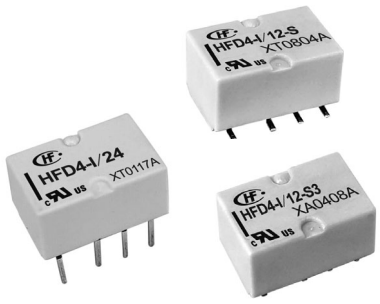
HFD4-I SUBMINIATURE HIGH LOAD RELAY

c US
File No.:E133481

File No.:R50333270



Features

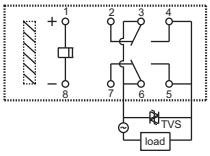
- Surge withstand current up to 3.5A(Valid value)
- Available in accordance with IEC 60335-1
- Low power consumption
- Single side stable and latching type available
- High temperature resistant products at 105˚C are available

RoHS compliant

CONTACT DATA

Contact arrangement		2C
Contact resistance		100mΩ max. (10mA 30mVDC)
Contact material		Silver alloy + Au plated
Contact rating (Res. load)		2A 30VDC 3A 30VDC 0.3A 125VAC 1A 125VAC
Max. switching voltage		250VAC / 220VDC
Max. switching current		3.5A(30VAC) (Valid value ,Two sets of normally open contacts in parallel)
Max. switching power		125VA/90W
Min. applicable load		5V 1mA
Mechanical endurance		1 x 10^7OPS
Electrical endurance	Resistive load	1 x 10^5ops (85˚C, 1s on 9s off, 2A 30VDC) 5 x 10^4ops (40˚C, 1s on 9s off, 3A 30VDC) 1 x 10^5ops (85˚C, 1s on 9s off, 0.3A 125VAC) 5 x 10^4ops (85˚C, 1s on 9s off, 1A 125VAC) 1 x 10^5ops (85˚C, 1s on 9s off, 1A 250VAC, Two sets of NO contacts in series connection)
	Inductive load(3)	1 x 10^5 OPS [Inrush current 3.5A (250ms) / steady state current 1A 30VAC cos Ø=0.4] [Room temperature, 1s: 9s, two sets of normally open contacts in parallel and connected to the load, Contact plus TVS protection]

Notes: 1) The data shown above are initial values.
2) Min. applicable load is reference value. Please perform the confirmation test with the actual load before production since reference value may change according to switching frequencies, environmental conditions and expected contact resistance and reliability.
3)Two sets of normally open contacts in parallel wiring diagram.



COIL

Coil power	Single side stable	See "COIL DATA"
	1 coil latching	See "COIL DATA"
Temperature rise	70K max.(At 2A load 85˚C environment)	

CHARACTERISTICS

Insulation resistance		1000MΩ (500VDC)
Dielectric strength	Between coil &contacts	1500VAC 1min
	Between open contacts	750VAC 1min
	Between contacts sets	1800VAC 1min
Surge withstand woltage Between open contacts (10/160μs) Between coil &contacts (2/10μs)		1500VAC (FCC part 68) 2500V(Telecordia)
Operate time (set time)		3ms max.
Release time (Reset time)		3ms max.
Ambient temperature		-40˚C to 85˚C, -40˚C to 105˚C2)
Humidity		5% to 85% RH
Shock resistance	Functional	735m/s^2
	Destructive	980m/s^2
Vibration resistance	Functional	10Hz ~ 55Hz 3.3mm DA
	Destructive	10Hz ~ 55Hz 5.0mm DA
Termination		THT, SMT
Unit weight		Approx. 0.8g
Moisture sensitivity levels(only for SMT type,JEDEC-STD-020)		MSL-3
Construction		Plastic sealed

Notes: 1) The data shown above are initial values.
2) The 888 version is for applications at 105˚C.

SAFETY APPROVAL RATINGS

UL/CUL	AgNi+ Au plated	2A 30VDC (at 85˚C) 3A 30VDC (at 40˚C) 1A 125VAC (at 85˚C) 1A 250VAC (at 85˚C) 1A 30VDC (at 105˚C)
	$AgSnO_2$+ Au plated	TV-1 125VAC(at 40˚C)
TÜV	AgNi+ Au plated	2A 30VDC (at 85˚C) 3A 30VDC (at 40˚C) 1A 125VAC (at 85˚C)
	$AgSnO_2$+ Au plated	1(1)A 125VAC(at 70˚C)

Notes:1) Only typical loads are listed above. Other load specifications can be available upon request.And different loads could have different wiring methods.

COIL DATA

at 23˚C

Single side stable

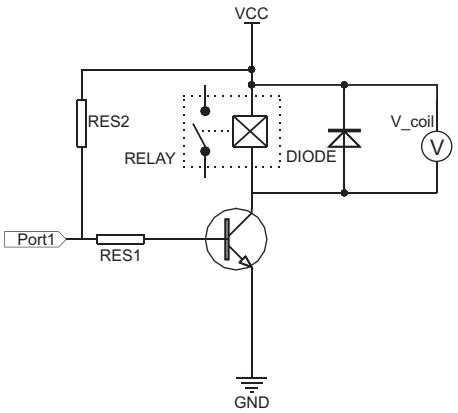
Coil Code	Nominal Coil Voltage VDC	Pick-up Voltage VDC max.[2)]	Drop-out Voltage VDC min.	Coil Resistance Ω	Nominal Power mW approx.	Max. Voltage VDC[5)]
HFD4-I/1.5	1.5	1.13	0.15	16 x (1±10%)	140	3
HFD4-I/2.4	2.4	1.8	0.24	41 x (1±10%)	140	4.8
HFD4-I/3[3)]	3	2.25	0.3	64.3 x (1±10%)	140	6
HFD4-I/4.5	4.5	3.38	0.45	145 x (1±10%)	140	9
HFD4-I/5[3)]	5	3.75	0.5	178 x (1±10%)	140	10
HFD4-I/6	6	4.5	0.6	257 x (1±10%)	140	12
HFD4-I/9	9	6.75	0.9	579 x (1±10%)	140	18
HFD4-I/12	12	9	1.2	1028 x (1±10%)	140	24
HFD4-I/24	24	18	2.4	2880 x (1±10%)	200	48

1 coil latching

Coil Code	Nominal Coil Voltage VDC	Pick-up Voltage VDC max.[2)]	Reset Voltage VDC max.[2)]	Coil Resistance Ω	Nominal Power mW approx.	Max. Voltage VDC[5)]
HFD4-I/1.5-L	1.5	1.13	1.13	22.5 x (1±10%)	100	3
HFD4-I/2.4-L	2.4	1.8	1.8	57.6 x (1±10%)	100	4.8
HFD4-I/3-L[3)]	3	2.25	2.25	90 x (1±10%)	100	6
HFD4-I/4.5-L	4.5	3.38	3.38	202.5 x (1±10%)	100	9
HFD4-I/5-L[3)]	5	3.75	3.75	250 x (1±10%)	100	10
HFD4-I/6-L	6	4.5	4.5	360 x (1±10%)	100	12
HFD4-I/9-L	9	6.75	6.75	810 x (1±10%)	100	18
HFD4-I/12-L	12	9	9	1440 x (1±10%)	100	24
HFD4-I/24-L	24	18	18	2880 x (1±10%)	200	48

Notes:1) The data shown above are initial values.

2) The initial Pick-up Voltage and Reset Voltage refer to the factory?set values of the relay. To supply rated step voltage to the coil is the foundation of proper relay operation. Please make sure the voltage applied across the coil reaches the rated value before use. Please refer to the typical diagram below for single?stable relay. "V_coil" is the rated voltage of the coil:



3) In case 5V of transistor drive circuit, it is recommended to use 4.5V type relay, and 3V to use 2.4V type relay.

4) For monostable relays, if you need to drop down voltage and hold mode after reliably operating,make sure that the effective value of holding voltage is not less than 60% of the rated voltage.

5) Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

6) When user's requirements can't be found in the above table, special order allowed.

7) During the relay pick-up or drop-out processes, there are stages of contact pressure change, contact vibration and unstable contact etc. When the voltage applied to coil is gradually changed, it will lengthen the unstable stage and affect relay endurance. To reduce this influence, please apply step voltage(switching circuit) to relay coil.

ORDERING INFORMATION

	HFD4-I/	24	-L	T	S	R	(XXX)
Type							
Coil voltage	1.5, 2.4, 3, 4.5, 5, 6, 9, 12, 24VDC						
Sort	**L:** 1 coil latching **Nil:** Single side stable						
Contact material	**T:** $AgSnO_2$ + Au plated **Nil:** AgNi+ Au plated						
Terminal type	**S:** Standard SMT **S1:** Short terminal SMT **S3:** J-legs SMT **Nil:** THT[1)]						
Packing style	**R:** Tape and reel packing (Only for SMT type)[2)] **Nil:** Tube packing(Only for THT type)						
Special code[3)]	**XXX:** Customer special requirement **Nil:** Standard For instance: (888) is for application at 105°C; (356) indicates a low-halogen product that meets the requirements of IEC 61249-2-21.						

Notes: 1) Please use wave soldering or manual soldering for straight-in relay. If you need reflow welding, please confirm the feasibility with us.
2) R type (tape and reel) packing is moisture-proof which meets requirement of MSL-3. Please choose R type packing for SMT products. For R type, the letter "R" will only be printed on packing tag but not on relay cover. Tube packing is normally not available for SMT products unless specially requested by customer. But please note that tube packing is not moisture-proof so please bake the products before use according to description of Notice 10 herewith. In addition, tube packaging will be adopted when the ordering quantity of R type is equal to or less than 100 pieces unless otherwise specified.
3) The customer special requirement express as special code after evaluating by Hongfa.
4) When coil sort, contact material, terminal type or packing style are needed, pleaes add "-" after coil voltage is selected. For instance, HFD4-I/12-SR.
5) For products that should meet the explosion-proof requirements of "IEC 60079 series",please note [Ex] after the specification while placing orders.Not all products have explosion-proof certification,so please contact us if necessary, in order to select the suitable products.
6) Please make sure that there are no silicon-based substances (such as silicon rubber, silicone oil, silicon-based coating agents, silicon fillers, etc.) around the relay, because it will generate silicon-containing volatile gas, which may cause poor contact in case of silicon-containing volatile gas sticking on contact.Flux proofed and dust cover type relays are prohibited in environments with water vapor and harmful gases (P, Cl, H_2S, SO_2, NO_2). Plastic sealed relays shall be used with practical test verification.

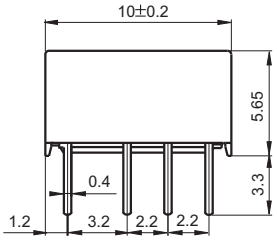
OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

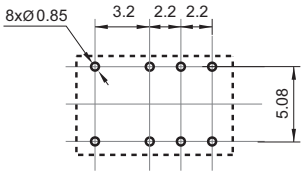
Unit: mm

Outline Dimensions

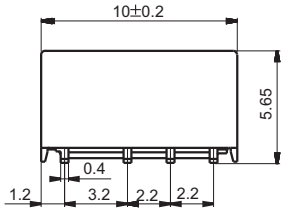
PCB Layout
(Bottom view)

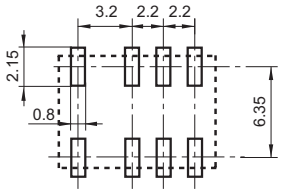
THT type



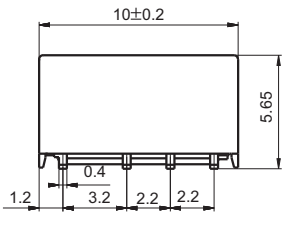


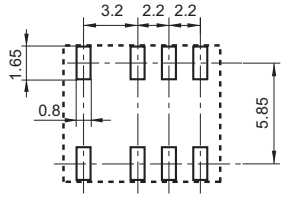
Standard
SMT type





Short terminal
SMT type



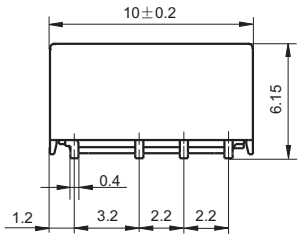


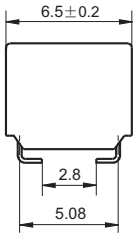
OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

Outline Dimensions

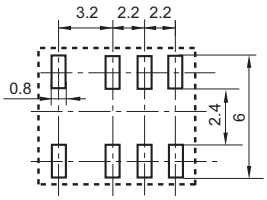
J-leg SMT type





PCB Layout

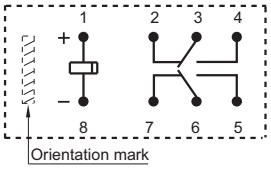
(Bottom view)



Wiring Diagram

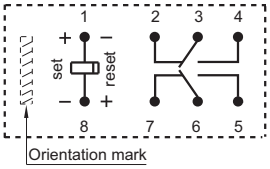
(Bottom view)

Single side stable



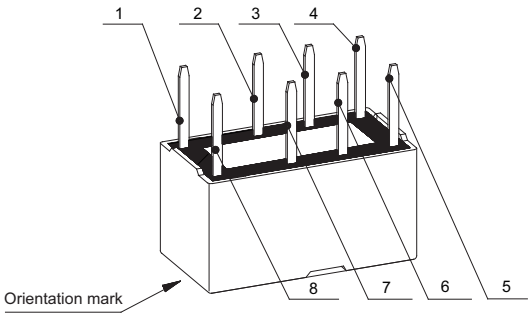
No energized condition

1 coil latching



Reset condition

Pin Layout



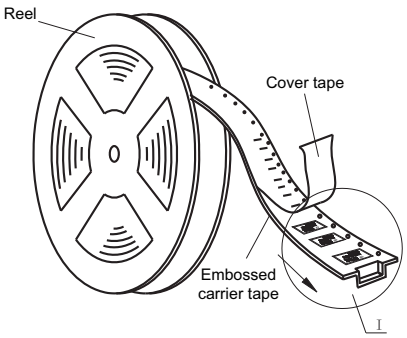
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be ±0.2mm; outline dimension>1mm and ≤5mm, tolerance should be ±0.3mm; outline dimension >5mm, tolerance should be ±0.4mm.

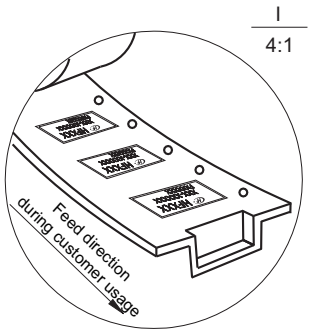
2) The tolerance without indicating for PCB layout is always ±0.1mm.

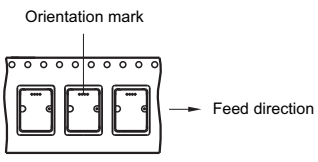
TAPE PACKING

Unit: mm

Direction of Relay Insertion



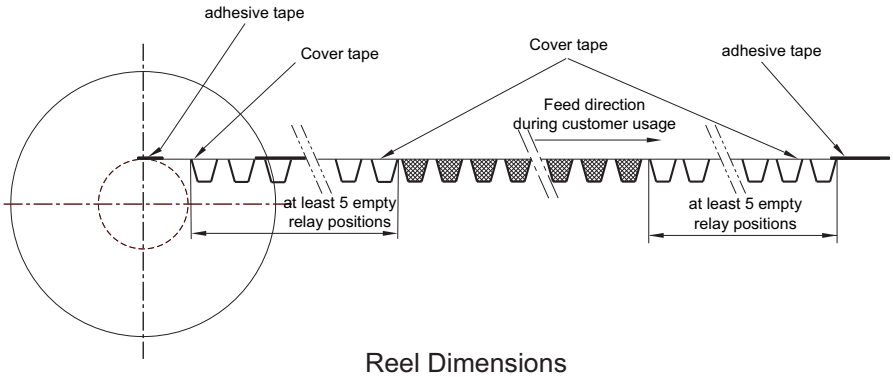




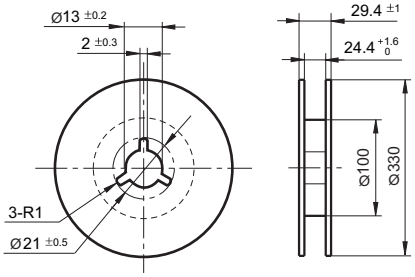
Notes: 1. S type/S1 type : 1) Packing: 900pcs/reel, 4 reels/carton.
2) MOQ for reel packing is 900pcs.
2. S3 type : 1) Packing : 850pcs/reel , 4 reels/carton.
2)MOQ for reel packing is 850pcs.

TAPE PACKING

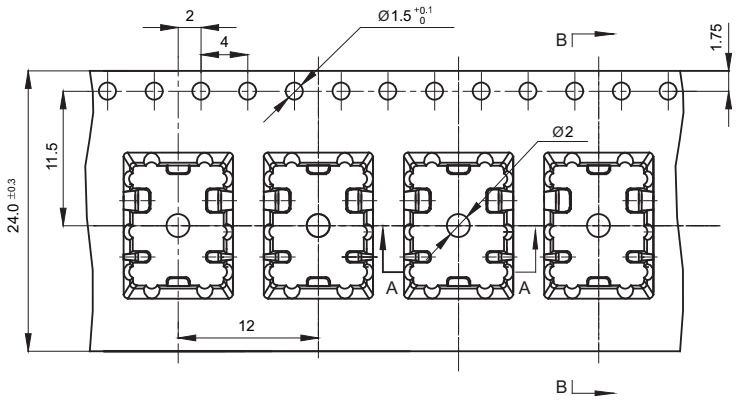
Unit: mm

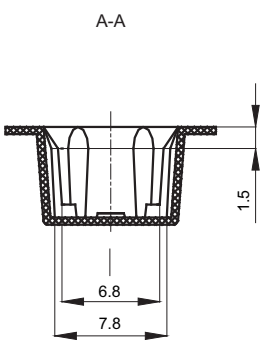


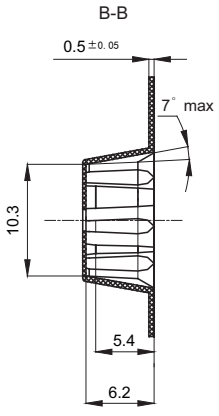
Reel Dimensions



Tape Dimensions (S type: Standard SMT S1 type: Short terminal SMT)



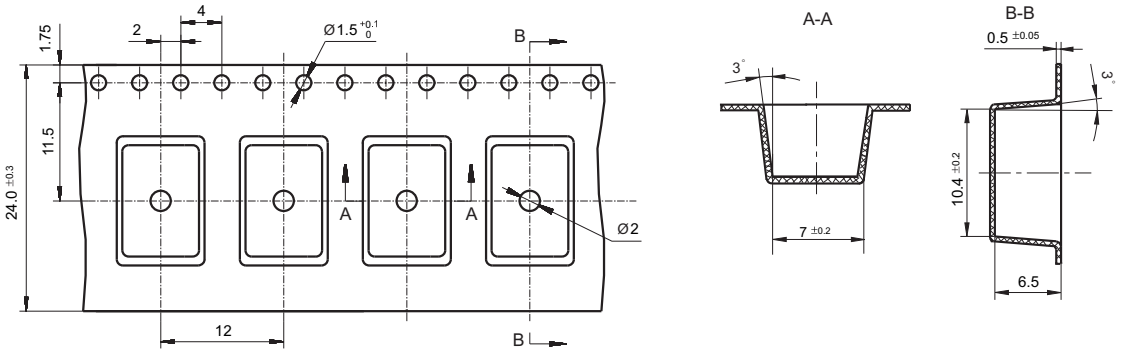




TAPE PACKING

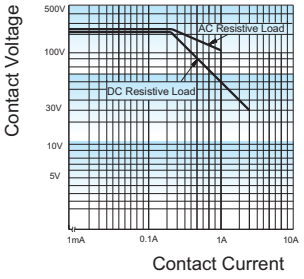
Unit: mm

Tape Dimensions (S3 type: J-legs SMT)

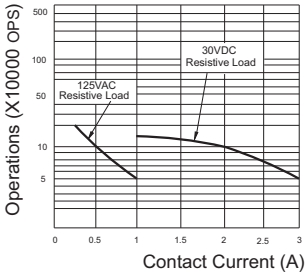


CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER



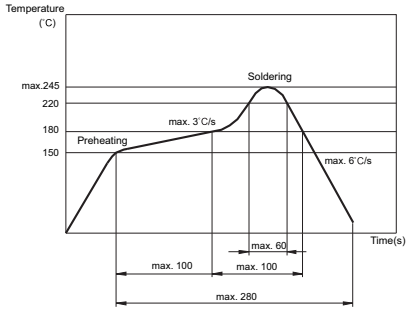
ENDURANCE CURVE



Test conditions:
Energized with rated voltage
Resistive load, 1s on 9s off.

RECOMMENDED REFLOW SOLDERING PROFILE

(For SMT type,for applications with PCB thickness ⩽3mm)[7]



(Measurement point: PCB surface where the relay is mounted)

Notice

1) This relay is highly sensitive polarized relay, if correct polarity is not applied to the coil terminals, the relay does not operate properly.
2) To avoid using relays under strong magnetic field which will change the parameters of relays such as pick-up voltage and drop-out voltage.
3) Relay is on the “reset” status when being released from stock, with the consideration of shock risen from transit and relay mounting, it should be changed to the “set” status when application(connecting to the power supply). Please reset the relay to “set” or “reset” status on request.
4) Energizing coil with rated voltage is basic for normal operation of a relay, please make sure the energized voltage to relay coil have reached the rated voltage. Regarding latching relay, in order to maintain the "set" or "reset" status, impulse width of the rated voltage applied to coil should be more than 5 times of "set" or "reset" time.
5) For a monosteady state relay, after the relay is reliably operated, if it needs to be kept under pressure, make sure that the effective value of the voltage is not less than 60% of the rated voltage;
6) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
7) For SMT products, practical validation shall be performed and confirmed acceptable before mass production if the reflow-soldering profile deviates from our recommended profile. In principle, double reflow-soldering of relays is not recommended. If a second reflow-soldering process is required, the relay shall be cooled down to ambient temperature by natural cooling or forced-air cooling after the first reflow, and practical validation shall be completed and confirmed acceptable prior to mass production.
   For applications with PCB thickness ＞3mm, the temperature of the relay body may be significantly higher than the PCB surface temperature. Practical validation shall be performed and confirmed acceptable before use and mass production.
8) Please use wave soldering or manual soldering for straight-in relay. If you need reflow welding, please confirm the feasibility with us.
9) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
10) Regarding the plastic sealed relay, we should leave it cooling naturally untill below 40°C after welding, then clean it and deal with coating, remarkably the temperature of solvents should also be controlled below 40°C.Please avoid cleaning the relay by ultrasonic, avoid using the solvents like gasoline, Freon, and so on, which would affect the configuration of relay or influence the environment.
11) Relays packaged in moisture barrier bags meet MSL-3 requirements. The relays should be stored at ambient conditions of ⩽30℃ and ⩽60% RH after they are removed from their packaging, and should be used within 168 hours. If the relays cannot be used within 168 hours, please repack them or store them in a drying oven at 25°C±5°C, ⩽10% RH. Otherwise, relays may be subjected to a soldering test to check their performance, or they may be used after keeping them in an oven for 72 hours at with 50°C±5°C, ⩽30% RH.
12) When applied with continuous current, the heat from relay coil will age its isolation. Thus, please do not ground connected the coil to reduce electrical errosion if possible. And please provide protection circuit to avoid broken wire and losses.
13) Please make sure that there are no silicon-based substances (such as silicon rubber, silicone oil, silicon-based coating agents, silicon fillers, etc.) around the relay, because it will generate silicon-containing volatile gas, which may cause poor contact in case of silicon-containing volatile gas sticking on contact.Flux proofed and dust cover type relays are prohibited in environments with water vapor and harmful gases (P, Cl, H_2S, SO_2, NO_2). Plastic sealed relays shall be used with practical test verification.
14) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidetines of relay".
15) During the relay pick-up or drop-out processes, there are stages of contact pressure change, contact vibration and unstable contact etc. When the voltage applied to coil is gradually changed, it will lengthen the unstable stage and affect relay endurance. To reduce this influence, please apply step voltage(switching circuit) to relay coil.

Disclaimer

The specification is for reference only. See to "Terminology and Guidelines" for more information. Specifications subject to change without notice. We could not evaluate all the performance and all the parameters for every possible application. Thus the user should be in a right position to choose the suitable product for their own application. If there is any query, please contact Hongfa for the technical service. However, it is the user’s responsibility to determine which product should be used only.

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