CMSAG80R180

800V, 170mΩ typ., 20A N-Channel Silicon Carbide Power MOSFET

General Description

This silicon carbide Power MOSFET device has been developed using Cmos's advanced SiC MOSFET technology.The device features a very low $R_{DS(on)}$ over the entire temperature range combined with low capacitances and very high switching operations,which improve application performance in frequency, energy efficiency, system size and weight reduction.

Product Summary

BVDSS	$R_{DS(on)}$ max.	ID
800V	200mΩ	20A

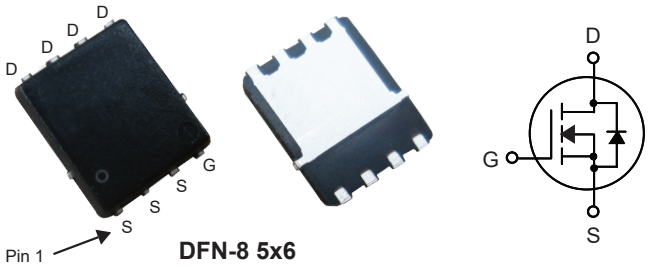
Applications

- Low power system, SMPS
- Adapter, LED power, TV display

Features

- 100% Avalanche Tested
- Optimized switching with a low gate charge
- Fast intrinsic diode with low reverse recovery
- RoHS Compliant

DFN-8 5x6 Pin Configuration



DFN-8 5x6

Type	Package	Marking
CMSAG80R180	DFN-8 5x6	CMSAG80R180

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	800	V
V_{GS}	Absolute maximum values	-10/+22	V
V_{GSop}	Recommended operational values	0/+18	V
I_D@T_C=25℃	Continuous Drain Current	20	A
I_D@T_C=100℃	Continuous Drain Current	14	A
I_{DM}	Pulsed Drain Current	55	A
EAS	Single Pulse Avalanche Energy (Note 1)	303	mJ
P_D@T_C=25℃	Total Power Dissipation	85	W
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	40	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-case	---	1.76	℃/W

800V, 170mΩ typ., 20A N-Channel Silicon Carbide Power MOSFET

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=1mA	800	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=18V , I_D=6A	---	170	200	mΩ
		V_{GS}=18V , I_D=6A , T_J=175℃	---	190	---	
		V_{GS}=15V , I_D=6A	---	230	---	
		V_{GS}=15V , I_D=6A , T_J=175℃	---	235	---	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =2.5mA (tested after V_{GS}=22V,1ms pulse)	2.5	3.4	5.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=650V , V_{GS} =0V	---	1	50	μA
		V_{DS}=650V , V_{GS} =0V , T_J=175℃	---	20	---	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=+22V , V_{DS} =0V	---	---	+250	nA
		V_{GS}= -10V , V_{DS} =0V	---	---	-250	
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	4.2	---	Ω
$Q_{g(tot)}$	Total Gate Charge	V_{DS} =500V , I_D=6A V_{GS}= 0V to 18V	---	15	---	nC
Q_{gs}	Gate-Source Charge		---	3.2	---	
Q_{gd}	Gate-Drain Charge		---	5	---	
E_{oss}	Stored Energy in Output Capacitance	V_{GS} =0V , V_{DS} =0V to 500V	---	5.7	---	μJ
$C_{o(er)}$	Energy Related Output Capacitance		---	46	---	pF
$C_{o(tr)}$	Time Related Output Capacitance		---	65	---	
$T_{d(on)}$	Turn-On Delay Time	V_{GS}=0V / 18V , V_{DS}=500V R_G =10Ω , I_D=6A FWD = 650V 4A SiC Diode Inductive load	---	8.5	---	ns
T_r	Rise Time		---	14.5	---	
$T_{d(off)}$	Turn-Off Delay Time		---	19	---	
T_f	Fall Time		---	9	---	
C_{iss}	Input Capacitance	V_{DS}=100V , V_{GS}=0V , f=1MHz	---	350	---	pF
C_{oss}	Output Capacitance		---	80	---	
C_{rss}	Reverse Transfer Capacitance		---	8	---	

Diode Characteristics

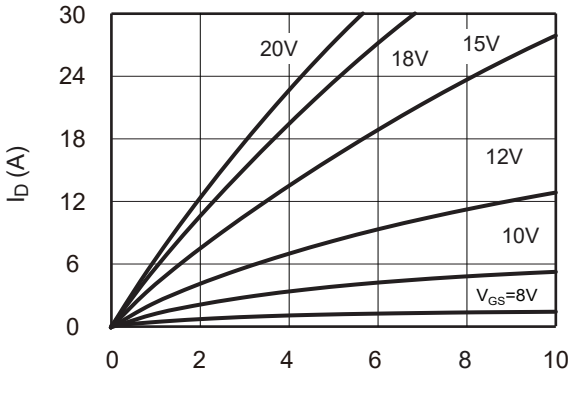
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	20	A
I_{SM}	Pulsed Source Current		---	---	55	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_{SD}=6A , T_J=25℃	---	4.3	---	V
t_{rr}	Reverse Recovery Time	di/dt=600A/μs , Includes Q_{OSS} V_{DD} =500V , I_{SD} =6A , T_J =25℃	---	10	---	ns
Q_{rr}	Reverse Recovery Charge		---	18	---	nC
I_{rrm}	Peak Reverse Recovery Current		---	3	---	A

Note :

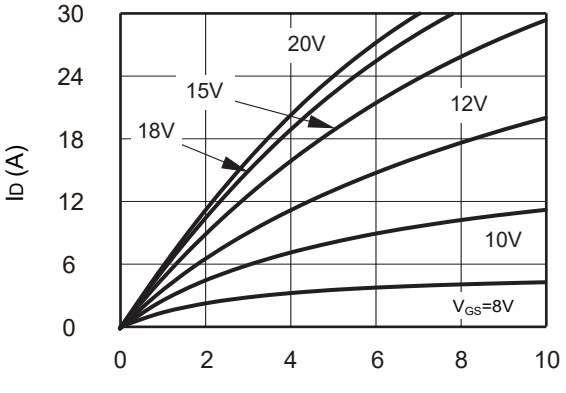
1.The EAS data shows Max. rating . The test condition is V_{DD}=100V , V_{GS}=10V , L=30mH , I_{AS}=4.5A.

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Cmos assumes no liability for customers' product design or applications.
Cmos reserver the right to improve product design ,functions and reliability wihtout notice.Please refer to the latest version of specification.

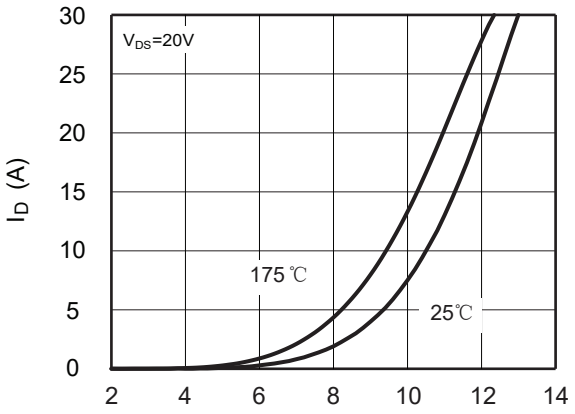
Typical Characteristics



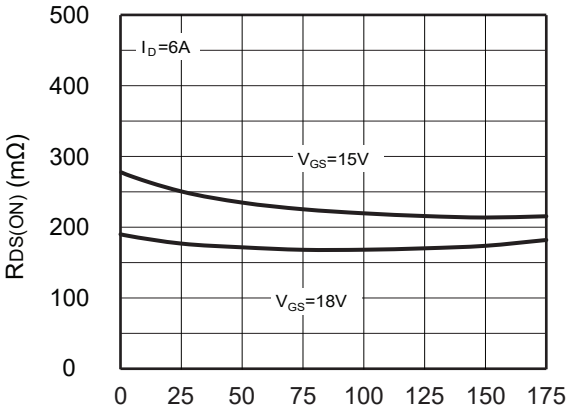
Output Characteristics Tj=25℃



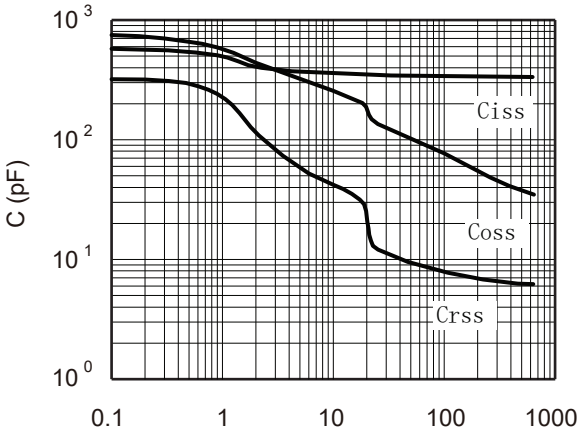
Output Characteristics Tj=175℃



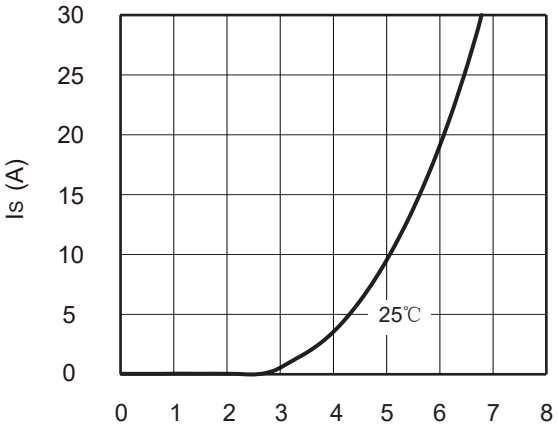
Transfer Characteristics



On-Resistance vs. temperature

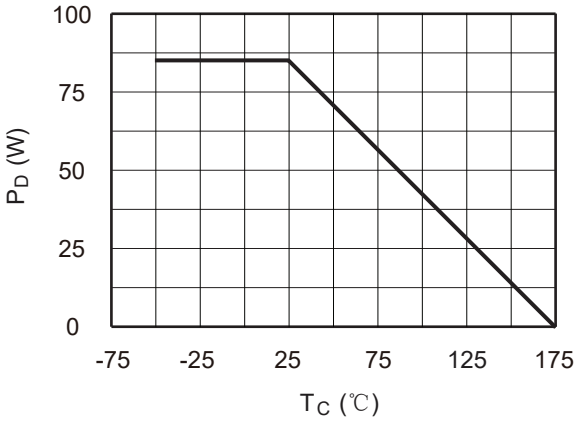


Capacitance Characteristics

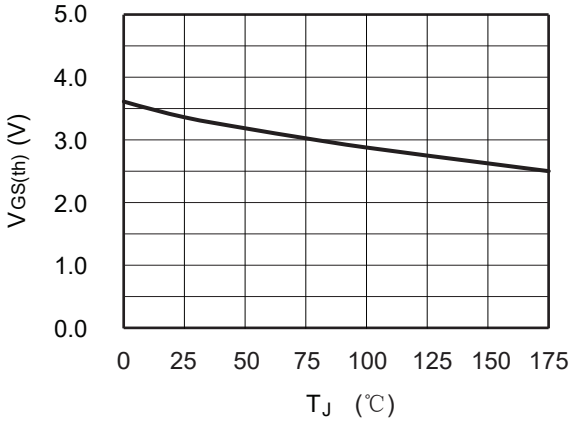


Body-Diode Characteristics

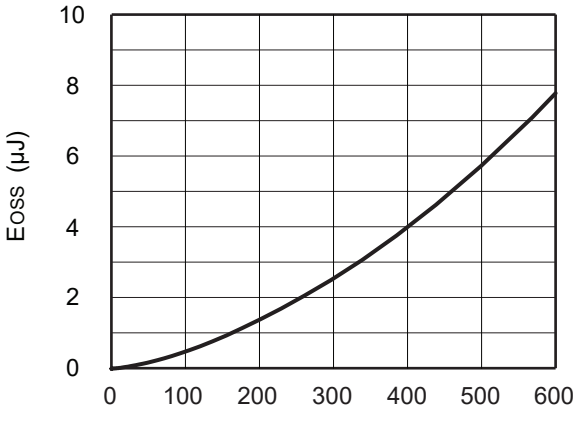
Typical Characteristics



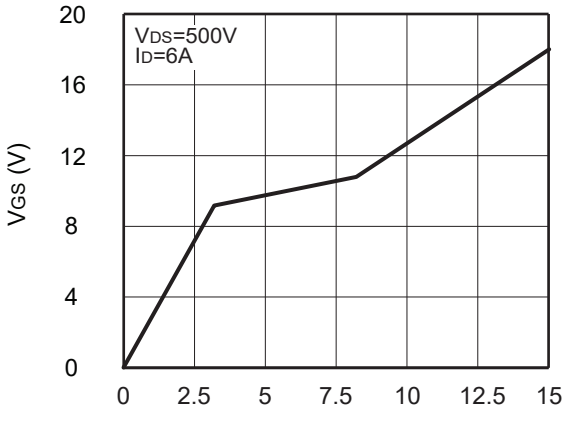
Maximum total power dissipation



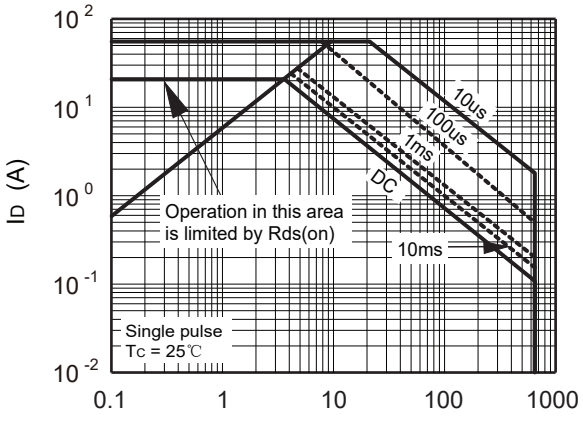
Threshold Voltage vs. Junction Temperatur



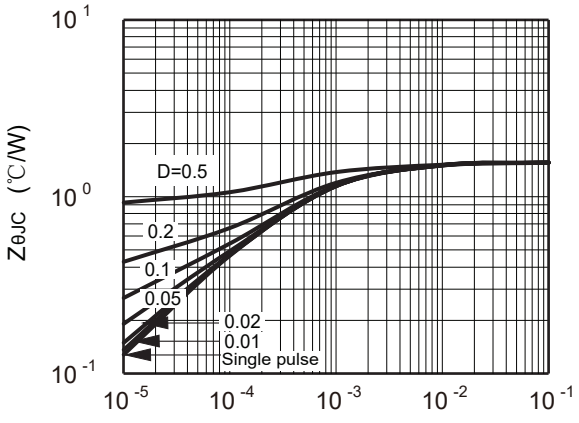
Stored Energy in Output Capacitance



Gate charge vs gate-source voltage



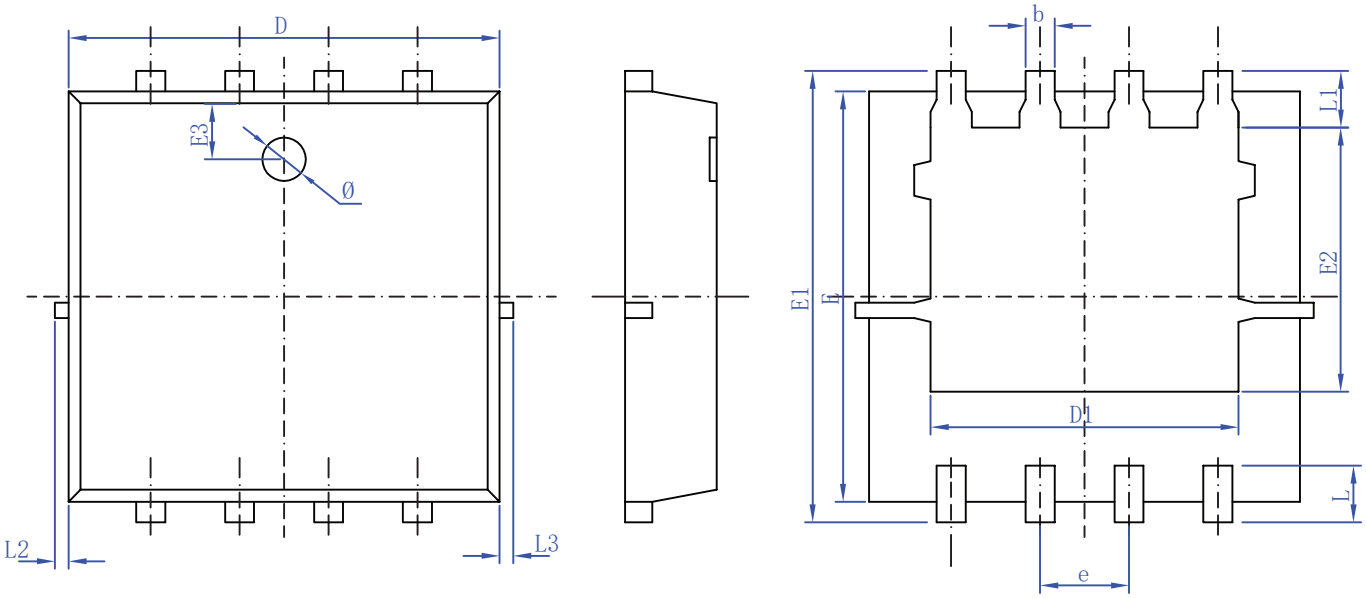
Maximum Safe Operating Area

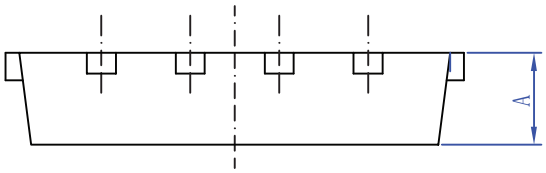


Transient Thermal Response Curve

Package Dimension

DFN-8 5x6 Unit :mm





Dimensions In Millimeters			
Symbol	Min.	Max.	Ave.
A	0.900	1.100	1.000
D	4.950	5.150	5.050
D1	3.850	4.250	4.050
E	5.750	5.950	5.850
E1	5.950	6.350	6.150
E2	3.300	3.700	3.500
E3	0.900	1.300	1.100
b	0.250	0.350	0.300
e	1.220	1.320	1.270
L	0.585	0.785	0.685
L1	0.525	0.725	0.625
Ø	1.000	1.400	1.200
L2	0~0.100		
L3	0~0.100		

注：
1.未注公差±0.05未标注圆角R max=0.25