

40V N-Channel Enhancement Mode MOSFET

Description

The CP100N04D6 uses Trench technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$ and Q_g . This device is ideal for high-frequency switching and synchronous rectification.

General Features

- ◆ $V_{DS} = 40V$, $I_D = 100A$
 $R_{DS(ON)}(Typ.) = 4.3m\Omega$ @ $V_{GS} = 10V$
 $R_{DS(ON)}(Typ.) = 5.6m\Omega$ @ $V_{GS} = 4.5V$
- ◆ Very low on-resistance $R_{DS(on)}$
- ◆ 150 °C operating temperature
- ◆ 100% UIS tested

Application

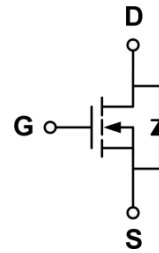
- ◆ high-frequency switching and synchronous rectification
- ◆ Industrial and Motor Drive applications

Package

- ◆ PDFN5*6-8L

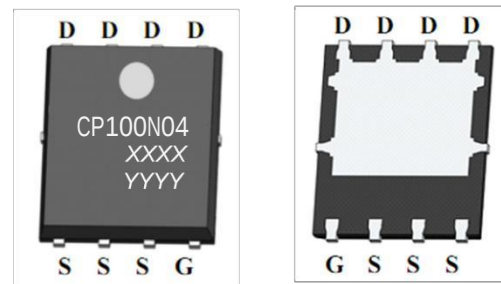


Schematic diagram



Marking and pin assignment

PDFN5*6-8L



Top View

Bottom View

XXXX—Wafer Information YYYY—
Quality Code

Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
CP100N04D6-G	-55°C to +150°C	PDFN5*6-8L	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
Continuous Drain Current	TC=25°C	I_D	100	A
	TC=70°C		80	
Power Dissipation	TC=25°C	P_D	73	W
	TC=70°C		46	
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 =250μA	40	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =40V, V _{GS} =0V	-	-	1	μA
		T _J =55°C	-	-	5	
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	1.0	1.7	2.5	V
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} =10V, I _D =10A	-	4.3	5.2	mΩ
		V _{GS} =4.5V, I _D =10A	-	5.6	6.7	
On Status Drain Current	I _{D(ON)}	V _{DS} =40V, V _{GS} =10V	100	-	-	A
Diode Characteristics						
Diode Forward Voltage	V _{SD}	I _{SD} =1A,V _{GS} =0V	-	0.78	1.2	V
Diode Continuous Forward Current	I _S		-	-	100	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = I _S , di/dt = 100A/μs	-	25.5	-	ns
Reverse Recovery Charge	Q _{rr}		-	44	-	nC
Dynamic Characteristics						
Gate Resistance	R _G	V _{GS} =0V, V _{DS} =0V,f=1MHz	-	1.3	-	Ω
Input capacitance	C _{ISS}	V _{GS} =0V ,V _{DS} =20V f=1.0MHz	-	4297	-	pF
Output capacitance	C _{OSS}		-	281	-	
Reverse transfer capacitance	C _{RSS}		-	242	-	
Turn-on delay time	t _{D(ON)}	V _{GS} =10V, V _{DS} =20V, R _L =1.5Ω, R _G =3Ω	-	12	-	ns
Turn-on Rise time	tr		-	5	-	
Turn-off delay time	t _{D(OFF)}		-	49	-	
Turn-off Fall time	t _f		-	6.7	-	
Total gate charge	Q _g	V _{GS} =10V, V _{DS} =20V, I _D =10A	-	77	-	nC
Gate-source charge	Q _{gs}		-	18.3	-	
Gate-drain charge	Q _{gd}		-	8.5	-	

Typical Performance Characteristics

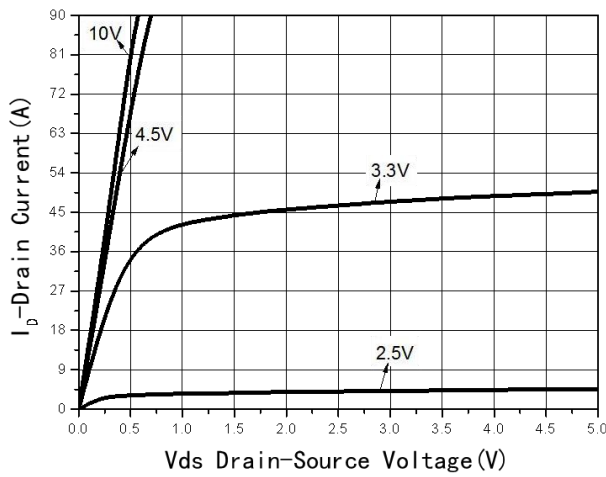


Fig1 Output Characteristics

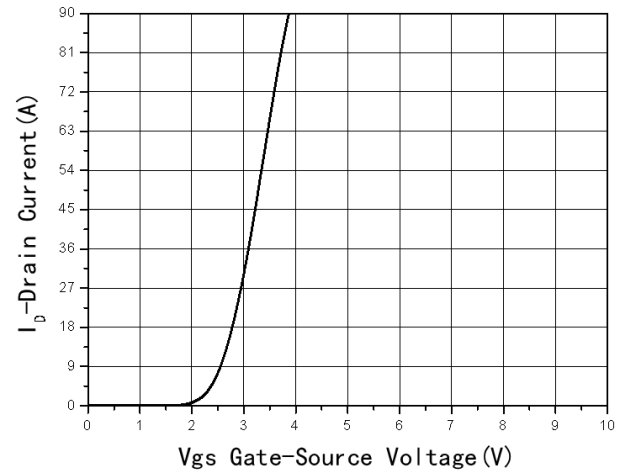


Fig2 Transfer Characteristics

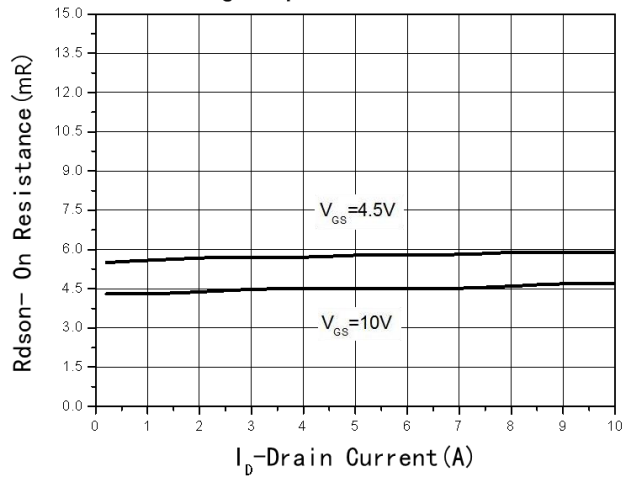


Fig3 $R_{DS(on)}$ -Drain current

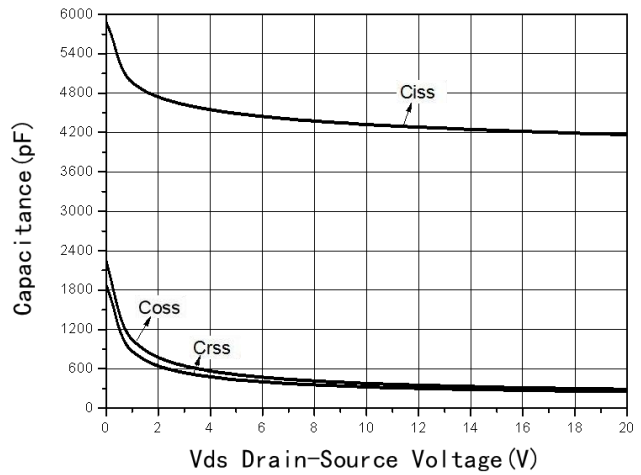


Fig4 Capacitance vs V_{DS}

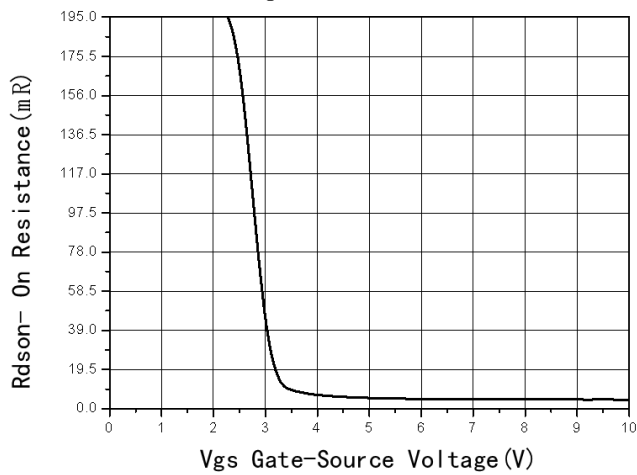


Fig5 $R_{DS(on)}$ -Gate Drain voltage

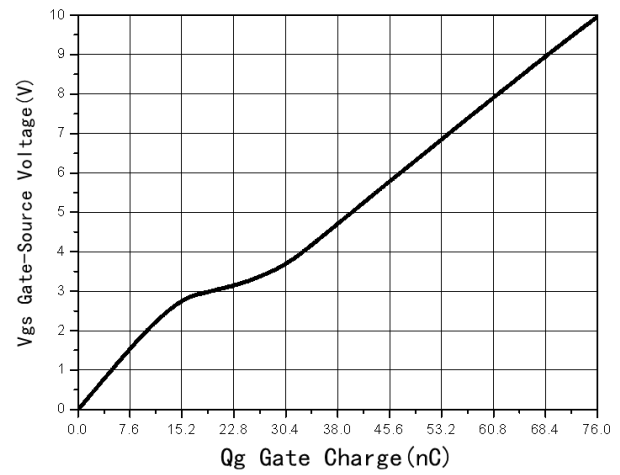


Fig6 Gate Charge

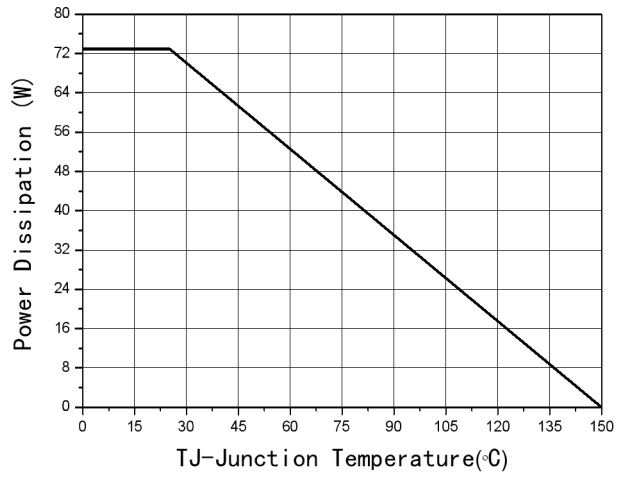


Fig7 Power De-rating

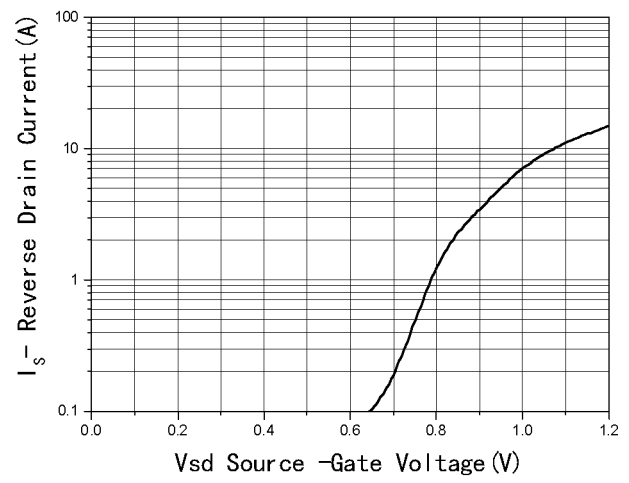
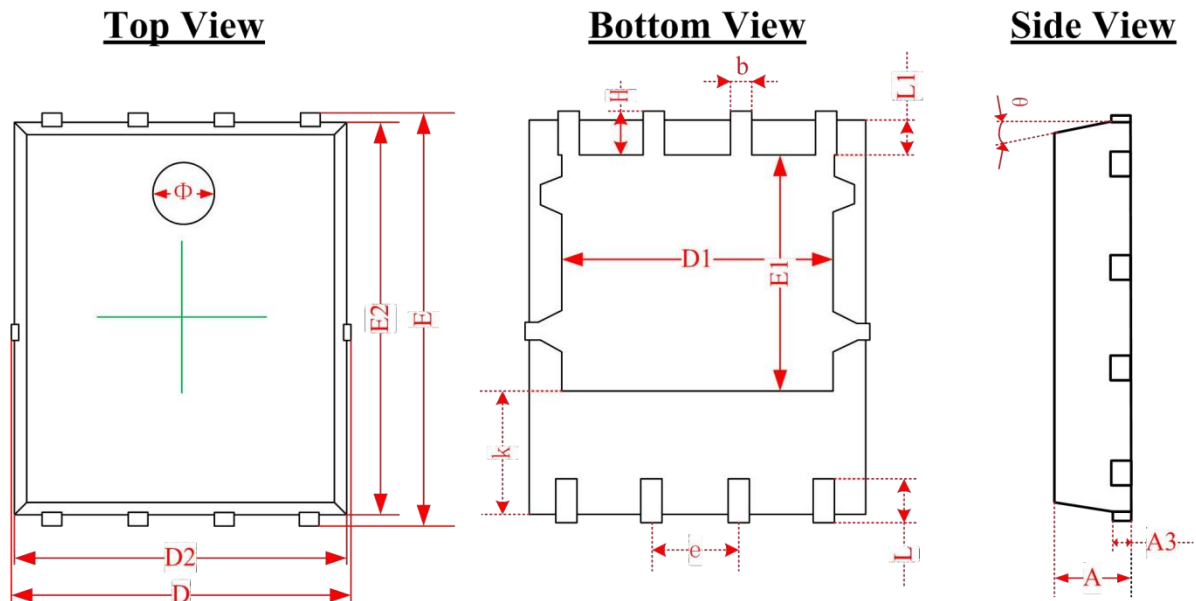


Fig8 Source-Drain Diode Forward

Package Information

- PDFN5*6-8L



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.870	0.900	0.930	0.034	0.035	0.036
A3	0.203REF.			0.008REF.		
D	4.944	5.020	5.096	0.195	0.198	0.201
E	5.974	6.050	6.126	0.235	0.238	0.241
D1	3.910	4.010	4.110	0.154	0.158	0.162
E1	3.375	3.475	3.575	0.133	0.137	0.141
D2	4.870	4.900	4.930	0.192	0.193	0.194
E2	5.720	5.750	5.780	0.226	0.227	0.228
k	1.190	1.290	1.390	0.047	0.051	0.055
b	0.350	0.380	0.410	0.014	0.015	0.016
e	1.270TYP.			0.050TYP.		
L	0.559	0.635	0.711	0.022	0.025	0.028
L1	0.424	0.500	0.576	0.017	0.020	0.023
H	0.574	0.650	0.726	0.023	0.026	0.029
θ	10°	11°	12°	10°	11°	12°
Φ	1.150	1.200	1.250	0.045	0.047	0.049