UNIKC Semiconductor

RoHS Compliant

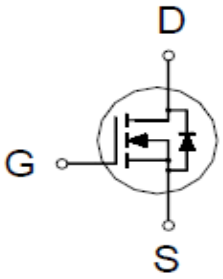
# PE552BA

## N-Channel Enhancement Mode MOSFET

### PRODUCT SUMMARY

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | $I_D$[3] |
|---|---|---|
| 20V | 5mΩ @$V_{GS}$ = 4.5V | 47A |


PDFN 3X3P




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

| PARAMETERS/TEST CONDITIONS | | SYMBOL | LIMITS | UNITS |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 20 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±8 | |
| Continuous Drain Current[3] | $T_c$ = 25 °C | $I_D$ | 47 | A |
| | $T_c$ = 100 °C | | 30 | |
| | $T_A$ = 25 °C | | 15 | |
| | $T_A$ = 70 °C | | 12 | |
| Pulsed Drain Current[1] | | $I_{DM}$ | 70 | |
| Avalanche Current | | $I_{AS}$ | 38.6 | |
| Avalanche Energy | L =0.1mH | $E_{AS}$ | 74.6 | mJ |
| Power Dissipation | $T_C$ = 25 °C | $P_D$ | 19 | W |
| | $T_C$ = 100 °C | | 7 | |
| | $T_A$ = 25 °C | | 2 | |
| | $T_A$ = 70 °C | | 1.3 | |
| 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] | $R_{\theta JA}$ | | 60 | °C / W |
| Junction-to-Case | $R_{\theta JC}$ | | 6.5 | |

[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.

[3]Package limitation current is 22A.

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### 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 | 20 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 0.4 | 0.7 | 0.9 | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±8V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 16V, $V_{GS}$ = 0V | | | 1 | μA |
| | | $V_{DS}$ = 10V, $V_{GS}$ = 0V, $T_J$ = 55 °C | | | 10 | |
| Drain-Source On-State Resistance[1] | $R_{DS(ON)}$ | $V_{GS}$ = 4.5V, $I_D$ = 5A | | 4.1 | 5 | mΩ |
| | | $V_{GS}$ = 2.5V, $I_D$ = 5A | | 4.7 | 5.7 | |
| | | $V_{GS}$ = 1.8V, $I_D$ = 5A | | 6 | 8.2 | |
| Forward Transconductance[1] | $g_{fs}$ | $V_{DS}$ = 5V, $I_D$ = 5A | | 70 | | S |
| **DYNAMIC** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 10V, f = 1MHz | | 4407 | | pF |
| Output Capacitance | $C_{oss}$ | | | 469 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 381 | | |
| Gate Resistance | $R_g$ | $V_{GS}$ = 0V, $V_{DS}$ = 0V, f = 1MHz | | 0.7 | | Ω |
| Total Gate Charge[2] | $Q_g$ | $V_{GS}$=4.5V , $V_{DS}$ = 10V , $I_D$ = 5A | | 49 | | nC |
| Gate-Source Charge[2] | $Q_{gs}$ | | | 6 | | |
| Gate-Drain Charge[2] | $Q_{gd}$ | | | 13 | | |
| Turn-On Delay Time[2] | $t_{d(on)}$ | $V_{DD}$= 4.5V, $I_D$ ≅ 5A, $V_{GEN}$ = 10V, $R_G$= 6Ω | | 20 | | nS |
| Rise Time[2] | $t_r$ | | | 25 | | |
| Turn-Off Delay Time[2] | $t_{d(off)}$ | | | 180 | | |
| Fall Time[2] | $t_f$ | | | 85 | | |
| **SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS ($T_J$ = 25 °C)** | | | | | | |
| Continuous Current[3] | $I_S$ | | | | 14 | A |
| Forward Voltage[1] | $V_{SD}$ | $I_F$ = 5A, $V_{GS}$ = 0V | | | 1.3 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = 5A, $dI_F/dt$ = 100A / μS | | 24 | | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | | 12 | | nC |

[1]Pulse test : Pulse Width ≤ 300 μsec, Duty Cycle ≤ 2%.

[2]Independent of operating temperature.

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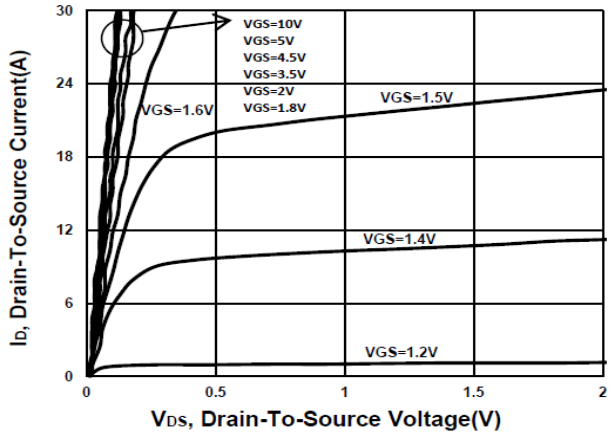
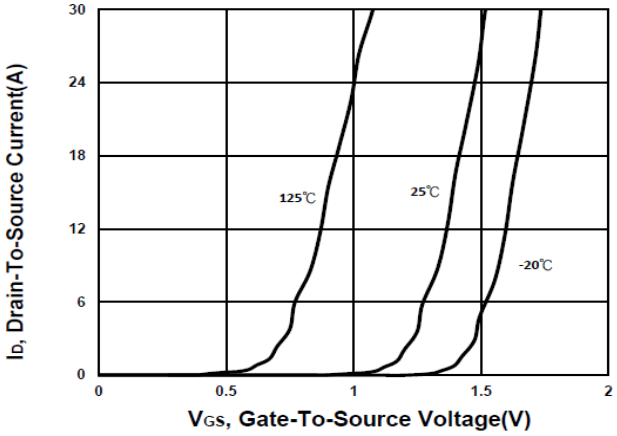
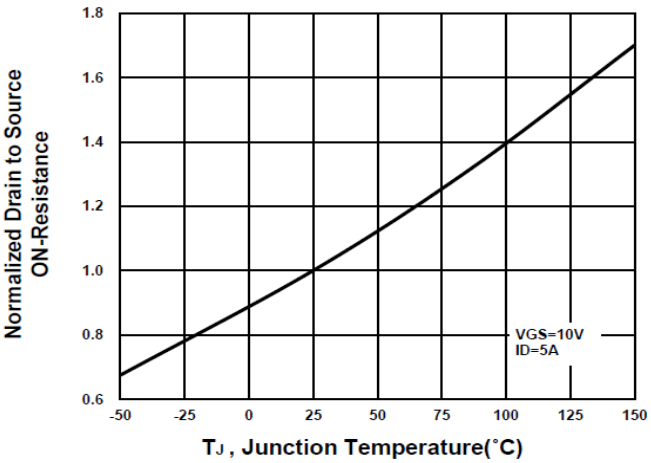
### Output Characteristics



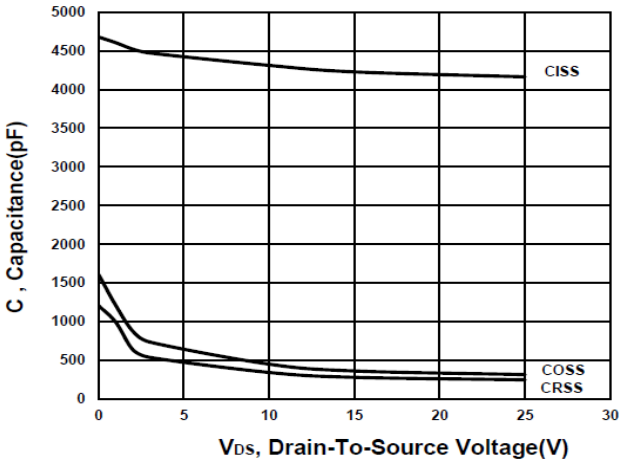

### Transfer Characteristics



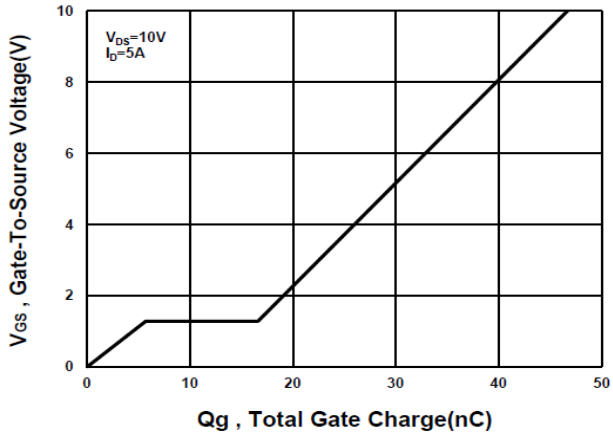

### On-Resistance VS Temperature



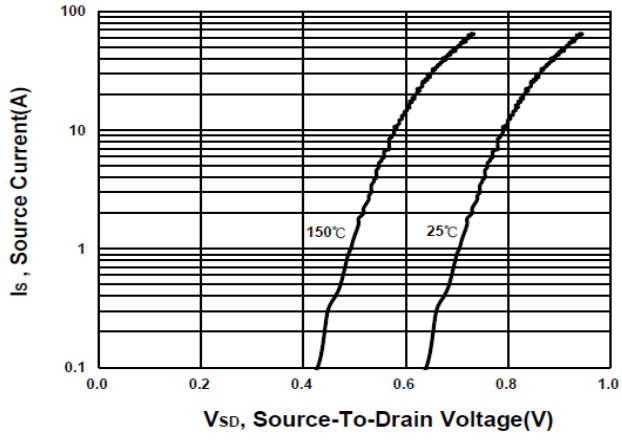

### Capacitance Characteristic




### Gate charge Characteristics




### Source-Drain Diode Forward Voltage



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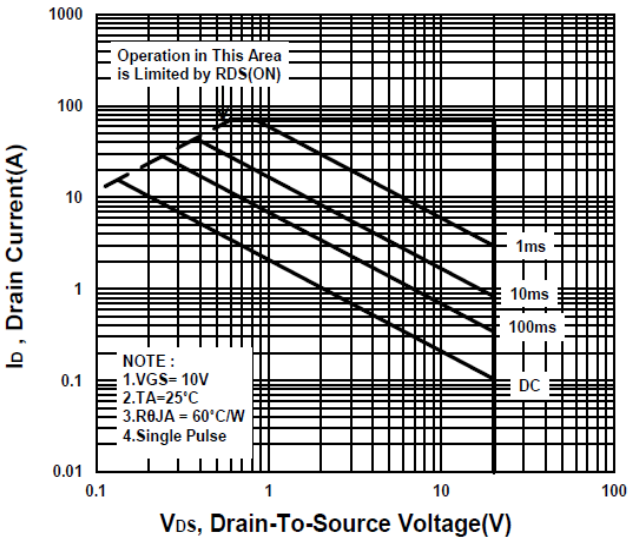
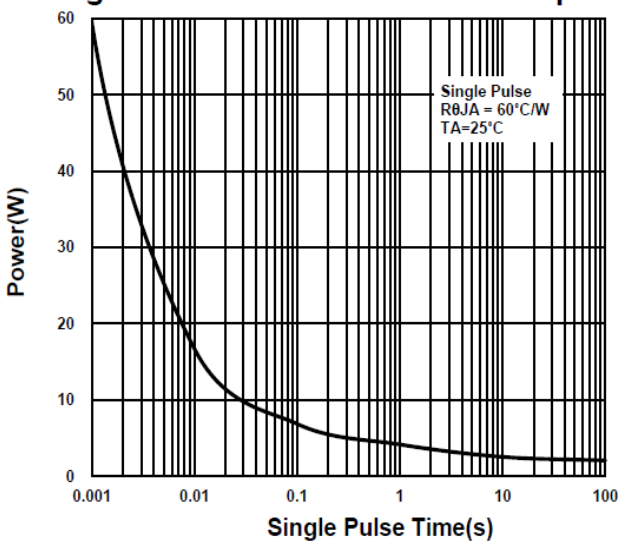
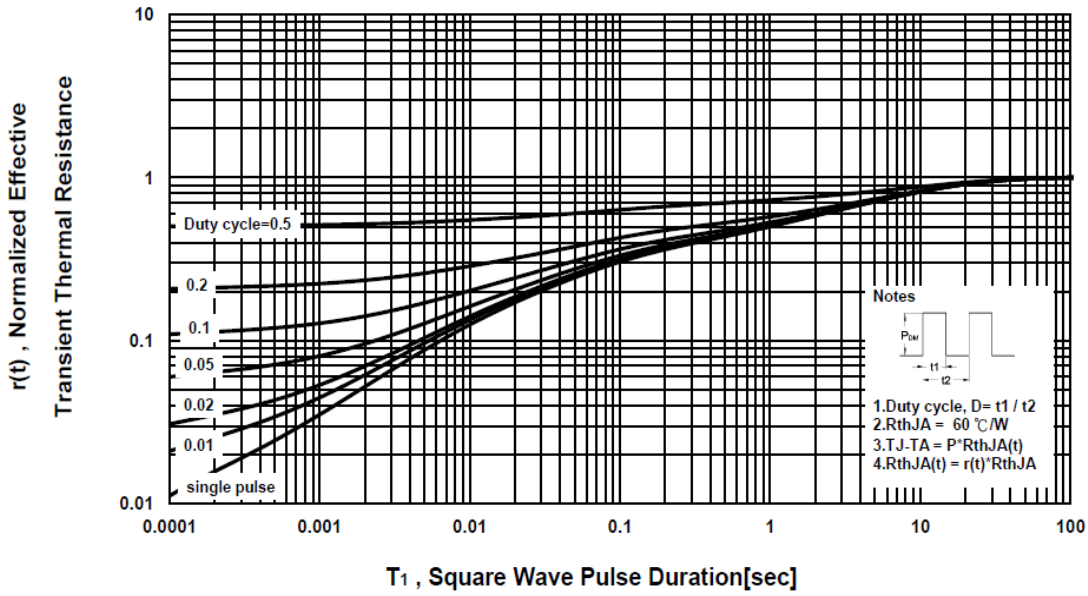
### Safe Operating Area




### Single Pulse Maximum Power Dissipation




### Transient Thermal Response Curve



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### Package Dimension

**PDFN 3x3P MECHANICAL DATA**

| Dimension | mm | | | Dimension | mm | | |
|---|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | | Min. | Typ. | Max. |
| A | 3 | | 3.6 | I | 0.7 | | 1.12 |
| B | 2.88 | | 3.2 | J | 0.1 | | 0.33 |
| C | 2.9 | | 3.2 | K | 0.6 | | |
| D | 1.98 | | 2.69 | L | 0° | 10° | 12° |
| E | 3 | | 3.6 | M | 0.14 | | 0.41 |
| F | 0 | | 0.455 | N | 0.6 | | 0.7 |
| G | 1.47 | | 2.2 | O | 0.12 | | 0.36 |
| H | 0.15 | | 0.56 | P | 0 | | 0.2 |