

NEC

MOS Field Effect Power Transistor

NP10N45CHB, NP10N45DHB, NP10N45EHB

SWITCHING

N-CHANNEL POWER MOS FET

INDUSTRIAL USE

DESCRIPTION

This product is N-Channel MOS Field Effect Transistor designed for high current switching applications.

FEATURES

- Channel temperature 175 degree rated
- Super Low On-State Resistance
 $R_{DS(on)1} = 0.5\Omega$ Max. ($V_{GS} = 10V, I_D = 5A$)
- Low C_{iss} $C_{iss} = 1600pF$ Typ.
- Built-in Gate Protection Diode

ORDERING INFORMATION

| PART NUMBER | PACKAGE |
|-------------|-----------|
| NP10N45CHB | TO-220AB |
| NP10N45DHB | TO-262AA |
| NP10N45EHB | TO-220SMD |

ABSOLUTE MAXIMUM RATINGS(T_a=25°C)

| | | | |
|--|----------------|---------------|----|
| Drain to Source Voltage | V_{DSS} | 450 | V |
| Gate to Source Voltage | V_{GSS} | ± 30 | V |
| Drain Current(DC) | $I_{D(DC)}$ | ± 10 | A |
| Drain Current(pulse)* | $I_{D(pulse)}$ | ± 40 | A |
| Total Power Dissipation(T _a =25°C) | P_T | 1.5 | W |
| Total Power Dissipation(T _{ch} =25°C) | P_T | 184 | W |
| Single Avalanche Current | I_{AS} | 10 | A |
| Single Avalanche Energy | E_{AS} | 143 | mJ |
| Channel Temperature | T_{ch} | 175 | °C |
| Storage Temperature | T_{stg} | - 55 to + 175 | °C |

* $PW \leq 10\mu s, Duty\ Cycle \leq 1\%$

**Starting $T_{ch} = 25^\circ C, R_G = 25\Omega, T_{GS} 20V \rightarrow 0$

THERMAL RESISTANCE

| | | | |
|--------------------|----------------|------|------|
| Channel to Case | $R_{th(ch-c)}$ | 0.82 | °C/W |
| Channel to Ambient | $R_{th(ch-a)}$ | 100 | °C/W |

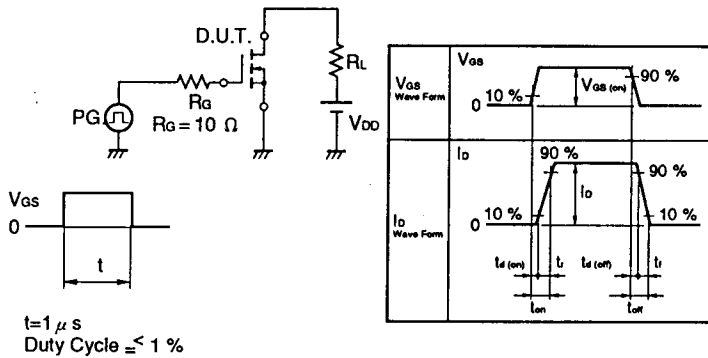
The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device is actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

This information in this document is being issued in advance of the production cycle for the device. The parameter for the device may change before final production or NEC Corporation, at its own discretion, may withdraw the device prior to its production.

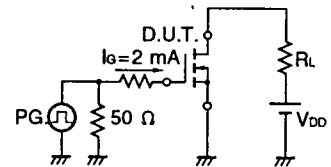
ELECTRICAL CHARACTERISTICS(Ta=25°C)

| CHARACTERISTICS | SYMBOL | TEST CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|--|---------------|------------------------------|------|------|-----------|----------|
| Drain to Source On-state Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=10A$ | | 0.4 | 0.5 | Ω |
| Gate to Source Cutoff Voltage | $V_{GS(off)}$ | $V_{DS}=10V, I_D=1mA$ | 2.5 | | 3.5 | V |
| Forward Transfer Admittance | $ y_{fs} $ | $V_{DS}=10V, I_D=5A$ | 4.0 | | | S |
| Drain Leakage Current | I_{DSS} | $V_{DS}=450V, V_{GS}=0$ | | | 100 | μA |
| Gate to Source Leakage Current | I_{GSS} | $V_{GS}=\pm 30V, V_{DS}=0$ | | | ± 100 | nA |
| Input Capacitance | C_{iss} | $V_{DS}=10V$ | | 1600 | 3600 | pF |
| Output Capacitance | C_{oss} | $V_{GS}=0$ | | 310 | 470 | pF |
| Reverse Transfer Capacitance | C_{rss} | $f=1MHz$ | | 30 | 60 | pF |
| Turn-On Delay Time | $t_{d(on)}$ | $I_D=5A$ | | 30 | 66 | nS |
| Rise Time | t_r | $V_{GS(on)}=10V$ | | 20 | 50 | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | $V_{DD}=150V$ | | 80 | 160 | nS |
| Fall Time | t_f | $R_G=10\Omega, R_L=30\Omega$ | | 20 | 50 | nS |
| Total Gate Charge | Q_G | $I_D=10A$ | | 42 | 63 | nC |
| Gate to Source Charge | Q_{GS} | $V_{DD}=400V$ | | 10 | | nC |
| Gate to Drain Charge | Q_{GD} | $V_{GS}=12V$ | | 20 | | nC |
| Body Diode Forward Voltage | $V_{F(S-D)}$ | $I_F=10A, V_{GS}=0$ | | 1.0 | | V |
| Reverse Recovery Time | t_{rr} | $I_F=10A, V_{GS}=0$ | | 350 | | ns |
| Reverse Recovery Charge | Q_{rr} | $di/dt=50A/\mu s$ | | 1.5 | | μC |

Test Circuit 1 Switching Time

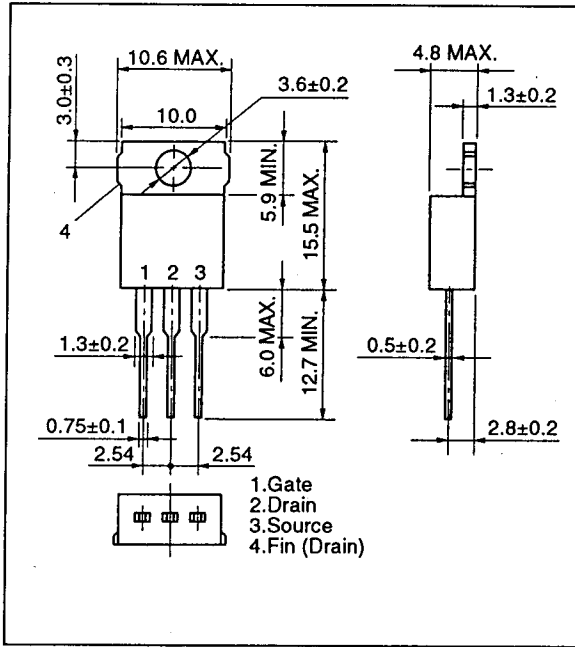


Test Circuit 2 Gate Charge

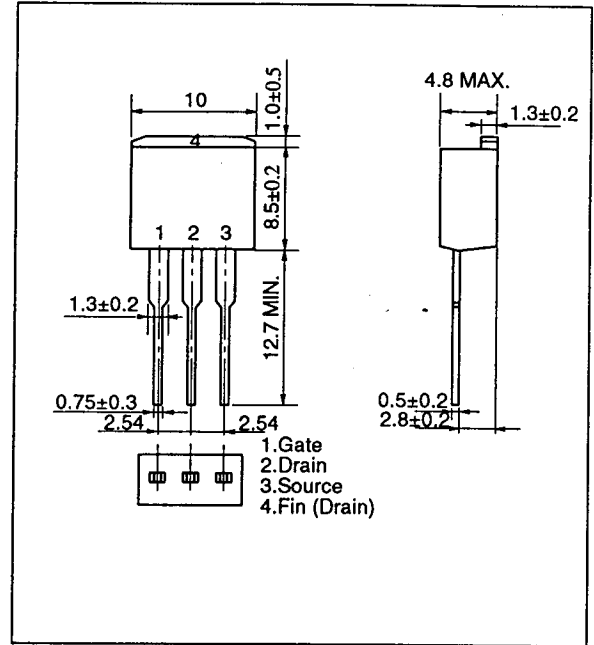


Package Dimensions (in millimeter)

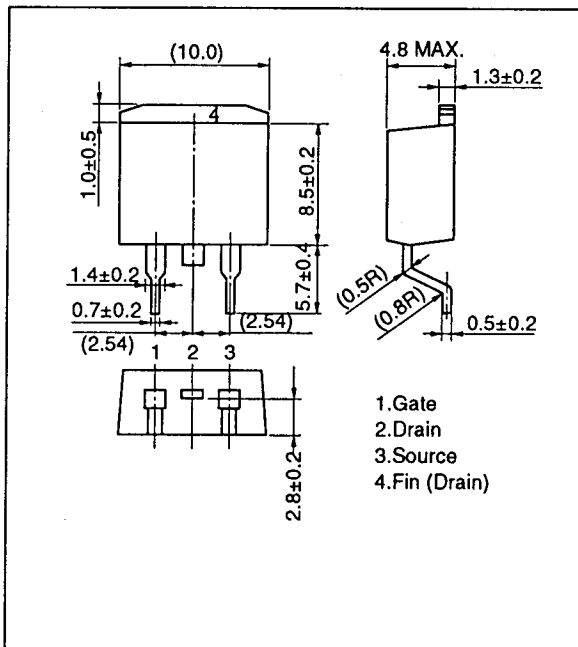
1) TO-220AB(MP-25)



2) TO-262AA(TO-220 Fin Cut:MP-25 Fin Cut)



3) TO-220SMD(JEDEC type:MP-25ZJ)



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Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

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Anti-radioactive design is not implemented in this product.