

CMDG65R180/CMUG65R180

650V, 180mΩ 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.

Features

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

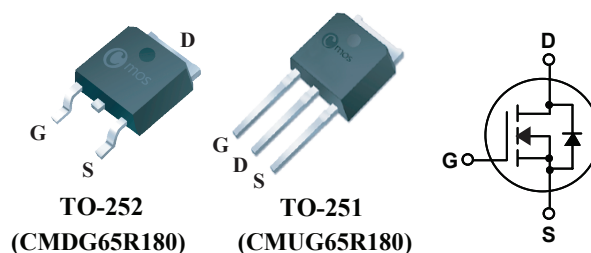
Product Summary

BVDSS	$R_{DS(on)}$ max.	ID
650V	200mΩ	20A

Applications

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

TO-252/TO-251 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Absolute maximum values	-10/+22	V
V_{GSop}	Recommended operational values	0/+18	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current	20	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current	14	A
I_{DM}	Pulsed Drain Current	55	A
EAS	Single Pulse Avalanche Energy (Note 1)	303	mJ
$P_D@T_C=25^{\circ}C$	Total Power Dissipation	85	W
T_{STG}	Storage Temperature Range	-55 to 175	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 175	$^{\circ}C$

Thermal Data

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

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Electrical Characteristics (T_J=25°C , unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =1mA	650	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =18V, I _D =6A	---	180	200	mΩ
		V _{GS} =18V, I _D =6A, T _J =175°C	---	190	---	
		V _{GS} =15V, I _D =6A	---	250	---	
		V _{GS} =15V, I _D =6A, T _J =175°C	---	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°C	---	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	---	3.6	---	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	---	8.5	---	ns
T _r	Rise Time	R _G =10Ω, I _D =6A	---	14.5	---	
T _{d(off)}	Turn-Off Delay Time	FWD = 650V 4A SiC Diode	---	19	---	
T _f	Fall Time	Inductive load	---	9	---	
C _{i(ss)}	Input Capacitance	V _{DS} =100V, V _{GS} =0V, f=1MHz	---	350	---	pF
C _{oss}	Output Capacitance		---	80	---	
C _{r(ss)}	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} =4A, T _J =25°C	---	4.1	---	V
t _{rr}	Reverse Recovery Time	di/dt=600A/μs, Includes Q _{OSS} V _{DD} =500V, I _{SD} =6A, T _J =25°C	---	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.

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

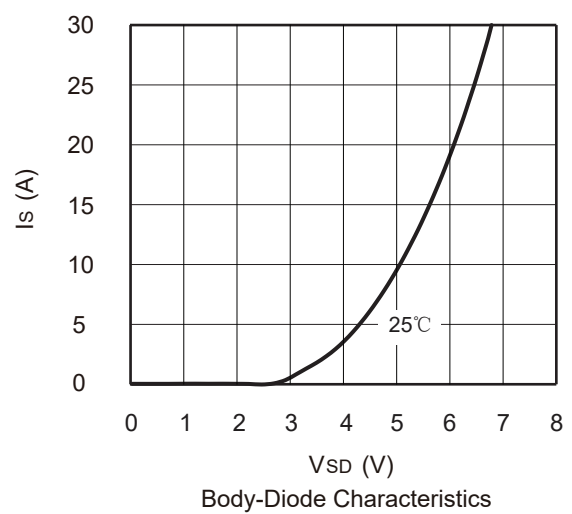
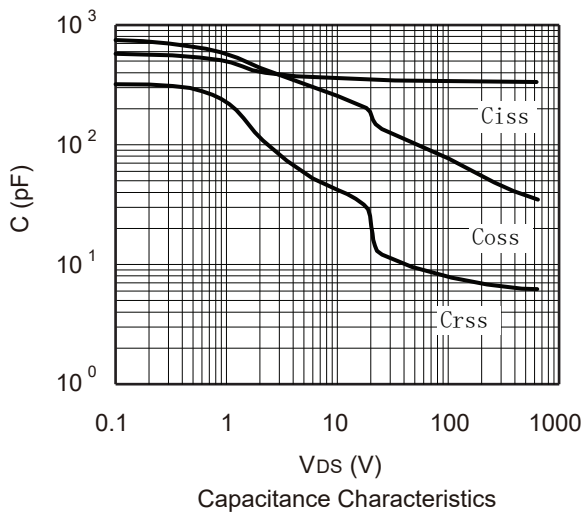
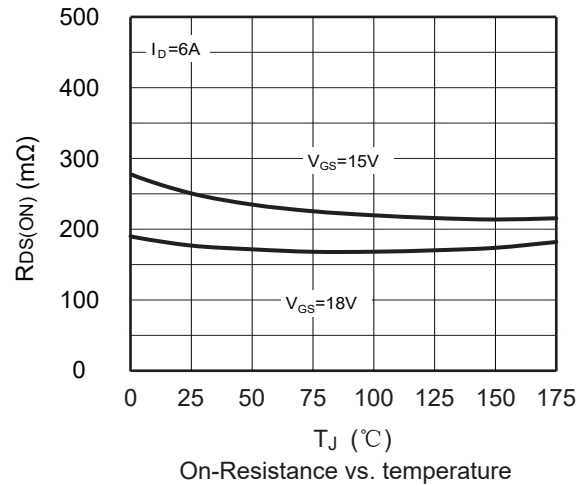
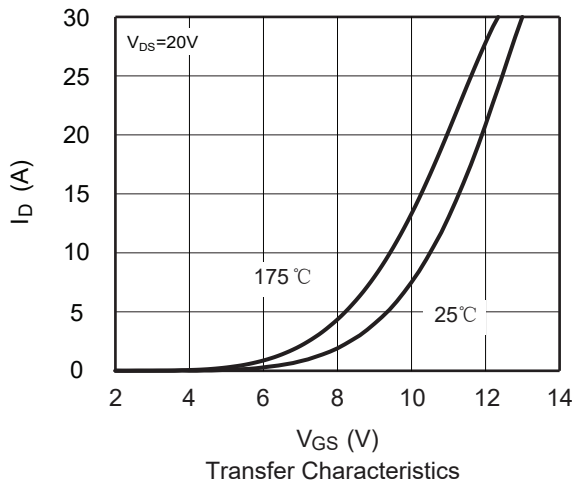
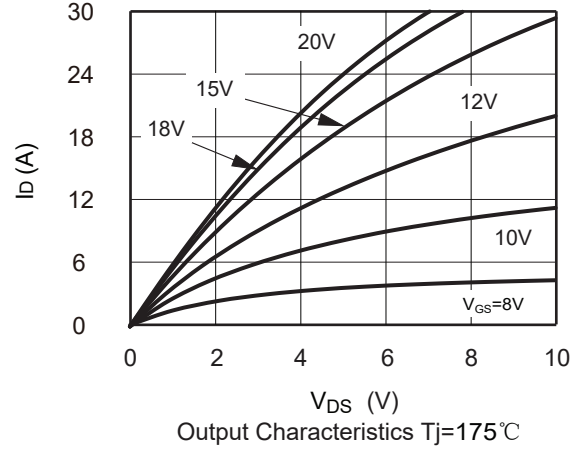
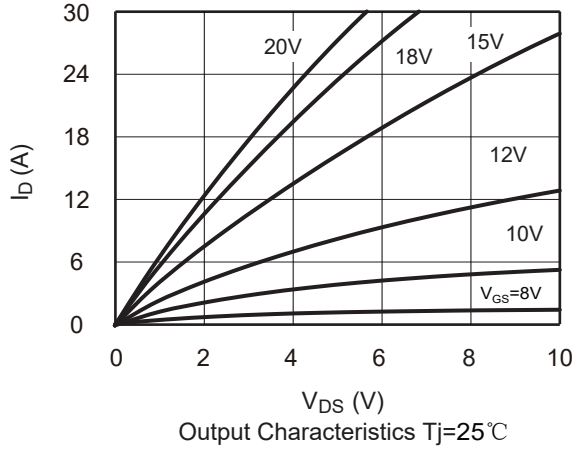
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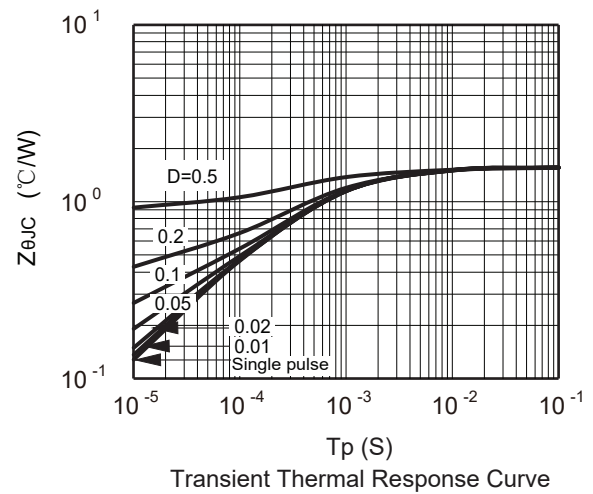
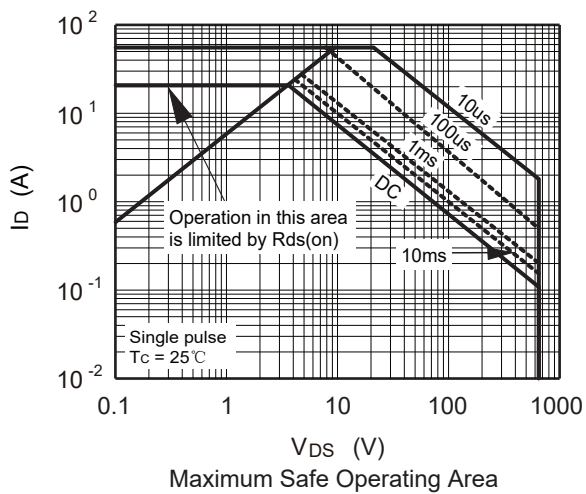
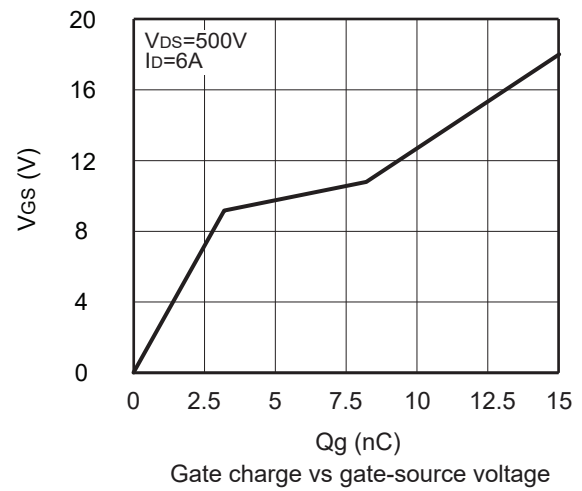
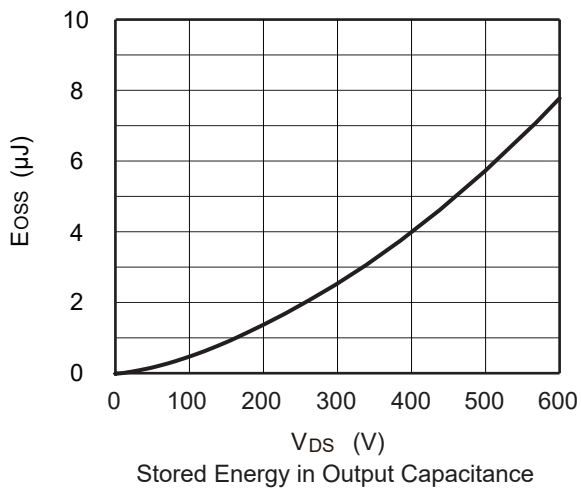
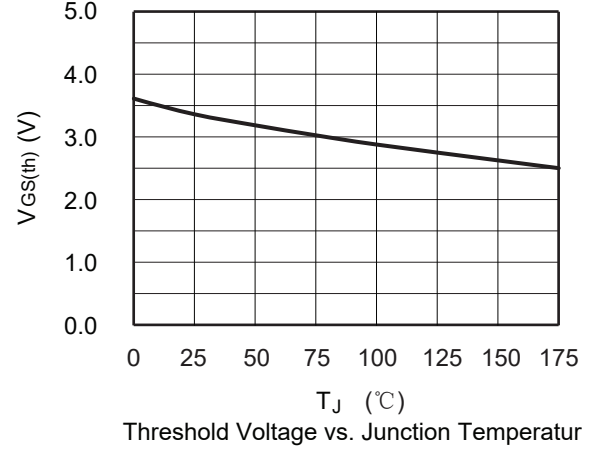
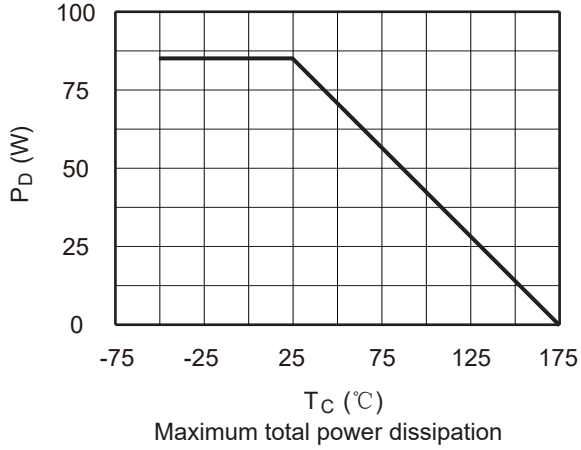
Typical Characteristics



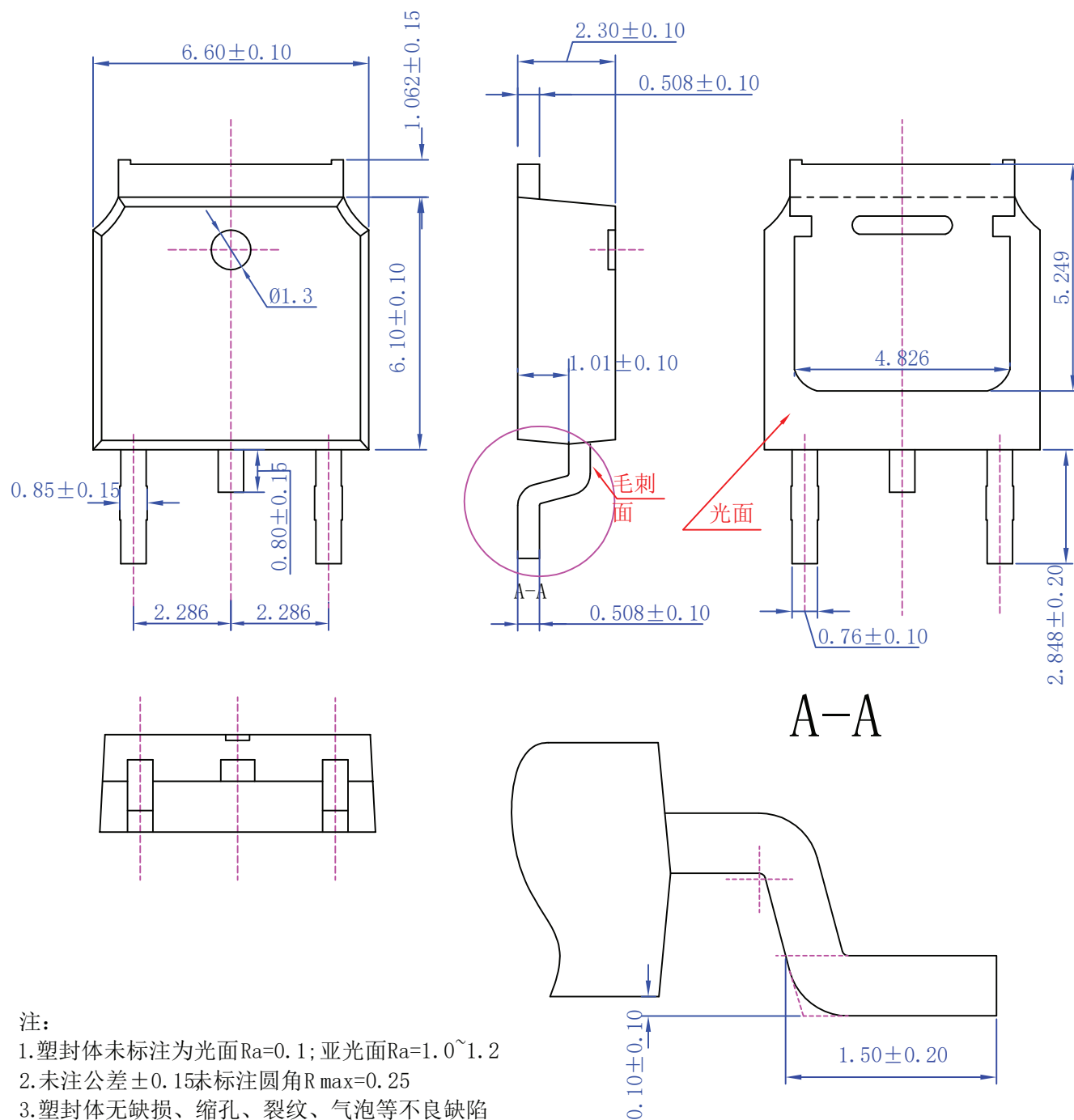
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Typical Characteristics



Unit :mm



1. 塑封体未标注为光面 $Ra=0.1$; 亚光面 $Ra=1.0\sim 1.2$
2. 未注公差 ± 0.15 未标注圆角 $R_{\max}=0.25$
3. 塑封体无缺损、缩孔、裂纹、气泡等不良缺陷
4. 标注单位mm
5. 顶针孔不允许凸出塑封体表面

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Package Dimension

TO-251A

Unit :mm

