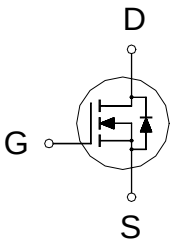
**NIKO-SEM**

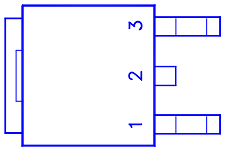
# N-Channel Logic Level Enhancement Mode Field Effect Transistor

**P70N02LD**
**TO-252 (DPAK)**

## PRODUCT SUMMARY

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | $I_D$ |
|---|---|---|
| 25 | 7mΩ | 60A |




1. GATE
2. DRAIN
3. SOURCE

## ABSOLUTE MAXIMUM RATINGS ($T_C$ = 25 °C Unless Otherwise Noted)

| PARAMETERS/TEST CONDITIONS | | SYMBOL | LIMITS | UNITS |
|---|---|---|---|---|
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $T_C$ = 25 °C | $I_D$ | 60 | A |
| | $T_C$ = 100 °C | | 40 | |
| Pulsed Drain Current[1] | | $I_{DM}$ | 150 | |
| Avalanche Current | | $I_{AR}$ | 60 | |
| Avalanche Energy | L = 0.1mH | $E_{AS}$ | 140 | mJ |
| Repetitive Avalanche Energy[2] | L = 0.05mH | $E_{AR}$ | 5.6 | |
| Power Dissipation | $T_C$ = 25 °C | $P_D$ | 60 | W |
| | $T_C$ = 100 °C | | 32.75 | |
| Operating Junction & Storage Temperature Range | | $T_j$, $T_{stg}$ | -55 to 150 | °C |
| Lead Temperature ($^1/_{16}$" from case for 10 sec.) | | $T_L$ | 275 | |

## THERMAL RESISTANCE RATINGS

| THERMAL RESISTANCE | SYMBOL | TYPICAL | MAXIMUM | UNITS |
|---|---|---|---|---|
| Junction-to-Case | $R_{\theta JC}$ | | 2.5 | °C / W |
| Junction-to-Ambient | $R_{\theta JA}$ | | 65 | |
| Case-to-Heatsink | $R_{\theta CS}$ | 0.7 | | |

[1]Pulse width limited by maximum junction temperature.
[2]Duty cycle ≤ 1%

## ELECTRICAL CHARACTERISTICS ($T_C$ = 25 °C, Unless Otherwise Noted)

| PARAMETER | SYMBOL | TEST CONDITIONS | LIMITS | | | UNIT |
|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | |
| **STATIC** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250µA | 25 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250µA | 1 | 1.5 | 3 | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | | | ±250 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 20V, $V_{GS}$ = 0V | | | 25 | µA |
| | | $V_{DS}$ = 20V, $V_{GS}$ = 0V, $T_J$ = 125 °C | | | 250 | |



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| | | | | | | |
|---|---|---|---|---|---|---|
| On-State Drain Current[1] | $I_{D(ON)}$ | $V_{DS}$ = 10V, $V_{GS}$ = 10V | 60 | | | A |
| Drain-Source On-State Resistance[1] | $R_{DS(ON)}$ | $V_{GS}$ = 10V, $I_D$ = 30A | | 7 | 9 | mΩ |
| | | $V_{GS}$ = 7V, $I_D$ = 24A | | 8 | 10 | |
| Forward Transconductance[1] | $g_{fs}$ | $V_{DS}$ = 15V, $I_D$ = 30A | | 16 | | S |
| **DYNAMIC** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 15V, f = 1MHz | | 2700 | | pF |
| Output Capacitance | $C_{oss}$ | | | 500 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 200 | | |
| Total Gate Charge[2] | $Q_g$ | $V_{DS}$ = 0.5$V_{(BR)DSS}$, $V_{GS}$ = 10V, $I_D$ = 30A | | 25 | | nC |
| Gate-Source Charge[2] | $Q_{gs}$ | | | 7 | | |
| Gate-Drain Charge[2] | $Q_{gd}$ | | | 11 | | |
| Turn-On Delay Time[2] | $t_{d(on)}$ | $V_{DS}$ = 15V, $R_L$ = 1Ω, $I_D \cong$ 30A, $V_{GS}$ = 10V, $R_{GS}$ = 2.5Ω | | 7 | | nS |
| Rise Time[2] | $t_r$ | | | 7 | | |
| Turn-Off Delay Time[2] | $t_{d(off)}$ | | | 24 | | |
| Fall Time[2] | $t_f$ | | | 6 | | |
| **SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_C$ = 25 °C)** | | | | | | |
| Continuous Current | $I_S$ | | | | 60 | A |
| Pulsed Current[3] | $I_{SM}$ | | | | 150 | |
| Forward Voltage[1] | $V_{SD}$ | $I_F$ = $I_S$, $V_{GS}$ = 0V | | | 1.3 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = $I_S$, $dI_F/dt$ = 100A / µS | | 37 | | nS |
| Peak Reverse Recovery Current | $I_{RM(REC)}$ | | | 200 | | A |
| Reverse Recovery Charge | $Q_{rr}$ | | | 0.043 | | µC |

[1]Pulse test : Pulse Width ≤ 300 µsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.
[3]Pulse width limited by maximum junction temperature.

**REMARK: THE PRODUCT MARKED WITH "P70N02LD", DATE CODE or LOT #**

# TO-252 (DPAK) MECHANICAL DATA

| Dimension | mm | | | Dimension | mm | | |
|---|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | | Min. | Typ. | Max. |
| A | 9.35 | | 10.1 | H | | 0.8 | |
| B | 2.2 | | 2.4 | I | 6.4 | | 6.6 |
| C | 0.48 | | 0.6 | J | 5.2 | | 5.4 |
| D | 0.89 | | 1.5 | K | 0.6 | | 1 |
| E | 0.45 | | 0.6 | L | 0.64 | | 0.9 |
| F | 0.03 | | 0.23 | M | 4.4 | | 4.6 |
| G | 6 | | 6.2 | N | | | |