# NIKO-SEM

## N-Channel Enhancement Mode Field Effect Transistor

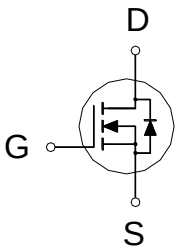
# P0620ED

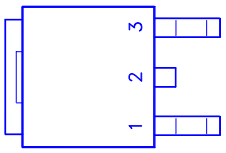
**TO-252**

**Halogen-Free & Lead-Free**

### PRODUCT SUMMARY

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | $I_D$ |
|---|---|---|
| 200V | 580mΩ | 6A |




1: GATE
2: DRAIN
3: SOURCE

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

| PARAMETERS/TEST CONDITIONS | | SYMBOL | LIMITS | UNITS |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 200 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $T_C$ = 25 ° C | $I_D$ | 6 | A |
| | $T_C$ = 100 ° C | | 3.8 | |
| Pulsed Drain Current[1] | | $I_{DM}$ | 24 | |
| Avalanche Current | | $I_{AS}$ | 8.9 | |
| Avalanche Energy | L = 1mH | $E_{AS}$ | 39.6 | mJ |
| Power Dissipation | $T_C$ = 25 ° C | $P_D$ | 52 | W |
| | $T_C$ = 100 ° C | | 20 | |
| Junction & Storage Temperature Range | | $T_J$, $T_{stg}$ | -55 to 150 | ° C |

### THERMAL RESISTANCE RATINGS

| THERMAL RESISTANCE | SYMBOL | TYPICAL | MAXIMUM | UNITS |
|---|---|---|---|---|
| Junction-to-Ambient | $R_{\theta JA}$ | | 62.5 | ° C / W |
| Junction-to-Case | $R_{\theta JC}$ | | 2.4 | |

[1]Pulse width limited by maximum junction temperature.

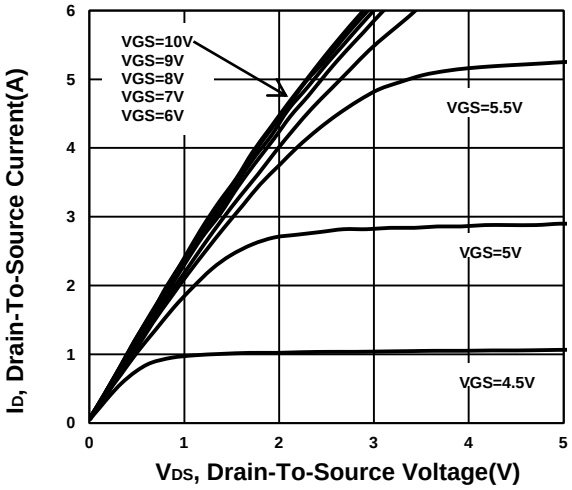
### .ELECTRICAL CHARACTERISTICS ($T_J$ = 25 ° C, Unless Otherwise Noted)

| PARAMETER | SYMBOL | TEST CONDITIONS | LIMITS | | | UNIT |
|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | |
| **STATIC** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 200 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 2 | 3 | 4 | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | | | ±100 | nA |

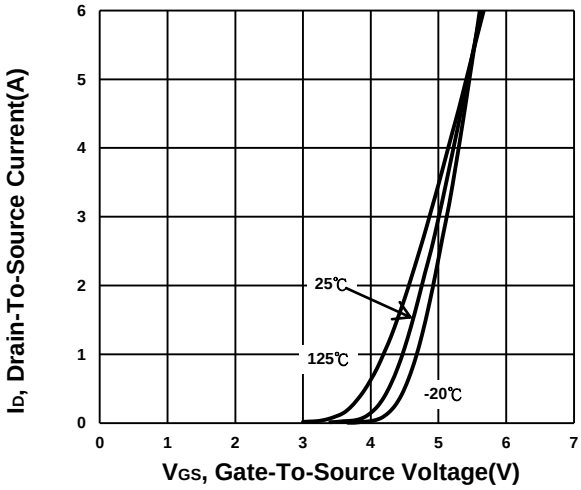
| | | | | | | |
|---|---|---|---|---|---|---|
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 200V, $V_{GS}$ = 0V | | | 1 | μA |
| | | $V_{DS}$ = 160V, $V_{GS}$ = 0V, $T_J$ = 125℃ | | | 10 | |
| Drain-Source On-State Resistance[1] | $R_{DS(ON)}$ | $V_{GS}$ =10V, $I_D$ = 3A | | 451 | 580 | mΩ |
| Forward Transconductance[1] | $g_{fs}$ | $V_{DS}$ = 15V, $I_D$ = 3A | | 4.4 | | S |
| **DYNAMIC** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 100V, f = 1MHz | | 223 | | pF |
| Output Capacitance | $C_{oss}$ | | | 31 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 9.4 | | |
| Gate Resistance | $R_g$ | $V_{GS}$ = 0V, $V_{DS}$ = 0V, f = 1MHz | | 3.5 | | Ω |
| Total Gate Charge[2] | $Q_g$ | $V_{DS}$ = 100V , $I_D$ =6A , $V_{GS}$ = 10V | | 7.7 | | nC |
| Gate-Source Charge[2] | $Q_{gs}$ | | | 1.2 | | |
| Gate-Drain Charge[2] | $Q_{gd}$ | | | 4.5 | | |
| Turn-On Delay Time[2] | $t_{d(on)}$ | $V_{DS}$ = 100V , $I_D$ ≅ 6A, $V_{GS}$ = 10V, $R_{GEN}$ = 6Ω | | 7.5 | | nS |
| Rise Time[2] | $t_r$ | | | 20 | | |
| Turn-Off Delay Time[2] | $t_{d(off)}$ | | | 12 | | |
| Fall Time[2] | $t_f$ | | | 27 | | |
| **SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_J$ = 25 ° C)** | | | | | | |
| Continuous Current[3] | $I_S$ | | | | 6 | A |
| Forward Voltage[1] | $V_{SD}$ | $I_F$ = 6A, $V_{GS}$ = 0V | | | 1.2 | V |
| Diode Reverse Recovery Time | $t_{rr}$ | $I_F$= 6A, dI/dt=100A/μs | | 89 | | nS |
| Diode Reverse Recovery Charge | $Q_{rr}$ | | | 265 | | nC |

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

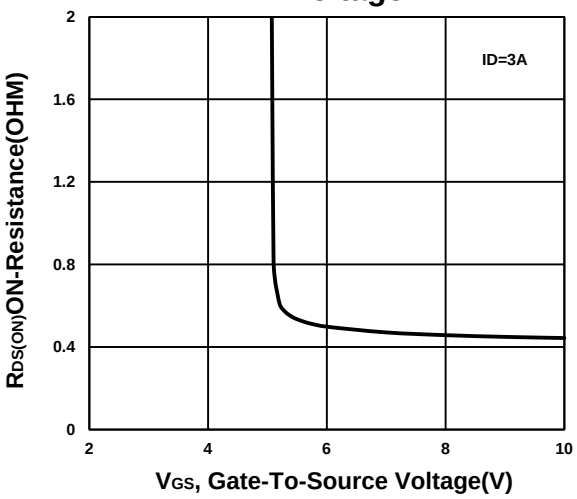
## Output Characteristics



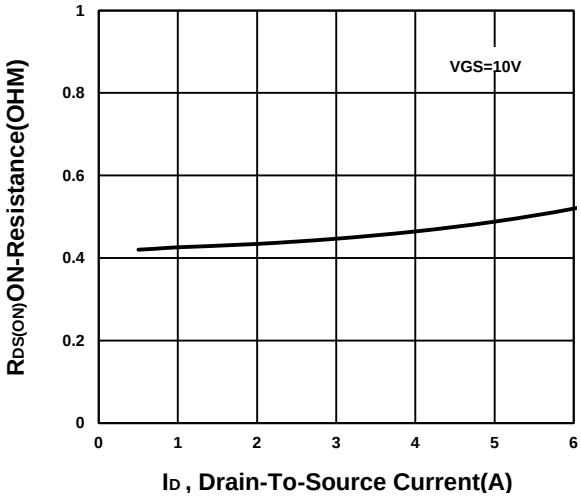

## Transfer Characteristics



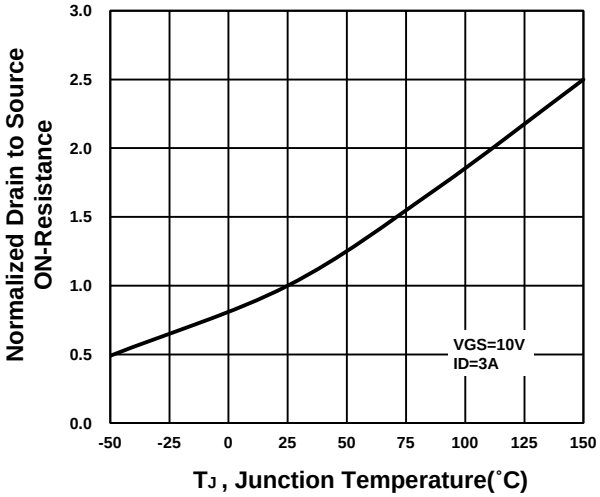

## On-Resistance VS Gate-To-Source Voltage



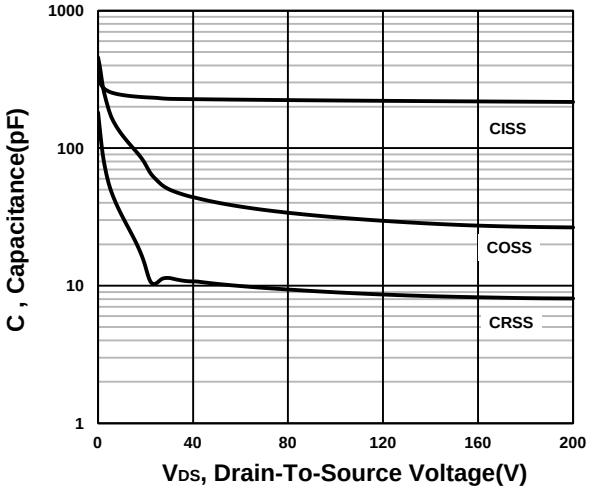

## On-Resistance VS Drain Current



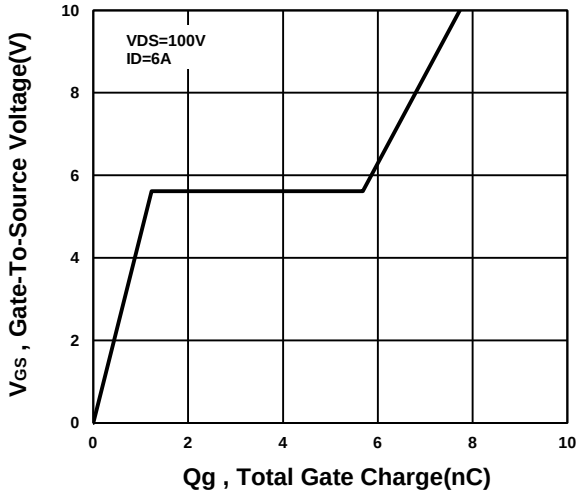

## On-Resistance VS Temperature



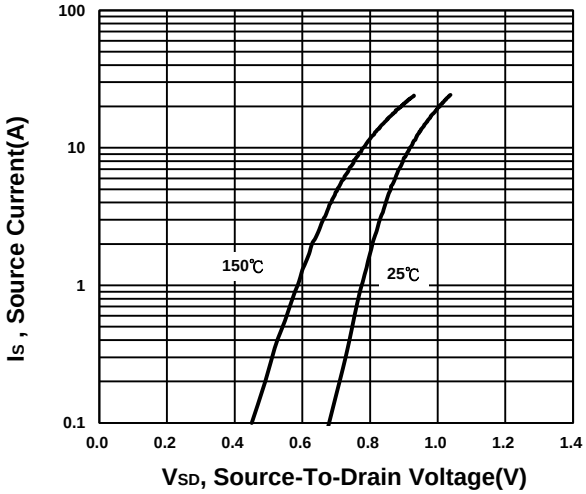

## Capacitance Characteristic



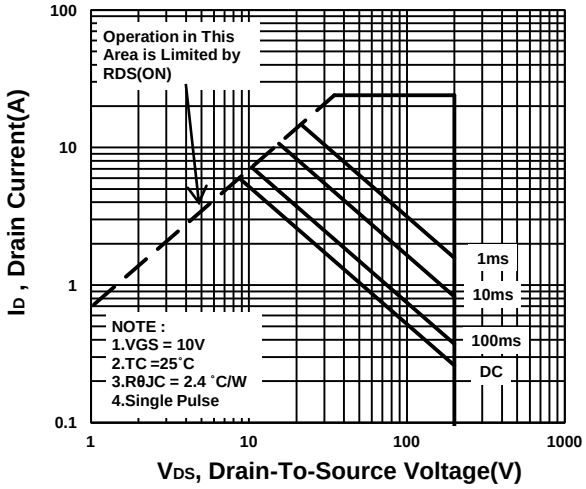
## Gate charge Characteristics



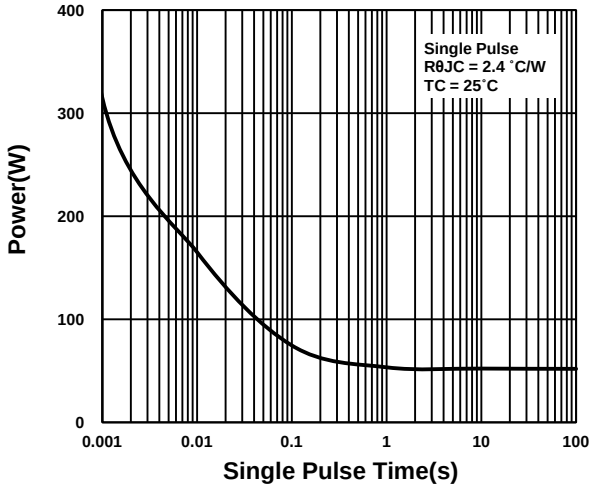

## Source-Drain Diode Forward Voltage




## Safe Operating Area




## Single Pulse Maximum Power Dissipation




## Transient Thermal Response Curve