Description

The ENP4009 uses trench MOSFET technology that is uniquely optimized to provide the most efficient high frequency switching performance. Conduction and switching losses are minimized due to an extremely low combination of RDS(ON) and Crss.

General Features

- VDS =40V，ID =10A
  RDS(ON)(Typ.)=12mΩ @VGS=10V
  RDS(ON)(Typ.)=14mΩ @VGS=4.5V
- Lead free product is acquired
- Surface mount package

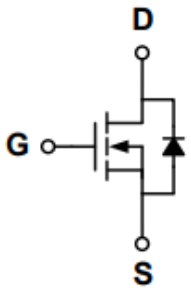
Application

- High Frequency Point-of-Load Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load switch

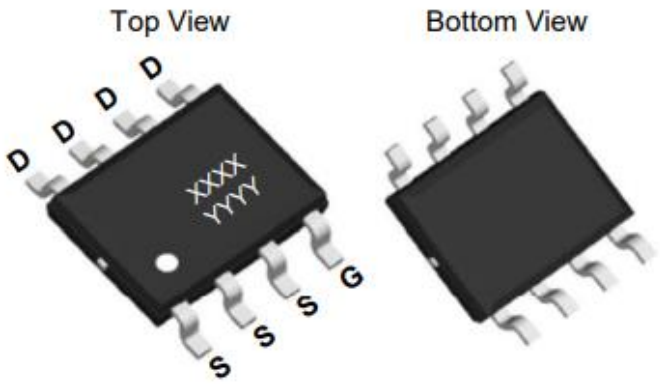
Package

- SOP-8

Schematic diagram



Marking and pin assignment SOP-8



Ordering Information

ENP4009 XX GR

M1=SOP-8

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
Continuous Drain Current	TC=25℃	I_D	10	A
	TC=70℃		7	
Pulsed Drain Current		I_{DP}	30	A
Avalanche energy(L=0.1mH)		E_{AS}	20	mJ
Power Dissipation	TC=25℃	P_D	3	W
	TC=70℃		2.1	
Operating junction Temperature range		Tj	-55—150	℃

Electrical Characteristics (TA=25℃ 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℃	-	-	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	1.75	2.3	V
Drain-source on-state resistance[1]	$R_{DS(ON)}$	V_{GS}=10V, I_D=10A	-	12	16	mΩ
		V_{GS}=4.5V, I_D=10A		14	20	
On Status Drain Current	$I_{D(ON)}$	V_{DS}=10V, V_{GS}=5V	10	-	-	A
Diode Characteristics						
Diode Forward Voltage	V_{SD}	I_{SD}=1A,V_{GS}=0V	-	0.82	1.1	V
Diode Continuous Forward Current	I_S		-	-	10	A
Reverse Recovery Time	t_{rr}	I_F=10A, dI/dt=100A/μs	-	12.5	-	ns
Reverse Recovery Charge	Q_{rr}		-	3.5	-	nC
Dynamic Characteristics						
Gate Resistance	R_G	V_{GS}=0V, V_{DS}=0V,f=1MHz	-	2.2	-	Ω
Input capacitance	C_{ISS}	V_{GS}=0V ,V_{DS}=20V f=1.0MHz	-	1152	-	pF
Output capacitance	C_{OSS}		-	97	-	
Reverse transfer capacitance	C_{RSS}		-	84	-	
Turn-on delay time	$t_{D(ON)}$	V_{GS}=10V, V_{DS}=20V, R_L=1Ω, R_G=3Ω	-	4	-	ns
Turn-on Rise time	tr		-	3	-	
Turn-off delay time	$t_{D(OFF)}$		-	15	-	
Turn-off Fall time	t_f		-	2	-	
Total gate charge	Q_g	V_{GS}=10V, V_{DS}=20V,I_D=10A	-	24.7	-	nC
Gate-source charge	Q_{gs}			2.5		
Gate-drain charge	Q_{gd}		-	4.2	-	

Thermal Characteristics

Parameter		Symbol	Typ	Max	Unit
Maximum Junction-to-Ambient[A]	≤ 10s	$R_{\theta JA}$	33	40	℃/W
Maximum Junction-to-Ambient[A]	Steady-State		59	75	
Maximum Junction-to-Lead[B]	Steady-State	$R_{\theta JC}$	16	24	

A:The value of R qJA 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 qJA is the sum of the thermal impedence from junction to lead R qJL and lead to ambient.

Typical Performance Characteristics

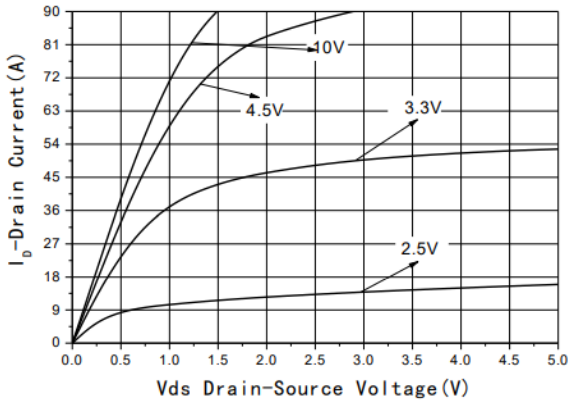


Fig1 Output Characteristics

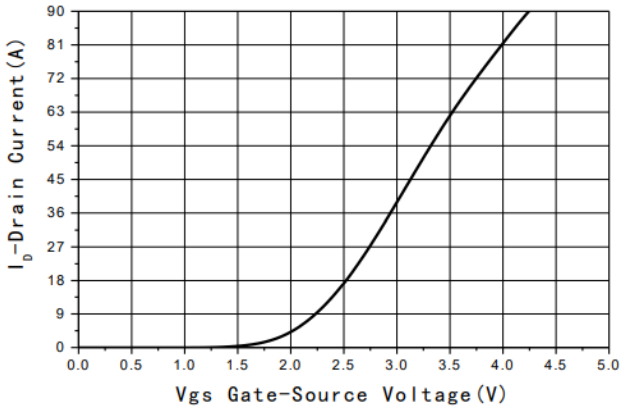


Fig2 Transfer Characteristics

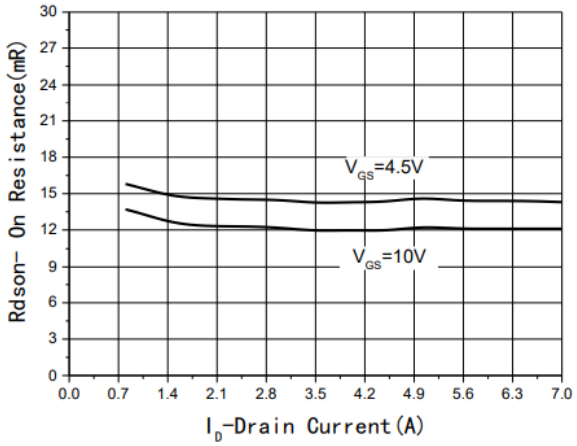


Fig3 Rdson-Drain current

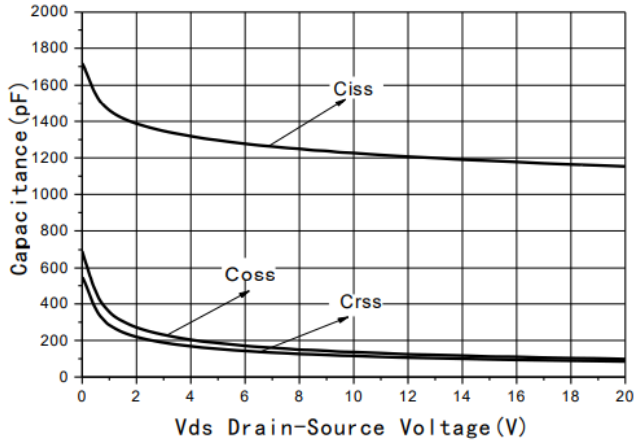


Fig4 Capacitance vs Vds

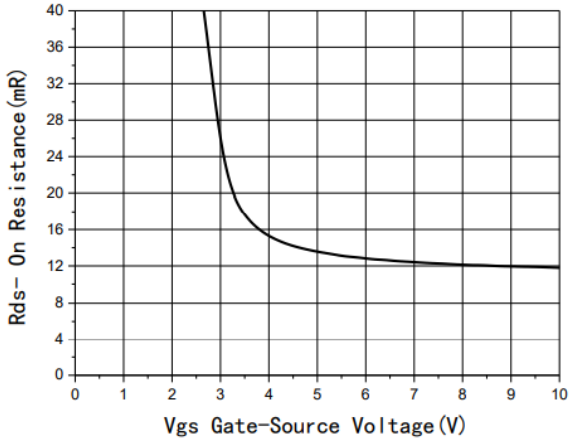


Fig5 Rdson-Gate Drain voltage

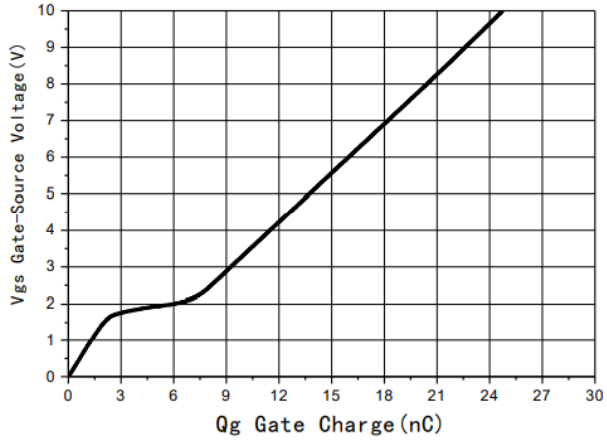


Fig6 Gate Charge

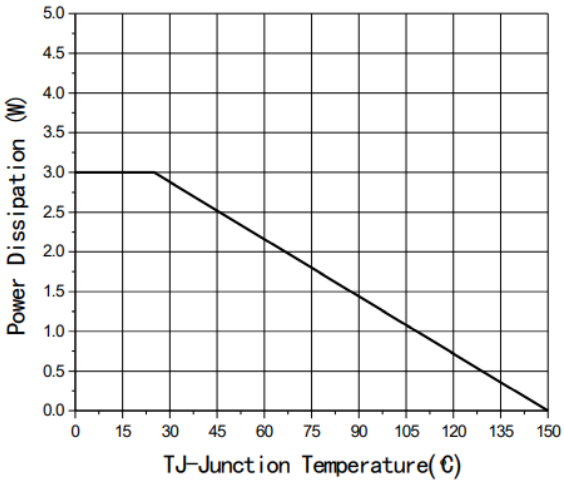


Fig7 Power De-rating

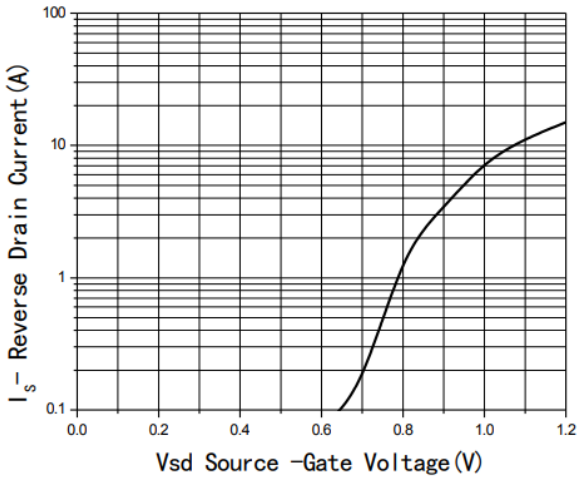
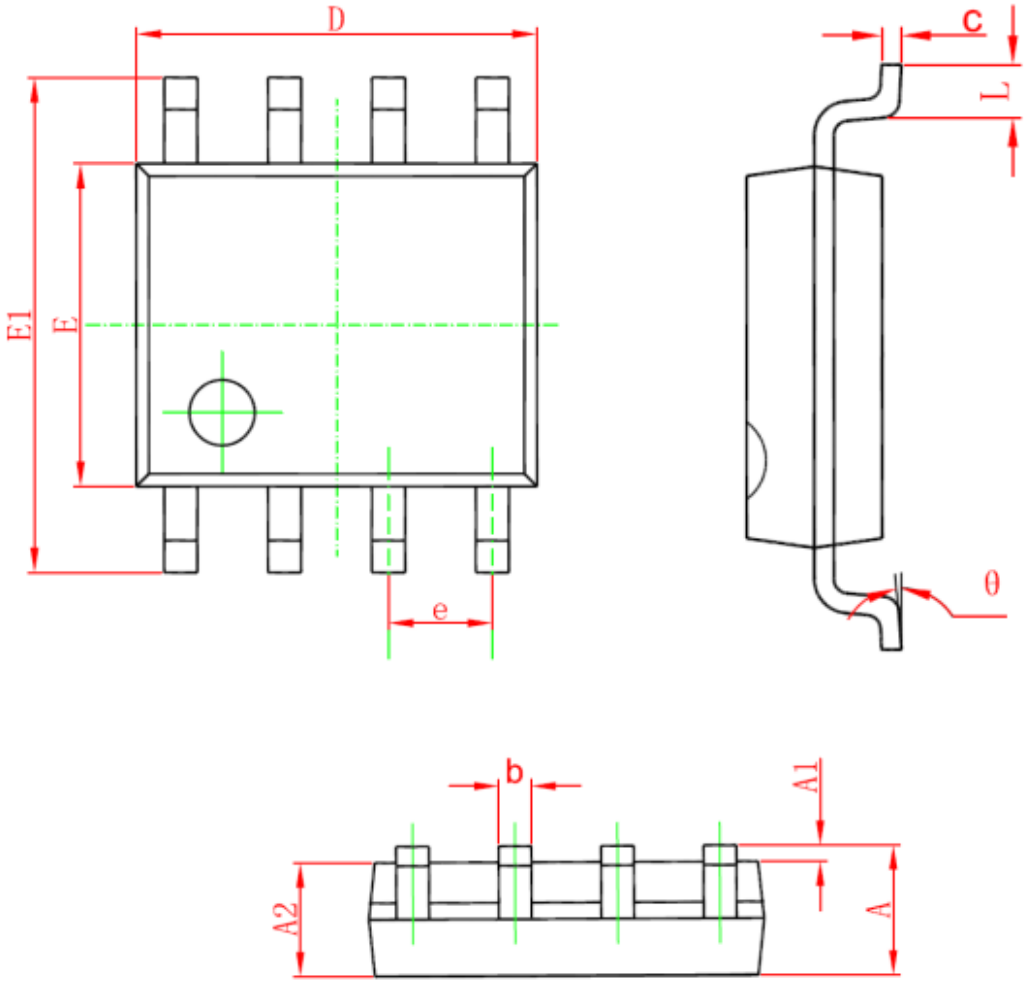


Fig8 Source-Drain Diode Forward

Package Information

- SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°