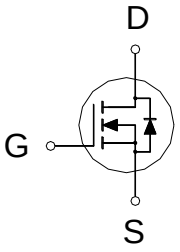
**NIKO-SEM**

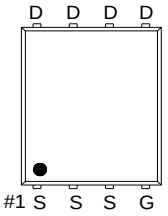
# N-Channel Enhancement Mode Field Effect Transistor

**PP9C15AK**
**PDFN 5x6P**
**Halogen-Free & Lead-Free**

## PRODUCT SUMMARY

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | $I_D$ |
|---|---|---|
| 150V | 9.3mΩ | 83A |




G. GATE
D. DRAIN
S. SOURCE

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

| PARAMETERS/TEST CONDITIONS | | SYMBOL | LIMITS | UNITS |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 150 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $T_C$ = 25 °C | $I_D$ | 83 | A |
| | $T_C$ = 100 °C | | 58 | |
| Pulsed Drain Current[1] | | $I_{DM}$ | 208 | |
| Continuous Drain Current | $T_A$ = 25 °C | $I_D$ | 15 | |
| | $T_A$ = 70 °C | | 13 | |
| Continuous Drain Current[4] | $T_A$ = 70 °C | | 11.8 | |
| Avalanche Current | | $I_{AS}$ | 18 | |
| Avalanche Energy | L = 1mH | $E_{AS}$ | 162 | mJ |
| Power Dissipation | $T_C$ = 25 °C | $P_D$ | 150 | W |
| | $T_C$ = 100 °C | | 75 | |
| Power Dissipation[3] | $T_A$ = 25 °C | $P_D$ | 5.1 | W |
| | $T_A$ = 70 °C | | 3.6 | |
| Operating Junction & Storage Temperature Range | | $T_j$, $T_{stg}$ | -55 to 175 | °C |

## THERMAL RESISTANCE RATINGS

| THERMAL RESISTANCE | | SYMBOL | TYPICAL | MAXIMUM | UNITS |
|---|---|---|---|---|---|
| Junction-to-Ambient[2] | t ≦10s | $R_{\theta JA}$ | | 29 | °C / W |
| Junction-to-Ambient[2] | Steady-State | $R_{\theta JA}$ | | 58 | |
| Junction-to-Case | Steady-State | $R_{\theta JC}$ | | 1 | |

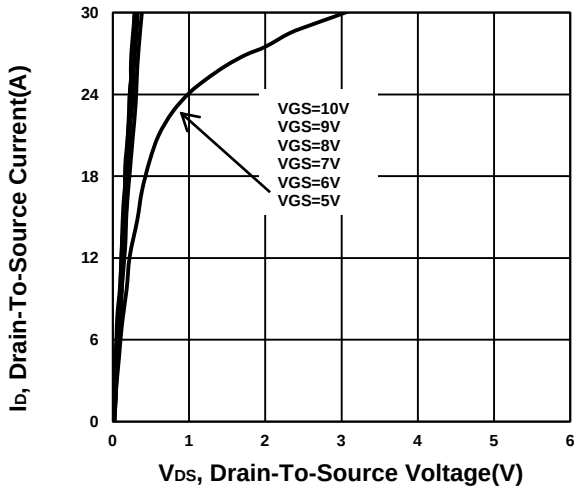
[1]Pulse width limited by maximum junction temperature.
[2]The value of $R_{\theta JA}$ is measured with the device mounted on 1in$^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A$ =25°C.
[3]The Power dissipation is based on $R_{\theta JA}$ t ≦10s value.
[4]Rds(on) Conditions is VGS=7V.

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

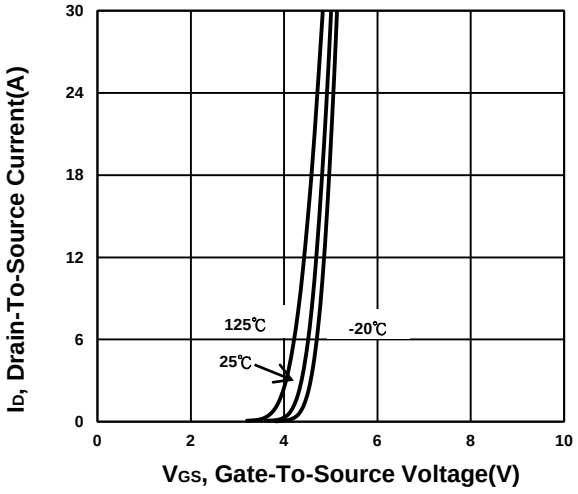
| PARAMETER | SYMBOL | TEST CONDITIONS | LIMITS | | | UNITS |
|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | |
| **STATIC** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 150 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 2 | 3.3 | 4 | V |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 150V, $V_{GS}$ = 0V | | | 1 | μA |
| | | $V_{DS}$ = 150V, $V_{GS}$ = 0V, $T_J$ = 125 ° C | | | 100 | μA |
| Drain-Source On-State Resistance[5] | $R_{DS(ON)}$ | $V_{GS}$ = 10V, $I_D$ = 20A | | 7.9 | 9.3 | mΩ |
| | | $V_{GS}$ = 7V, $I_D$ = 10A | | 8.8 | 11 | mΩ |
| Forward Transconductance[5] | $g_{fs}$ | $V_{DS}$ = 5V, $I_D$ = 20A | | 22 | | S |
| **DYNAMIC** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 75V, f = 1MHz | | 3497 | | pF |
| Output Capacitance | $C_{oss}$ | | | 304 | | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 7 | | pF |
| Gate Resistance | Rg | $V_{GS}$ = 0V, $V_{DS}$ = 0V, f = 1MHz | | 1.3 | | Ω |
| Total Gate Charge[6] | $Q_g$ | $V_{GS}$ = 10V, $V_{DS}$ = 75V,$I_D$ = 20A | | 46 | | nC |
| Gate-Source Charge[6] | $Q_{gs}$ | | | 16 | | nC |
| Gate-Drain Charge[6] | $Q_{gd}$ | | | 13 | | nC |
| Turn-On Delay Time[6] | $t_{d(on)}$ | $V_{DD}$ = 75V, $I_D$ ≅ 20A, $V_{GS}$ = 10V, $R_{GEN}$ =6Ω | | 27 | | nS |
| Rise Time[6] | $t_r$ | | | 71 | | nS |
| Turn-Off Delay Time[6] | $t_{d(off)}$ | | | 40 | | nS |
| Fall Time[6] | $t_f$ | | | 73 | | nS |
| **SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_J$ = 25 °C)** | | | | | | |
| Continuous Current | $I_S$ | | | | 83 | A |
| Forward Voltage[5] | $V_{SD}$ | $I_F$ =20A , $V_{GS}$ = 0V | | | 1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = 20A , $dI_F/dt$= 100A/μs | | 94 | | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | | 253 | | nC |

[5]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.
[6]Independent of operating temperature.

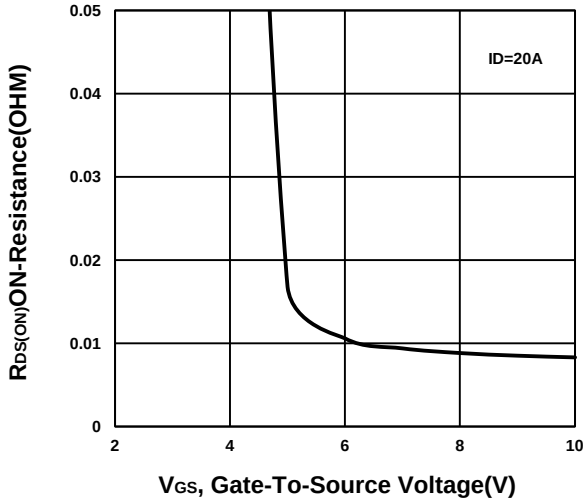
## Output Characteristics



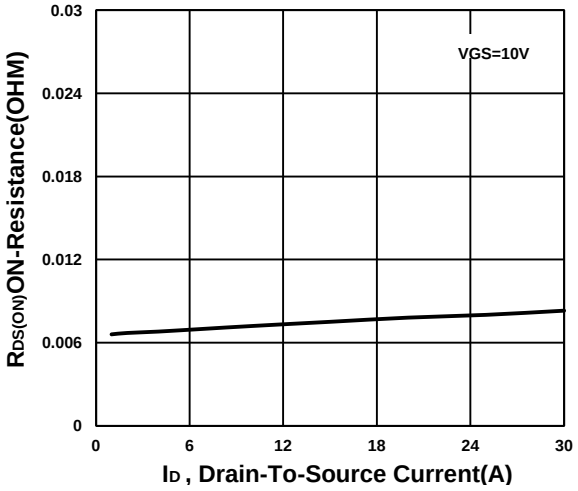

## Transfer Characteristics



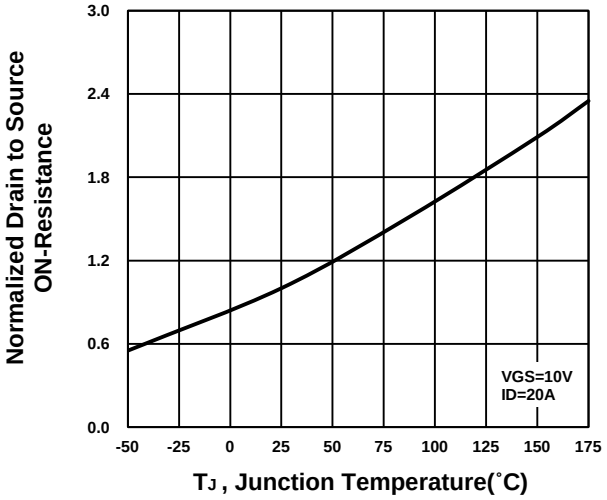

## On-Resistance VS Gate-To-Source Voltage



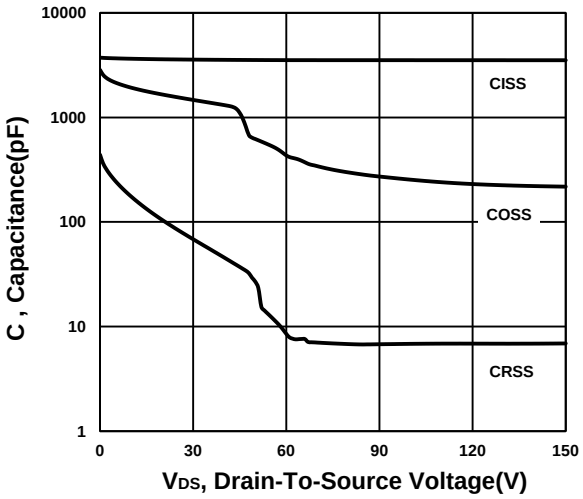

## On-Resistance VS Drain Current



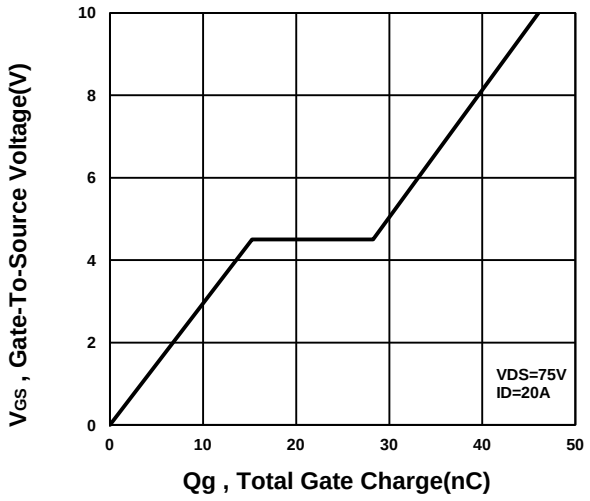

## On-Resistance VS Temperature



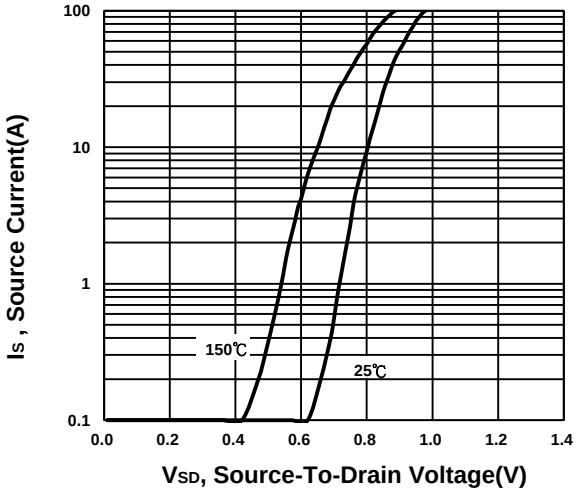

## Capacitance Characteristic



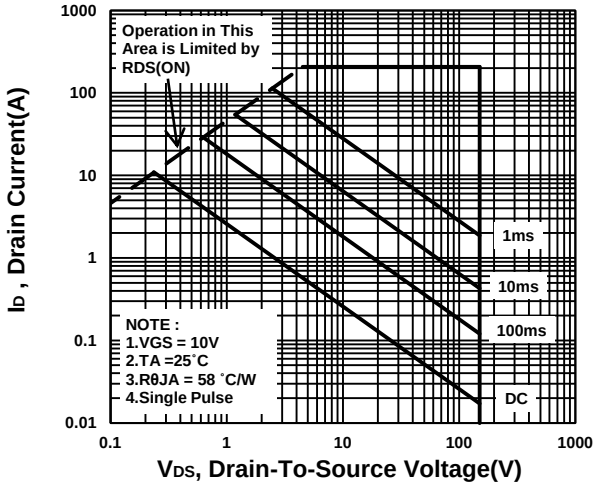
## Gate charge Characteristics



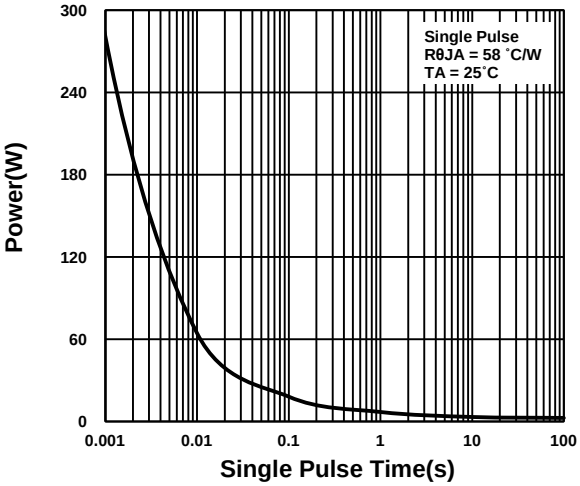

## Source-Drain Diode Forward Voltage



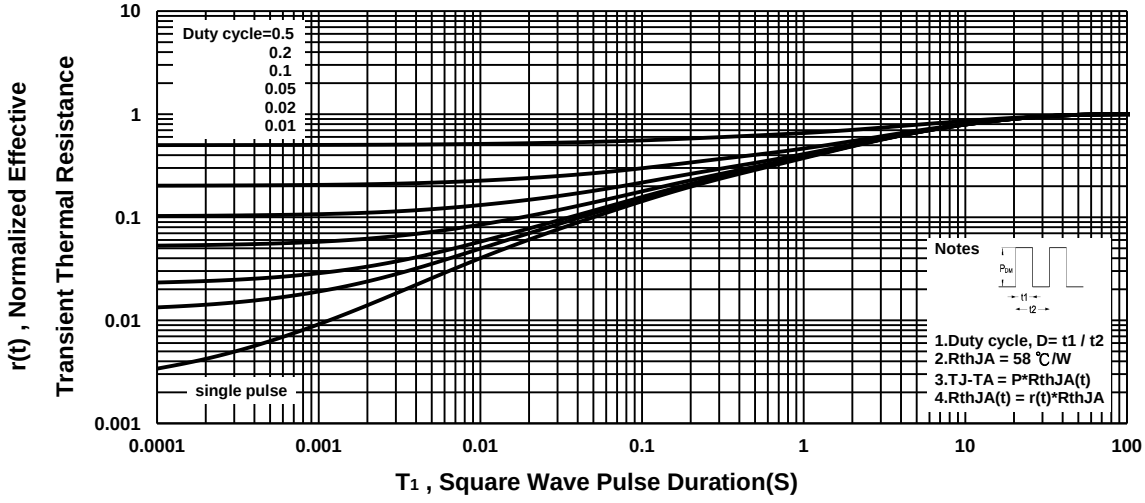

## Safe Operating Area



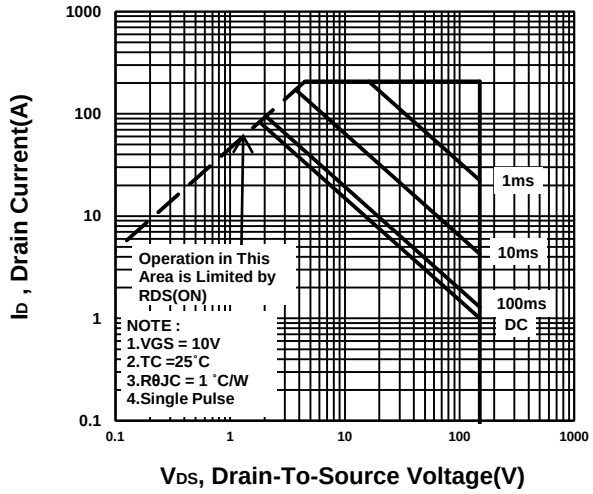

## Single Pulse Maximum Power Dissipation



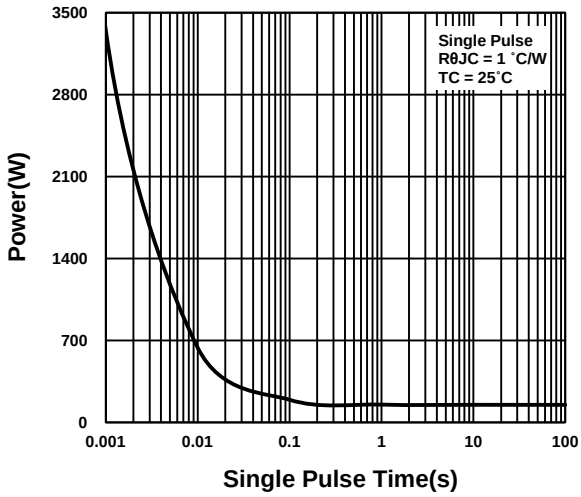

## Transient Thermal Response Curve



## Safe Operating Area




## Single Pulse Maximum Power Dissipation

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