



# NXH006P120M3F2PTHG

## PIN FUNCTION DESCRIPTION

| Pin | Name | Description                          |
|-----|------|--------------------------------------|
| 1   | S1   | Q1 Kelvin Emitter (High side switch) |
| 2   | G1   |                                      |

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## MAXIMUM RATINGS

| Rating   | Symbol       | Value   | Unit               |
|--|--------------|---------|--------------------|
| SiC MOSFET   |              |         |                    |
| Drain-Source Voltage   | $V_{DSS}$    | 1200    | V                  |
| Gate-Source Voltage  | $V_{GS}$     | +22/-10 | V                  |
| Continuous Drain Current @ $T_c = 80\text{ }^{\circ}\text{C}$ ( $T_J = 175\text{ }^{\circ}\text{C}$ )  | $I_D$        | 191     | A                  |
| Pulsed Drain Current ( $T_J = 175\text{ }^{\circ}\text{C}$ )   | $I_{Dpulse}$ | 382     | A                  |
| Maximum Power Dissipation @ $T_c = 80\text{ }^{\circ}\text{C}$ ( $T_J = 175\text{ }^{\circ}\text{C}$ ) | $P_{tot}$    | 556     | W                  |
| Minimum Operating Junction Temperature   | $T_{JMIN}$   | -40     | $^{\circ}\text{C}$ |
| Maximum Operating Junction Temperature   | $T_{JMAX}$   | 175     | $^{\circ}\text{C}$ |

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ELECTRICAL CHARACTERISTICS ( $T_J = 25\text{ }^\circ\text{C}$  unless otherwise noted) (continued)

| Parameter                         | Test Conditions   | Symbol         | Min | Typ   | Max | Unit |
|-----------------------------------|---|----------------|-----|-------|-----|------|
| <b>SiC MOSFET CHARACTERISTICS</b> |   |                |     |       |     |      |
| Total Gate Charge                 | $V_{DS} = 800\text{ V}, V_{GS} = -5/20\text{ V}, I_D = 100\text{ A}$  | $Q_{G(TOTAL)}$ | –   | 622   | –   | nC   |
| Gate–Source Charge                |   | $Q_{GS}$       | –   | 109   | –   | nC   |
| Gate–Drain Charge                 |   | $Q_{GD}$       | –   | 120   | –   | nC   |
| Turn-on Delay Time                | $T_J = 25\text{ }^\circ\text{C}$<br>$V_{DS} = 600\text{ V}, I_D = 100\text{ A}$<br>$V_{GS} = -5\text{ V} / 18\text{ V}, R_G = 1$  | $t_{d(on)}$    | –   | 40.53 | –   | ns   |
| Rise Time                         |   | $t_r$          | –   | 13.61 | –   |      |
| Turn-off Delay Time               |   | $t_{d(off)}$   | –   | 109   | –   |      |
| Fall Time                         |   | $t_f$          | –   | 8.54  | –   |      |
| Turn-on Switching Loss per Pulse  |   | $E_{ON}$       | –   | 0.89  | –   | mJ   |
| Turn-off Switching Loss per Pulse |   | $E_{OFF}$      | –   | 0.44  | –   |      |
| Turn-on Delay Time                | $T_J = 150\text{ }^\circ\text{C}$<br>$V_{DS} = 600\text{ V}, I_D = 100\text{ A}$<br>$V_{GS} = -5\text{ V} / 18\text{ V}, R_G = 1$ | $t_{d(on)}$    | –   | 38.21 | –   | ns   |
| Rise Time                         |   | t              |     |       |     |      |

# NXH006P120M3F2PTHG

## TYPICAL CHARACTERISTIC (M1/M2 SiC MOSFET CHARACTERISTIC)

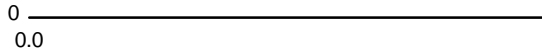


Figure 2. MOSFET Typical Output Characteristic



Figure 3. MOSFET Typical Output Characteristic

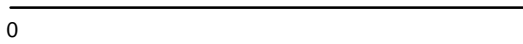


Figure 4. MOSFET Typical Transfer Characteristic



Figure 5. Body Diode Forward Characteristic



Figure 6. MOSFET R

# NXH006P120M3F2PTHG

## TYPICAL CHARACTERISTIC (M1/M2 SiC MOSFET CHARACTERISTIC)

T

Figure 8. MOSFET  $R_{DS(ON)}$  vs.  $T_j$

Figure 9. Gate-to-Source Voltage vs. Total Charge

Figure 10. Capacitance vs. Drain-to-Source Voltage

Figure 11. MOSFET Junction-to-Case Transient Thermal Impedance

NXH006P120M3F2PTHG

# NXH006P120M3F2PTHG

## TYPICAL CHARACTERISTIC (M1/M1 SiC MOSFET SWITCHING CHARACTERISTIC)

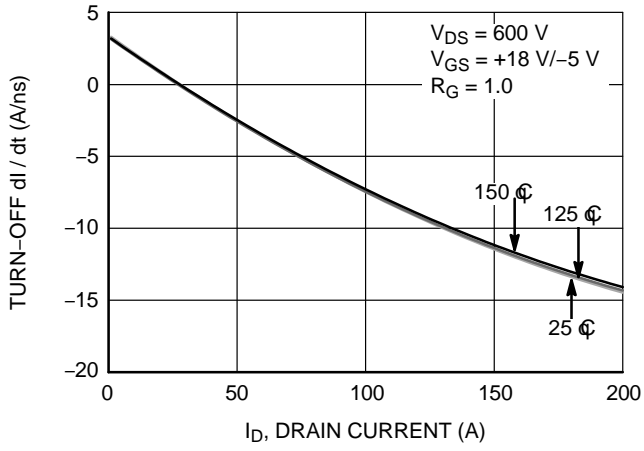


Figure 18. di/dt OFF vs.  $I_D$

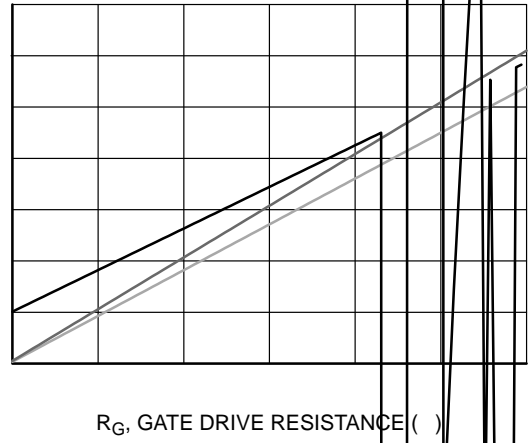


Figure 19. di/dt OFF vs.  $R_G$

TURN-ON dV/dt (V/ns)

Figure 20. dv/dt ON vs.  $I_D$

Figure 21. dv/dt ON vs.  $R_G$

TURN-OFF dV/dt (V/ns)

Figure 22. dv/dt OFF vs.  $I_D$  vs.  $I_D$

Figure 23. dv/dt OFF vs.  $I_D$  vs.  $R_G$



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## TYPICAL CHARACTERISTIC (M1/M1 SiC MOSFET SWITCHING CHARACTERISTIC)

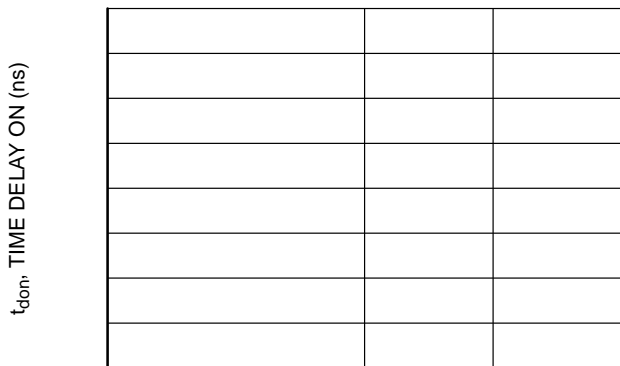


Figure 24. Typical Switching Loss  $t_{don}$  vs.  $I_D$

Figure 25. Typical Switching Loss  $t_{don}$  vs.  $R_G$



Figure 26. Typical Switching Loss  $t_{doff}$  vs.  $I_D$



Figure 27. Typical Switching Loss  $t_{doff}$  vs.  $R_G$




Figure 28. Typical Switching Loss  $t_r$  vs.  $I_D$



Figure 29. Typical Switching Loss  $t_r$  vs.  $R_G$







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