CMD609

N- and P-Channel Enhancement Mode MOSFET

General Description

The CMD609 uses advanced trench technology MOSFETs to provide excellent RDS(ON) and low gate charge. The complementary MOSFETs may be used in H-bridge, Inverters and other applications.

Product Summary

	BVDSS	RDSON	ID
N-Channel	40V	21mΩ	12A
P-Channel	-40V	32mΩ	-12A

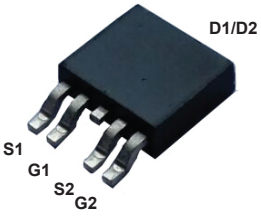
Features

- 40V 12A RDS(ON)≤21mΩ @ VGS=10V
  RDS(ON)≤25mΩ @ VGS=4.5V
- -40V -12A RDS(ON)≤32mΩ @ VGS=10V
  RDS(ON)≤40mΩ @ VGS=4.5V
- High Density Cell Design For Ultra Low On Resistance

Applications

- Power Management
- Load Switch
- DC/DC Converter

TO-252-4L Pin Configuration



TO-252-4L
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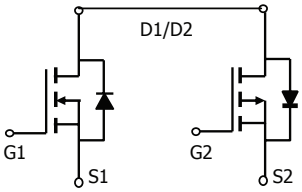

n-channel **p-channel**

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	-12	A
I_{DM}	Pulsed Drain Current	36	-36	A
E_{AR}	Repetitive Avalanche Energy	9.8	20	mJ
P_D	Power Dissipation (T_C = 25°C)	27	30	W
T_{STG}	Storage Temperature Range	-55 to 175	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	-55 to 175	℃

Thermal Characteristics: n-channel

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Maximum Junction-to-Ambient	---	60	℃/W
$R_{\theta Jc}$	Maximum Junction-to-Case	---	5.5	℃/W

Thermal Characteristics: p-channel

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Maximum Junction-to-Ambient	---	60	℃/W
$R_{\theta JC}$	Maximum Junction-to-Case	---	5	℃/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=250μA	40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=12A	---	---	21	mΩ
		V_{GS}=4.5V , I_D=8A	---	---	25	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250μA	1	---	2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=40V , V_{GS}=0V	---	---	1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}= ±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=12A	---	17	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	3	---	Ω
Q_g	Total Gate Charge (10V)	V_{DS}=20V , V_{GS}=10V , I_D=12A	---	8.5	---	nC
Q_{gs}	Gate-Source Charge		---	2.3	---	
Q_{gd}	Gate-Drain Charge		---	1.5	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=20V , V_{GS}=10V , R_L=1.4Ω R_{GEN}=3Ω ,	---	6.5	---	ns
T_r	Rise Time		---	4	---	
$T_{d(off)}$	Turn-Off Delay Time		---	16	---	
T_f	Fall Time		---	6.5	---	
C_{iss}	Input Capacitance	V_{DS}=20V , V_{GS}=0V , f=1MHz	---	1200	---	pF
C_{oss}	Output Capacitance		---	85	---	
C_{rss}	Reverse Transfer Capacitance		---	45	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	12	A
I_{SM}	Pulsed Source Current		---	---	36	A
t_{rr}	Body Diode Reverse Recovery Time	I_F=12A , di/dt=100A/μs	---	18	---	ns
Q_{rr}	Body Diode Reverse Recovery Charge		---	10	---	nC
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A	---	---	1.2	V

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=-12A	---	---	32	mΩ
		V_{GS}=-4.5V , I_D=-8A	---	---	40	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250μA	-1	---	-2	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-40V , V_{GS}=0V	---	---	-1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-12A	---	18	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	16	---	Ω
Q_g	Total Gate Charge (10V)	V_{DS}=-20V, V_{GS}=-10V, I_D=-12A	---	16	---	nC
Q_{gs}	Gate-Source Charge		---	4	---	
Q_{gd}	Gate-Drain Charge		---	3.5	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=-20V , V_{GS}=-10V, R_L=1.4Ω R_{GEN}=3Ω ,	---	6.5	---	ns
T_r	Rise Time		---	8.5	---	
$T_{d(off)}$	Turn-Off Delay Time		---	45	---	
T_f	Fall Time		---	41	---	
C_{iss}	Input Capacitance	V_{DS}=-20V , V_{GS}=0V , f=1MHz	---	1300	---	pF
C_{oss}	Output Capacitance		---	100	---	
C_{rss}	Reverse Transfer Capacitance		---	70	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	-12	A
I_{SM}	Pulsed Source Current		---	---	-36	A
t_{rr}	Body Diode Reverse Recovery Time	I_F=-12A , di/dt=100A/μs	---	21	---	ns
Q_{rr}	Body Diode Reverse Recovery Charge		---	14	---	nC
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-12A	---	---	1.5	V

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