



ZHEJIANG UNIÜ-NE Technology CO., LTD

浙江宇力微新能源科技有限公司



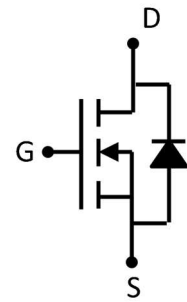
## APG050N85 Data Sheet

V 1.1

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**Feature**

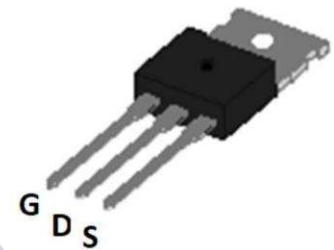
- 85V,135A  
 $R_{DS(ON)} < 5m\Omega @ V_{GS}=10V$
- Advanced Trench Power MOSFET
- Provide Excellent  $R_{DS(ON)}$  And Low Gate Charge



Schematic diagram

**Application**

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch
- Rectifier



TO-220C

**Package Marking and Ordering Information**

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
G050N85	APG050N85	TO-220C		-	1000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	85	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_a = 25^{\circ}C$ )	$I_D$	135	A
Continuous Drain Current ( $T_a = 100^{\circ}C$ )	$I_D$	80	A
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	260	A
Singel Pulsed Avalanche Energy <sup>(2)</sup>	$E_{AS}$	238	mJ
Power Dissipation	$P_D$	196	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.59	$^{\circ}C/W$
Junction Temperature	$T_J$	150	$^{\circ}C$
Storage Temperature	$T_{STG}$	-55~ +150	$^{\circ}C$

**MOSFET ELECTRICAL CHARACTERISTICS(T<sub>a</sub>=25°C unless otherwise noted)**

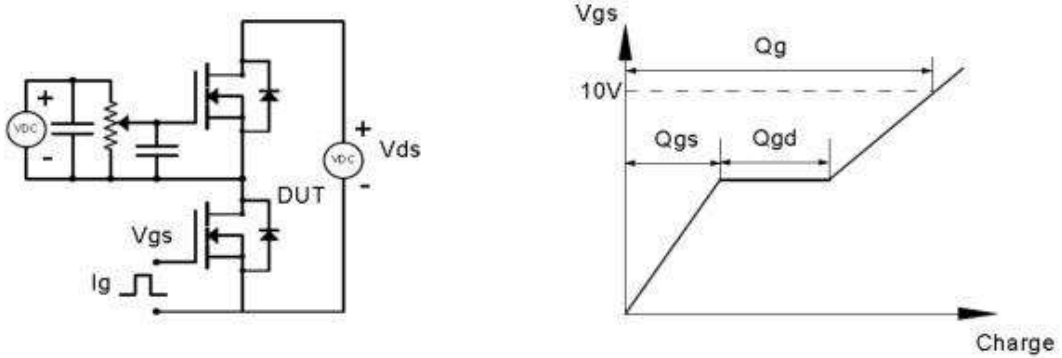
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	85	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = 85V, V <sub>GS</sub> = 0V	-	-	1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
Gate threshold voltage <sup>(3)</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	2	3	4	V
Drain-source on-resistance <sup>(3)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 70A	-	4.5	5	mΩ
Forward tranconductance <sup>(3)</sup>	g <sub>FS</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 70A	-	95	-	S
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 40V, V <sub>GS</sub> = 0V, f = 1MHz	-	2924	-	pF
Output Capacitance	C <sub>oss</sub>		-	771	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	15	-	
<b>Switching characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = 40V, I <sub>D</sub> = 70A, V <sub>GS</sub> = 10V, R <sub>G</sub> = 25Ω	-	19	-	ns
Turn-on rise time	t <sub>r</sub>		-	33	-	
Turn-off delay time	t <sub>d(off)</sub>		-	29	-	
Turn-off fall time	t <sub>f</sub>		-	19	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 40V, I <sub>D</sub> = 70A, V <sub>GS</sub> = 10V	-	48	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	13	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	19	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(3)</sup>	V <sub>DS</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = 120A	-	-	1.2	V
Diode Forward current <sup>(4)</sup>	I <sub>S</sub>		-	-	135	A
Reverse recovery time	T <sub>rr</sub>	I <sub>S</sub> = 60A, V <sub>GS</sub> = 0V, dI <sub>F</sub> /dt = 100A/us		52		ns
Reverse recovery charge	Q <sub>rr</sub>	I <sub>S</sub> = 60A, V <sub>GS</sub> = 0V, dI <sub>F</sub> /dt = 100A/us		73		nC

**Notes:**

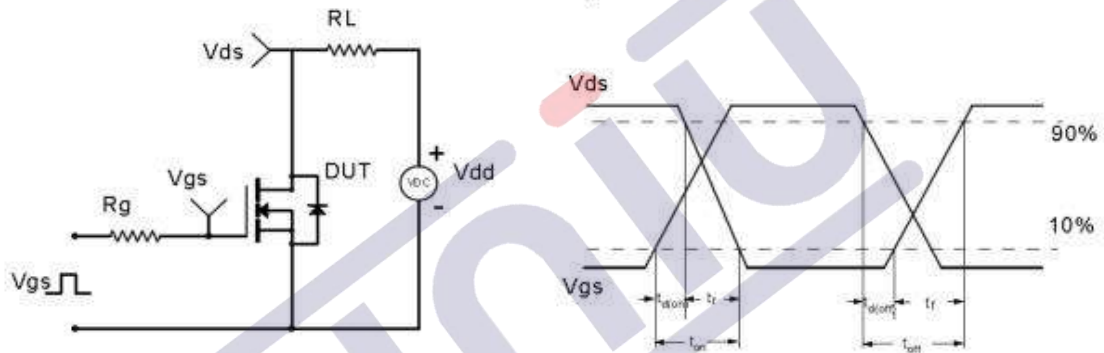
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: T<sub>J</sub> = 25°C, V<sub>DD</sub> = 10V, R<sub>G</sub> = 20 Ω, L = 0.5mH, I<sub>AS</sub> = 30A
3. Pulse Test: pulse width ≤ 300μs, duty cycle ≤ 2%
4. Surface Mounted on FR4 Board, t ≤ 10 sec

**Test Circuit & Waveform**

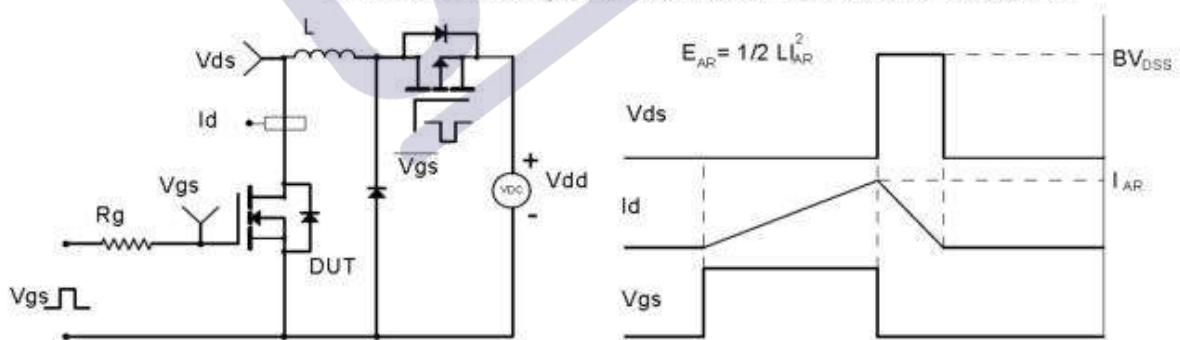
Gate Charge Test Circuit & Waveform



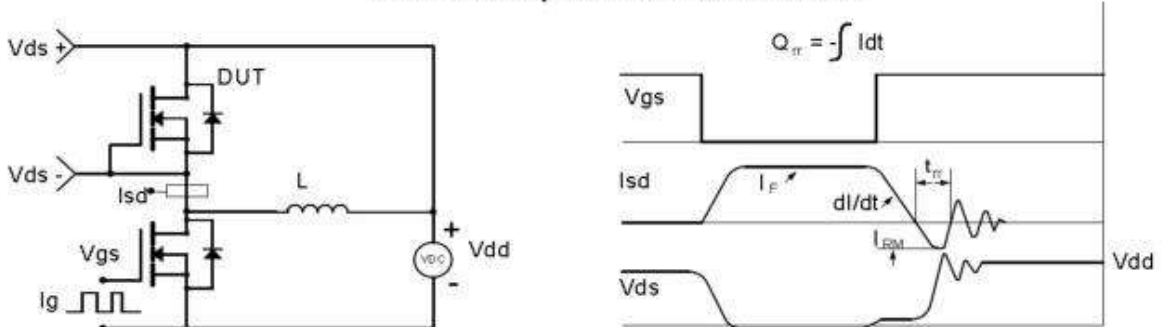
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Electronic and Thermal Characteristics

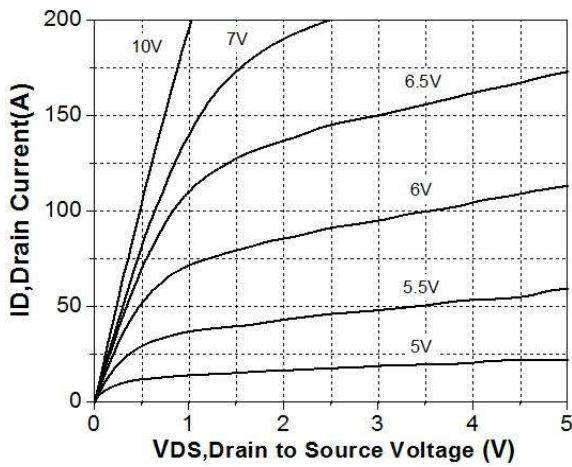


Figure 1. On-Region Characteristics

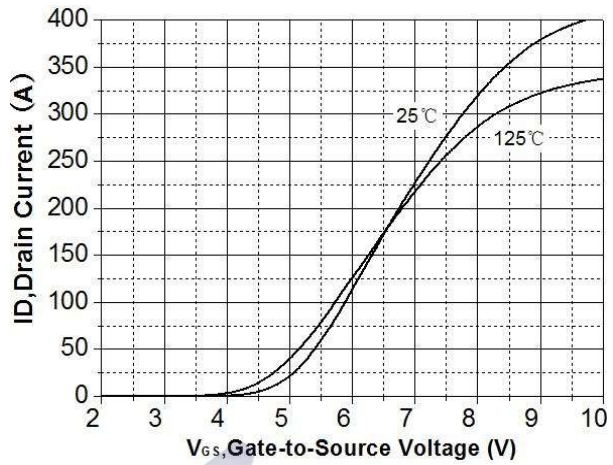


Figure 2. Transfer Characteristics

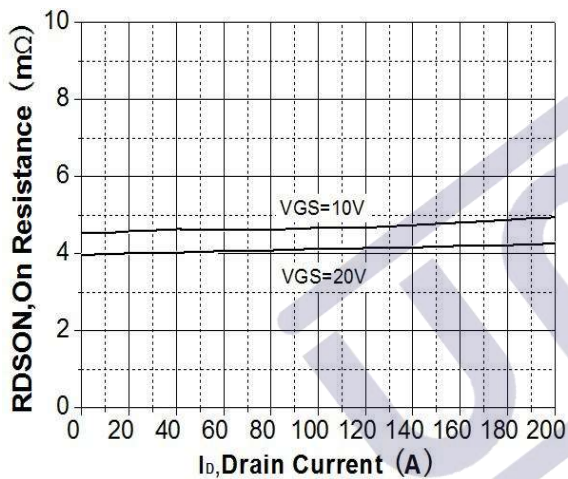


Figure 3. On-Resistance Variation vs Drain Current

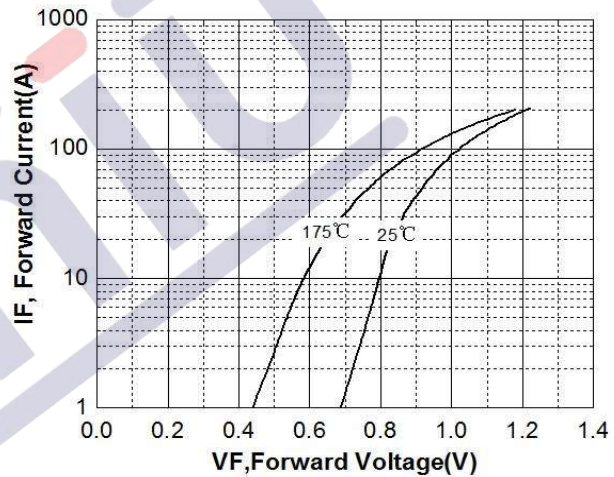


Figure 4. Body Diode Forward Voltage Vs Reverse Drain Current

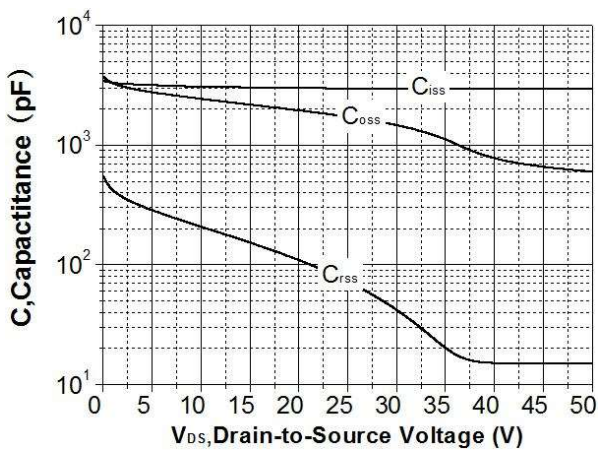


Figure 5. Capacitance Characteristics

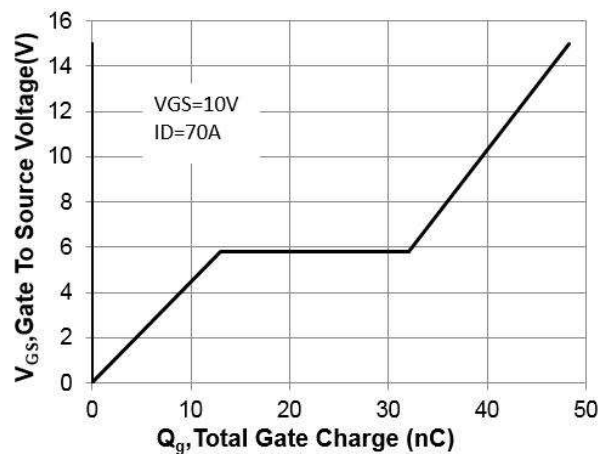


Figure 6. Gate Charge Characteristics

Typical Electronic and Thermal Characteristics

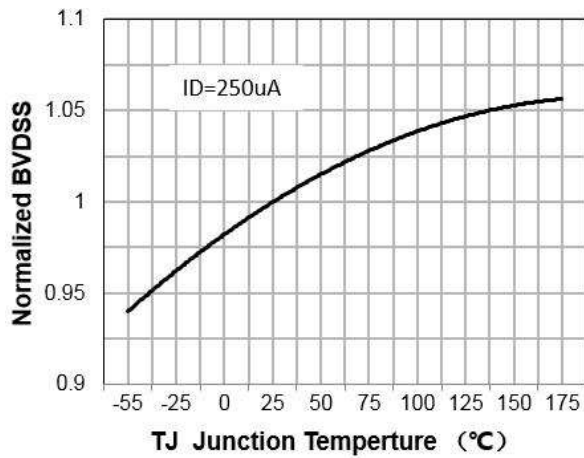


Figure 7. Breakdown Voltage Variation vs Temperature

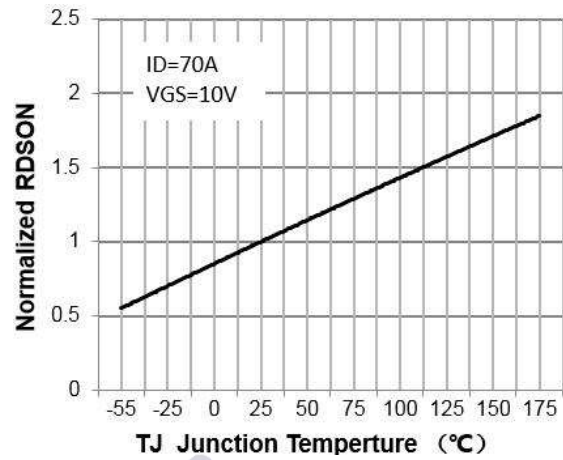


Figure 8. On-Resistance Variation vs Temperature

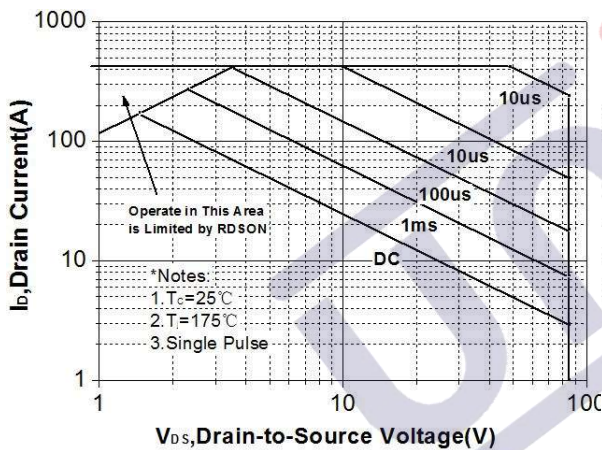


Figure 9. Maximum Safe Operating Area

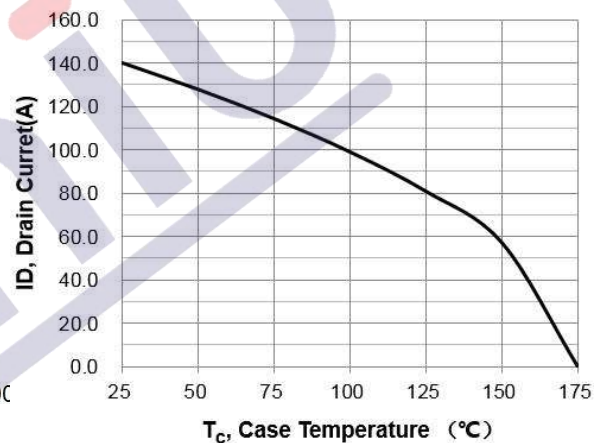


Figure 10. Maximum Drain Current vs Case Temperature

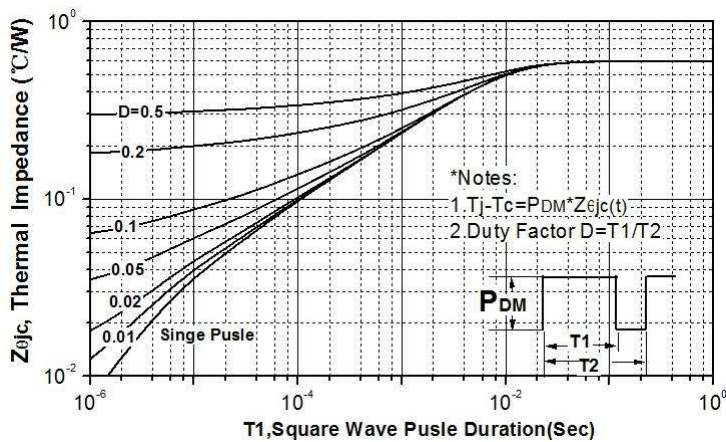
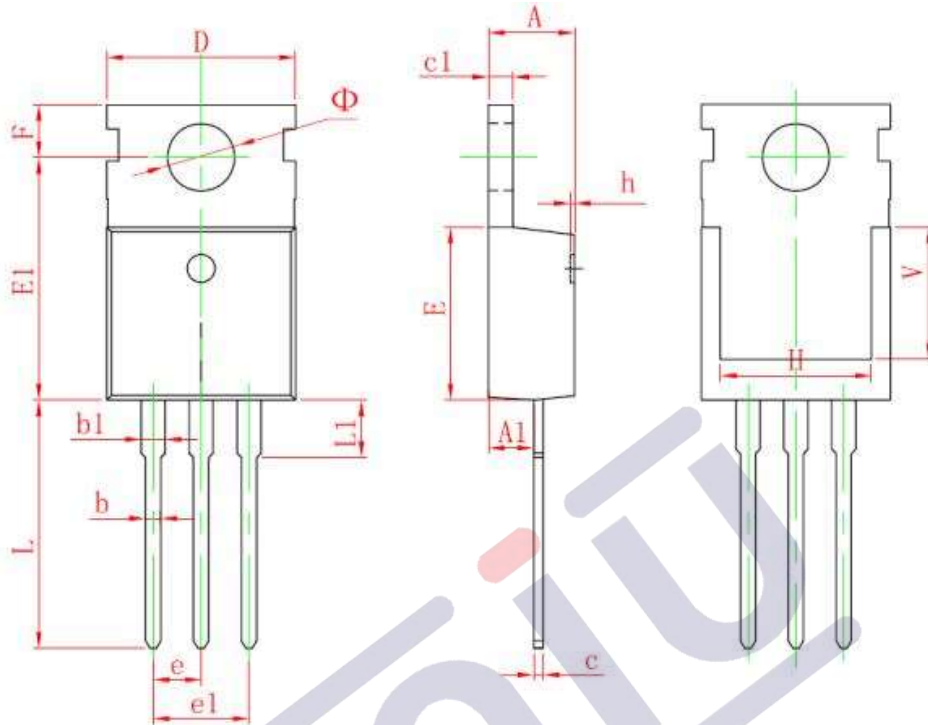


Figure 11. Transient Thermal Response Curve

**TO220C Package Information**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150

## 1.版本记录

DATE	REV.	DESCRIPTION
2018/04/19	1.0	First Release
2021/11/15	1.1	Layout adjustment

## 2.免责声明

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