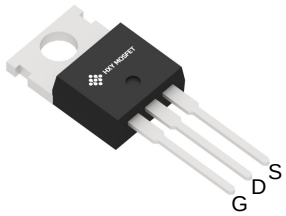
# PSMN4R8-100PSEQ

N-SGT Enhancement Mode MOSFET

## General Description

The PSMN4R8-100PSEQ use advanced SGT MOSFET technology toprovide low RDS(ON), low gate charge, fast switching and excellent avalanche characteristics.

This device is specially designed to get better ruggedness.

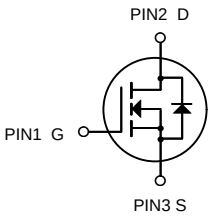



**TO-220C**

## General Features

$V_{DS}$ = 100V $I_D$ = 120A

$R_{DS(ON)}$ < 5.0mΩ @ $V_{GS}$=10V




N-Channel MOSFET

## Applications

Consumer electronic power supply Motor control

Synchronous-rectification Isolated DC

Synchronous-rectification applications

## Package Marking and Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|---|---|---|---|
| PSMN4R8-100PSEQ | TO-220C | HXY MOSFET | 50 |

## Absolute Maximum Ratings at $T_j$=25°C unless otherwise noted

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain source voltage | | $V_{DS}$ | 100 | V |
| Gate source voltage | | $V_{GS}$ | ±20 | V |
| Continuous drain current[1] | $T_C$=25°C | $I_D$ | 120 | A |
| Continuous drain current[1] | $T_C$=100°C | $I_D$ | 81 | A |
| Pulsed drain current[2] | | $I_{DM}$ | 512 | A |
| Power dissipation[4] | | $P_D$ | 178 | W |
| Single pulsed avalanche energy[3] | | EAS | 486 | mJ |
| Operation and storage temperature | | Tstg，Tj | -55 to 150 | °C |
| Thermal resistance, junction-case | | $R_{\theta JC}$ | 0.8 | °C/W |
| Thermal resistance, junction-ambient[4] | | $R_{\theta JA}$ | 56 | °C/W |

## Electrical Characteristics（$T_J$ = 25°C, unless otherwise noted）

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 100 | --- | --- | V |
| $\triangle BV_{DSS}/\triangle T_J$ | $BV_{DSS}$ Temperature Coefficient | Reference to 25℃ , $I_D$=1mA | --- | --- | --- | V/℃ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=10V , $I_D$=20A | --- | 4.1 | 5.0 | mΩ |
| | | $V_{GS}$=4.5V , $I_D$=20A | --- | --- | --- | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 2.0 | 3.0 | 4.0 | V |
| $\triangle V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | --- | --- | mV/℃ |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=80V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=80V, $V_{GS}$=0V , $T_J$=100℃ | --- | --- | 100 | |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| gfs | Forward Transconductance | $V_{DS}$=5V , $I_D$=20A | --- | 35 | --- | S |
| $R_g$ | Gate Resistance | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 1.6 | --- | Ω |
| $Q_g$ | Total Gate Charge | $V_{DS}$=50V , $V_{GS}$=10V , $I_D$=20A | --- | 69 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 24 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 18.5 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | VGS=10V, VDD=50V, RG=3Ω, ID=20A | --- | 18.0 | --- | ns |
| $T_r$ | Rise Time | | --- | 23 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 37 | --- | |
| $T_f$ | Fall Time | | --- | 15.7 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=50V , $V_{GS}$=0V , f=1MHz | --- | 4102 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 592 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 19.8 | --- | |

## Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current[1,5] | $V_G$=$V_D$=0V , Force Current | --- | --- | 120 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=1A , $T_J$=25℃ | --- | --- | 1.2 | V |

Note :

1.The data tested by surface mounted on a 1 inch$^2$ FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The EAS data shows Max. rating . The test condition is TJ = 25°C, L = 3.0mH, IAS = 18A, VGS = 10V, VDD = 50V; 100% test at L = 0.1mH, IAS = 67A.

4.The power dissipation is limited by 150℃ junction temperature

5.The data is theoretically the same as $I_D$ and $I_{DM}$ , in real applications , should be limited by total power dissipation.

## Typical Characteristics

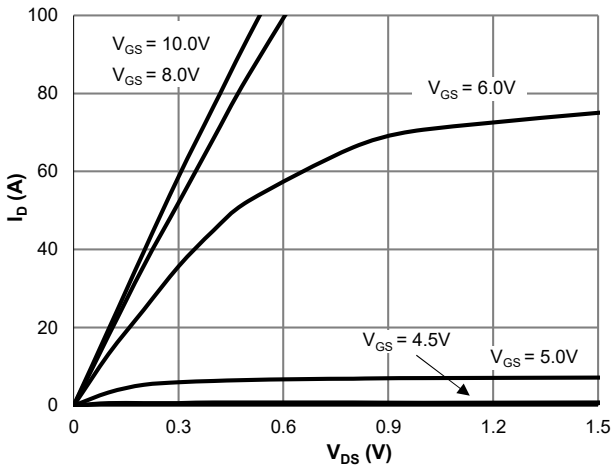



**Figure 1: Saturation Characteristics**

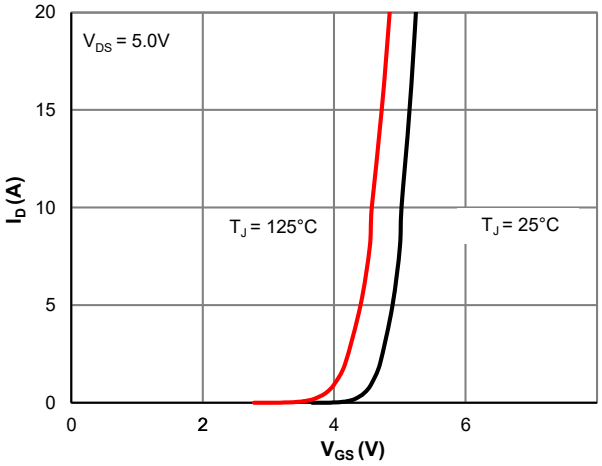



**Figure 2: Transfer Characteristics**

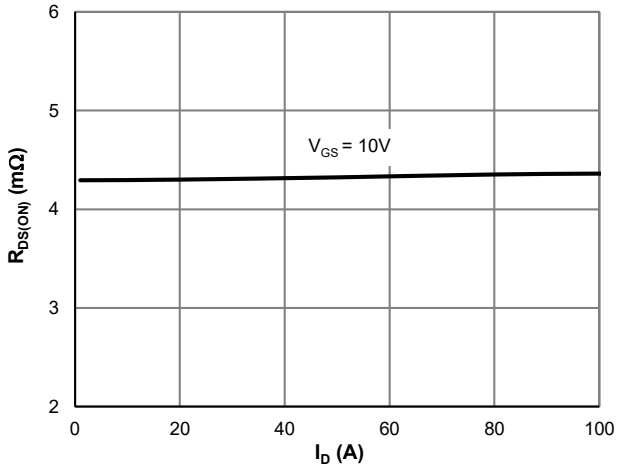



**Figure 3: $R_{DS(ON)}$ vs. Drain Current**

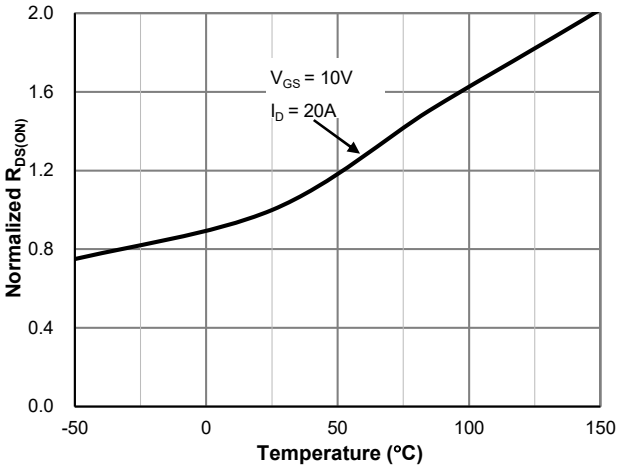



**Figure 4: $R_{DS(ON)}$ vs. Junction Temperature**

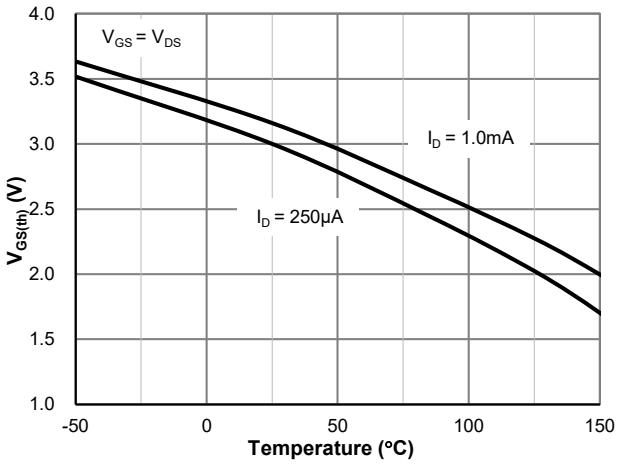



**Figure 5: $V_{GS(th)}$ vs. Junction Temperature**

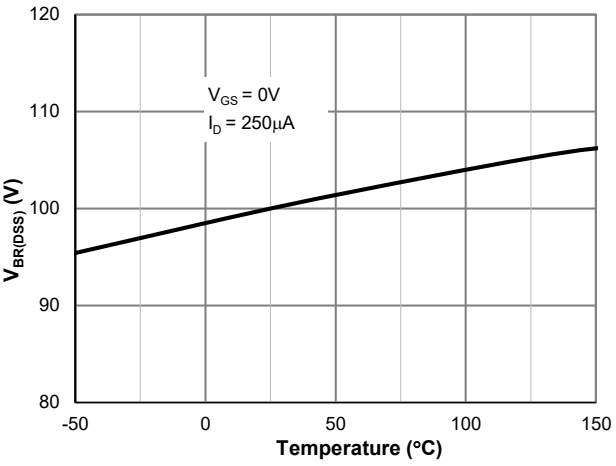



**Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature**

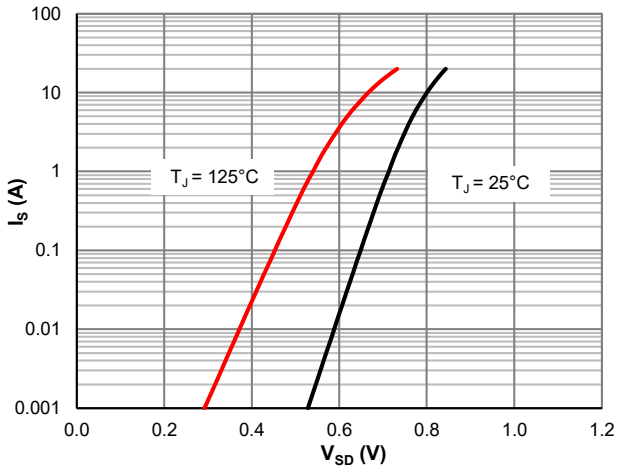



**Figure 7: Body-Diode Characteristics**

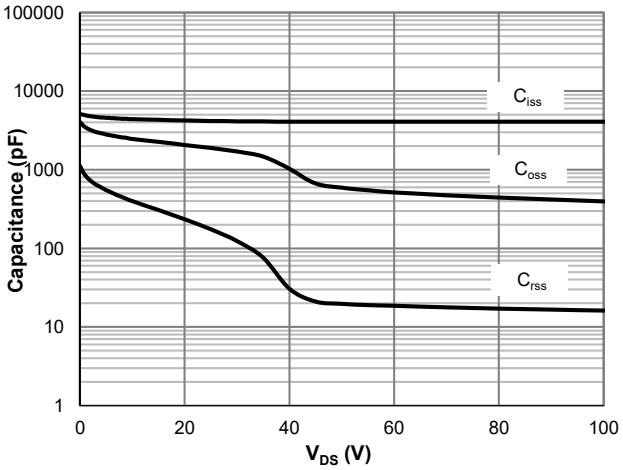



**Figure 8: Capacitance Characteristics**

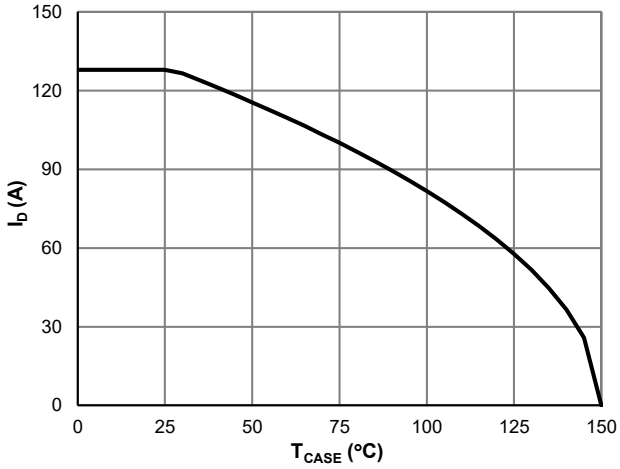



**Figure 9: Current De-rating**

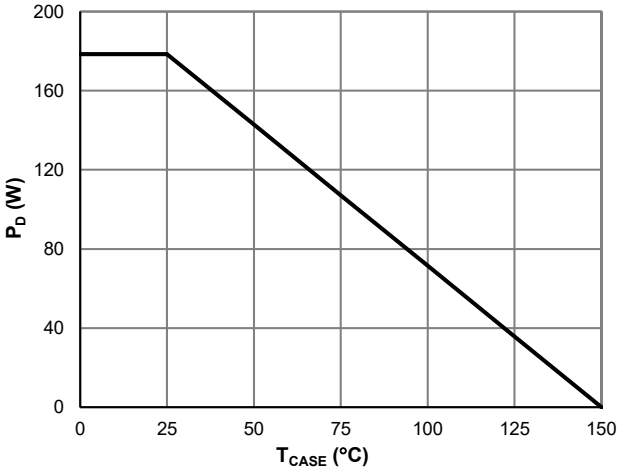



**Figure 10: Power De-rating**

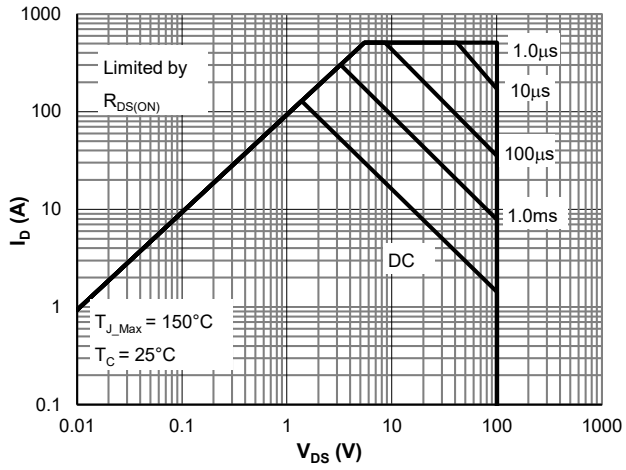



**Figure 11: Maximum Safe Operating Area**

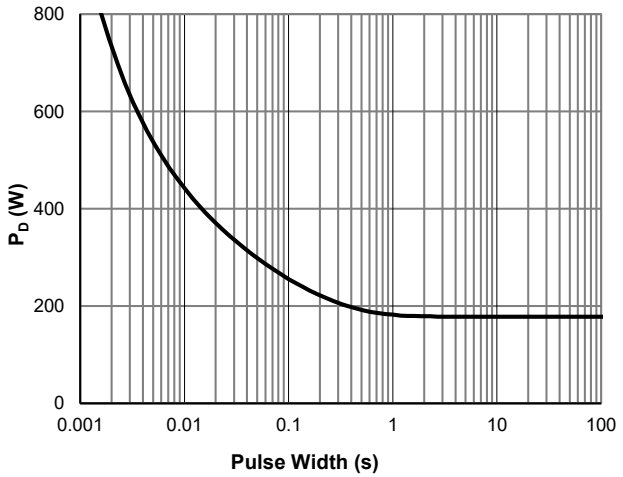



**Figure 12: Single Pulse Power Rating, Junction-to-Case**

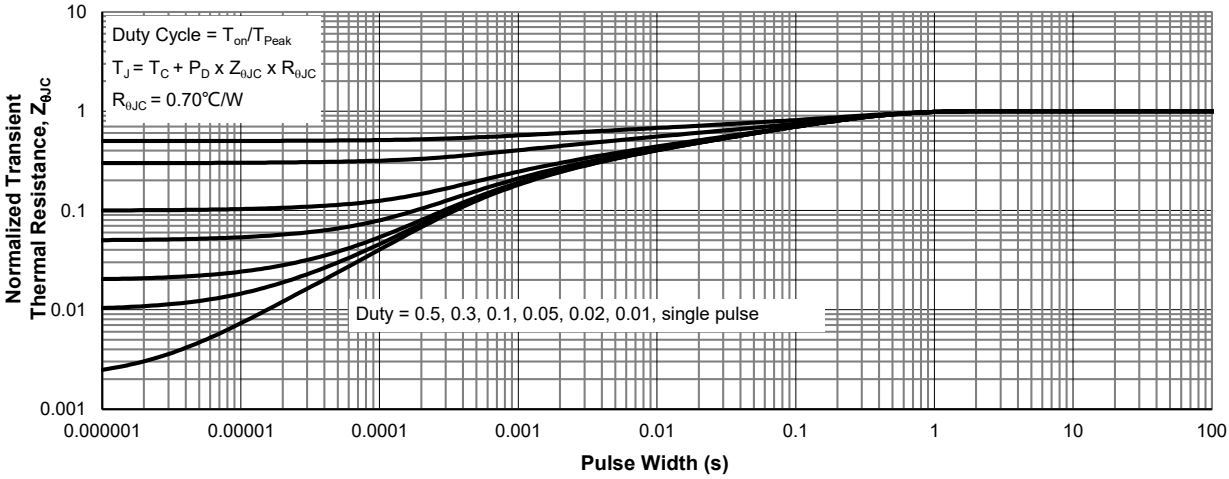
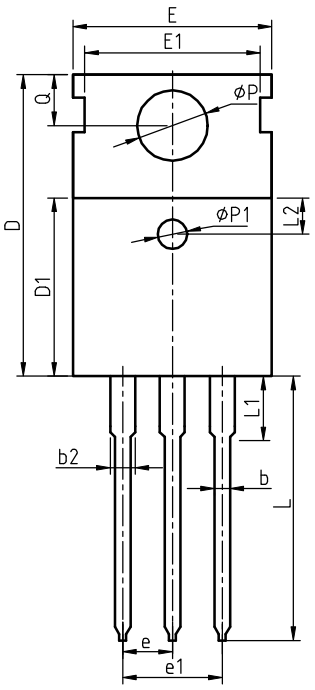
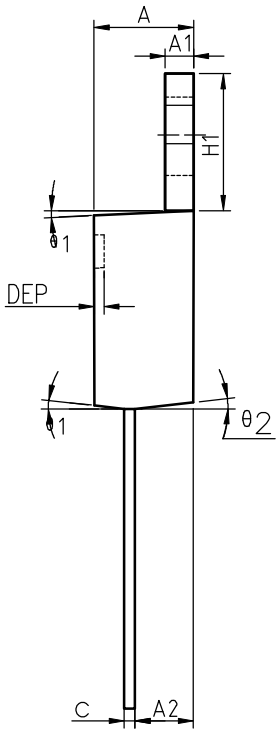


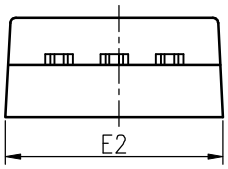

**Figure 13: Normalized Maximum Transient Thermal Impedance**

## Package Information

### TO-220C




COMMON DIMENSIONS

| SYMBOL | MIN | NOM | MAX | MIN | NOM | MAX |
|---|---|---|---|---|---|---|
| A | 4.40 | 4.57 | 4.70 | 0.173 | 0.180 | 0.185 |
| A1 | 1.27 | 1.30 | 1.33 | 0.050 | 0.051 | 0.052 |
| A2 | 2.35 | 2.40 | 2.50 | 0.093 | 0.094 | 0.098 |
| b | 0.77 | 0.80 | 0.90 | 0.030 | 0.031 | 0.035 |
| b2 | 1.17 | 1.27 | 1.36 | 0.046 | 0.050 | 0.054 |
| c | 0.48 | 0.50 | 0.56 | 0.019 | 0.020 | 0.022 |
| D | 15.40 | 15.60 | 15.80 | 0.606 | 0.614 | 0.622 |
| D1 | 9.00 | 9.10 | 9.20 | 0.354 | 0.358 | 0.362 |
| DEP | 0.05 | 0.10 | 0.20 | 0.002 | 0.004 | 0.008 |
| E | 9.80 | 10.00 | 10.20 | 0.386 | 0.394 | 0.402 |
| E1 | - | 8.70 | - | - | 0.343 | - |
| E2 | 9.80 | 10.00 | 10.20 | 0.386 | 0.394 | 0.402 |
| e | | 2.54 | BSC | | 0.100 | BSC |
| e1 | | 5.08 | BSC | | 0.200 | BSC |
| H1 | 6.40 | 6.50 | 6.60 | 0.252 | 0.256 | 0.260 |
| L | 12.75 | 13.50 | 13.65 | 0.502 | 0.531 | 0.537 |
| L1 | - | 3.10 | 3.30 | - | 0.122 | 0.130 |
| L2 | | 2.50 | REF | | 0.098 | REF |
| P | 3.50 | 3.60 | 3.63 | 0.138 | 0.142 | 0.143 |
| P1 | 3.50 | 3.60 | 3.63 | 0.138 | 0.142 | 0.143 |
| Q | 2.73 | 2.80 | 2.87 | 0.107 | 0.110 | 0.113 |
| θ1 | 5° | 7° | 9° | 5° | 7° | 9° |
| θ2 | 1° | 3° | 5° | 1° | 3° | 5° |
| θ3 | 1° | 3° | 5° | 1° | 3° | 5° |

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