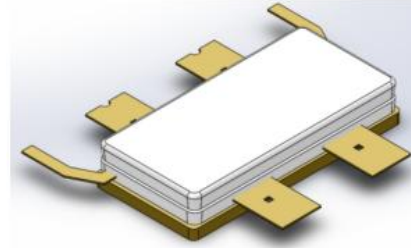


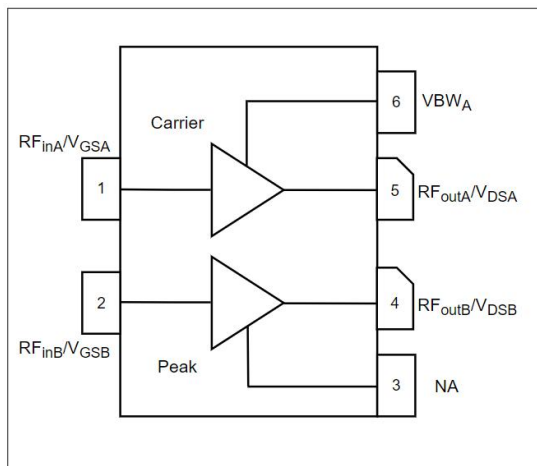
### Description

The HTH1D27P550S is a discrete device based on GaN, which is an Asymmetrical Doherty Power Amplifier designed for the base station applications with 60W average output power covering frequency range from 2496 to 2690 MHz.



**ACS2110S-4L2L**  
Air Cavity Spliced Package; 6 Leads

### Block Diagram



### Applications

- 3GPP 5G NR N41 and 4G/LTE B41
- Power Amplifier for macro base stations
- Repeaters/DAS.
- Mobile Infrastructure.

### Order Information

Part Number	Description
HTH1D27P550S	Tray & Reel Package

- Operating Frequency Range: 2496 to 2690 MHz
- Operating Drain Voltage: +50 V
- Saturation Output Power: 550 W
- Integrated Asymmetrical Doherty Final Stage
- High Back-off Efficiency
- Linear Gain over the Frequency Range is about 15dB
- Designed for broadband operation
- High reliability

### Typical Performances

Freq (MHz)	MaxGain (dB)	P1dB (dBm)	Eff (%)	P3dB (dBm)	Eff (%)	P5dB (dBm)	Eff (%)	Eff (%) @49dBm
2515	15.9	52.8	63.7	56.2	58.7	57.5	55.8	60.5
2595	17.0	51.7	65.4	55.3	59.3	57.6	59.0	62.1
2675	16.4	51.8	64.4	55.6	55.9	57.3	57.7	57.1

VDD=50Vdc, IDQ=250mA, Vgsp=Vgsm-2.5V, Pout=49 dBm, Pulsed CW, Pulse Width = 1 ms, Duty Cycle =10%, Test on Watech EVB.

Freq (MHz)	Gain (dB) @49dBm	PAE (%) @49dBm	5MHz (dBc) @49dBm	10MHz (dBc) @49dBm
2515	15.7	56.3	-26.8	-44.4
2595	16.3	56.1	-28.1	-44.5
2675	15.4	54.6	-30.7	-44.8

VDD=50Vdc, IDQ=250mA, Vgsp=Vgsm-2.5V, Pout=49 dBm, WCDMA, PAR=9.6 dB, Test on Watech EVB.

## Absolute Maximum Ratings

Parameter	Range/Value	Units
Drain voltage (VDSS)	/ to +150	V
Gate voltage (VGS)	-10 to +2	V
Storage Temperature (TSTG)	-40 to +150	°C
Case Temperature (TC)	-65 to 150	°C
Junction Temperature (TJ)	/ to 275	°C

## Electrical Specification

### DC Characteristics Carrier

Parameter	Conditions	Min	Typ	Max	Units
Breakdown voltage V(BR)DSS	VGS=-8V; IDS=24mA	150	-	-	Vdc
Gate-Source threshold Voltage VGS(th)	VDS=10V; IDS=24mA	-3.5	-2.8	-2.3	Vdc
Drain leakage Current IDSS	VDS=50V; VGS=-8V	-	0.65	-	mAdc
Gate leakage Current IGSS	VDS=0V; VGS=-10V	-	78	-	uAdc

### DC Characteristics Peak

Parameter	Conditions	Min	Typ	Max	Units
Breakdown voltage V(BR)DSS	VGS=-8V; IDS=42mA	150	-	-	Vdc
Gate-Source threshold Voltage VGS(th)	VDS=10V; IDS=42mA	-3.5	-2.8	-2.3	Vdc
Drain leakage Current IDSS	VDS=50V; VGS=-8V	-	1.5	-	mAdc
Gate leakage Current IGSS	VDS=0V; VGS=-10V	-	180	-	uAdc

**RF Characteristics (Pulsed CW)**

Parameter	Min	Typ	Max	Units
Frequency Range	2515	-	2675	MHz
P5dB	56.8	57.2	-	dBm

Test conditions, unless otherwise noted: 25 °C, VDD=+50Vdc, IDQ = 250 mA, Vgsp=Vgsm-2.5V, Pout=49dBm, CW, 100 us, Duty Cycle = 10%, Based on FT board

**RF Characteristics (WCDMA)**

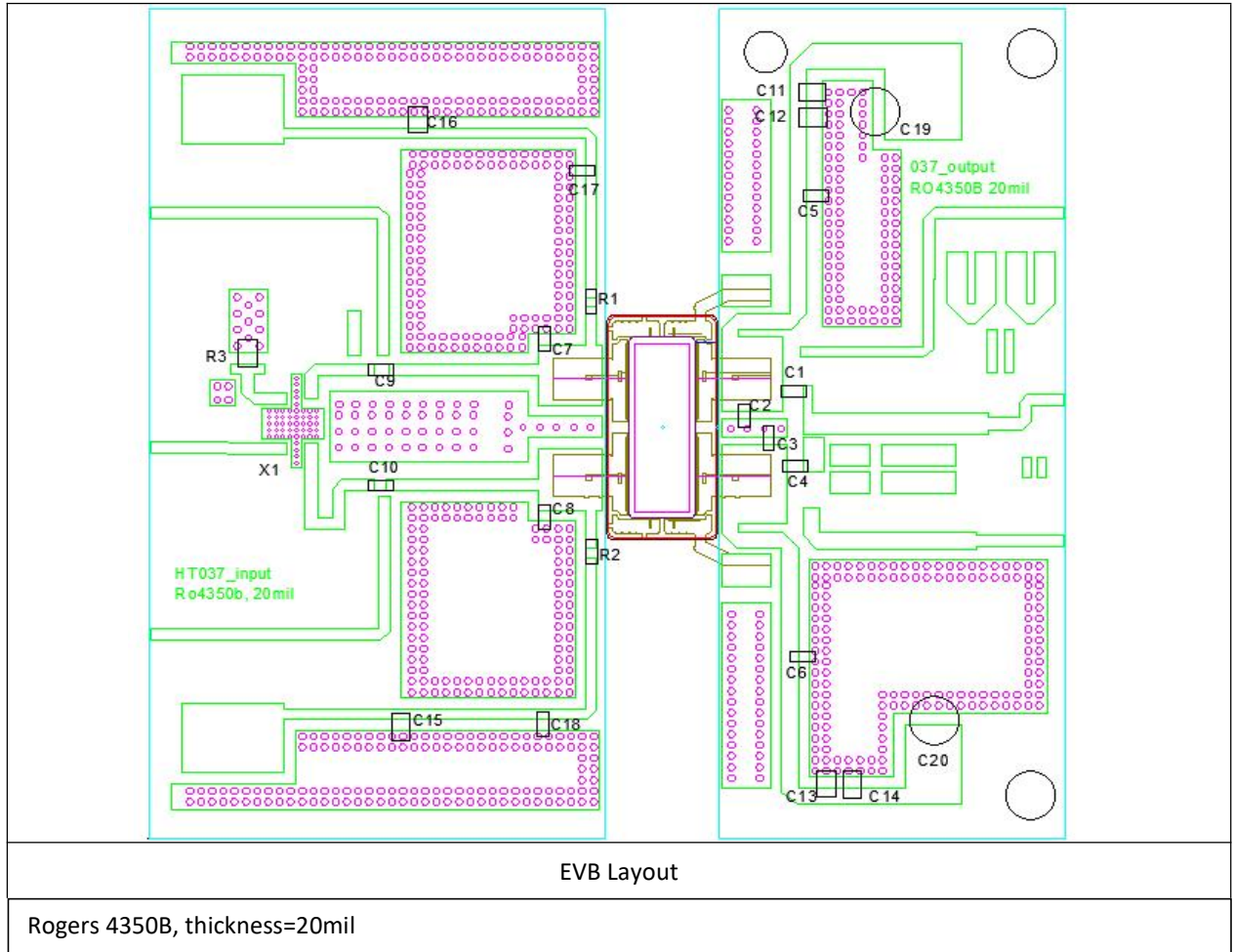
Parameter	Min	Typ	Max	Units
Frequency Range	2515	-	2675	MHz
Gain	14.5	15.5	-	dB
Eff	52	54.5	-	%
IRL	10	15	-	dB
ACLR@5MHz	-	-27	-25	dBc

Test conditions, unless otherwise noted: 25 °C, VDD=+50Vdc, IDQ = 250mA, Vgsp=Vgsm-2.5V, Pout=49dBm, single-carrier, 5MHz WCDMA signal with 9.9dB PAR @ 0.01% CCDF, Based on FT board

**Thermal Information**

Parameter	Condition	Value (Typ)	Units
Thermal Resistance Junction to Case (RTH)	Tcase=80C, WCDMA 1C , Pout=49 dBm	0.72	°C/W

**HTH1D27P550S 2515-2675 MHz Reference Design**



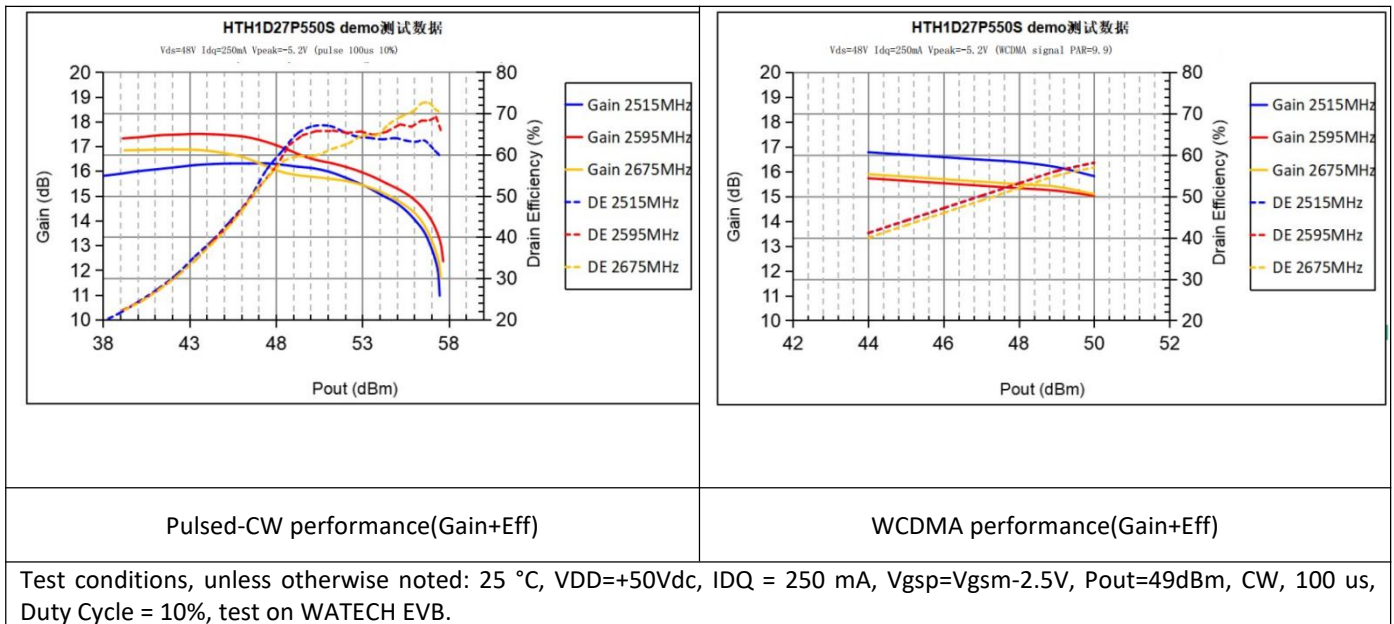
**BOM-HTH1D27P550S 2515 – 2675 MHz Reference Design**

Component	Type	Value	Description	Manufacturer	P/N
Q1	GaN transistor	/	High Power transistor	WATECH	HTH1D27P550S
C1	Capacitor	2.7pf	Multilayer Ceramic Capacitor	Murata, 0805	GQM2195C2E2R7BB12
C2、C7	Capacitor	1.0pf	Multilayer Ceramic Capacitor	Murata, 0805	GQM2195C2E1R0BB12
C3	Capacitor	2.2pf	Multilayer Ceramic Capacitor	Murata, 0805	GQM2195C2E2R2BB12

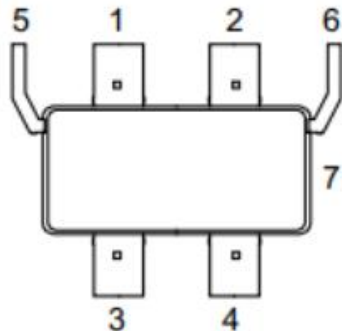
### BOM-HTH1D27P550S 2515 – 2675 MHz Reference Design

Component	Type	Value	Description	Manufacturer	P/N
C4,C5,C6,C15,C16,C17,C18	Capacitor	9pF	Multilayer Ceramic Capacitor	Murata, 0805	GQM2195C2E9R0BB12
C8	Capacitor	0.9pF	Multilayer Ceramic Capacitor	Murata, 0805	GQM2195C2E0R9BB12
C9	Capacitor	3.6pF	Multilayer Ceramic Capacitor	Murata, 0805	GQM2195C2E3R6BB12
C10	Capacitor	3.0pf	Multilayer Ceramic Capacitor	Murata, 0805	GQM2195C2E3R0BB12
C11,C12,C13,C14,C15,C16	Capacitor	10uF	Multilayer Ceramic Capacitor	Murata, 1210	/
C19,C20	Capacitor	220uf	Electrolytic capacitor	/	/
R1,R2	resistor	8.2Ω, 1%	resistor	/	SMD 0805
R3	resistor	50Ω, 16w	resistor	/	Anaren:C16A50Z4
X1		2dB	Hybrid coupler	/	X3C25F1-02S

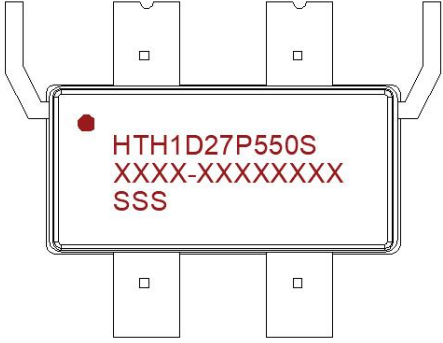
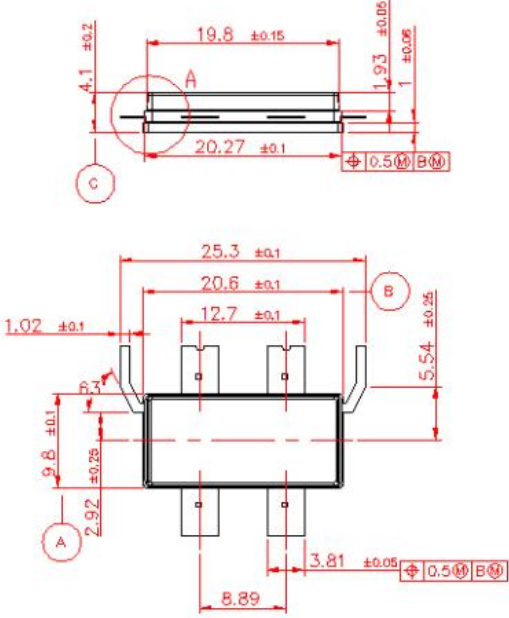
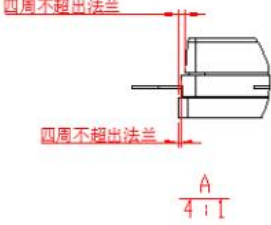
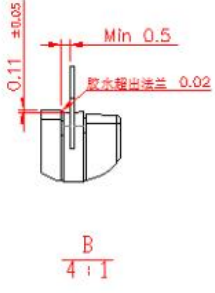
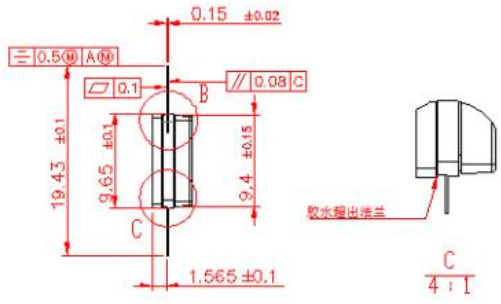
### Performance Plots



### Pin Configuration and Description

		
Pin Number	Name	Description
1	Drain1(main)	Drain-Source voltage of main
2	Drain2(peak)	Drain-Source voltage of peak
3	Gate1(main)	Gate-Source voltage of main
4	Gate2(peak)	Gate-Source voltage of peak
5	Video decoupling(main)	VBW Enhanced
6	Video decoupling(peak)	NA
7	source	GND

### Package Marking and Dimensions

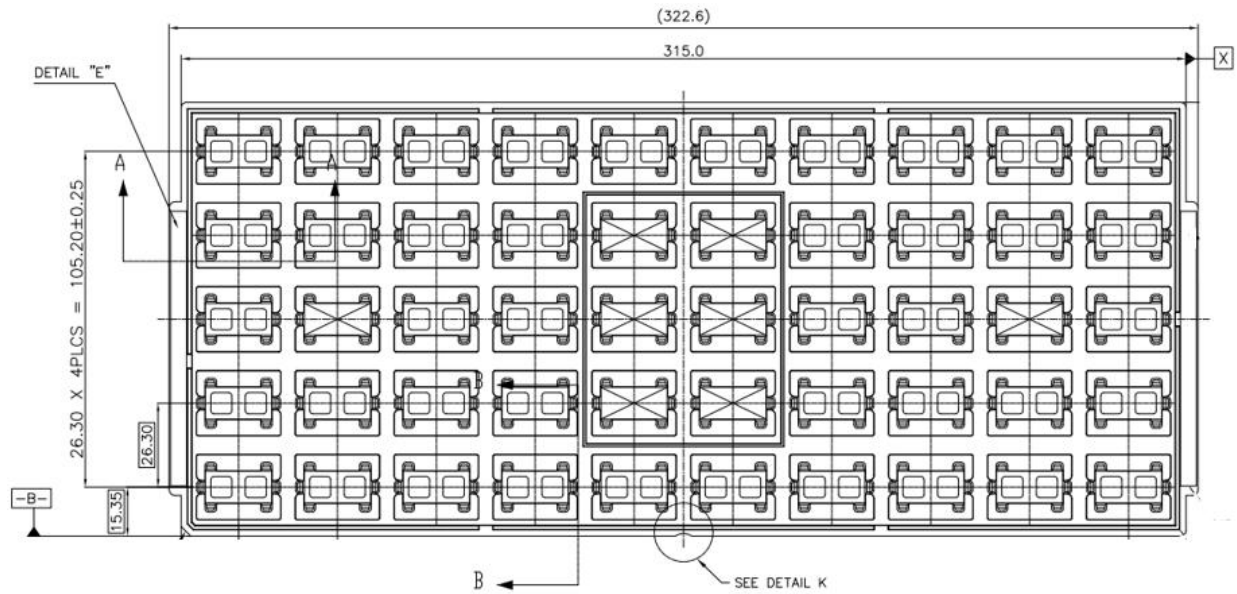
Marking spec No.	HTH1D27P550S Marking Spec_A
<b>Marking Spec</b>	
	<ul style="list-style-type: none"> <li>Line1 (fixed): Part No in W/O</li> <li>Line2 (unfixed): Marking Lot No in W/O (Sample: E596-20140001)</li> <li>Line3 (unfixed): last three of LOT No</li> </ul> <p>This Marking SPEC only stipulates the content of Marking. For marking requirements such as font and size, please refer to the latest version of "Watech Product Printing Specification"</p>
<b>Marking</b>	
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  <p>四周不超出法兰</p> </div> <div style="text-align: center;">  <p>胶水超出法兰 0.02</p> </div> <div style="text-align: center;">  <p>胶水超出法兰</p> </div> </div>	



### Packing Information

**Tray Packaging:**

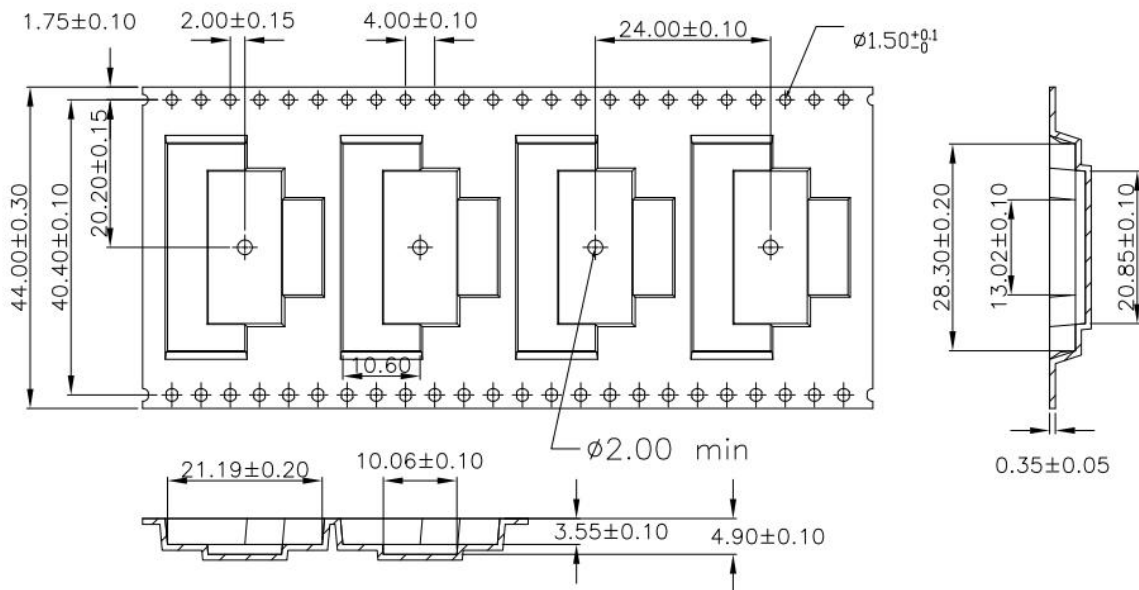
Package Type	Qty/Tray(pcs)	Qty/Box(pcs)
ACS2110S-4L2L	50	500



**Tray Packaging Descriptions**

**Reel Packaging:**

Package Type	Qty/Tray(pcs)	Qty/Box(pcs)
ACS2110S-4L2L	480	480



**Reel Packaging Descriptions**

## Handling Precautions

Parameter	Rating	Standard	
ESD – Human Body Model (HBM)	Class 1C	ANSI/ESDA/JEDEC Standard JS-001	
ESD – Charged Device Model (CDM)	Class III	ANSI/ESDA/JEDEC Standard JS-002	
MSL – 260°C Convection Reflow	MSL3	IPC/JEDEC Standard J-STD-020	

## RoHS Compliance

This product is compliant with the 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment), as amended by Directive 2015/863/EU.

## Datasheet Status

Document status	Product status	Definition
Objective datasheet	Design simulation	Product objective specification
Preliminary datasheet	Customer sample	Engineering samples and first test results
Product datasheet	Mass production	Final product specification

## Revision history

Datasheet status	Release date	Version revision record
MP	2023.09.11	Rev 2.1

## Abbreviations

Acronym	Definition
GaN	Gallium Nitride
CW	Continuous Waveform
WCDMA	Wideband Code Division Multiple Access
PAE	Power Added Efficiency



## Contact Information

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For the latest specifications, additional product information, worldwide sales and distribution locations and information about WATECH:

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- Email: [MKT@huatai-elec.com](mailto:MKT@huatai-elec.com)

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- Email: [MKT@huatai-elec.com](mailto:MKT@huatai-elec.com)

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