

CMDG65R245/CMUG65R245

650V, 255mΩ typ., 15A 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

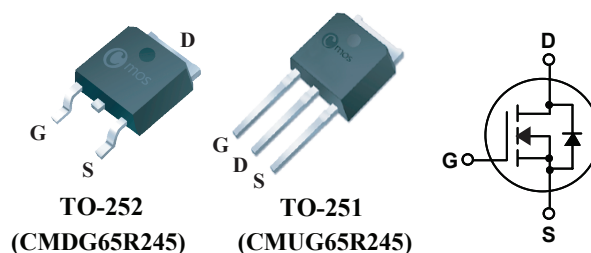
Product Summary

BVDSS	$R_{DS(on)}$ max.	ID
650V	290mΩ	15A

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	15	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current	10.5	A
I_{DM}	Pulsed Drain Current	45	A
EAS	Single Pulse Avalanche Energy (Note 1)	151	mJ
$P_D@T_C=25^{\circ}C$	Total Power Dissipation	75	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	---	2	$^{\circ}C/W$

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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 =5A	---	255	290	mΩ
		V _{GS} =18V, I _D =5A, T _J =175°C	---	265	---	
		V _{GS} =15V, I _D =5A	---	366	---	
		V _{GS} =15V, I _D =5A, T _J =175°C	---	335	---	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =2mA (tested after V _{GS} =22V, 1ms pulse)	2.0	3.1	5.0	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	---	3.9	---	Ω
Q _{g(tot)}	Total Gate Charge	V _{DS} =500V, I _D =5A V _{GS} =0V to 18V	---	10.5	---	nC
Q _{gs}	Gate-Source Charge		---	2.4	---	
Q _{gd}	Gate-Drain Charge		---	3.4	---	
E _{oss}	Stored Energy in Output Capacitance	V _{GS} =0V, V _{DS} =0V to 500V	---	4.1	---	μJ
C _{o(er)}	Energy Related Output Capacitance		---	33	---	pF
C _{o(tr)}	Time Related Output Capacitance		---	47	---	
E _{on}	Turn-on Switching Energy	V _{DS} =500V I _D =5A V _{GS} =0V / 18V R _G =10Ω FWD = 650V 4A SiC Diode Inductive load	---	27.4	---	μJ
E _{off}	Turn-off Switching Energy		---	7.6	---	
E _{tot}	Total Switching Energy		---	35	---	
T _{d(on)}	Turn-On Delay Time		---	7	---	ns
T _r	Rise Time		---	13.5	---	
T _{d(off)}	Turn-Off Delay Time		---	15	---	
T _f	Fall Time		---	10	---	
C _{iss}	Input Capacitance	V _{DS} =100V, V _{GS} =0V, f=1MHz	---	240	---	pF
C _{oss}	Output Capacitance		---	65	---	
C _{rss}	Reverse Transfer Capacitance		---	14	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	15	A
I _{SM}	Pulsed Source Current		---	---	45	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _{SD} =5A, T _J =25°C	---	4.6	---	V
t _{rr}	Reverse Recovery Time	di/dt=600A/μs, Includes Q _{oss} V _{DD} =500V, I _{SD} =5A, T _J =25°C	---	8.6	---	ns
Q _{rr}	Reverse Recovery Charge		---	13.4	---	nC
I _{rrm}	Peak Reverse Recovery Current		---	2.6	---	A

Note :

1.The EAS data shows Max. rating . The test condition is V_{DD}=100V, V_{GS}=10V, L=10mH, I_{AS}=5.5A.

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

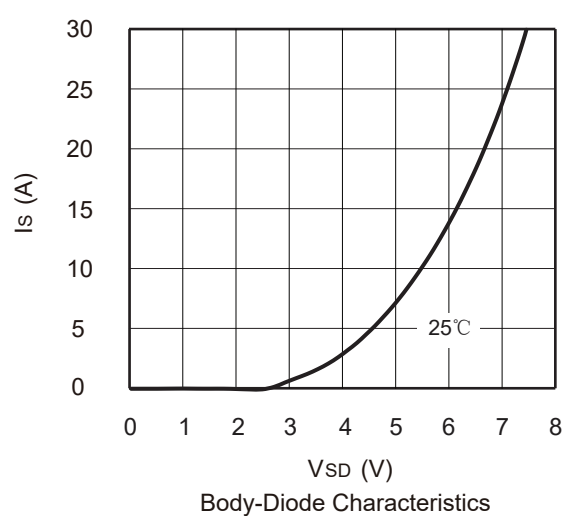
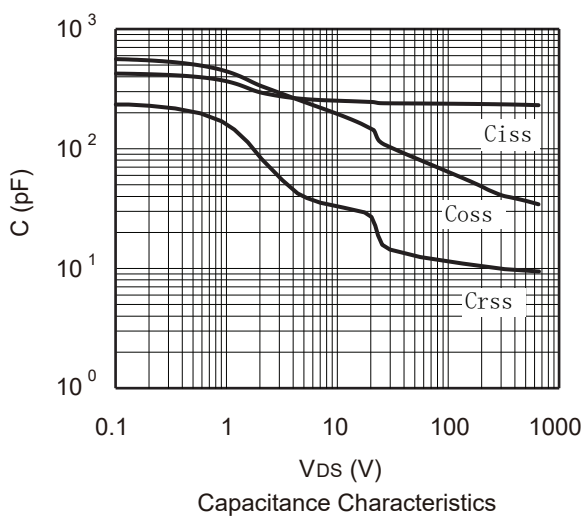
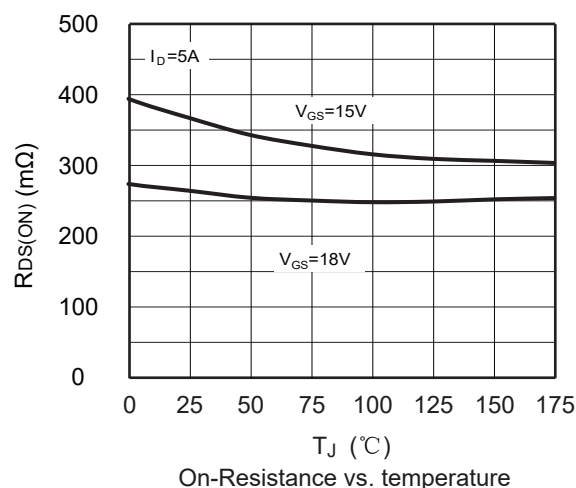
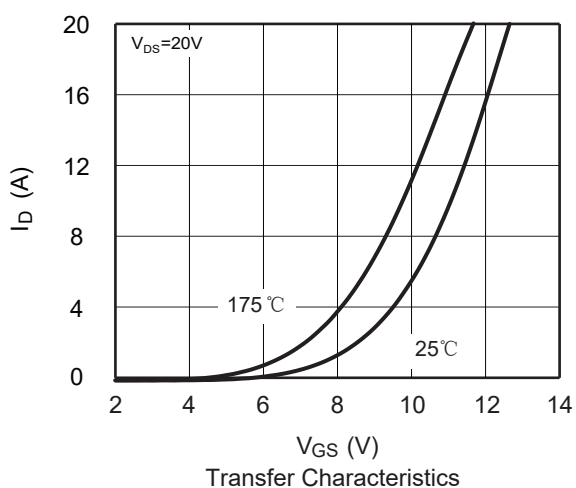
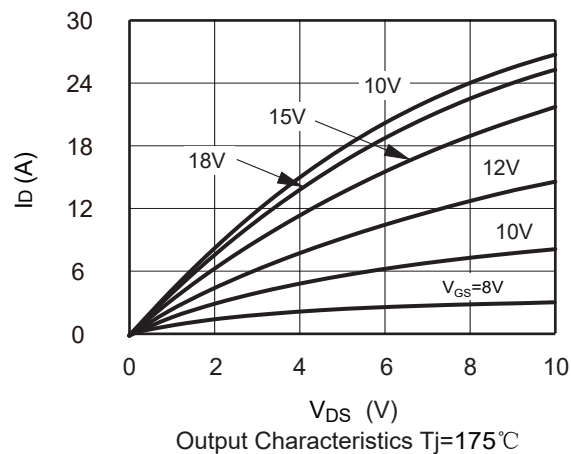
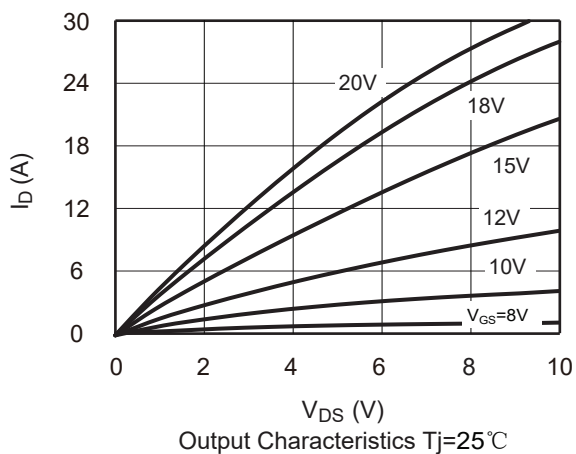
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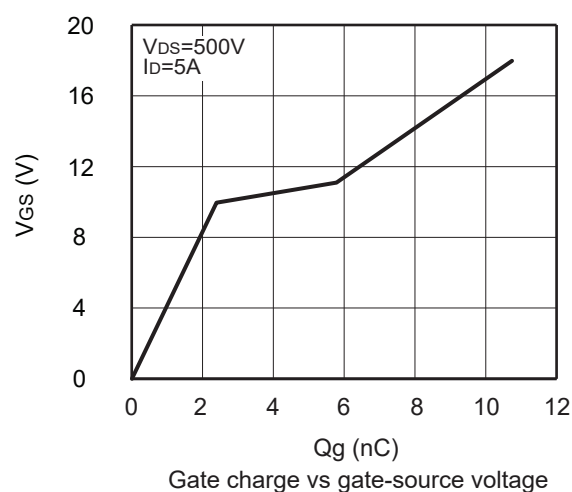
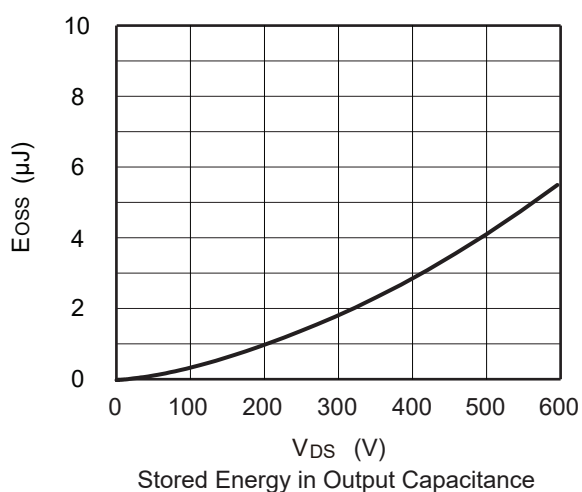
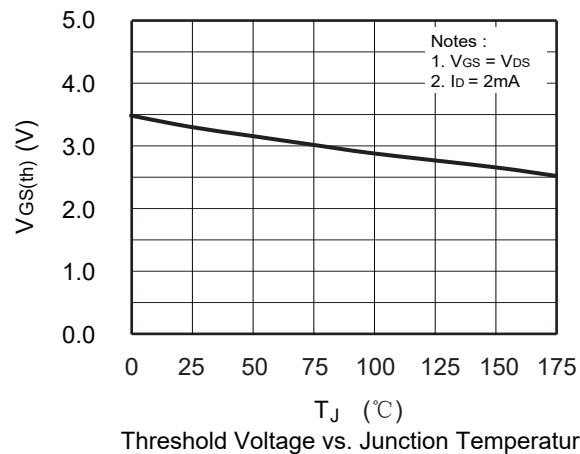
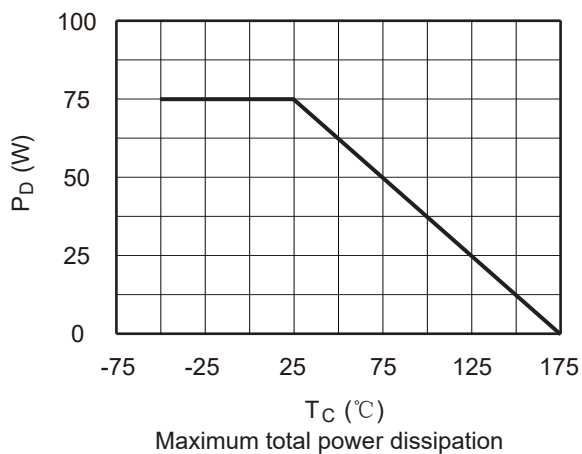
Typical Characteristics



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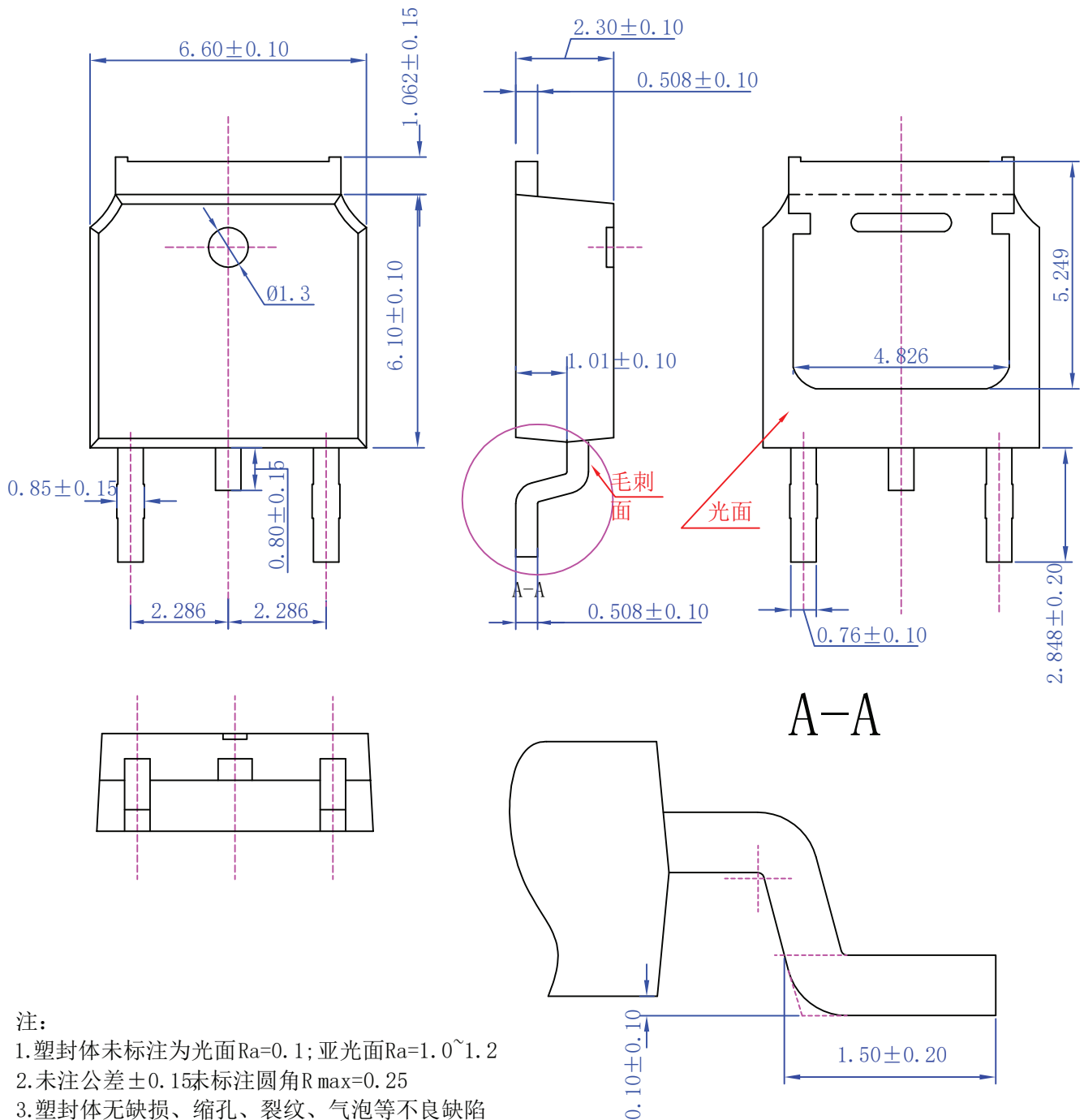
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Package Dimension

TO-252

Unit :mm



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Package Dimension

TO-251A

Unit :mm

