N And P-Channel Enhancement Mode MOSFET

Description

The NP6666D6 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge . The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications.

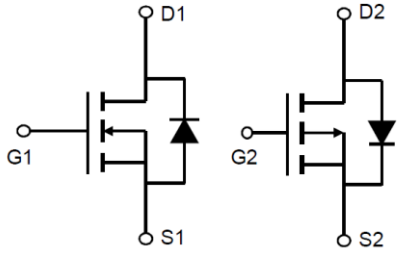
General Features

- **N-channel：**
  V_{DS} =30V，ID =30A
  $R_{DS(ON)}$=9mΩ (typical) @ VGS=10V
  $R_{DS(ON)}$=11mΩ (typical) @ VGS=4.5V
  P-Channel：
  V_{DS} =-30V，ID =-30A
  $R_{DS(ON)}$=14mΩ (typical) @ VGS=-10V
  $R_{DS(ON)}$=19mΩ (typical) @ VGS=-4.5V
- Excellent gate charge x $R_{DS(ON)}$ product(FOM)
- Very low on-resistance $R_{DS(ON)}$
- 150 °C operating temperature
- Pb-free lead plating
- 100% UIS tested

Application

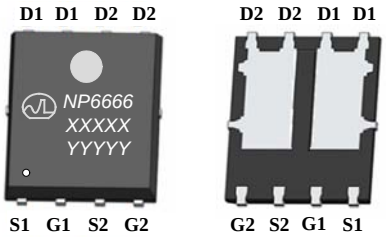
- Pch+Nch Complementary MOSFET for DC-FAN
- H-Bridge application

Schematic diagram



Marking and pin assignment

PDFN5×6-8L-B



XXXX—Wafer Information

YYYY—Quality Code

Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
NP6666D6-G	-55°C to +150°C	PDFN5*6-8L-B	5000

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

Parameter		Symbol	Limit		Unit
			N	P	
Drain-source voltage		V_{DS}	30	-30	V
Gate-source voltage		V_{GS}	±20	±20	V
Operating junction Temperature range		T_j	-55—150	-55—150	℃
Drain Current-Continuous (Silicon Limited)	T_A=25°C	I_D	30	-30	A
	T_A=75°C		22	-22	

Pulsed Drain Current (Package Limited)		I_{DM}	55	-55	A
Avalanche Current [C]		I_{AS}, I_{AR}	24	-32	A
Avalanche energy L=0.1mH[C]		E_{AS}, E_{AR}	18	36	mJ
Power Dissipation [B]	T_A=25°C	P_D	10	20	W
	T_A=75°C		4	8	
Junction and Storage Temperature Range		T_J, T_{STG}	-55—150		℃

N-Channel Electrical Characteristics (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	30	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=30V, V_{GS}=0V	-	-	1	μA
Gate-body leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±20V	-	-	±100	nA
ON Characteristics						
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.2	1.45	2.5	V
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=30A	-	9	11	mΩ
		V_{GS}=4.5V, I_D=20A	-	11	14	
Forward transconductance	gfs	V_{DS}=5V, I_D=20A	-	15	-	S
Dynamic Characteristics						
Input capacitance	C_{ISS}	V_{DS}=15V ,V_{GS}=0V f=1.0MHz	-	1142	-	pF
Output capacitance	C_{OSS}		-	163	-	
Reverse transfer capacitance	C_{RSS}		-	113	-	
Gate resistance	Rg	V_{GS}=0V, V_{DS}=0V, f=1.0MHz	-	1.1	-	Ω
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DS}=15V V_{GS}=10V R_L=1.8Ω R_{GEN}=3Ω	-	5	-	ns
Rise time	tr		-	3.5	-	
Turn-off delay time	$t_{D(OFF)}$		-	9	-	
Fall time	tf		-	3.5	-	
Total gate charge	Qg	V_{DS}=15V,I_D=20A V_{GS}=10V	-	19.8	-	nC
Gate-source charge	Qgs		-	3.1	-	
Gate-drain charge	Qgd		-	3.3	-	

Typical Performance Characteristics

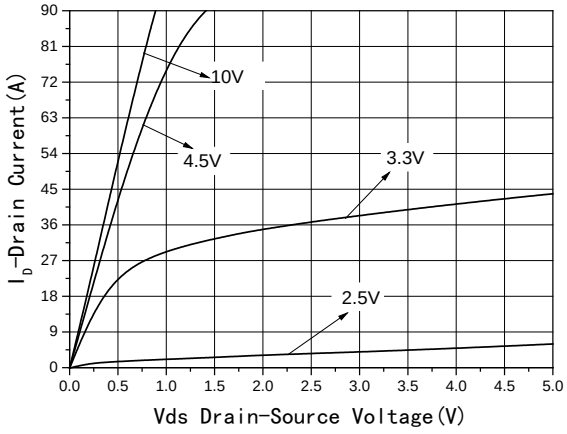


Fig1 Output Characteristics

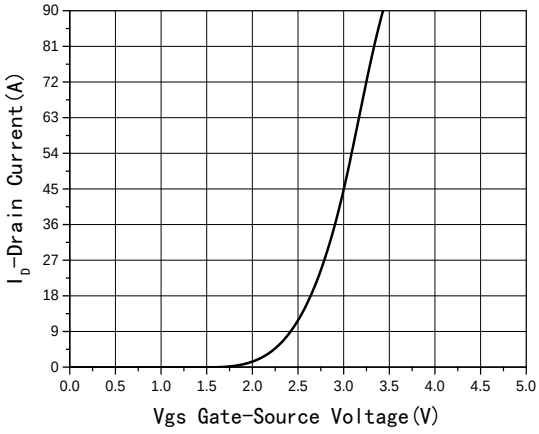


Fig2 Transfer Characteristics

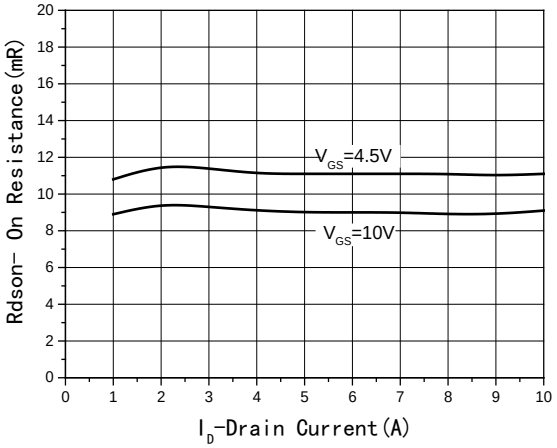


Fig3 Rdson-Drain current

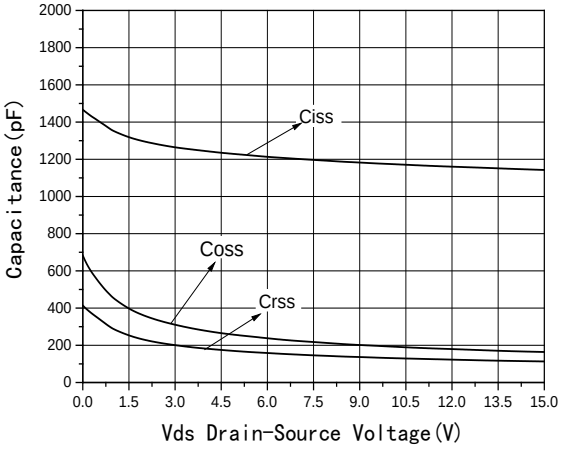


Fig4 Capacitance vs Vds

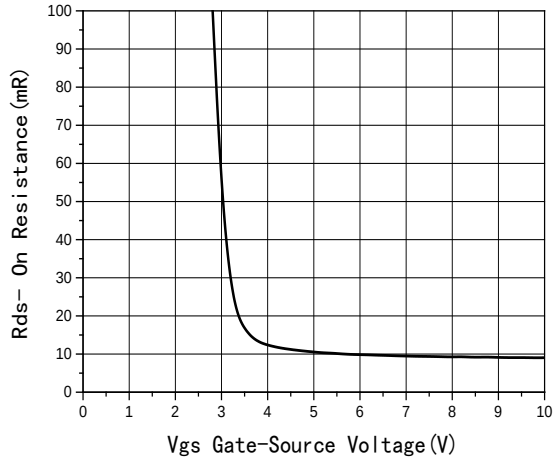


Fig5 Rdson-Gate Drain voltage

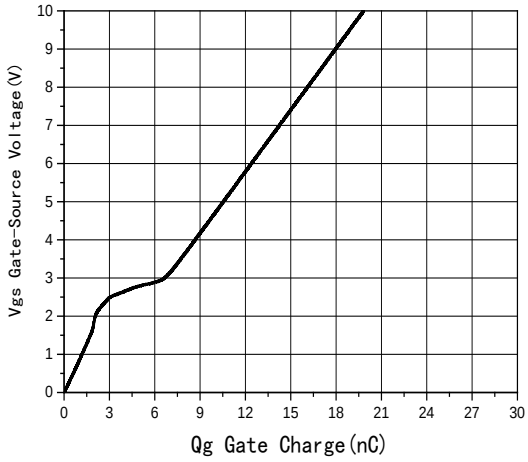


Fig6 Gate Charge

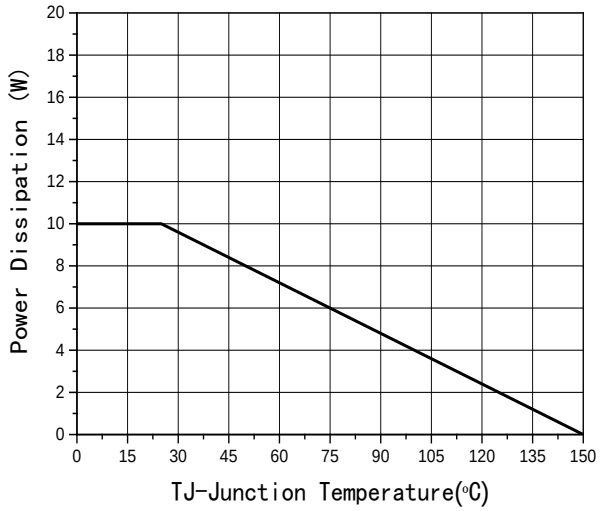


Fig7 Power De-rating

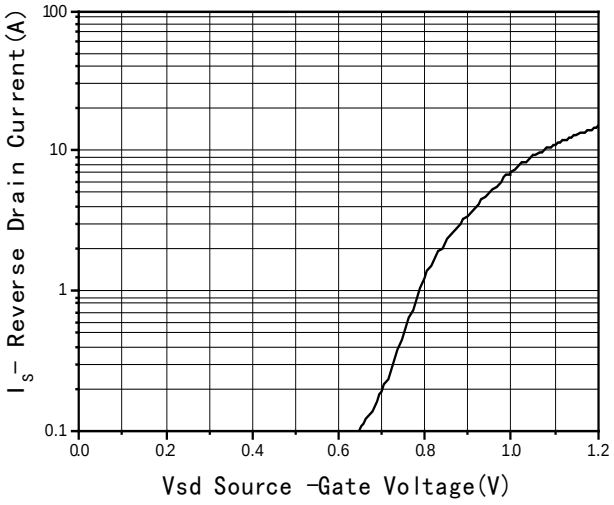


Fig8 Source-Drain Diode Forward

P-Channel Electrical Characteristics (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V, I_D=-250μA	-30	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=-30V, V_{GS}=0V	-	-	-1	μA
Gate-body leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±20V	-	-	±100	nA
ON Characteristics						
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1	-1.6	-2.5	V
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-30A	-	14	18	mΩ
		V_{GS}=-4.5V, I_D=-20A	-	19	25	
Forward transconductance	gfs	V_{DS}=-5V, I_D=-20A	-	18	-	S
Dynamic Characteristics						
Input capacitance	C_{ISS}	V_{DS}=-15V ,V_{GS}=0V f=1.0MHz	-	2512	-	pF
Output capacitance	C_{OSS}		-	278	-	
Reverse transfer capacitance	C_{RSS}		-	212	-	
Gate resistance	Rg	V_{GS}=0V, V_{DS}=0V, f=1.0MHz	-	4	-	Ω
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DS}=-15V V_{GS}=-10V R_L=2.3Ω R_{GEN}=3Ω	-	10	-	ns
Rise time	tr		-	5.5	-	
Turn-off delay time	$t_{D(OFF)}$		-	3.6	-	
Fall time	tf		-	4.6	-	
Total gate charge	Qg	V_{DS}=-15V,I_D=-20A V_{GS}=-10V	-	41	-	nC
Gate-source charge	Qgs		-	6.5	-	
Gate-drain charge	Qgd		-	5.2	-	

Typical Performance Characteristics

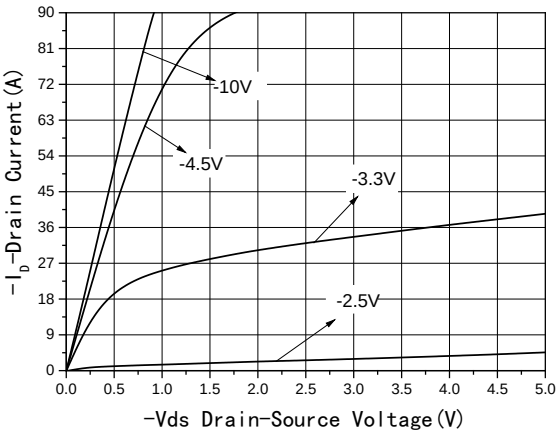


Fig1 Output Characteristics

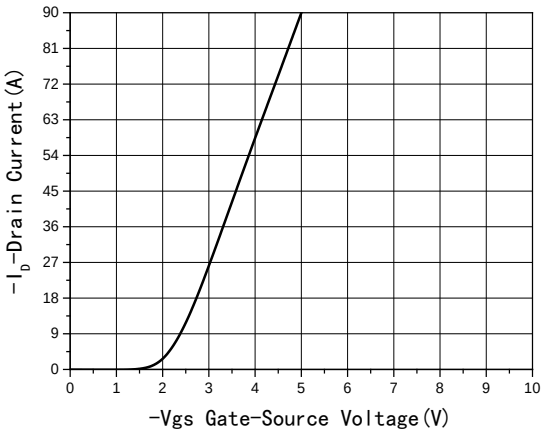


Fig2 Transfer Characteristics

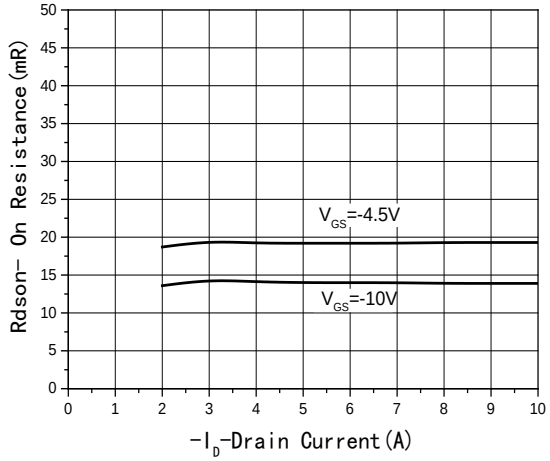


Fig3 Rdson-Drain current

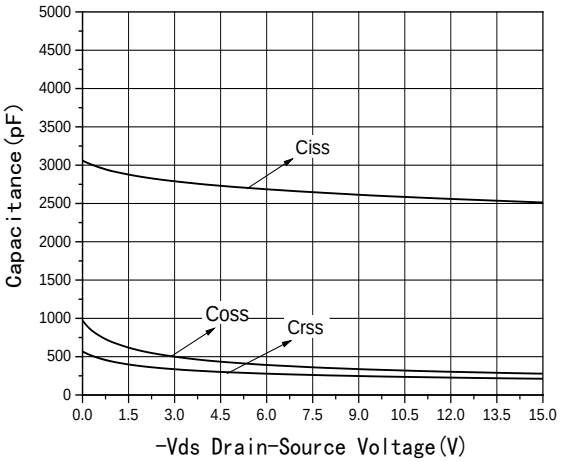


Fig4 Capacitance vs Vds

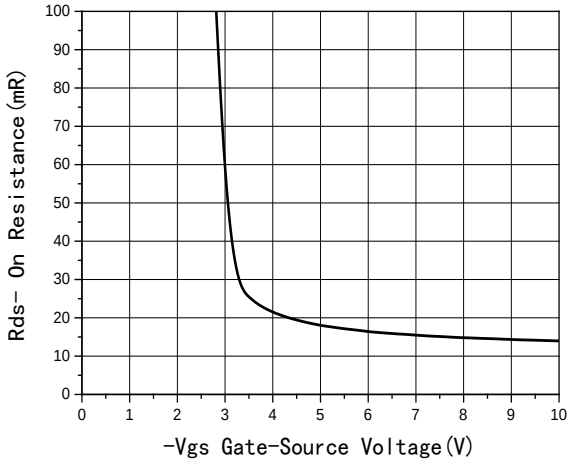


Fig5 Rdson-Gate Drain voltage

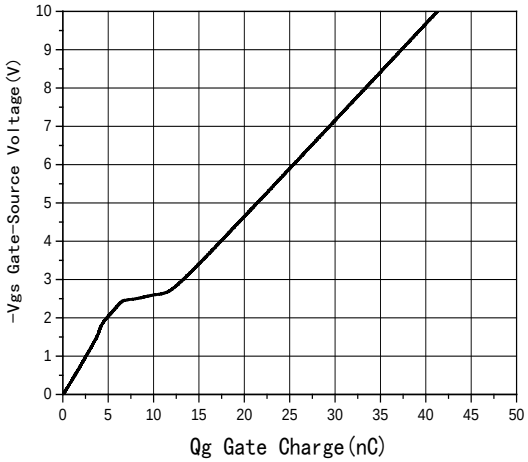


Fig6 Gate Charge

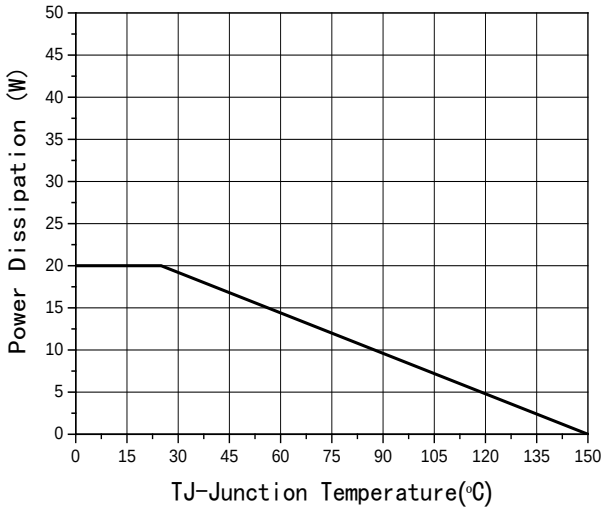


Fig7 Power De-rating

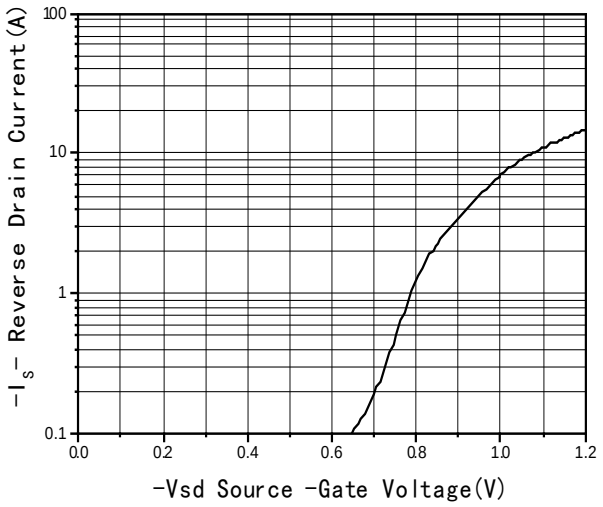
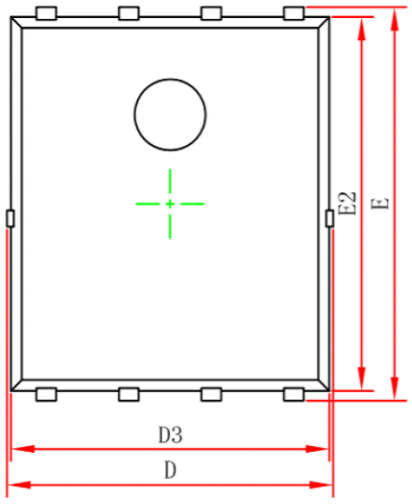


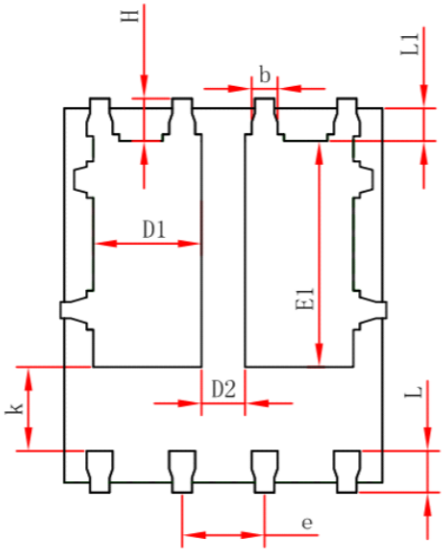
Fig8 Source-Drain Diode Forward

Package Information

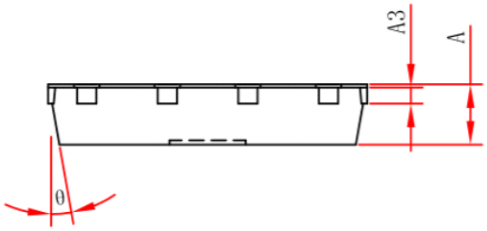
- **PDFN5*6-8L-B**



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.154REF.		0.006REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	1.470	1.870	0.058	0.074
D2	0.470	0.870	0.019	0.034
E1	3.375	3.575	0.133	0.141
D3	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°