

PM045N060CG

60V 15A 45mΩ Si Single N-ch Enhancement Mode Power MOSFET with Normal Diode

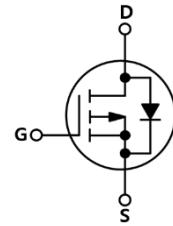
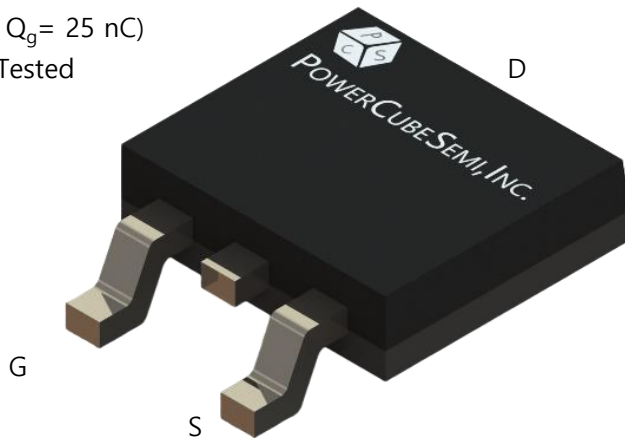
Features

Si Single N-ch Enhancement Mode Power MOSFET

- Rated to 60V at 15Amps @ $T_j = 25^\circ\text{C}$
- Max $R_{DS(on)} = 45\text{ m}\Omega$
- Typ $R_{DS(on)} = 31\text{ m}\Omega$
- Gate Charge(Typ. $Q_g = 25\text{ nC}$)
- 100% Avalanche Tested

Application

- Power Switch
- DC-DC Converters



PKG type : TO-252 (DPAK)

Description

The PM045N060CG 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 | $T_c=25^\circ\text{C}$ | 15 | A |
| I_{DM} | Pulsed Drain Current | Pulse width limited by junction temperature | 60 | A |
| V_{GS} | Gate-Source Voltage | | ± 20 | V |
| E_{AS} | Single Pulsed Avalanche Energy | $R_G=25\Omega, V_{GS}=10V$ $V_{DD}=50V, L=0.5mH$ | 12 | mJ |
| P_d | Power Dissipation | $T_c=25^\circ\text{C}$ | 40 | 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 |
|----------------|-----------|---------|----------------|------------|----------|
| PM045N060CG | PM045N060 | TO-252 | REEL | - | 2500 |

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 | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 1 | 1.9 | 2.5 | V |
| $R_{DS(ON)}$ | Static Drain-Source on state resistance | $V_{GS} = 10V, I_D = 8A$ | - | 31 | 45 | m Ω |
| g_{FS} | Forward Transconductance | $V_{GS} = 5V, I_D = 8A$ | - | 17 | - | S |
| $t_{d(on)}$ | Turn-on Delay time | $V_{DD} = 30V, I_D = 8A, R_G = 3\Omega$ | - | 20 | - | ns |
| T_r | Turn-on Rise time | | - | 7 | - | |
| $t_{d(off)}$ | Turn-off Delay time | | - | 23 | - | |
| T_f | Turn-off Fall time | | - | 16 | - | |

Electrical Characteristics of Si MOSFET

| Symbol | Parameter | Test Condition | Numerical | | Unit |
|---------------------|--------------------------------------|--|-----------|------|-----------------------------|
| | | | Typ. | Max. | |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | | 3.1 | - | $^{\circ}\text{C}/\text{W}$ |
| C_{iss} | Input Capacitance | $V_{DS} = 30\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$ | 762 | - | pF |
| C_{oss} | Output Capacitance | | 41 | - | |
| C_{rss} | Reverse Transfer Capacitance | | 37 | - | |
| $Q_{g(\text{tot})}$ | Total Gate Charge at 10V | $V_{DD} = 30\text{V}, I_D = 8\text{A}, V_{GS(\text{on})} = 10\text{V}$ | 25 | - | nC |
| Q_{gs} | Gate to Source Gate Charge | | 4.5 | - | |
| Q_{gd} | Gate to Drain "Miller" Charge | | 6.5 | - | |

Electrical Characteristics of Si Diode

| Symbol | Parameter | Test Condition | Numerical | | Unit |
|----------|--|--|-----------|------|------|
| | | | Typ. | Max. | |
| I_S | Maximum Continuous Drain to Source Diode Forward Current | | - | 15 | A |
| V_{SD} | Drain to Source Diode Forward Voltage | $I_F = 8\text{A}, V_{GS} = 0\text{V}$ | - | 1.2 | V |
| T_{rr} | Reverse Recovery Time | $I_F = 8\text{A}, dI_F/dt = 500\text{A}/\mu\text{s}$ | 29 | - | ns |
| Q_{rr} | Reverse Recovery Charge | | 49 | - | nC |

Typical Characteristics

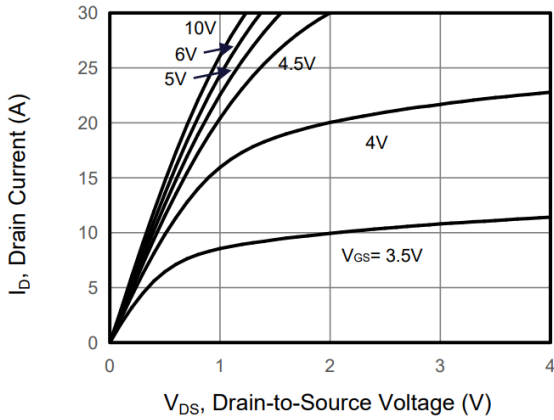


Figure 1. Output Characteristics

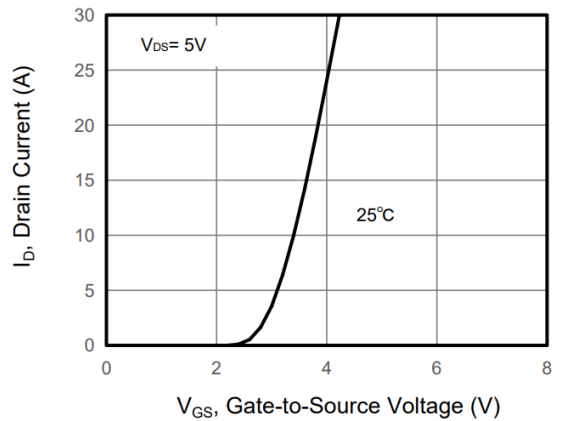


Figure 2. Transfer Characteristics

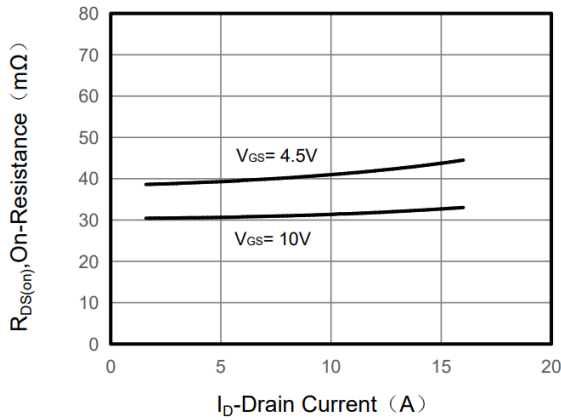


Figure 3. Drain to Source On-Resistance

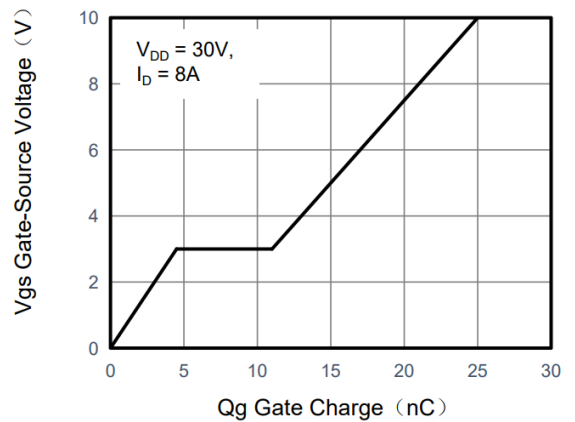


Figure 4. Gate Charge

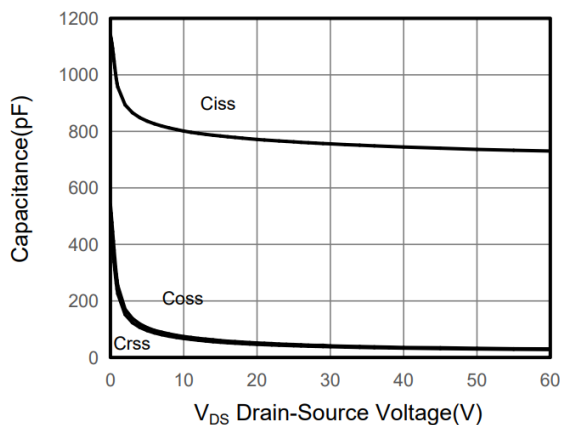


Figure 5. Capacitance Characteristics

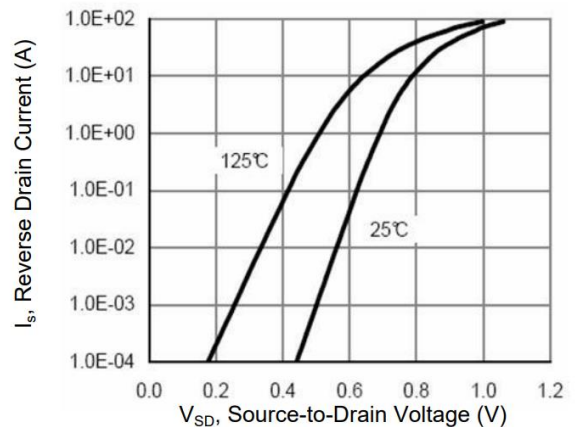


Figure 6. Source to Drain Diode Forward

Typical Characteristics

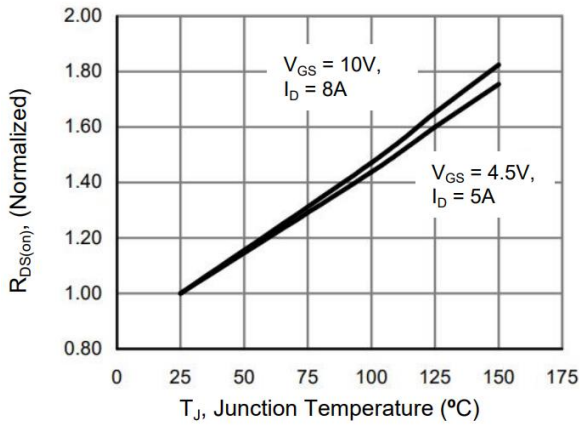


Figure 7. Drain to Source On-Resistance

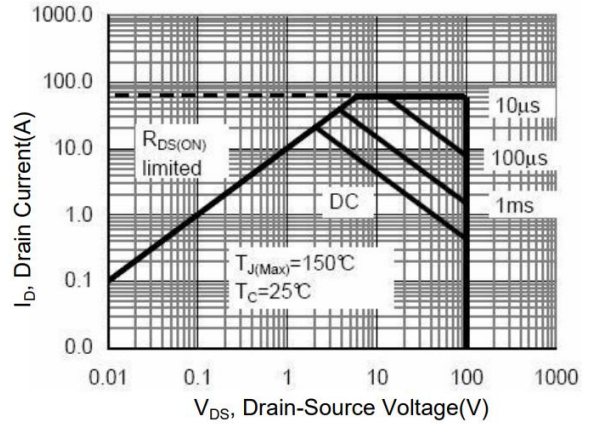


Figure 8. Safe Operation Area

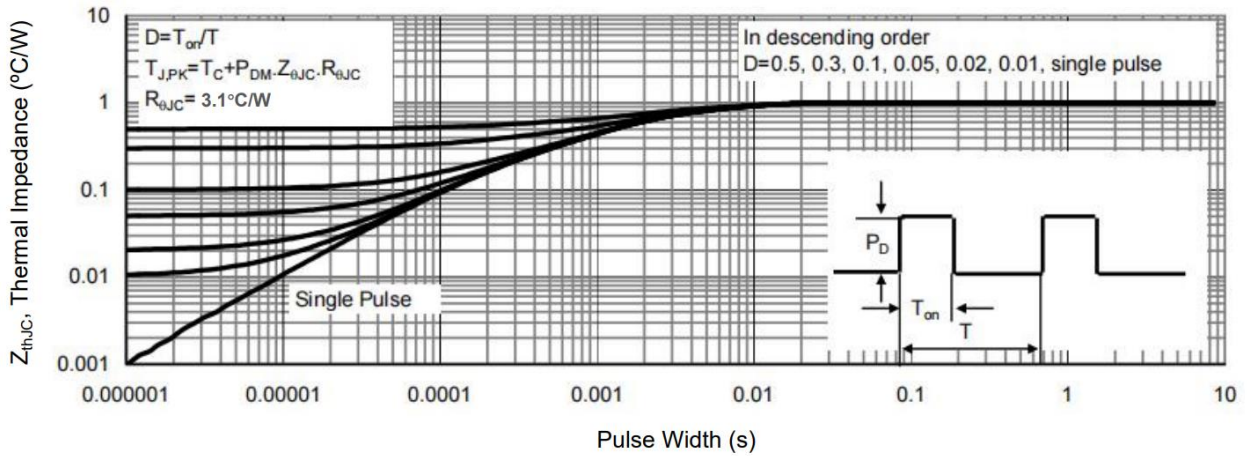
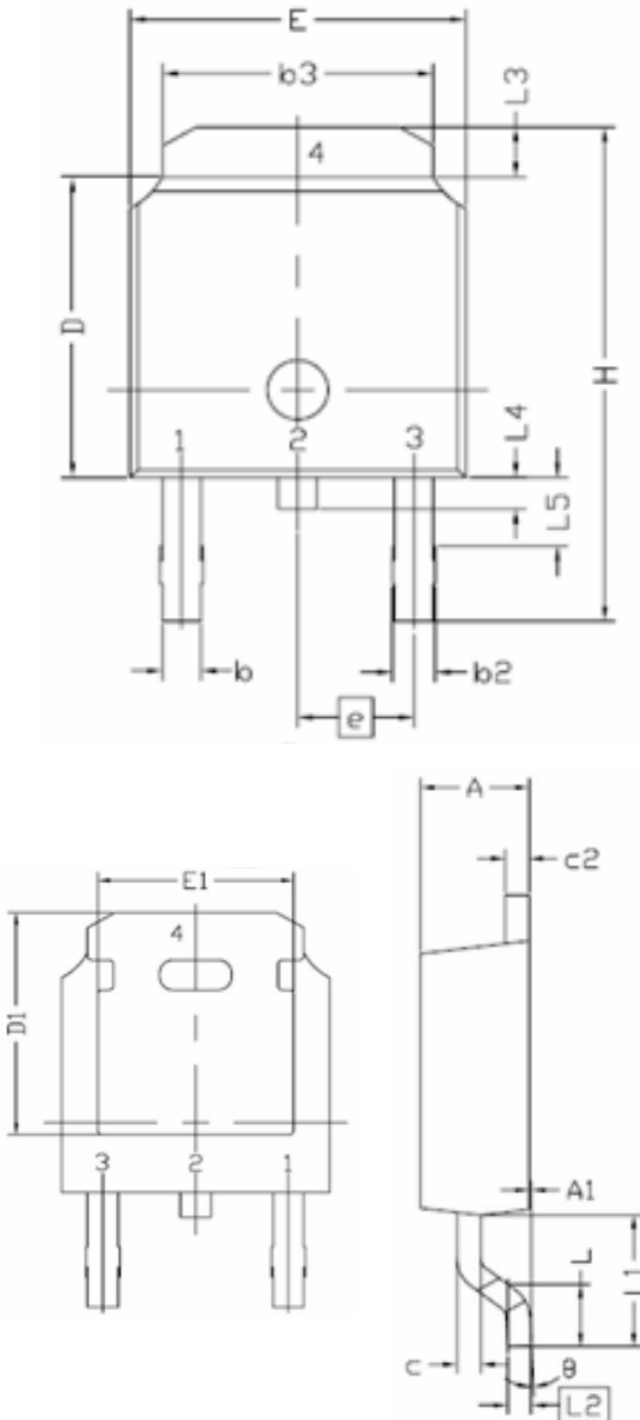


Figure 9. Normalized Maximum Transient Thermal Impedance

Package Outline

Unit : mm



| SYMBOL | DIMENSIONS | | |
|----------------------------|------------|--------|------|
| | MIN | NOM | MAX |
| E | 6.34 | 6.54 | 6.74 |
| L | 1.30 | 1.60 | 1.90 |
| L1 | 2.60 | 2.90 | 3.20 |
| L2 | 0.5 BSC | | |
| L3 | 0.82 | 1.02 | 1.22 |
| L4 | 0.80 | 1.00 | 1.20 |
| L5 | 2.60 | 2.90 | 3.20 |
| D | 5.80 | 6.10 | 6.40 |
| H | 8.40 | 9.00 | 9.60 |
| b | 1.42 | 1.52 | 1.62 |
| b2 | 2.35 | 2.55 | 2.75 |
| b3 | 5.20 | 5.30 | 5.40 |
| e | 4.58 BSC | | |
| A | 2.08 | 2.28 | 2.48 |
| A1 | 0.00 | 0.15 | - |
| c | 0.40 | 0.50 | 0.60 |
| c2 | 0.40 | 0.50 | 0.60 |
| D1 | - | 5.25 | - |
| E1 | - | 4.8 | - |
| θ | 0.00° | 10.00° | |