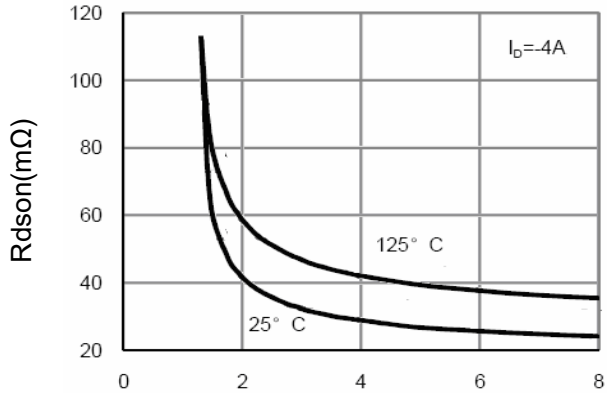



Figure 9 Rdson vs Vgs

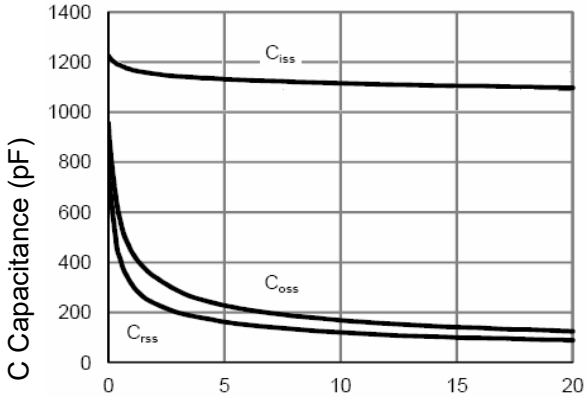



Figure 10 Capacitance vs Vds

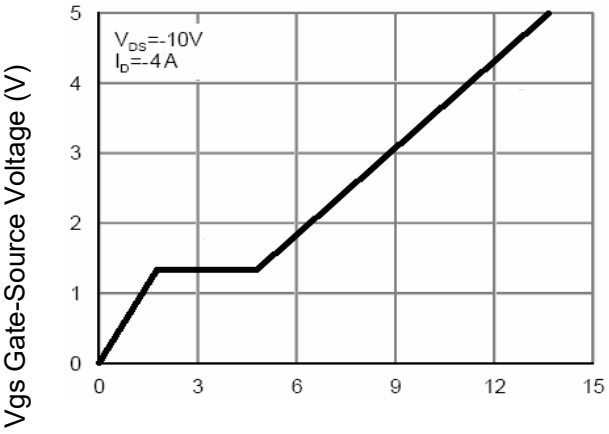



Figure 11 Gate Charge

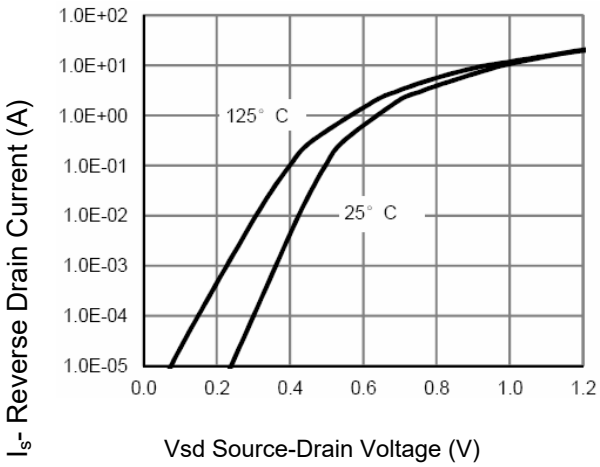



Figure 12 Source- Drain Diode Forward

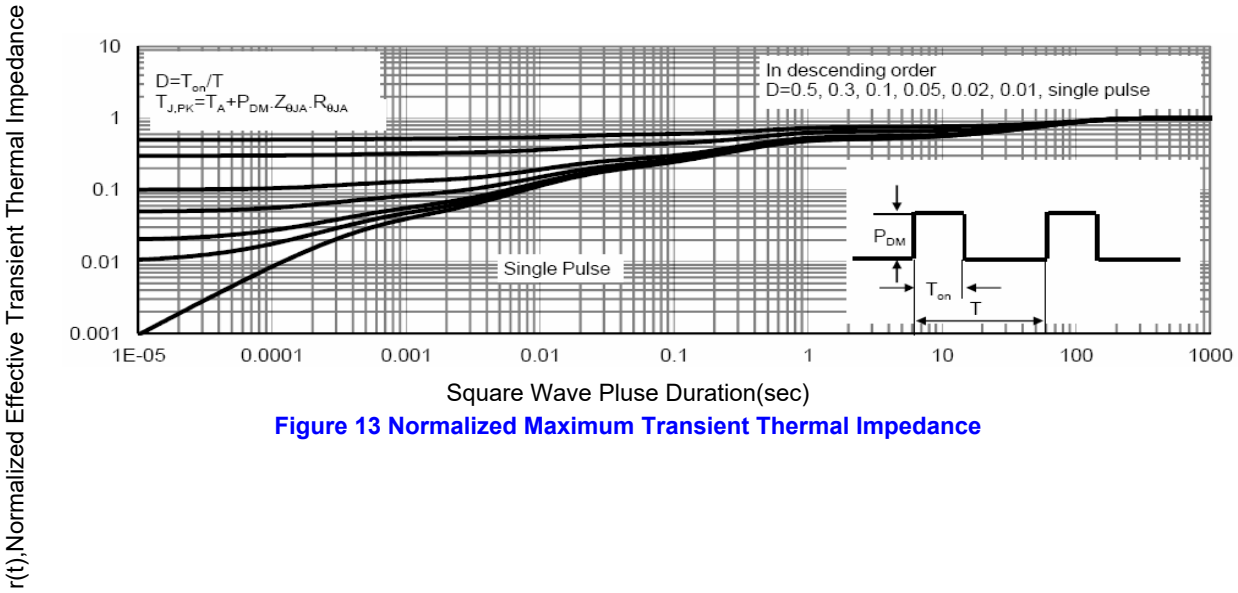



Figure 13 Normalized Maximum Transient Thermal Impedance

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