20V N-Channel Enhancement Mode MOSFET

Description

The NP2060G 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} =20V，I_D =60A
  $R_{DS(ON)}$(Typ.)=4.8mΩ @V_{GS}=4.5V
  $R_{DS(ON)}$(Typ.)= 6.2mΩ @V_{GS}=2.5V
- High density cell design for ultra low Rdson
- 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

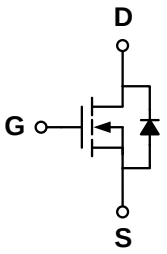
Application

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

Package

- TO-252-2L

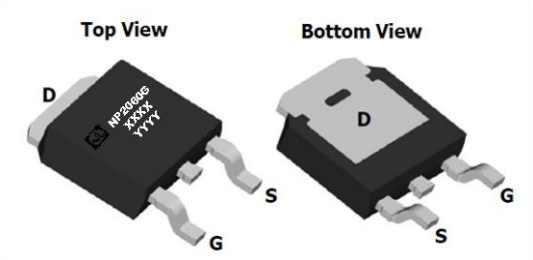
Schematic diagram



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
NP2060G	-55°C to +150°C	TO-252-2L	2500

Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

parameter		symbol	limit	unit
Drain-source voltage		V_{DS}	20	V
Gate-source voltage		V_{GS}	±12	V
Continuous Drain Current	TC=25°C	I_D	60	A
	TC=100°C		42	
Pulsed Drain Current		I_{DP}	210	A
Avalanche energy(L=0.5mH) (note1)		E_{AS}	200	mJ
Maximum power dissipation	TC=25°C	P_D	60	W
Operating junction Temperature range		Tj	-55—150	℃

Electrical Characteristics (TA=25℃ unless otherwise noted)

Parameter	Symbol	Condition		Min	Typ	Max	Unit
Static Characteristics							
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA		20	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=20V, V_{GS}=0V	T_J=25°C	-	-	1	μA
			T_J=85°C	-	-	5	
Gate Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±12V		-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA		0.5	0.75	1.2	V
Drain-source on-state resistance[1]	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=60A		-	4.8	6	mΩ
		V_{GS}=2.5V, I_D=40A		-	6.2	9	
On Status Drain Current	$I_{D(ON)}$	V_{DS}=20V, V_{GS}=4.5V		60	-	-	A
Gate resistance	R_G			-	1.2	-	Ω
Diode Characteristics							
Diode Continuous Forward Current	I_S			-	-	12	A
Reverse Recovery Time	t_{rr}	I_F=20A, dI/dt=20A/us		-	25	-	ns
Reverse Recovery Charge	Q_{rr}			-	24	-	nC
Dynamic Characteristics[2]							
Input capacitance	C_{ISS}	V_{GS}=0V ,V_{DS}=10V f=1.0MHz		-	3415	-	pF
Output capacitance	C_{OSS}			-	482	-	
Reverse transfer capacitance	C_{RSS}			-	78	-	
Turn-on delay time	$t_{D(ON)}$	V_{GS}=4.5V, V_{DS}=10V, I_D=2A		-	6.5	-	ns
Turn-on Rise time	tr			-	17	-	
Turn-off delay time	$t_{D(OFF)}$			-	29.5	-	
Turn-off Fall time	tf			-	17	-	
Total gate charge	Q_g	V_{GS}=10V,I_D=60A V_{DS}=10V		-	82	-	nC
Gate-source charge	Q_{gs}			-	4.7	-	
Gate-drain charge	Q_{gd}			-	10.7	-	
Drain-Source Diode Characteristics							
Diode forward voltage	V_{SD}	I_{SD}=10A,V_{GS}=0V		-	0.8	1.2	V

Note: 1：Eas test：VDD=10V，RG=25ohm，L=500uH

2：Pulse test; pulse width ≦ 300ns, duty cycle ≦ 2%.

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

Typical Performance Characteristics

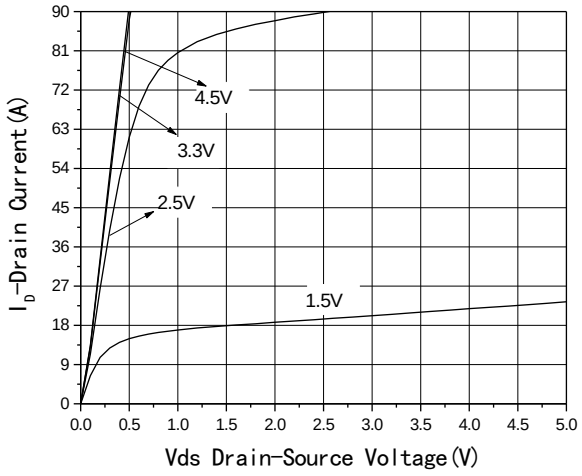


Fig1 Output Characteristics

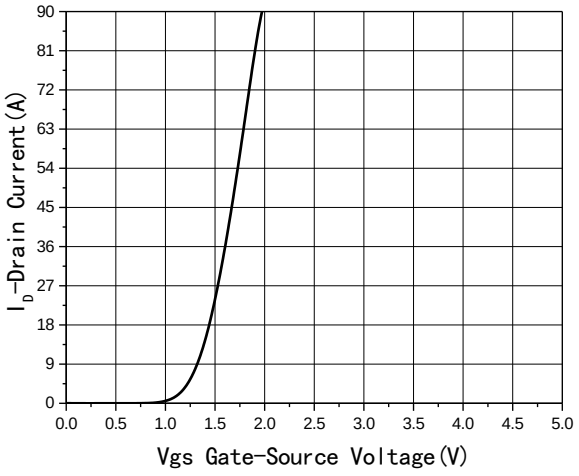


Fig2 Transfer Characteristics

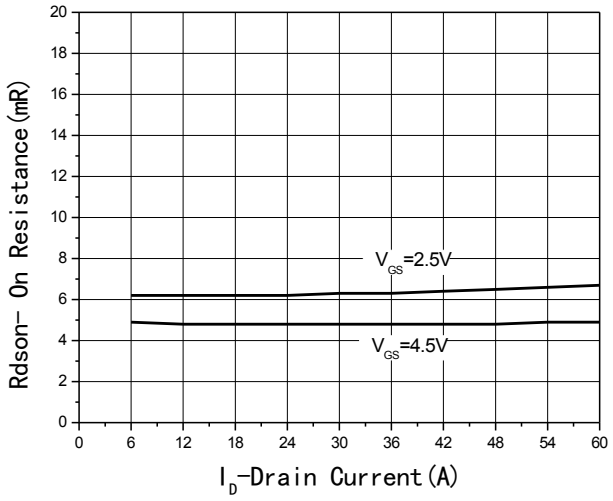


Fig3 Rdson-Drain current

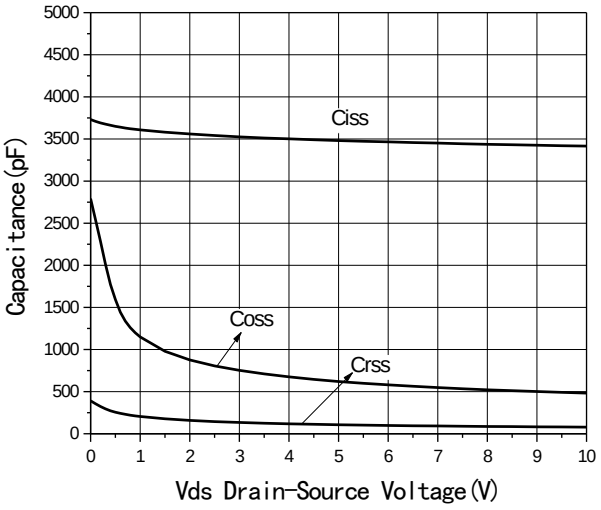


Fig4 Capacitance vs Vds

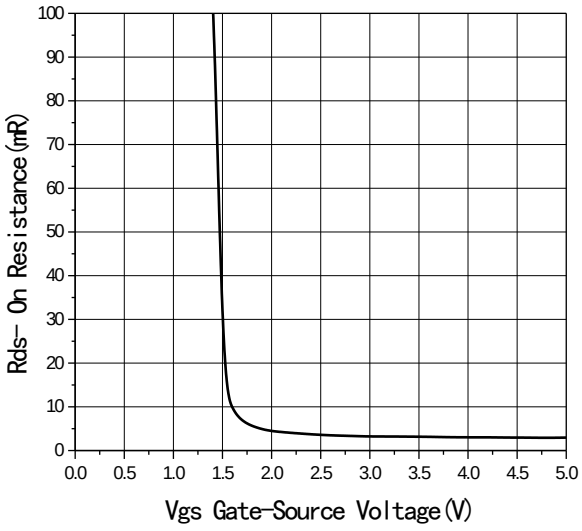


Fig5 Rdson-Gate Drain voltage

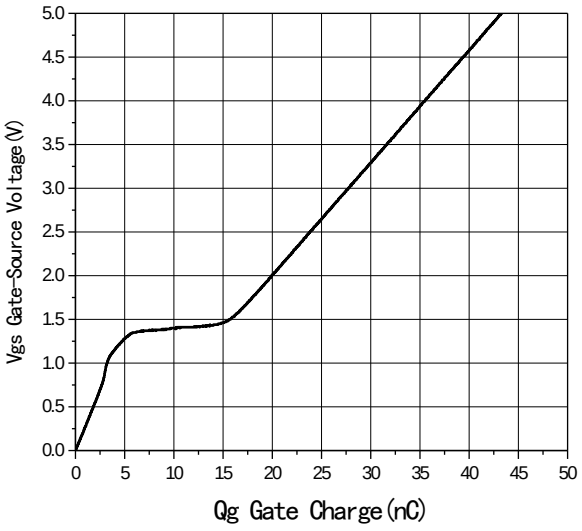


Fig6 Gate Charge

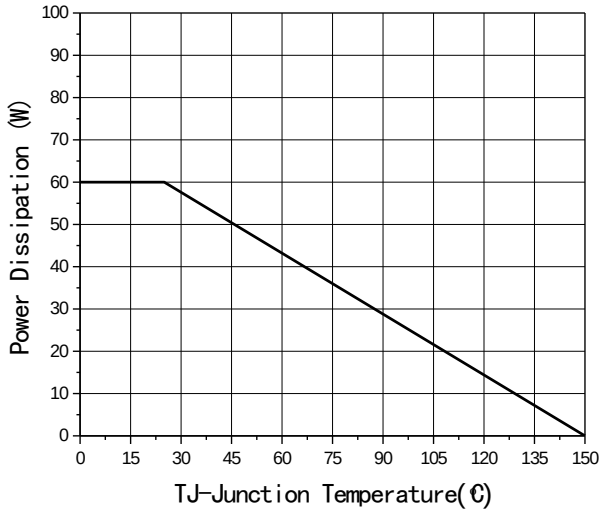


Fig7 Power De-rating

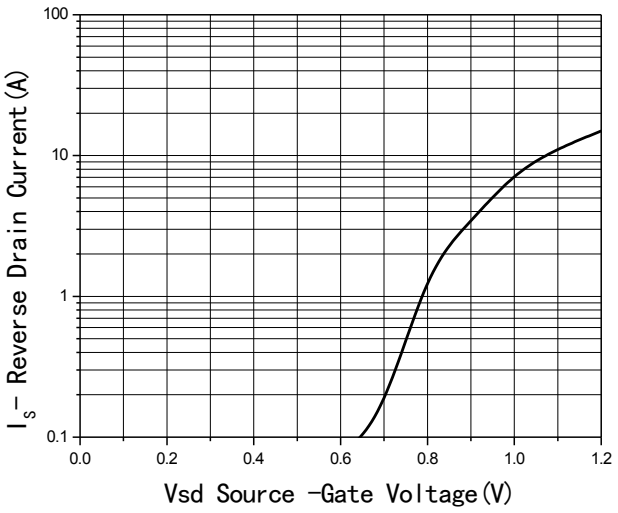
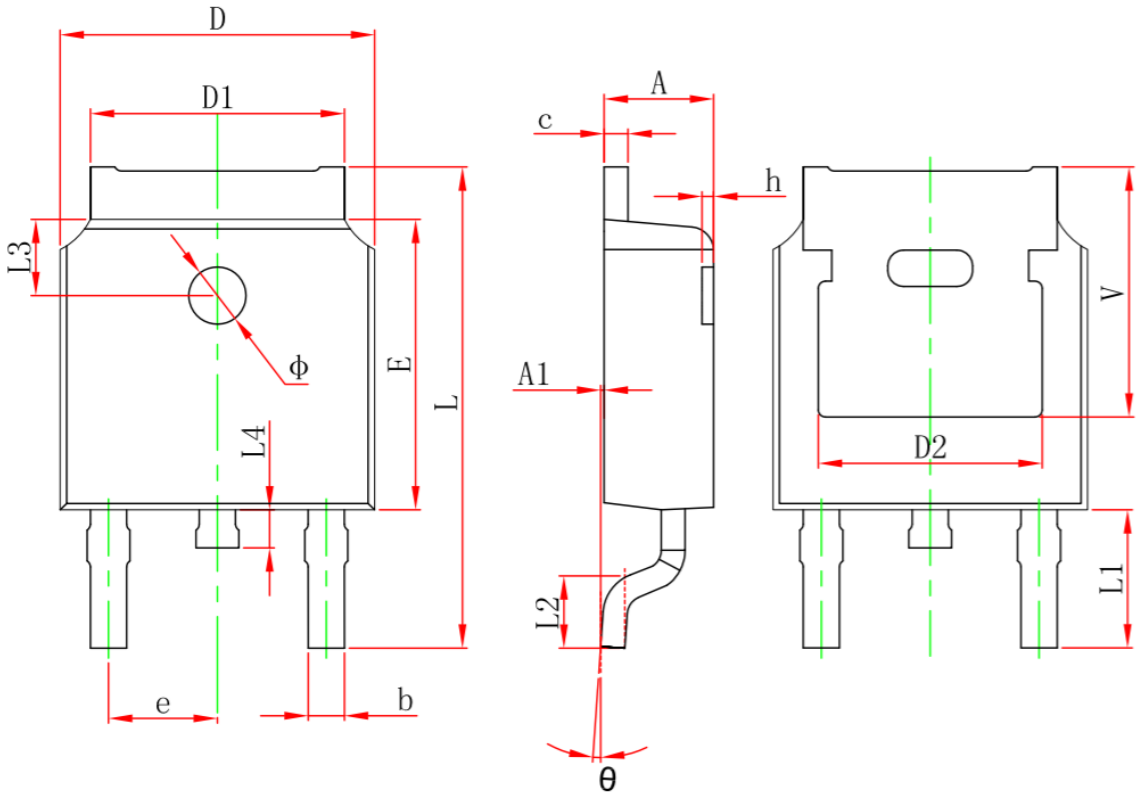


Fig8 Source-Drain Diode Forward

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 REF.		0.190 REF.	
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 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
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 REF.		0.211 REF.	

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