

NEC

MOS Field Effect Power Transistor

NP24N10CLB, NP24N10DLB, NP24N10ELB

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
 $R_{DS(on)1} = 80m\Omega$ Max. ($V_{GS}=10V, I_D=12A$)
 $R_{DS(on)2} = 93m\Omega$ Max. ($V_{GS}=5V, I_D=10A$)
- Low C_{iss} $C_{iss} = 1400pF$ Typ.
- Built-in Gate Protection Diode

ORDERING INFORMATION

PART NUMBER	PACKAGE
NP24N10CLB	TO-220AB
NP24N10DLB	TO-262AA
NP24N10ELB	TO-220SMD

ABSOLUTE MAXIMUM RATINGS(T_a=25°C)

Drain to Source Voltage	V_{DSS}	100	V
Gate to Source Voltage	V_{GSS}	± 20	V
Drain Current(DC)	$I_{D(DC)}$	± 24	A
Drain Current(pulse)*	$I_{D(pulse)}$	± 80	A
Total Power Dissipation(T _a =25°C)	P_T	1.8	W
Total Power Dissipation(T _{ch} =25°C)	P_T	100	W
Single Avalanche Current	I_{AS}	24	A
Single Avalanche Energy	E_{AS}	T.B.D.	mJ
Channel Temperature	T_{ch}	175	°C
Storage Temperature	T_{stg}	- 55 to + 175	°C

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

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

THERMAL RESISTANCE

Channel to Case	$R_{th(ch-c)}$	1.50	°C/W
Channel to Ambient	$R_{th(ch-a)}$	83.3	°C/W

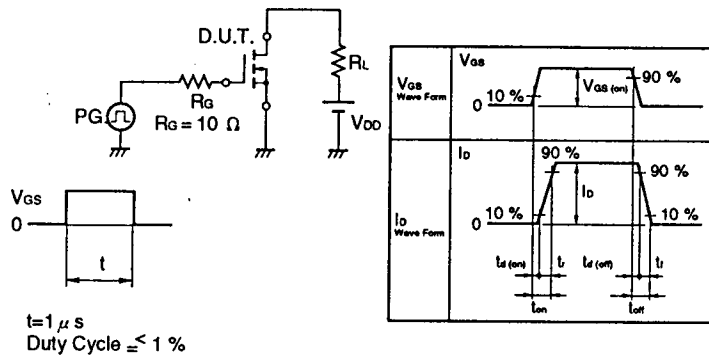
The diode connected between the gate and source of the transistor serves as a protector against ESD. When this device actually used, an additional protection circuit is externally required if a voltage exceeding the rated voltage may be applied to this device.

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.

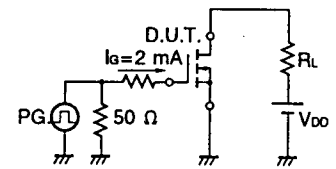
ELECTRICAL CHARACTERISTICS(Ta=25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	$R_{DS(on)1}$	$V_{GS}=10V, I_D=12A$		58	80	mΩ
	$R_{DS(on)2}$	$V_{GS}=5V, I_D=10A$		65	93	mΩ
	$R_{DS(on)3}$	$V_{GS}=4V, I_D=10A$		70	100	mΩ
Gate to Source Cutoff Voltage	$V_{GS(off)}$	$V_{DS}=10V, I_D=1mA$	1.0	1.7	2.0	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS}=10V, I_D=10A$	12	19		S
Drain Leakage Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0$			10	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0$			±10	μA
Input Capacitance	C_{iss}	$V_{DS}=10V$		1400	3100	pF
Output Capacitance	C_{oss}	$V_{GS}=0$		470	710	pF
Reverse Transfer Capacitance	C_{rss}	$f=1MHz$		150	270	pF
Turn-On Delay Time	$t_{d(on)}$	$I_D=10A$		21	47	nS
Rise Time	t_r	$V_{GS(on)}=10V$		110	280	nS
Turn-Off Delay Time	$t_{d(off)}$	$V_{DD}=50V$		140	280	nS
Fall Time	t_f	$R_G=10\Omega$		110	280	nS
Total Gate Charge	Q_G	$I_D=20A$		51	77	nC
Gate to Source Charge	Q_{GS}	$V_{DD}=80V$		4.9		nC
Gate to Drain Charge	Q_{GD}	$V_{GS}=10V$		15		nC
Body Diode Forward Voltage	$V_{F(S-D)}$	$I_F=20A, V_{GS}=0$		1.1		V
Reverse Recovery Time	t_{rr}	$I_F=20A, V_{GS}=0$		170		ns
Reverse Recovery Charge	Q_{rr}	$di/dt=100A/\mu s$		770		nC

Test Circuit 1 Switching Time

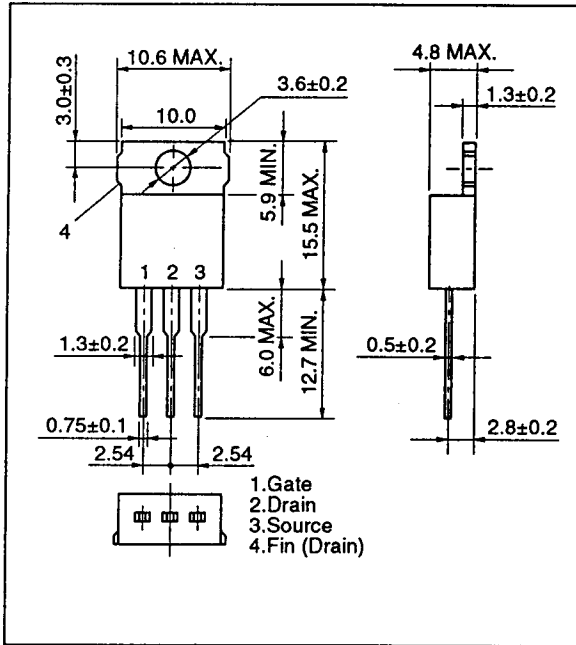


Test Circuit 2 Gate Charge

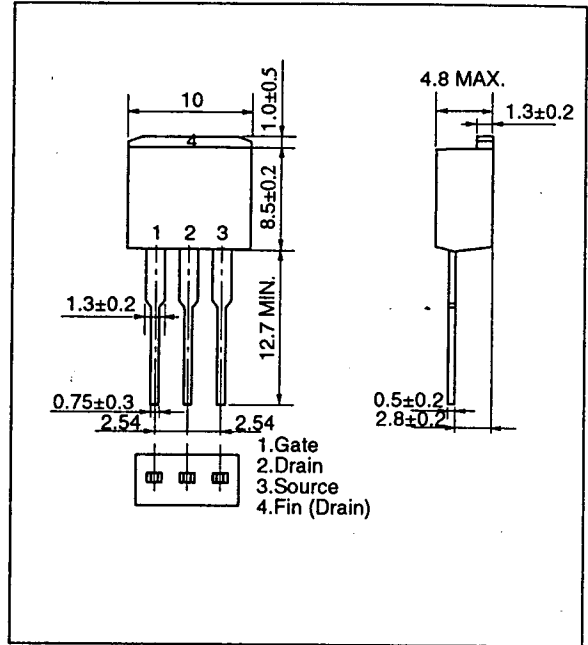


Package Dimensions (in millimeter)

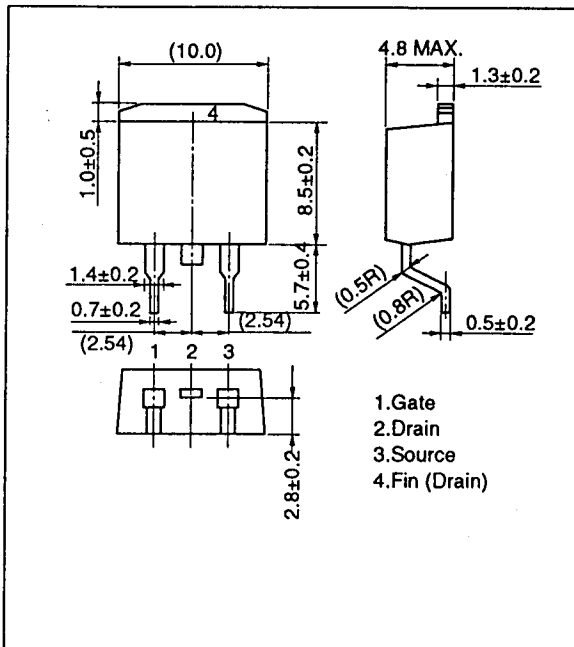
1) TO-220AB(MP-25)



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.