# NIKO-SEM

# P-Channel Logic Level Enhancement Mode Field Effect Transistor

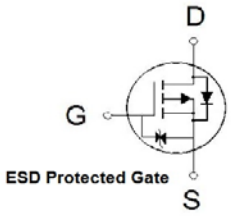
# PZ0703EK

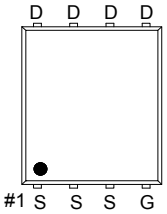
**PDFN 5x6P**

**Halogen-Free & Lead-Free**

## PRODUCT SUMMARY

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | $I_D$[3] |
|---|---|---|
| -30V | 7mΩ | -70A |




1. GATE
2. DRAIN
3. SOURCE

RoHS Compliant

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

| PARAMETERS/TEST CONDITIONS | | SYMBOL | LIMITS | UNITS |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current[3] | $T_C$ = 25 °C | $I_D$ | -70 | A |
| | $T_C$ = 100 °C | | -56 | |
| Pulsed Drain Current[1] | | $I_{DM}$ | -150 | |
| Continuous Drain Current | $T_A$ = 25 °C | $I_D$ | -13 | |
| | $T_A$ = 70 °C | | -10 | |
| Avalanche Current | | $I_{AS}$ | -71 | |
| Avalanche Energy | L = 0.1mH | $E_{AS}$ | 252 | mJ |
| Power Dissipation | $T_C$ = 25 °C | $P_D$ | 50 | W |
| | $T_C$ = 100 °C | | 32 | |
| Power Dissipation | $T_A$ = 25 °C | $P_D$ | 2.5 | W |
| | $T_A$ = 70 °C | | 1.6 | |
| Operating Junction & Storage Temperature Range | | $T_j$, $T_{stg}$ | -55 to 150 | °C |
| ESD Class | HBM | | >3KV | |

## THERMAL RESISTANCE RATINGS

| THERMAL RESISTANCE | SYMBOL | TYPICAL | MAXIMUM | UNITS |
|---|---|---|---|---|
| Junction-to-Ambient | $R_{\theta JA}$ | | 50 | °C / W |
| Junction-to-Case | $R_{\theta JC}$ | | 2.5 | |

[1]Pulse width limited by maximum junction temperature.
[2]The value of $R_{\theta JA}$ is measured with the device mounted on 1in$^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A$ =25°C. The value in any given application depends on the user's specific board design.
[3]Package limitation current is -51A

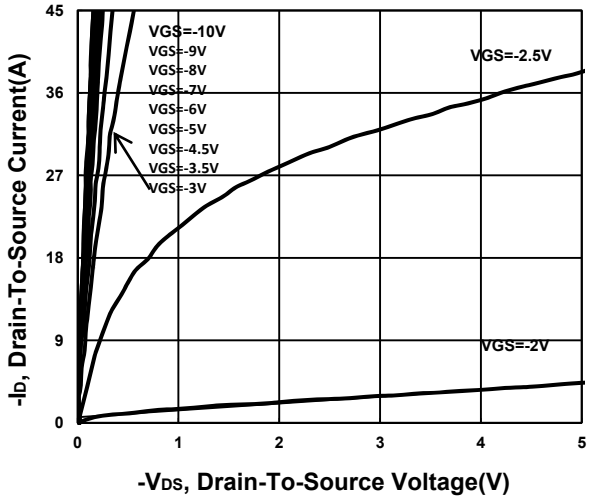
## ELECTRICAL CHARACTERISTICS ($T_J$ = 25 °C, Unless Otherwise Noted)

| PARAMETER | SYMBOL | TEST CONDITIONS | LIMITS MIN | LIMITS TYP | LIMITS MAX | UNIT |
|---|---|---|---|---|---|---|
| **STATIC** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = -250μA | -30 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = -250μA | -1 | -1.4 | -3 | |

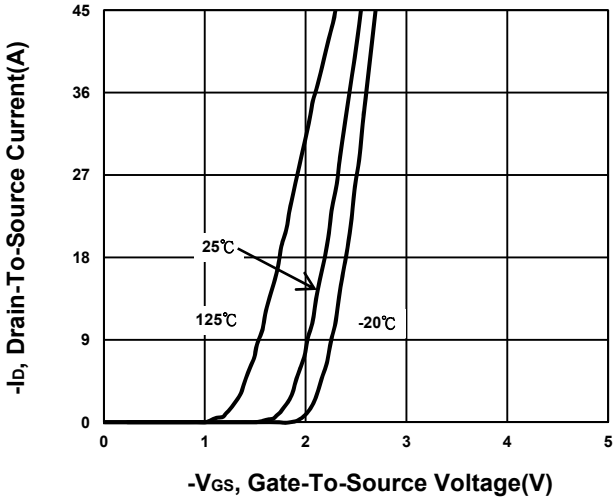
| | | | | | | |
|---|---|---|---|---|---|---|
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±16V | | | ±30 | uA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = -24V, $V_{GS}$ = 0V | | | -1 | μA |
| | | $V_{DS}$ = -20V, $V_{GS}$ = 0V, $T_J$ = 125 °C | | | -10 | |
| Drain-Source On-State Resistance[1] | $R_{DS(ON)}$ | $V_{GS}$ = -4.5V, $I_D$ = -20A | | 5.7 | 10 | mΩ |
| | | $V_{GS}$ = -10V, $I_D$ = -20A | | 3.8 | 7 | |
| Forward Transconductance[1] | $g_{fs}$ | $V_{DS}$ = -5V, $I_D$ = -20A | | 65 | | S |
| **DYNAMIC** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = -15V, f = 1MHz | | 5210 | | pF |
| Output Capacitance | $C_{oss}$ | | | 960 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 890 | | |
| Total Gate Charge[2] | $Q_g$ $V_{GS}$=10V | $V_{DS}$ = -15V , $V_{GS}$ = -10V, $I_D$ = -20A | | 121 | | nC |
| | $Q_g$ $V_{GS}$=4.5V | | | 64 | | |
| Gate-Source Charge[2] | $Q_{gs}$ | | | 12 | | |
| Gate-Drain Charge[2] | $Q_{gd}$ | | | 27 | | |
| Turn-On Delay Time[2] | $t_{d(on)}$ | $V_{DS}$ = -15V, $I_D \cong$ -20A, $V_{GS}$ = -10V, $R_{GS}$ = 6Ω | | 33 | | nS |
| Rise Time[2] | $t_r$ | | | 25 | | |
| Turn-Off Delay Time[2] | $t_{d(off)}$ | | | 100 | | |
| Fall Time[2] | $t_f$ | | | 45 | | |
| **SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_J$ = 25 °C)** | | | | | | |
| Continuous Current[3] | $I_S$ | | | | -70 | A |
| Forward Voltage[1] | $V_{SD}$ | $I_F$ = -20A, $V_{GS}$ = 0V | | | -1.3 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = -20A, $dI_F/dt$ = 100A / μS | | 26.5 | | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | | 16 | | nC |

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.
[3]Package limitation current is -51A

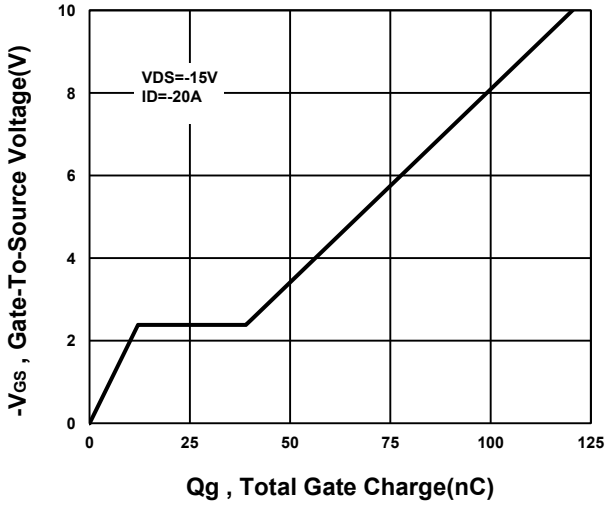
## Output Characteristics



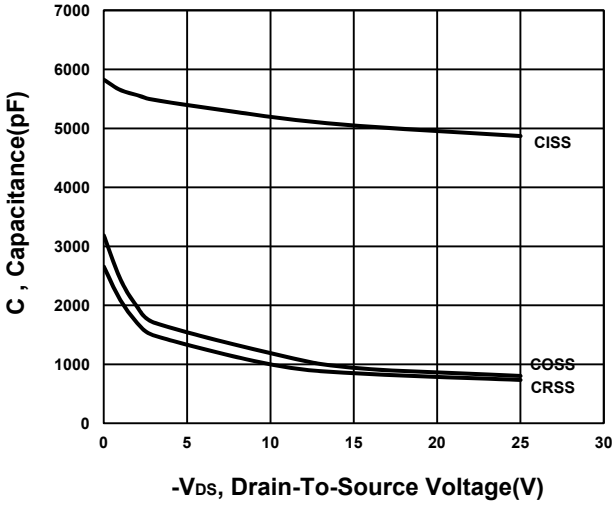

## Transfer Characteristics



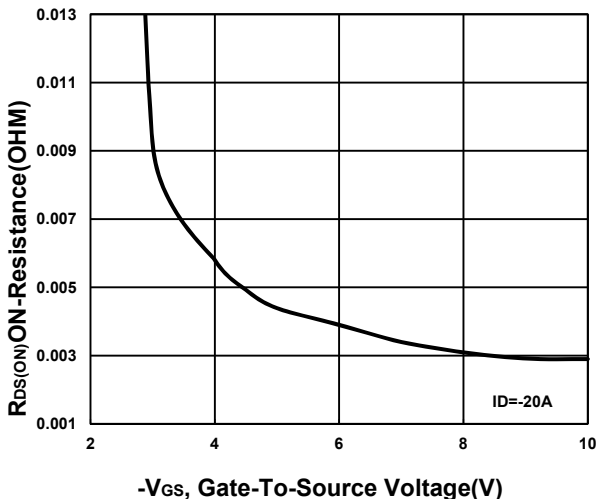

## Gate charge Characteristics



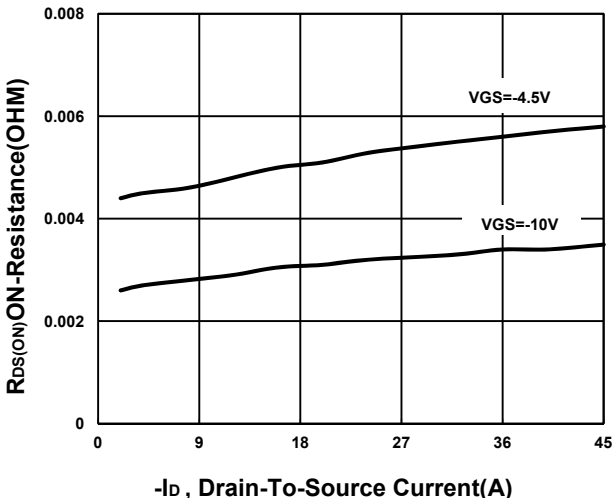

## Capacitance Characteristic



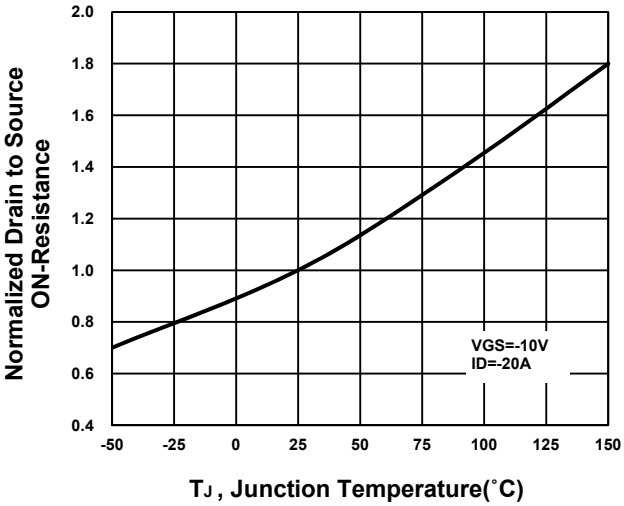

## On-Resistance VS Gate-To-Source



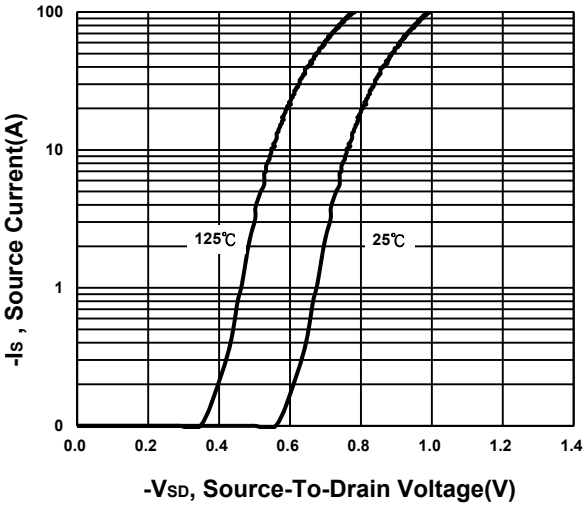

## On-Resistance VS Drain Current



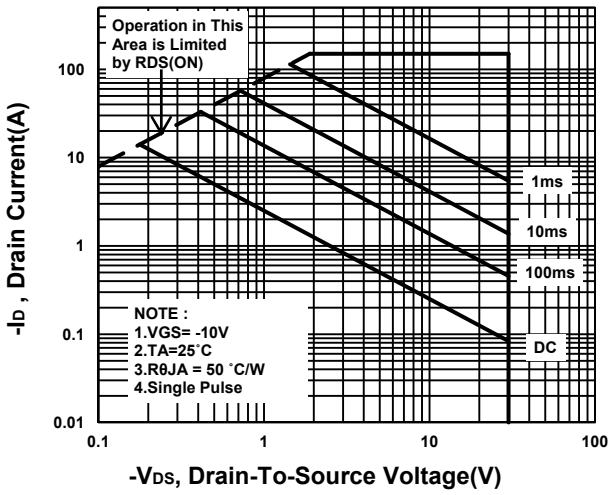
## On-Resistance VS Temperature



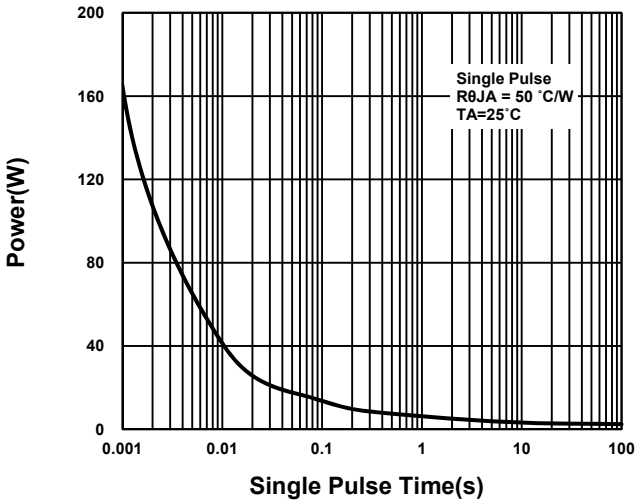

## Source-Drain Diode Forward Voltage




## Safe Operating Area




## Single Pulse Maximum Power Dissipation




## Transient Thermal Response Curve