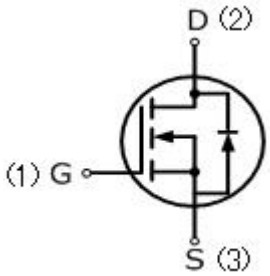
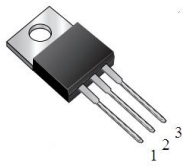
# 50N06(F,B,H)

## 50A mps,60 Volts N-CHANNEL MOSFET

### FEATURE

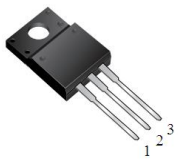
- 50A,60V,$R_{DS(ON)}$=16mΩ@$V_{GS}$=10V/25A
- Low gate charge
- Low $C_{iss}$
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



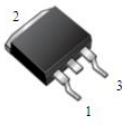

TO-220AB

50N06



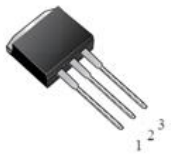

ITO-220AB

50N06F




TO-263

50N06B




TO-262

50N06H

## Absolute Maximum Ratings($T_C$=25℃,unless otherwise noted)

| Parameter | | Symbol | 50N06 | UNIT |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 60 | V |
| Gate-Source Voltage | | $V_{GSS}$ | ±20 | |
| Continuous Drain Current | | $I_D$ | 52.4 | A |
| Pulsed Drain Current(Note1) | | $I_{DM}$ | 210 | |
| Single Pulse Avalanche Energy (Note 2) | | $E_{AS}$ | 990 | mJ |
| Avalanche Current(Note1) | | $I_{AR}$ | 52.4 | A |
| Repetitive Avalanche Energy (Note1) | | $E_{AR}$ | 12 | mJ |
| Reverse Diode dV/dt (Note 3) | | dv/dt | 7.0 | V/ns |
| Operating Junction and Storage Temperature Range | | $T_J$,$T_{STG}$ | -55 to +150 | ℃ |
| Maximum lead temperature for soldering purposes, 1/8″from case for 5 seconds | | $T_L$ | 260 | ℃ |
| Mounting Torque | 6-32 or M3 screw | | 10 | lbf • in |
| | | | 1.1 | N • m |

## Thermal Characteristics

| Parameter | | Symbol | ITO-220 | TO-220 | TO-262 TO-263 | Units |
|---|---|---|---|---|---|---|
| Maximum Junction-to-Case | | $R_{thJC}$ | 1.66 | 0.83 | 0.83 | ℃/W |
| Maximum Power Dissipation | $T_C$=25℃ | $P_D$ | 75 | 150 | 150 | W |

| **Electrical Characteristics** ($T_c$=25℃,unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Symbol** | **Test Conditions** | **Mix** | **Typ** | **Max** | **Units** |
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V,$I_D$=250uA | 60 | — | — | V |
| Breakdown Temperature Coefficient | $\Delta BV_{DSS}$ /$\Delta T_J$ | Reference to 25℃, $I_D$=250uA | — | 0.6 | — | V/℃ |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=60V,$V_{GS}$=0V | — | — | 1 | uA |
| Gate-Body Leakage Current,Forward | $I_{GSSF}$ | $V_{GS}$=20V,$V_{DS}$=0V | — | — | 100 | nA |
| Gate-Body Leakage Current,Reverse | $I_{GSSR}$ | $V_{GS}$=-20V,$V_{DS}$=0V | — | — | -100 | nA |
| **On Characteristics** | | | | | | |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=10V,$I_D$=250uA | 2.0 | — | 4.0 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}$=10V,$I_D$=25A | — | — | 16 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=25V,$V_{GS}$=0V, f=1.0MHZ | — | 1250 | 1630 | pF |
| Output Capacitance | $C_{oss}$ | | — | 445 | 580 | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | — | 90 | 120 | pF |
| **Switching Characteristics** | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$=30V,$I_D$=50A, $R_G$=25Ω (Note4,5) | — | 20 | 50 | ns |
| Turn-On Rise Time | $t_r$ | | — | 380 | 770 | ns |
| Turn-Off Delay Time | $t_{d(off)}$ | | — | 80 | 170 | ns |
| Turn-Off Fall Time | $t_f$ | | — | 145 | 300 | ns |
| Total Gate Charge | Qg | $V_{DS}$=48V,$I_D$=50A, $V_{GS}$=5V, (Note4,5) | — | 24.5 | 32 | nC |
| Gate-Source Charge | Qgs | | — | 6 | — | nC |
| Gate-Drain Charge | Qgd | | — | 14.5 | — | nC |
| **Drain-Source Body Diode Charcteristics and Maximum Ratings** | | | | | | |
| Continuous Diode Forward Current | $I_S$ | | — | — | 50 | A |
| Pulsed Diode Forward Current | $I_{SM}$ | | — | — | 200 | A |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=50A,$V_{GS}$=0V | — | — | 1.5 | V |
| Reverse Recovery Time | $t_{rr}$ | $V_{GS}$=0V,$I_S$=50A, $dI_F/dt$=100A/us, (Note4) | — | 65 | — | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | — | 125 | — | uC |

**Notes**

1. Repetitive Rating:pulse width limited by maximum junction temperature.
2. $V_{DD}$=10V,,L=0.8mH,$R_g$=25Ω,$I_{AS}$=50A , $T_J$=25℃.
3. $I_{SD}$≤$I_D$,dI/dt=_A/us,$V_{DD}$≤$BV_{DSS}$,starting $T_J$=25℃.
4. Pulse width≤300us;duty cycle≤2%.
5. Repetitive rating; pulse width limited by maximum junction temperature.