



50N06 N-Channel Power MOSFET

| | | |
|---------------|-----------------|-------|
| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | I_D |
| 60V | 20mΩ@10V | 50A |

TO-220



- 1. GATE
- 2. DRAIN
- 3. SOURCE

GENERAL DESCRIPTION

The MOSFET 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.

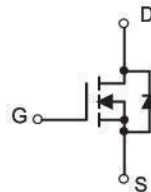
FEATURE

- High density cell design for ultra low R_{dson}
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability

APPLICATION

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

EQUIVALENT CIRCUIT



Maximum ratings ($T_a=25^{\circ}C$ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|-----------------|-----------|---------------|
| Drain-Source Voltage | V_{DS} | 60 | V |
| Gate-Source Voltage | V_{GS} | ±20 | |
| Continuous Drain Current | I_D | 50 | A |
| Pulsed Drain Current | I_{DM} | 220 | |
| Single Pulsed Avalanche Energy* | E_{AS} | 115 | mJ |
| Power Dissipation | P_D | 2 | W |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 62.5 | $^{\circ}C/W$ |
| Junction Temperature | T_J | 150 | $^{\circ}C$ |
| Storage Temperature | T_{stg} | -50 ~+150 | |

* E_{AS} condition: $T_J=25^{\circ}C, V_{DD}=50V, L=0.5mH, R_G=25\Omega, Starting T_J = 25^{\circ}C$

MOSFET ELECTRICAL CHARACTERISTICS

$T_a=25\text{ }^\circ\text{C}$ unless otherwise specified

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---------------|---|-----|-----|-----------|------------|
| Off characteristics | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$ | 60 | | | V |
| Zero gate voltage drain current | I_{DSS} | $V_{DS} = 60V, V_{GS} = 0V$ | | | 1 | μA |
| Gate-body leakage current | I_{GSS} | $V_{DS} = 0V, V_{GS} = \pm 20V$ | | | ± 100 | nA |
| On characteristics (note1) | | | | | | |
| Gate-threshold voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 1.5 | 1.8 | 2.5 | V |
| Static drain-source on-resistance | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 20A$ | | 17 | 20 | m Ω |
| Forward transconductance | g_{fs} | $V_{DS} = 25V, I_D = 20A$ | 24 | | | S |
| Dynamic characteristics (note 2) | | | | | | |
| Input capacitance | C_{iss} | $V_{DS} = 25V, V_{GS} = 0V,$ $f = 1MHz$ | | 900 | | pF |
| Output capacitance | C_{oss} | | | 104 | | |
| Reverse transfer capacitance | C_{rss} | | | 33 | | |
| Switching characteristics (note 2) | | | | | | |
| Total gate charge | Q_g | $V_{DS} = 30V, V_{GS} = 10V,$ $I_D = 50A$ | | 30 | | nC |
| Gate-source charge | Q_{gs} | | | 10 | | |
| Gate-drain charge | Q_{gd} | | | 5 | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD} = 30V, I_D = 2A,$ $V_{GS} = 10V, R_G = 2.5\Omega,$ $R_L = 15\Omega$ | | 25 | | ns |
| Turn-on rise time | t_r | | | 5 | | |
| Turn-off delay time | $t_{d(off)}$ | | | 50 | | |
| Turn-off fall time | t_f | | | 6 | | |
| Drain-Source Diode Characteristics | | | | | | |
| Drain-source diode forward voltage(note1) | V_{SD} | $V_{GS} = 0V, I_S = 40A$ | | | 1.2 | V |
| Continuous drain-source diode forward current | I_S | | | | 50 | A |
| Pulsed drain-source diode forward current | I_{SM} | | | | 220 | A |

Notes:

1. Pulse Test : Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
2. Guaranteed by design, not subject to production.

Typical Characteristics

