

CMS12NP04

40V, 18mΩ typ., 12A N-Channel MOSFET and -40V, 40mΩ typ., -6A P-Channel MOSFET

General Description

The CMS12NP04 uses advanced trench technology to provide excellent RDS(ON). The complementary MOSFETs may be used in H-bridge, Inverters and other applications.

Features

- Low On-resistance
- Simple Drive Requirement
- Surface mount Package
- RoHS Compliant

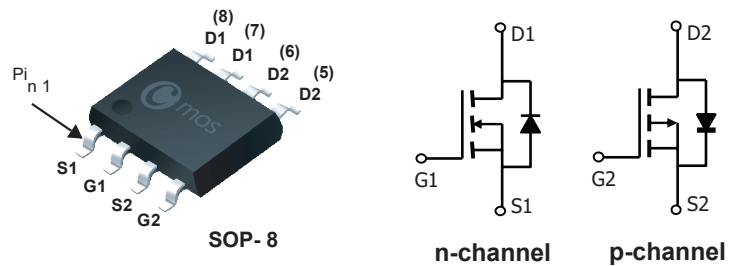
Product Summary

	BVDSS	RDSON	ID
N-Channel	40V	22mΩ	12A
P-Channel	-40V	50mΩ	-6A

Applications

- DC/DC Converter
- Power Management

SOP-8 Pin Configuration



Type	Package	Marking
CMS12NP04	SOP- 8	CMS12NP04

Absolute Maximum Ratings

Symbol	Parameter	Max n-ch	Max p-ch	Units
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	±20	±20	V
$I_D@T_A=25^{\circ}C$	Continuous Drain Current	12	-6	A
$I_D@T_A=100^{\circ}C$	Continuous Drain Current	7.8	-3.9	A
I_{DM}	Pulsed Drain Current	48	-24	A
EAS	Single Pulse Avalanche Energy ¹	45	42	mJ
$P_D@T_A=25^{\circ}C$	Total Power Dissipation	3	3	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	°C

Thermal Characteristics: n-channel

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	41.7	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-to-Case	---	48	°C/W

CMS12NP04

40V, 18mΩ typ., 12A N-Channel MOSFET and -40V, 40mΩ typ., -6A P-Channel MOSFET

Thermal Characteristics: P-channel

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	41.7	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-case	---	25	°C/W

N-channel Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V$, $I_D=7A$	---	18	22	mΩ
		$V_{GS}=4.5V$, $I_D=6A$	---	23	35	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.0	---	3.0	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=40V$, $V_{GS}=0V$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	±100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V$, $I_D=10A$	---	12	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	7.5	---	Ω
Q_g	Total Gate Charge	$I_D=7A$	---	14	---	nC
Q_{gs}	Gate-Source Charge	$V_{DD}=20V$	---	2	---	
Q_{gd}	Gate-Drain Charge	$V_{GS}=0$ to $10V$	---	2.5	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=20V$ $V_{GS}=10V$ $R_{GEN}=6\Omega$, $I_D=7A$	---	7	---	ns
T_r	Rise Time		---	3	---	
$T_{d(off)}$	Turn-Off Delay Time		---	20	---	
T_f	Fall Time		---	2	---	
C_{iss}	Input Capacitance	$V_{DS}=25V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	850	---	pF
C_{oss}	Output Capacitance		---	100	---	
C_{rss}	Reverse Transfer Capacitance		---	50	---	

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		---	---	48	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_F=12A$, $T_J=25^{\circ}\text{C}$	---	0.90	1.2	V

CMS12NP04

40V, 18mΩ typ., 12A N-Channel MOSFET and -40V, 40mΩ typ., -6A P-Channel MOSFET

P-channel Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V$, $I_D=-6A$	---	40	50	mΩ
		$V_{GS}=-4.5V$, $I_D=-6A$	---	51	68	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-1	---	-3	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-40V$, $V_{GS}=0V$	---	---	-1	uA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=-5V$, $I_D=-10A$	---	12	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	50	---	Ω
Q_g	Total Gate Charge	$V_{DS}=-20V$, $V_{GS}=-4.5V$, $I_D=-12A$	---	9.3	---	nC
Q_{gs}	Gate-Source Charge		---	3	---	
Q_{gd}	Gate-Drain Charge		---	3.5	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-15V$, $V_{GS}=-10V$, $I_D=-1A$ $R_{GEN}=3.3\Omega$	---	20	---	ns
T_r	Rise Time		---	13	---	
$T_{d(off)}$	Turn-Off Delay Time		---	47	---	
T_f	Fall Time		---	4.5	---	
C_{iss}	Input Capacitance	$V_{DS}=-25V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	1050	---	pF
C_{oss}	Output Capacitance		---	95	---	
C_{rss}	Reverse Transfer Capacitance		---	50	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	-6	A
I_{SM}	Pulsed Source Current		---	---	-24	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_F=-12A$, $T_J=25^{\circ}\text{C}$	---	-0.94	-1.2	V

Note:

1.The EAS data shows Max. rating . The N-Channel test condition is $V_{DD}=30V$, $V_{GS}=10V$, $L=0.5\text{mH}$, $I_{AS}=13.5A$.

The P-Channel test condition is $V_{DD}=-30V$, $V_{GS}=-10V$, $L=0.5\text{mH}$, $I_{AS}=-13A$.

This product has been designed and qualified for the consumer market.

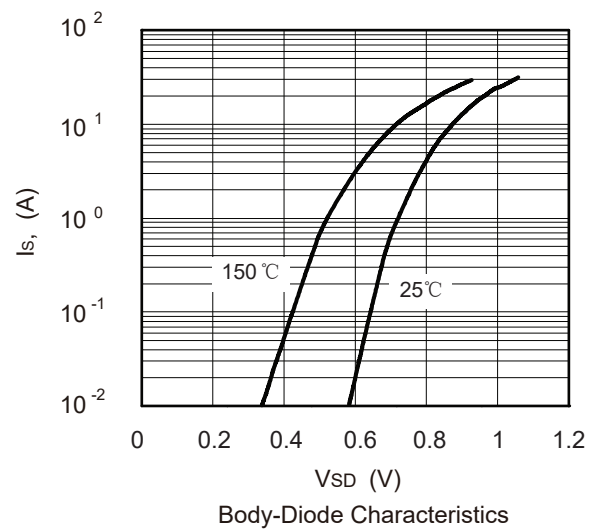
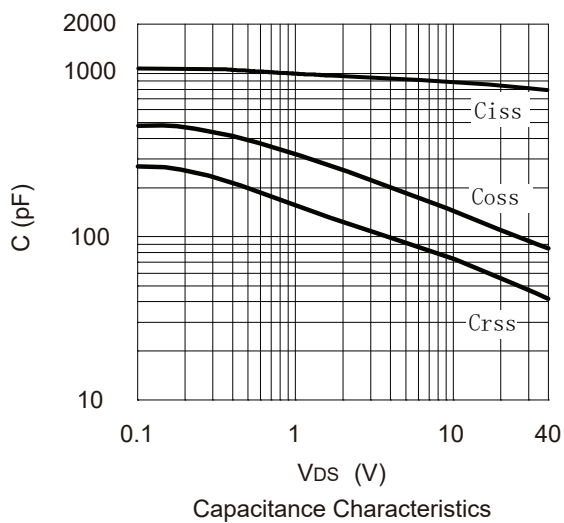
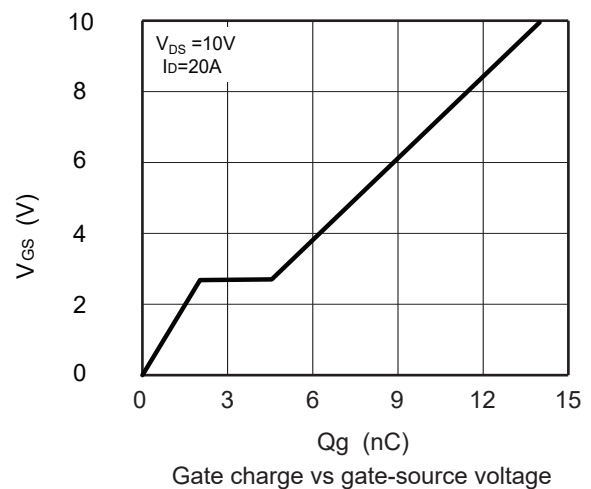
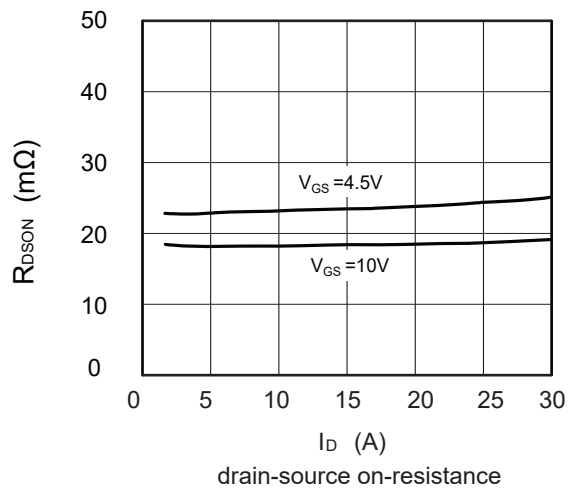
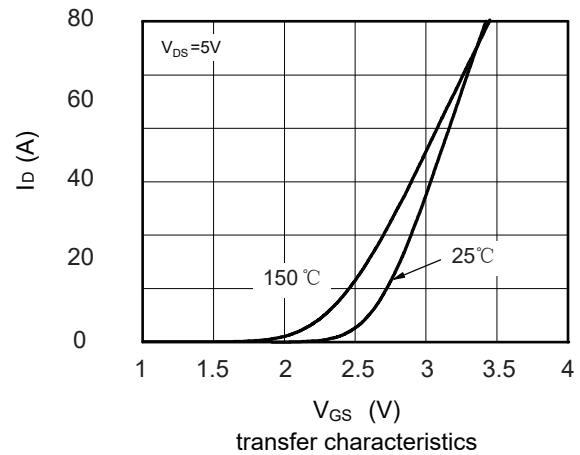
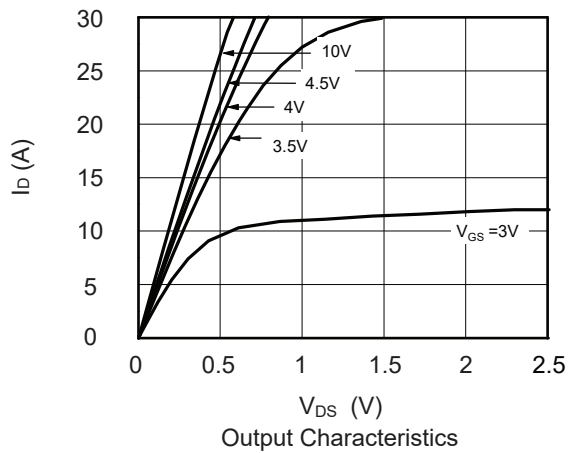
Cmos assumes no liability for customers' product design or applications.

Cmos reserves the right to improve product design ,functions and reliability without notice.Please refer to the latest version of specification.

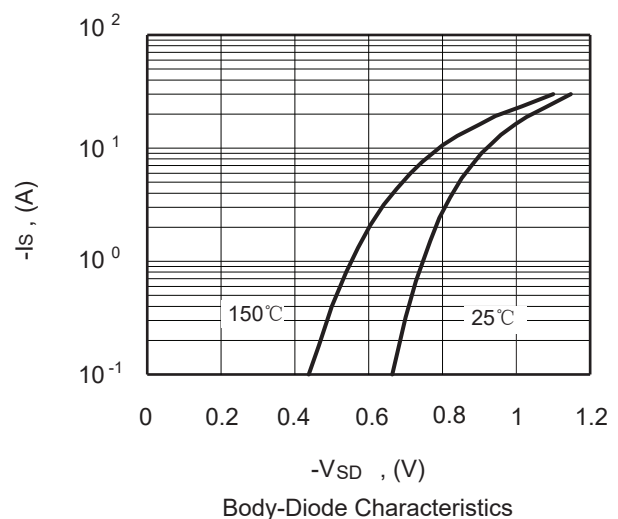
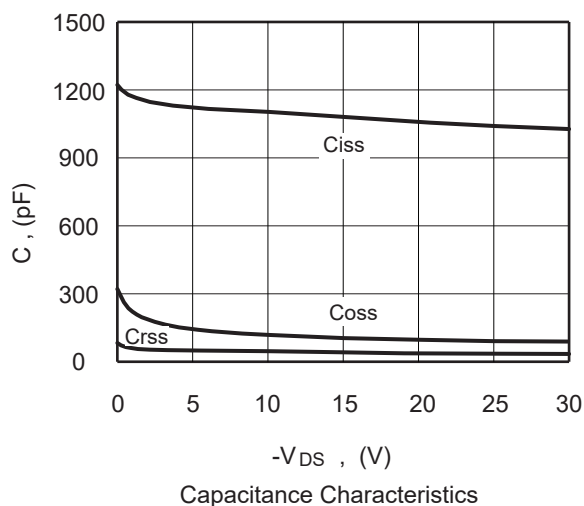
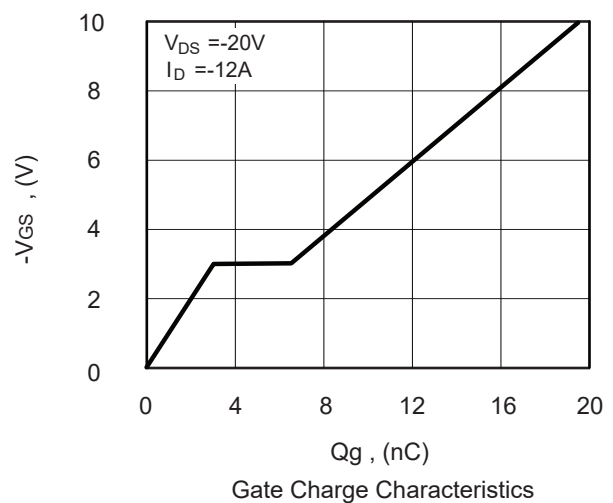
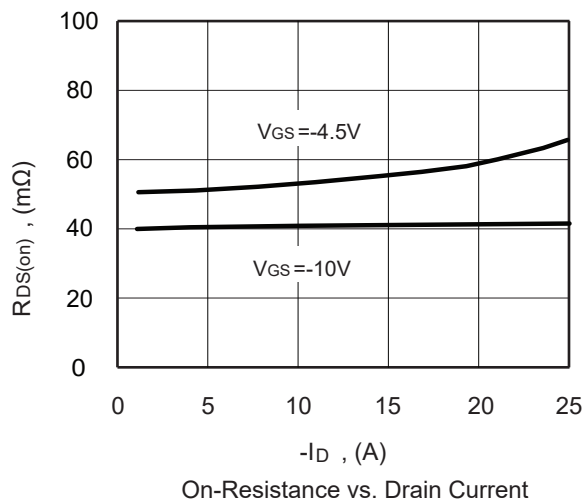
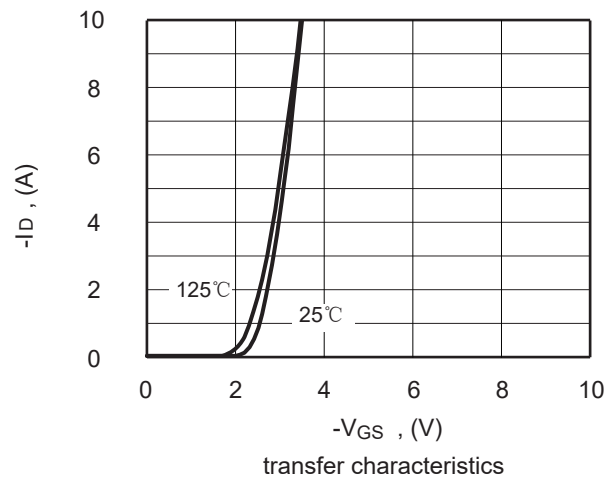
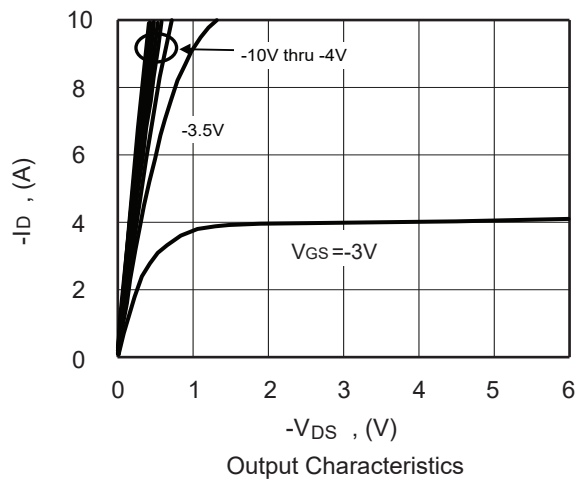
CMS12NP04

40V, 18mΩ typ., 12A N-Channel MOSFET and -40V, 40mΩ typ., -6A P-Channel MOSFET

Typical Characteristics



P-Channel: Typical Characteristics



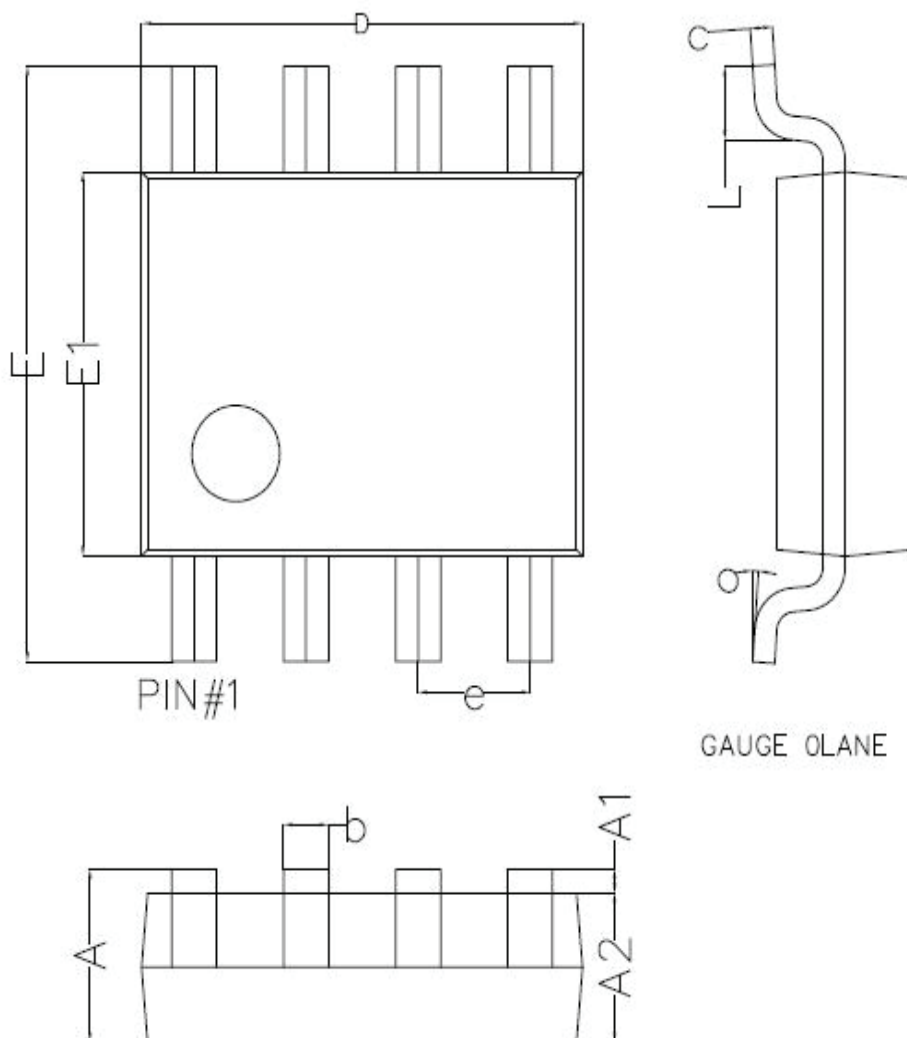
CMS12NP04

40V, 18mΩ typ., 12A N-Channel MOSFET and -40V, 40mΩ typ., -6A P-Channel MOSFET

Package Dimension

SOP-8

Unit :mm



Symbol	Dim in mm		
	Min	Nor	Max
A	1.35	1.55	1.75
A1	0.02	0.065	0.10
A2	1.35	1.45	1.55
b	0.33	0.42	0.51
c	0.17	0.21	0.25
D	4.80	4.90	5.00
e	1.270 (BSC)		
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
L	0.4	0.835	1.27
θ	0°	4°	8°