

CMS510B

100V, 95mΩ typ., 5A N-Channel MOSFET and -100V, 170mΩ typ., -5A P-Channel MOSFET

General Description

The CMS510B uses advanced trench technology MOSFETs to provide excellent RDS(ON) and low gate charge.

The complementary MOSFETs may be used in high-speed switching, motor driver.

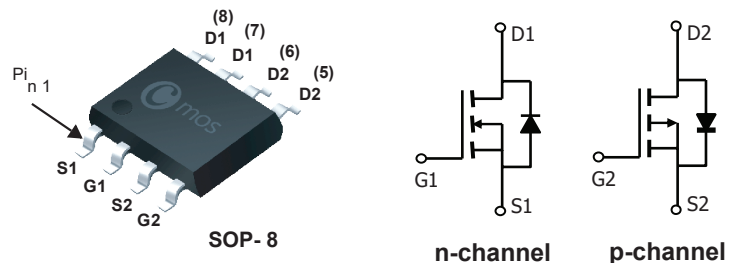
Product Summary

	BVDSS	RDSON	ID
N-Channel	100V	110mΩ	5A
P-Channel	-100V	200mΩ	-5A

Applications

- DC/DC Converter
- Motor drive

SOP-8 Pin Configuration



Features

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

Absolute Maximum Ratings

Symbol	Parameter	N-ch	P-ch	Units
V_{DS}	Drain-Source Voltage	100	-100	V
V_{GS}	Gate-Source Voltage	±20	±20	V
$I_D@T_A=25^{\circ}C$	Continuous Drain Current	5	-5	A
$I_D@T_A=100^{\circ}C$	Continuous Drain Current	3.5	-3.5	A
I_{DM}	Pulsed Drain Current	20	-20	A
EAS	Single Pulse Avalanche Energy ¹	30	45	mJ
$P_D@T_A=25^{\circ}C$	Total Power Dissipation	2.5	2.5	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	---	50	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-to-Case	---	25	°C/W

Thermal Characteristics: P-channel

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	50	°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	$V_{GS}=0V$, $I_D=250\mu A$	100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V$, $I_D=5A$	---	95	110	mΩ
		$V_{GS}=4.5V$, $I_D=5A$	---	102	125	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D = 250\mu A$	1	---	2.5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=100V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS} = \pm 20V$, $V_{DS}=0V$	---	---	±100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V$, $I_D=5A$	---	7	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	1.0	---	Ω
Q_g	Total Gate Charge	$V_{DD}=80V$, $I_D=5A$ $V_{GS}=0$ to $10V$	---	23	---	nC
Q_{gs}	Gate-Source Charge		---	3	---	
Q_{gd}	Gate-Drain Charge		---	6	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=80V$, $V_{GS}=10V$, $R_G=5\Omega$ $I_D=5A$	---	9	---	ns
T_r	Rise Time		---	5	---	
$T_{d(off)}$	Turn-Off Delay Time		---	26	---	
T_f	Fall Time		---	13	---	
C_{iss}	Input Capacitance	$V_{DS}= 25V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	1150	---	pF
C_{oss}	Output Capacitance		---	42	---	
C_{rss}	Reverse Transfer Capacitance		---	5	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	5	A
I_{SM}	Pulsed Source Current		---	---	20	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_S=5A$, $T_J=25^\circ\text{C}$	---	0.83	1.2	V
t_{rr}	Reverse Recovery Time	$di/dt = 100A/\mu s$	---	30	---	ns
Q_{rr}	Reverse Recovery Charge	$V_R = 80V$, $I_F = 5A$	---	0.05	---	μC

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	$V_{GS}=0V$, $I_D=-250\mu A$	-100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V$, $I_D=-5A$	---	170	200	mΩ
		$V_{GS}=-4.5V$, $I_D=-5A$	---	183	215	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-1	---	-2.5	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-100V$, $V_{GS}=0V$	---	---	-1	uA
		$V_{DS}=-100V$, $V_{GS}=0V$, $T_J=125^{\circ}\text{C}$	---	---	-10	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=-5V$, $I_D=-5A$	---	12	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	20	---	Ω
Q_g	Total Gate Charge	$V_{DS}=-50V$, $V_{GS}=-4.5V$, $I_D=-2A$	---	15	---	nC
Q_{gs}	Gate-Source Charge		---	4	---	
Q_{gd}	Gate-Drain Charge		---	7	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-50V$, $V_{GS}=-10V$, $I_D=-1A$ $R_G=3.3\Omega$	---	10	---	ns
T_r	Rise Time		---	5	---	
$T_{d(off)}$	Turn-Off Delay Time		---	55	---	
T_f	Fall Time		---	22	---	
C_{iss}	Input Capacitance	$V_{DS}=-25V$, $V_{GS}=0V$, $f=1\text{MHz}$	---	1500	---	pF
C_{oss}	Output Capacitance		---	45	---	
C_{rss}	Reverse Transfer Capacitance		---	35	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	-5	A
I_{SM}	Pulsed Source Current		---	---	-20	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_F=-5A$, $T_J=25^{\circ}\text{C}$	---	-0.87	-1.2	V

Note:

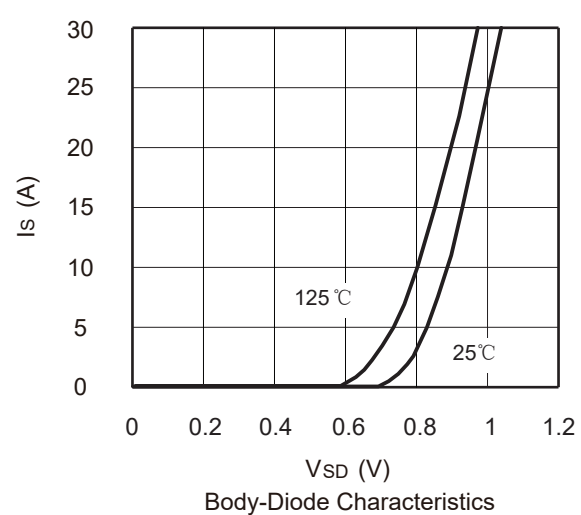
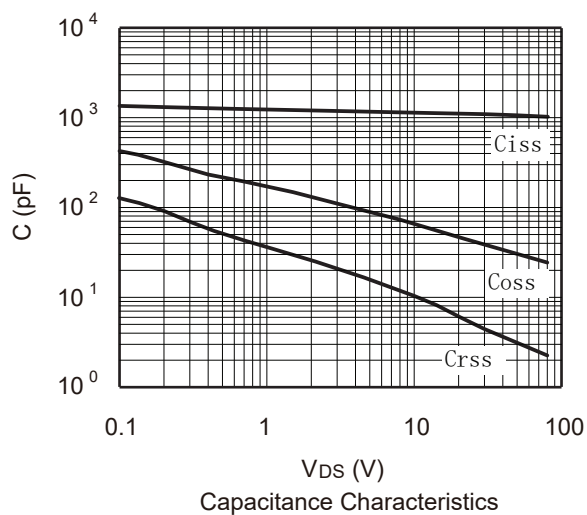
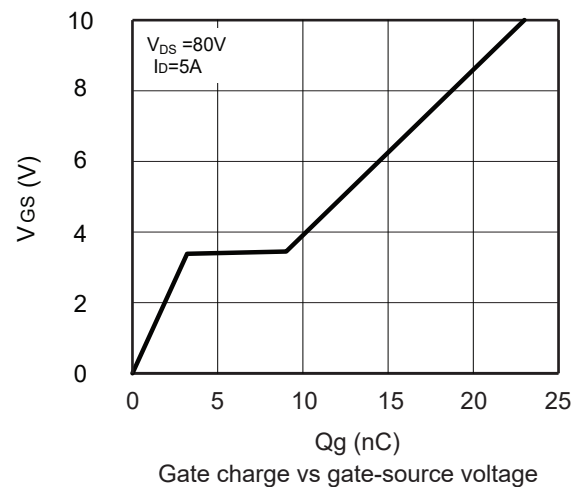
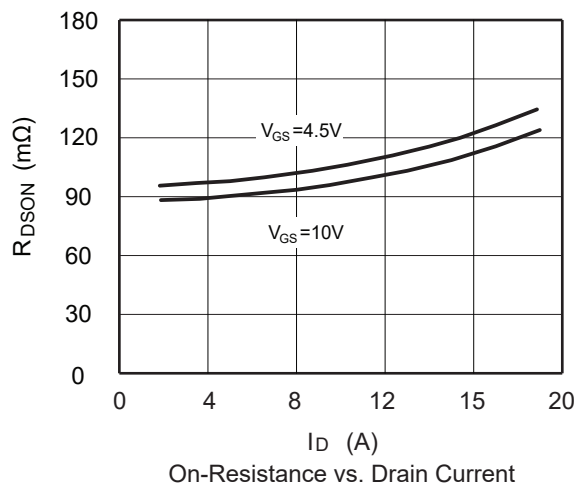
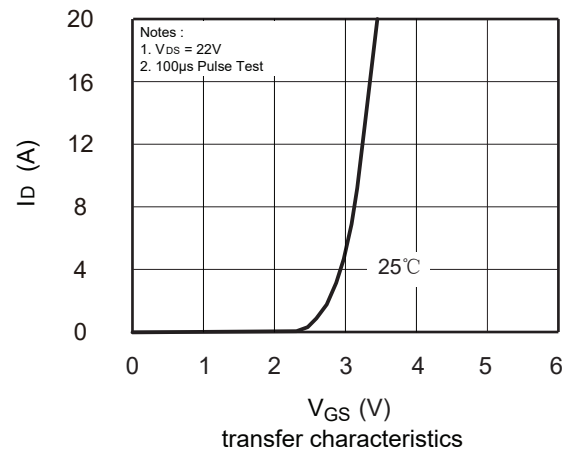
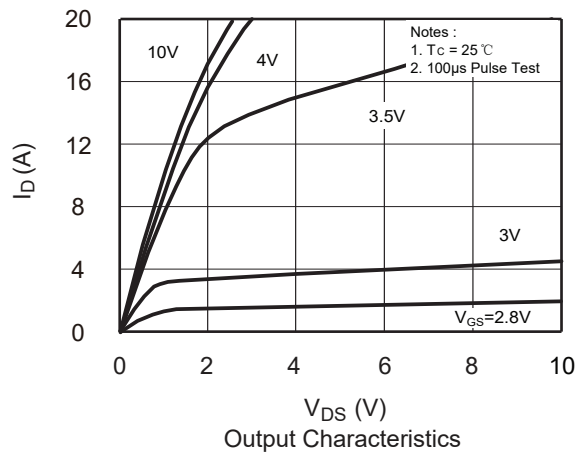
1. The EAS data shows Max. rating . The N-Channel test condition is $V_{DD}=50V$, $V_{GS}=10V$, $L=0.5\text{mH}$, $I_{AS}=11A$.
The P-Channel test condition is $V_{DD}=-50V$, $V_{GS}=-10V$, $L=0.5\text{mH}$, $I_{AS}=-13.5A$.

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

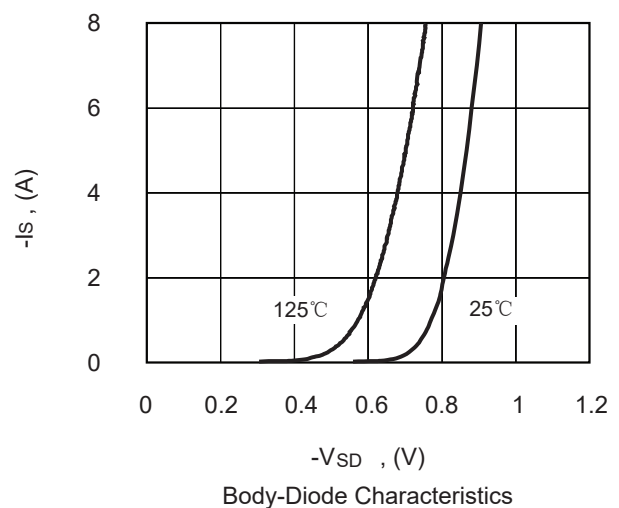
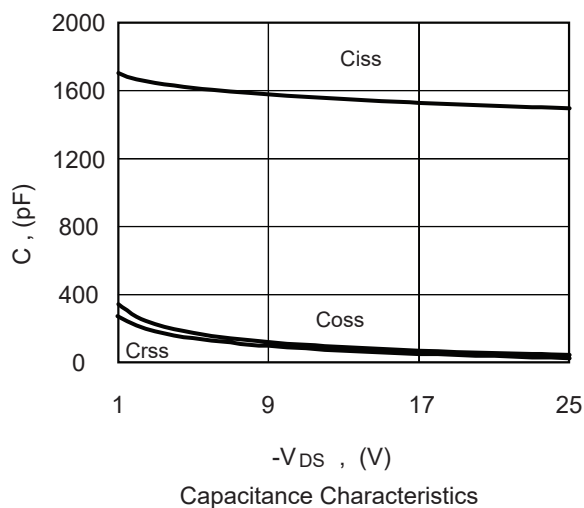
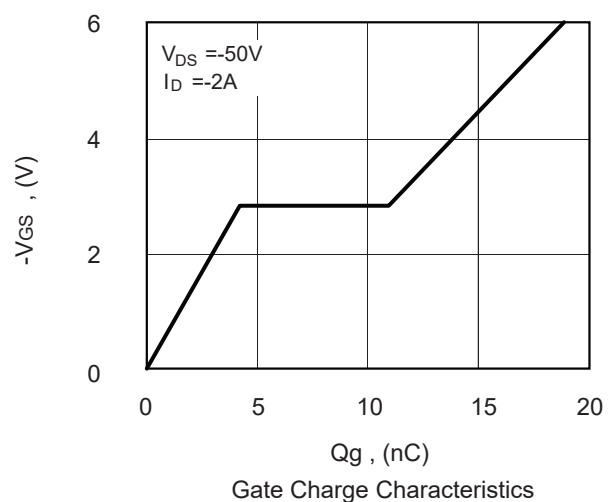
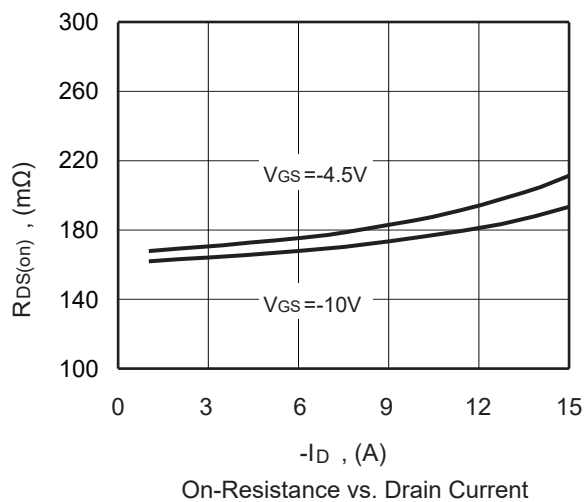
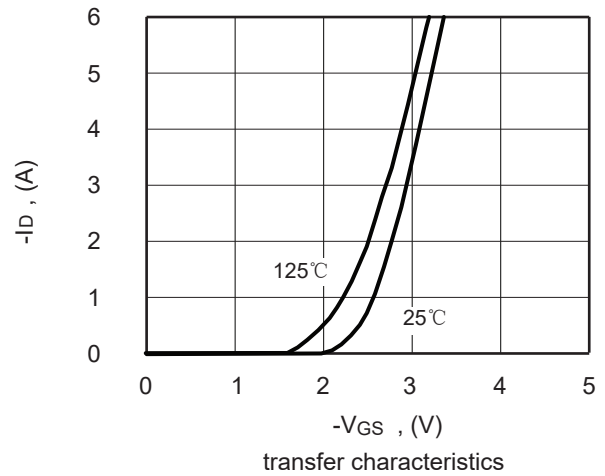
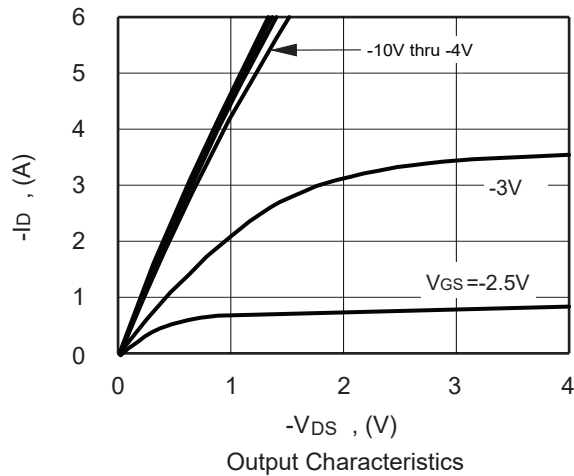
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N-Channel:Typical Characteristics



P-Channel: Typical Characteristics



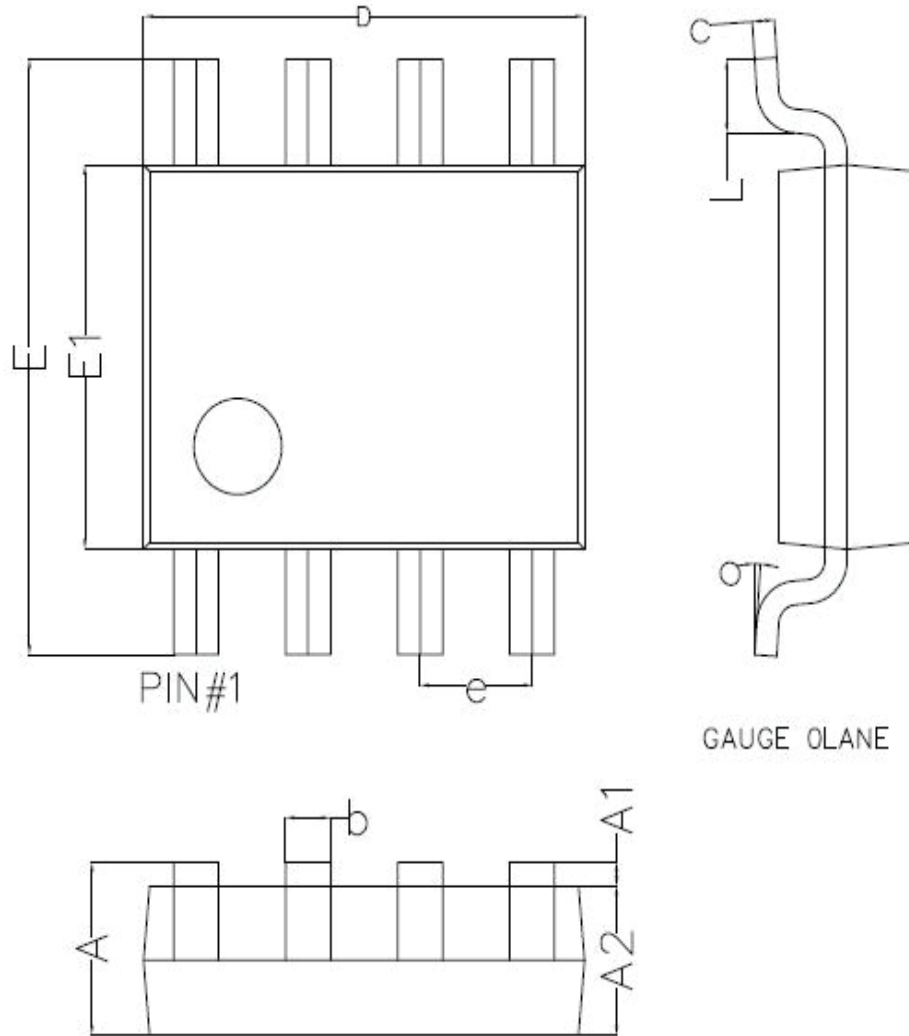
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Package Dimension

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°