# CMP180P04/CMB180P04/CMI180P04

P-Channel Enhancement Mode MOSFET

## General Description

The 180P04 is a P-channel Power MOSFET. They use advanced trench technology to provide excellent RDS(ON). The device is therefore suitable in advanced high-efficiency switching applications.

## Product Summary

| BVDSS | RDSON | ID |
|---|---|---|
| -40V | 4.2mΩ | -120A |

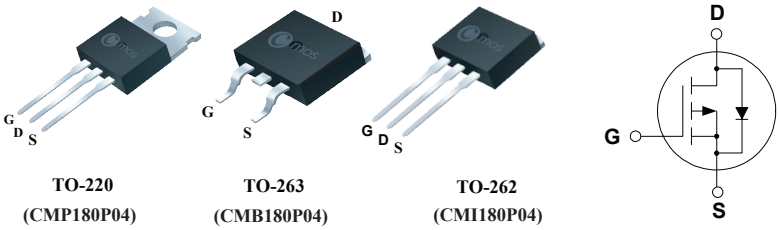
## Applications

- DC-DC Converters
- Motor control
- LED controller

## Features

- Fast switching
- Lower On-resistance
- 100% EAS Guaranteed
- RoHS Compliant

## TO-220/263/262 Pin Configuration




TO-220 (CMP180P04) TO-263 (CMB180P04) TO-262 (CMI180P04)

## Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | -40 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_C$=25℃ | Continuous Drain Current | -120 | A |
| $I_D$@$T_C$=100℃ | Continuous Drain Current | -110 | A |
| $I_{DM}$ | Pulsed Drain Current | -480 | A |
| EAS | Single Pulse Avalanche Energy [1] | 1352 | mJ |
| $P_D$@Tc=25℃ | Total Power Dissipation | 136 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 175 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 175 | ℃ |

## Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Junction-to-Ambient | --- | 62 | ℃/W |
| $R_{\theta JC}$ | Junction-to-Case | --- | 1.1 | ℃/W |

## Electrical Characteristics ($T_J$=25℃ , unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=-250uA | -40 | --- | --- | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=-10V, $I_D$=-20A | --- | 3.7 | 4.2 | mΩ |
| | | $V_{GS}$=-4.5V, $I_D$=-20A | --- | 5 | 6 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =- 250uA | -1 | --- | -3 | V |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=-32V, $V_{GS}$=0V , $T_J$=25℃ | --- | --- | -1 | uA |
| | | $V_{DS}$=-32V, $V_{GS}$=0V , $T_J$=125℃ | --- | --- | -200 | |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$ =±20V, $V_{DS}$=0V | --- | --- | ±100 | nA |
| gfs | Forward Transconductance | $V_{DS}$=-10V , $I_D$=-20A | --- | 59 | --- | S |
| $R_g$ | Gate Resistance | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 2 | --- | Ω |
| $Q_g$ | Total Gate Charge | $V_{DD}$=-32V , $I_D$=-80A<br>$V_{GS}$=0 to -10V | --- | 140 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 31 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 25 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=-20V, $V_{GS}$=-10V, $R_G$=3.5Ω<br>$I_D$=-80A | --- | 30 | --- | ns |
| $T_r$ | Rise Time | | --- | 15 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 120 | --- | |
| $T_f$ | Fall Time | | --- | 65 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=-25V, $V_{GS}$=0V , f=1MHz | --- | 9000 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 900 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 920 | --- | |

## Diode Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current | $V_G$=$V_D$=0V , Force Current | --- | --- | -120 | A |
| $I_{SM}$ | Pulsed Source Current | | --- | --- | -480 | A |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V , $I_F$=-20A | --- | -0.8 | -1.3 | V |

Notes:

1.The EAS data shows Max. rating .The test condition is $V_{DS}$=-30V , $V_{GS}$=-10V , L=1mH , $I_{AS}$=-52A.

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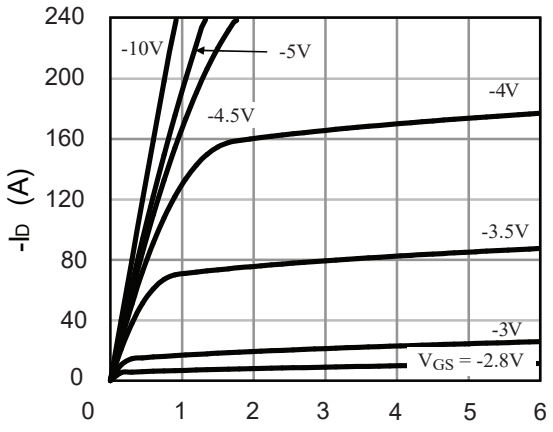
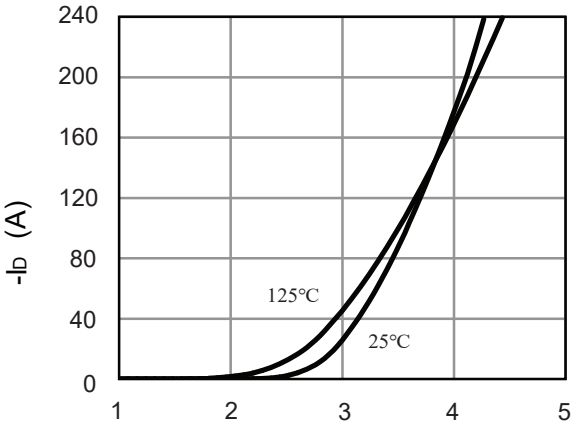
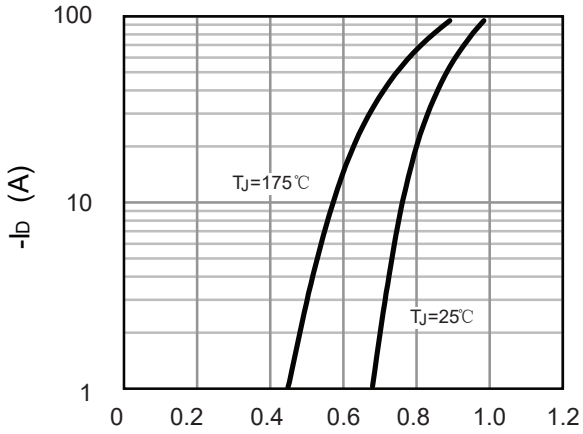
## Typical Characteristics



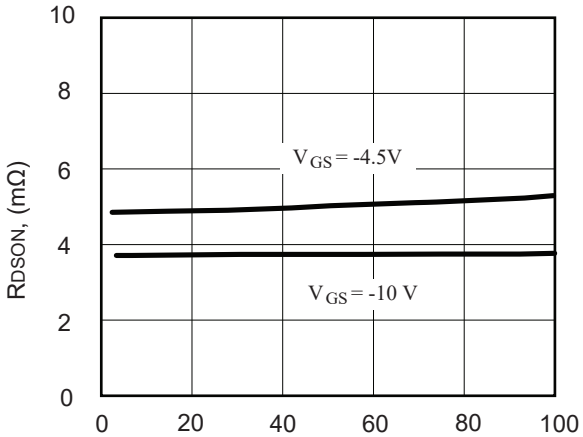

Output Characteristics



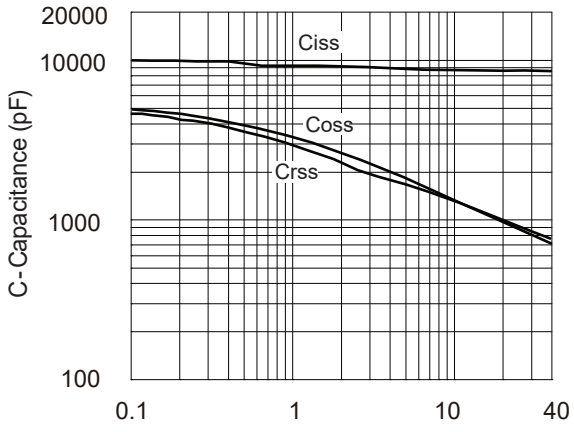

transfer characteristics



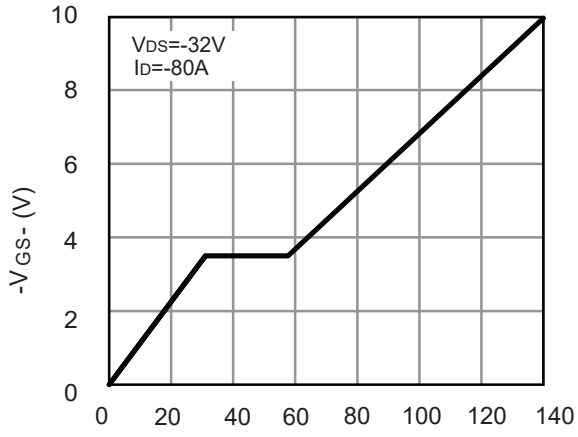

Body-Diode Characteristics




On-Resistance vs.Drain Current




Capacitance Characteristics




Gate-Charge Characteristics