CMS10NP02

20V, 13mΩ typ., 10A N-Channe MOSFET and -20V, 28mΩ typ., -10A P-Channe MOSFET

General Description

The CMS10NP02 uses advanced trench technology MOSFETs to provide excellent RDS(ON).The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications.

Product Summary

	BVDSS	$R_{DS(on)}$ max.	ID
N-Channel	20V	15mΩ	10A
P-Channel	-20V	33mΩ	-10A

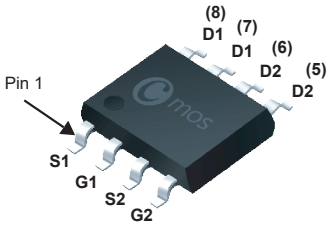
Applications

- Level Shift
- Load Switch

Features

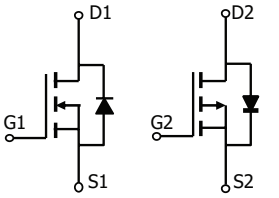
- Low On-Resistance
- 100% avalanche tested
- RoHS Compliant

SOP-8 Pin Configuration



SOP-8

CMS10NP02



N-channel P-channel

Absolute Maximum Ratings

Symbol	Parameter	N-channel	P-channel	Units
V_{DS}	Drain-Source Voltage	20	-20	V
V_{GS}	Gate-Source Voltage	±16	±16	V
I_D@T_A=25℃	Continuous Drain Current	10	-10	A
I_D@T_A=100℃	Continuous Drain Current	7	-7	A
I_{DM}	Pulsed Drain Current	40	-40	A
EAS	Single Pulse Avalanche Energy [1]	25	42	mJ
P_D@T_A=25℃	Power Dissipation	2	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
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	62.5	℃/W

20V, 13mΩ typ., 10A N-Channe MOSFET and -20V, 28mΩ typ., -10A P-Channe MOSFET

Thermal Characteristics: P-channel

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	62.5	℃/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=250uA	20	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=4.5V , I_D=6.5A	---	13	15	mΩ
		V_{GS}=2.5V , I_D=5.5A	---	16	20	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D = 250μA	0.3	---	1.1	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=16V , V_{GS}=0V , T_J=25℃	---	---	1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±10V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=6.5A	---	14	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.3	---	Ω
Q_g	Total Gate Charge	V_{DS} =10V , I_D=6A V_{GS}=4.5V	---	11	---	nC
Q_{gs}	Gate-Source Charge		---	2	---	
Q_{gd}	Gate-Drain Charge		---	3.2	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=10V , V_{GS}= 5V , R_{GEN} =3Ω R_L=1.7Ω	---	0.3	---	μs
T_r	Rise Time		---	0.6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	7.9	---	
T_f	Fall Time		---	4.4	---	
C_{iss}	Input Capacitance	V_{DS}= 10V, V_{GS}=0V , f=1MHz	---	650	---	pF
C_{oss}	Output Capacitance		---	115	---	
C_{rss}	Reverse Transfer Capacitance		---	110	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Diode continuous forward current	V_G=V_D=0V , Force Current	---	---	10	A
$I_{S,pulse}$	Diode pulse current		---	---	40	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_F=1A , Tj=25 ℃	---	0.74	1.2	V

20V, 13mΩ typ., 10A N-Channe MOSFET and -20V, 28mΩ typ., -10A P-Channe MOSFET

P 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	-20	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-4.5V , I_D=-6.5A	---	28	33	mΩ
		V_{GS}=-2.5V , I_D=-5.5A	---	43	55	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250μA	-0.5	---	-1.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-16V , V_{GS}=0V	---	---	-1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±10V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-6.5A	---	14	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	15	---	Ω
Q_g	Total Gate Charge	V_{DS}=-16V, V_{GS}=-4.5V , I_D=-6A	---	11	---	nC
Q_{gs}	Gate-Source Charge		---	2	---	
Q_{gd}	Gate-Drain Charge		---	4	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-10V , V_{GS}=-4.5V , I_D =-3A R_G=10Ω	---	25	---	ns
T_r	Rise Time		---	110	---	
$T_{d(off)}$	Turn-Off Delay Time		---	130	---	
T_f	Fall Time		---	140	---	
C_{iss}	Input Capacitance	V_{DS}=-10V , V_{GS}=0V , f=1MHz	---	1000	---	pF
C_{oss}	Output Capacitance		---	140	---	
C_{rss}	Reverse Transfer Capacitance		---	135	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	-10	A
I_{SM}	Pulsed Source Current		---	---	-40	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_F=-1A ,T_J=25℃	---	-0.77	-1.2	V

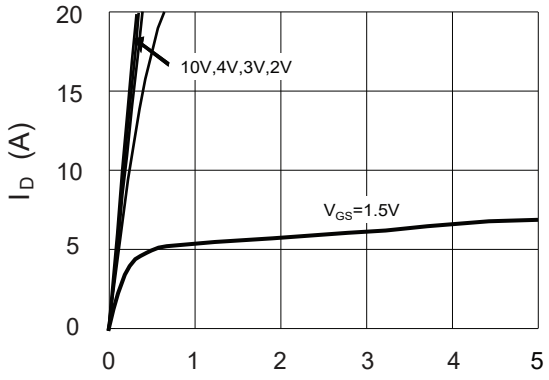
Note:

1. The EAS data shows Max. rating . The N-Channel test condition is V_{DD}=15V , V_{GS}=10V , L=0.5mH , I_{AS}=10A.
   The P-Channel test condition is V_{DD}=-15V , V_{GS}=-10V , L=0.5mH , I_{AS}=-13A.

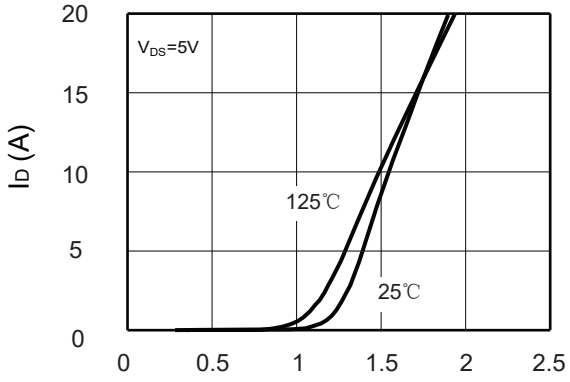
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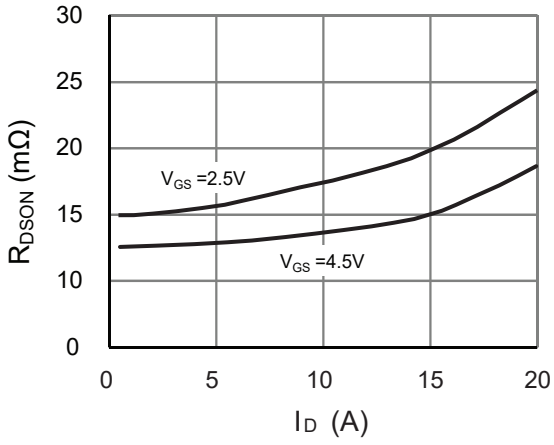
N-Channel:Typical Characteristics



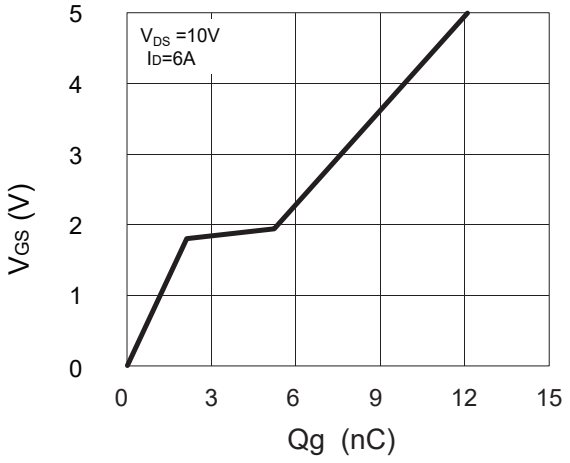
Output Characteristics



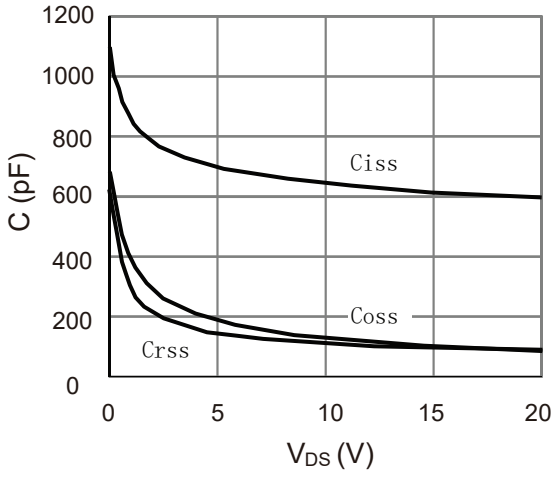
transfer characteristics



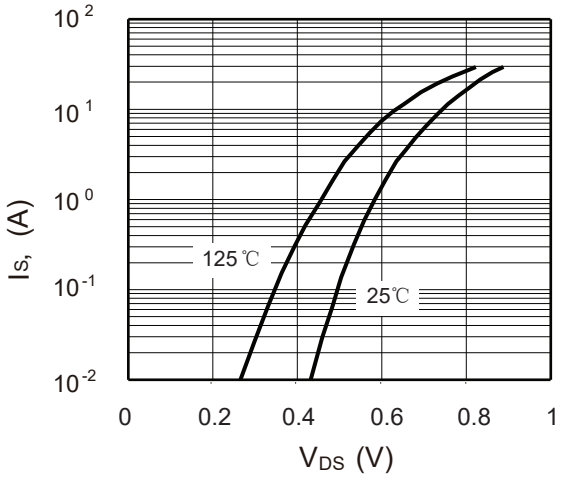
drain-source on-resistance



Gate charge vs gate-source voltage



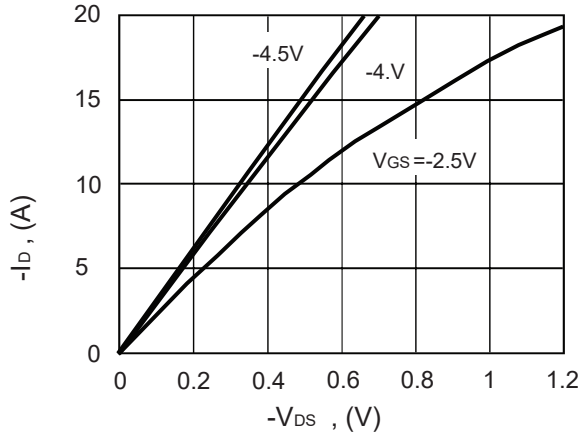
Capacitance Characteristics



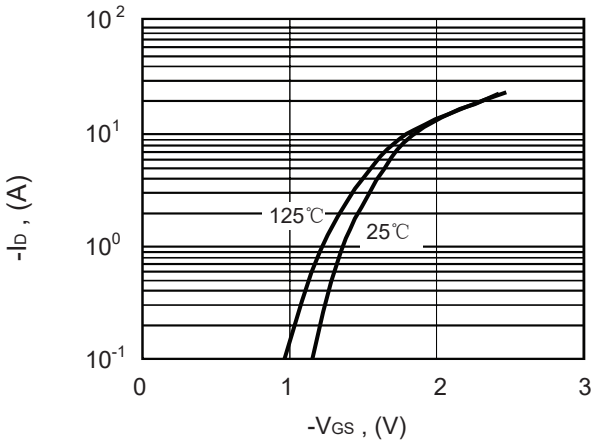
Body-Diode Characteristics

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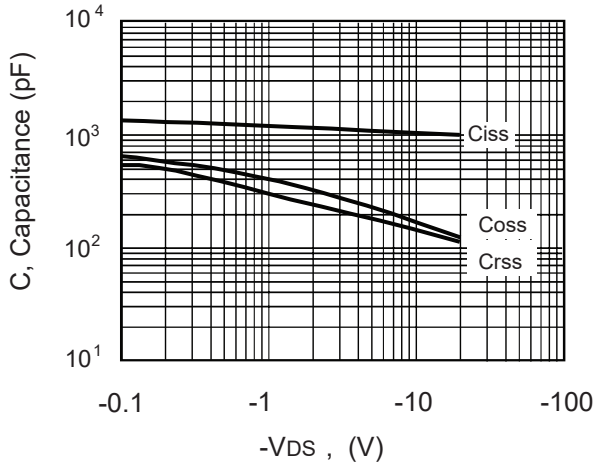
P-Channel:Typical Characteristics



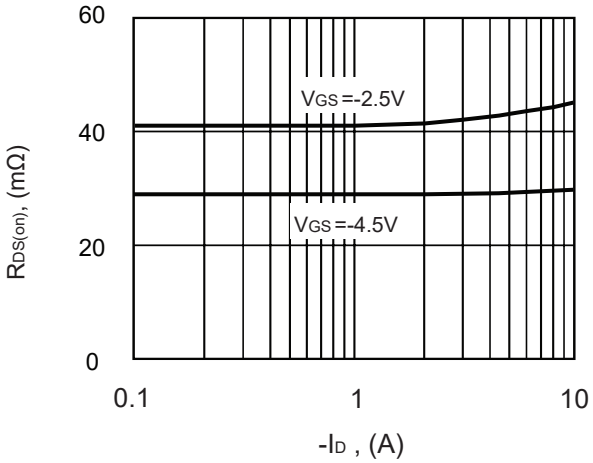
Output Characteristics



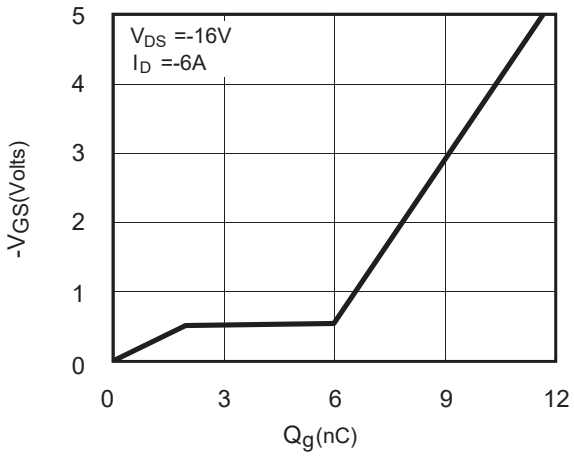
transfer characteristics



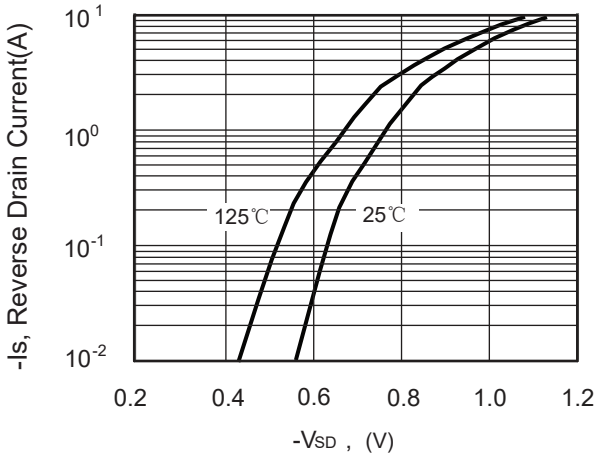
Capacitance Characteristics



On-Resistance vs. Drain Current



Gate Charge Characteristics



Body-Diode Characteristics