40V N-Channel Enhancement Mode MOSFET

Description

The CP40N04QR 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 Qg. This device is ideal for high-frequency switching and synchronous rectification.

General Features

- V_{DS} =40V，ID =40A
  $R_{DS(ON)}$=5.2mΩ (typical) @ VGS= 10V
  $R_{DS(ON)}$=8 mΩ (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

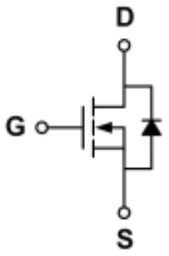
Application

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

Package

- DFN3X3-8L

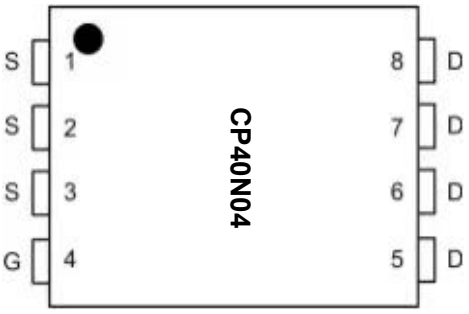
Schematic diagram



Marking and pin assignment

DFN3×3-8L

（Top View）



XXXX—Wafer Information

YYYY—Quality Code

Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
CP40N04QR-G	-55°C to +150°C	DFN3X3-8L	5000

Absolute Maximum Ratings (TA=25℃ 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	40	A
Drain Current-Continuous(T_C= 100℃)	I_D （100℃）	20	A
Pulsed Drain Current (Package Limited)	I_{DM}	160	A

Single pulse avalanche energy	E_{AS}	350	mJ
Maximum power dissipation	P_D	65	W
Operating junction Temperature range	Tj	-55—150	℃

Electrical Characteristics (TA=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	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	-	-	±10	μA
ON Characteristics						
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.0	1.5	2	V
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}= 10V, I_D=40A	-	5.2	11	mΩ
		V_{GS}=4.5V, I_D=40A	-	8	13	
Forward transconductance	gfs	V_{DS}=5V, I_D=40A	26	30	-	S
Dynamic Characteristics						
Input capacitance	C_{ISS}	V_{DS}=-20V ,V_{GS}=0V f= 1.0MHz	-	1991	-	pF
Output capacitance	C_{OSS}		-	180	-	
Reverse transfer capacitance	C_{RSS}		-	156	-	
Switching Characteristics						
Turn-on delay time	$t_{D(ON)}$	V_{DS}=-20V I_D=-2.8A V_{GEN}=-4.5V R_L= 10ohm R_{GEN}=-60ohm	-	14	-	ns
Rise time	tr		-	18	-	
Turn-off delay time	$t_{D(OFF)}$		-	50	-	
Fall time	tf		-	21	-	
Total gate charge	Qg	V_{DS}=-20V,I_D=-3A V_{GS}=-4.5V	-	33.4	-	nC
Gate-source charge	Qgs		-	5.9	-	
Gate-drain charge	Qgd		-	6.5	-	

Thermal Characteristics

Thermal Resistance junction-to ambient	Rth JA	100	℃/W

Typical Performance Characteristics

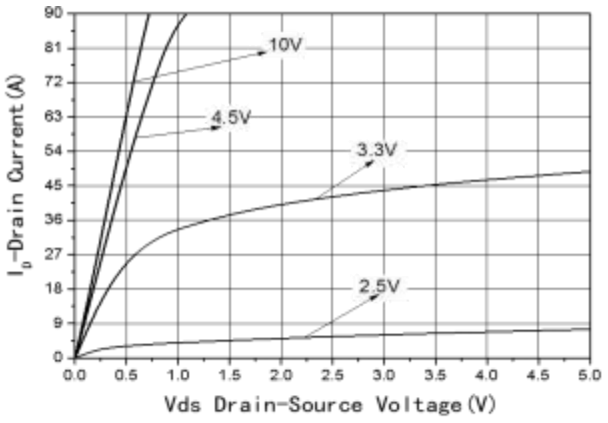


Fig1 Output Characteristics

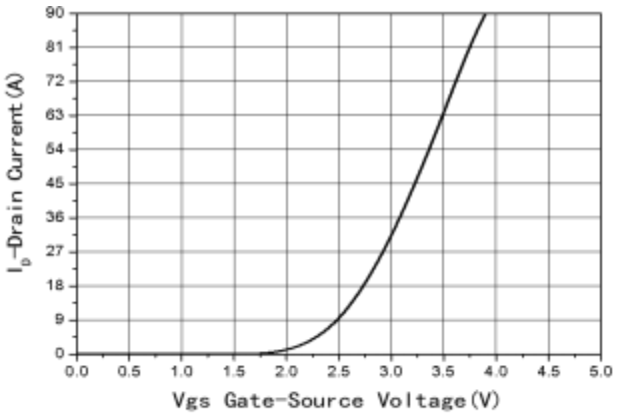


Fig2 Transfer Characteristics

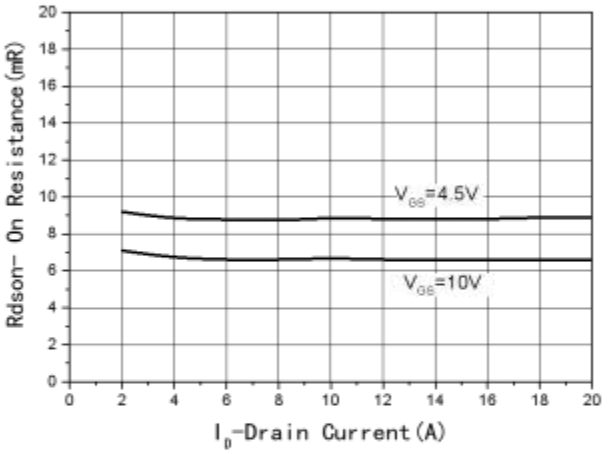


Fig3 Rdson-Drain current

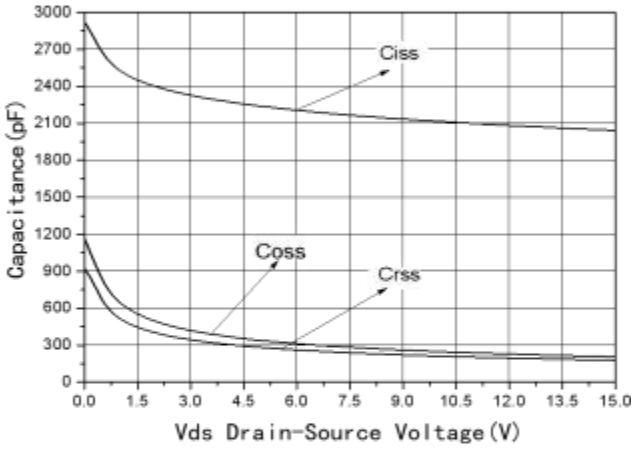


Fig4 Capacitance vs Vds

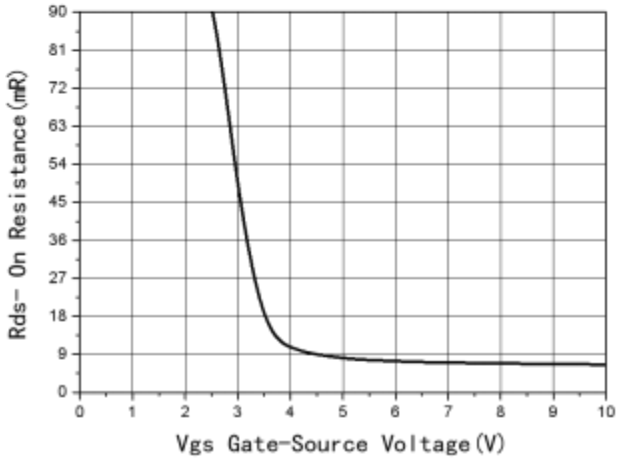


Fig5 Rdson-Gate Drain voltage

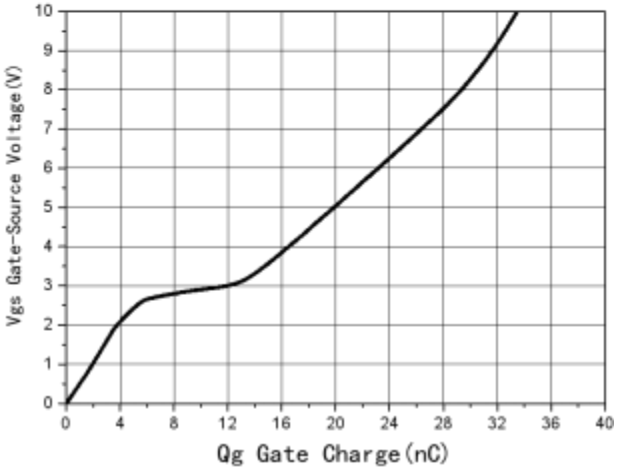


Fig6 Gate Charge

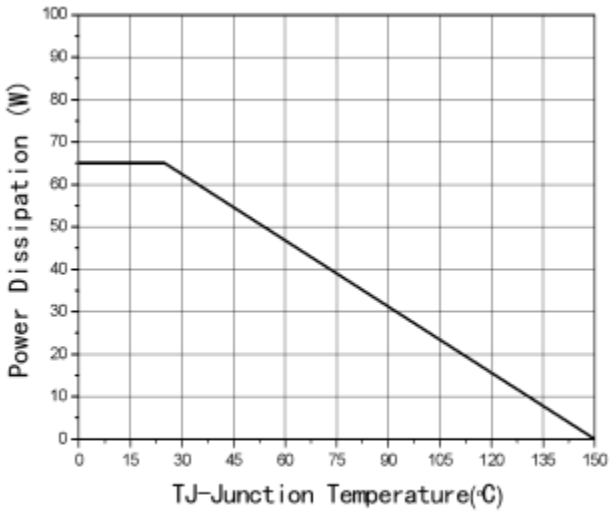


Fig7 Power De-rating

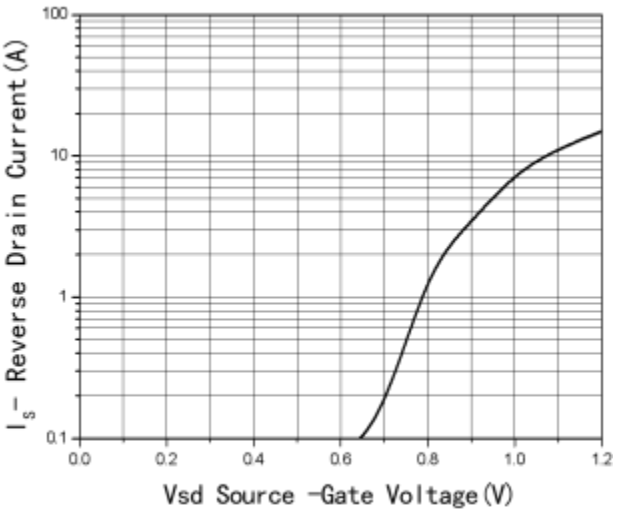
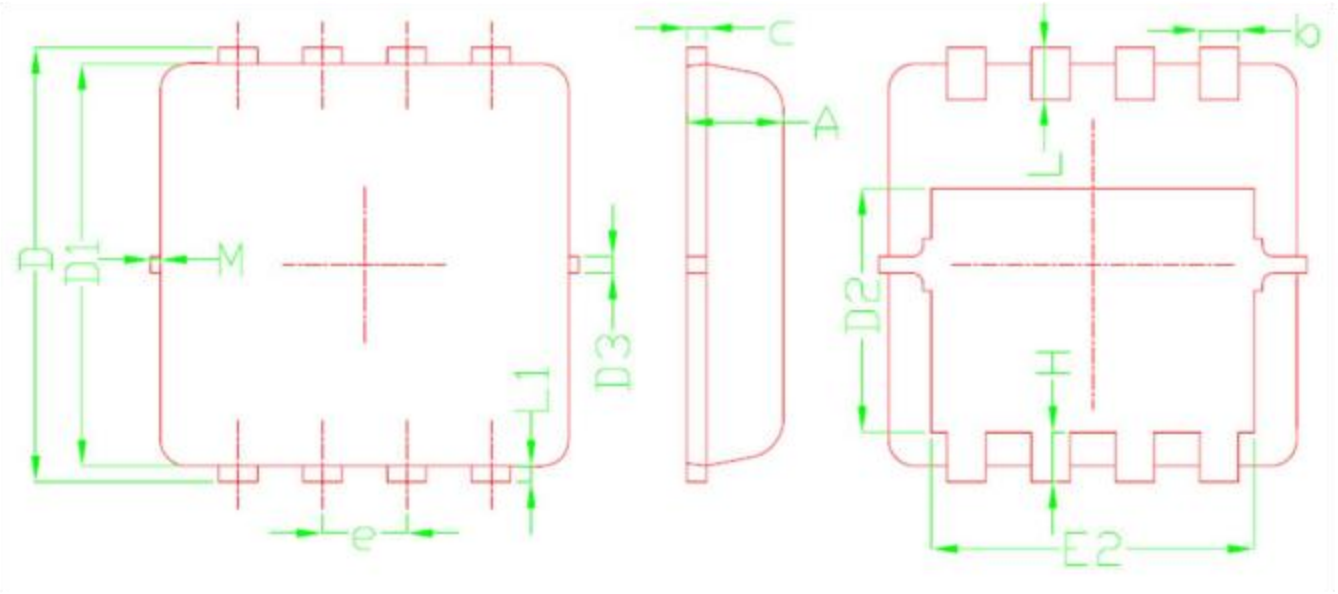
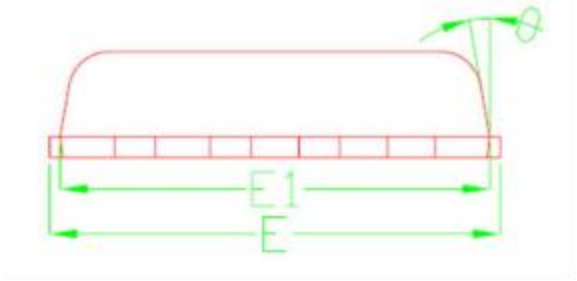


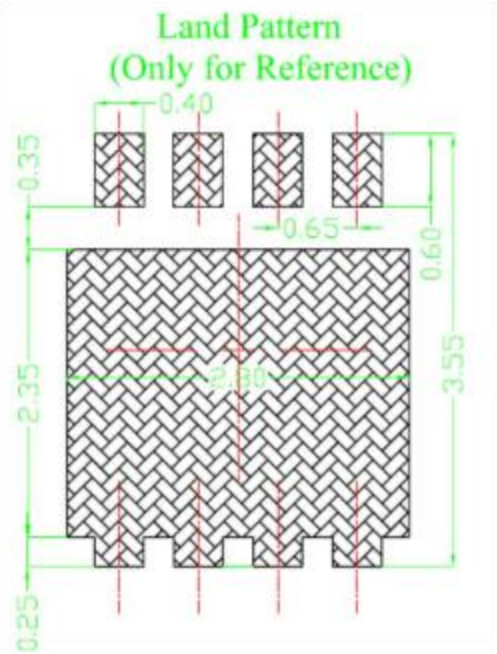
Fig8 Source-Drain Diode Forward

Package Information

DFN3×3-8L







SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	---	0.13	---
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	---	0.13	---
θ	---	10°	12°
M	*	*	0.15
* Not specified			