CMHG170R900N/CMAG170R900N

1700V, 540mΩ typ., 6A 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	$R_{DS(on)}$ typ.	ID
1700V	540mΩ	6A

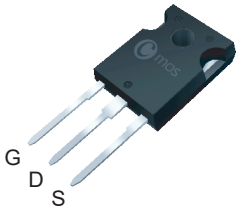
Applications

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC/DC Converters

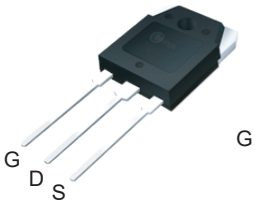
Features

- High Speed Switching with Low Capacitances
- High Blocking Voltage with Low RDS(on)
- Simple to Drive
- RoHS Compliant

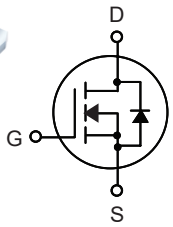
TO-247/TO-3P Pin Configuration



TO-247
CMHG170R900N



TO-3P
CMAG170R900N



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	1700	V
V_{GS}	Absolute maximum values	-10/+25	V
V_{GSop}	Recommended operational values	-5/+20	V
I_D@T_C=25℃	Continuous Drain Current	6	A
I_D@T_C=100℃	Continuous Drain Current	4.2	A
I_{DM}	Pulsed Drain Current	16	A
EAS	Single Pulse Avalanche Energy[1]	93	mJ
P_D@T_C=25℃	Total Power Dissipation	80	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	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-case	---	1.86	℃/W

1700V, 540mΩ typ., 6A 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=100μA	1700	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=18V , I_D=2A	---	540	800	mΩ
		V_{GS}=18V , I_D=2A , T_J=175℃	---	1000	---	
		V_{GS}=15V , I_D=2A	---	660	---	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =1mA (tested after V_{GS}=22V,1ms pulse)	2.0	3.2	5.0	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=1700V , V_{GS} =0V	---	1	100	μA
		V_{DS}=1700V , V_{GS} =0V , T_J=175℃	---	10	---	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=+25V , V_{DS} =0V	---	---	+250	nA
		V_{GS}= -10V , V_{DS} =0V	---	---	-250	
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	3.5	---	Ω
$Q_{g(tot)}$	Total Gate Charge	V_{DS} =1200V , I_D=2A V_{GS}= -5V to 20V	---	24	---	nC
Q_{gs}	Gate-Source Charge		---	7	---	
Q_{gd}	Gate-Drain Charge		---	6.5	---	
E_{on}	Turn-on Switching Energy	V_{DS} =1200V I_D =2A V_{GS}=-5V / 20V R_G =5.1Ω	---	79.8	---	μJ
E_{off}	Turn-off Switching Energy		---	34.2	---	
E_{tot}	Total Switching Energy		---	114	---	
$T_{d(on)}$	Turn-On Delay Time		---	7	---	ns
T_r	Rise Time		---	14	---	
$T_{d(off)}$	Turn-Off Delay Time		---	16	---	
T_f	Fall Time		---	88	---	
C_{iss}	Input Capacitance	V_{DS}=100V , V_{GS}=0V , f=1kHz	---	220	---	pF
C_{oss}	Output Capacitance		---	36	---	
C_{rss}	Reverse Transfer Capacitance		---	8.5	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	6	A
I_{SM}	Pulsed Source Current		---	---	16	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_{SD}=1A ,T_J=25℃	---	3.8	---	V
t_{rr}	Reverse Recovery Time	di/dt=1200A/μs , V_{GS} =-5V V_{DD} =1200V , I_{SD}=2A	---	43	---	ns
Q_{rr}	Reverse Recovery Charge		---	86	---	nC

Note :

1.The EAS data shows Max. rating . The test condition is V_{DD}=100V , V_{GS}=10V , L=30mH , I_{AS}=2.5A.

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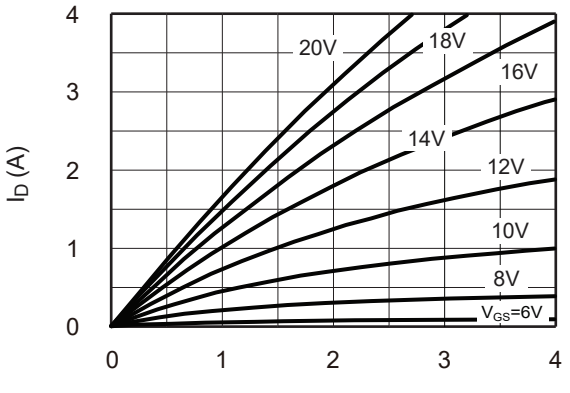
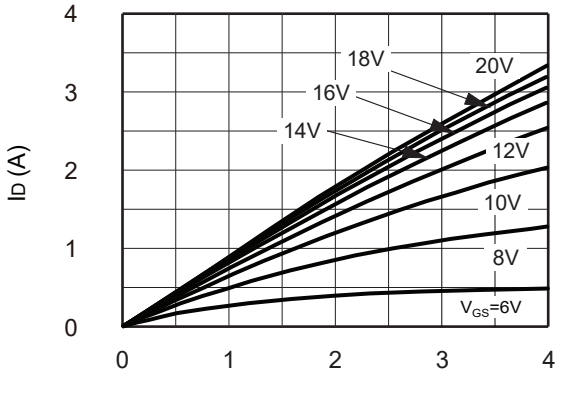
Cmos reserver the right to improve product design ,functions and reliability wihtout notice.Please refer to the latest version of specification.

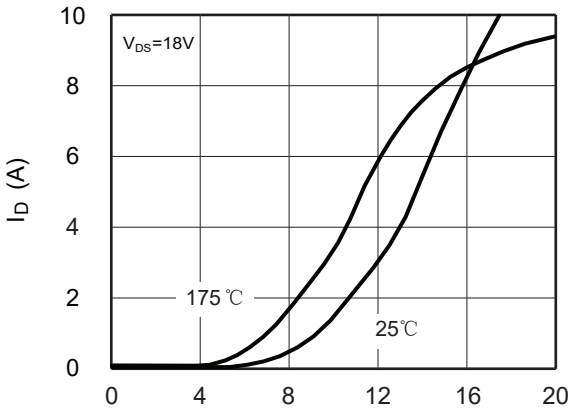
Typical Characteristics



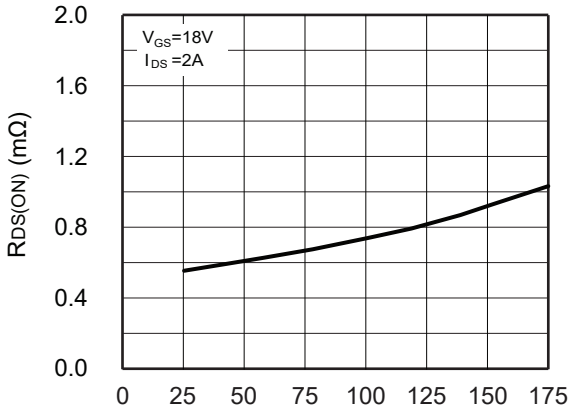
Output Characteristics Tj=25℃



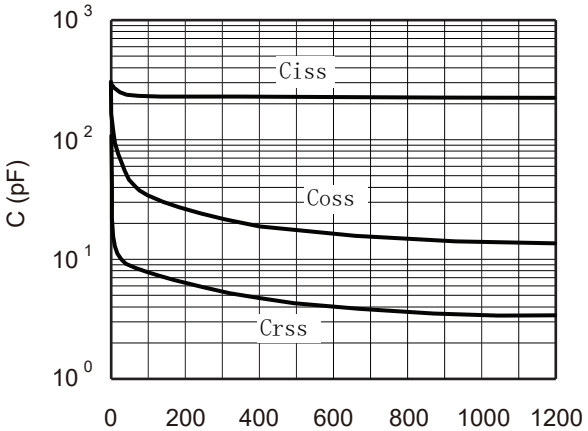
Output Characteristics Tj=175℃



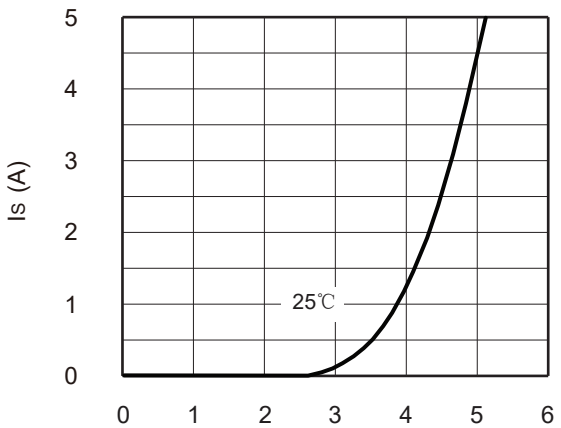
Transfer Characteristics



On-Resistance vs. temperature

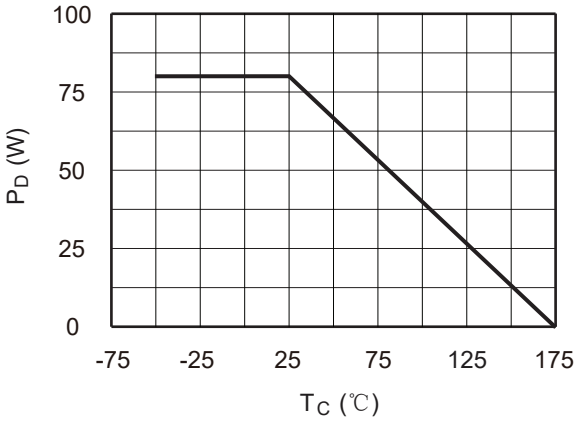


Capacitance Characteristics

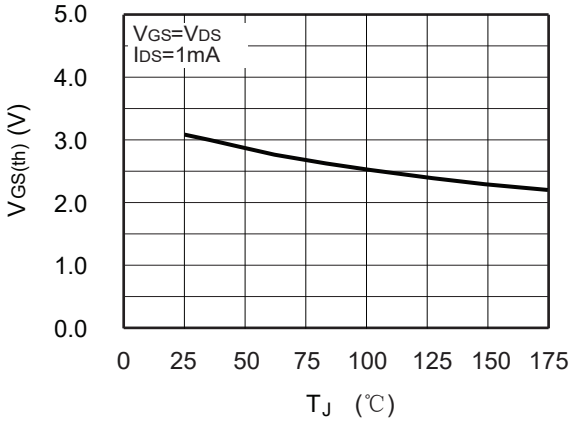


Body-Diode Characteristics

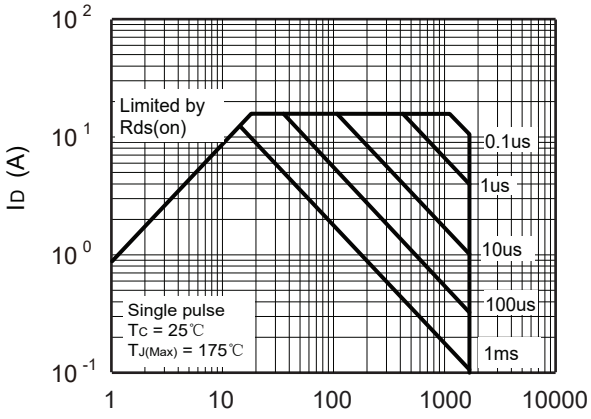
Characteristics



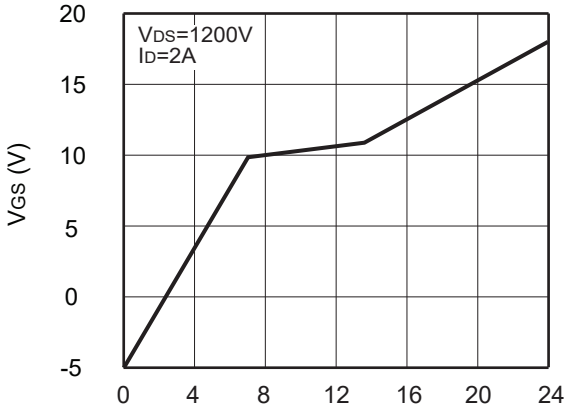
Maximum total power dissipation



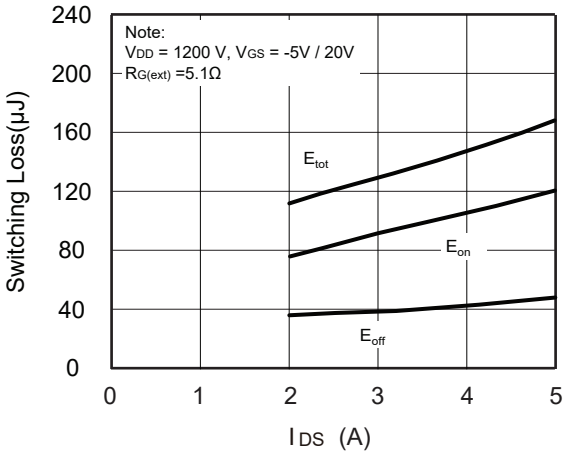
Threshold Voltage vs. Junction Temperatur



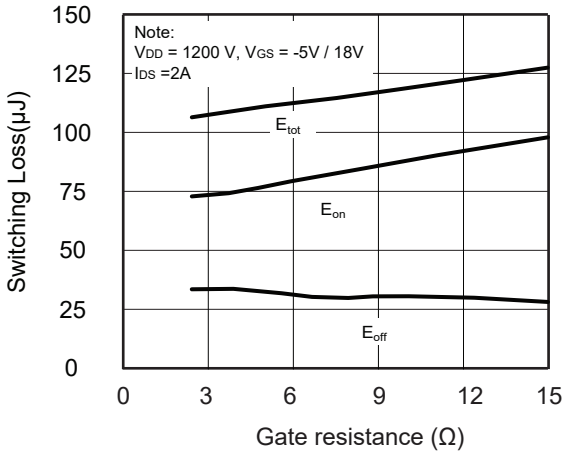
Safe Operating Area



Typical Gate charge vs gate-source voltage



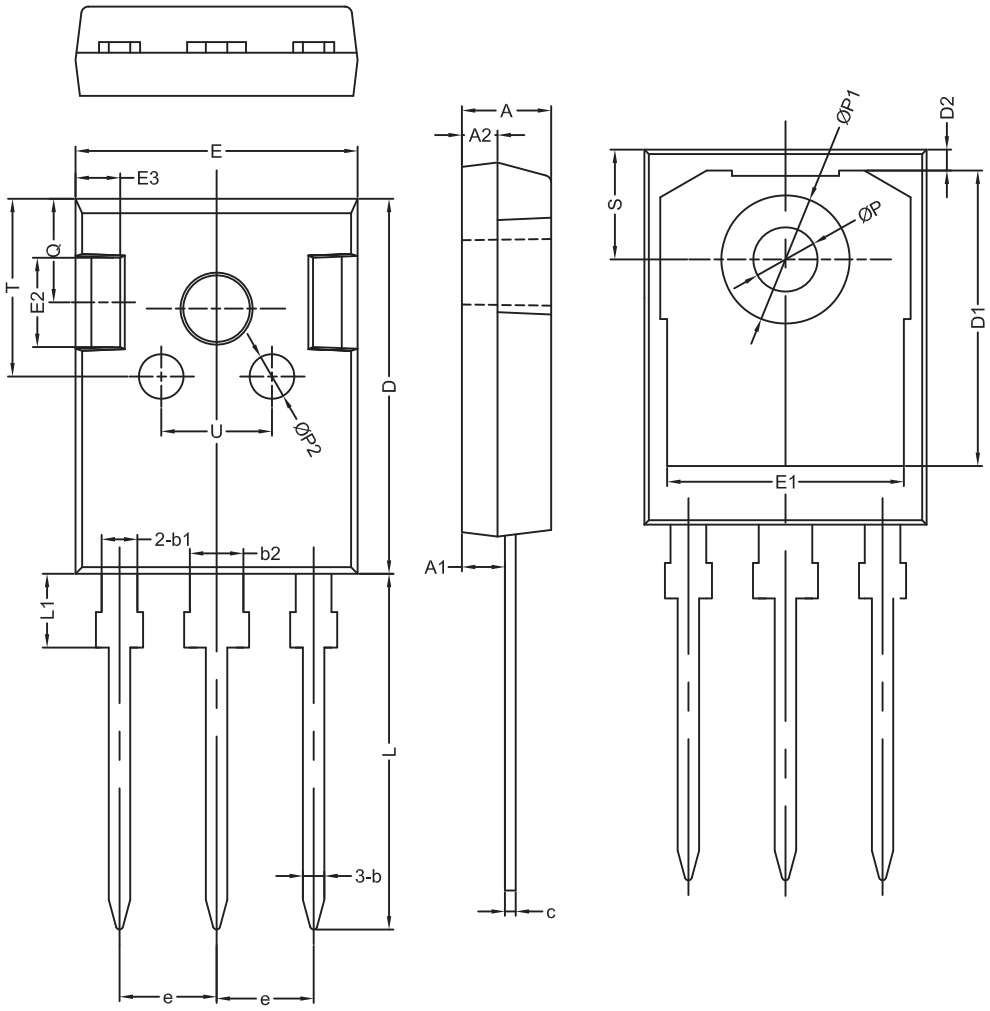
Typical Switching Losses vs. Drain Current



Typical Switching Losses vs. Gate Resistance

Package Dimension

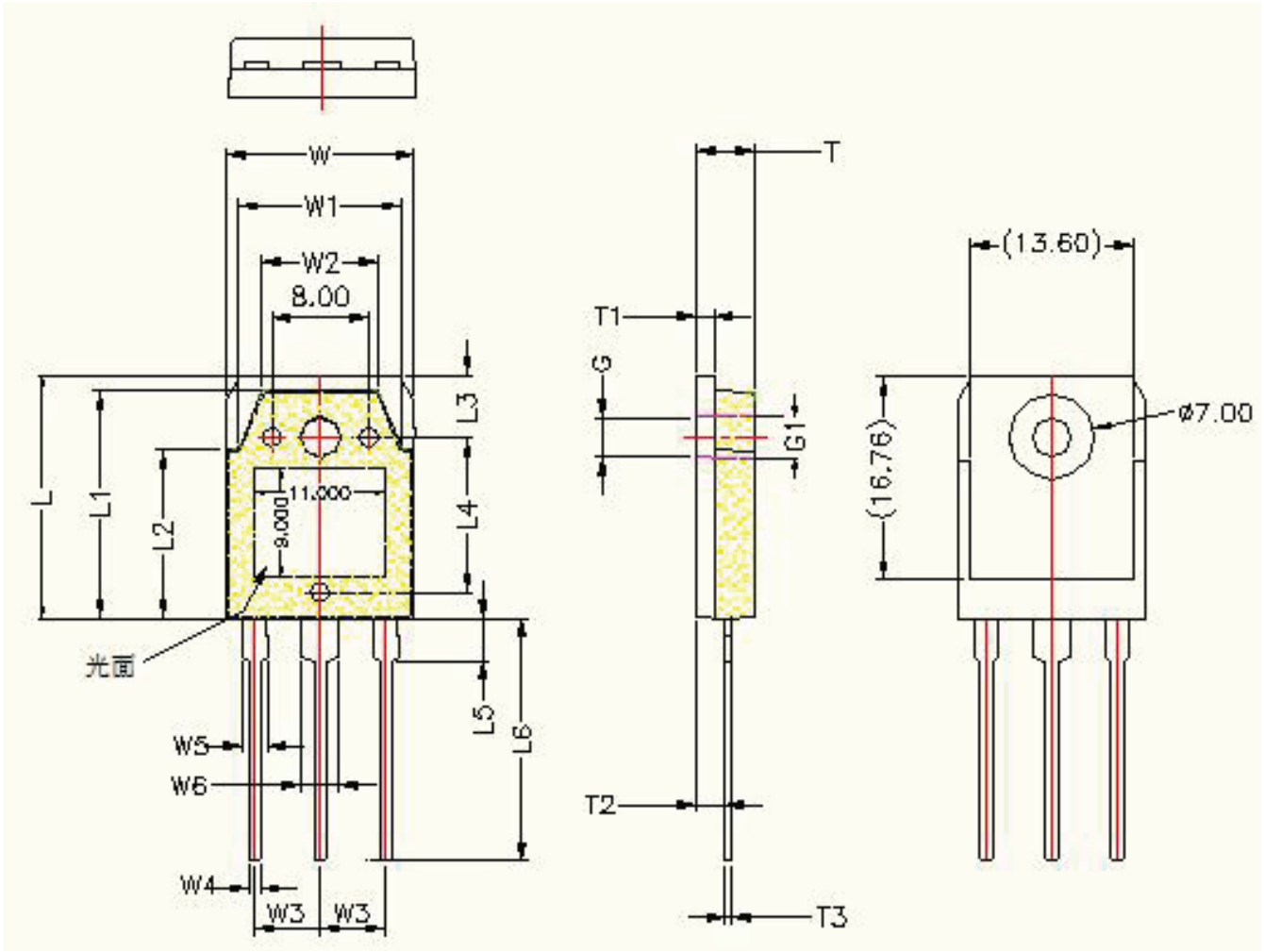
TO-247 Unit :mm



符号	机械尺寸/mm			符号	机械尺寸/mm		
	最小值	典型值	最大值		最小值	典型值	最大值
A	4.80	5.00	5.20	E2		5.00	
A1	2.21	2.41	2.61	E3		2.50	
A2	1.90	2.00	2.10	e		5.44	
b	1.10	1.20	1.35	L	19.42	19.92	20.42
b1		2.00		L1		4.13	
b2		3.00		P	3.50	3.60	3.70
c	0.55	0.60	0.75	P1		7.19	
D	20.80	21.00	21.20	P2		2.50	
D1		16.55		Q		5.80	
D2		1.20		S	6.05	6.15	6.25
E	15.60	15.80	16.0	T		10.00	
E1		13.30		U		6.20	

Package Dimension

TO-3P Unit :mm



Symbol	Dimensions	Symbol	Dimensions	Symbol	Dimensions
W	15.60±0.3	L	19.90±0.3	T	4.80±0.3
W1	13.60±0.3	L1	18.70±0.3	T1	1.50±0.3
W2	9.60±0.3	L2	13.90±0.3	T2	2.40±0.3
W3	5.45(TYP)	L3	5.00±0.3	T3	0.60±0.3
W4	1.00±0.3	L4	12.76±0.3	G	Ø3.25±0.3
W5	2.10±0.2	L5	3.50±0.3	G1	Ø3.58±0.3
W6	3.10±0.2	L6	20.00±0.3		