

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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Not recommended
for new design

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MOS FIELD EFFECT TRANSISTOR NP82N06MLG, NP82N06NLG

SWITCHING N-CHANNEL POWER MOS FET

DESCRIPTION

The NP82N06MLG and NP82N06NLG are N-channel MOS Field Effect Transistors designed for high current switching applications.

ORDERING INFORMATION

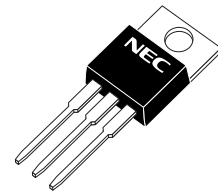
PART NUMBER	LEAD PLATING	PACKING	PACKAGE
NP82N06MLG-S18-AY ^{Note}	Pure Sn (Tin)	Tube	TO-220 (MP-25K) typ. 1.9 g
NP82N06NLG-S18-AY ^{Note}		50 p/tube	TO-262 (MP-25SK) typ. 1.8 g

Note Pb-free (This product does not contain Pb in the external electrode.)

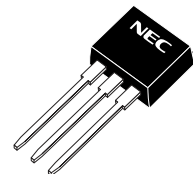
FEATURES

- Logic level
- Built-in gate protection diode
- Super low on-state resistance
 - $R_{DS(on)1} = 7.4 \text{ m}\Omega \text{ MAX. (} V_{GS} = 10 \text{ V, } I_D = 41 \text{ A)}$
 - $R_{DS(on)2} = 9.7 \text{ m}\Omega \text{ MAX. (} V_{GS} = 5 \text{ V, } I_D = 41 \text{ A)}$
- High current rating
 - $I_{D(DC)} = \pm 82 \text{ A}$
- Low input capacitance
 - $C_{iss} = 5700 \text{ pF TYP.}$
- Designed for automotive application and AEC-Q101 qualified

(TO-220)



(TO-262)



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Drain to Source Voltage (V _{GS} = 0 V)	V _{DSS}	60	V
Gate to Source Voltage (V _{DS} = 0 V)	V _{GSS}	±20	V
Drain Current (DC) (T _c = 25°C)	I _{D(DC)}	±82	A
Drain Current (pulse) ^{Note1}	I _{D(pulse)}	±270	A
Total Power Dissipation (T _c = 25°C)	P _{T1}	143	W
Total Power Dissipation (T _A = 25°C)	P _{T2}	1.8	W
Channel Temperature	T _{ch}	175	°C
Storage Temperature	T _{stg}	-55 to +175	°C
Repetitive Avalanche Current ^{Note2}	I _{AR}	37	A
Repetitive Avalanche Energy ^{Note2}	E _{AR}	137	mJ

Notes 1. PW ≤ 10 μs, Duty Cycle ≤ 1%

2. T_{ch} ≤ 150°C, R_G = 25 Ω

THERMAL RESISTANCE

Channel to Case Thermal Resistance	R _{th(ch-C)}	1.05	°C/W
Channel to Ambient Thermal Resistance	R _{th(ch-A)}	83.3	°C/W

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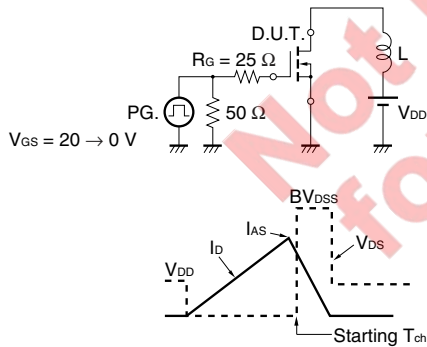
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ELECTRICAL CHARACTERISTICS (T_A = 25°C)

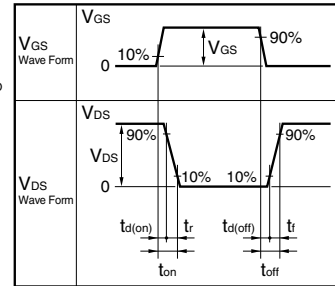
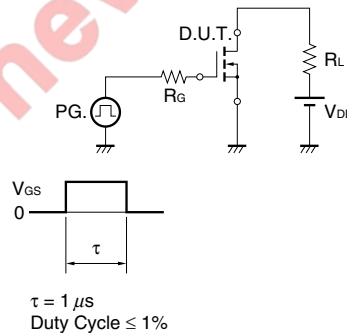
CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 60 V, V _{GS} = 0 V			1	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±20 V, V _{DS} = 0 V			±10	μA
Gate to Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.5		2.5	V
Forward Transfer Admittance ^{Note}	y _{fs}	V _{DS} = 5 V, I _D = 41 A	19	68		S
Drain to Source On-state Resistance ^{Note}	R _{DS(on)1}	V _{GS} = 10 V, I _D = 41 A		5.9	7.4	mΩ
	R _{DS(on)2}	V _{GS} = 5 V, I _D = 41 A		6.7	9.7	mΩ
Input Capacitance	C _{iss}	V _{DS} = 25 V,		5700	8550	pF
Output Capacitance	C _{oss}	V _{GS} = 0 V,		420	630	pF
Reverse Transfer Capacitance	C _{rss}	f = 1 MHz		275	500	pF
Turn-on Delay Time	t _{d(on)}	V _{DD} = 20 V, I _D = 41 A,		28	70	ns
Rise Time	t _r	V _{GS} = 10 V,		22	60	ns
Turn-off Delay Time	t _{d(off)}	R _G = 0 Ω		79	160	ns
Fall Time	t _f			9	30	ns
Total Gate Charge	Q _G	V _{DD} = 48 V,		106	160	nC
Gate to Source Charge	Q _{GS}	V _{GS} = 10 V,		29		nC
Gate to Drain Charge	Q _{GD}	I _D = 82 A		35		nC
Body Diode Forward Voltage ^{Note}	V _{F(S-D)}	I _F = 82 A, V _{GS} = 0 V		0.9	1.5	V
Reverse Recovery Time	t _{rr}	I _F = 82 A, V _{GS} = 0 V,		43		ns
Reverse Recovery Charge	Q _{rr}	di/dt = 100 A/μs		65		nC

Note Pulsed test

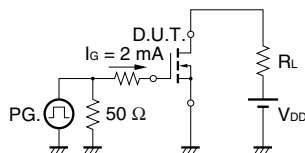
TEST CIRCUIT 1 AVALANCHE CAPABILITY



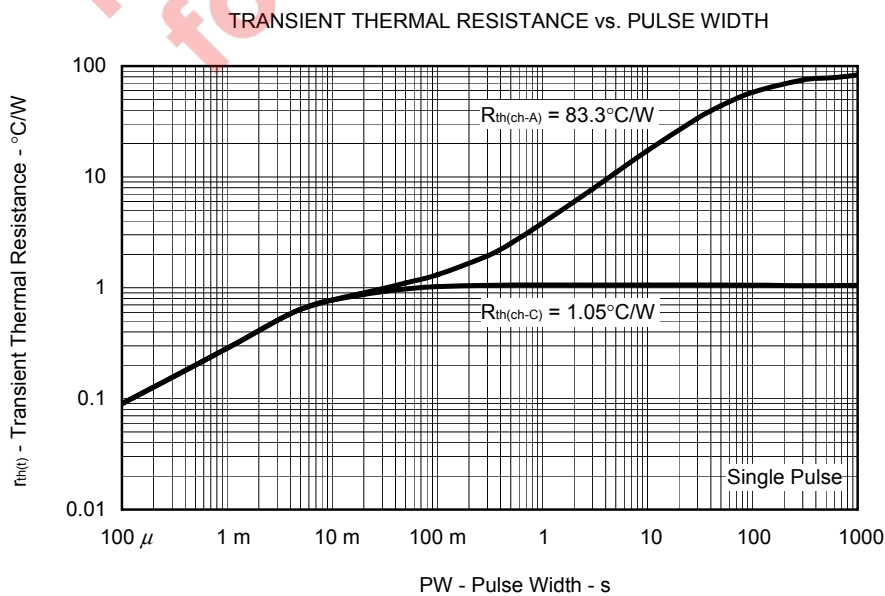
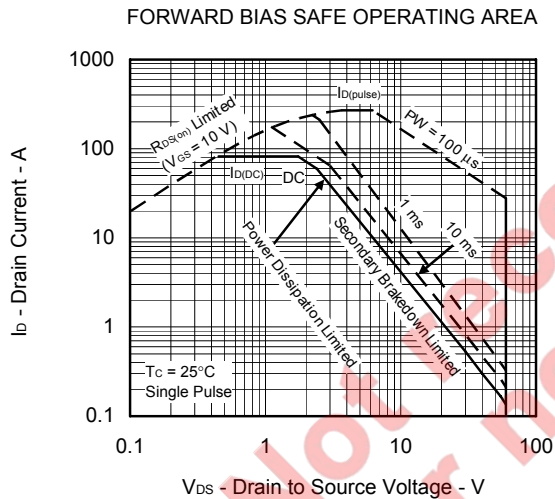
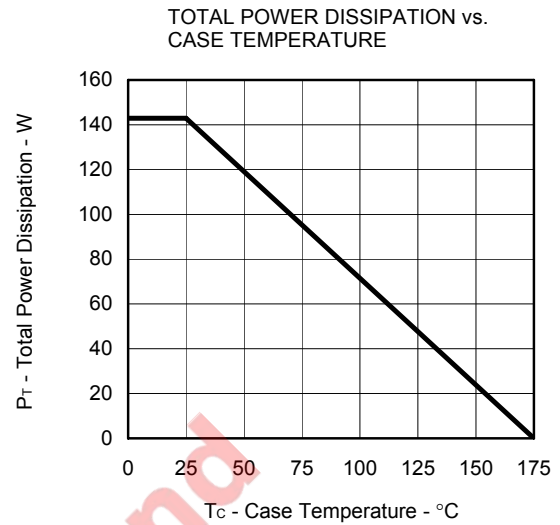
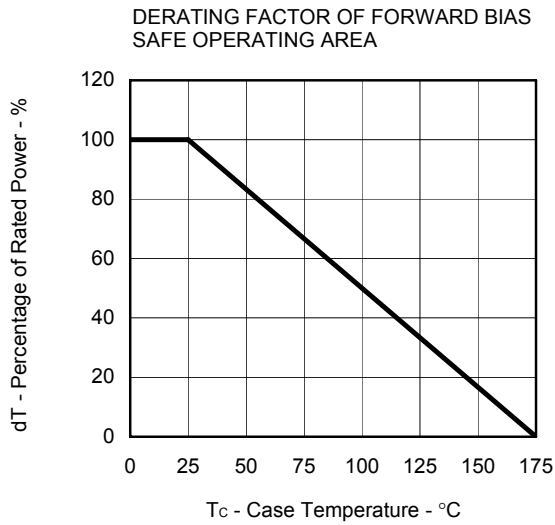
TEST CIRCUIT 2 SWITCHING TIME



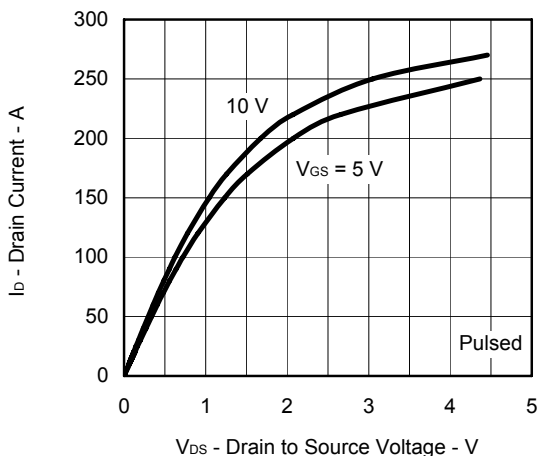
TEST CIRCUIT 3 GATE CHARGE



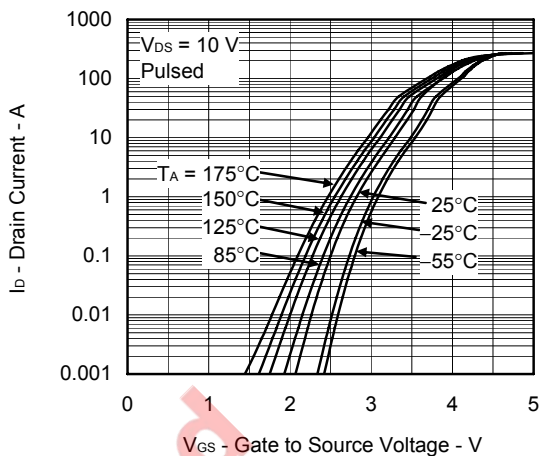
TYPICAL CHARACTERISTICS (T_A = 25°C)



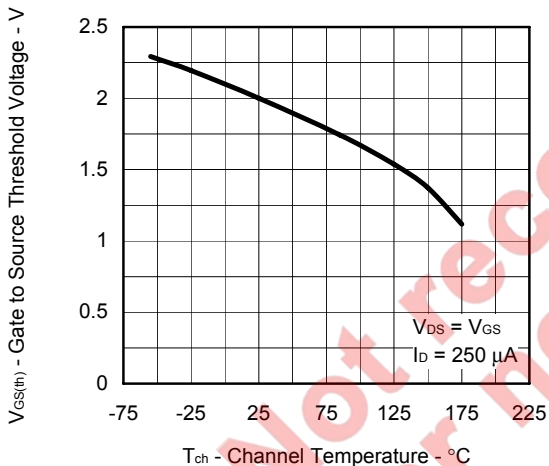
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



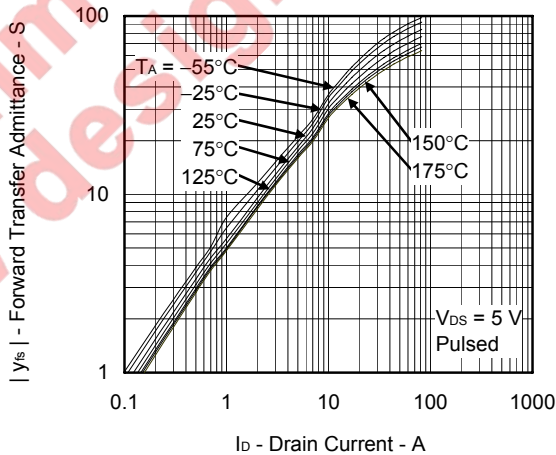
FORWARD TRANSFER CHARACTERISTICS



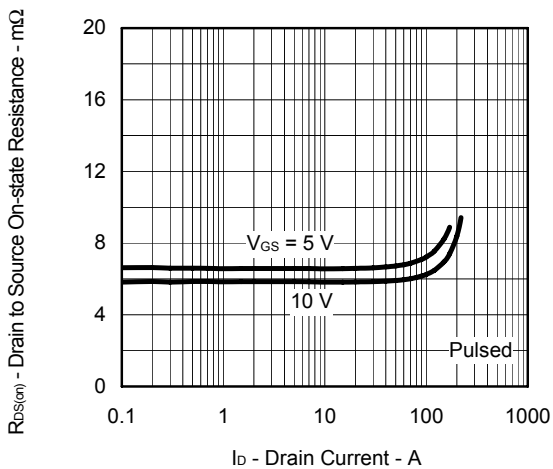
GATE TO SOURCE THRESHOLD VOLTAGE vs. CHANNEL TEMPERATURE



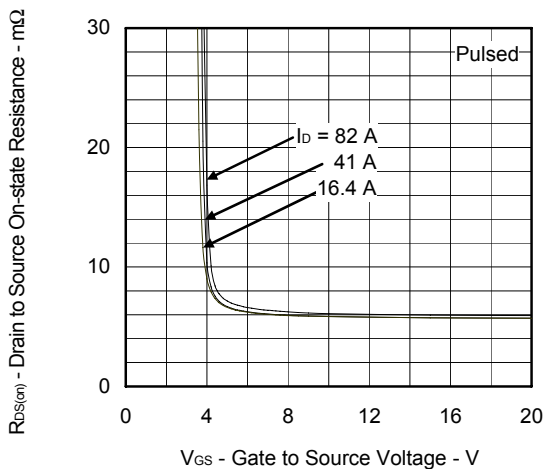
FORWARD TRANSFER ADMITTANCE vs. DRAIN CURRENT



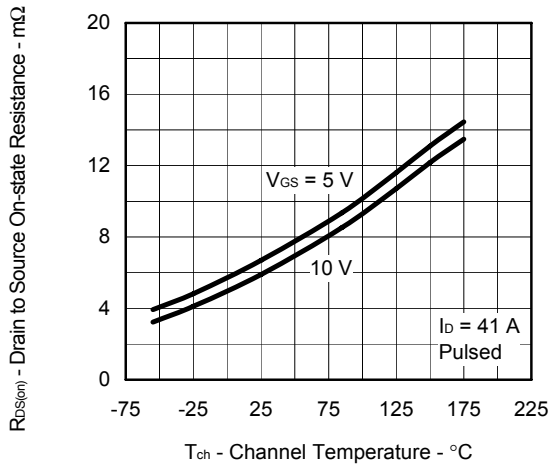
DRAIN TO SOURCE ON-STATE RESISTANCE vs. DRAIN CURRENT



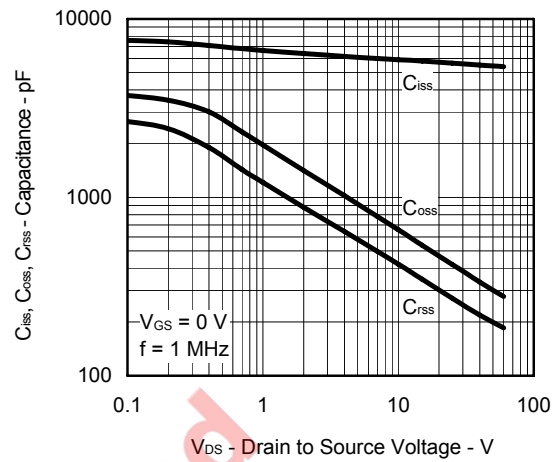
DRAIN TO SOURCE ON-STATE RESISTANCE vs. GATE TO SOURCE VOLTAGE



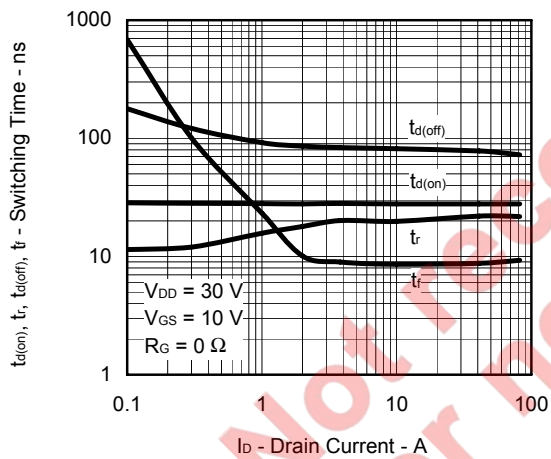
DRAIN TO SOURCE ON-STATE RESISTANCE vs. CHANNEL TEMPERATURE



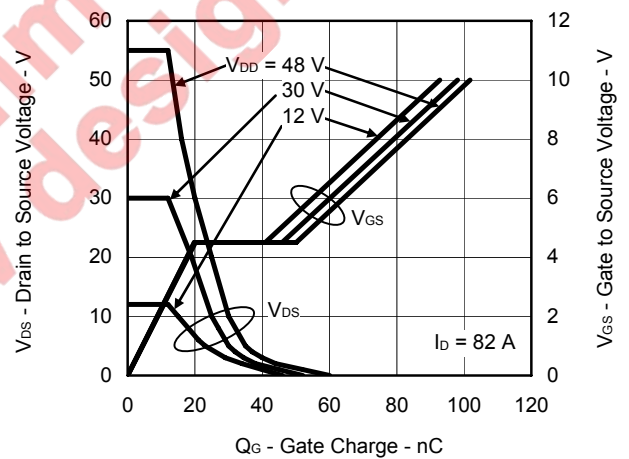
CAPACITANCE vs. DRAIN TO SOURCE VOLTAGE



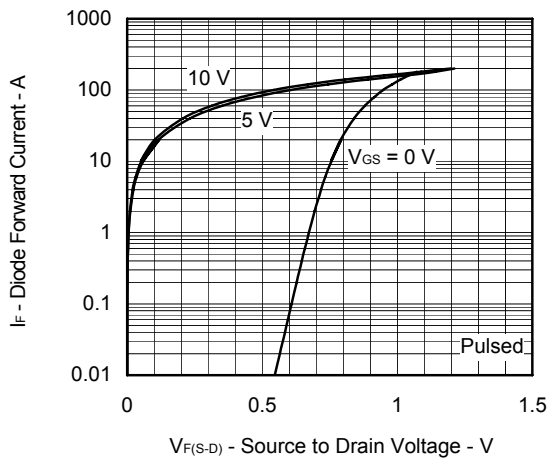
SWITCHING CHARACTERISTICS



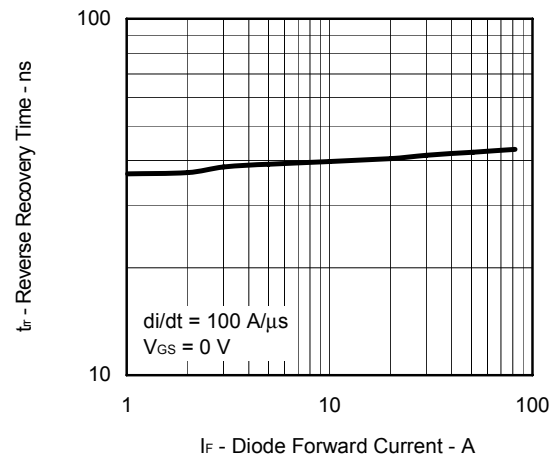
DYNAMIC INPUT/OUTPUT CHARACTERISTICS



SOURCE TO DRAIN DIODE FORWARD VOLTAGE

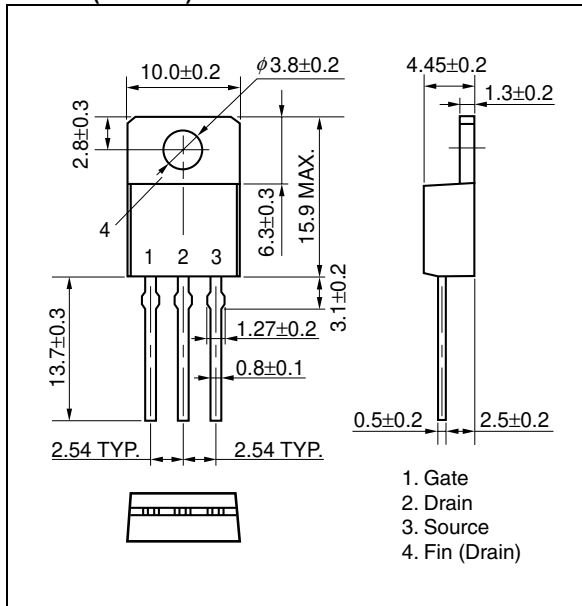


REVERSE RECOVERY TIME vs. DIODE FORWARD CURRENT

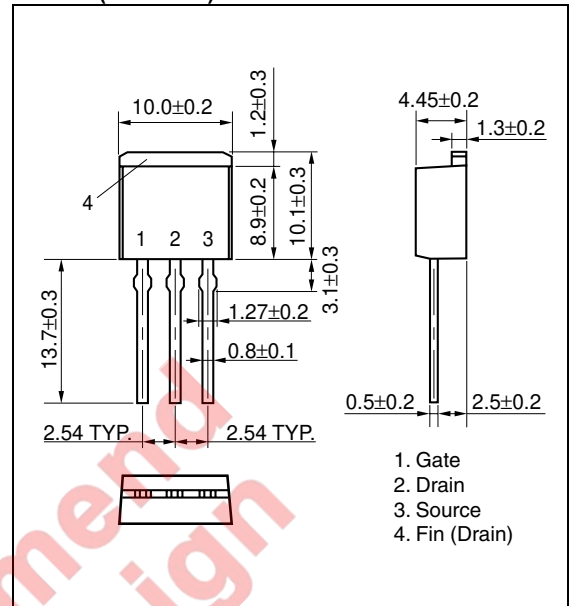


PACKAGE DRAWINGS (Unit: mm)

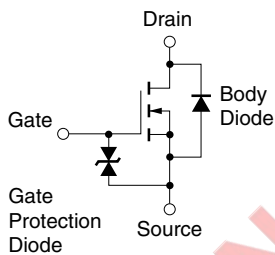
TO-220 (MP-25K)



TO-262 (MP-25SK)

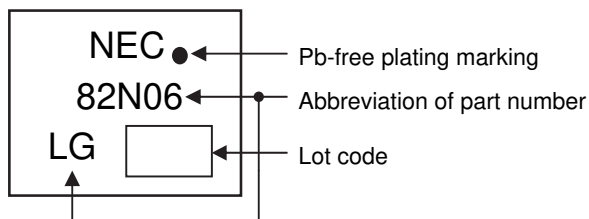


EQUIVALENT CIRCUIT



Remark 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.

MARKING INFORMATION



RECOMMENDED SOLDERING CONDITIONS

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For soldering methods and conditions other than those recommended below, please contact an NEC Electronics sales representative.

For technical information, see the following website.

Semiconductor Device Mount Manual (<http://www.necel.com/pkg/en/mount/index.html>)

Soldering Method	Soldering Conditions	Recommended Condition Symbol
Wave soldering NP82N06MLG, NP82N06NLG	Maximum temperature (Solder temperature): 260°C or below Time: 10 seconds or less Maximum chlorine content of rosin flux: 0.2% (wt.) or less	THDWS
Partial heating NP82N06MLG, NP82N06NLG	Maximum temperature (Pin temperature): 350°C or below Time (per side of the device): 3 seconds or less Maximum chlorine content of rosin flux: 0.2% (wt.) or less	P350

Caution Do not use different soldering methods together (except for partial heating).

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