

PM011N020SG

20V 6A 11.3mΩ Si Single N-ch Enhancement Mode Power MOSFET with Normal Diode

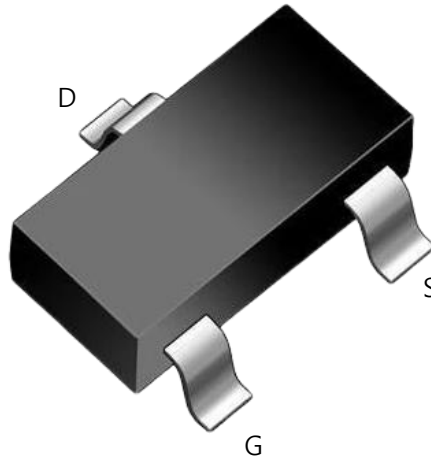
Features

Si Single N-ch Enhancement Mode Power MOSFET

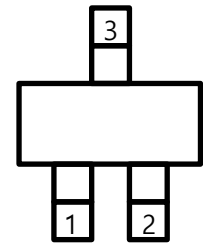
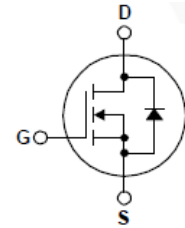
- Rated to 20V at 6Amps @ $T_j = 25^\circ\text{C}$
- Max $R_{DS(on)} = 11.3\text{ m}\Omega$
- Typ $R_{DS(on)} = 9.5\text{ m}\Omega$
- Gate Charge(Typ. $Q_g=12.5\text{ nC}$)
- 100% Avalanche Tested

Application

- DC-DC Converters
- Power switch



PKG type : SOT-23



Pin assignment

Description

The PM011N020SG uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

Absolute Maximum Ratings

| Symbol | Parameter | Test Condition | Value | Unit |
|------------|--------------------------------|---|------------|------------------|
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 20 | V |
| I_D | Drain Current | $T_c=25^\circ\text{C}$ | 6 | A |
| I_{DM} | Pulsed Drain Current | Pulse width limited by junction temperature | 24 | A |
| V_{GS} | Gate-Source Voltage | | ± 12 | V |
| P_d | Power Dissipation | $T_c=25^\circ\text{C}$ | 1 | W |
| T_j | Operating Junction Temperature | | 150 | $^\circ\text{C}$ |
| T_{stg} | Storage Temperature | | -55 to 150 | $^\circ\text{C}$ |



Package Marking and Ordering Information

| Device Marking | Device | Package | Packing Method | Tape width | Quantity |
|----------------|-----------|---------|----------------|------------|----------|
| PM011N020SG | PM011N020 | SOT-23 | - | - | - |

Electrical Characteristics of Si MOSFET

| Symbol | Parameter | Test Condition | Numerical | | | Unit |
|--------------|---|---|-----------|------|-----------|------------|
| | | | Min | Typ. | Max. | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS} = 0V, I_D = 250\mu A, T_J = 25^\circ C$ | 20 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = 20V, V_{GS} = 0V$ | - | - | 1 | nA |
| I_{GSS} | Gate-Source Leakage Current | $V_{GS} = \pm 12V, V_{DS} = 0V$ | - | - | ± 100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 0.5 | 0.7 | 0.9 | V |
| $R_{DS(ON)}$ | Static Drain-Source on state resistance | $V_{GS} = 4.5V, I_D = 3A$ | - | 9.5 | 11.3 | m Ω |
| g_{FS} | Forward Transconductance | $V_{DS} = 5V, I_D = 3A$ | - | 24 | - | S |
| $t_{d(on)}$ | Turn-on Delay time | $V_{DD} = 4.5V, I_D = 3A, R_G = 3\Omega$ | - | 2.7 | - | ns |
| T_r | Turn-on Rise time | | - | 3 | - | |
| $t_{d(off)}$ | Turn-off Delay time | | - | 37 | - | |
| T_f | Turn-off Fall time | | - | 7 | - | |



Electrical Characteristics of Si MOSFET

| Symbol | Parameter | Test Condition | Numerical | | Unit |
|---------------------|---|---|-----------|------|-----------------------------|
| | | | Typ. | Max. | |
| $R_{\theta JA}$ | Thermal resistance, Junction to Ambient | | 120 | - | $^{\circ}\text{C}/\text{W}$ |
| C_{iss} | Input capacitance | $V_{DS} = 10\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$ | 1151 | - | pF |
| C_{oss} | Output capacitance | | 160 | - | |
| C_{rss} | Reverse transfer capacitance | | 152 | - | |
| $Q_{g(\text{tot})}$ | Total gate charge at 10V | $V_{DD} = 4.5\text{V}, I_D = 6\text{A}$ $V_{GS(\text{on})} = 10\text{V}$ | 12.5 | - | nC |
| Q_{gs} | Gate to source gate charge | | 1.2 | - | |
| Q_{gd} | Gate to drain "Miller" charge | | 2.7 | - | |

Electrical Characteristics of Si Diode

| Symbol | Parameter | Test Condition | Numerical | | Unit |
|----------|--|--|-----------|------|------|
| | | | Typ. | Max. | |
| I_S | Maximum continuous drain to source diode forward current | | - | 6 | A |
| I_{SM} | Maximum pulsed drain to source diode forward current | | - | 24 | A |
| V_{SD} | Drain to source diode forward voltage | $I_{SD} = 3\text{A}, V_{GS} = 0\text{V}$ | - | 1.2 | V |

Typical Characteristics

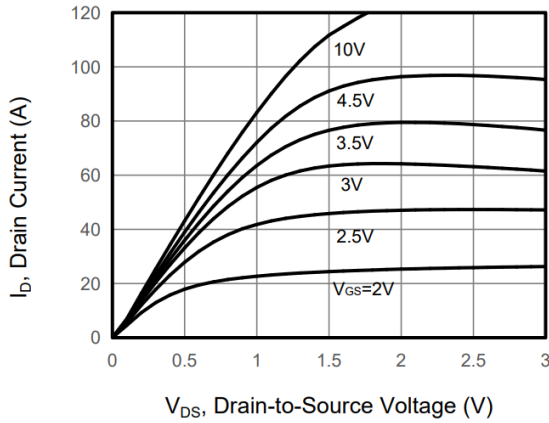


Figure 1. Output Characteristics

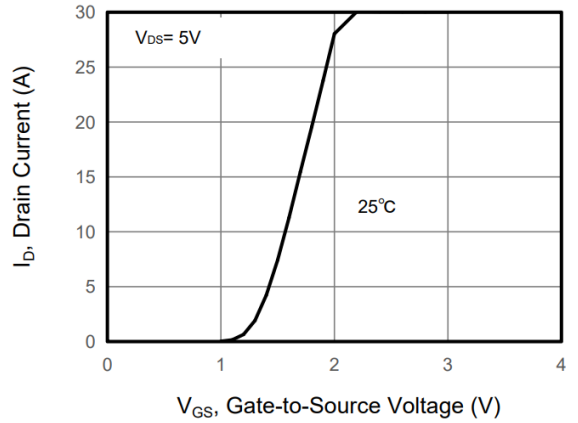


Figure 2. Transfer Characteristics

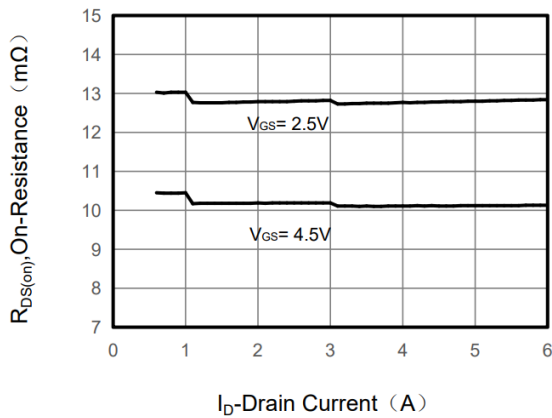


Figure 3. Drain to Source On Resistance

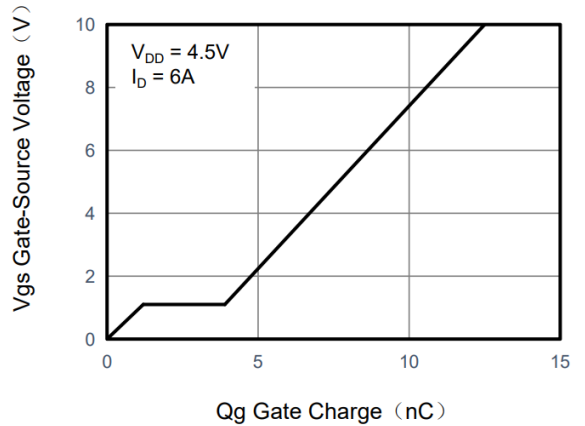


Figure 4. Gate Charge

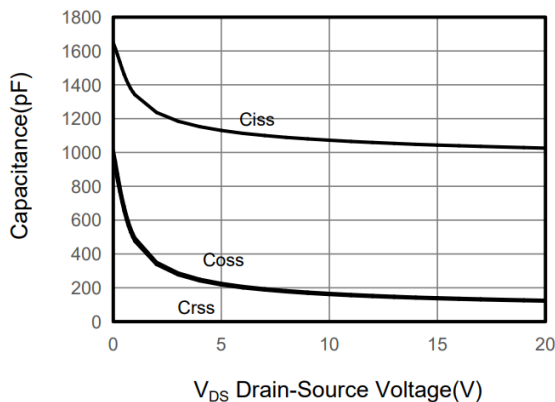


Figure 5. Capacitance Characteristics

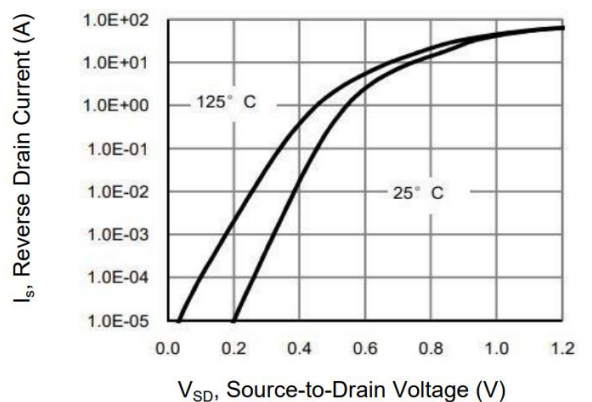


Figure 6. Source to Drain Diode Forward

Typical Characteristics

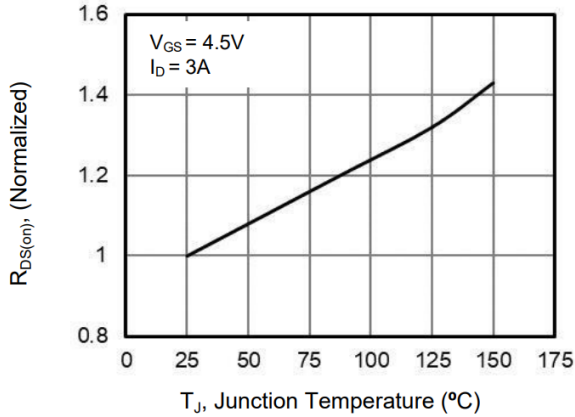


Figure 7. Drain to Source On-Resistance

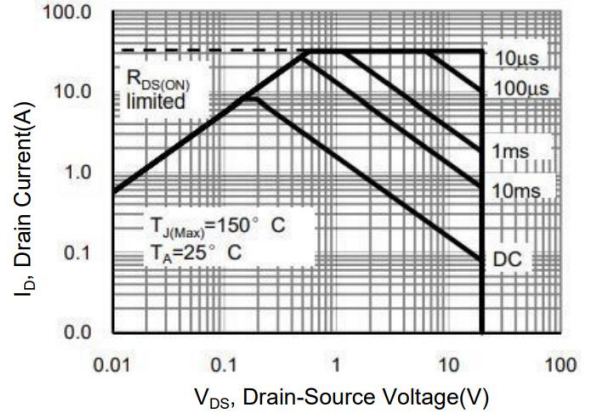


Figure 8. Safe Operation Area

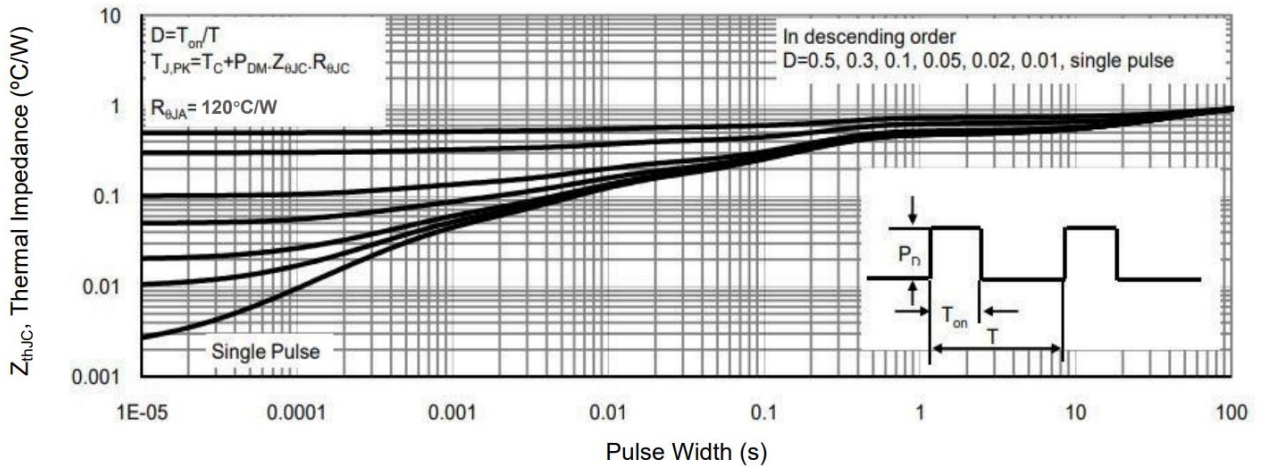
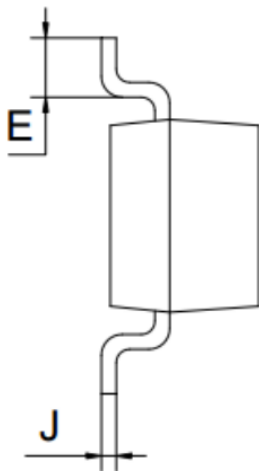
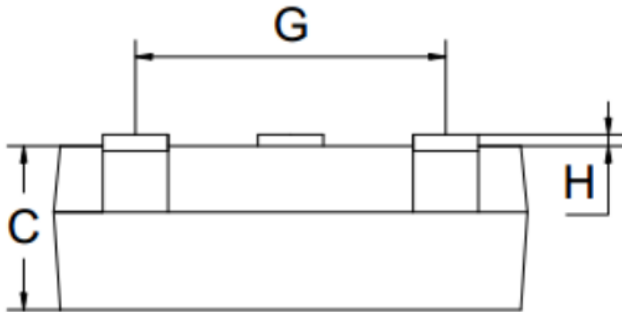
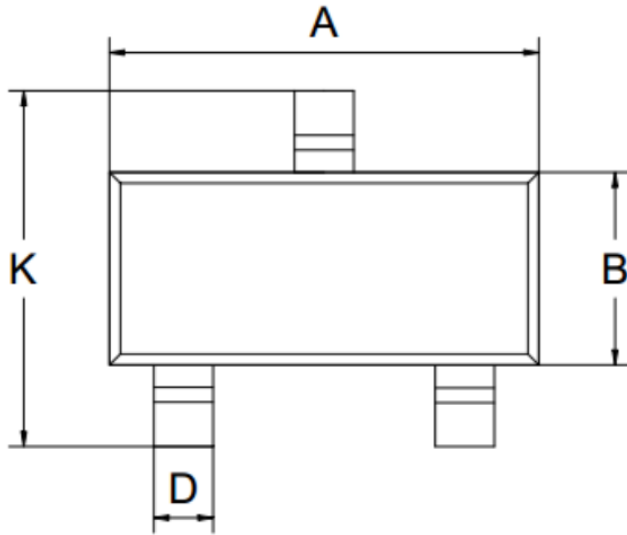


Figure 9. Normalized Maximum Transient Thermal Impedance



Package Outline

Unit : mm



| SYMBOL | DIMENSIONS | | |
|--------|------------|-------|-------|
| | MIN | NOM | MAX |
| A | 2.80 | 2.90 | 3.00 |
| B | 1.50 | 1.60 | 1.70 |
| C | 1.00 | 1.10 | 1.20 |
| D | 0.30 | 0.40 | 0.50 |
| E | 0.25 | 0.40 | 0.55 |
| G | 1.90 | | |
| H | 0.00 | - | 0.10 |
| J | 0.047 | 0.127 | 0.207 |
| K | 2.60 | 2.80 | 3.00 |