600V N-Channel Enhancement Mode MOSFET

Description

The NP5N60KG uses advanced high-voltage plane technology to provide excellent $R_{DS(ON)}$ and low gate charge. This power MOSFET is usuallyused at high speed switching applications in power supplies,PWM motor controls, high efficient DC to DC converters and bridge circuits.

General Features

- V_{DS} =600V，I_D =5A
  $R_{DS(ON)}$(Typ.)=2.0Ω @V_{GS}=10V
- Fast switching tim
- Low gate charge
- Low on-state resistance and have a high rugged avalanche characteristics
- Excellent package for good heat dissipation

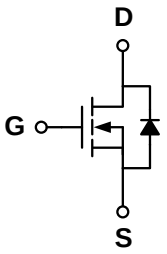
Application

- Hard switched and high frequency circuits
- Uninterruptible power supply

Package

- TO-252-2L

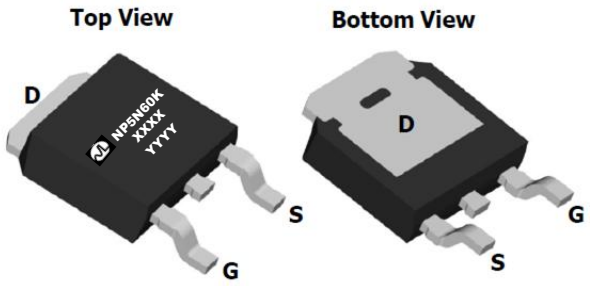
Schematic diagram



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
NP5N60KG-G	-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}	600	V
Gate-source voltage		V_{GS}	±30	V
Continuous Drain Current	TC=25°C	I_D	5	A
	TC=100°C		3	
Pulsed Drain Current		I_{DM}	20	A
Avalanche energy(L=0.5mH)		E_{AS}	95	mJ
Maximum power dissipation	TC=25°C	P_D	50	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		600	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=600V, $_{GS}$=0V	T_J=25°C	-	-	1	μA
			T_J=85°C	-	-	30	
Gate Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V		-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA		2.0	3.0	4.0	V
Drain-source on-state resistance[1]	$R_{DS(ON)}$	V_{GS}=10V, I_D=2A		-	2.0	2.8	Ω
Diode Characteristics							
Diode Continuous Forward Current	I_S			-	-	5	A
Reverse Recovery Time	t_{rr}	IF=5A, V_{GS}=0V dI/dt=100A/us		-	300	-	ns
Reverse Recovery Charge	Q_{rr}			-	3.0	-	nC
Dynamic Characteristics[2]							
Intrinsic gate resistance	R_G	V_{GS}=0V, V_{DS}=0V,f=1MHz		-	2.2	-	Ω
Input capacitance	C_{ISS}	V_{GS}=0V ,V_{DS}=50V f=1.0MHz		-	538	-	pF
Output capacitance	C_{OSS}			-	36	-	
Reverse transfer capacitance	C_{RSS}			-	2.8	-	
Turn-on delay time	$t_{D(ON)}$	V_{GS}=10V, V_{DS}=100V, R_G=25Ω , I_D=5A		-	7	-	ns
Turn-on Rise time	tr			-	14	-	
Turn-off delay time	$t_{D(OFF)}$			-	25	-	
Turn-off Fall time	tf			-	19	-	
Total gate charge	Q_g	V_{GS}=10V,I_D=5A V_{DS}=50V		-	12.4	-	nC
Gate-source charge	Q_{gs}			-	4.2	-	
Gate-drain charge	Q_{gd}			-	2.7	-	
Drain-Source Diode Characteristics							
Diode forward voltage	V_{SD}	I_{SD}=5A,V_{GS}=0V		-	0.9	1.4	V

Note: 1：Pulse test; pulse width ≦ 300ns, duty cycle ≦ 2%.

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

Thermal Characteristics

Parameter	Symbol	Typical	Unit
Thermal Resistance-Junction to Case	$R_{θJC}$	2.5	℃/W
Thermal Resistance junction-to Ambient	$R_{θJA}$	70	

Typical Performance Characteristics

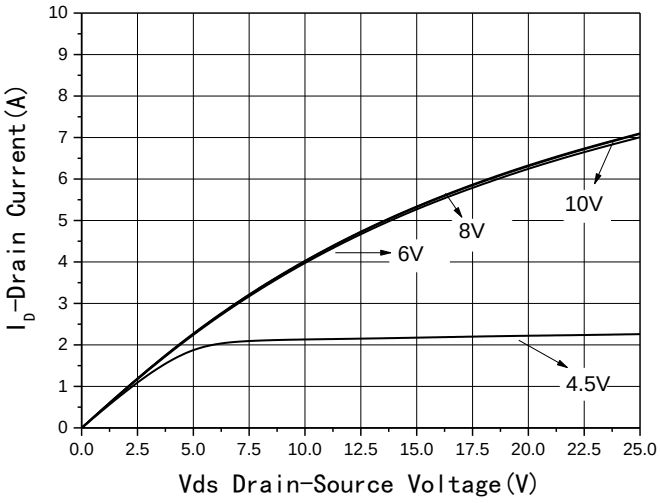


Fig1 Output Characteristics

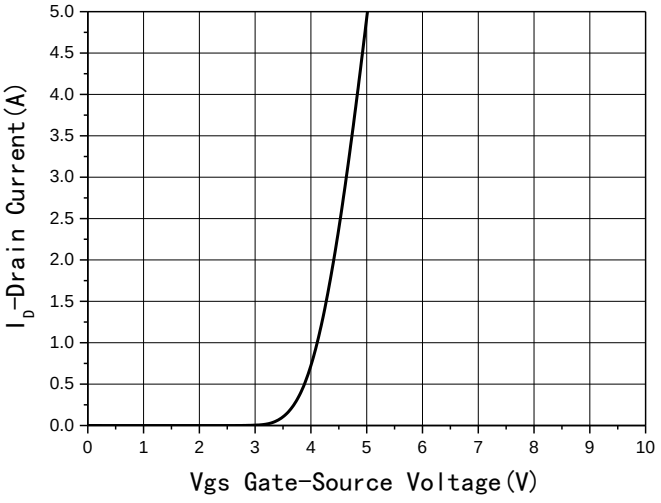


Fig2 Transfer Characteristics

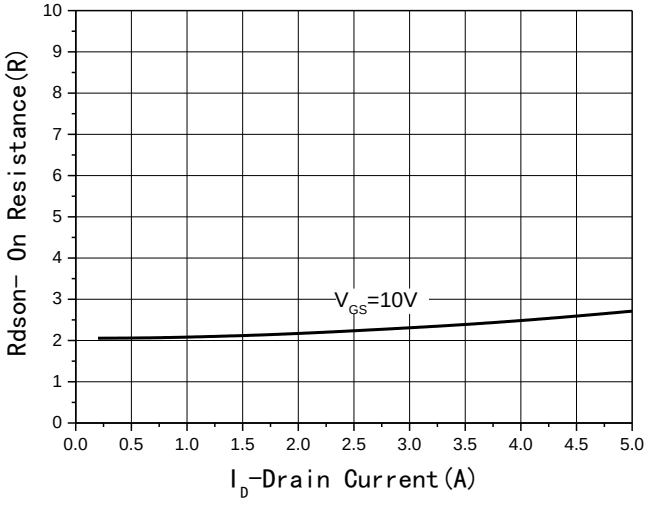


Fig3 Rdson-Drain current

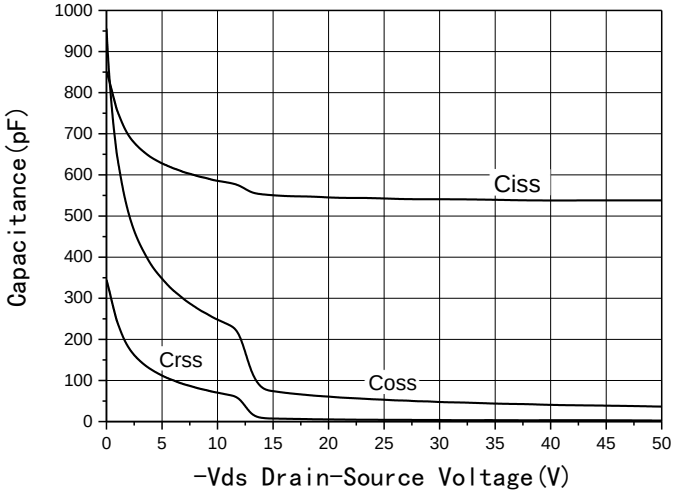


Fig4 Capacitance vs Vds

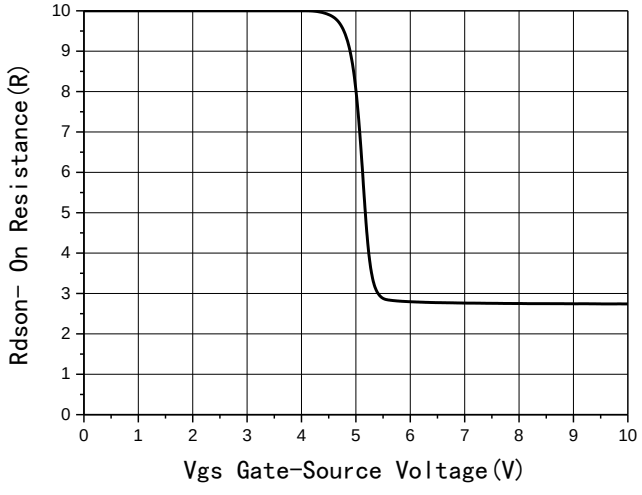


Fig5 Rdson-Gate Drain voltage

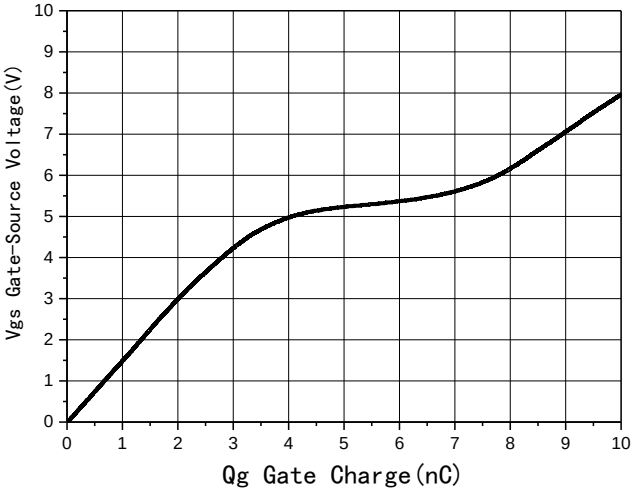


Fig6 Gate Charge

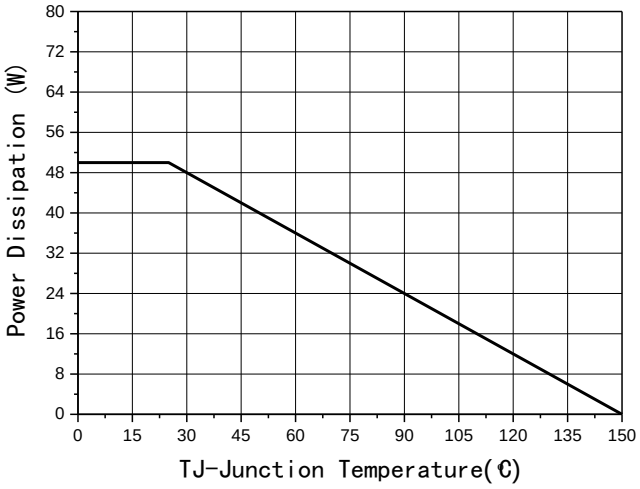


Fig7 Power De-rating

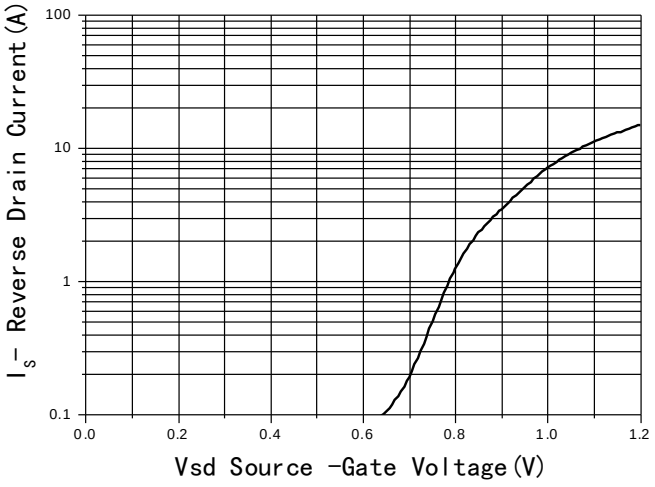


Fig8 Source-Drain Diode Forward

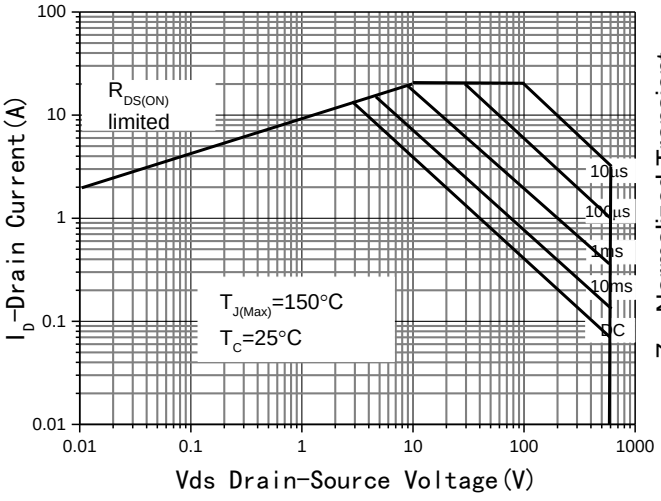


Fig9 Safe Operating Area

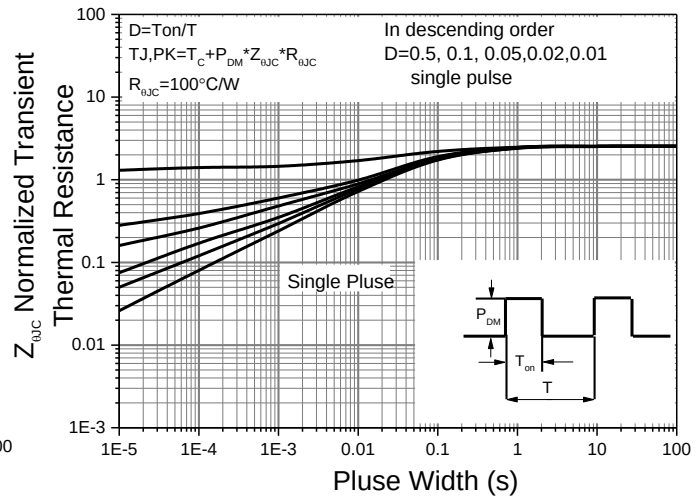
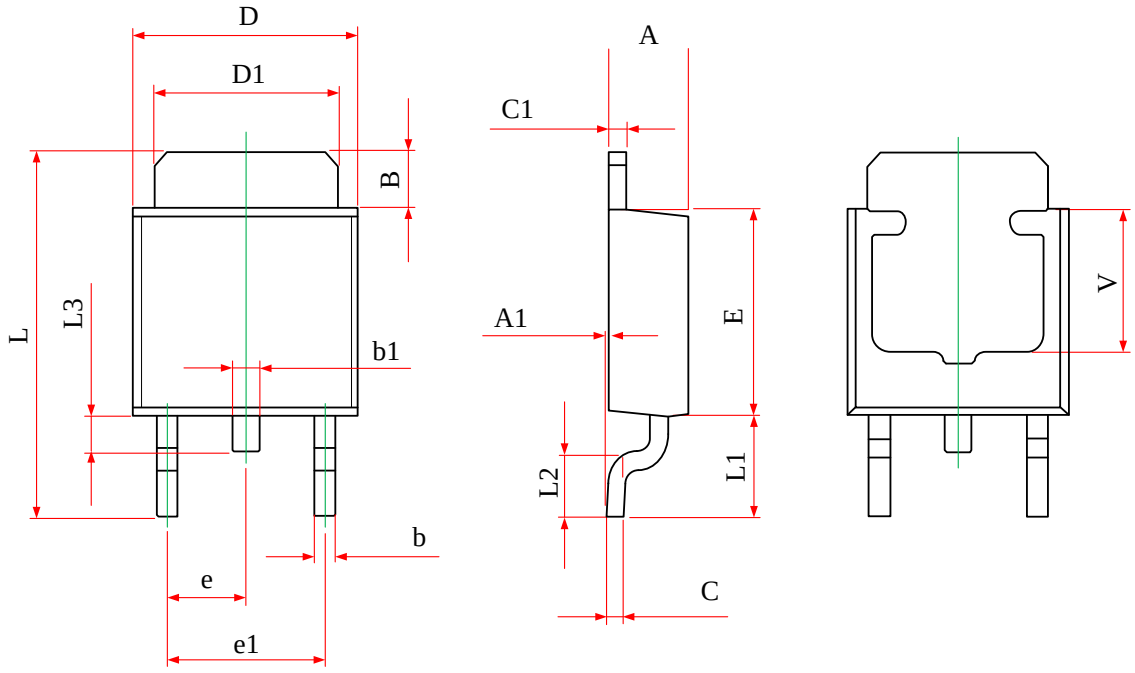


Fig10 Transient Thermal Response Curve

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	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300TYP		0.091TYP	
e1	4.500	4.700	0.177	0.185
L	9.500	9.900	0.374	0.390
L1	2.550	2.900	0.100	0.114
L2	1.400	1.780	0.055	0.070
L3	0.600	0.900	0.024	0.035
V	3.800REF		0.150REF	