

100V N-Channel Enhancement Mode MOSFET

Description

The NP12N10G uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. It can be used in a wide variety of applications.

General Features

- ◆ $V_{DS} = 100V$, $I_D = 12A$
 $R_{DS(ON)}(Typ.) = 105m\Omega$ @ $V_{GS} = 10V$
 $R_{DS(ON)}(Typ.) = 122m\Omega$ @ $V_{GS} = 4.5V$
- ◆ High density cell design for ultra low R_{dson}
- ◆ Fully characterized avalanche voltage and current
- ◆ Good stability and uniformity with high E_{AS}
- ◆ Excellent package for good heat dissipation
- ◆ Special process technology for high ESD capability

Application

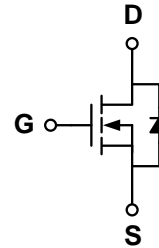
- ◆ Automotive applications
- ◆ Hard switched and high frequency circuits
- ◆ Uninterruptible power supply

Package

- ◆ TO-252-2L



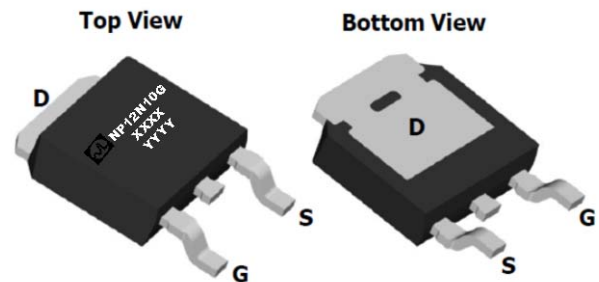
Schematic diagram



Marking and pin assignment

TO-252-2L

(Top View)



XXXX—Wafer Information

YYYY—Quality Code

Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
NP12N10G-G	-55°C to +150°C	TO-252-2L	2500

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

parameter		symbol	limit	unit
Drain-source voltage		V_{DS}	100	V
Gate-source voltage		V_{GS}	±20	V
Continuous Drain Current	TC=25°C	I_D	12	A
	TC=100°C		8	
Pulsed Drain Current		I_{DP}	48	A
Avalanche energy(L=0.5mH) ^(note1)		E_{AS}	25	mJ
Maximum power dissipation	TC=25°C	P_D	50	W
Operating junction Temperature range		T_j	-55—150	°C

Electrical Characteristics (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit	
Static Characteristics							
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$	$T_J=25^\circ C$	-	-	1	μA
			$T_J=85^\circ C$	-	-	30	
Gate Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA	
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.6	2.5	V	
Drain-source on-state resistance ¹	$R_{DS(ON)}$	$V_{GS}=10V, I_D=12A$	-	105	130	m Ω	
		$V_{GS}=4.5V, I_D=10A$	-	122	150		
On Status Drain Current	$I_{D(ON)}$	$V_{DS}=100V, V_{GS}=10V$	12	-	-	A	
Diode Characteristics							
Diode Continuous Forward Current	I_S		-	-	12	A	
Reverse Recovery Time	t_{rr}	$I_F=12A,$	-	22	-	ns	
Reverse Recovery Charge	Q_{rr}	$di/dt=100A/us$	-	90	-	nC	
Dynamic Characteristics²							
Input capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=50V$ $f=1.0MHz$	-	730	-	pF	
Output capacitance	C_{OSS}		-	36	-		
Reverse transfer capacitance	C_{RSS}		-	31	-		
Turn-on delay time	$t_{D(ON)}$	$V_{GS}=10V, V_{DS}=50V, I_D=12A$	-	15	-	ns	
Turn-on Rise time	t_r		-	5	-		
Turn-off delay time	$t_{D(OFF)}$		-	25	-		
Turn-off Fall time	t_f		-	7	-		
Total gate charge	Q_g	$V_{GS}=10V, I_D=12A$ $V_{DS}=50V$	-	19	-	nC	
Gate-source charge	Q_{gs}		-	4.6	-		
Gate-drain charge	Q_{gd}		-	4.1	-		
Drain-Source Diode Characteristics							
Diode forward voltage	V_{SD}	$I_{SD}=12A, V_{GS}=0V$	-	0.8	1.1	V	

Note: 1: Eas test: VDD=50V, RG=50ohm, L=500uH

2: Pulse test; pulse width $\leq 300ns$, duty cycle $\leq 2\%$.

3: Guaranteed by design, not subject to production testing.

Typical Performance Characteristics

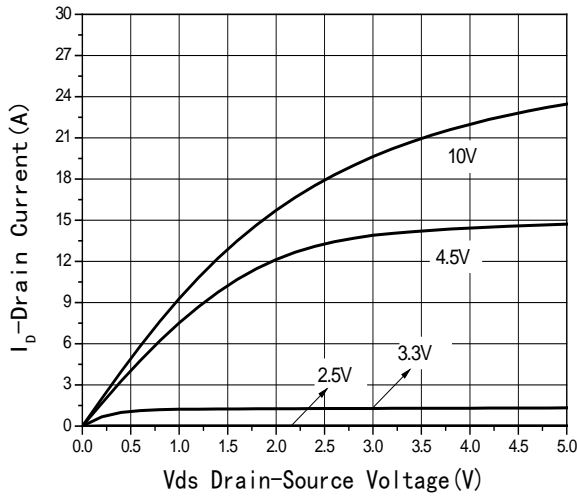


Fig1 Output Characteristics

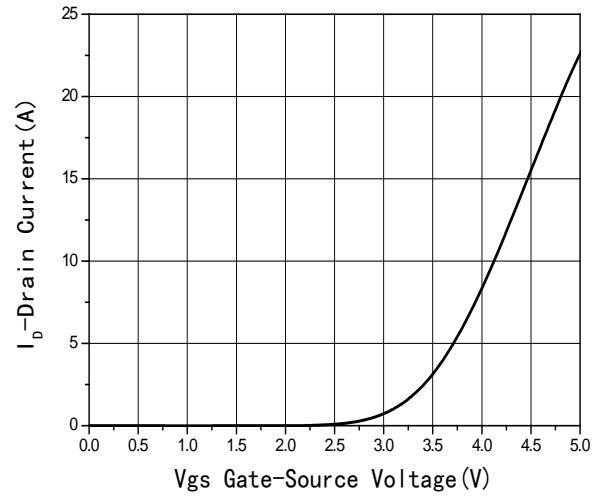


Fig2 Transfer Characteristics

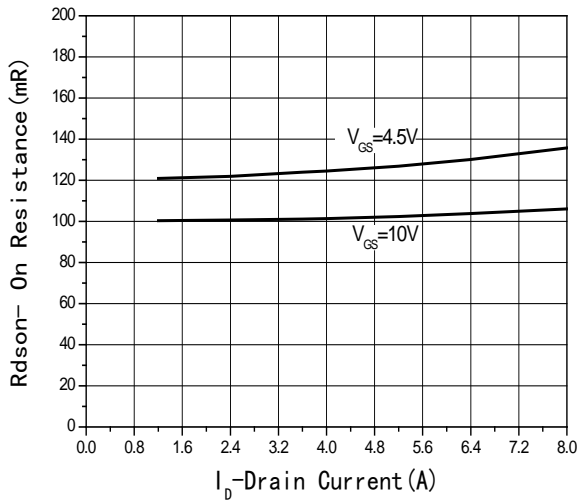


Fig3 Rdson-Drain current

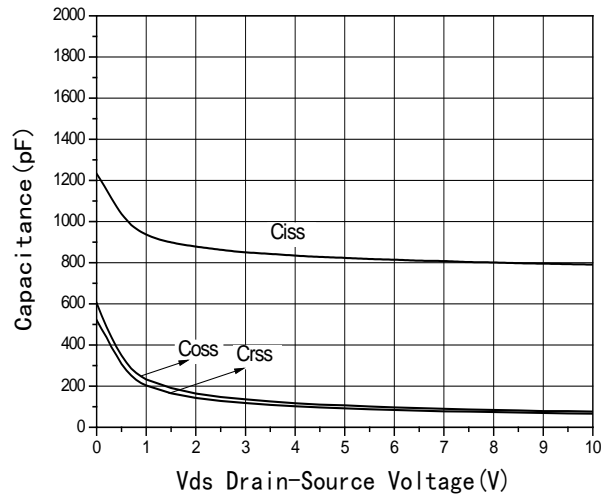


Fig4 Capacitance vs V_DS

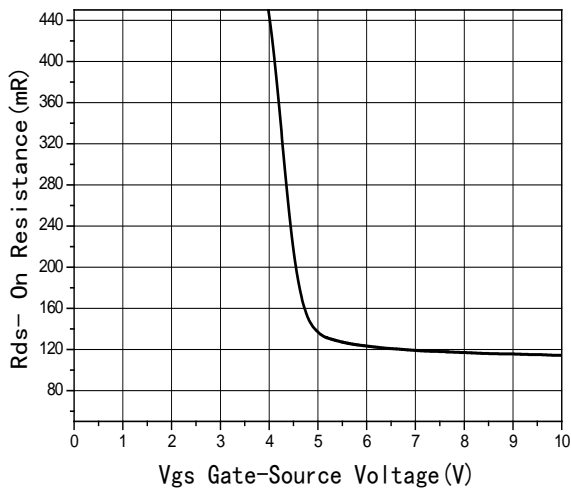


Fig5 Rdson-Gate Drain voltage

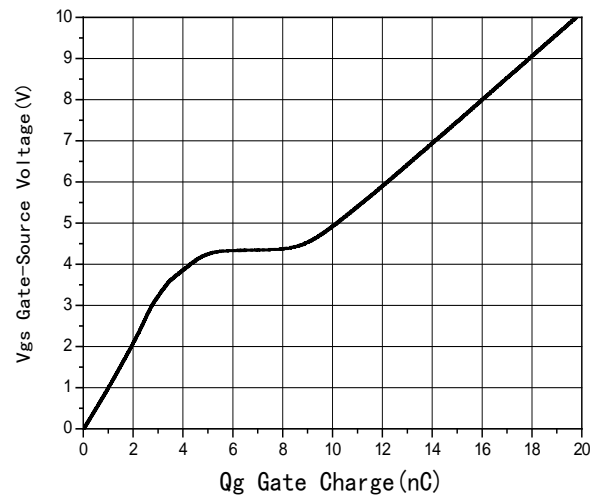


Fig6 Gate Charge

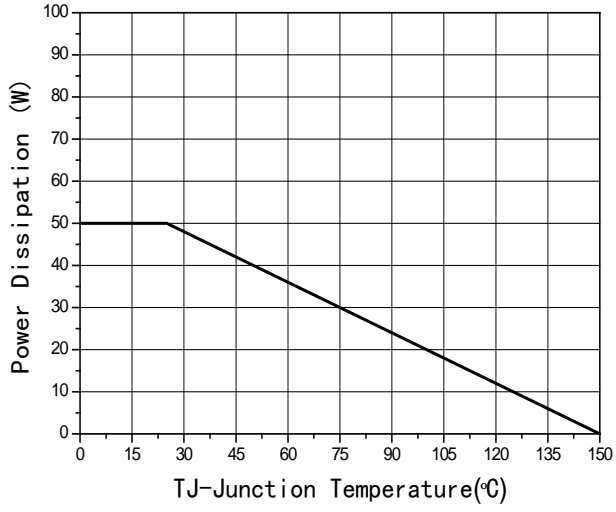


Fig7 Power De-rating

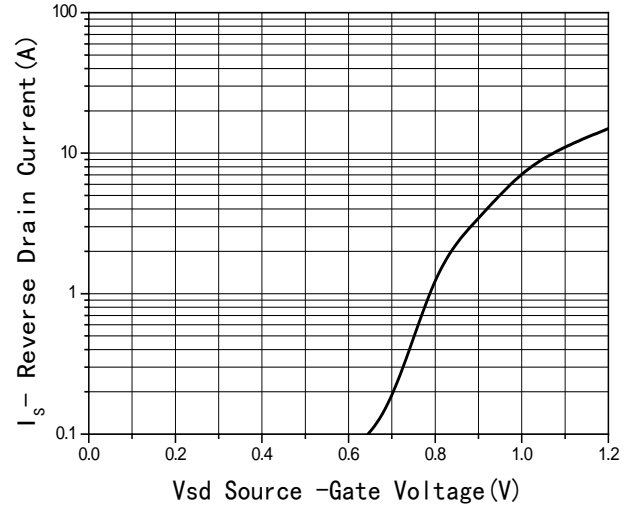
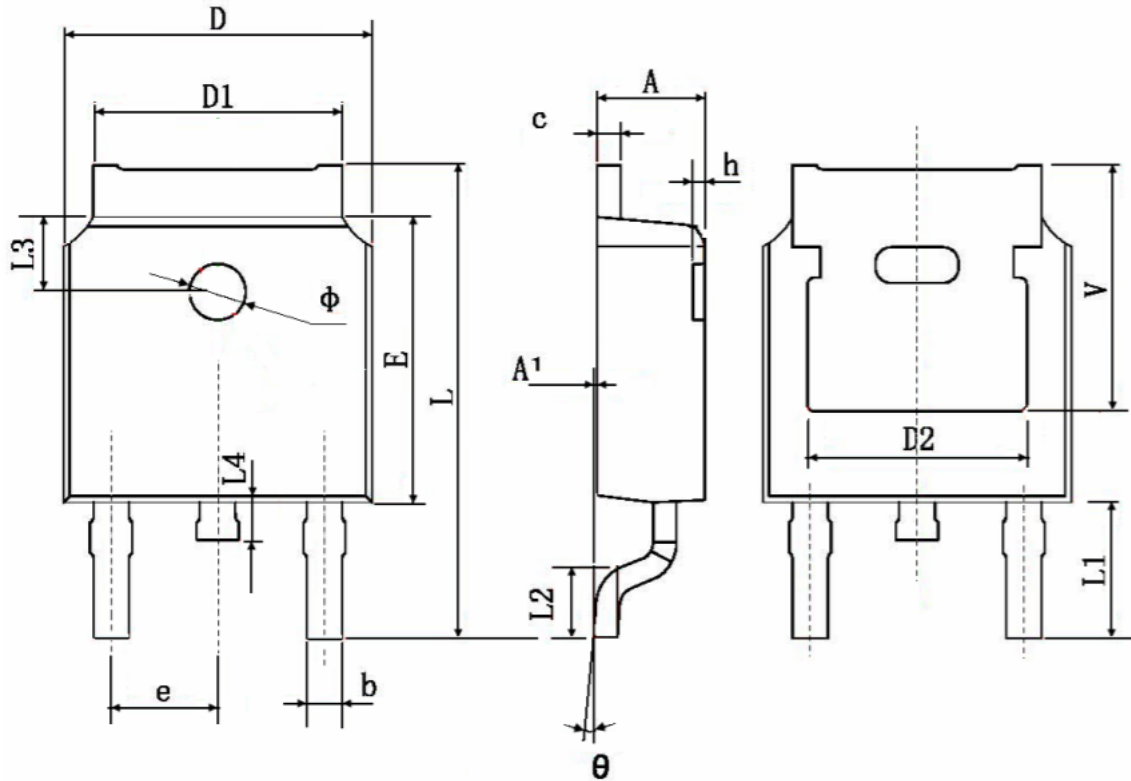


Fig8 Source-Drain Diode Forward

Package Information

- TO-252-2L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	