



ZHEJIANG UNIU-NE Technology CO., LTD

浙江宇力微新能源科技有限公司



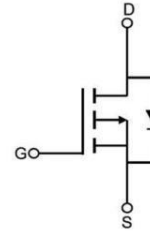
AP40P100K Data Sheet

V 1.1

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Features

- -100V,-34A
 $R_{DS(ON)} < 37m\Omega @ V_{GS} = -10V$ TYP: $31m\Omega$
 $R_{DS(ON)} < 48m\Omega @ V_{GS} = -4.5V$ TYP: $37m\Omega$
- Advanced Trench Technology
- Low On-Resistance
- Low Gate Charge



Schematic Diagram



Marking and pin assignment

Applications

- Battery management
- Motor control and drive
- UPS (Uninterruptible Power Supplies)

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
40P100K	AP40P100K	TO-252	-	-	2500

ABSOLUTE MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_c = 25^\circ\text{C}$) ⁽¹⁾	I_D	-34	A
Continuous Drain Current ($T_c = 100^\circ\text{C}$) ⁽¹⁾	I_D	-21	A
Pulsed Drain Current ^(2,3)	I_{DM}	-135	A
Drain Power Dissipation ⁽¹⁾	P_D	94	W
Single Pulsed Avalanche Energy	E_{AS}	750	mJ
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.33	$^\circ\text{C/W}$
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	129	$^\circ\text{C/W}$
Junction Temperature	T_J	-55~ +150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

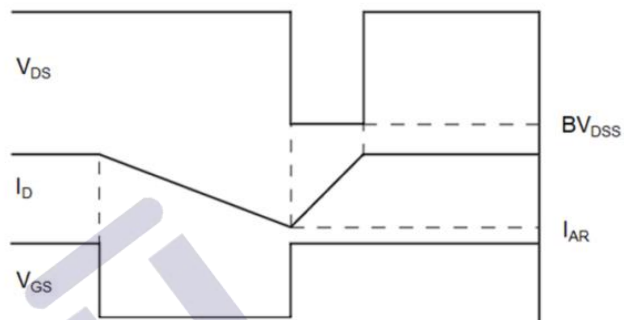
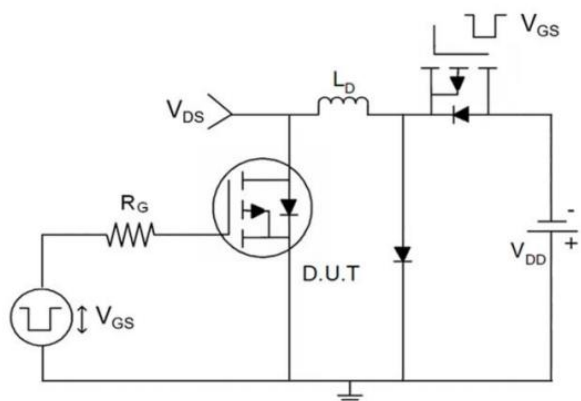
MOSFET ELECTRICAL CHARACTERISTICS(T_J=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =-250μA	-100	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =-100V, V _{GS} = 0V	-	-	-1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage ⁽⁴⁾	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-1.5	-2.0	-2.5	V
Drain-source on-resistance ⁽⁴⁾	R _{DS(on)}	V _{GS} =-10V, I _D =-22A	-	31	37	mΩ
		V _{GS} =-4.5V, I _D =-10A	-	37	48	mΩ
Gate Input Resistance	R _G	f=1MHz	-	3.8	-	Ω
Dynamic characteristics ⁽⁵⁾						
Input Capacitance	C _{iss}	V _{DS} =-50V, V _{GS} =0V, f=1MHz	-	5805	-	pF
Output Capacitance	C _{oss}		-	178	-	
Reverse Transfer Capacitance	C _{rss}		-	86	-	
Switching characteristics ⁽⁵⁾						
Turn-on delay time	t _{d(on)}	V _{DD} =-50V, I _D =-22A, R _G =2.7Ω, V _{GS} =-10V	-	15	-	nS
Turn-on rise time	t _r		-	44	-	
Turn-off delay time	t _{d(off)}		-	90	-	
Turn-off fall time	t _f		-	76	-	
Total Gate Charge	Q _g	V _{DS} =-50V, I _D =-22A, V _{GS} =-10V	-	100	-	nC
Gate-Source Charge	Q _{gs}		-	25	-	
Gate-Drain Charge	Q _{gd}		-	16	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽⁴⁾	V _{SD}	T _J =25℃, V _{GS} =0V, I _S =-22A	-	-0.87	-1.3	V
Diode Forward current	I _S	T _C =25℃	-	-	-34	A
Body Diode Reverse Recovery Time	trr	T _J =25℃, I _F =-22A,di/dt=100A/us	-	33	-	nS
Body Diode Reverse Recovery Charge	Qrr		-	54	-	nC

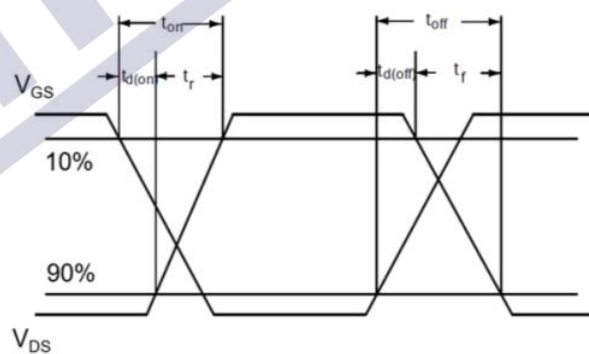
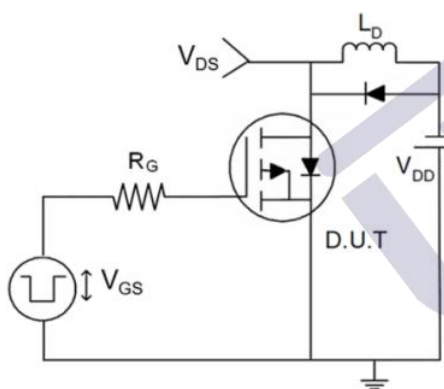
Notes:

- 1) Surface Mounted on 1 in² pad area, t ≤ 10 sec
- 2) Pulse width ≤ 10μs, duty cycle ≤ 1 %
- 3) Limited by bonding wire
- 4) Pulse width ≤ 300 μs, duty cycle ≤ 2%
- 5) Guaranteed by design, not subject to production testing

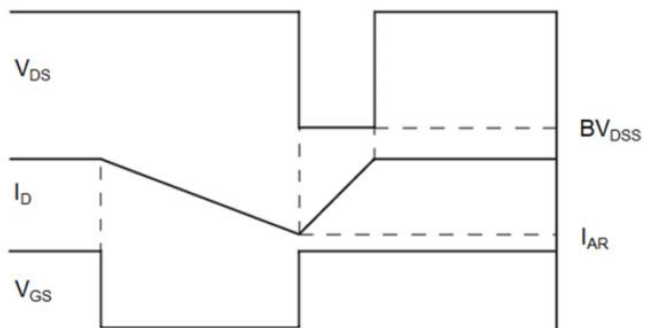
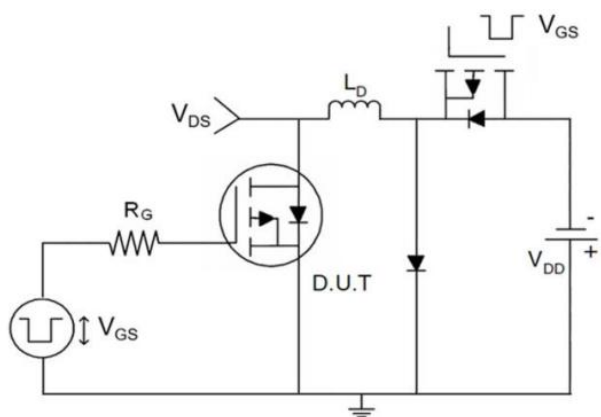
Test Circuit & Waveform



Gate Charge Test Circuit



Resistive Switching Test Circuit



Unclamped Inductive Switching Test Circuit

Typical Characteristics

Fig 1: Output Characteristics

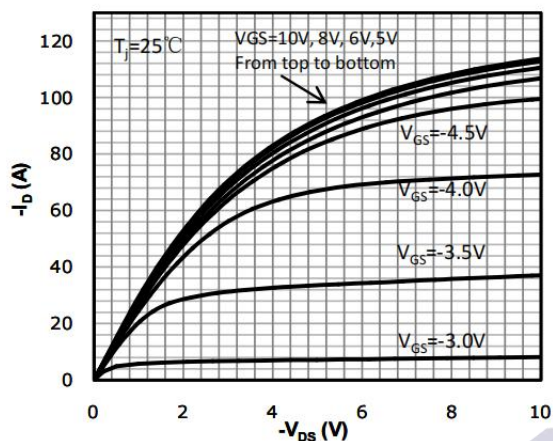


Fig 2: Transfer Characteristics

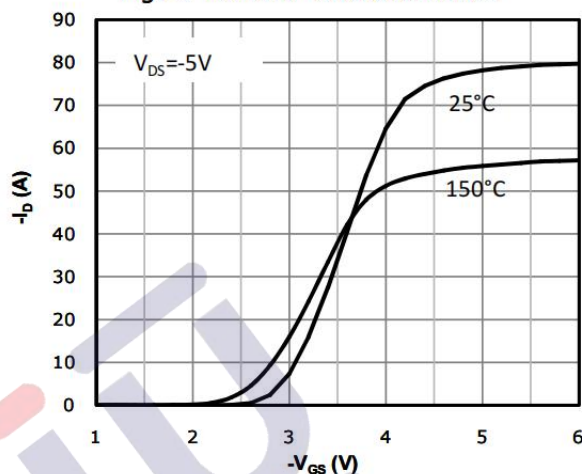
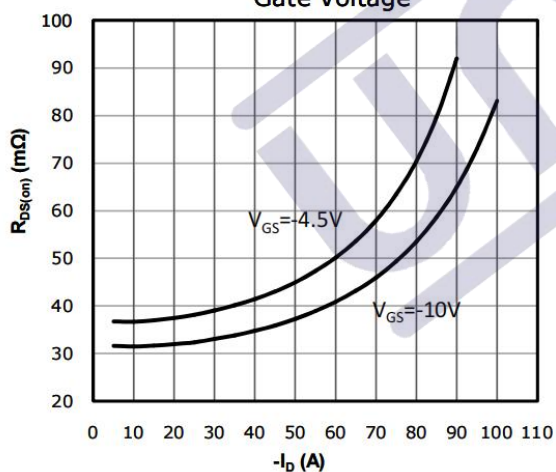
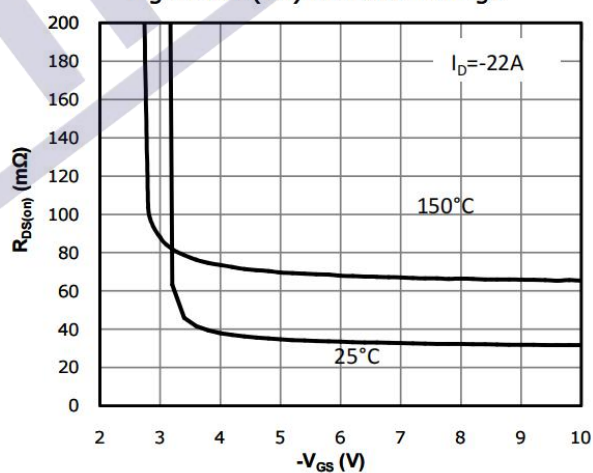
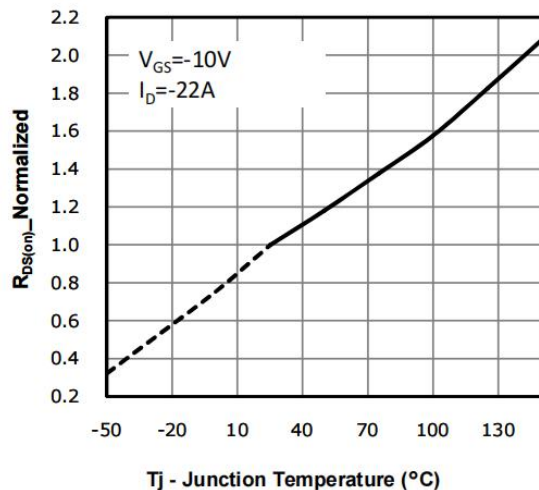
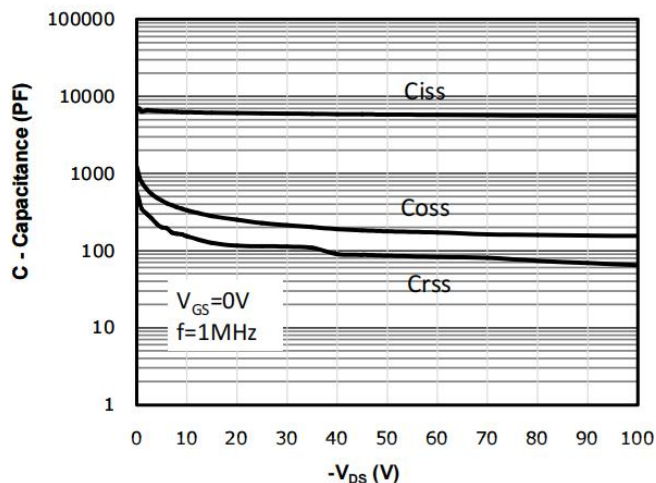
Fig 3: $R_{DS(on)}$ vs Drain Current and Gate VoltageFig 4: $R_{DS(on)}$ vs Gate VoltageFig 5: $R_{DS(on)}$ vs. Temperature

Fig 6: Capacitance Characteristics



Typical Characteristics (cont.)

Fig 7: BVDS vs. Temperature

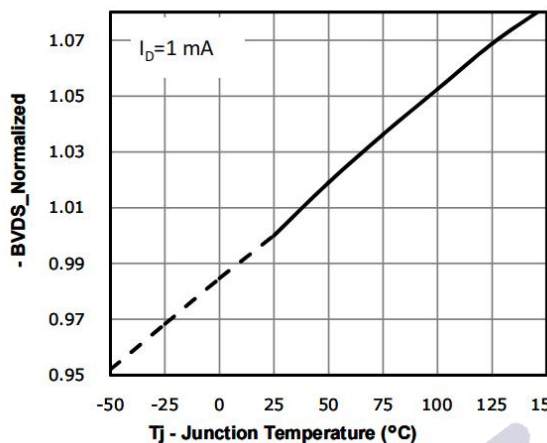
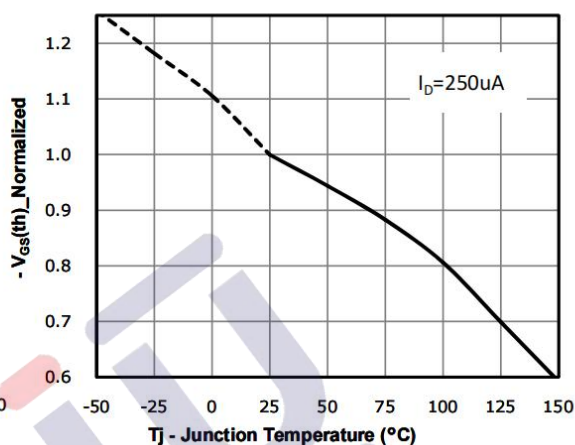
Fig 8: $V_{GS(th)}$ vs. Temperature

Fig 9: Gate Charge Characteristics

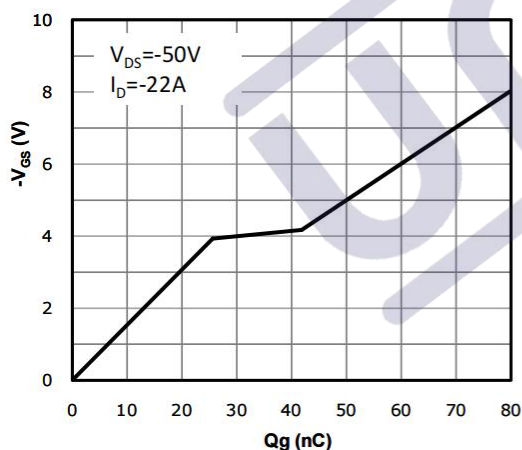


Fig 10: Body-diode Forward Characteristics

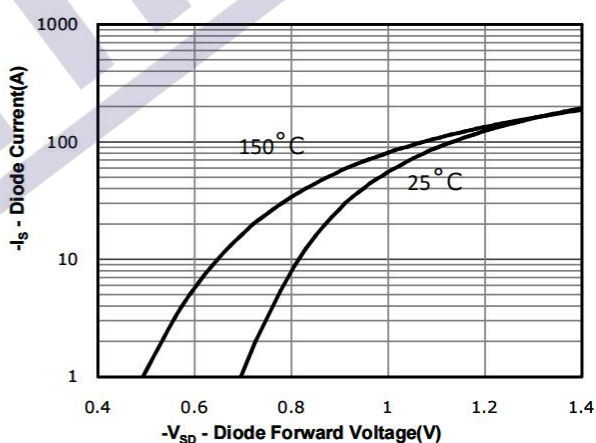


Fig 11: Power Dissipation

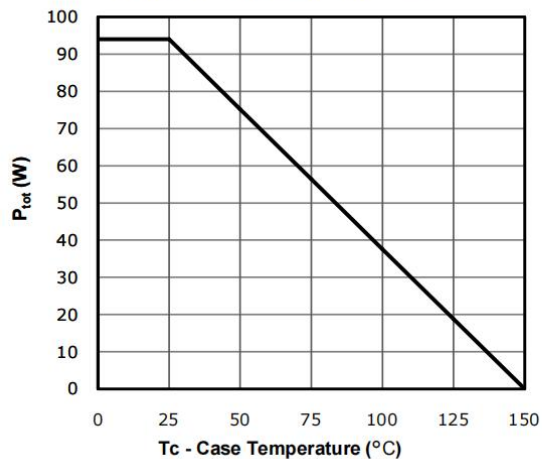
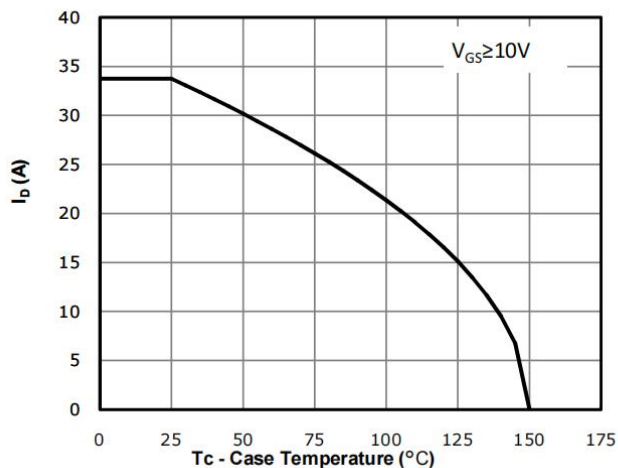


Fig 12: Drain Current Derating



Typical Characteristics (cont.)

Fig 13: Safe Operating Area

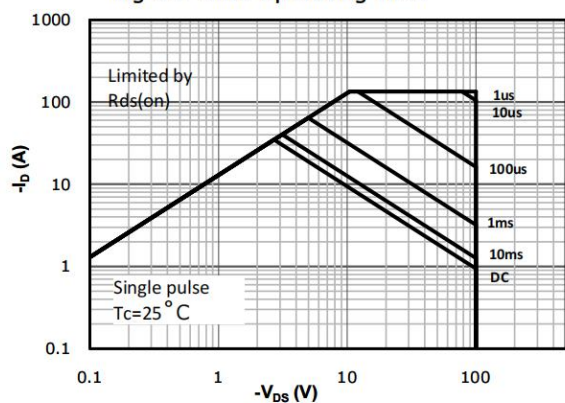
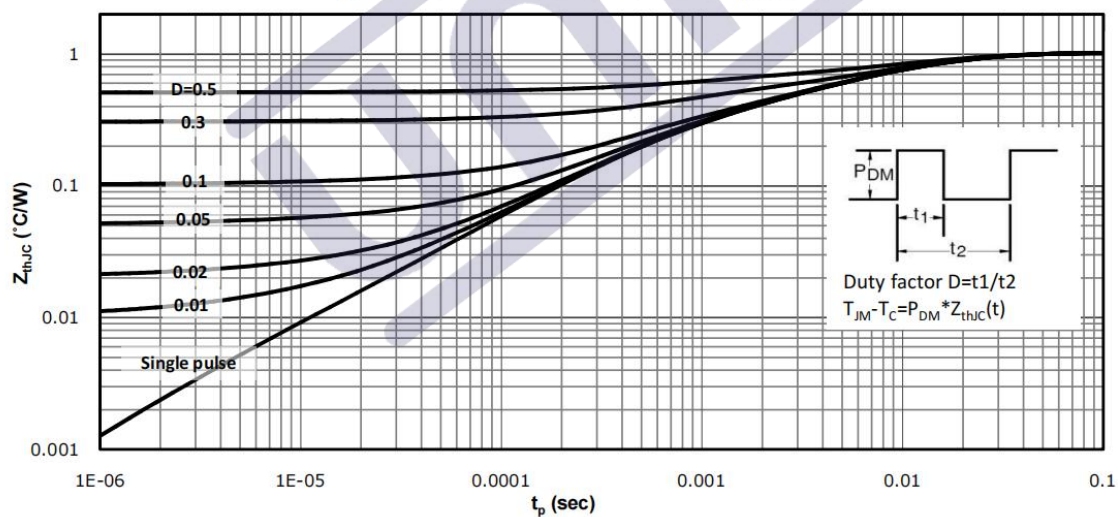
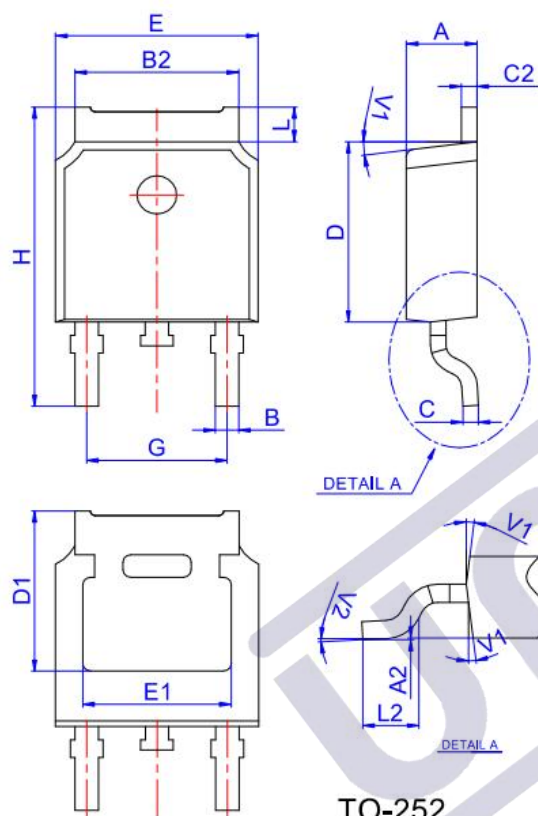


Fig 14: Max. Transient Thermal Impedance



TO-252 Package Information



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

1.版本记录

DATE	REV.	DESCRIPTION
2023/05/01	1.0	Initial Release
2023/11/01	1.1	Layout Adjustment

2.免责声明

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3.联系我们

浙江宇力微新能源科技有限公司

总部地址：绍兴市越城区斗门街道袍渎路25号中节能科创园45幢4/5楼

电话：0575-85087896（研发部）

传真：0575-88125157

E-mail: htw@uni-semic.com

无锡地址:江苏省无锡市锡山区先锋中路6号中国电子(无锡)数字芯城1#综合楼503室

电 话：0510-85297939

E-mail: zh@uni-semic.com

深圳地址:深圳市宝安区西乡街道南昌社区宝源路泳辉国际商务大厦410

电 话：0755-84510976

E-mail: htw@uni-semic.com