

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

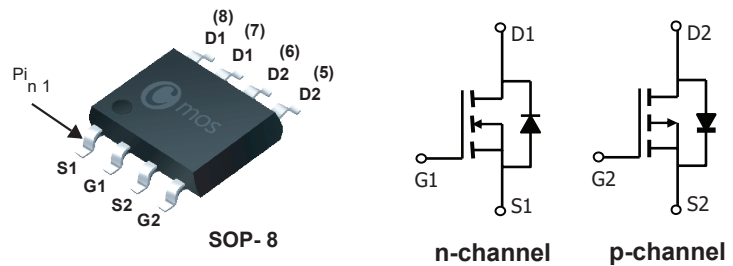
Product Summary

	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

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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

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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	$V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$	---	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	$V_{DS}=-25V$, $V_{GS}=0V$, $f=1MHz$	---	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 $V_{DD}=30V$, $V_{GS}=10V$, $L=0.5mH$, $I_{AS}=13.5A$.

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

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

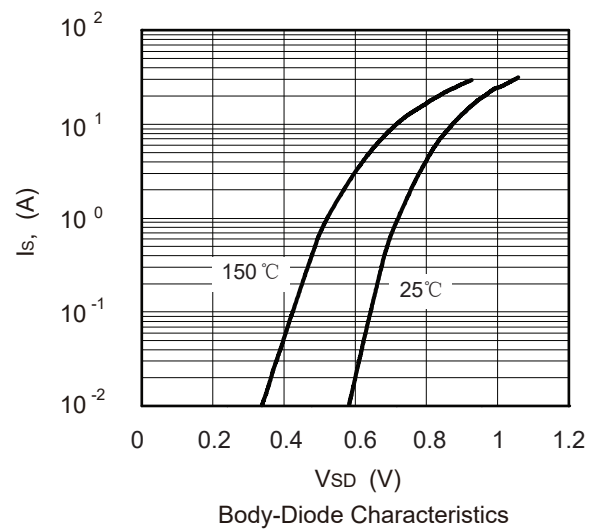
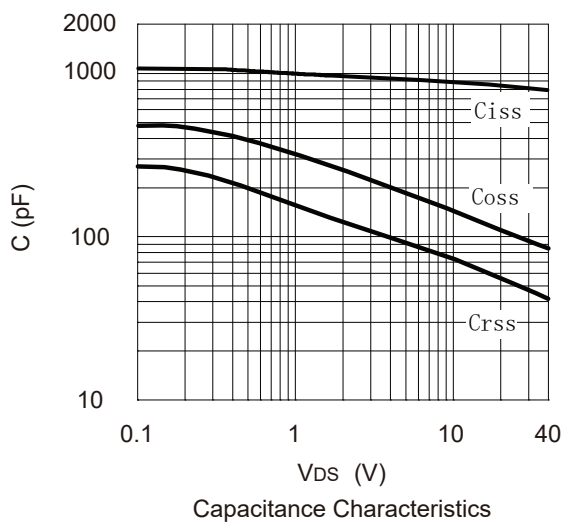
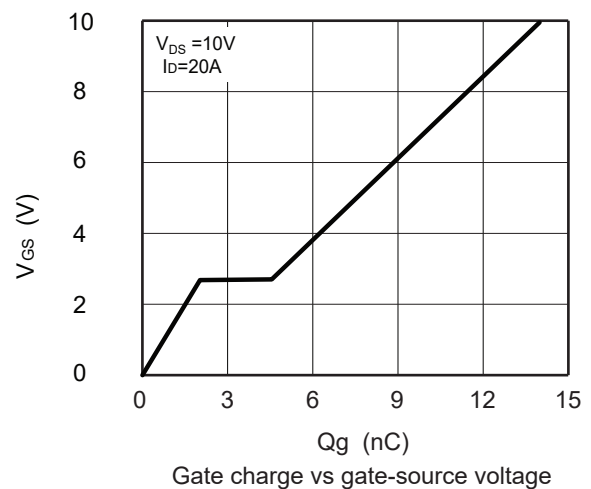
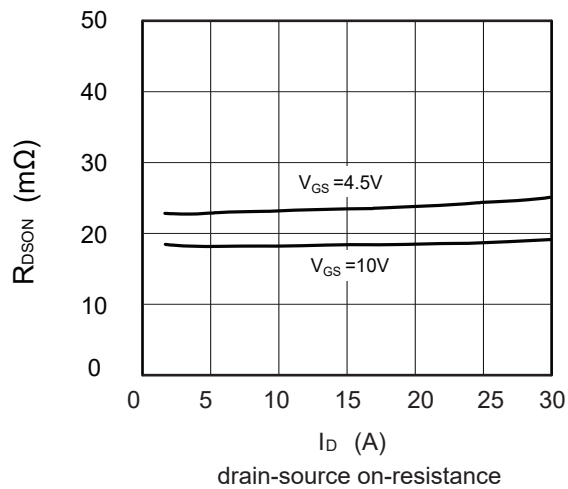
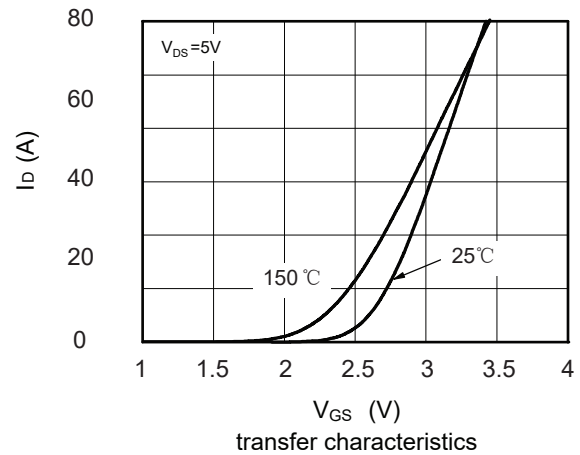
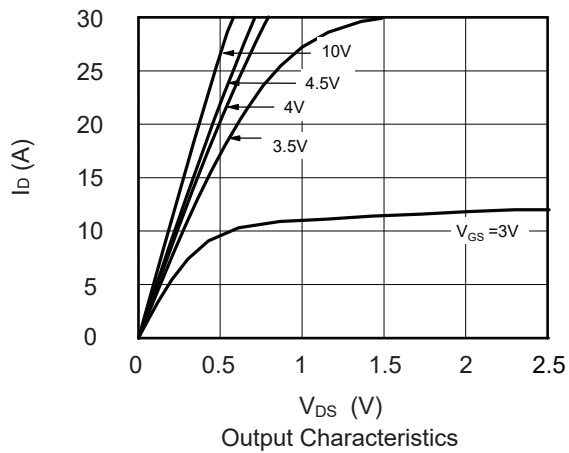
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Cmos reserves the right to improve product design ,functions and reliability without notice.Please refer to the latest version of specification.

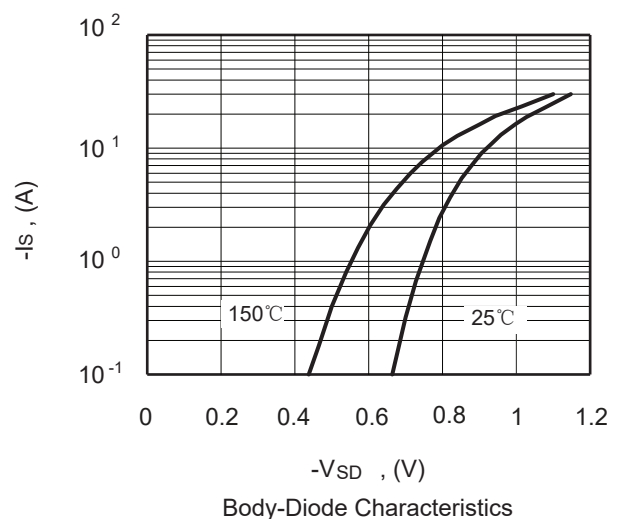
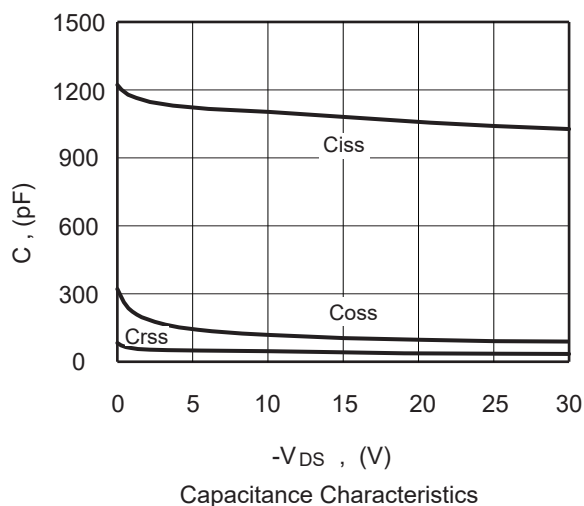
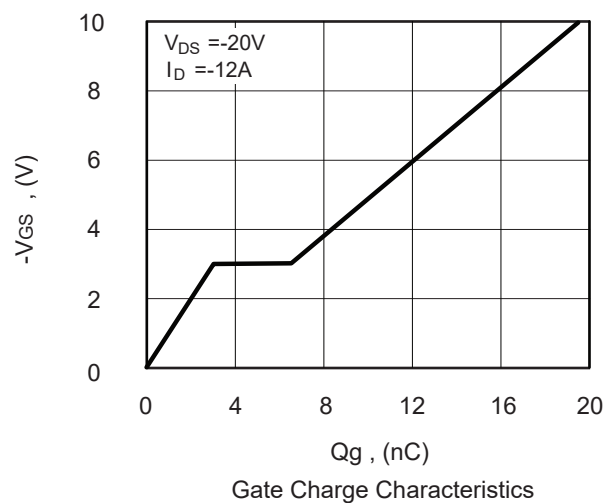
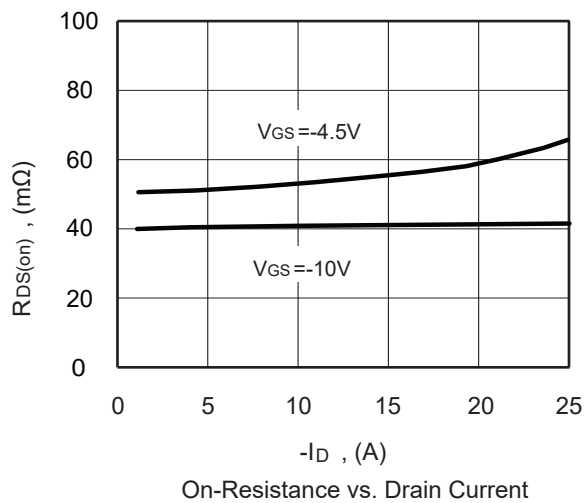
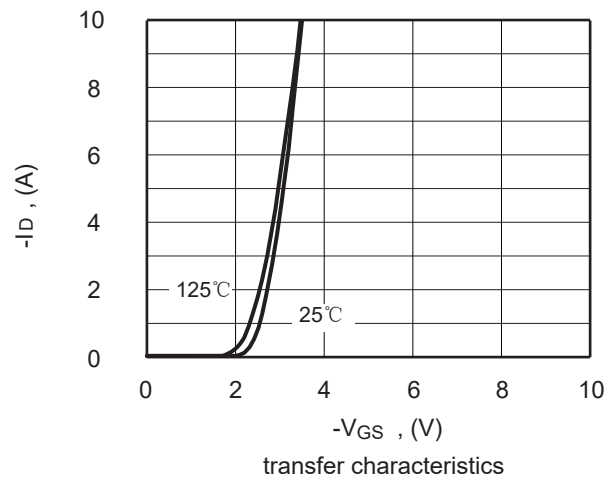
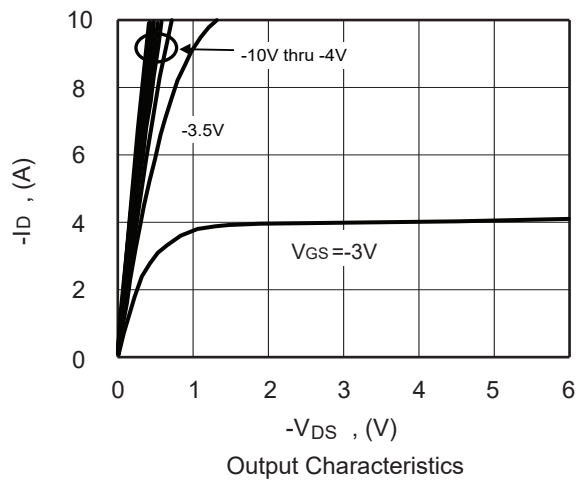
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Typical Characteristics



P-Channel: Typical Characteristics



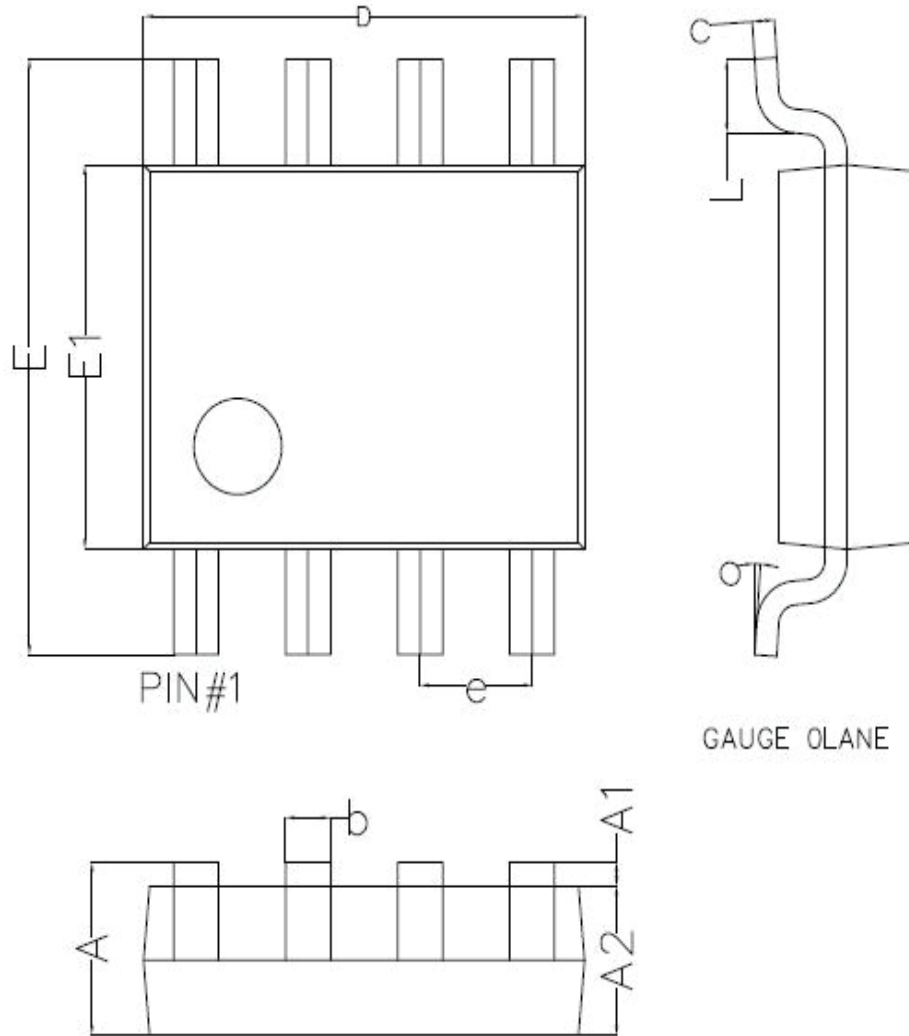
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Package Dimension

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°