# CP60P06G

## 60V P-Channel Enhancement Mode MOSFET

### Description

The CP60P06G uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

### General Features

- $V_{DS}$ =-60V，$I_D$ =-60A
  $R_{DS(ON)}$(Typ.)= 17.5mΩ @$V_{GS}$=-10V
  $R_{DS(ON)}$(Typ.)= 19.5mΩ @$V_{GS}$=-4.5V
- High density cell design for ultra low $R_{DS(ON)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high $E_{AS}$
- Excellent package for good heat dissipation

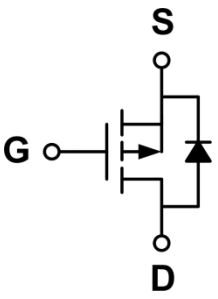
### Application

- Load switch

### Package

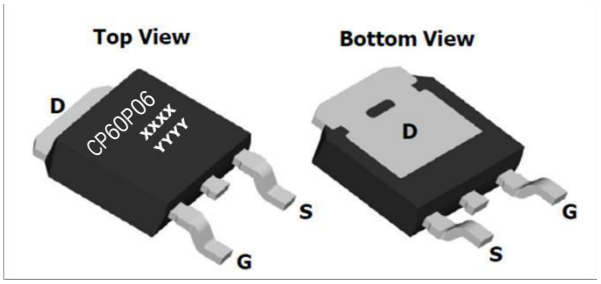
- TO-252-2L

### Schematic diagram




### Marking and pin assignment

**TO-252-2L**




XXXX: Wafer Information YYYY：
Quality Code

### Ordering Information

| Part Number | Storage Temperature | Package | Devices Per Reel |
|---|---|---|---|
| CP60P06G-G | -55°C to +150°C | TO-252-2L | 2500 |

### Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

| parameter | | symbol | limit | unit |
|---|---|---|---|---|
| Drain-source voltage | | $V_{DS}$ | -60 | V |
| Gate-source voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | TC=25°C | $I_D$ | -60 | A |
| | TC=125°C | | -35 | |
| Pulsed Drain Current | | $I_{DP}$ | -240 | A |
| Avalanche Current | | $I_{AS}$ | -60 | A |
| Avalanche energy( L=1mH) (note1) | | $E_{AS}$ | 600 | mJ |
| Maximum power dissipation | TC=25°C | $P_D$ | 130 | W |
| | TC=100°C | | 44 | |
| Operating junction Temperature range | | Tj | -55—150 | ℃ |

## Electrical Characteristics (TA=25℃ unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-source breakdown voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$=-250μA | -60 | - | - | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$=-60V, $V_{GS}$=0V | - | - | -1 | μA |
| | | $T_J$=85°C | - | - | -30 | |
| Gate Leakage Current | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$=±20V | - | - | ±100 | nA |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=-250μA | -1.0 | -1.6 | -2.5 | V |
| Drain-source on-state resistance[1] | $R_{DS(ON)}$ | $V_{GS}$=-10V, $I_D$=-20A | - | 17.5 | 21 | mΩ |
| | | $V_{GS}$=-4.5V, $I_D$=-20A | - | 19.5 | 23 | |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=-10V, $I_D$=-20A | - | 25 | - | S |
| **Diode Characteristics** | | | | | | |
| Diode Forward Voltage[1] | $V_{SD}$ | $I_{SD}$=-20A,$V_{GS}$=0V | - | -0.9 | -1.2 | V |
| Diode Continuous Forward Current | $I_S$ | | - | - | -60 | A |
| Reverse Recovery Time | $t_{rr}$ | $I_F$=-20A, dI/dt=-100A/us | - | 48 | - | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | - | 57 | - | nC |
| **Dynamic Characteristics[2]** | | | | | | |
| Gate Resistance | $R_G$ | $V_{GS}$=0V, $V_{DS}$=0V,f=1MHz | - | 3 | - | Ω |
| Input capacitance | $C_{ISS}$ | $V_{GS}$=0V ,$V_{DS}$=-30V f=1.0MHz | - | 4674 | - | pF |
| Output capacitance | $C_{OSS}$ | | - | 218 | - | |
| Reverse transfer capacitance | $C_{RSS}$ | | - | 183 | - | |
| Turn-on delay time | $t_{D(ON)}$ | $V_{GS}$=-10V, $V_{DS}$=-30V, $R_L$=1.5Ω, $R_G$=3Ω | - | 14 | - | ns |
| Turn-on Rise time | tr | | - | 16 | - | |
| Turn-off delay time | $t_{D(OFF)}$ | | - | 38 | - | |
| Turn-off Fall time | tf | | - | 45 | - | |
| Total gate charge | $Q_g$ | $V_{GS}$=-10V,$I_D$=-20A $V_{DS}$=-30V | - | 89 | - | nC |
| Gate-source charge | $Q_{gs}$ | | - | 12 | - | |
| Gate-drain charge | $Q_{gd}$ | | - | 16 | - | |

Note: 1：Pulse test; pulse width ≦ 300ns, duty cycle ≦ 2%.

2：Guaranteed by design, not subject to production testing.

## Thermal Characteristics

| Parameter | Symbol | Typical | Unit |
|---|---|---|---|
| Thermal Resistance-Junction to Case | $R_{\theta JC}$ | 0.85 | ℃/W |
| Thermal Resistance junction-to ambient | $R_{\theta JA}$ | 62.5 | |

## Typical Performance Characteristics

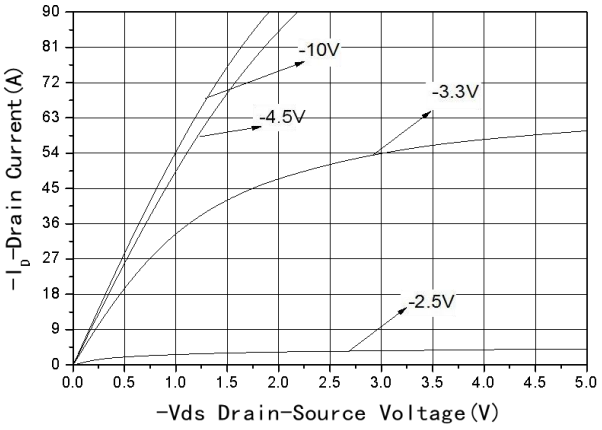



Fig1 Output Characteristics

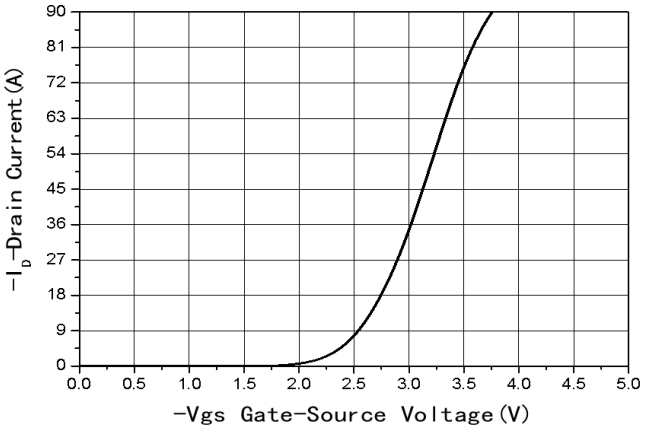



Fig2 Transfer Characteristics

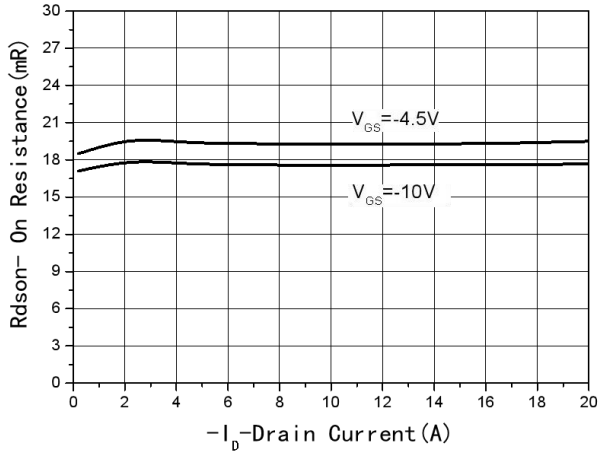



Fig3 Rdson-Drain current

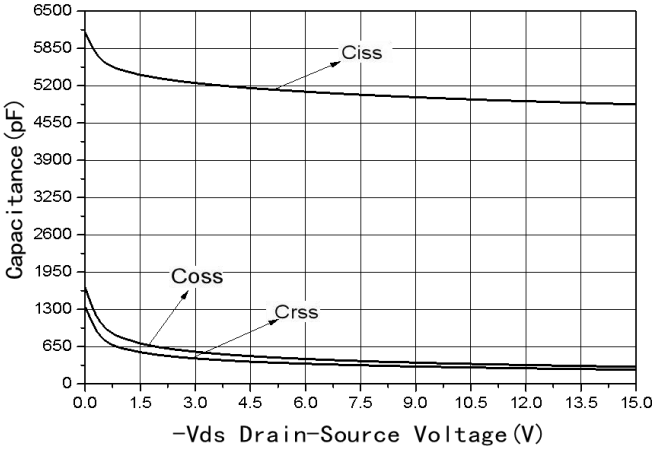



Fig4 Capacitance vs Vds

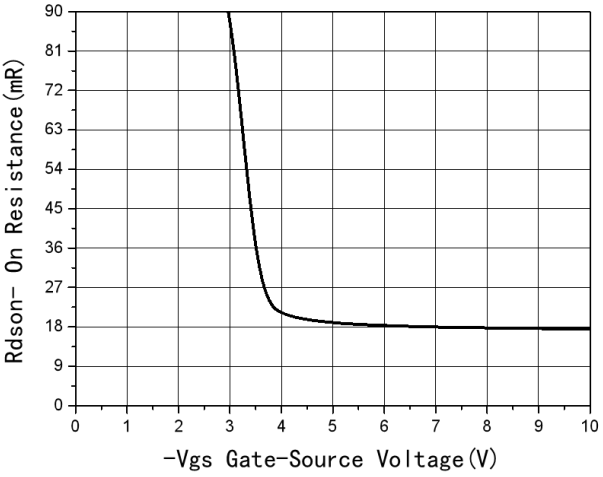



Fig5 Rdson-Gate Drain voltage

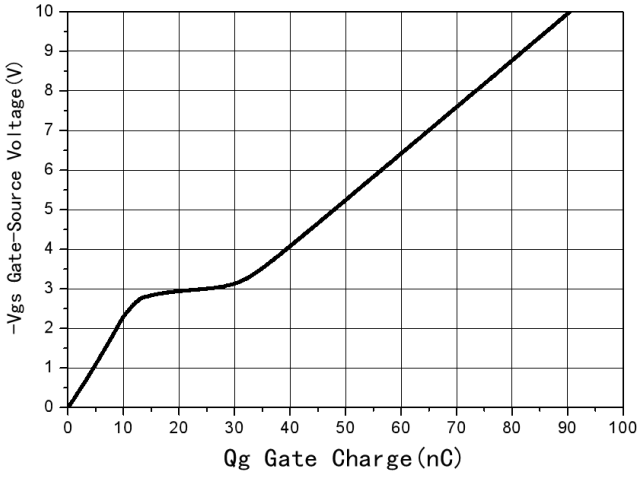



Fig6 Gate Charge

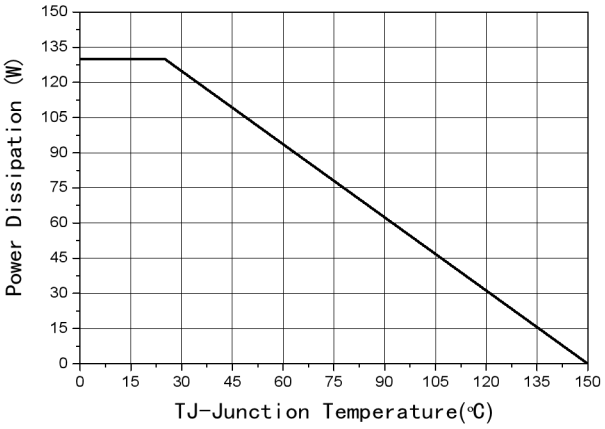



**Fig7 Power De-rating**

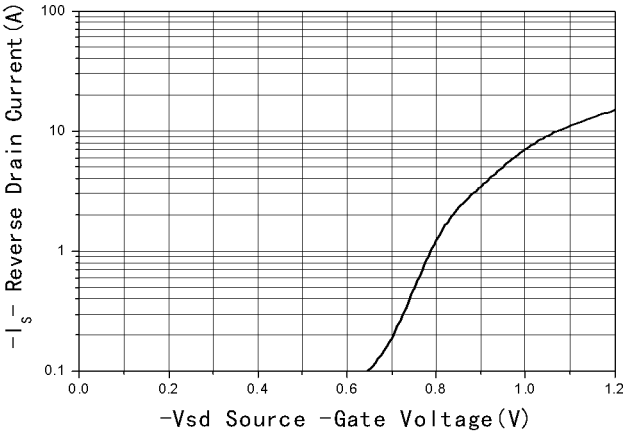
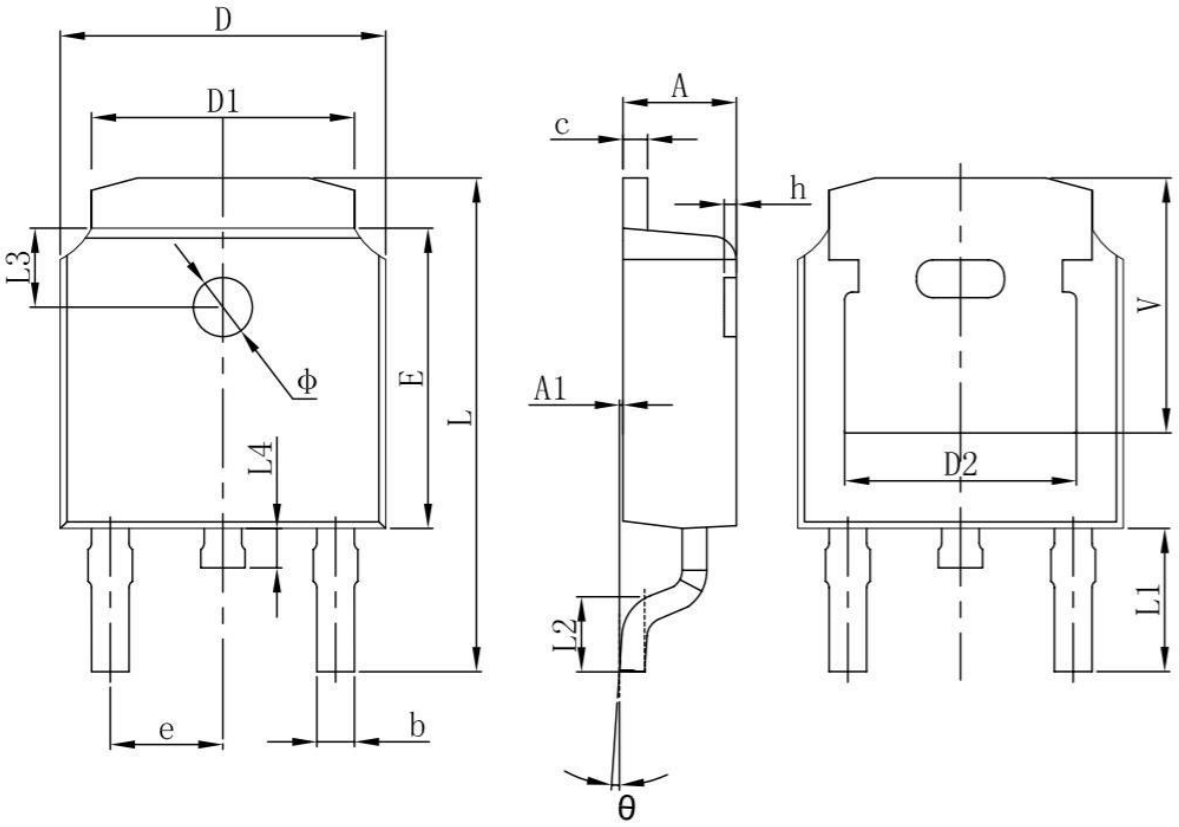



**Fig8 Source-Drain Diode Forward**

## Package Information

- **TO-252-2L**




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 2.200 | 2.400 | 0.087 | 0.094 |
| A1 | 0.000 | 0.127 | 0.000 | 0.005 |
| b | 0.635 | 0.770 | 0.025 | 0.030 |
| c | 0.460 | 0.580 | 0.018 | 0.023 |
| D | 6.500 | 6.700 | 0.256 | 0.264 |
| D1 | 5.100 | 5.460 | 0.201 | 0.215 |
| D2 | 4.830 REF. | | 0.190 REF. | |
| E | 6.000 | 6.200 | 0.236 | 0.244 |
| e | 2.186 | 2.386 | 0.086 | 0.094 |
| L | 9.712 | 10.312 | 0.382 | 0.406 |
| L1 | 2.900 REF. | | 0.114 REF. | |
| L2 | 1.400 | 1.700 | 0.055 | 0.067 |
| L3 | 1.600 REF. | | 0.063 REF. | |
| L4 | 0.600 | 1.000 | 0.024 | 0.039 |
| Φ | 1.100 | 1.300 | 0.043 | 0.051 |
| θ | 0° | 8° | 0° | 8° |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| V | 5.250 REF. | | 0.207 REF. | |