

# CMHG65R020-4

## 650V, 22mΩ typ., 100A 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
- Easy to Parallel and Simple to Drive
- Low On-Resistance with High Blocking Voltage
- RoHS Compliant

### Product Summary

BVDSS	$R_{DS(on)}$ max.	ID
650V	26mΩ	100A

### 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
$V_{GS}$	Gate-Source Voltage(DC)	-10/+22	V
$I_D@T_C=25^\circ C$	Continuous Drain Current	100	A
$I_D@T_C=100^\circ C$	Continuous Drain Current	70	A
$I_{DM}$	Pulsed Drain Current	300	A
EAS	Single Pulse Avalanche Energy <sup>1</sup>	3153	mJ
$P_D@T_C=25^\circ C$	Total Power Dissipation	350	W
$T_{STG}$	Storage Temperature Range	-55 to 175	°C
$T_J$	Operating Junction Temperature Range	-55 to 175	°C

### Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient	---	40	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-case	---	0.43	°C/W

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**Electrical Characteristics (T<sub>J</sub>=25°C , unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =100μA	650	---	---	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =18V , I <sub>D</sub> =30A	---	22	26	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =11.7mA (tested after V <sub>GS</sub> =V <sub>DS</sub> ,1ms pulse)	2.5	3.1	4.5	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =650V , V <sub>GS</sub> =0V	---	---	10	μA
		V <sub>DS</sub> =650V , V <sub>GS</sub> =0V , T <sub>J</sub> =150°C	---	10	---	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =-10V to 22V , V <sub>DS</sub> =0V	---	---	±250	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =20V , I <sub>D</sub> =30A	---	1	---	S
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V , V <sub>GS</sub> =0V , f=1MHz	---	0.8	---	Ω
Q <sub>g(tot)</sub>	Total Gate Charge	V <sub>DS</sub> =500V , I <sub>D</sub> =60A V <sub>GS</sub> =-5V to 18V	---	125	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	35	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	17	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DS</sub> =500V	---	21	---	ns
T <sub>r</sub>	Rise Time	I <sub>D</sub> =20A	---	76	---	
T <sub>d(off)</sub>	Turn-Off Delay Time	V <sub>GS</sub> =0V to 18V	---	70	---	
T <sub>f</sub>	Fall Time	R <sub>G</sub> =10Ω	---	37	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =100V , V <sub>GS</sub> =0V , f=1MHz	---	3500	---	pF
C <sub>oss</sub>	Output Capacitance		---	470	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	35	---	

**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current	---	---	100	A
I <sub>SM</sub>	Pulsed Source Current		---	---	300	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V , I <sub>SD</sub> =10A , T <sub>J</sub> =25°C	---	3.4	---	V
t <sub>rr</sub>	Reverse Recovery Time	di/dt=400A/μs , V <sub>GS</sub> =0V	---	35	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge	V <sub>DD</sub> =500V , I <sub>F</sub> =60A , T <sub>J</sub> =25°C	---	13	---	nC

Note :

1.The EAS data shows Max. rating . The test condition is V<sub>DD</sub>=80V , V<sub>GS</sub>=10V , L=5mH , I<sub>AS</sub>=33.5A.

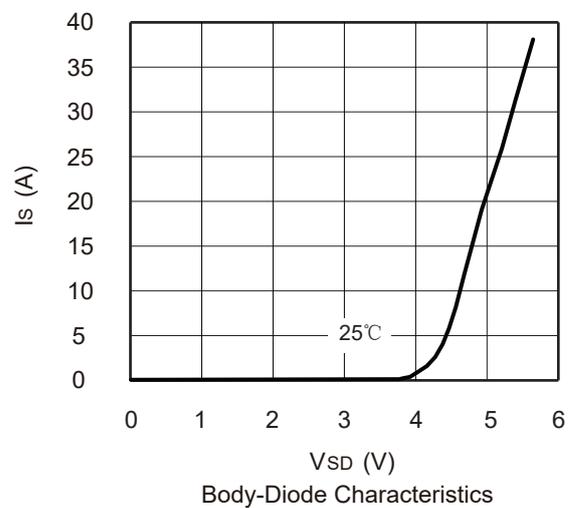
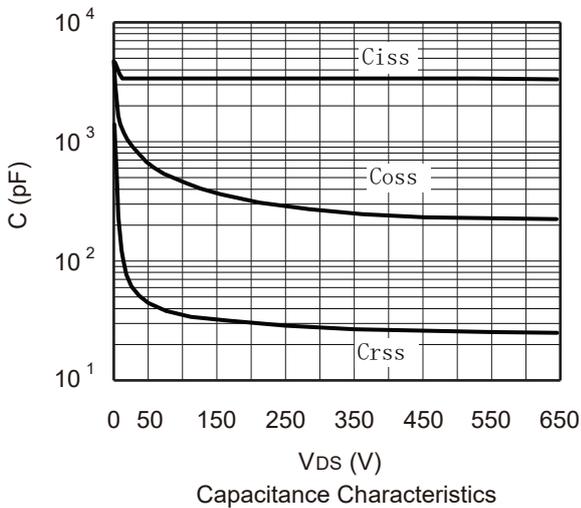
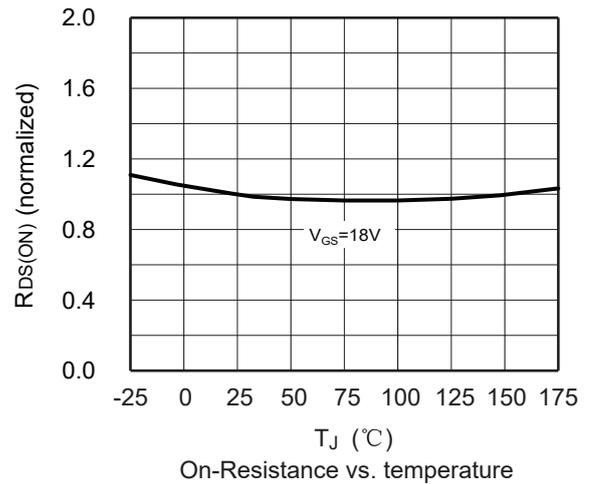
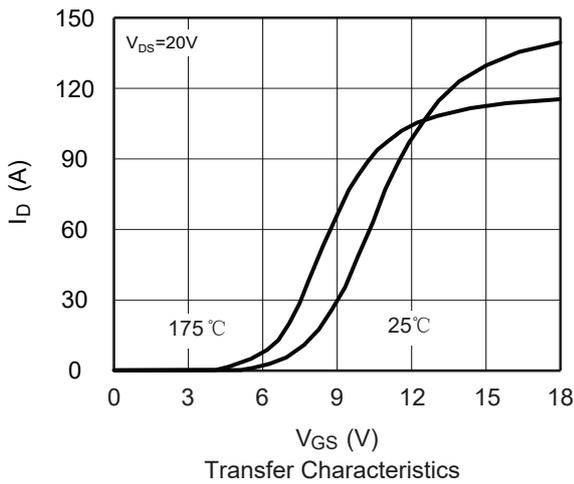
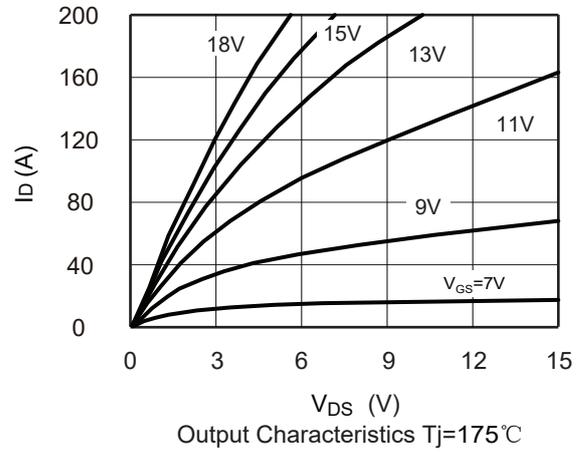
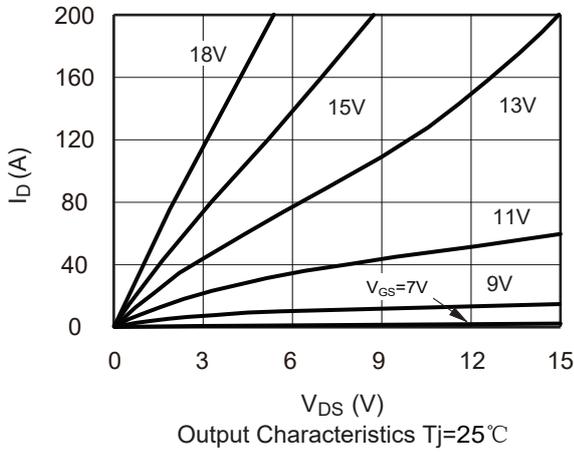
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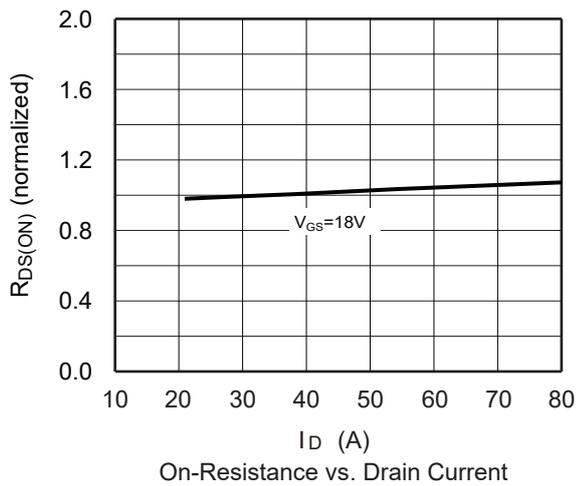
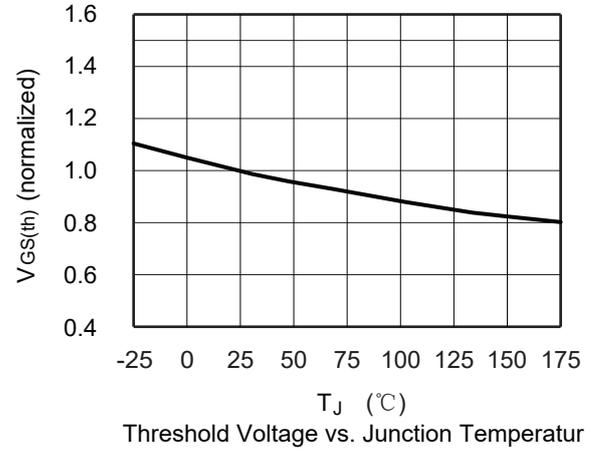
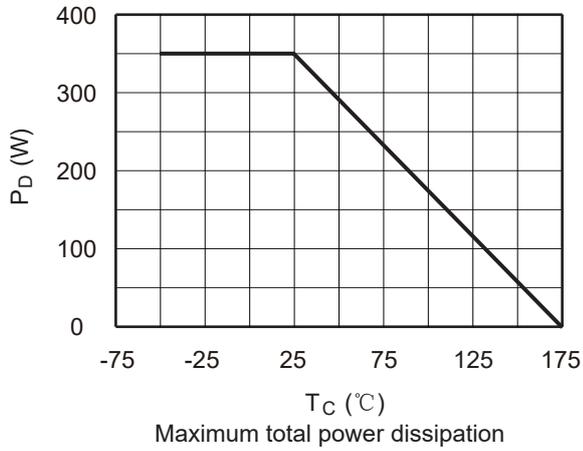
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Typical Characteristics



**Typical Characteristics**


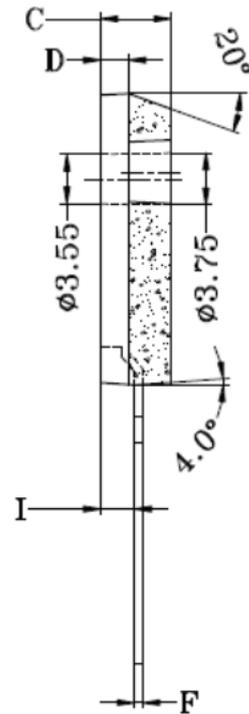
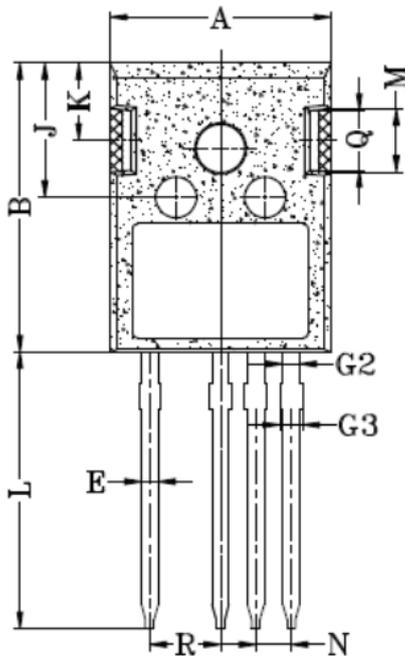
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## Package Dimension

TO-247-4

Unit :mm



Symbol	Dimensions in Millimeter	
	MIN	MAX
A	15.80	16.00
B	20.90	21.10
C	4.90	5.10
D	1.90	2.10
E	1.10	1.30
F	0.50	0.70
G2	1.10	1.30
G3	1.18	1.38
H	4.18	4.38
I	2.30	2.50
J	9.65	9.85
K	5.54	5.74
L	19.80	20.20
M	4.50	4.70
N	2.34	2.74
φ P	3.40	3.60
Q	4.232	4.432
R	4.88	5.28

