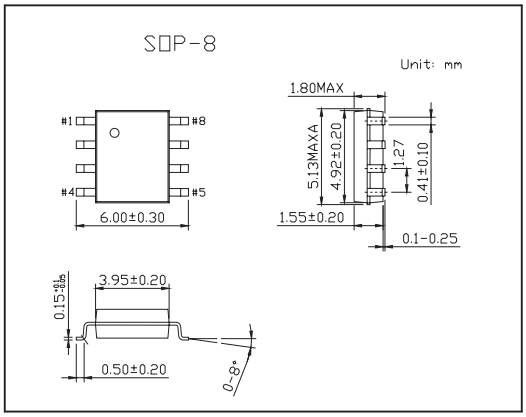
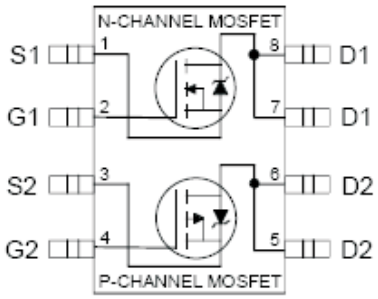
# HEXFET®Power MOSFET

# KRF7309




## Features

- Generation V Technology
- Ultra Low On-Resistance
- Dual N and P Channel Mosfet
- Surface Mount
- Available in Tape & Reel
- Dynamic dv/dt Rating
- Fast Switching




## Absolute Maximum Ratings Ta = 25℃

| Parameter | Symbol | N-Channel | P-Channel | Unit |
|---|---|---|---|---|
| 10 Sec. Pulse Drain Current, $V_{GS}$ @ 10V Ta = 25℃ | $I_D$ | 4.7 | -3.5 | A |
| Continuous Drain Current $V_{GS}$ @ 10V Ta = 25℃ | $I_D$ | 4.0 | -3.0 | |
| Continuous Drain Current $V_{GS}$ @ 10V Ta = 70℃ | $I_D$ | 3.2 | -2.4 | |
| Pulsed Drain Current *1 | $I_{DM}$ | 16 | -12 | |
| Power Dissipation @Ta= 25℃ *3 | $P_D$ | 1.4 | | W |
| Linear Derating Factor (PCB Mount)*4 | | 0.011 | | W/℃ |
| Peak Diode Recovery dv/dt *2 | dv/dt | 6.9 | -6.0 | V/ ns |
| Gate-to-Source Voltage | $V_{GS}$ | ±20 | | V |
| Junction and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to + 150 | | ℃ |
| Junction-to-Amb. (PCB Mount, steady state)*4 | $R_{\theta JA}$ | 90 | | ℃/W |

*1 Repetitive rating; pulse width limited by max. junction temperature.

*2 N-Channel $I_{SD} \leqslant$ 2.4A, $di/dt \leqslant$ 73A/μs, $V_{DD} \leqslant V_{(BR)DSS}$, $T_J \leqslant$ 150℃

P-Channel $I_{SD} \leqslant$ -1.8A, $di/dt \leqslant$ 90A/μs, $V_{DD} \leqslant V_{(BR)DSS}$, $T_J \leqslant$ 150℃

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

*4 When mounted on 1" square PCB (FR-4 or G-10 Material).

# KRF7309

■ Electrical Characteristics Ta = 25℃

| Parameter | Symbol | Testconditons | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Drain-to-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | N-Ch | 30 | | | V |
| | | $V_{GS}$ = 0V, $I_D$ = -250μA | P-Ch | -30 | | | |
| Breakdown Voltage Temp. Coefficient | $\triangle V_{(BR)DSS}/\triangle T_J$ | $I_D$ = 1mA,Reference to 25℃ | N-Ch | | 0.032 | | V/℃ |
| | | $I_D$ = -1mA,Reference to 25℃ | P-Ch | | -0.037 | | |
| Static Drain-to-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 2.4A*1 | N-Ch | | | 0.050 | Ω |
| | | $V_{GS}$ = 4.5V, $I_D$ = 2.0A*1 | | | | 0.080 | |
| | | $V_{GS}$ = -10V, $I_D$ = -1.8A*1 | P-Ch | | | 0.10 | |
| | | $V_{GS}$ = -4.5V, $I_D$ = -1.5A*1 | | | | 0.16 | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | N-Ch | 1.0 | | | V |
| | | $V_{DS}$ = $V_{GS}$, $I_D$ = -250μA | P-Ch | -1.0 | | | |
| Forward Transconductance | $g_{fs}$ | $V_{DS}$ =15V, $I_D$ = 2.4A*1 | N-Ch | 5.2 | | | S |
| | | $V_{DS}$ = -24V, $I_D$ = -1.8A*1 | P-Ch | 2.5 | | | |
| Drain-to-Source Leakage Current | $I_{DSS}$ | $V_{DS}$ = 24V, $V_{GS}$ = 0V | N-Ch | | | 1.0 | μA |
| | | $V_{DS}$ = -24V, $V_{GS}$ = 0V | P-Ch | | | -1.0 | |
| | | $V_{DS}$ = 24V, $V_{GS}$ = 0V, $T_J$ = 125℃ | N-Ch | | | 25 | |
| | | $V_{DS}$ = -24V, $V_{GS}$ = 0V, $T_J$ = 125℃ | P-Ch | | | -25 | |
| Gate-to-Source Forward Leakage | $I_{GSS}$ | $V_{GS}$ = ±20V | N-Ch | | | ±100 | nA |
| | | | P-Ch | | | ±100 | |
| Total Gate Charge | $Q_g$ | N-Channel<br>$I_D$ =2.6A,$V_{DS}$ = 16V,$V_{GS}$ =4.5V | N-Ch | | | 25 | nC |
| | | | P-Ch | | | 25 | |
| Gate-to-Source Charge | $Q_{gs}$ | | N-Ch | | | 2.9 | |
| | | P-Channel | P-Ch | | | 2.9 | |
| Gate-to-Drain ("Miller") Charge | $Q_{gd}$ | $I_D$ = -2.2A,$V_{DS}$ = -16V,$V_{GS}$ = -4.5V | N-Ch | | | 7.9 | |
| | | | P-Ch | | | 9.0 | |
| Turn-On Delay Time | $t_{d(on)}$ | N-Channel | N-Ch | | 6.8 | | ns |
| | | $V_{DD}$ = 10V,$I_D$ = 2.6A,$R_G$ = 6.0Ω | P-Ch | | 11 | | |
| Rise Time | $t_r$ | $R_D$ = 3.8Ω | N-Ch | | 21 | | |
| | | P-Channel | P-Ch | | 17 | | |
| Turn-Off Delay Time | $t_{d(off)}$ | $V_{DD}$ = -10V,$I_D$ = -2.2A,$R_G$ = 6.0Ω | N-Ch | | 22 | | |
| | | RD = 4.5Ω | P-Ch | | 25 | | |
| Fall Time | $t_f$ | | N-Ch | | 7.7 | | |
| | | | P-Ch | | 18 | | |
| Internal Drain Inductace | $L_D$ | Between lead tip<br>and center of die contact | N-Ch | | 4.0 | | nH |
| | | | P-Ch | | 4.0 | | |
| Internal Source Inductance | $L_S$ | | N-Ch | | 6.0 | | |
| | | | P-Ch | | 6.0 | | |
| Input Capacitance | $C_{iss}$ | N-Channel<br>$V_{GS}$ = 0V,$V_{DS}$ = 15V,f = 1.0MHz | N-Ch | | 520 | | pF |
| | | | P-Ch | | 440 | | |
| Output Capacitance | $C_{oss}$ | P-Channel<br>$V_{GS}$ = 0V,$V_{DS}$ = -15V,f = 1.0MHz | N-Ch | | 180 | | |
| | | | P-Ch | | 200 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | N-Ch | | 72 | | |
| | | | P-Ch | | 93 | | |

# KRF7309

■ Electrical Characteristics Ta = 25℃

| Parameter | Symbol | Testconditons | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Continuous Source Current（Body Diode) | $I_S$ | | N-Ch | | | 1.8 | A |
| | | | P-Ch | | | -1.8 | |
| Pulsed Source Current （Body Diode) *2 | $I_{SM}$ | | N-Ch | | | 16 | |
| | | | P-Ch | | | -12 | |
| Diode Forward Voltage | $V_{SD}$ | $T_J$ = 25℃, $I_S$ = 1.8A, $V_{GS}$ = 0V*1 | N-Ch | | | 1.0 | V |
| | | $T_J$ = 25℃, $I_S$ = -1.8A, $V_{GS}$ = 0V*1 | P-Ch | | | -1.0 | |
| Reverse Recovery Time | $t_{rr}$ | N-Channel | N-Ch | | 47 | 71 | ns |
| | | $T_J$ = 25℃, $I_F$ =2.6A,di/dt = 100A/μs*1 | P-Ch | | 53 | 80 | |
| Reverse RecoveryCharge | $Q_{rr}$ | P-Channel | N-Ch | | 56 | 84 | nC |
| | | $T_J$=25℃,$I_F$=-2.2A,di/dt=-100A/μs*1 | P-Ch | | 66 | 99 | |
| Forward Turn-On Time | $t_{on}$ | Intrinsic turn-on time is neglegible (turn-on is dominated by $L_S$+$L_D$) | N-Ch | | | | |
| | | | P-Ch | | | | |

*1 Pulse width ≤ 300μs; duty cycle ≤ 2%.

*2 Repetitive rating; pulse width limited by max. junction temperature.