

CMHG65R015-4

650V, 17mΩ typ., 120A 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

- Wide Bandgap SiC MOSFET Technology
- High switching speed with a low gate charge
- Fast intrinsic diode with low reverse recovery
- RoHS Compliant

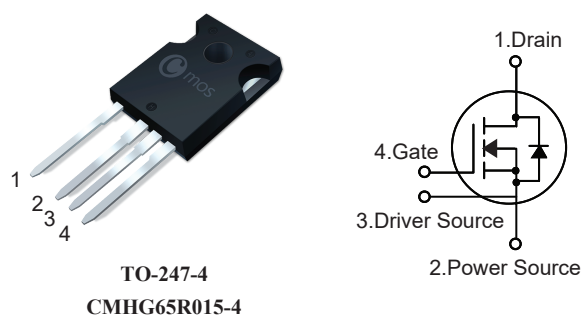
Product Summary

BVDSS	$R_{DS(on)}$ typ.	ID
650V	17mΩ	120A

Applications

- inverter
- EV charging infrastructure
- uninterruptable power supplies

TO-247-4 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	-5/+18	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current	120	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current	83	A
I_{DM}	Pulsed Drain Current	312	A
EAS	Single Pulse Avalanche Energy (Note 1)	4335	mJ
$P_D@T_C=25^{\circ}C$	Total Power Dissipation	400	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	---	0.38	$^{\circ}C/W$

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 =2mA	650	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =18V , I _D =30A	---	17	22	mΩ
		V _{GS} =18V , I _D =30A , T _J =175°C	---	21	---	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =20.3mA (tested after V _{GS} =22V,1ms pulse)	1.8	2.4	4.5	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =650V , V _{GS} =0V	---	1	100	μA
		V _{DS} =650V , V _{GS} =0V , T _J =175°C	---	10	---	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =-10V to 22V , V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =20V , I _D =20A	---	9	---	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	2.2	---	Ω
Q _{g(tot)}	Total Gate Charge	V _{DS} =400V , I _D =60A V _{GS} =-5V to 18V	---	146	---	nC
Q _{gs}	Gate-Source Charge		---	45	---	
Q _{gd}	Gate-Drain Charge		---	36	---	
E _{oss}	Stored Energy in Output Capacitance	V _{GS} =0V , V _{DS} =0V to 400V	---	36.5	---	μJ
C _{o(er)}	Energy Related Output Capacitance		---	456	---	pF
C _{o(tr)}	Time Related Output Capacitance		---	648	---	
E _{on}	Turn-on Switching Energy	V _{DS} =400V I _D =60A V _{GS} =-5V / 18V R _G =5.6Ω FWD = 650V 20A SiC Diode Inductive load	---	146	---	μJ
E _{off}	Turn-off Switching Energy		---	279	---	
E _{tot}	Total Switching Energy		---	425	---	
T _{d(on)}	Turn-On Delay Time		---	29	---	ns
T _r	Rise Time		---	26	---	
T _{d(off)}	Turn-Off Delay Time		---	60	---	
T _f	Fall Time		---	10.5	---	
C _{iss}	Input Capacitance	V _{DS} =100V , V _{GS} =0V , f=250kHz	---	3450	---	pF
C _{oss}	Output Capacitance		---	660	---	
C _{rss}	Reverse Transfer Capacitance		---	28	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V , Force Current	---	---	120	A
I _{SM}	Pulsed Source Current		---	---	312	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V , I _{SD} =30A , T _J =25°C	---	3.9	---	V
t _{rr}	Reverse Recovery Time	di/dt=1000A/μs , V _{GS} =0V	---	30	---	ns
Q _{rr}	Reverse Recovery Charge	V _{DD} =400V , I _F =60A , T _J =25°C	---	303	---	nC

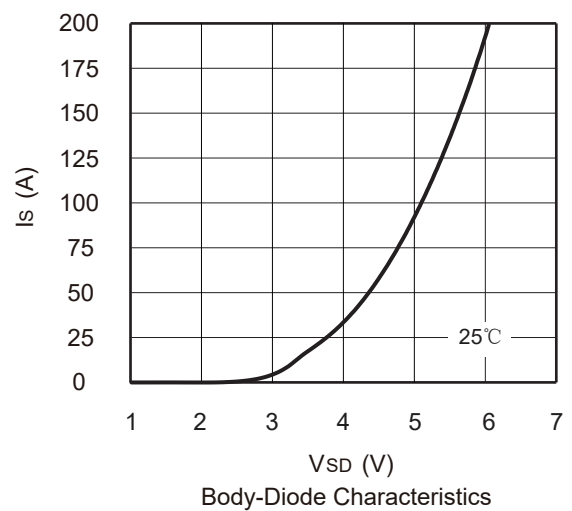
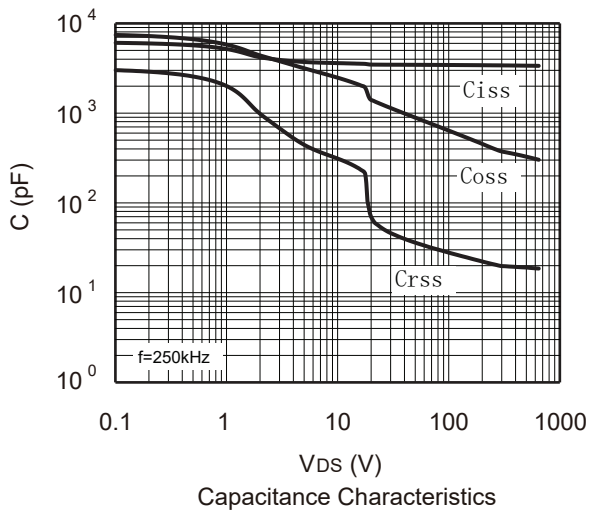
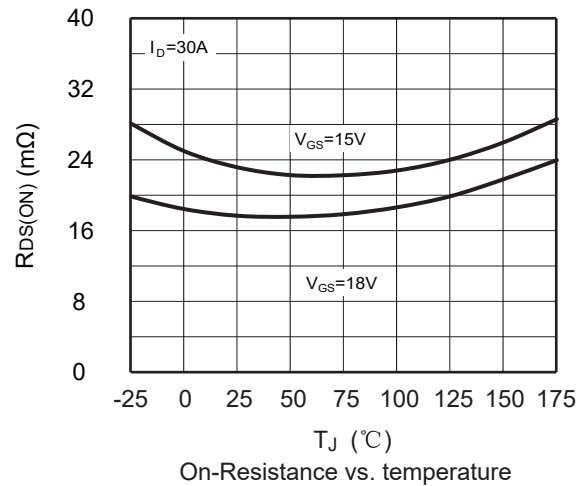
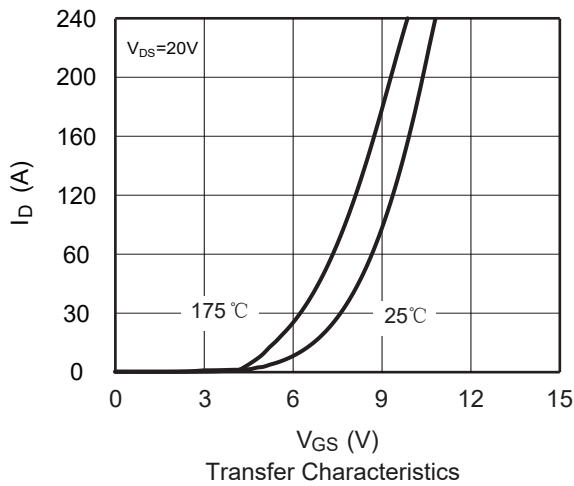
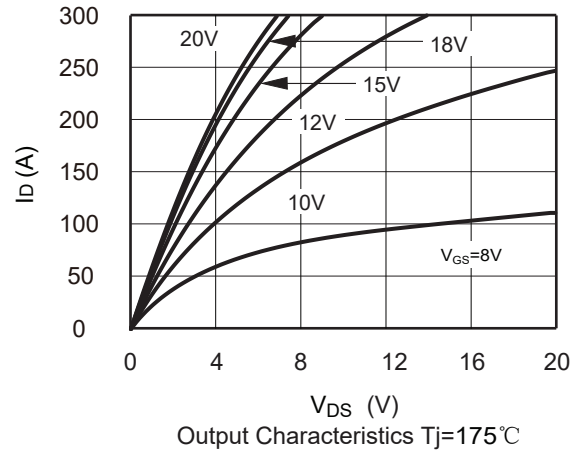
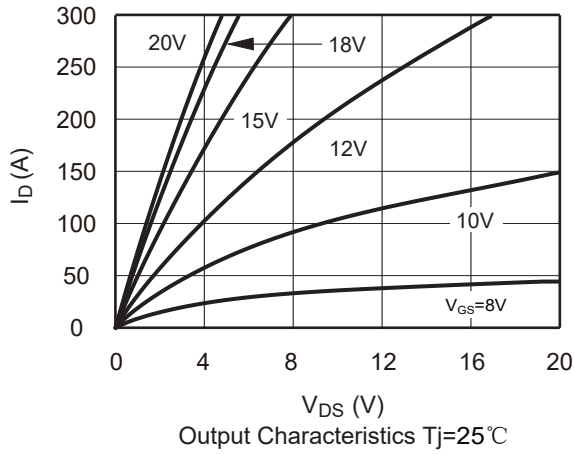
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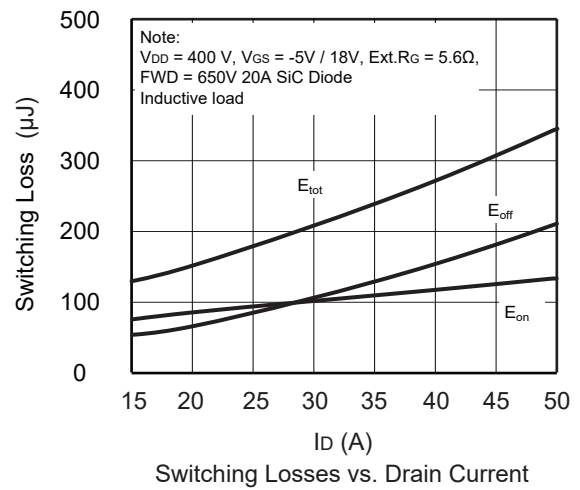
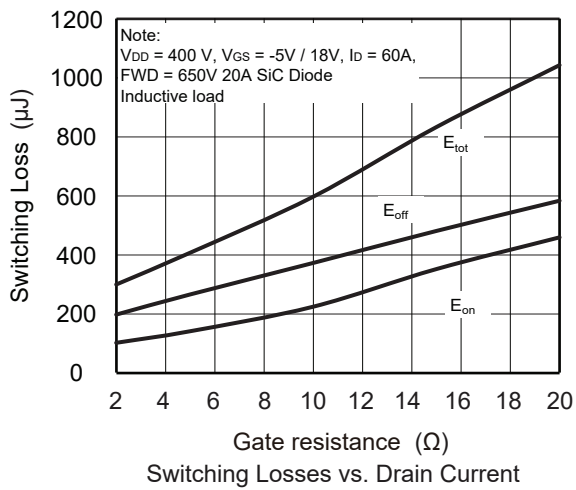
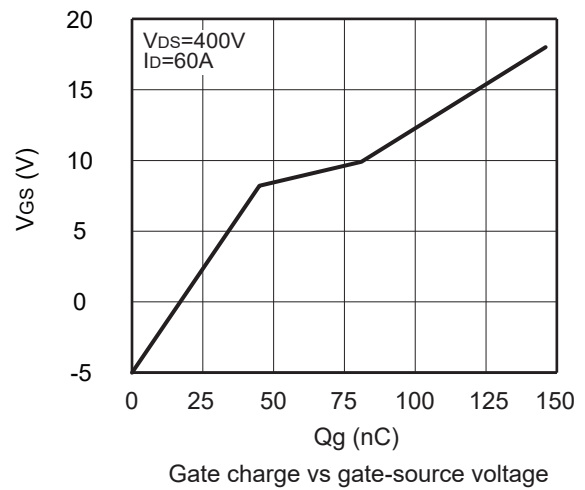
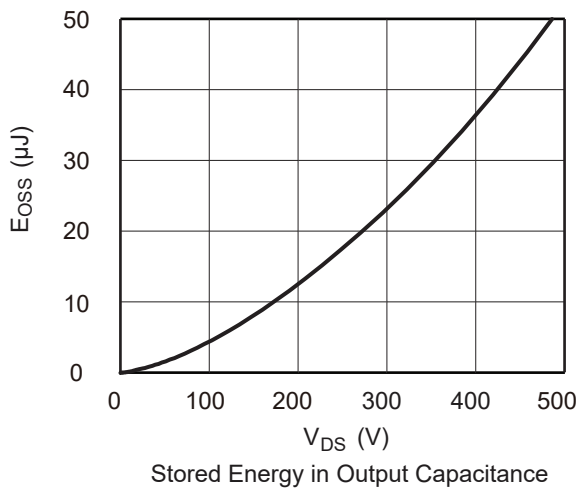
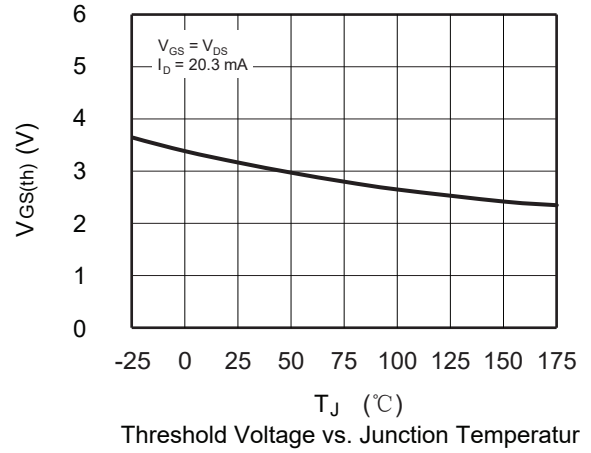
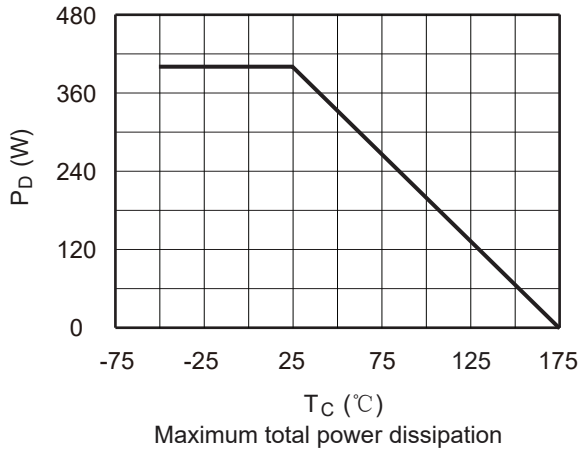
1.The EAS data shows Max. rating . The test condition is V_{DD}=100V , V_{GS}=10V , L=30mH , I_{AS}=17A.

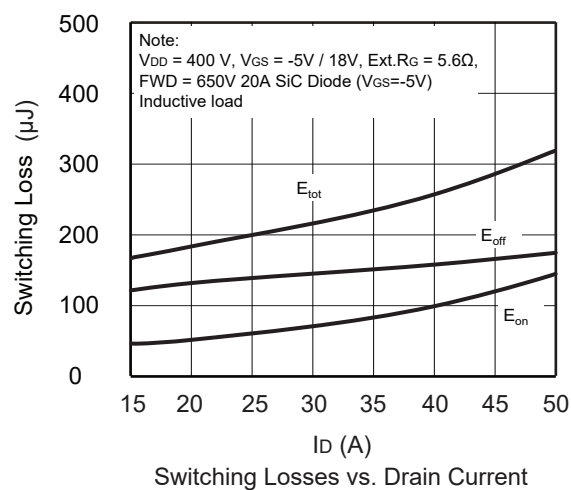
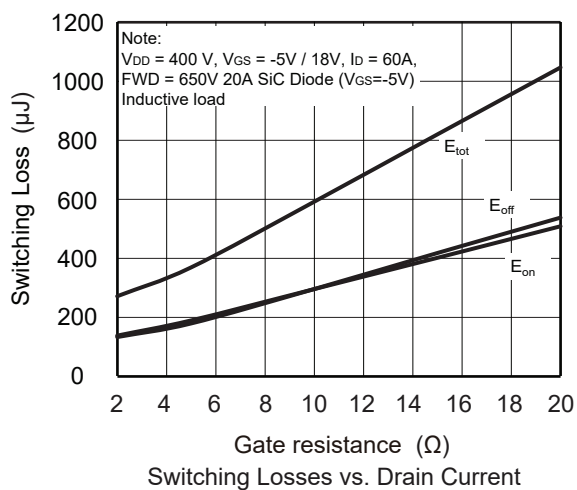
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Typical Characteristics


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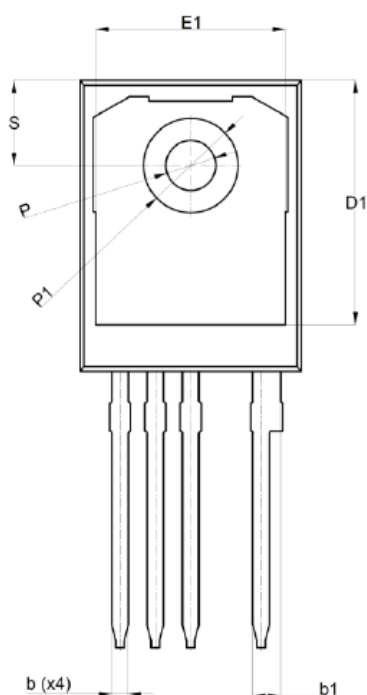
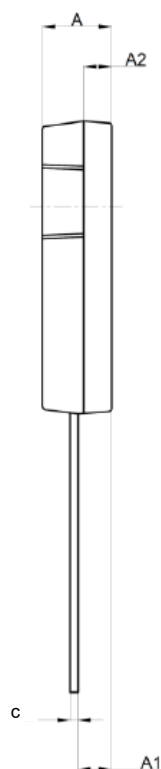
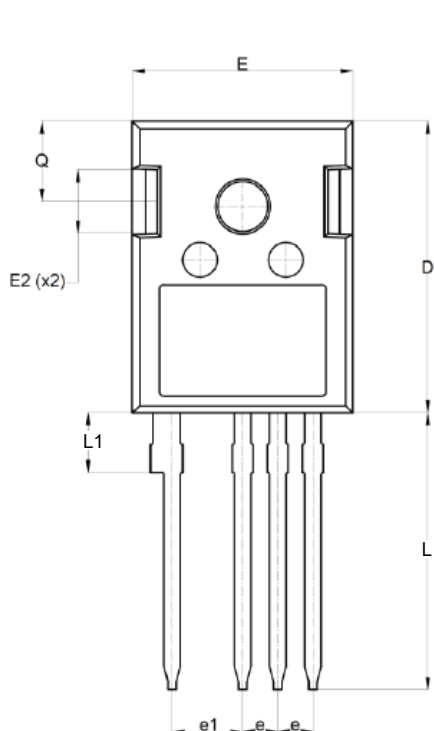
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Package Dimension

TO-247-4

Unit :mm



SYMBOL	Common		
	DIMENSIONS		
	MILLIMETER		
	MIN.	NOM.	MAX.
A	4.80	5.00	5.20
A1	2.29	2.42	2.54
A2	1.90	2.00	2.10
b	1.10	1.20	1.30
b1	1.86	2.01	2.15
c	0.50	0.60	0.70
D	20.90	21.00	21.10
D1	17.43	17.63	17.83
E	15.75	15.94	16.13
E1	13.46	13.66	13.86
E2	4.32	4.58	4.83
e	2.54 BSC.		
e1	5.08 BSC.		
L	19.80	19.95	20.10
L1	-	-	4.30
P	3.56	3.61	3.66
P1	6.75	6.80	6.85
Q	5.38	5.79	6.20
S	6.15 BSC.		