NEC

MOS FIELD EFFECT TRANSISTOR
NP32N06CLD,NP32N06DLD,NP32N06ELD

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
  $R_{DS(on)1}$ = 34 mΩ (MAX.) (V_{GS} = 10 V, I_D = 16 A)
  $R_{DS(on)2}$ = 40 mΩ (MAX.) (V_{GS} = 5 V, I_D = 16 A)
- Low C_{iss} : C_{iss} = 870 pF (TYP.)
- Built-in Gate protection diode

ORDERING INFORMATION

PART NUMBER	PACKAGE
NP32N06CLD	TO-220AB
NP32N06DLD	TO-262
NP32N06ELD	TO-263

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

Drain to Source Voltage	V_{DSS}	60	V
Gate to Source Voltage	V_{GSS}	±20	V
Drain Current (DC)	$I_{D(DC)}$	±32	A
Drain Current (Pulse) Note1	$I_{D(pulse)}$	±100	A
Total Power Dissipation (T_A = 25 °C)	P_T	1.8	W
Total Power Dissipation (T_{ch} = 25 °C)	P_T	60	W
Single Avalanche Current	I_{AS}	TBD	A
Single Avalanche Energy Note2	E_{AS}	TBD	mJ
Channel Temperature	T_{ch}	175	°C
Storage Temperature	T_{stg}	–55 to + 175	°C

Notes 1. PW ≤ 10 μs, Duty cycle ≤ 1 %

2. Starting T_{ch} = 25 °C, R_G = 25 Ω, V_{GS} = 20 V →0

THERMAL RESISTANCE

Channel to Case	Rth(ch-C)	2.5	°C/W
Channel to Ambient	Rth(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.

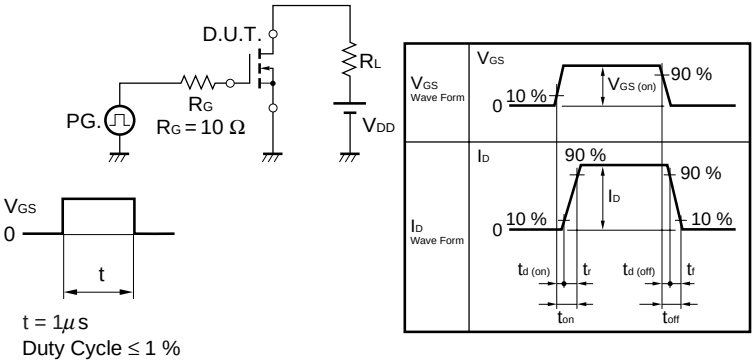
The information contained in this document is being issued in advance of the production cycle for the device. The parameters for the device may change before final production or NEC Corporation, at its own discretion, may withdraw the device prior to its production.

Document No. D13791EJ2V0PM00 (2nd edition)
Date Published January 1999 NS CP(K)
Printed in Japan

ELECTRICAL CHRACTERISTICS (T_A = 25 °C)

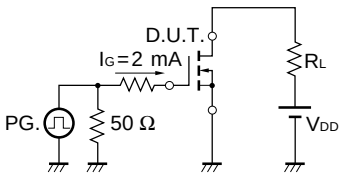
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Drain to Source On-state Resistance	$R_{DS(on)1}$	V_{GS} = 10 V, I_D = 16 A		25	34	mΩ
	$R_{DS(on)2}$	V_{GS} = 5 V, I_D = 16 A		31	40	mΩ
	$R_{DS(on)3}$	V_{GS} = 4 V, I_D = 16 A		37	50	mΩ
Gate to Source Cut-off Voltage	$V_{GS(off)}$	V_{DS} = 10 V, I_D = 250 μA	1.0	1.5	2.0	V
Forward Transfer Admittance	$\|y_{fs}\|$	V_{DS} = 10 V, I_D = 16 A	8	21		S
Drain Leakage Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V			10	μA
Gate to Source Leakage Current	I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V			±10	μA
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1 MHz		870	1310	pF
Output Capacitance	C_{oss}			190	290	pF
Reverse Transfer Capacitance	C_{rss}			82	150	pF
Turn-on Delay Time	$t_{d(on)}$	I_D = 16 A, $V_{GS(on)}$ = 10 V, V_{DD} = 30 V,		23	50	ns
Rise Time	t_r	R_G = 10 Ω		280	700	ns
Turn-off Delay Time	$t_{d(off)}$			65	130	ns
Fall Time	t_f			90	230	ns
Total Gate Charge 1	Q_{G1}	I_D = 32 A, V_{DD} = 48 V, V_{GS} = 10 V		23	35	nC
Total Gate Charge 2	Q_{G2}	I_D = 32 A, V_{DD} = 48 V, V_{GS} = 5 V		13	20	nC
Gate to Source Charge	Q_{GS}			3.7		nC
Gate to Drain Charge	Q_{GD}			7.2		nC
Body Diode Forward Voltage	$V_{F(S-D)}$	I_F = 32 A, V_{GS} = 0 V		1.0		V
Reverse Recovery Time	t_{rr}	I_F = 32 A, V_{GS} = 0 V, di/dt = 100 A/μs		50		ns
Reverse Recovery Charge	Q_{rr}			68		nC

TEST CIRCUIT 1 SWITCHING TIME



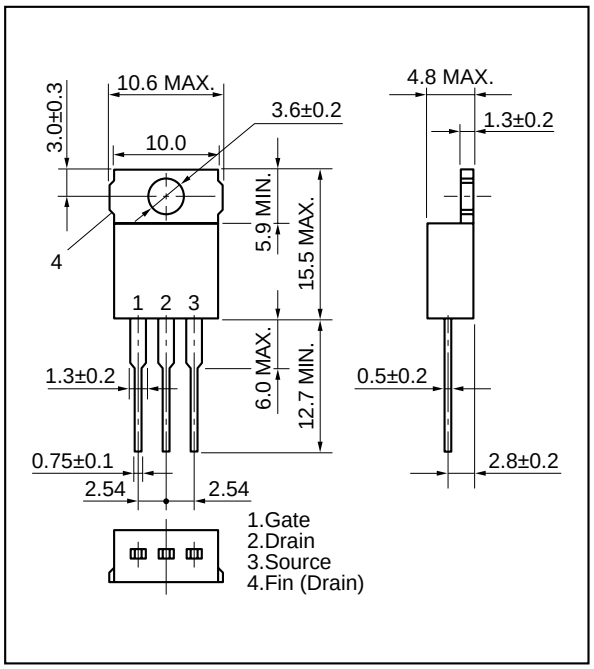
t = 1μs
Duty Cycle ≤ 1 %

TEST CIRCUIT 2 GATE CHARGE

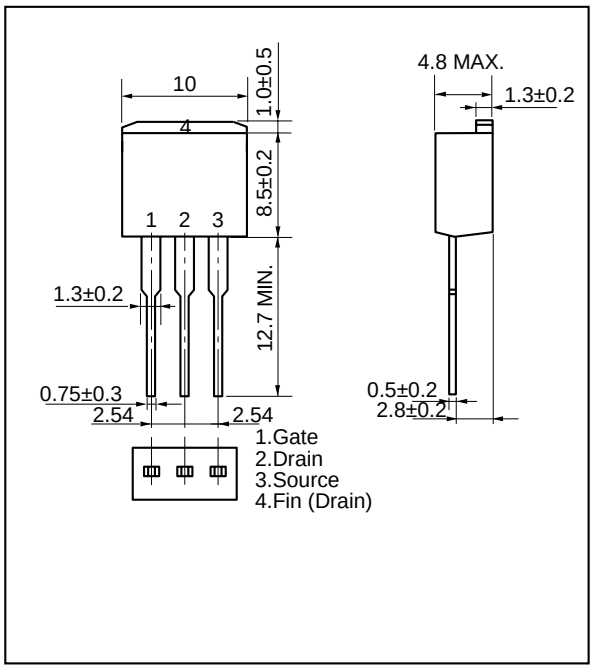


PACKAGE DRAWINGS (Unit : mm)

1. TO-220AB (MP-25)



2. TO-262 (MP-25 Fin Cut)



3. TO-263 (JEDEC type : MP-25ZJ)