

PM023P060HG

-60V -42A 23mΩ Si Single P-ch Enhancement Mode MOSFET with Normal Diode

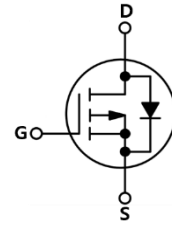
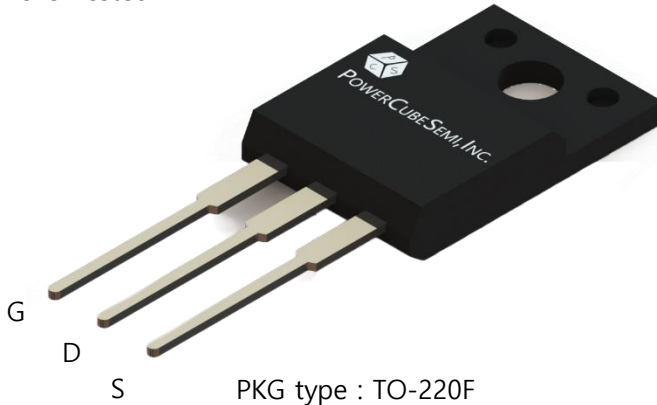
Features

Si P-Ch Enhancement Mode Power MOSFET

- Rated to -60V at -42Amps @ $T_j = 25^\circ\text{C}$
- Max $R_{DS(on)} = 23\text{ m}\Omega$
- Typ $R_{DS(on)} = 18\text{ m}\Omega$
- Gate Charge(Typ. $Q_g=62\text{ nC}$)
- 100% Avalanche Tested

Application

- Power switch
- DC/DC converters



Description

The PM023P060HG uses advanced trench technology to provide excellent $R_{DS(ON)}$, 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 | $V_{GS}=0V, I_D=-250\mu A$ | -60 | V |
| I_D | Drain current | $T_c=25^\circ\text{C}$ | -42 | A |
| I_{DM} | Drain current | Pulse width limited by junction temperature | -168 | A |
| V_{GS} | Gate-source voltage | | ± 20 | V |
| E_{AS} | Single pulsed avalanche energy | $V_{GS}=-10V, R_G=25\Omega$ $V_{DD}=-50V, L=0.5mH$ | 81 | mJ |
| P_d | Power dissipation | $T_c=25^\circ\text{C}$ | 67.57 | W |
| T_j | Operating junction | | 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 |
|----------------|-----------|---------|----------------|------------|----------|
| PM023P060HG | PM023P060 | TO-220F | TUBE | - | 50 |

Electrical Characteristics of Si MOSFET

| Symbol | Parameter | Test Condition | Numerical | | | Unit |
|--------------|---|--|-----------|------|-----------|------------|
| | | | Min | Typ. | Max. | |
| BV_{DSS} | Drain-source breakdown voltage | $V_{GS} = 0V, I_D = -250\mu A, T_J = 25^\circ C$ | -60 | - | - | V |
| I_{DSS} | Zero gate voltage drain current | $V_{DS} = -60V, V_{GS} = 0V$ | - | - | -1 | μA |
| I_{GSS} | Gate-source leakage current | $V_{GS} = \pm 20V, V_{DS} = 0V$ | - | - | ± 100 | nA |
| $V_{GS(th)}$ | Gate threshold voltage | $V_{DS} = V_{GS}, I_D = -250\mu A$ | -2.0 | -3.0 | -4.0 | V |
| $R_{DS(ON)}$ | Static drain-source on state resistance | $V_{GS} = -10V, I_D = -10A$ | - | 18 | 23 | m Ω |
| g_{FS} | Forward transconductance | $V_{DS} = -5V, I_D = -10A$ | - | 12 | - | S |
| $t_{d(on)}$ | Turn-on Delay time | $V_{DD} = -30V, I_D = -10A, R_G = 3\Omega$ | - | 20 | - | ns |
| t_r | Turn-on Rise time | | - | 18 | - | |
| $t_{d(off)}$ | Turn-off Delay time | | - | 55 | - | |
| t_f | Turn-off Fall time | | - | 35 | - | |

Electrical Characteristics of Si MOSFET

| Symbol | Parameter | Test Condition | Numerical | | Unit |
|---------------------|--------------------------------------|---|-----------|------|-----------------------------|
| | | | Typ. | Max. | |
| $R_{\theta JC}$ | Thermal resistance, Junction to case | | 1.85 | - | $^{\circ}\text{C}/\text{W}$ |
| C_{iss} | Input capacitance | $V_{DS} = -30\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$ | 4669 | - | pF |
| C_{oss} | Output capacitance | | 246 | - | |
| C_{rss} | Reverse transfer capacitance | | 239 | - | |
| $Q_{g(\text{tot})}$ | Total gate charge at 10V | $V_{DD} = -30\text{V}, I_D = -10\text{A}$ $V_{GS} = -10\text{V}$ | 62 | - | nC |
| Q_{gs} | Gate to source gate charge | | 9 | - | |
| Q_{gd} | Gate to drain "Miller" charge | | 16 | - | |

Electrical Characteristics of Si Diode

| Symbol | Parameter | Test Condition | Numerical | | Unit |
|----------|--|---|-----------|------|------|
| | | | Typ. | Max. | |
| I_S | Maximum continuous drain to source diode forward current | $T_c = 25^{\circ}\text{C}$ | - | -42 | A |
| V_{SD} | Drain to source diode forward voltage | $I_{SD} = -10\text{A}, V_{GS} = 0\text{V}$ | - | -1.2 | V |
| T_{rr} | Reverse recovery time | $I_F = -10\text{A}, V_{GS} = 0\text{V},$ $di_F/dt = 100\text{A}/\mu\text{s}$ | 49 | - | ns |
| Q_{rr} | Reverse recovery charge | | 71 | - | nC |

Typical Characteristics

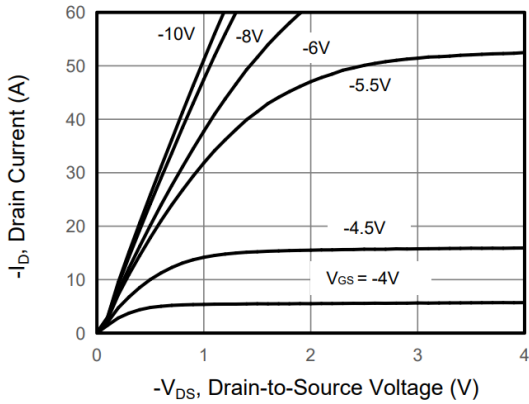


Figure 1. Output Characteristics

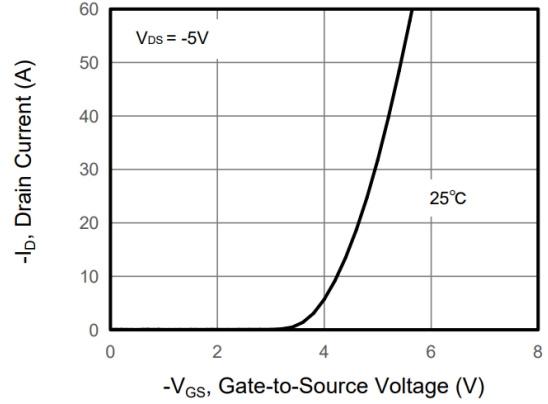


Figure 2. Transfer Characteristics

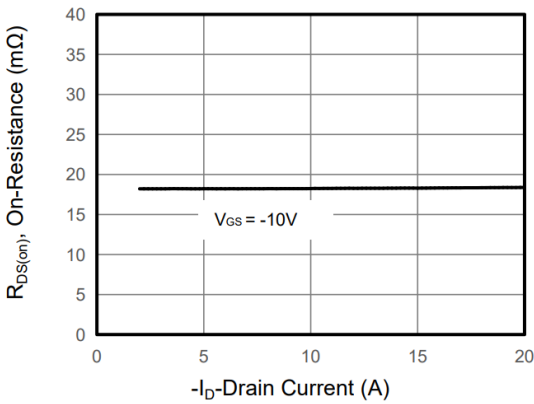


Figure 3. Drain Source On Resistance

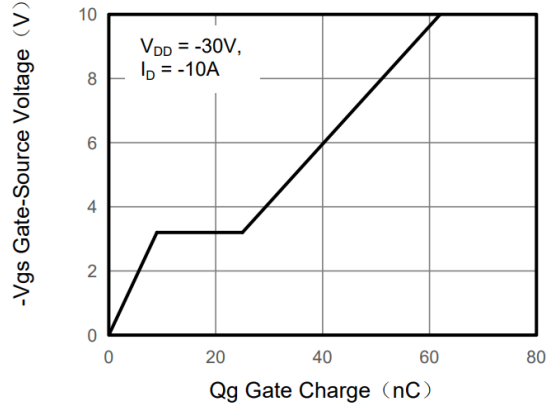


Figure 4. Gate Charge

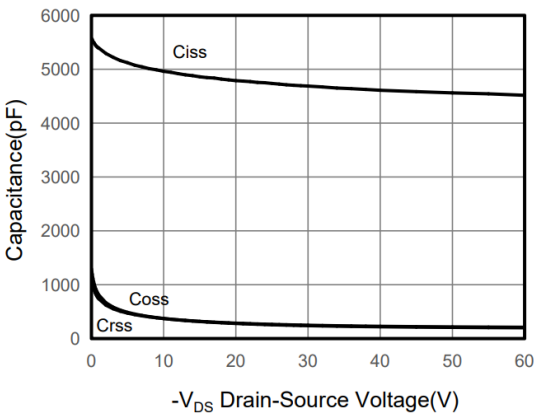


Figure 5. Capacitance

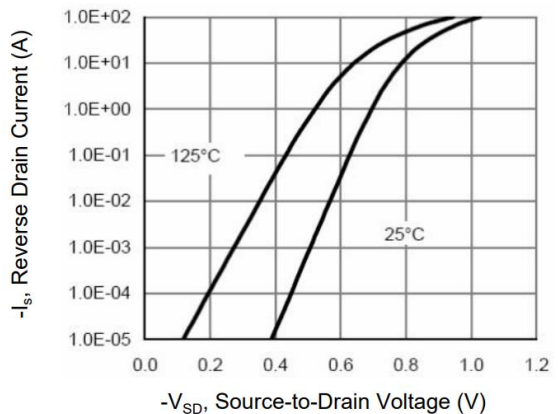


Figure 6. Source-Drain Diode Forward

Typical Characteristics

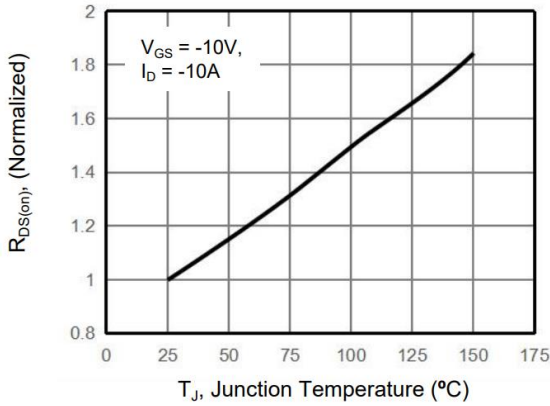


Figure 7. Drain-Source On-Resistance

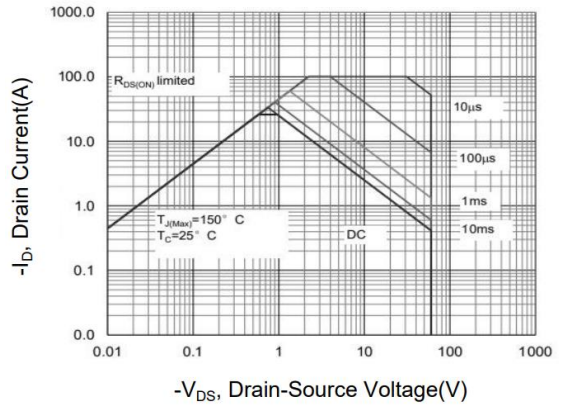


Figure 8. Safe Operation Area

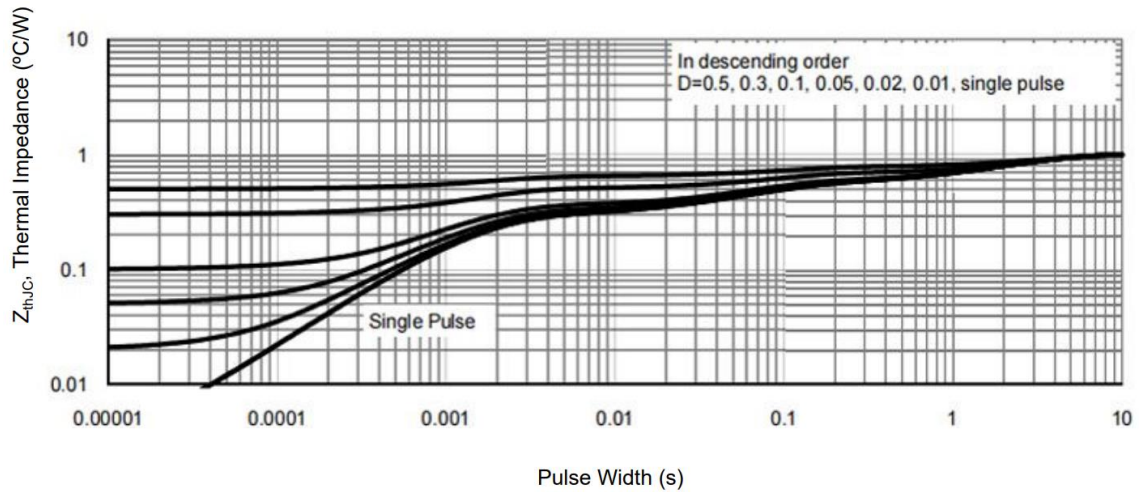
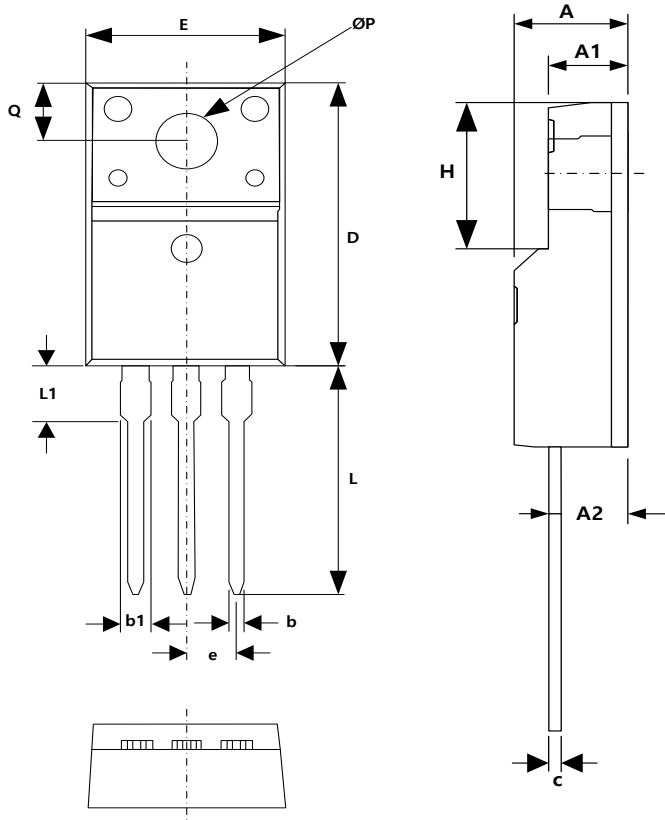


Figure 9. Normalized Maximum Transient Thermal Impedance

Package Outline

Unit : mm



| SYMBOL | DIMENSIONS | | |
|-----------|------------|-------|-------|
| | MIN | NOM | MAX |
| A | 4.60 | 4.70 | 4.80 |
| A1 | 2.44 | 2.54 | 2.64 |
| A2 | 2.15 | 2.45 | 2.75 |
| b | 0.70 | 0.80 | 0.90 |
| b1 | 1.15 | 1.35 | 1.55 |
| c | 0.50 | 0.60 | 0.70 |
| D | 15.30 | 15.80 | 16.30 |
| E | 9.90 | 10.10 | 10.30 |
| e | 4.98 | 5.08 | 5.18 |
| H | 6.40 | 6.60 | 6.80 |
| L | 13.05 | 13.55 | 14.05 |
| L1 | 3.00 | 3.30 | 3.60 |
| ØP | 3.00 | 3.20 | 3.40 |
| Q | 3.10 | 3.30 | 3.50 |