# NIKO-SEM

# N-Channel Enhancement Mode Field Effect Transistor

# PG1010BIS

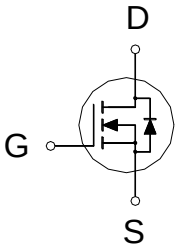
**TO-251(IS)**

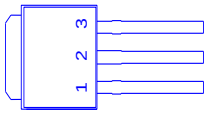
**Halogen-Free & Lead-Free**

RoHS Compliant

## PRODUCT SUMMARY

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | $I_D$ |
|---|---|---|
| 100V | 10.5mΩ | 64A |




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 | | $V_{DS}$ | 100 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current[2] | $T_C$ = 25 ° C | $I_D$ | 64 | A |
| | $T_C$ = 100 ° C | | 45 | |
| Pulsed Drain Current[1] | | $I_{DM}$ | 150 | |
| Avalanche Current | | $I_{AS}$ | 12.5 | |
| Avalanche Energy | L = 1mH | $E_{AS}$ | 78.1 | mJ |
| Power Dissipation | $T_C$ = 25 ° C | $P_D$ | 100 | W |
| | $T_C$ = 100 ° C | | 50 | |
| Operating Junction & Storage Temperature Range | | $T_j$, $T_{stg}$ | -55 to 175 | ° C |

## THERMAL RESISTANCE RATINGS

| THERMAL RESISTANCE | SYMBOL | TYPICAL | MAXIMUM | UNITS |
|---|---|---|---|---|
| Junction-to-Case | $R_{\theta JC}$ | | 1.5 | ° C / W |
| Junction-to-Ambient | $R_{\theta JA}$ | | 62.5 | |

[1]Pulse width limited by maximum junction temperature.
[2]Package limitation current is 55A

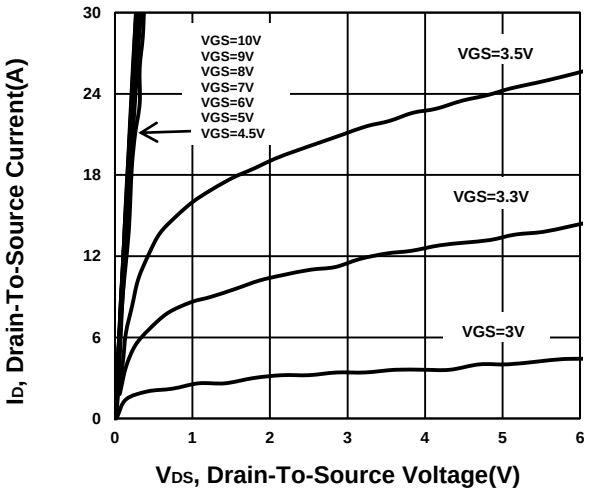
## ELECTRICAL CHARACTERISTICS ($T_J$ = 25 ° C, Unless Otherwise Noted)

| PARAMETER | SYMBOL | TEST CONDITIONS | LIMITS | | | UNITS |
|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | |
| **STATIC** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 100 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 1.4 | 2 | 3 | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 100V, $V_{GS}$ = 0V | | | 1 | μA |
| | | $V_{DS}$ = 100V, $V_{GS}$ = 0V, $T_J$ = 125 ° C | | | 100 | |

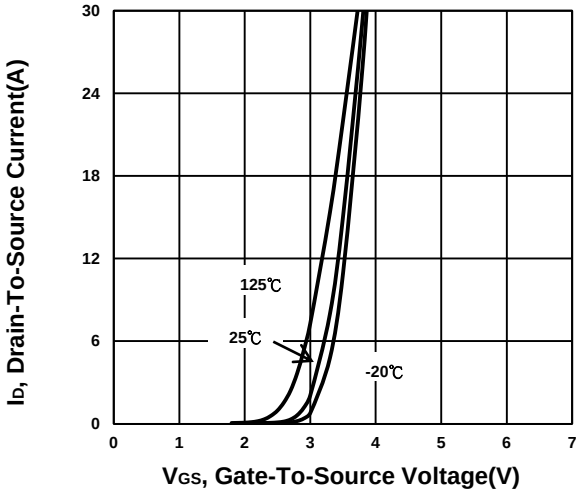
| | | | | | | |
|---|---|---|---|---|---|---|
| Drain-Source On-State Resistance[1] | $R_{DS(ON)}$ | $V_{GS}$ = 4.5V, $I_D$ = 10A | | 12 | 15 | mΩ |
| | | $V_{GS}$ = 10V, $I_D$ = 12A | | 8.3 | 10.5 | |
| Forward Transconductance[1] | $g_{fs}$ | $V_{DS}$ = 5V, $I_D$ = 12A | | 60 | | S |
| **DYNAMIC** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 50V, f = 1MHz | | 2164 | | pF |
| Output Capacitance | $C_{oss}$ | | | 191 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 15 | | |
| Gate Resistance | Rg | $V_{GS}$ = 0V, $V_{DS}$ = 0V, f = 1MHz | | 1.6 | | Ω |
| Total Gate Charge[2] | $Q_g$ ($V_{GS}$ = 10V) | $V_{DS}$ =50V,$I_D$ = 12A | | 40 | | nC |
| | $Q_g$ ($V_{GS}$ = 4.5V) | | | 23 | | |
| Gate-Source Charge[2] | $Q_{gs}$ | | | 6.8 | | |
| Gate-Drain Charge[2] | $Q_{gd}$ | | | 12 | | |
| Turn-On Delay Time[2] | $t_{d(on)}$ | $V_{DD}$ = 50V, $I_D \cong$ 12A, $V_{GS}$ = 10V, $R_{GEN}$ =6Ω | | 12 | | nS |
| Rise Time[2] | $t_r$ | | | 32 | | |
| Turn-Off Delay Time[2] | $t_{d(off)}$ | | | 40 | | |
| Fall Time[2] | $t_f$ | | | 57 | | |
| **SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_J$ = 25 °C)** | | | | | | |
| Continuous Current[3] | $I_S$ | | | | 64 | A |
| Forward Voltage[1] | $V_{SD}$ | $I_F$ = 12A , $V_{GS}$ = 0V | | | 1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = 12A , $dI_F/dt$= 100A/μs | | 30 | | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | | 32 | | nC |

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.
[2]Independent of operating temperature.
[3]Package limitation current is 55A

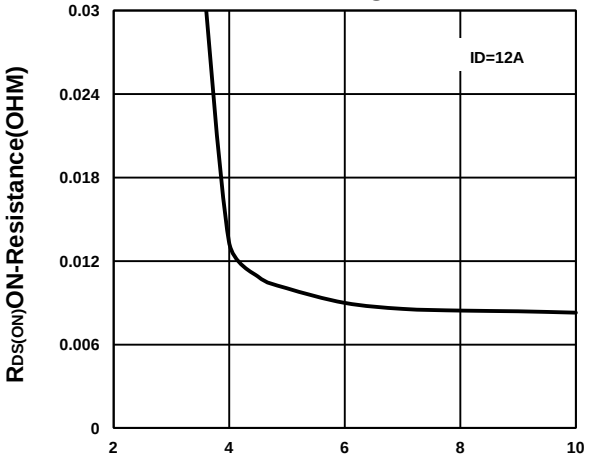
## Output Characteristics



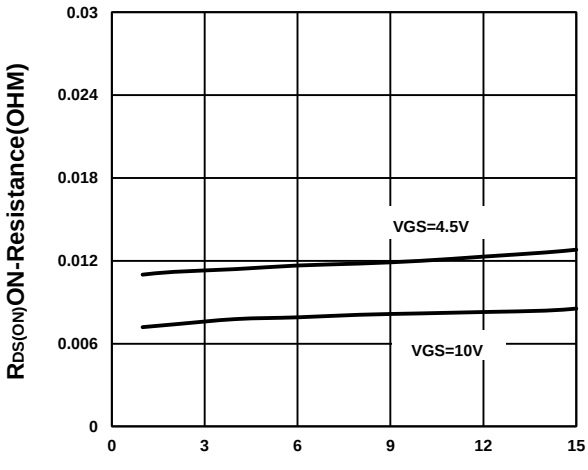

## Transfer Characteristics



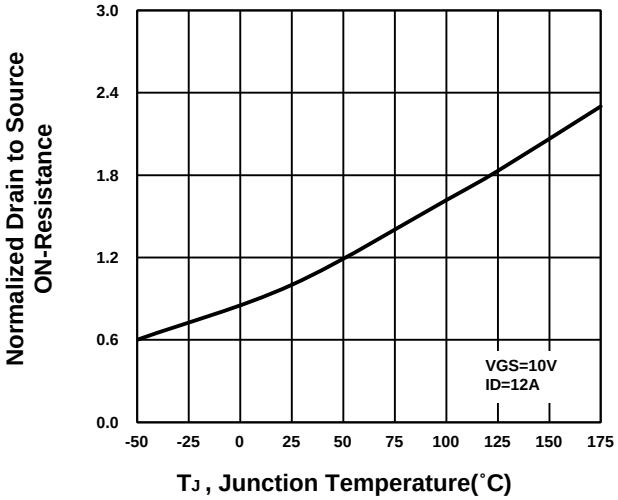

## On-Resistance VS Gate-To-Source Voltage



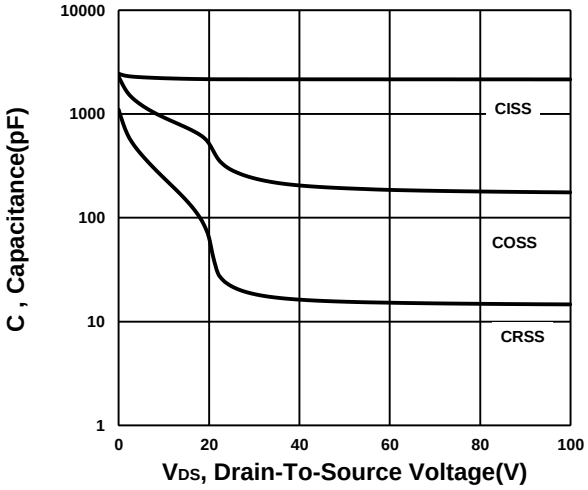

## On-Resistance VS Drain Current



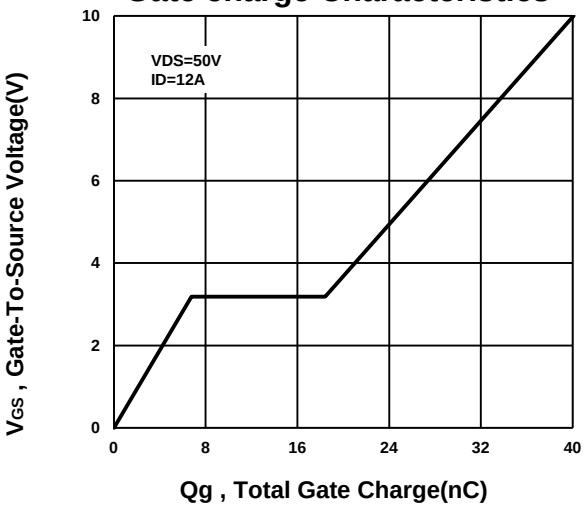

## On-Resistance VS Temperature



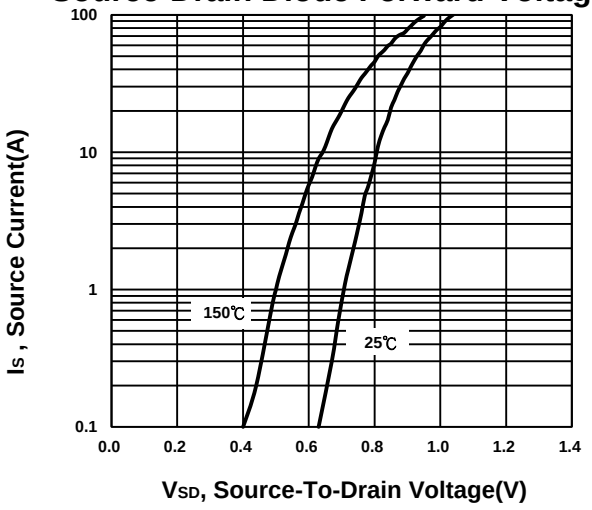

## Capacitance Characteristic



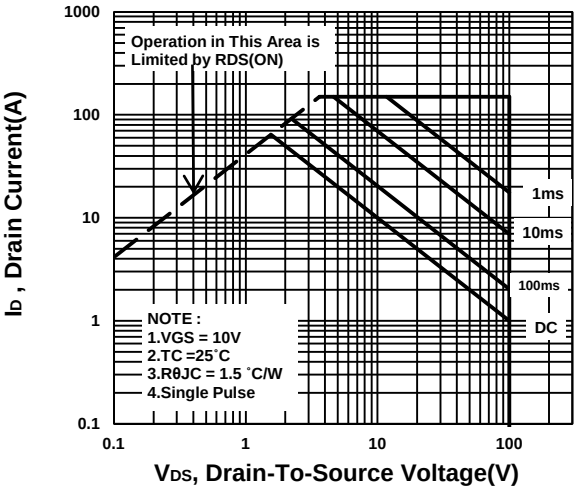
## Gate charge Characteristics



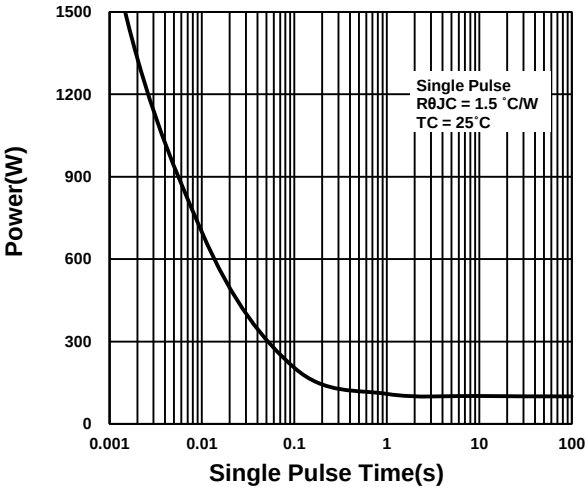

## Source-Drain Diode Forward Voltage




## Safe Operating Area




## Single Pulse Maximum Power Dissipation




## Transient Thermal Response Curve