

40V P-Channel Enhancement Mode MOSFET

Description

The CP30P04QR uses advanced trench technology to provide excellent $R_{DS(ON)}$. This device is suitable for use as a load switch or in PWM applications.

General Features

- ◆ $V_{DS} = -40V$, $I_D = -30A$
 $R_{DS(ON)}(Typ.) = 15m\Omega$ @ $V_{GS} = -10V$
 $R_{DS(ON)}(Typ.) = 19m\Omega$ @ $V_{GS} = -4.5V$
- ◆ High power and current handling capability
- ◆ Lead free product is acquired
- ◆ Surface mount package
- ◆ 150 °C operating temperature
- ◆ 100% UIS tested

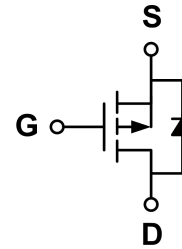
Application

- ◆ PWM applications
- ◆ Load switch
- ◆ Uninterruptible power supply

Package

- ◆ PDFN3*3-8L

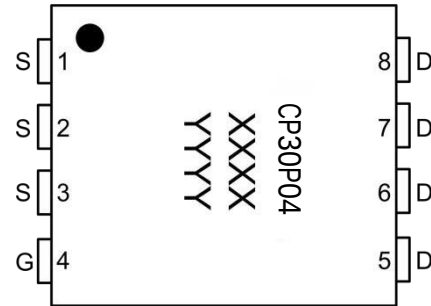
Schematic diagram



Marking and pin assignment

PDFN3×3-8L

(Top View)



XXXX—Wafer Information

YYYY—Quality Code

Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
CP30P04QR-G	-55°C to +150°C	PDFN3*3-8L	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	-30	A
	TC=70°C		-24	
Pulsed Drain Current		I_{DM}	-120	A
Avalanche energy($T_J=25^\circ C$, $V_{DD}=30V$, $V_G=10V$, $L=0.5mH$, $R_g=50\Omega$)		E_{AS}	160	mJ
Power Dissipation	TC=25°C	P_D	60	W
	TC=70°C		48	
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 =85°C	-	-	-10	
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	-1.5	-2.5	V
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-20A	-	15	18	mΩ
		V _{GS} =-4.5V, I _D =-10A	-	19	23	
On Status Drain Current	I _{D(ON)}	V _{DS} =-20V, V _{GS} =-10V	-30	-	-	A
Diode Characteristics						
Diode Forward Voltage	V _{SD}	I _{SD} =-30A, V _{GS} =0V	-	-0.7	-1.5	V
Diode Continuous Forward Current	I _S		-	-20	-	A
Reverse Recovery Time	t _{rr}	I _F =-30A, dI/dt=-100A/us	-	26	-	ns
Reverse Recovery Charge	Q _{rr}		-	19	-	nC
Dynamic Characteristics						
Gate Resistance	R _G	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	6.2	-	Ω
Input capacitance	C _{ISS}	V _{GS} =0V, V _{DS} =-20V f=1.0MHz	-	2727	-	pF
Output capacitance	C _{OSS}		-	174	-	
Reverse transfer capacitance	C _{RSS}		-	157	-	
Turn-on delay time	t _{D(ON)}	V _{GS} =-10V, V _{DS} =-20V, R _L =3Ω, I _D =-30A, R _G =2.5Ω	-	7	-	ns
Turn-on Rise time	t _r		-	25	-	
Turn-off delay time	t _{D(OFF)}		-	90	-	
Turn-off Fall time	t _f		-	36	-	
Total gate charge	Q _g	V _{GS} =-10V, I _D =-30A V _{DS} =-20V	-	54	-	nC
Gate-source charge	Q _{gs}		-	12.9	-	
Gate-drain charge	Q _{gd}		-	5.9	-	

Thermal Characteristics

Parameter		Symbol	Typ	Unit
Maximum Junction-to-Ambient	Steady-State	R _{θJA}	50	°C/W
Maximum Junction-to-Case	Steady-State	R _{θJC}	2.6	°C/W

Typical Performance Characteristics

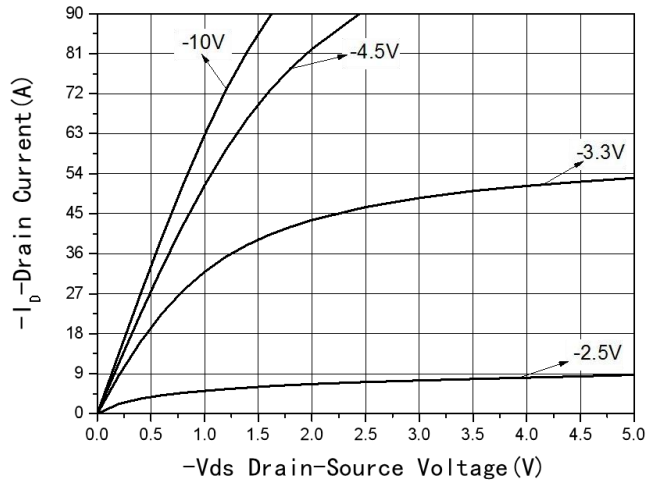


Fig1 Output Characteristics

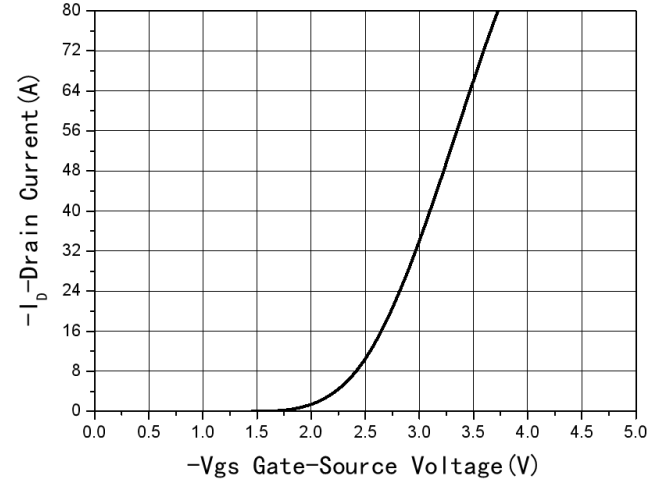


Fig2 Transfer Characteristics

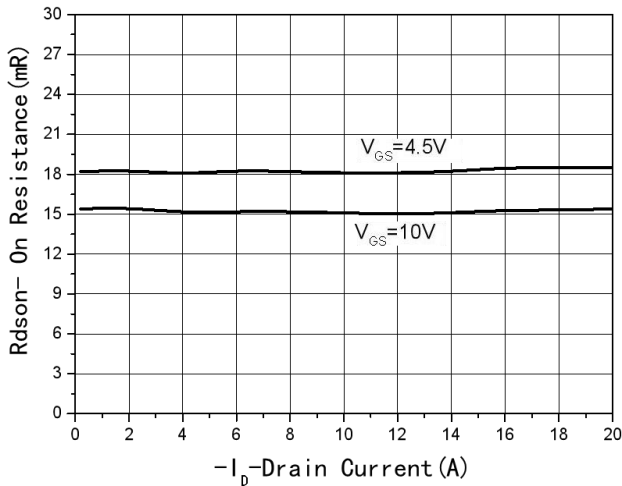


Fig3 $R_{DS(on)}$ -Drain current

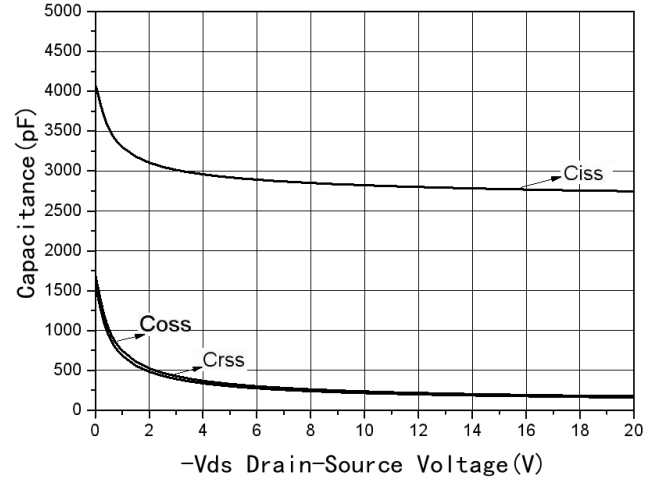


Fig4 Capacitance vs V_{DS}

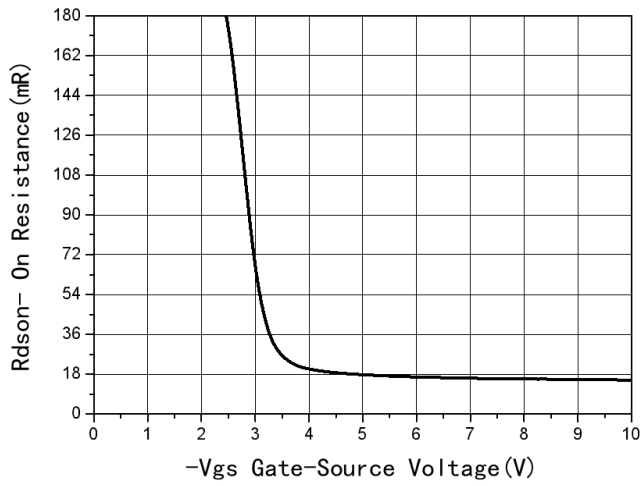


Fig5 $R_{DS(on)}$ -Gate Drain voltage

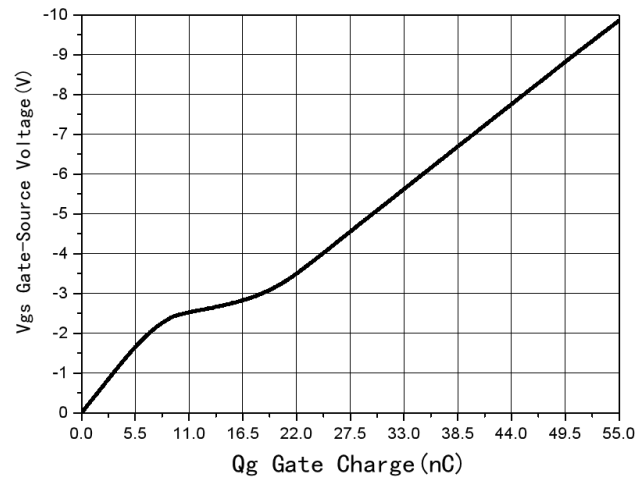
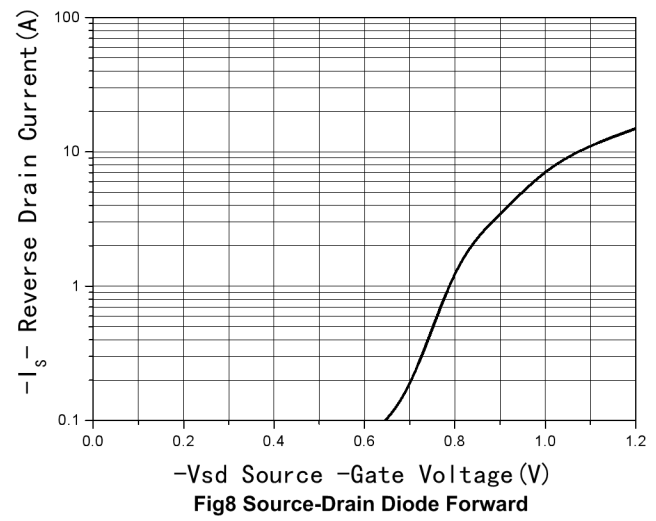
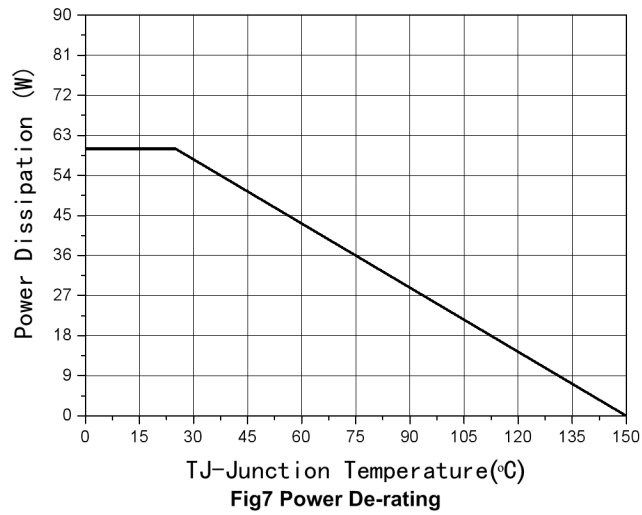
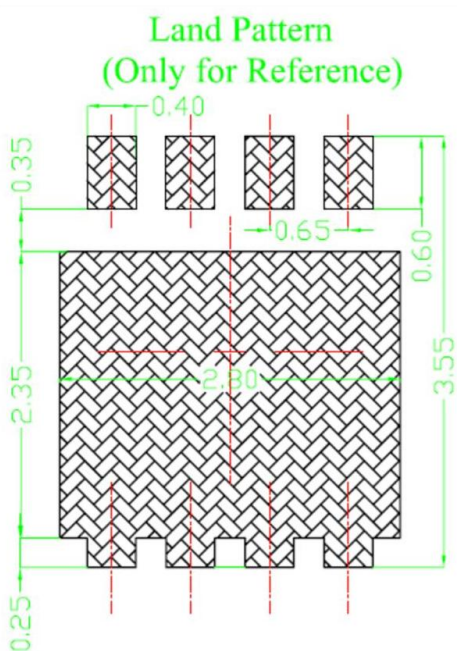
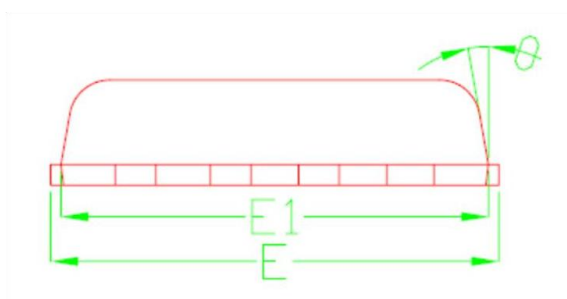
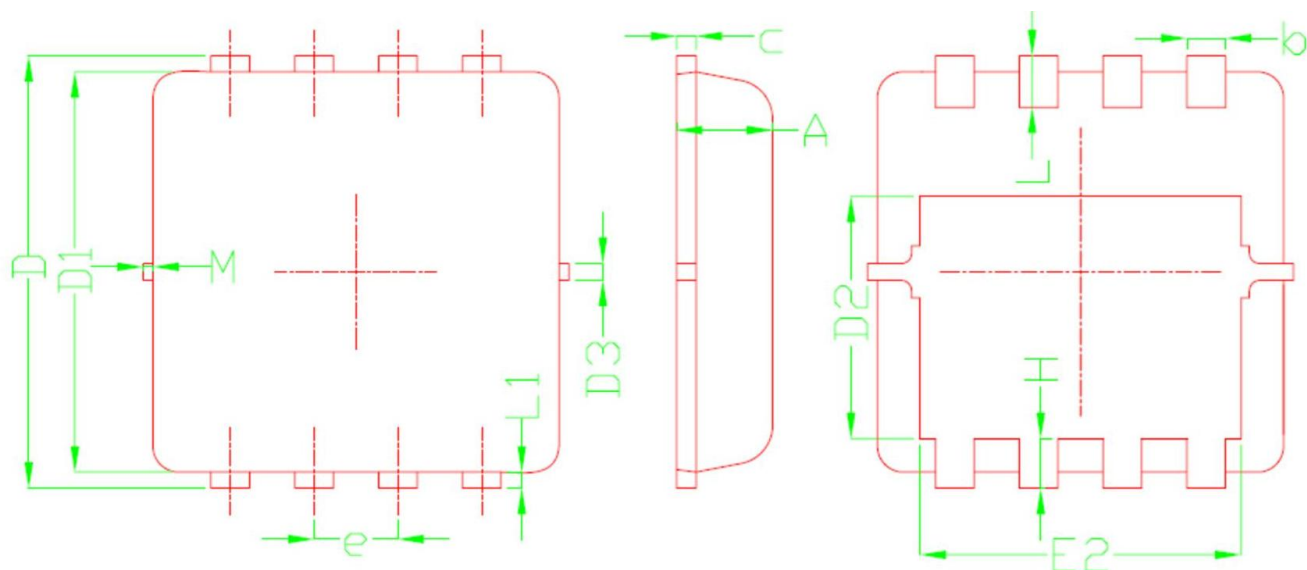


Fig6 Gate Charge



Package Information

- PDFN3*3-8L



SYMBOL	DIMENSIONAL REOMTS		
	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			