CMSC4009

Cmos

N&P-Channel Enhancement Mode MOSFET

General Description

The CMSC4009 is the highest performance trench N-ch and P-ch MOSFETs with high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

Product Summary

	BVDSS	RDSON	ID
N-Channel	40V	20mΩ	12A
P-Channel	-40V	33mΩ	-9A

Applications

- Synchronous Rectification.
- High Current, High Speed Switching.
- Protable equipment application

Features

- 30V,12A, RDS(ON) =20mΩ @VGS = 10V
  -30V,-8A, RDS(ON) =35mΩ @VGS =-10V
- Improved dv/dt capability
- Fast switching
- RoHS Compliant

DFN-8 3.3x3.3 Pin Configuration

DFN-8 3.3x3.3

N-channel   P-channel

Type	Package	Marking
CMSC4009	DFN-8 3.3*3.3	4009

Absolute Maximum Ratings

Symbol	Parameter	Max N-channel	Max P-channel	Units
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D@T_C=25℃	Continuous Drain Current	12	-9	A
I_D@T_C=100℃	Continuous Drain Current	9.6	-7.2	A
I_{DM}	Pulsed Drain Current	36	-27	A
P_D@T_C=25℃	Power Dissipation	2		W
T_{STG}	Storage Temperature Range	-55 to 150		℃
T_J	Operating Junction Temperature Range	-55 to 150		℃

Thermal Characteristics: N-channel

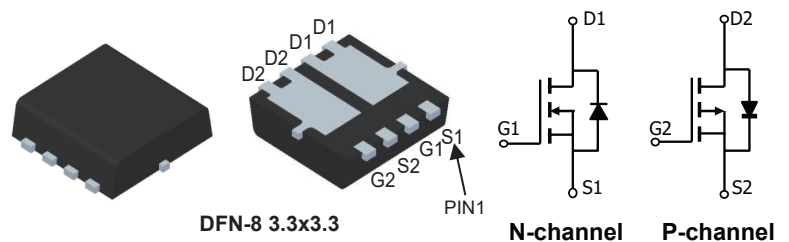| Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Maximum Junction-to-Ambient (Steady-State)	---	62.5	℃/W
$R_{\theta Jc}$	Maximum Junction-to-Case (Steady-State)	---	6.4	℃/W

Thermal Characteristics: P-channel

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Maximum Junction-to-Ambient (Steady-State)	---	62.5	℃/W
$R_{\theta JC}$	Maximum Junction-to-Case (Steady-State)	---	6.4	℃/W

N-channel Electrical Characteristics (T_J=25℃ , unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=10A	---	---	20	mΩ
		V_{GS}=4.5V , I_D=5A	---	---	22	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D = 250μA	1	---	2	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=32V , V_{GS}=0V	---	---	1	uA
		V_{DS}=32V , V_{GS}=0V , T_J=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±20V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=10V , I_D=5A	---	13	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	18	---	Ω
Q_g	Total Gate Charge	V_{DS}=20V , I_D=5A V_{GS}=4.5V	---	6	---	nC
Q_{gs}	Gate-Source Charge		---	1.5	---	
Q_{gd}	Gate-Drain Charge		---	3	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=20V , V_{GS}=10V , R_G =3.3Ω I_D =1A	---	9	---	ns
T_r	Rise Time		---	2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	42	---	
T_f	Fall Time		---	3	---	
C_{iss}	Input Capacitance	V_{DS}= 25V, V_{GS}=0V , f=1MHz	---	1200	---	pF
C_{oss}	Output Capacitance		---	76	---	
C_{rss}	Reverse Transfer Capacitance		---	56	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Diode continuous forward current	V_G=V_D=0V , Force Current	---	---	12	A
$I_{S,pulse}$	Diode pulse current		---	---	36	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_F=1A , Tj=25℃	---	---	1.2	V

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P Channel Electrical Characteristics (TJ=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250μA	-40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V, I_D=-10A	---	---	33	mΩ
		V_{GS}=-4.5V , I_D=-5A	---	---	42	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250μA	-1	---	-2	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-32V , V_{GS}=0V	---	---	-1	uA
		V_{DS}=-32V , V_{GS}=0V,T_J=55℃	---	---	-5	
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}= -10V , I_D=-5A	---	14	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	18	---	Ω
Q_g	Total Gate Charge	V_{DS}=-20V, V_{GS}=-4.5V, I_D=-6A	---	12	---	nC
Q_{gs}	Gate-Source Charge		---	4	---	
Q_{gd}	Gate-Drain Charge		---	3	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-15V, V_{GS}=-10V, I_D =-1A R_G=3.3Ω	---	23	---	ns
T_r	Rise Time		---	16	---	
$T_{d(off)}$	Turn-Off Delay Time		---	60	---	
T_f	Fall Time		---	6	---	
C_{iss}	Input Capacitance	V_{DS}=-25V , V_{GS}=0V , f=1MHz	---	1200	---	pF
C_{oss}	Output Capacitance		---	134	---	
C_{rss}	Reverse Transfer Capacitance		---	102	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	-9	A
I_{SM}	Pulsed Source Current		---	---	-27	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_F=-1A ,T_J=25℃	---	---	-1.2	V

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