



HCS24N65 N-CHANNEL MOSFET

FEATURES

- Low gate charge
- Low C_{rss} (typical 10pF)
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability
- RoHS product

APPLICATIONS

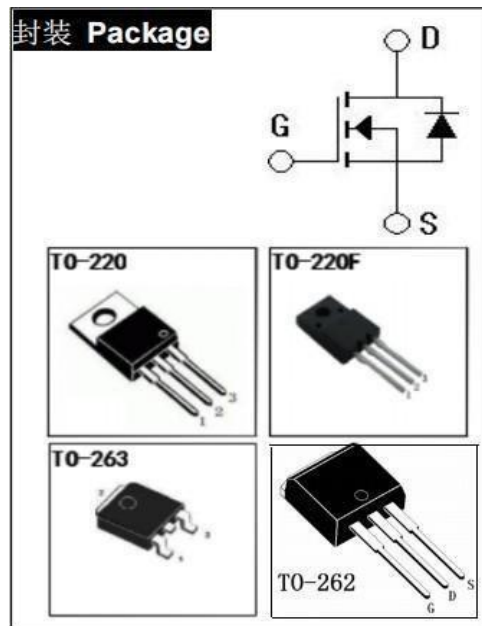
- High efficiency switch mode power supplies
- Electronic lamp ballasts based on half bridge
- LED power supplies

产品特性

- 低栅极电荷
- 低 C_{rss} (典型值 10pF)
- 开关速度快
- 产品全部经过雪崩测试
- 高抗 dv/dt 能力
- RoHS 产品

用途

- 高频开关电源
- 电子镇流器
- LED电源



主要参数 MAIN CHARACTERISTICS

I_D		24A
V_{DSS}		650 V
R_{dson} ($V_{gs}=10V$)	Typ	
	Max	0.45 Ω
Q_g -typ		45nC

产品型号信息 PRODUCT MESSAGE

型 号 Model	印 记 Marking	封 装 Package
HCS24N65C	HCS24N65C	TO-220
HCS24N65D	HCS24N65D	TO-220F
HCS24N65S	HCS24N65S	TO-263
HCS24N65B	HCS24N65B	TO-262

绝对最大额定值 ABSOLUTE RATINGS ($T_C=25^{\circ}\text{C}$)

项 目 Parameter	符 号 Symbol	数 值 Value		单 位 Unit
最高漏极—源极直流电压 Drain-Source Voltage	V_{DSS}	650		V
连续漏极电流 Drain Current -continuous	I_{D} $T=25^{\circ}\text{C}$ $T=100^{\circ}\text{C}$	24		A
		15		A
最大脉冲漏极电流 (注 1) Drain Current – pulse (note 1)	I_{DM}	96		A
最高栅源电压 Gate-Source Voltage	V_{GSS}	± 30		V
单脉冲雪崩能量 (注 2) Single Pulsed Avalanche Energy (note 2)	E_{AS}	108		mJ
雪崩电流 (注 1) Avalanche Current (note 1)	I_{AR}	24		A
重复雪崩能量 (注 1) Repetitive Avalanche Energy (note 1)	E_{AR}	20.7		mJ
二极管反向恢复最大电压变化速率 (注 3) Peak Diode Recovery dv/dt (note 3)	dv/dt	50		V/ns
耗散功率 Power Dissipation	P_{D} $T_C=25^{\circ}\text{C}$ -Derate above 25°C	62.2		W
		0.5		W/ $^{\circ}\text{C}$
最高结温及存储温度 Operating and Storage Temperature Range	$T_{\text{J}}, T_{\text{STG}}$	$-55\sim+150$		$^{\circ}\text{C}$
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T_{L}	300		$^{\circ}\text{C}$

*漏极电流由最高结温限制

*Drain current limited by maximum junction temperature



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项 目 Parameter	符 号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
关态特性 Off-Characteristics						
漏-源击穿电压 Drain-Source Voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	650	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu A$, referenced to $25^\circ C$	-	0.5	-	V/ $^\circ C$
零栅压下漏极漏电流 Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V, T_C=25^\circ C$	-	-	10	μA
		$V_{DS}=520V, T_C=125^\circ C$	-	-	100	μA
正向栅极体漏电流 Gate-body leakage current, forward	I_{GSSF}	$V_{DS}=0V, V_{GS}=30V$	-	-	100	nA
反向栅极体漏电流 Gate-body leakage current, reverse	I_{GSSR}	$V_{DS}=0V, V_{GS}=-30V$	-	-	-100	nA
通态特性 On-Characteristics						
阈值电压 Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D=250\mu A$	3.0	-	5.0	V
静态导通电阻 Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=10A$	-	0.40	0.45	Ω
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$	-	1550	2500	pF
输出电容 Output capacitance	C_{oss}		-	250		pF
反向传输电容 Reverse transfer capacitance	C_{rss}		-	10		pF



电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching Characteristics						
延迟时间 Turn-On delay time	$t_d(\text{on})$	$V_{DD}=300V, I_D=24A, R_G=25\Omega$ (note 4, 5)	-	56	128	ns
上升时间 Turn-On rise time	t_r		-	140	270	ns
延迟时间 Turn-Off delay time	$t_d(\text{off})$		-	80	350	ns
下降时间 Turn-Off Fall time	t_f		-	50	120	ns
栅极电荷总量 Total Gate Charge	Q_g	$V_{DS} = 520V$, $I_D=24A$ $V_{GS} = 10V$ (note 4, 5)	-	45	80	nC
栅-源电荷 Gate-Source charge	Q_{gs}		-	15.0	-	nC
栅-漏电荷 Gate-Drain charge	Q_{gd}		-	17	-	nC
漏-源二极管特性及最大额定值 Drain-Source Diode Characteristics and Maximum Ratings						
正向最大连续电流 Maximum Continuous Drain-Source Diode Forward Current	I_S		-	-	24	A
正向最大脉冲电流 Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}		-	-	96	A
正向压降 Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=24A$	-	-	1.45	V
反向恢复时间 Reverse recovery time	t_{rr}	$V_{GS}=0V, I_S=24A$ $di_F/dt=100A/\mu s$ (note 4)	-	660	-	ns
反向恢复电荷 Reverse recovery charge	Q_{rr}		-	.9.3	-	μC

热特性 THERMAL CHARACTERISTIC

项 目 Parameter	符 号 Symbol	最大 Max	单 位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	$R_{th(j-c)}$	2.01	$^{\circ}C/W$
结到环境的热阻 Thermal Resistance, Junction to Ambient	$R_{th(j-A)}$	39.7	$^{\circ}C/W$

注释:

- 1: 脉冲宽度由最高结温限制
- 2: $L=0.5mH, I_{AS}=24A, V_{DD}=50V, R_G=25\Omega$, 起始结温 $T_J=25^{\circ}C$
- 3: $I_{SD} \leq 9.5A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$, 起始结温 $T_J=25^{\circ}C$
- 4: 脉冲测试: 脉冲宽度 $\leq 300\mu s$, 占空比 $\leq 2\%$
- 5: 基本与工作温度无关

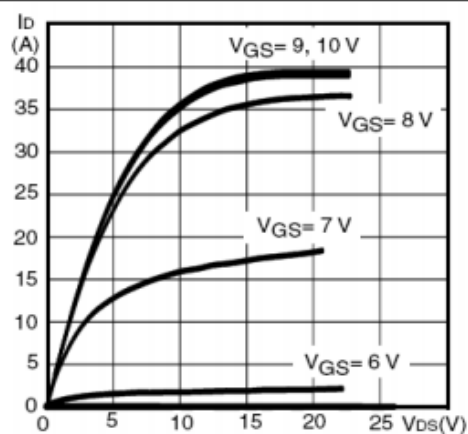
Notes:

- 1: Pulse width limited by maximum junction temperature
- 2: $L=0.5mH, I_{AS}=24A, V_{DD}=50V, R_G=25\Omega$, Starting $T_J=25^{\circ}C$
- 3: $I_{SD} \leq 9.5A, di/dt \leq 300A/\mu s, V_{DD} \leq BV_{DSS}$, Starting $T_J=25^{\circ}C$
- 4: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$
- 5: Essentially independent of operating temperature

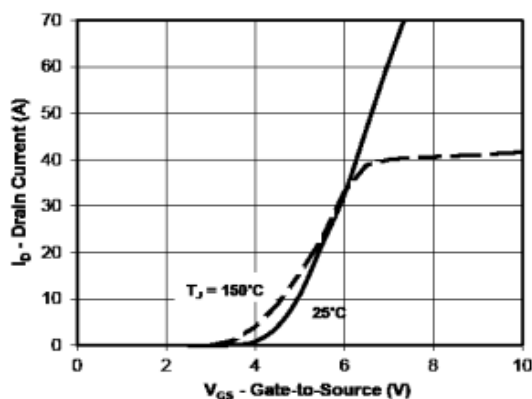


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

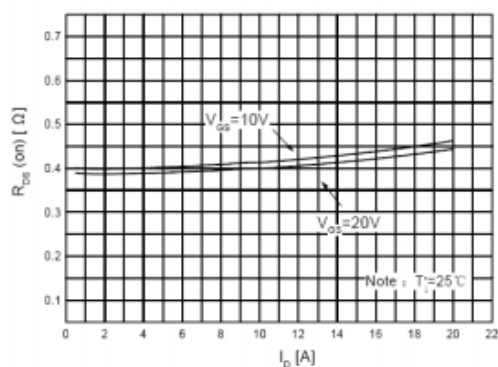
On-Region Characteristics



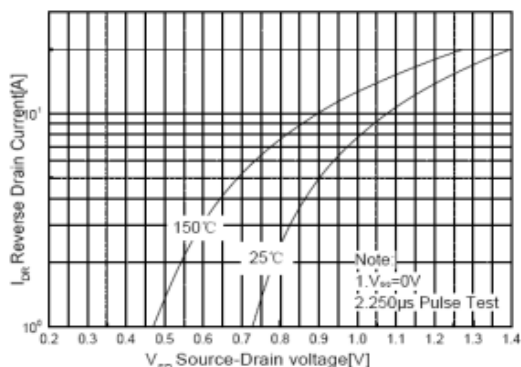
Transfer Characteristics



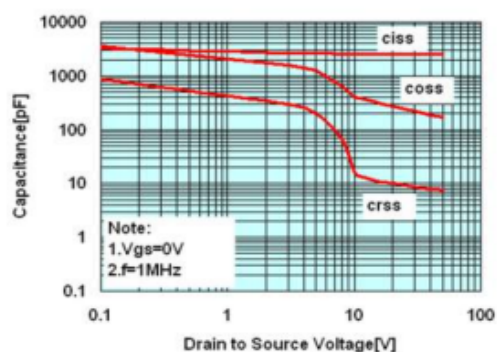
On-Resistance Variation vs. Drain Current and Gate Voltage



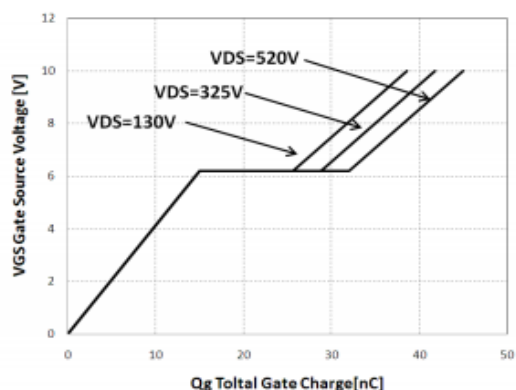
Body Diode Forward Voltage Variation vs. Source Current and Temperature



Capacitance Characteristics



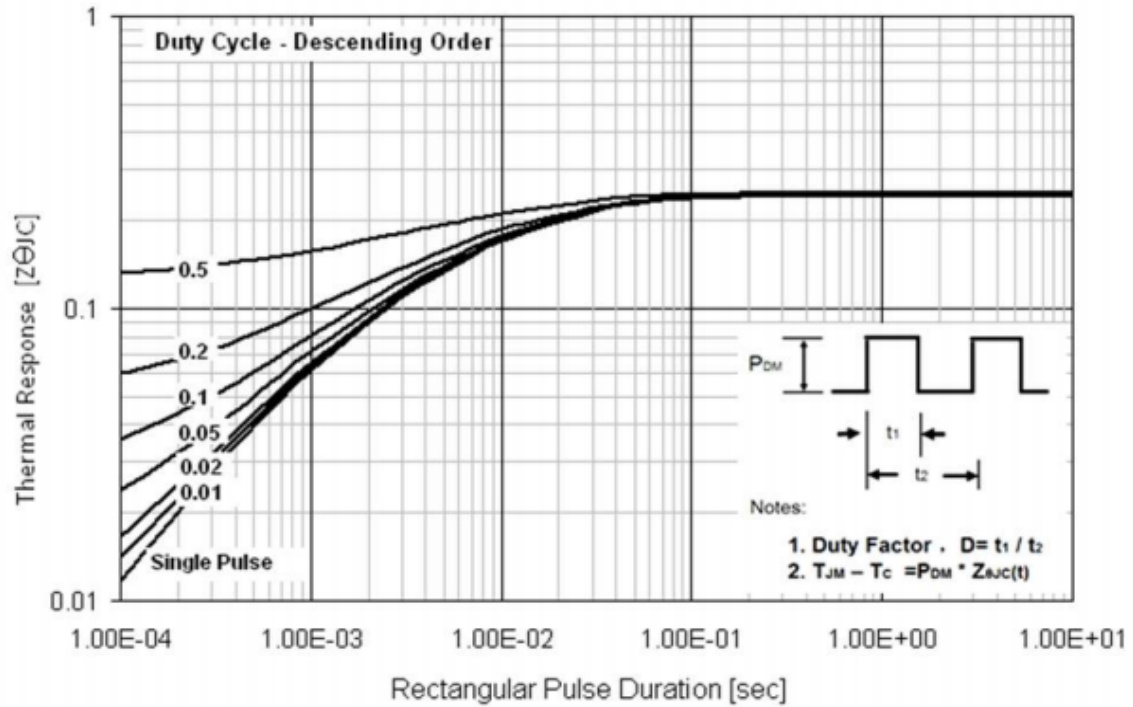
Gate Charge Characteristics





特征曲线 ELECTRICAL CHARACTERISTICS (curves)

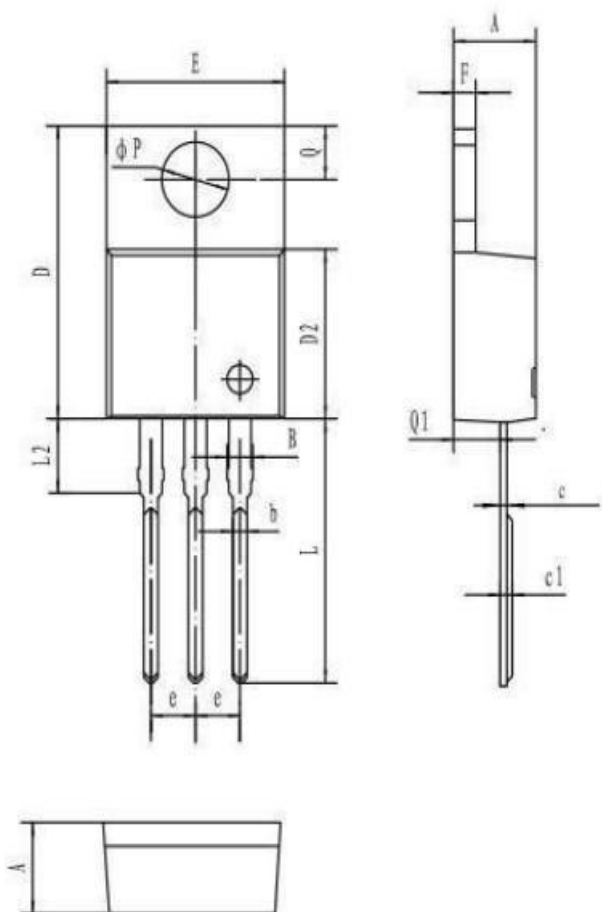
Transient Thermal Response Curve





TO-220

单位 Unit : mm



符号 symbol	MIN	MAX
A	4.40	4.80
B	1.10	1.40
b	0.70	0.95
c	0.28	0.48
c1	0.32	0.52
D	14.45	16.00
D2	8.20	9.20
E	9.60	10.40
e	2.39	2.69
F	1.20	1.35
L	13.05	14.05
L2	3.70	3.90
Q	2.40	3.00
Q1	2.20	2.90
P	3.50	4.00



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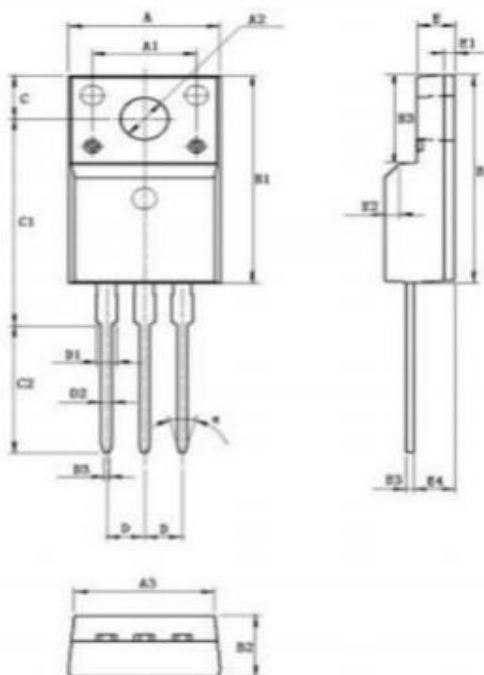
外形 寸 PACKAGE MECHANICAL DATA

TO-220F

单位 Unit : mm

Package Dimension

TO-220F

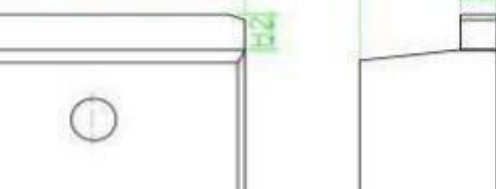


单位: mm

Symbol	Min	Max	Symbol	Min	Max
A	9.96	10.36	D	2.54	
A1	7.00		D1	1.15	1.35
A2	3.08	3.28	D2	0.70	0.90
A3	9.25	9.65	D3	0.28	0.48
B1	15.70	16.10	E	2.34	2.74
B2	4.50	4.90	E1	0.70	
B3	6.20	6.80	E2	1.0×45°	
C	3.20	3.40	E3	0.36	0.65
C1	15.20	16.00	E4	2.55	2.95
C2	9.75	10.15	a(度)	30°	



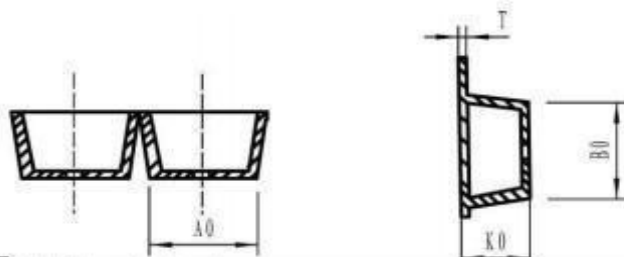
TO-263



Technical drawings of the 1000 Series 1/2" components. The left drawing shows a top view with dimensions E (width), H2 (height), and a central circular feature. The right drawing shows a side view with dimensions A (width), A1 (top flange width), A2 (main body width), and a curved bottom profile with dimensions C and L.

SYMBOL	MM.	
	MIN	MAX
A	4.30	4.80
A1	1.12	1.42
A2	2.54	2.84
b	0.67	1.00
c	0.29	0.52
D1	8.40	9.00
E	9.80	10.46
e	2.54BSC	
H	14.00	16.00
H2	1.12	1.45
L	1.50	3.10
L1	1.45	1.70

Technical drawing of a rectangular plate with a row of holes. The plate has a width of 12.2 and a height of 16. A row of 10 holes is spaced at P . The first hole is offset by P_1 from the left edge, and the last hole is offset by P_2 from the right edge. The hole diameter is labeled as $\phi D1$.



产品尺寸规格 (UNIT:mm)					
规格	W	A0	E	F	D
尺寸	24 ± 0.3	10.9 ± 0.2	1.75 ± 0.2	11.5 ± 0.2	1.5 ± 0.2/-0.1
规格	D1	P0	P2	P	T
尺寸	1.5 ± 0.2/-0.1	4 ± 0.2	2 ± 0.2	16 ± 0.2	0.35 ± 0.05
规格	K0	B0			
尺寸	4.9 ± 0.2	16.0 ± 0.2			

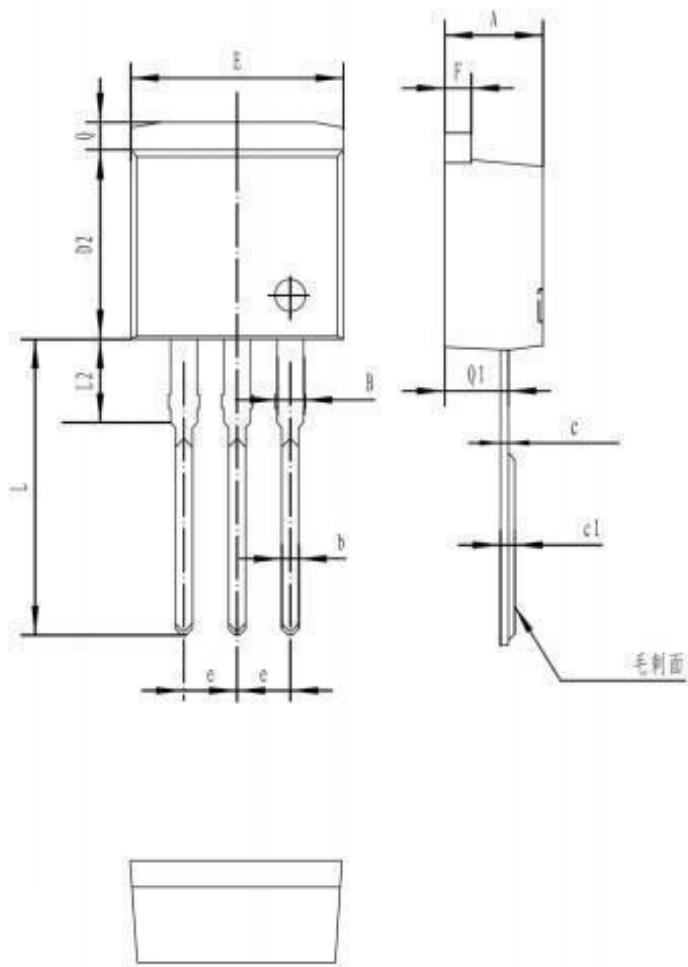


HCS24N65 N-CHANNEL MOSFET

外形尺寸 PACKAGE MECHANICAL DATA

TO-262

单位 Unit: mm



符号 symbol	MIN	MAX
A	4.40	4.90
B	1.10	1.40
b	0.70	0.95
c	0.30	0.60
c1	0.33	0.63
D2	8.20	9.20
E	9.60	10.50
e	2.39	2.69
F	1.20	1.35
L	13.11	14.61
L2	3.55	4.05
Q	1.10	1.40
Q1	2.65	2.85



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4. 本说明书如有版本变更不另外告知

NOTE

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2. We strongly recommend customers check carefully on the trademark when buying our product, if there is any question, please don't be hesitate to contact us.
3. Please do not exceed the absolute maximum ratings of the device when circuit designing.
4. Shenzhen Huatianwei Electronics co., Ltd reserves the right to make changes in this specification sheet and is subject to change without prior notice.

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