CMSC510B

100V, 98mΩ typ., 12A N-Channe MOSFET and -100V, 190mΩ typ., -5A P-Channe MOSFET

General Description

The CMSC510B 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	$R_{DS(on)}$ max.	ID
N-Channel	100V	115mΩ	12A
P-Channel	-100V	220mΩ	-5A

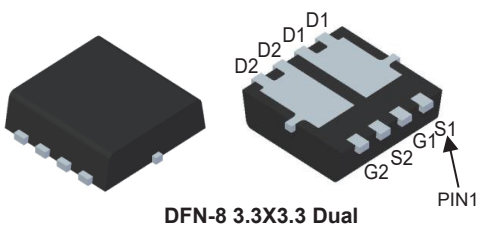
Applications

- Power Management
- Load Switch
- DC/DC Converter

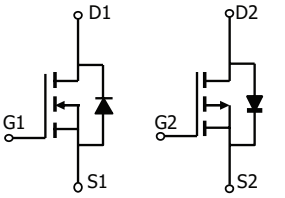
Features

- Low On-Resistance
- 100% avalanche tested
- Surface Mount Package
- RoHS Compliant

DFN-8 3.3X3.3 Dual Pin Configuration



DFN-8 3.3X3.3 Dual



N-channel P-channel

Type	Package	Marking
CMSC510B	DFN-8 3.3X3.3 Dual	510B

Absolute Maximum Ratings

Symbol	Parameter	Max n-channel	Max p-channel	Units
V_{DS}	Drain-Source Voltage	100	-100	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D@T_C=25℃	Continuous Drain Current	12	-5	A
I_{DM}	Pulsed Drain Current	48	-20	A
EAS	Single Pulse Avalanche Energy[1]	60	60	mJ
P_D@T_C=25℃	Power Dissipation	25	30	W
T_{STG}	Storage Temperature Range	-55 to 150	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	-55 to 150	℃

Thermal Characteristics: n-channel

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Maximum Junction-to-Ambient (Steady-State)	---	60	℃/W
$R_{\theta Jc}$	Maximum Junction-to-Case (Steady-State)	---	5	℃/W

100V, 98mΩ typ., 12A N-Channe MOSFET and -100V, 190mΩ typ., -5A P-Channe MOSFET

Thermal Characteristics: p-channel

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Maximum Junction-to-Ambient (Steady-State)	---	60	℃/W
$R_{\theta JC}$	Maximum Junction-to-Case (Steady-State)	---	4.17	℃/W

N Channel Electrical Characteristics (TJ=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250μA	100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=10A	---	98	115	mΩ
		V_{GS}=4.5V , I_D=10A	---	110	140	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250μA	1	---	3.0	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=100V , V_{GS}=0V	---	---	1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}= ±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=3V, I_D=5A	---	10	---	S
Q_g	Total Gate Charge	V_{DD}=80V , V_{GS}=10V , I_D=5A	---	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 , I_D=5A R_{GEN} =5Ω	---	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=1MHz	---	1100	---	pF
C_{oss}	Output Capacitance		---	55	---	
C_{rss}	Reverse Transfer Capacitance		---	15	---	

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		---	---	48	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=10A, T_J=25℃	---	0.9	1.2	V

100V, 98mΩ typ., 12A N-Channe MOSFET and -100V, 190mΩ typ., -5A P-Channe MOSFET

P Channel Electrical Characteristics (TJ=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250μA	-100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V , I_D=-5A	---	190	220	mΩ
		V_{GS}=-4.5V , I_D=-5A	---	215	270	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250μA	-1	---	-3.0	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-100V , V_{GS}=0V	---	---	-1	uA
		V_{DS}=-100V , V_{GS}=0V,T_J=125℃	---	---	-10	
I_{GSS}	Gate-Source Leakage Current	V_{GS} = ±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-10V , I_D=-5A	---	9	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	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=3.3Ω	---	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=1MHz	---	1500	---	pF
C_{oss}	Output Capacitance		---	55	---	
C_{rss}	Reverse Transfer Capacitance		---	15	---	

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℃	---	---	-1.2	V

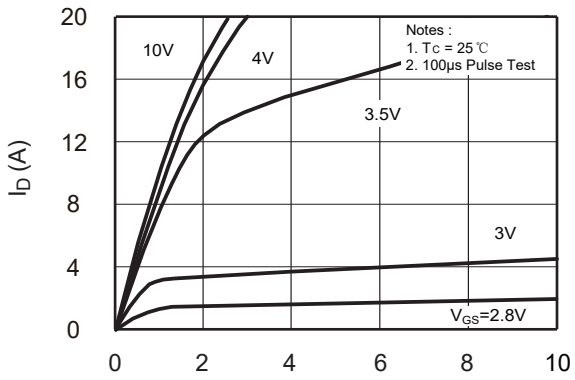
Note:

1. The EAS data shows Max. rating . The N-Channel test condition is V_{DD}=80V , V_{GS}=10V , L=1mH , I_{AS}=11A.
   The P-Channel test condition is V_{DD}=-80V , V_{GS}=-10V , L=1mH , I_{AS}=-11A.

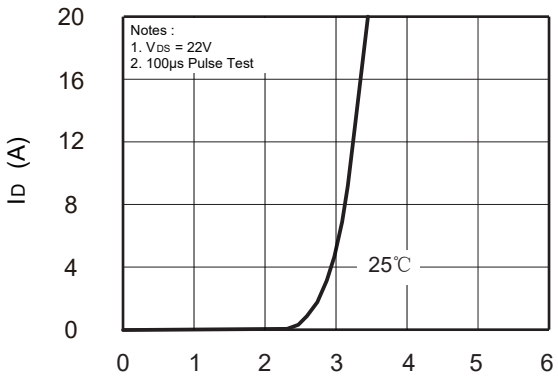
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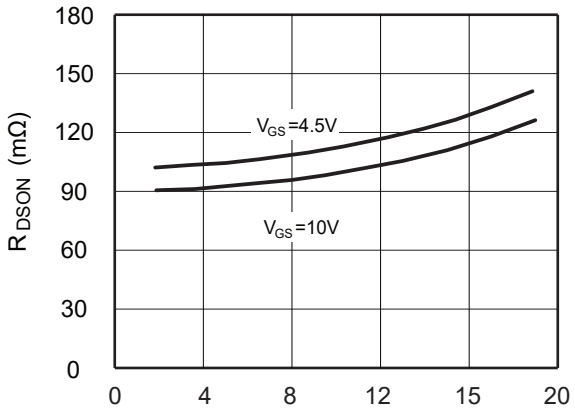
N-Channel:Typical Characteristics



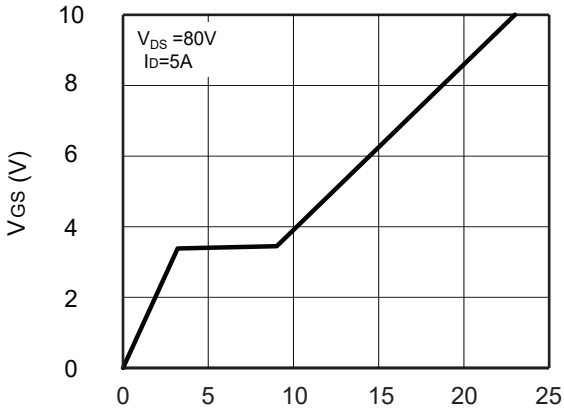
Output Characteristics



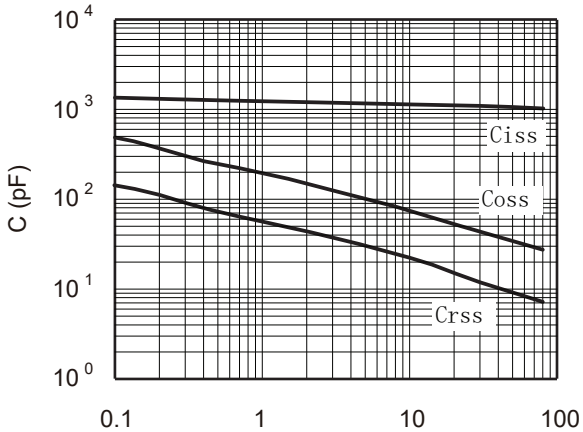
transfer characteristics



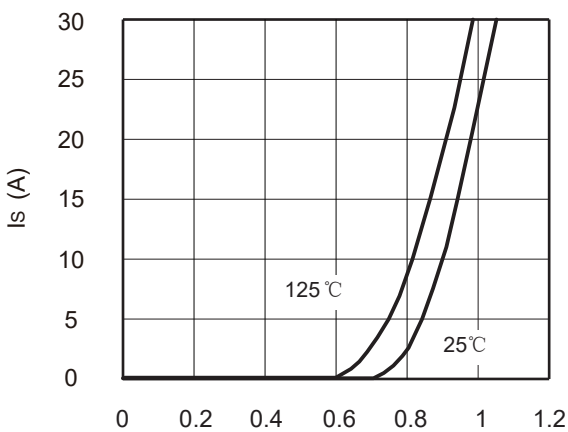
On-Resistance vs. Drain Current



Gate charge vs gate-source voltage



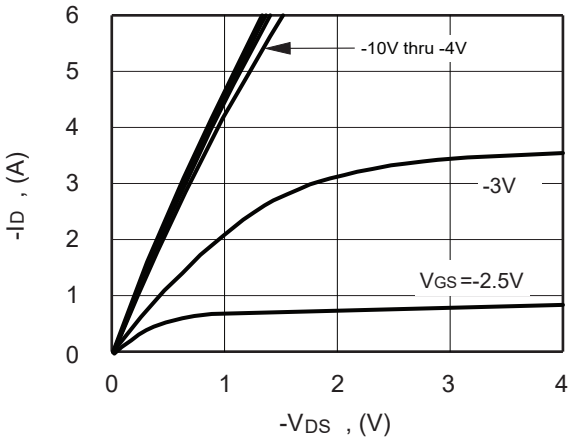
Capacitance Characteristics



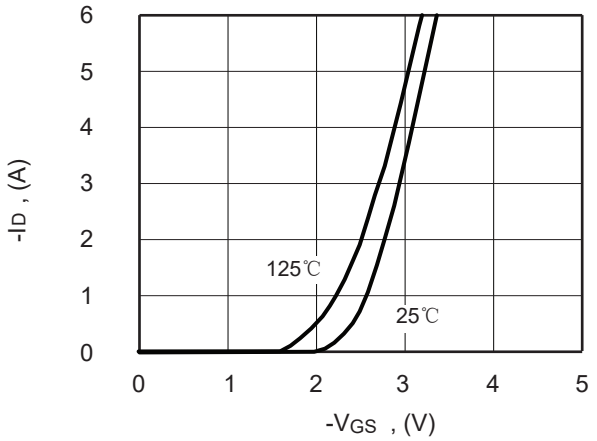
Body-Diode Characteristics

100V, 98mΩ typ., 12A N-Channe MOSFET and -100V, 190mΩ typ., -5A P-Channe MOSFET

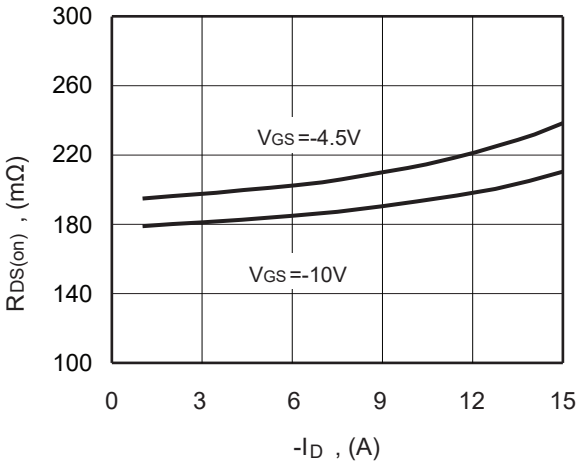
P-Channel:Typical Characteristics



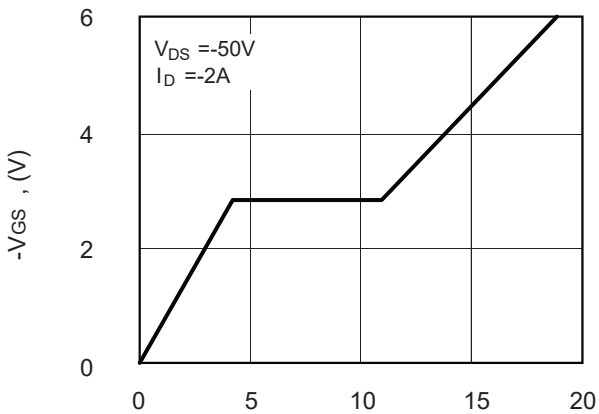
Output Characteristics



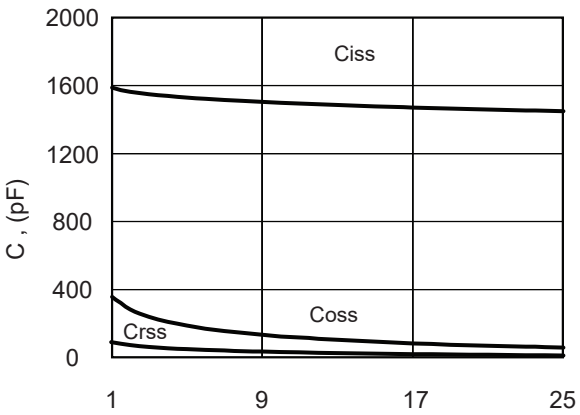
transfer characteristics



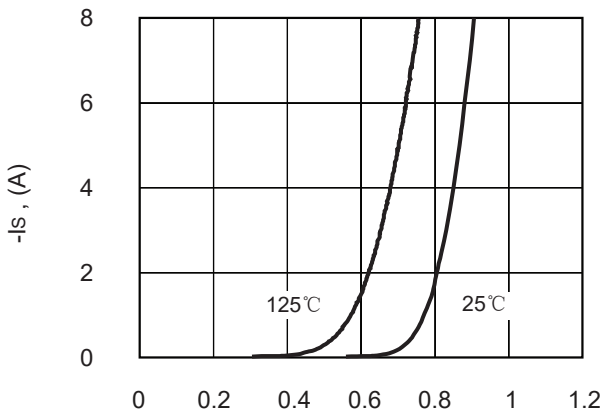
On-Resistance vs. Drain Current



Gate Charge Characteristics



Capacitance Characteristics

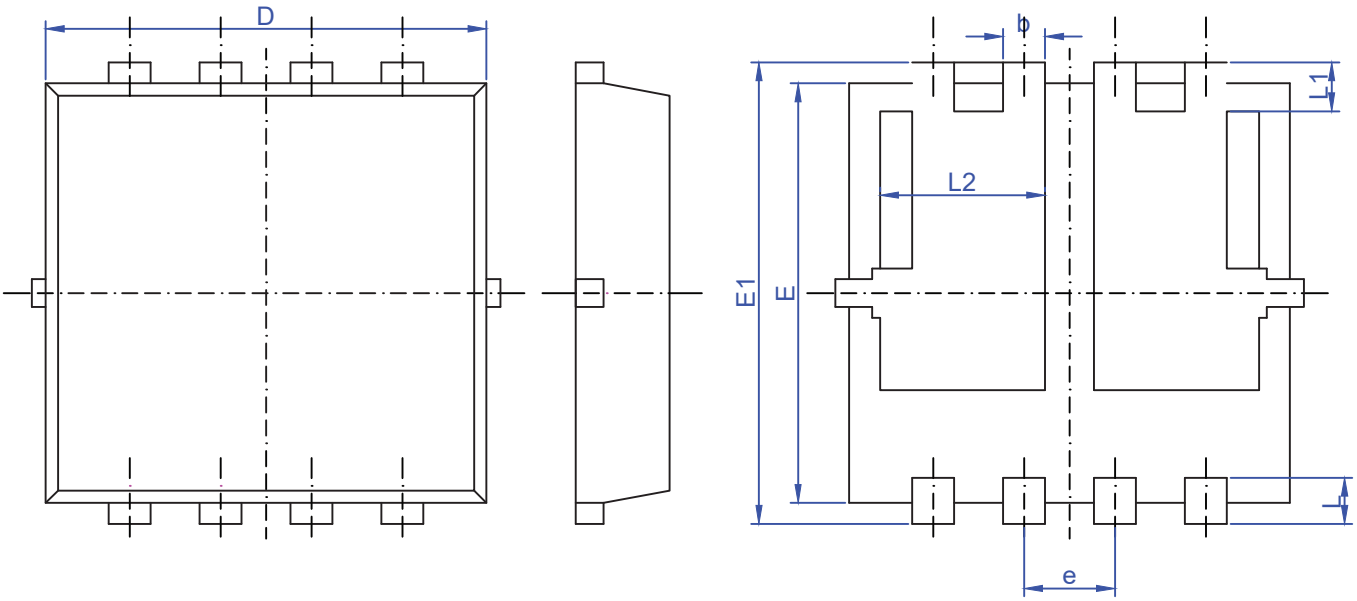


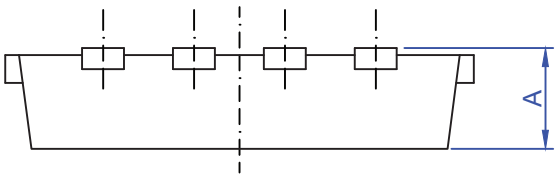
Body-Diode Characteristics

100V, 98mΩ typ., 12A N-Channe MOSFET and -100V, 190mΩ typ., -5A P-Channe MOSFET

Package Dimensions

DFN-8 3.3X3.3 Dual Unit :mm





Dimensions In Millimeters			
Symbol	Min.	Max.	Ave.
A	0.700	0.900	0.800
D	3.000	3.200	3.100
E	3.000	3.200	3.100
E1	3.200	3.600	3.400
b	0.200	0.400	0.300
e	0.550	0.750	0.650
L	0.250	0.650	0.450
L1	0.255	0.655	0.455
L2	0.935	1.135	1.035

Note:

1. No tolerance ±0.10
2. The plastic package has no defects such as defects, shrinkage holes, cracks, bubbles, etc.
3. Marking unit mm