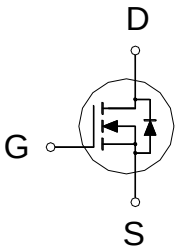
**NIKO-SEM**

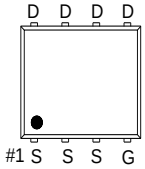
# N-Channel Enhancement Mode Field Effect Transistor

**PE8D8BA**
**PDFN 3x3P**
**Halogen-Free & Lead-Free**

## PRODUCT SUMMARY

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | $I_D$ |
|---|---|---|
| 30V | 4.8mΩ | 52A |




G. GATE
D. DRAIN
S. SOURCE

### Features
- Pb−Free, Halogen Free and RoHS compliant.
- Low $R_{DS(on)}$ to Minimize Conduction Losses.
- Ohmic Region Good $R_{DS(on)}$ Ratio.
- Optimized Gate Charge to Minimize Switching Losses.
- 100% UIS and Rg Tested.

### Applications
- Protection Circuits Applications.
- Computer for DC to DC Converters Applications.

## 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 | $T_C$ = 25 °C | $I_D$ | 52 | A |
| | $T_C$ = 100 °C | | 33 | |
| Pulsed Drain Current[1] | | $I_{DM}$ | 82 | |
| Continuous Drain Current[4] | $T_A$ = 25 °C | $I_D$ | 18 | |
| | $T_A$ = 70 °C | | 14 | |
| Avalanche Current | | $I_{AS}$ | 40 | |
| Avalanche Energy | L = 0.03mH | $E_{AS}$ | 24 | mJ |
| Power Dissipation | $T_C$ = 25 °C | $P_D$ | 23 | W |
| | $T_C$ = 100 °C | | 9.4 | |
| Power Dissipation[3] | $T_A$ = 25 °C | $P_D$ | 2.8 | W |
| | $T_A$ = 70 °C | | 1.8 | |
| Operating Junction & Storage Temperature Range | | $T_j$, $T_{stg}$ | -55 to 150 | °C |

## THERMAL RESISTANCE RATINGS

| THERMAL RESISTANCE | | SYMBOL | TYPICAL | MAXIMUM | UNITS |
|---|---|---|---|---|---|
| Junction-to-Ambient[2] | t ≦10s | $R_{\theta JA}$ | | 45 | °C / W |
| Junction-to-Ambient[2] | Steady-State | $R_{\theta JA}$ | | 85 | |
| Junction-to-Case | Steady-State | $R_{\theta JC}$ | | 5.3 | |

[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.

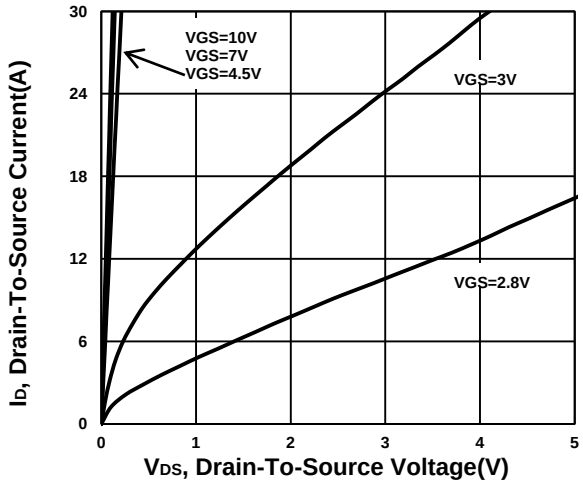
## ELECTRICAL CHARACTERISTICS ($T_J$ = 25 °C, Unless Otherwise Noted)

| 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 | 1.3 | 1.7 | 2.3 | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 30V, $V_{GS}$ = 0V | | | 1 | μA |
| | | $V_{DS}$ = 30V, $V_{GS}$ = 0V, $T_J$ = 55 °C | | | 10 | |
| Drain-Source On-State Resistance[4] | $R_{DS(ON)}$ | $V_{GS}$ = 4.5V, $I_D$ = 13A | | 5.9 | 8.2 | mΩ |
| | | $V_{GS}$ = 10V, $I_D$ = 13A | | 3.6 | 4.8 | |
| Forward Transconductance[4] | $g_{fs}$ | $V_{DS}$ = 5V, $I_D$ = 13A | | 68 | | S |
| **DYNAMIC** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 15V, f = 1MHz | | 1091 | | pF |
| Output Capacitance | $C_{oss}$ | | | 263 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 57 | | |
| Gate Resistance | $R_g$ | $V_{GS}$ = 0V, $V_{DS}$ = 0V, f = 1MHz | | 2.3 | | Ω |
| Total Gate Charge[5] | $Q_g$ $V_{GS}$ = 10V | $V_{DS}$ = 15V , $V_{GS}$ = 10V, $I_D$ = 13A | | 19 | | nC |
| | $Q_g$ $V_{GS}$ = 4.5V | | | 9.6 | | |
| Gate-Source Charge[5] | $Q_{gs}$ | | | 2.7 | | |
| Gate-Drain Charge[5] | $Q_{gd}$ | | | 3.7 | | |
| Turn-On Delay Time[5] | $t_{d(on)}$ | $V_{DS}$ = 15V , $I_D$ ≅ 13A, $V_{GS}$ = 10V, $R_{GEN}$ =6Ω | | 9.7 | | nS |
| Rise Time[5] | $t_r$ | | | 63 | | |
| Turn-Off Delay Time[5] | $t_{d(off)}$ | | | 29 | | |
| Fall Time[5] | $t_f$ | | | 76 | | |

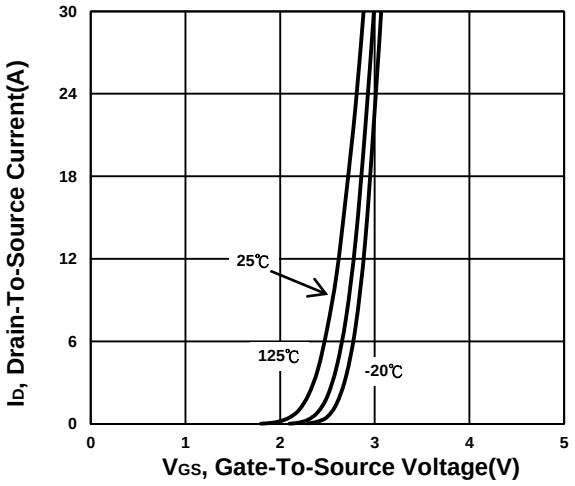
| SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_J$ = 25 °C) | | | | | | |
|---|---|---|---|---|---|---|
| Continuous Current | $I_S$ | | | | 19 | A |
| Forward Voltage[4] | $V_{SD}$ | $I_F$ = 13A, $V_{GS}$ = 0V | | | 1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = 13A, $dI_F/dt$ = 400A / μS | | 20 | | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | | 20 | | nC |

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

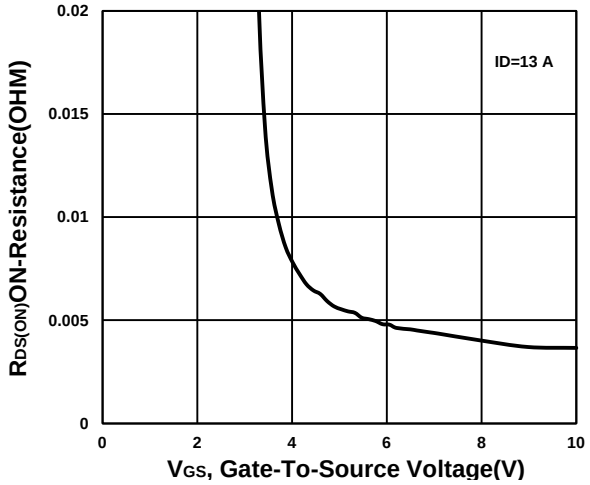
## Output Characteristics



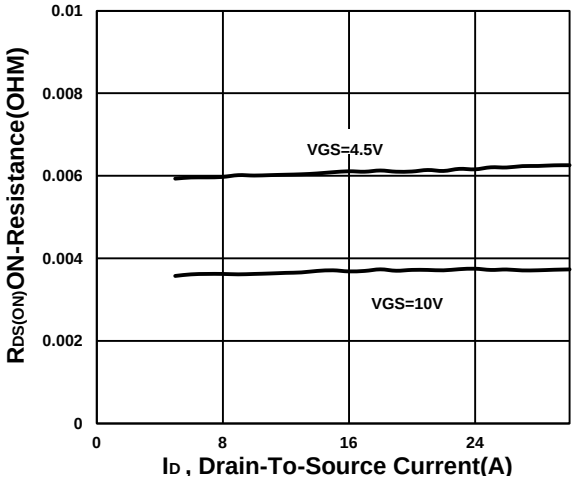

## Transfer Characteristics



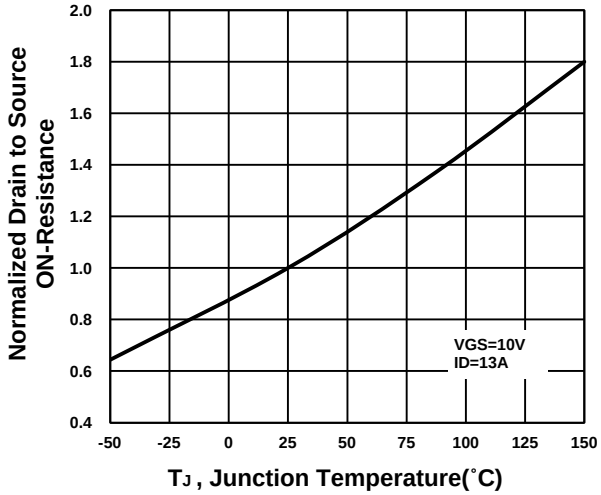

## On-Resistance VS Gate-To-Source Voltage



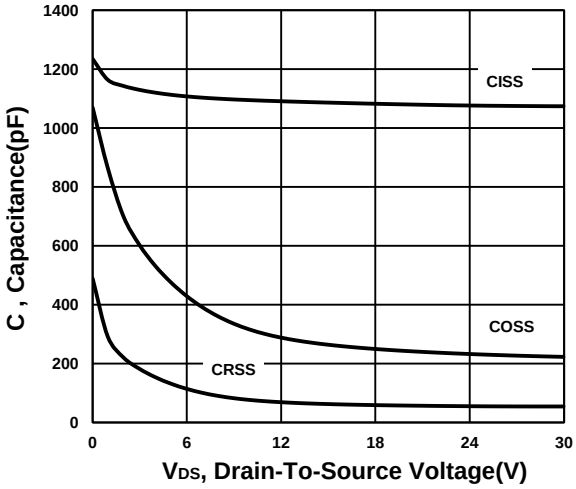

## On-Resistance VS Drain Current



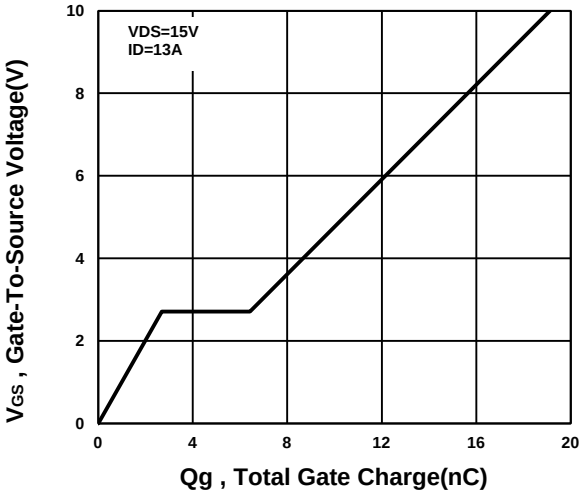

## On-Resistance VS Temperature



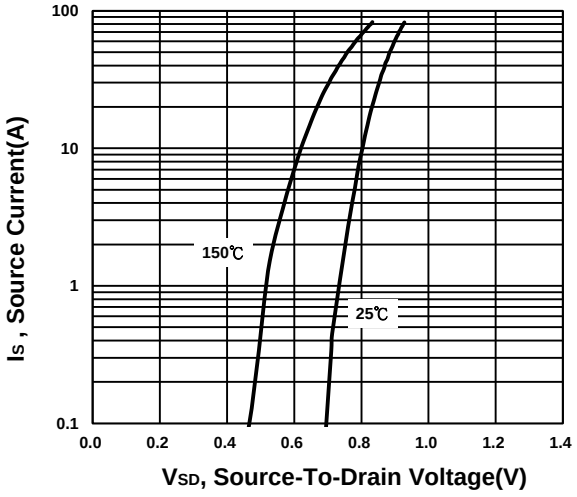

## Capacitance Characteristic



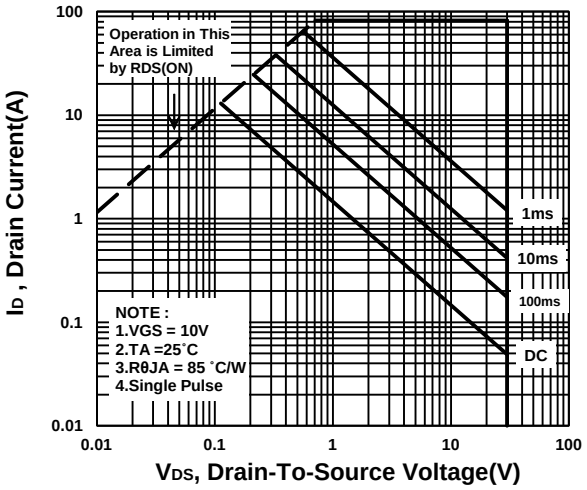
## Gate charge Characteristics



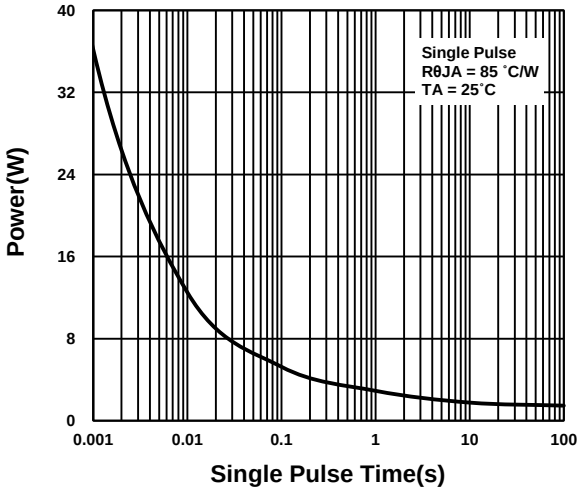

## Source-Drain Diode Forward Voltage



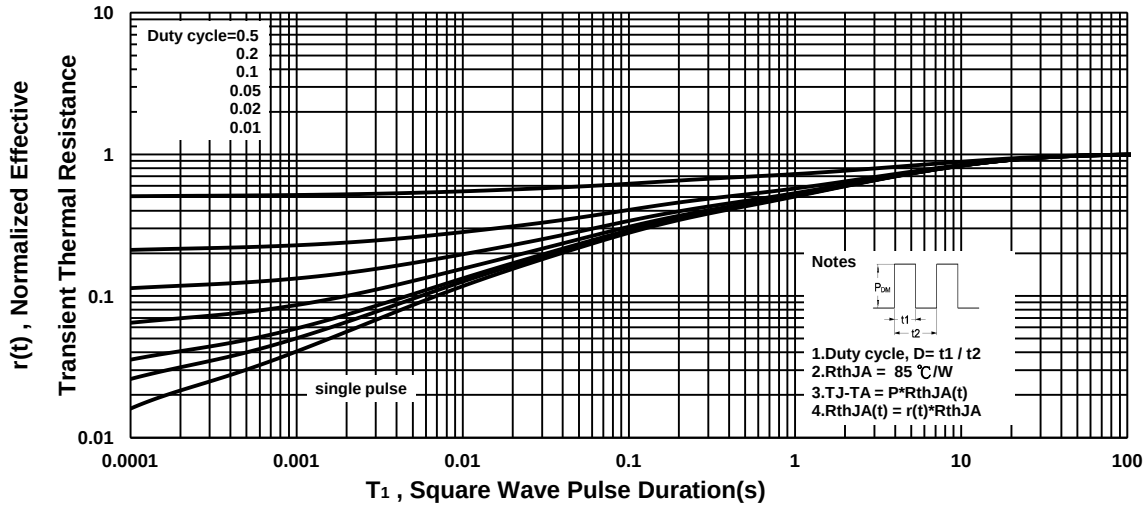

## Safe Operating Area



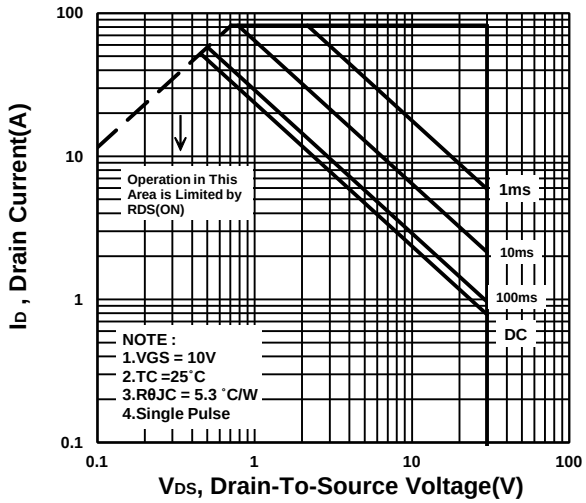

## Single Pulse Maximum Power Dissipation



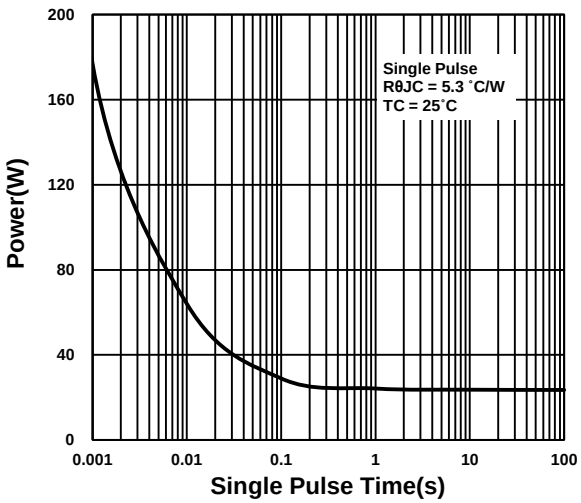

## Transient Thermal Response Curve



## Safe Operating Area




## Single Pulse Maximum Power Dissipation




## Transient Thermal Response Curve