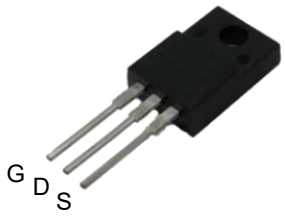
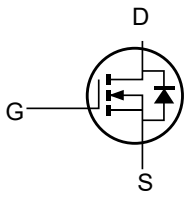
## N-Channel Super Junction MOSFET

**MCR65B580CTF**




### Features

- Fast switching speed
- Improved dv/dt capability
- 100% Avalanche Tested

### Application

- Power factor correction（PFC）
- Switched mode power supplies（SMPS）
- Uninterruptible Power Supply（UPS）
- AC to DC Converters

**Table 1. Absolute Maximum Ratings ($T_C$=25℃)**

| Parameter | Symbol | MCR65B580CTF | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | 650 | V |
| Gate-Source Voltage | $V_{GS}$ | ±30 | V |
| Continuous Drain Current at $T_C$ =25°C | $I_D$ | 7.3 * | A |
| Continuous Drain Current at $T_C$ =100°C | $I_D$ | 4.5* | A |
| Pulsed drain current (Note 1) | $I_{DM}$ | 24* | A |
| Power Dissipation($T_C$=25℃) | $P_D$ | 28 | W |
| Single pulse avalanche energy (Note2) | $E_{AS}$ | 129 | mJ |
| Avalanche current | $I_{AR}$ | 3.1 | A |
| MOSFET dv/dt ruggedness, $V_{DS}$ =0...400V | dv/dt | 50 | V/ns |
| Reverse diode dv/dt, VDS=0…400V, IDS≤ID | dv/dt | 15 | V/ns |
| Operating Junction and Storage Temperature Range | $T_J$,$T_{STG}$ | -55~+150 | °C |

* limited by maximum junction temperature

**Table 2. Thermal Characteristic**

| Parameter | Symbol | MCR65B580CTF | Unit |
|---|---|---|---|
| Thermal Resistance，Junction-to-Case | $R_{thJC}$ | 4.5 | °C /W |
| Thermal Resistance，Junction-to-Ambient | $R_{thJA}$ | 80 | °C /W |

**Table 3. Electrical Characteristics (TA=25℃unless otherwise noted)**

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **On/off states** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V $I_D$=250uA | 650 | -- | -- | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=650V,$V_{GS}$=0V | -- | -- | 1 | μA |
| Gate- to- Source Forward Leakage | $I_{GSS}$ | $V_{GS}$=30V,$V_{DS}$=0V | -- | -- | 100 | nA |
| Gate- to- Source Reverse Leakage | $I_{GSS}$ | $V_{GS}$=-30V,$V_{DS}$=0V | -- | -- | -100 | nA |
| Gate Threshold Voltage | $V_{GS\ (th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250uA | 2 | -- | 4 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}$=10V, $I_D$=2A | -- | 520 | 580 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{lss}$ | $V_{DS}$=50V,$V_{GS}$=0V, F=400kHz | -- | 470 | -- | pF |
| Output Capacitance | $C_{oss}$ | | -- | 35 | -- | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | -- | 1.7 | -- | pF |
| Total Gate Charge | $Q_g$ | $V_{DS}$=520V,$I_D$=7.3A, $V_{GS}$=10V | -- | 13 | -- | nC |
| Gate-Source Charge | $Q_{gs}$ | | -- | 2.1 | -- | nC |
| Gate-Drain Charge | $Q_{gd}$ | | -- | 6.9 | -- | nC |
| **Switching times** | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DS}$=325V,$I_D$=7.3A, $R_G$=25Ω | -- | 17 | -- | nS |
| Turn-on Rise Time | $t_r$ | | -- | 26 | -- | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | -- | 53 | -- | nS |
| Turn-Off Fall Time | $t_f$ | | -- | 38 | -- | nS |
| **Source- Drain Diode Characteristics** | | | | | | |
| Continuous Source Current | $I_S$ | Integral pn- diode in MOSFET | -- | -- | 7.3 | A |
| Maximum Pulsed Current | $I_{SM}$ | | -- | -- | 24 | A |
| Forward on voltage | $V_{SD}$ | $I_S$=7.3A,$V_{GS}$=0V | -- | -- | 1.4 | V |
| Reverse Recovery Time | $t_{rr}$ | $V_R$=100V,$I_S$=7.3A, di/dt=100A/μs | -- | 220 | -- | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | -- | 2 | -- | μC |

Notes: 1.Repetitive Rating: Pulse width limited by maximum junction temperature

2.L=10mH,$V_{DS}$=50V,$R_G$=25Ω,Starting $T_J$=25℃

## Typical Characteristics)

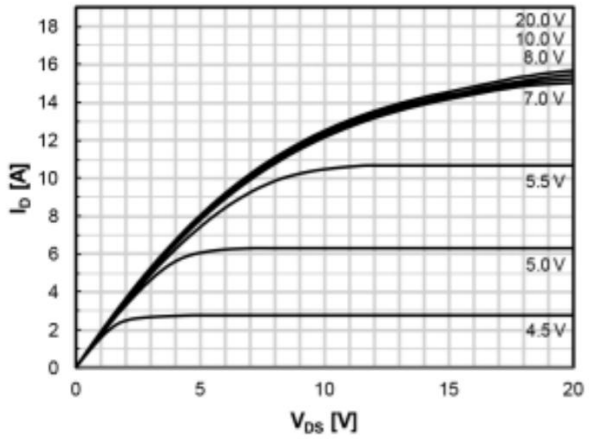



Fig. 1 Output Characteristics

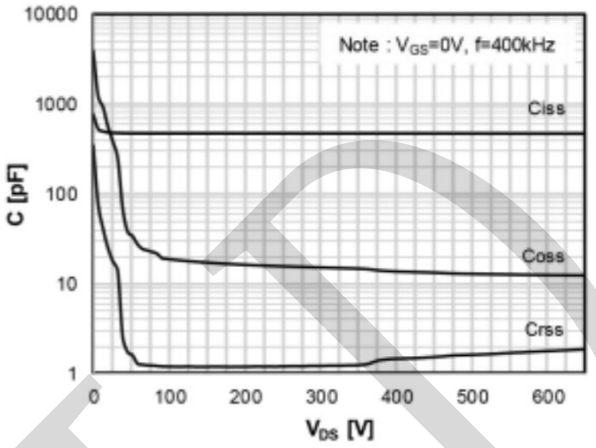



Fig. 2 Capacitances

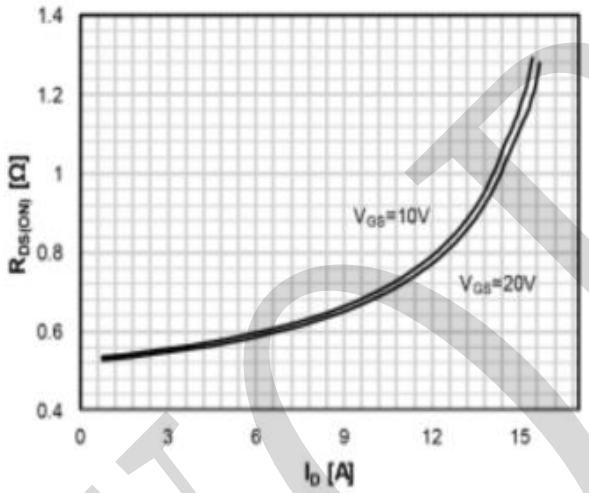



Fig. 3 On-state Resistance

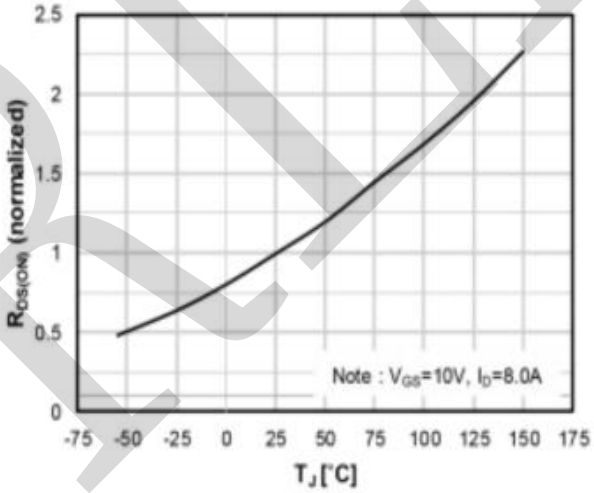



Fig. 4 On-state Resistance with Temperature

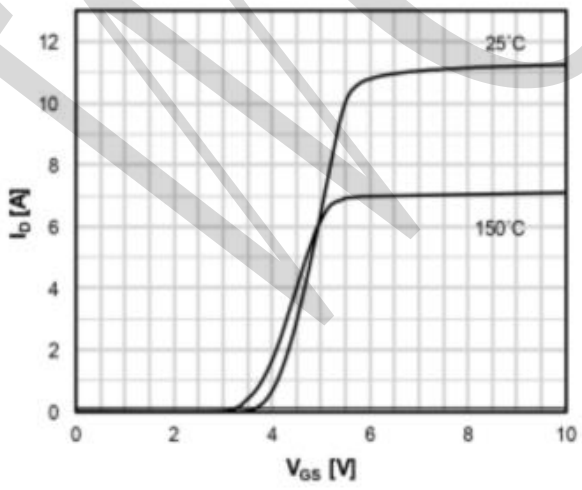



Fig 5. Transfer Characteristics

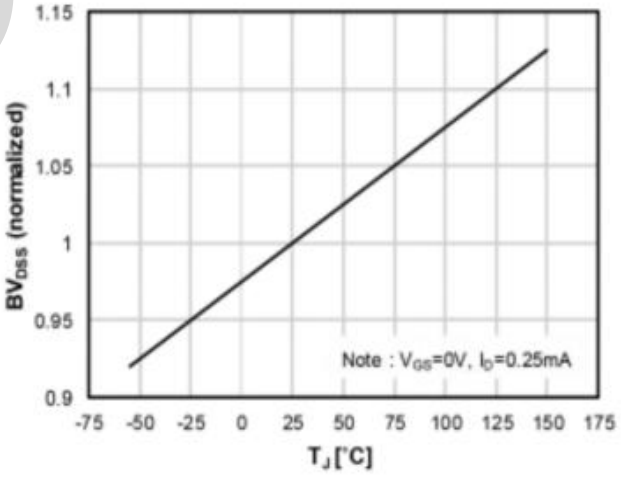



Fig 6. Breakdown Voltage with Temperature

## Typical Characteristics

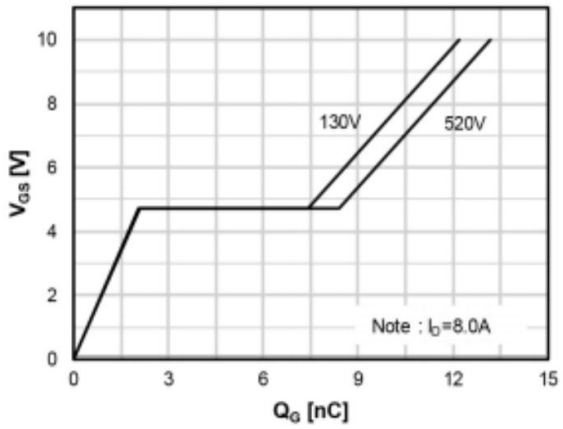



Fig 7. Gate Charge

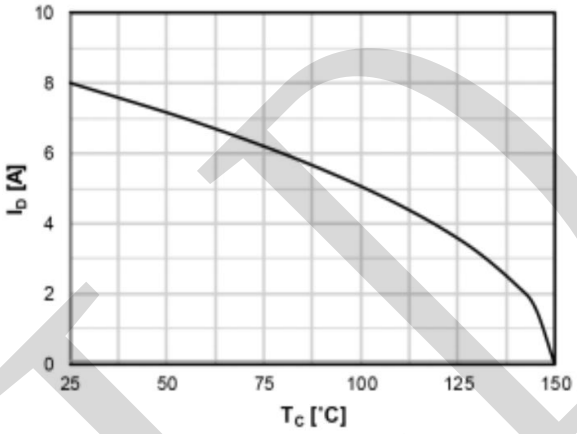



Fig 8. Maximum Drain Current

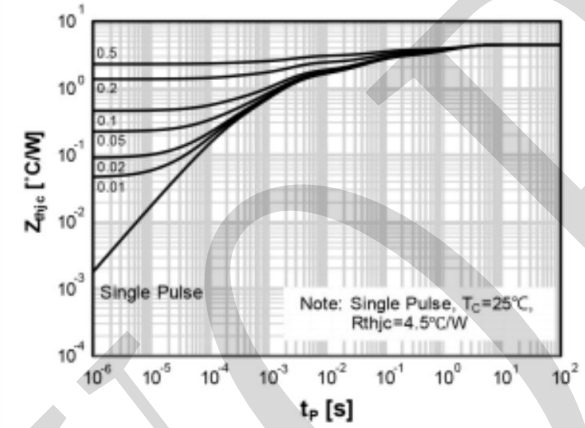



Fig 9. Maximum Transient Thermal Characteristics

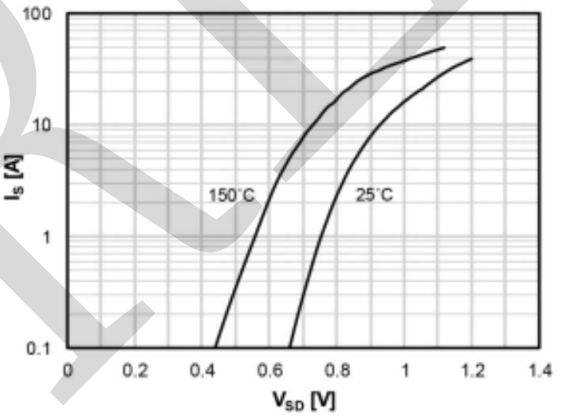



Fig 10. Body Diode Characteristics

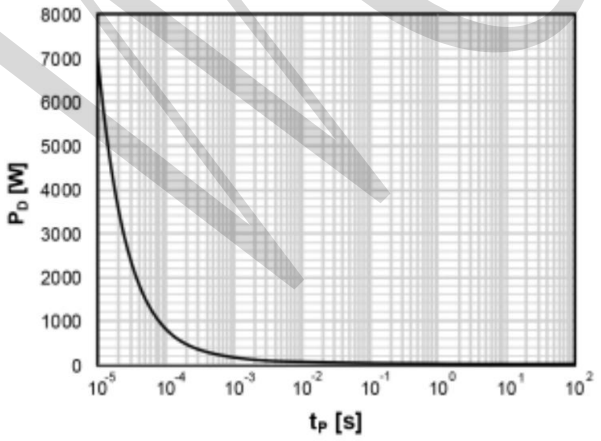



Fig 11. Power Dissipation

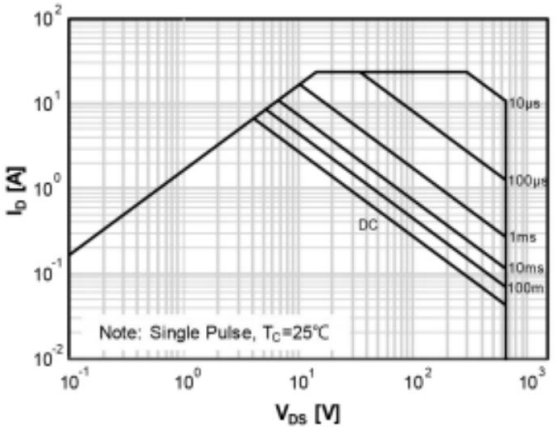
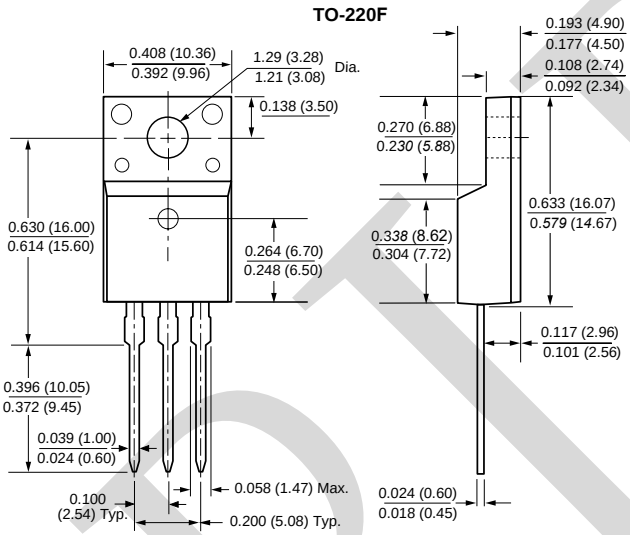


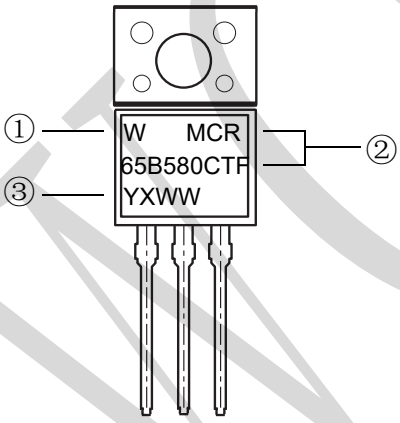

Fig 12. Safe Operating Area

## PACKAGE OUTLINE DIMENSIONS

### TO-220F Package Information




### Marking Information




①W : Company's trademark

②Product model : MCR65B580CTF

③PDC information：

Y X WW

WW:Week code(01 to 53)

X:Internal identification code

Y:Year code(ex:0=2020)