# MOS Field Effect Transistor

# KPA1890

## Features

- Can be driven by a 4.0-V power source
- Low on-state resistance

  N-channel $R_{DS(on)1}$ = 27 mΩ MAX. ($V_{GS}$ = 10 V, $I_D$ = 3.0 A)

  $R_{DS(on)2}$ = 37 mΩ MAX. ($V_{GS}$ = 4.5 V, $I_D$ = 3.0 A)

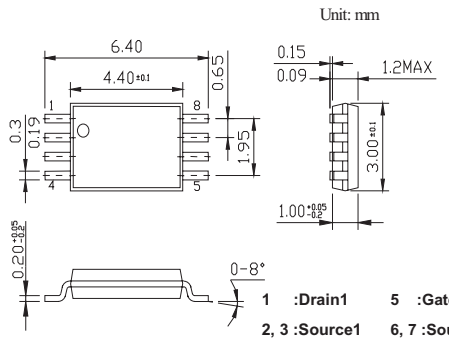
  $R_{DS(on)3}$ = 47 mΩ MAX. ($V_{GS}$ = 4.0 V, $I_D$ = 3 A)
- P-channel $R_{DS(on)1}$ = 37 mΩ MAX. ($V_{GS}$ = -10 V, $I_D$ = -2.5 A)

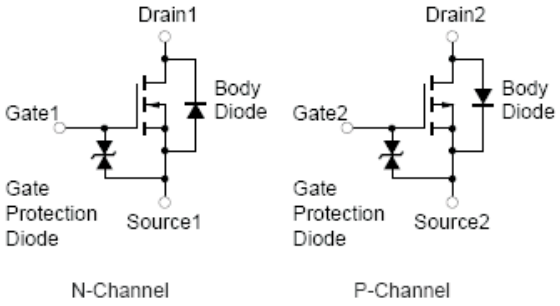
  $R_{DS(on)2}$ = 56 mΩ MAX. ($V_{GS}$ = -4.5 V, $I_D$ = -2.5 A)

  $R_{DS(on)3}$ = 64 mΩ MAX. ($V_{GS}$ = -4.0 V, $I_D$ = -2.5 A)
- Built-in G-S protection diode against ESD

TSSOP-8

Unit: mm




## Absolute Maximum Ratings Ta = 25℃

| Parameter | Symbol | N-Channel | P- Channel | Unit |
|---|---|---|---|---|
| Drain to Source Voltage ($V_{GS}$ = 0 V) | $V_{DSS}$ | 30 | -30 | V |
| Gate to Source Voltage ($V_{DS}$ = 0 V) | $V_{GSS}$ | ±20 | ±20 | V |
| Drain Current (DC) | $I_{D(DC)}$ | ±6.0 | ±5.0 | A |
| Drain Current (pulse) *1 | $I_{D(pulse)}$ | ±24 | ±20 | A |
| Total Power Dissipation *2 | $P_T$ | 2 | | W |
| Channel Temperature | $T_{ch}$ | 150 | | ℃ |
| Storage Temperature | $T_{stg}$ | -55 to +150 | | ℃ |

*1 PW ≤ 10 μs, Duty Cycle ≤ 1%

*2 Mounted on ceramic substrate of 5000 $mm^2$ X 1.1 mm

# KPA1890

■ Electrical Characteristics Ta = 25℃

| Parameter | Symbol | Testconditons | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 30 V, $V_{GS}$ = 0 V | N-Ch | | | 10 | μA |
| | | $V_{DS}$ = -30V, $V_{GS}$ = 0 V | P- Ch | | | -10 | |
| Gate Leakage Current | $I_{GSS}$ | $V_{GS}$ = ±16 V, $V_{DS}$ = 0 V | N-Ch | | | ±10 | μA |
| | | $V_{GS}$ = ±16 V, $V_{DS}$ = 0 V | P- Ch | | | ±10 | |
| Gate Cut-off Voltage | $V_{GS(off)}$ | $V_{DS}$ = 10 V, $I_D$ = 1 mA | N-Ch | 1.5 | 1.8 | 2.5 | V |
| | | $V_{DS}$ = -10 V, $I_D$ = -1 mA | P- Ch | -1.3 | -1.8 | -2.3 | |
| Forward Transfer Admittance | $\|y_{fs}\|$ | $V_{DS}$ = 10 V, $I_D$ = 3.0 A | N-Ch | 3 | 7.6 | | S |
| | | $V_{DS}$ = -10 V, $I_D$ = -2.5 A | P- Ch | 3 | 7.8 | | |
| Drain to Source On-state Resistance | $R_{DS(on)1}$ | $V_{GS}$ = 10 V, $I_D$ = 3.0 A | N-Ch | | 18 | 27 | mΩ |
| | $R_{DS(on)2}$ | $V_{GS}$ = 4.5 V, $I_D$ = 3.0 A | | | 24 | 37 | mΩ |
| | $R_{DS(on)3}$ | $V_{GS}$ = 4.0 V, $I_D$ = 3.0A | | | 27 | 47 | mΩ |
| | $R_{DS(on)1}$ | $V_{GS}$ = -10 V, $I_D$ = -2.5 A | P- Ch | | 28 | 37 | mΩ |
| | $R_{DS(on)2}$ | $V_{GS}$ = -4.5 V, $I_D$ = -2.5 A | | | 42 | 56 | mΩ |
| | $R_{DS(on)3}$ | $V_{GS}$ = -4.0 V, $I_D$ = -2.5 A | | | 47 | 64 | mΩ |
| Input Capacitance | $C_{iss}$ | N-Channel<br>$V_{DS}$ = 10 V,$V_{GS}$ = 0 V,f = 1 MHz | N-Ch | | 748 | | pF |
| | | | P- Ch | | 851 | | |
| Output Capacitance | $C_{oss}$ | P- Channel<br>$V_{DS}$ = -10 V,$V_{GS}$ = 0 V,f = 1 MHz | N-Ch | | 227 | | pF |
| | | | P- Ch | | 279 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | N-Ch | | 107 | | pF |
| | | | P- Ch | | 128 | | |
| Turn-on Delay Time | $t_{d(on)}$ | N-Channel<br>$V_{DD}$ = 15 V, $I_D$ = 3.0 A,$V_{GS}$ = 10 V<br>$R_G$ = 10 Ω | N-Ch | | 20 | | ns |
| | | | P- Ch | | 17 | | |
| Rise Time | $t_r$ | P- Channel<br>$V_{DD}$ = -15 V, $I_D$ = -2.5 A,$V_{GS}$ = -10 V<br>$R_G$ = 10 Ω | N-Ch | | 80 | | ns |
| | | | P- Ch | | 52 | | |
| Turn-off Delay Time | $t_{d(off)}$ | | N-Ch | | 48 | | ns |
| | | | P- Ch | | 84 | | |
| Fall Time | $t_f$ | | N-Ch | | 30 | | ns |
| | | | P- Ch | | 73 | | |
| Total Gate Charge | $Q_G$ | N-Channel<br>$I_D$ = 6.0 A,$V_{DD}$ = 24 V,$V_{GS}$ = 10 V | N-Ch | | 14 | | nC |
| | | | P- Ch | | 15 | | |
| Gate to Source Charge | $Q_{GS}$ | P- Channel<br>$I_D$ = -5.0 A,$V_{DD}$ = -24 V,$V_{GS}$ = -10 V | N-Ch | | 1.9 | | nC |
| | | | P- Ch | | 1.9 | | |
| Gate to Drain Charge | $Q_{GD}$ | | N-Ch | | 3.8 | | nC |
| | | | P- Ch | | 4.2 | | |
| Body Diode Forward Voltage Note | $V_{F(S-D)}$ | $I_F$ = 6. A, $V_{GS}$ = 0 V | N-Ch | | 0.82 | | V |
| | | $I_F$ = 5.0 A, $V_{GS}$ = 0 V | P- Ch | | 0.83 | | |
| Reverse Recovery Time | $t_{rr}$ | N-Channel<br>$I_F$ = 6 A, $V_{GS}$ = 0 V,$di/dt$ = 100 A/μs | N-Ch | | 31 | | ns |
| | | | P- Ch | | 38 | | |
| Reverse Recovery Charge | $Q_{rr}$ | P- Channel<br>$I_F$ = 5 A, $V_{GS}$ = 0 V,$di/dt$ = 100 A/μs | N-Ch | | 32 | | nC |
| | | | P- Ch | | 35 | | |