

40V Dual N-Channel Enhancement Mode MOSFET

Description

The NP6884D6 uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge.

This device is suitable for high side switch in SMPS and general purpose applications.

General Features

- ◆ $V_{DS} = 40V$, $I_D = 26A$
 $R_{DS(ON)} = 13.7\ m\Omega$ (typical) @ $V_{GS} = 10V$
 $R_{DS(ON)} = 17.8\ m\Omega$ (typical) @ $V_{GS} = 4.5V$
- ◆ 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

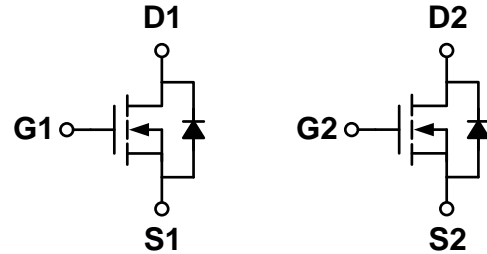
- ◆ DC/DC Converter
- ◆ Ideal for high-frequency switching and synchronous rectification

Package

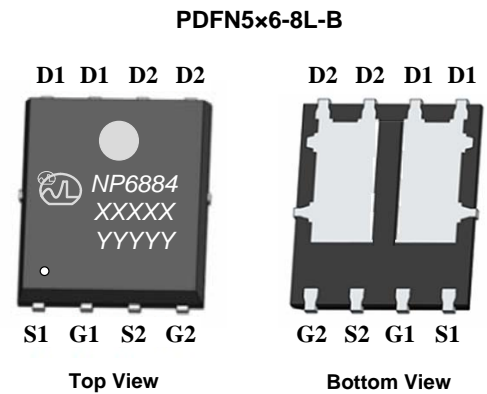
- ◆ PDFN5*6-8L-B



Schematic diagram



Marking and pin assignment



XXXX—Wafer Information
 YYYY—Quality Code

Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
NP6884D6-G	-55°C to +150°C	PDFN5*6-8L-B	5000

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

parameter	symbol	limit	unit
Drain-source voltage	V_{DS}	40	V
Gate-source voltage	V_{GS}	±20	V
Drain Current-Continuous (Silicon Limited)	I_D	$T_A = 25^\circ C$	26
		$T_A = 75^\circ C$	18
Pulsed Drain Current (Package Limited)	I_{DM}	104	A
Single pulse avalanche energy	E_{AS}	50	mJ
Maximum power dissipation	P_D	$T_A = 25^\circ C$	31
		$T_A = 75^\circ C$	16

Operating junction Temperature range	T _j	-55—150	°C
--------------------------------------	----------------	---------	----

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	40	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =40V, 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	1.0	1.4	2.0	V
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} =10V, I _D =26A	-	13.7	15	mΩ
		V _{GS} =4.5V, I _D =15A	-	17.8	19	
Forward transconductance	g _{fs}	V _{DS} =5V, I _D =10A	-	50	-	S
Dynamic Characteristics						
Input capacitance	C _{ISS}	V _{DS} =20V, V _{GS} =0V f=1.0MHz	-	1226	-	pF
Output capacitance	C _{OSS}		-	103	-	
Reverse transfer capacitance	C _{RSS}		-	87	-	
Gate resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1.0MHz	-	3.5	5	Ω
Switching Characteristics						
Turn-on delay time	t _{D(ON)}	V _{DS} =20V V _{GS} =10V R _L =1.5Ω R _{GEN} =3Ω	-	6.4	-	ns
Rise time	t _r		-	17.2	-	
Turn-off delay time	t _{D(OFF)}		-	29	-	
Fall time	t _f		-	16	-	
Total gate charge	Q _g	V _{DS} =20V, I _D =10A V _{GS} =10V	-	24.8	-	nC
Gate-source charge	Q _{gs}		-	4.3	-	
Gate-drain charge	Q _{gd}		-	4.8	-	

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Maximum Junction-to-Ambient ^A	R _{θJA}	12	20	°C/W
Maximum Junction-to-Ambient ^A		Steady-State	33	
Maximum Junction-to-Lead ^B	R _{θJC}	2.4	2.9	

A: The value of R_{θJA} is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design. The current rating is based on the t ≤ 10s thermal resistance rating.

B: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJC} and lead to ambient.

Typical Performance Characteristics

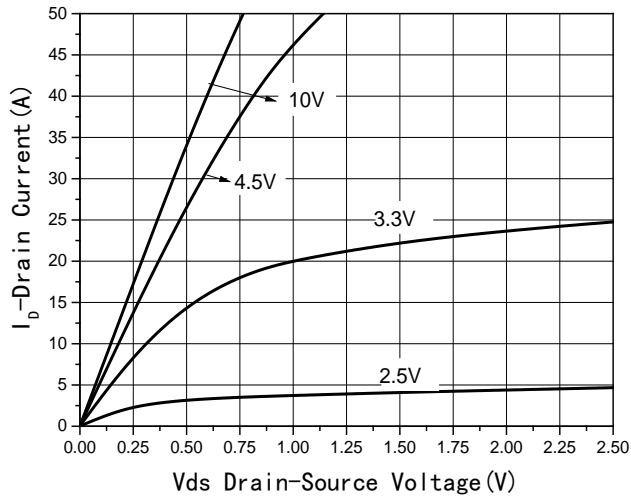


Fig1 Output Characteristics

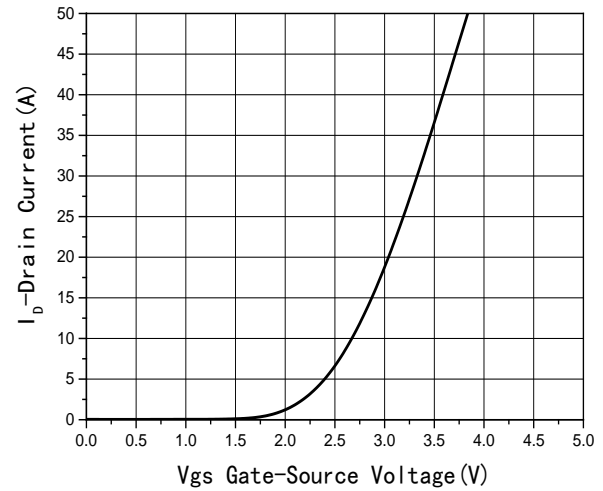


Fig2 Transfer Characteristics

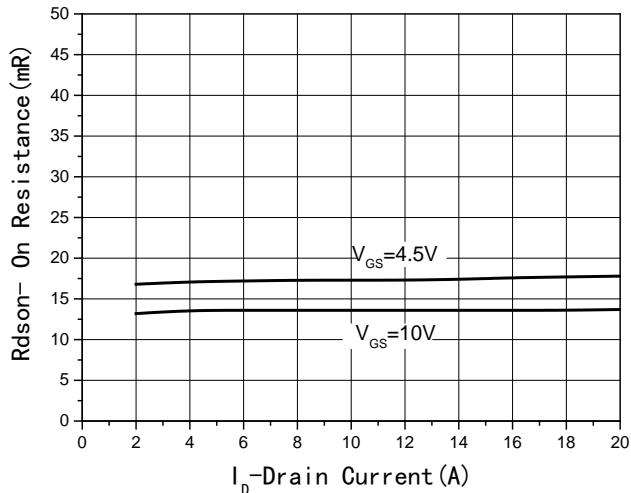


Fig3 $R_{DS(on)}$ -Drain current

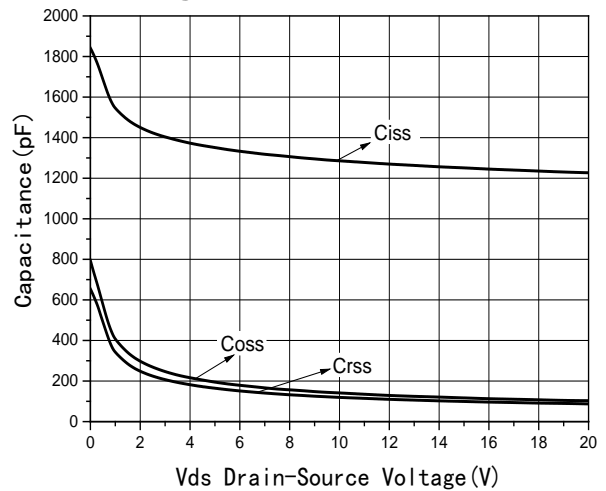


Fig4 Capacitance vs V_{DS}

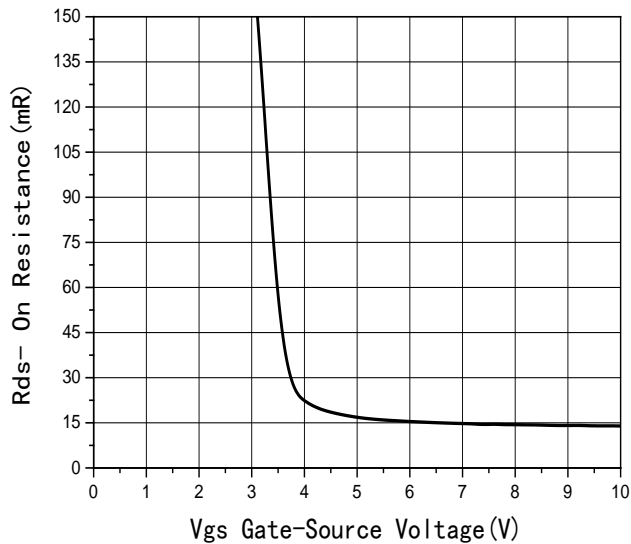


Fig5 $R_{DS(on)}$ -Gate Drain voltage

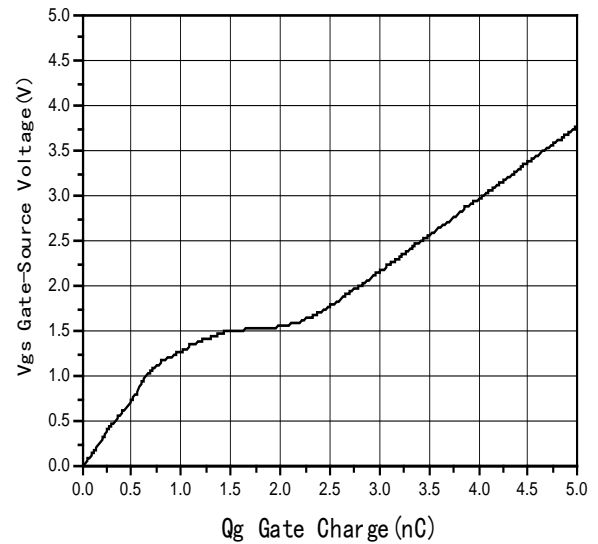


Fig6 Gate Charge

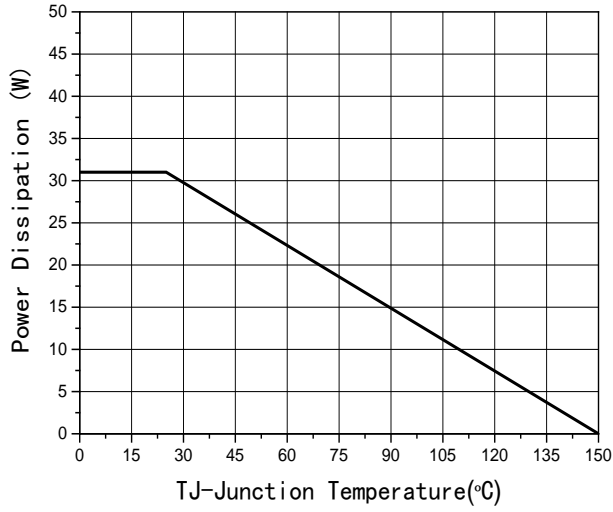


Fig7 Power De-rating

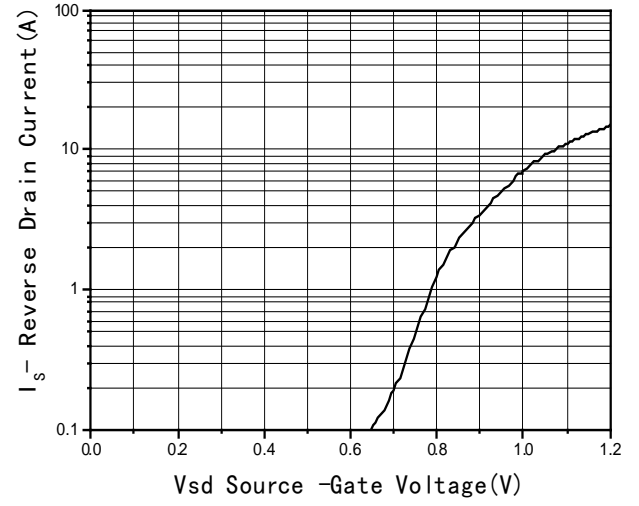
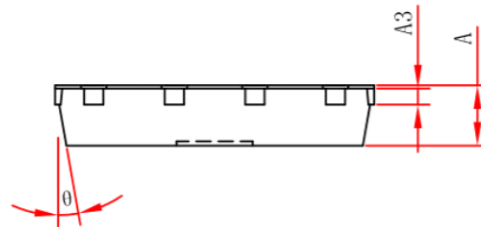
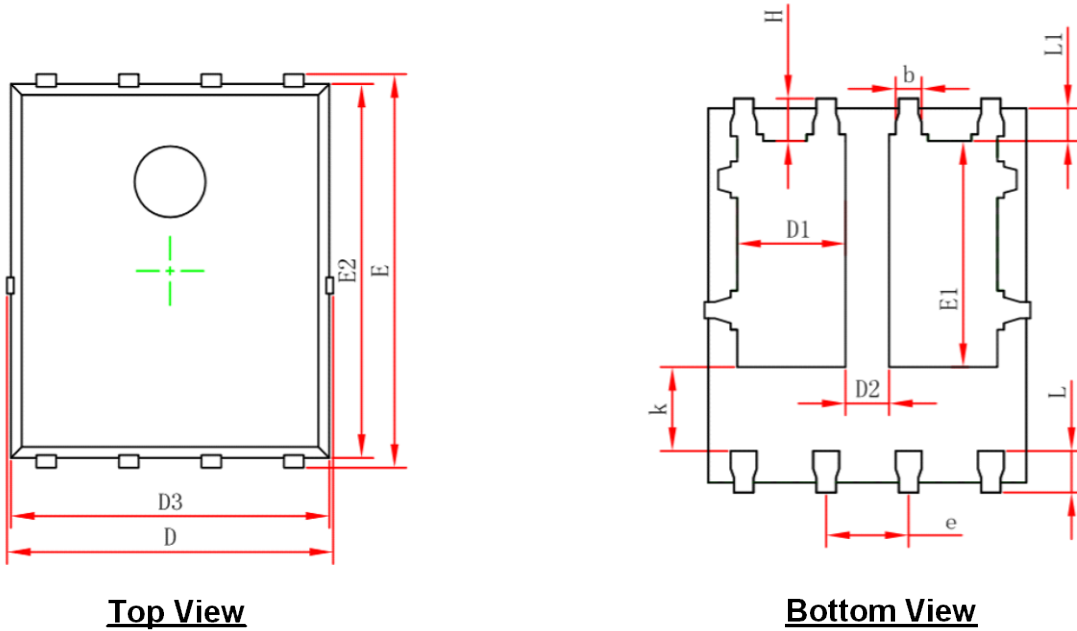


Fig8 Source-Drain Diode Forward

Package Information

- PDFN5*6-8L-B



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°