

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

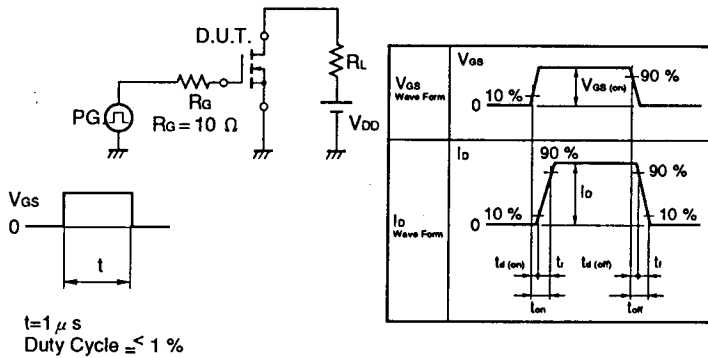
The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device is actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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.

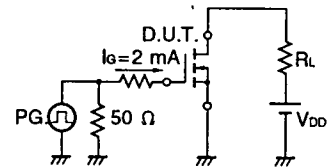
ELECTRICAL CHARACTERISTICS(Ta=25°C)

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

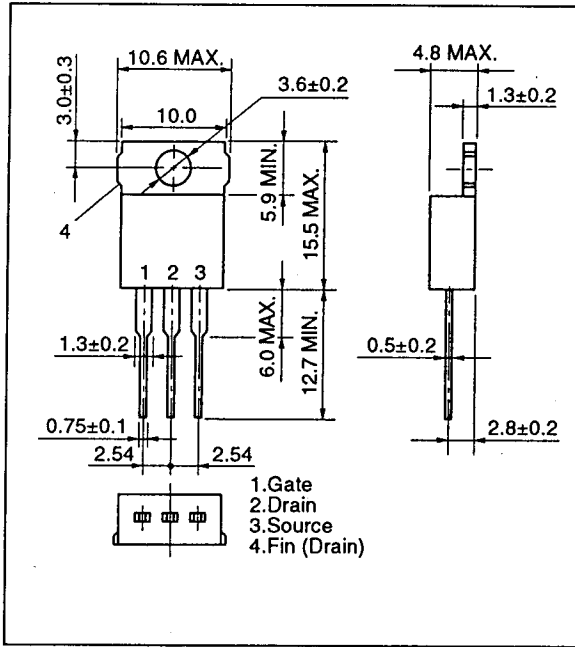


Test Circuit 2 Gate Charge

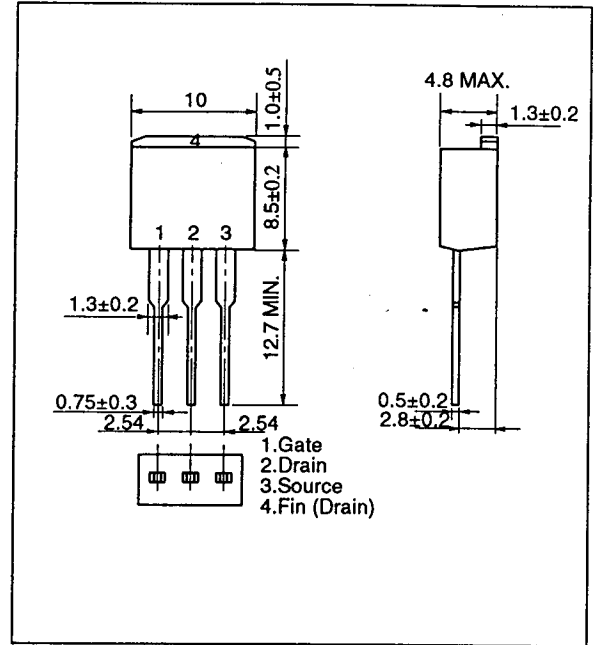


Package Dimensions (in millimeter)

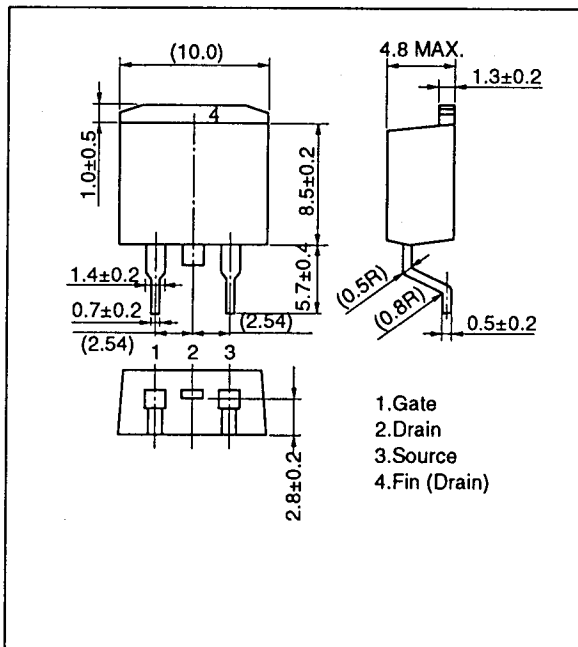
1) TO-220AB(MP-25)



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



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



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Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

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.