华润半导体
CR Semiconductor

HK2201/HK2202
120kbps Optocoupler

Description

The HK2201/HK2202 consists of a high-output GaAlAs light-emitting diode optically coupled to a high-speed phototransistor. The signal is then internally amplified to improve transmission rate. The device is packaged in a 6-pin DIP/SMD package. The HK2201/HK2202 corresponds to the transmission rate of 120 kbps, which is much faster than general-purpose transistor coupler.

Features

- Open-collector output
- High bit rate: 120kbps
- Low input current
- High isolation: 5000Vrms
- Guaranteed performance from temperature: -55-100 ℃
- RoHS compliant

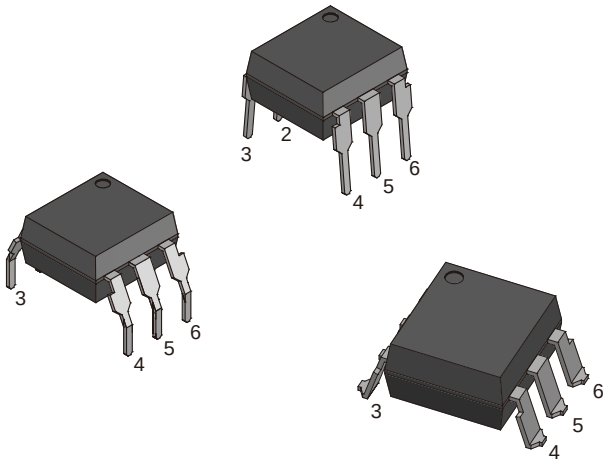
Truth Table (positive logic)

LED	V_O
ON	Low
OFF	High

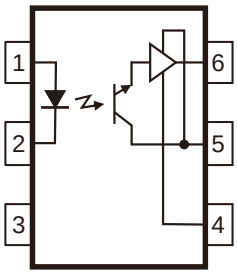
Applications

- Data communication
- Home appliances

Package Outlines



Schematic



Pin Configuration

1	Anode	6	V_O
2	Cathode	5	V_{CC}
3	NC	4	GND

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Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit	Note
Input	Forward Current	I_F	25	mA	
	Peak Forward Current	I_{FP}	50	mA	1
	Peak Transient Current	$I_{F(trans)}$	1	A	2
	Reverse Voltage	V_R	6	V	
	Power Dissipation	P_D	100	mW	
Output	Average Output Current	I_O	60	mA	
	Output Power Dissipation	P_O	100	mW	
	Average Output Current	I_O	60	mA	
	Supply Voltage	Vcc	-0.5~18V	V	
	Output Voltage	Vo	-0.5~18V	V	
Isolation Voltage		Viso	5000	Vrms	
Operating Temperature		Topr	-55~+100	℃	
Storage Temperature		Tstg	-55~+125	℃	
Soldering Temperature		Tsol	260	℃	

Note1.50％duty，1ms P.W

Note2.≤1us P.W，300pps

Electro-optical Characteristics (Ta=25°C)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
INPUT							
Forward Voltage		V_F	I_F=2mA	-	1.17	1.7	V
Reverse Voltage		V_R	I_R=10μA	5.0	-	-	V
Reverse Current		I_R	V_R=5V	-	-	10	μA
Input Capacitance		C_{in}	V=0, f=1MHz	-	60	-	pF
OUTPUT							
Logic High Supply Current		I_{CCH}	I_F=0mA, V_O=Open, V_{CC}=18V,	-	25	100	nA
Logic Low Supply Current		I_{CCL}	I_F=2mA, V_O=Open, V_{CC}=18V	-	2.3	10	mA
			I_F=2mA， V_O=Open, V_{CC}=5V		2	8	mA
Logic High Output Current		I_{OH}	I_F=0mA, Vo=V_{CC}=18V,	-	20	200	nA
			I_F=0mA, V_O=V_{CC}=5V	-	5	100	nA
Logic Low Output Voltage		V_{OL}	I_F=2mA，I_O=8mA		0.1	0.4	V
COUPLED							
Current Transfer Ratio	HK2201	CTR	I_F=1.5mA, V_O=0.4V, V_{CC}=5V	2000	3600		%
			I_F=2mA, V_O=0.5V, V_{CC}=5V	3000	4000		
			I_F=5mA, V_O=0.5V, V_{CC}=5V	2500	3500		
	HK2202		I_F=0.6mA, V_O=0.4V, V_{CC}=5V	800	1200		%
			I_F=1.5mA, V_O=0.5V, V_{CC}=5V	4000	7500		
			I_F=2mA, V_O=0.5V, V_{CC}=5V	3500	7000		
			I_F=5mA, V_O=0.5V, V_{CC}=5V	2500	5000		
SWITCHING (V_{CC} = 5Vor3.3V)							
Propagation Delay Time To Logic Low	HK2201	T_{PHL}	I_F=3mA , f=1KHz,R_L=1kΩ		1.8	3	μs
	HK2202		I_F=2mA , f=1KHz,R_L=1kΩ		2.4	4	μs
Propagation Delay Time To Logic High	HK2201	T_{PLH}	I_F=3mA , f=1KHz,R_L=1kΩ		1.8	3	μs
	HK2202		I_F=2mA , f=1KHz,R_L=1kΩ		2.4	4	μs
Turn on Time	HK2201	T_{on}	I_F=3mA , f=1KHz,R_L=1kΩ		1.8	3	us
	HK2202		I_F=2mA , f=1KHz,R_L=1kΩ		2.4	4	us
Rise Time	HK2201	T_r	I_F=3mA , f=1KHz,R_L=1kΩ		0.06	0.5	us
	HK2202		I_F=2mA , f=1KHz,R_L=1kΩ		0.2	0.8	us

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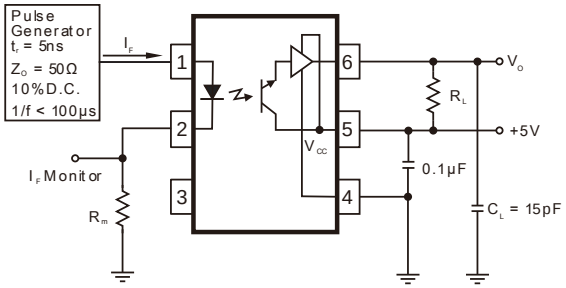
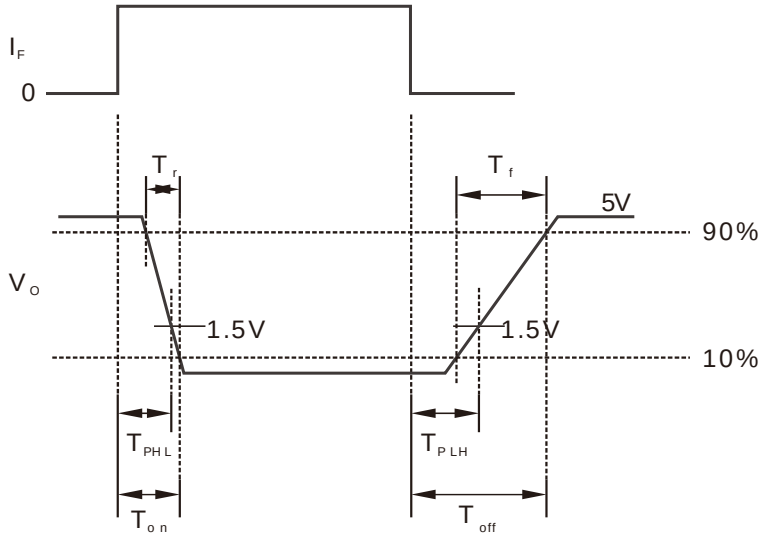
Turn off Time	HK2201	T_{off}	I_F=3mA , f=1KHz,R_L=1kΩ		1.8	3	us
	HK2202		I_F=2mA , f=1KHz,R_L=1kΩ		2.4	4	us
Fall Time	HK2201	T_f	I_F=3mA , f=1KHz,R_L=1kΩ		0.06	0.2	us
	HK2202		I_F=2mA , f=1KHz,R_L=1kΩ		0.2	0.8	us
ISOLATION							
Input-Output Insulation Leakage Current		I_{I-O}	RH=45%, t=5s, V_{I-O}=3kVdc, T_A=25 ℃	-	-	1.0	μA
Withstand Insulation Test Voltage		V_{ISO}	RH≤50%, t=1min., T_A=25 ℃	5000	-	-	V_{RMS}
Input-Output Resistance		R_{I-O}	V_{I-O}=500VDC	-	10^{12}	-	Ω
Input-Output Capacitance		C_{I-O}	f=1MHz	-	0.6	-	pF

Switching Time



Switching Time Test Circuit



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Typical Performance Curves

Fig.1 Forward Current vs. Forward Voltage

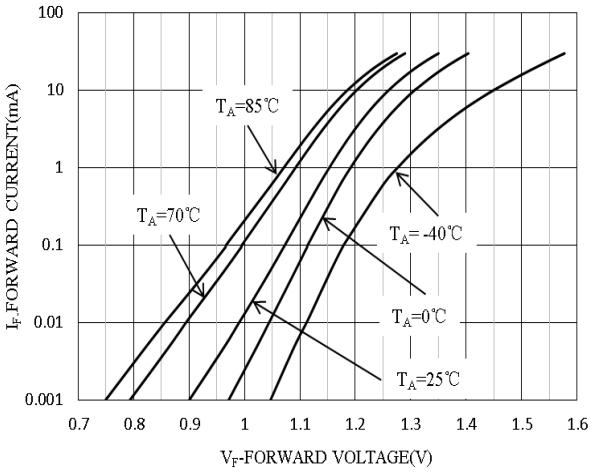

Fig.2 Forward Voltage vs. Ambient Temperature

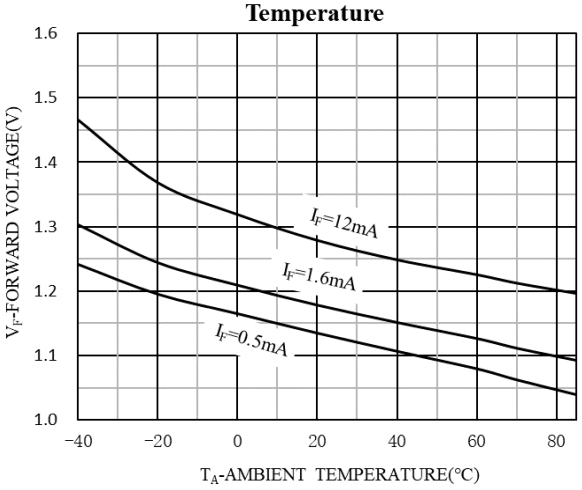

Fig.3 Logic Low Supply Current vs. Forward Current

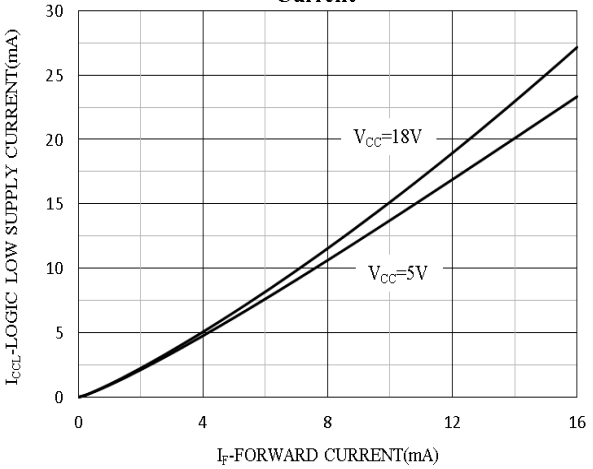

Fig.4 Output Current vs. Output Voltage

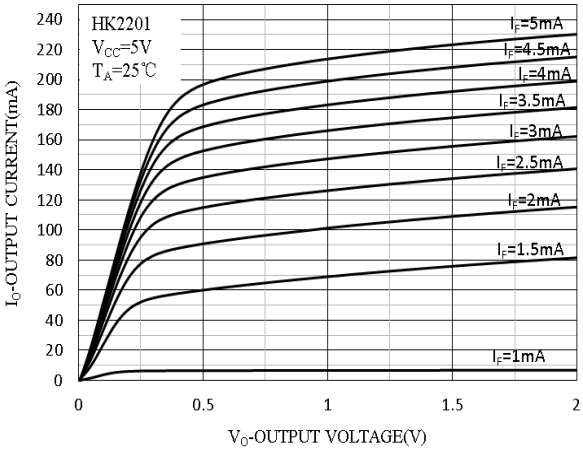

Fig.5 Output Current vs. Output Voltage

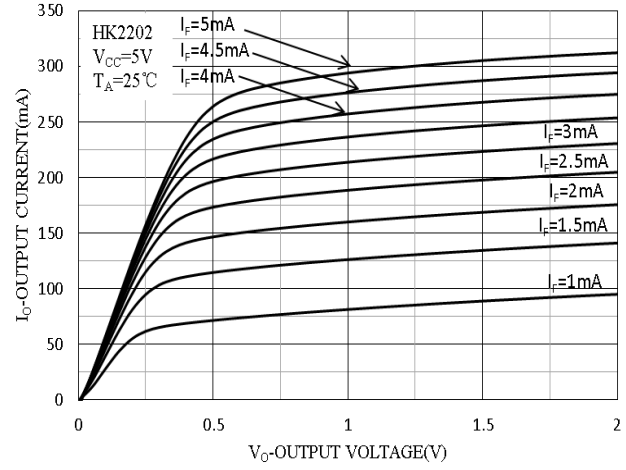

Fig.6 Current Transfer Ratio vs.Forward Current

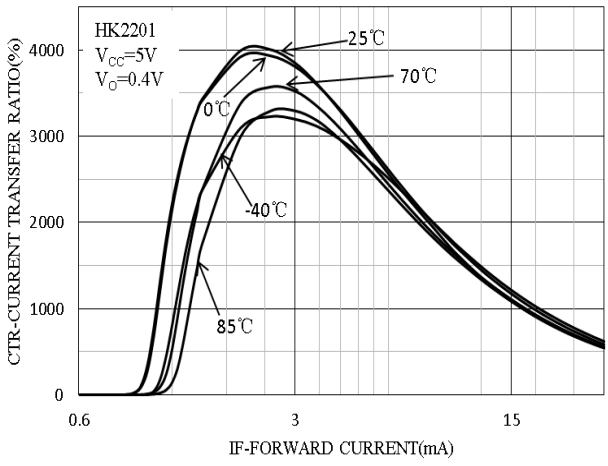

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Fig.7 Current Transfer Ratio vs.Forward Current

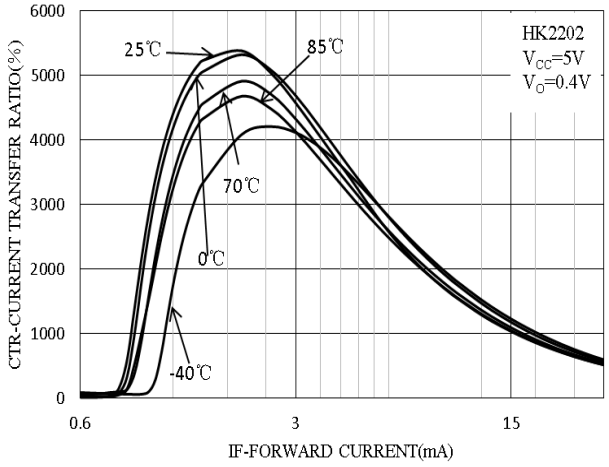


Fig.8 Output Current vs. Forward Current

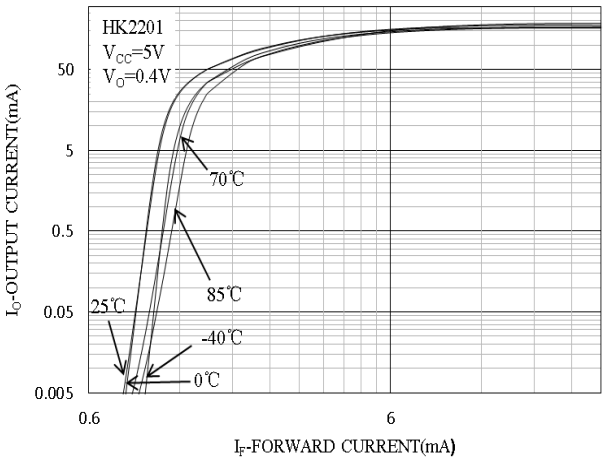


Fig.9 Output Current vs. Forward Current

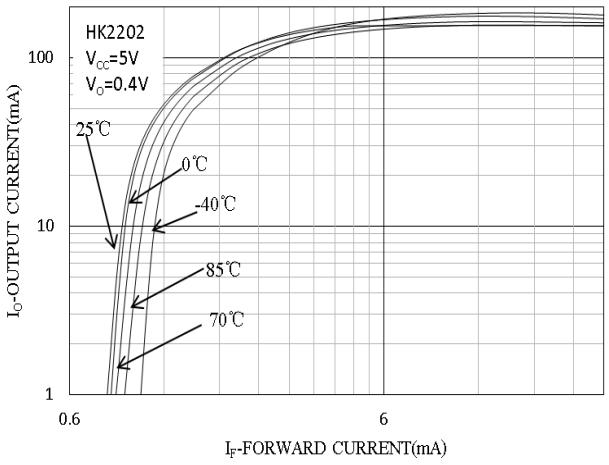


Fig.10 Propagation Delay vs. Forward Current

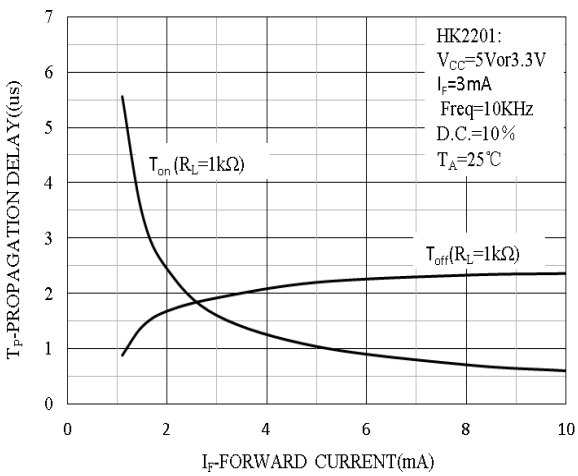


Fig.11 Propagation Delay vs. Forward Current

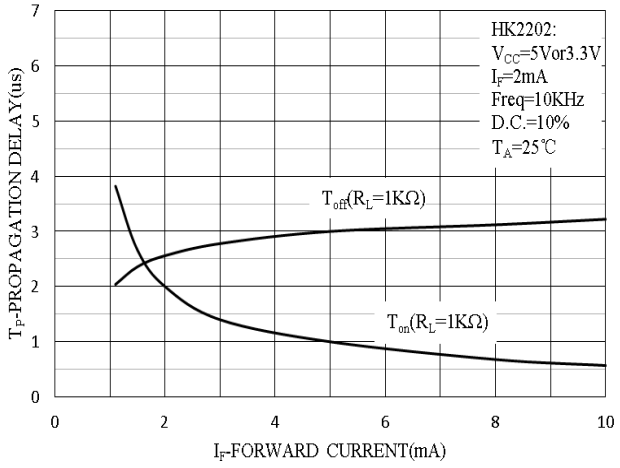


Fig.12 Non-saturated Rise and Fall Time vs. Load Resistance

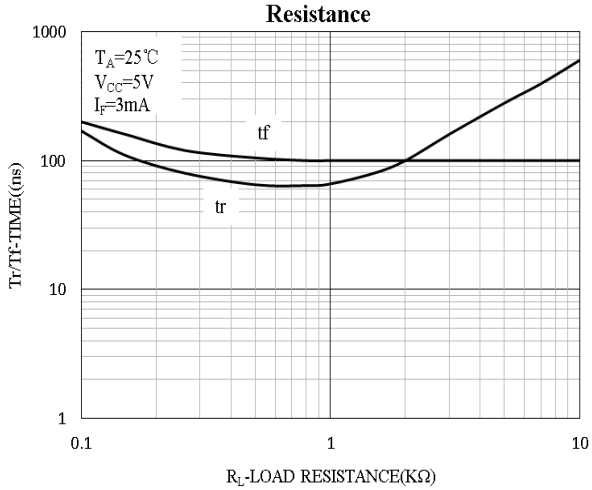


Fig.13 Propagation Delay vs. Temperature

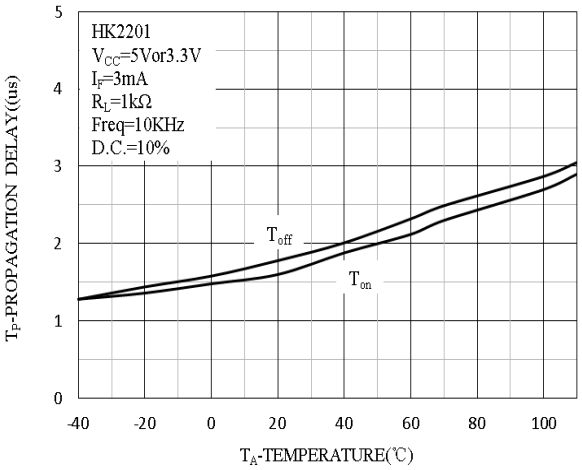
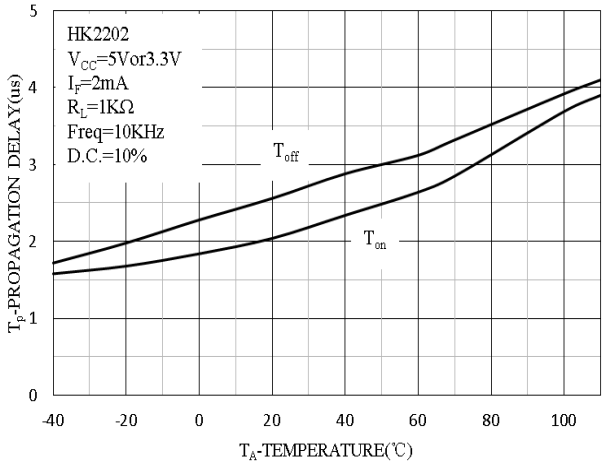


Fig.14 Propagation Delay vs.Temperature



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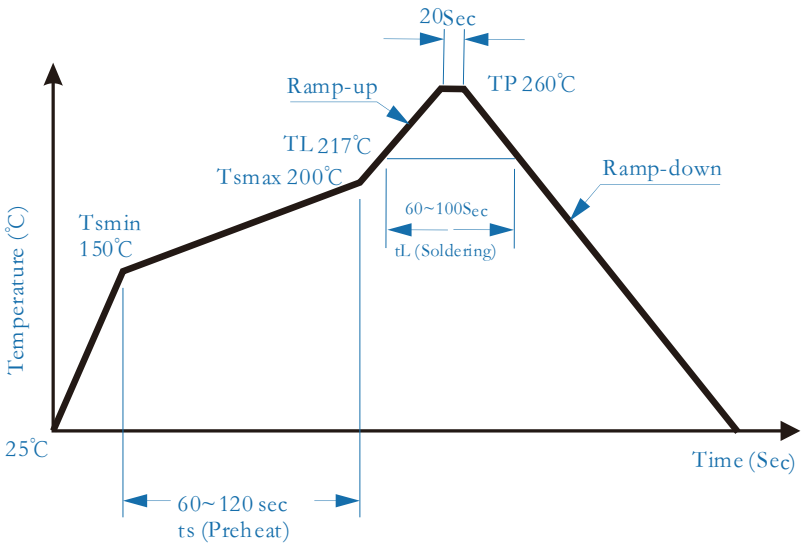
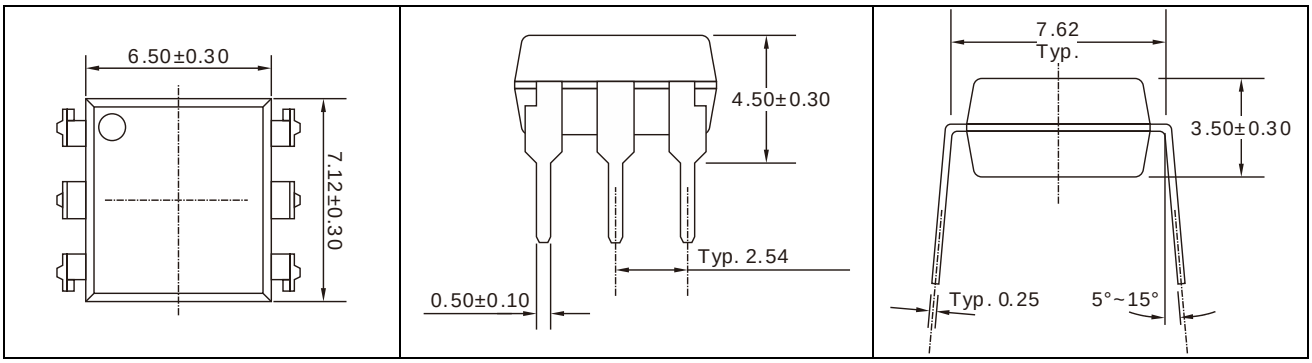
Solder Reflow Profile

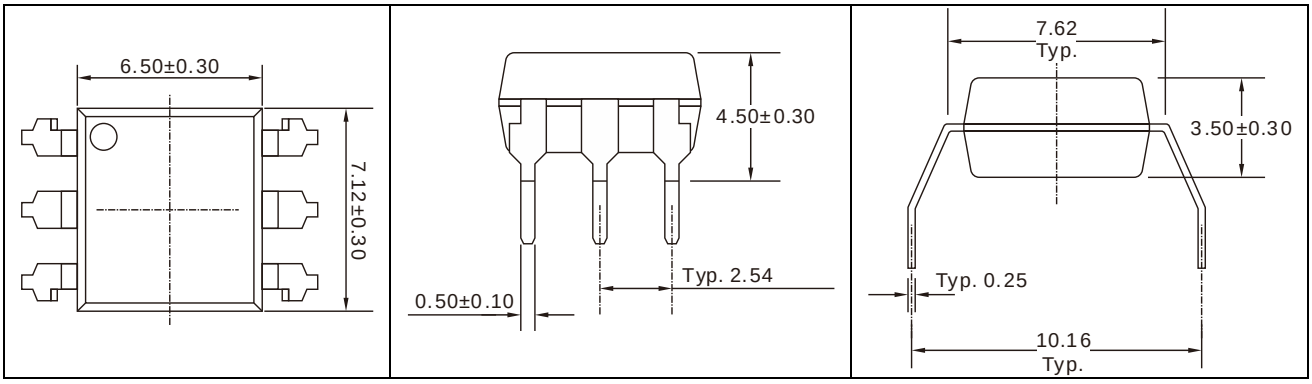


Outline Dimensions

Unit: mm



6-pin DIP



6-pin DIP (M Type)

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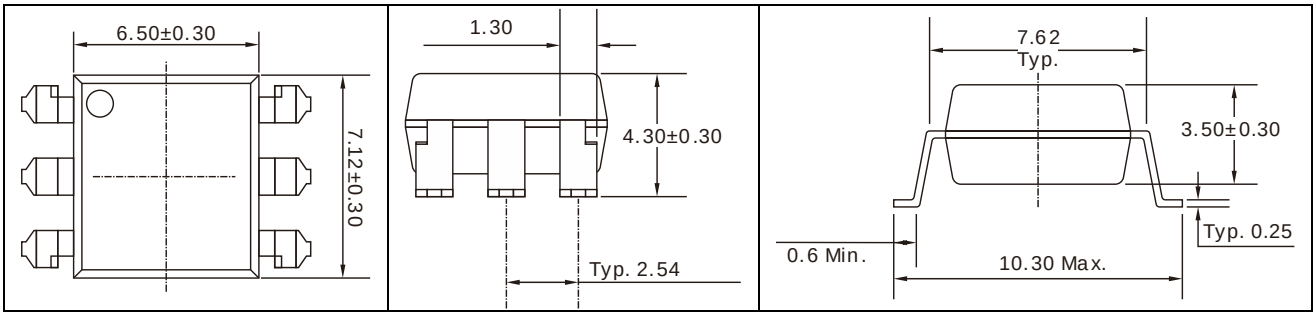

6-pin SMD (S)

Marking

HK220X
YYWW

- “YY” denotes YEAR; “WW” denotes WEEK

Order Code

HK220X-(Y)(Z)-GV

X = the classification: 1, 2
Y = Lead form (M, S, or none)
Z = Tape & Reel option (T1, T2, or none)
G = Material option (G= halogen-free, none = with halogen)
V = VDE option (V or none)
For example,

Order Code	Description	Main Marking
HK2201-(S)(T1)-V	SMD(S); T1 Tape & Reel; with halogen; VDE approved	HK2201
HK2201-(M)-G	DIP (M type); halogen-free	HK2201
HK2202-GV	DIP; halogen-free; VDE approved	HK2202
HK2202-(S)(T2)-GV	SMD(S); T2 Tape & Reel; halogen-free; VDE approved	HK2202

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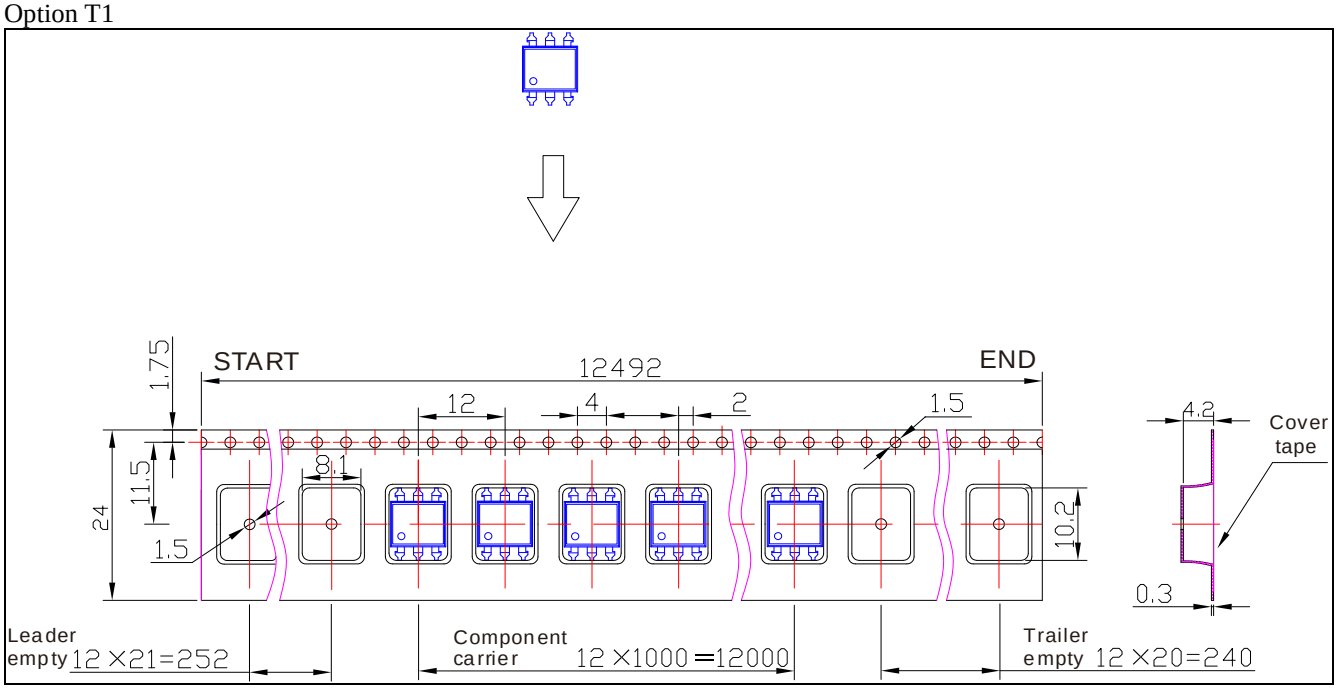
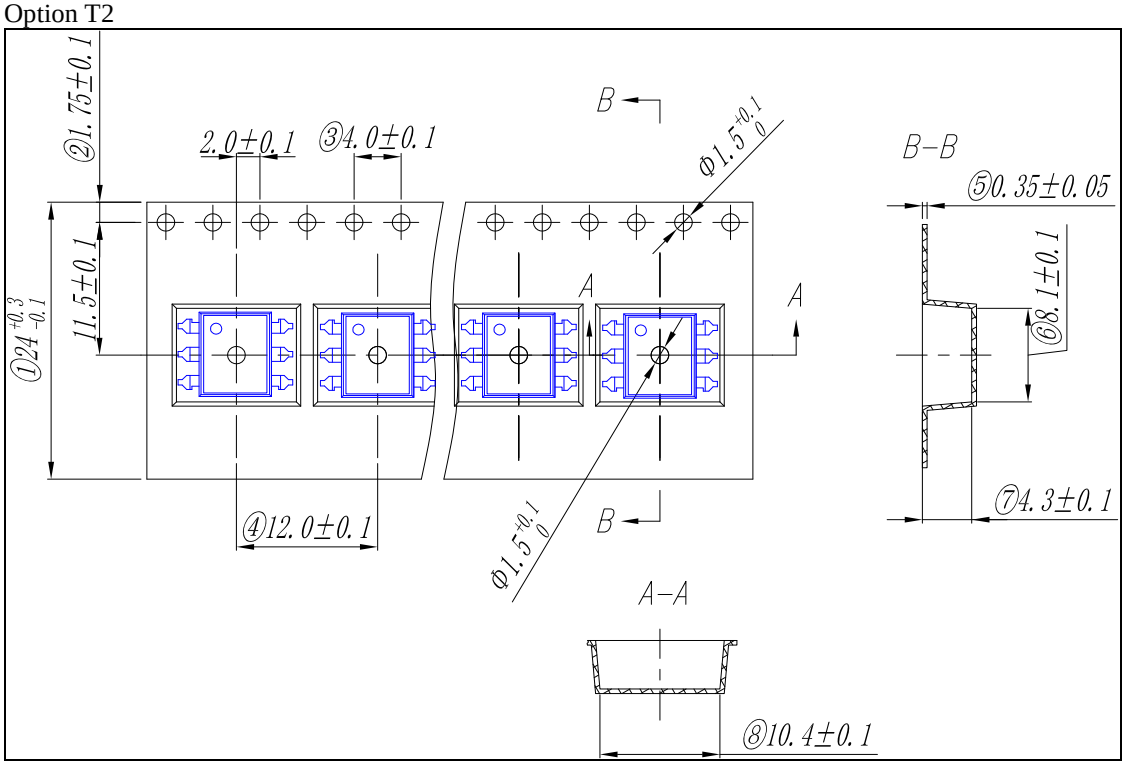
Tape & Reel Packing

Option T1



Option T2



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