4-Bitdual Supply Translating Transceiver with Configurable Voltage Translation; 3-State

General Description

The ET74AVCH4T774Y is a 4-bit, dual supply transceiver that enables bidirectional level translation. It features two 8-bit input-output ports (An and Bn), a direction control input (DIR), an output enable input ($\overline{OE}$) and dual supply pins (VCC(A) and VCC(B)). Both VCC(A) and VCC(B) can be supplied at any voltage between 0.8V and 3.6V making the device suitable for translating between any of the low voltage nodes (0.8V, 1.2V, 1.5V, 1.8V, 2.5V and 3.3V). Pins An, $\overline{OE}$ and DIR are referenced to VCC(A) and pins Bn are referenced to VCC(B). A HIGH on DIR allows transmission from An to Bn and a LOW on DIR allows transmission from Bn to An. The output enable input ($\overline{OE}$) can be used to disable the outputs so the buses are effectively isolated.

The device is fully specified for partial power-down applications using I_{OFF}. The I_{OFF} circuitry disables the output, preventing any damaging backflow current through the device when it is powered down. In suspend mode when either VCC(A) or VCC(B) are at GND level, both An and Bn outputs are in the high-impedance OFF-state.

Features

- Wide Supply Voltage Range:
  -- $V_{CC(A)}$: 0.8V to 3.6V
  -- $V_{CC(B)}$: 0.8V to 3.6V
- Suspend mode
- Maximum Data Rates:
  -- 380Mbit/s (≥ 1.8V to 3.3V translation)
  -- 200Mbit/s (≥ 1.1V to 3.3V translation)
  -- 200Mbit/s (≥ 1.1V to 2.5V translation)
  -- 200Mbit/s (≥ 1.1V to 1.8V translation)
  -- 150Mbit/s (≥ 1.1V to 1.5V translation)
  -- 100Mbit/s (≥ 1.1V to 1.2V translation)
- I_{OFF} Circuitry Provides Partial Power-down Mode Operation
- ESD Protection Complies with JESD22 Standard
  -- HBM: ±4000V Pass (JEDEC JS-001)
  -- CDM: ±1500V Pass (JEDEC JS-002)
- Latch-up Performance Exceeds ±100mA per JEDEC JESD78F
- Part No. and Package Information

Part No.	Package	MSL
ET74AVCH4T774Y	QFN16L (2.6mm x 1.8mm)	1

Applications

- Personal Electronic
- Industrial Equipment
- Enterprise Infrastructure
- Telecom Equipment

Pin Configuration

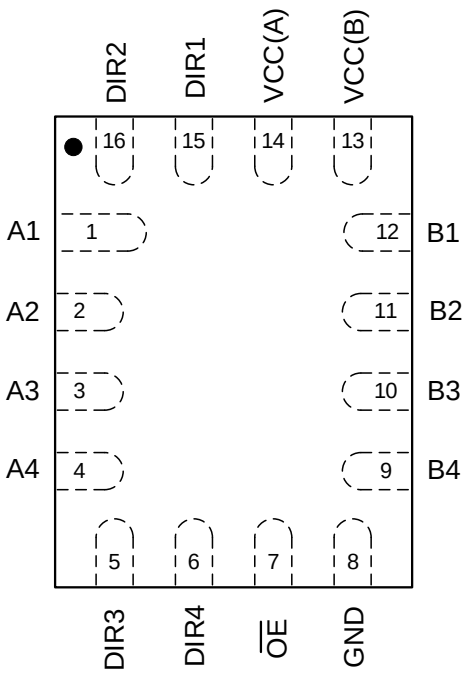


Figure1. Pin Configuration

Pin Function

Pin		I/O	Description
Pin Name	QFN16L		
VCC(A)	14	–	A Port Supply Voltage
VCC(B)	13	–	B Port Supply Voltage
DIR1~DIR4	15, 16, 5, 6	I	Direction-Control Signal. Referenced to VCC(A)
$\overline{OE}$	7	I	3-State Output-Mode Enables. Pull $\overline{OE}$ High to Place All Outputs In 3-State Mode. Referenced to VCC(A)
A1~A4	1~4	I/O	Input / Output A1~A4. Referenced to VCC(A)
B1~B4	9~12	I/O	Input / Output B1~B4. Referenced to VCC(B)
GND	8	–	Ground

Functional Diagram

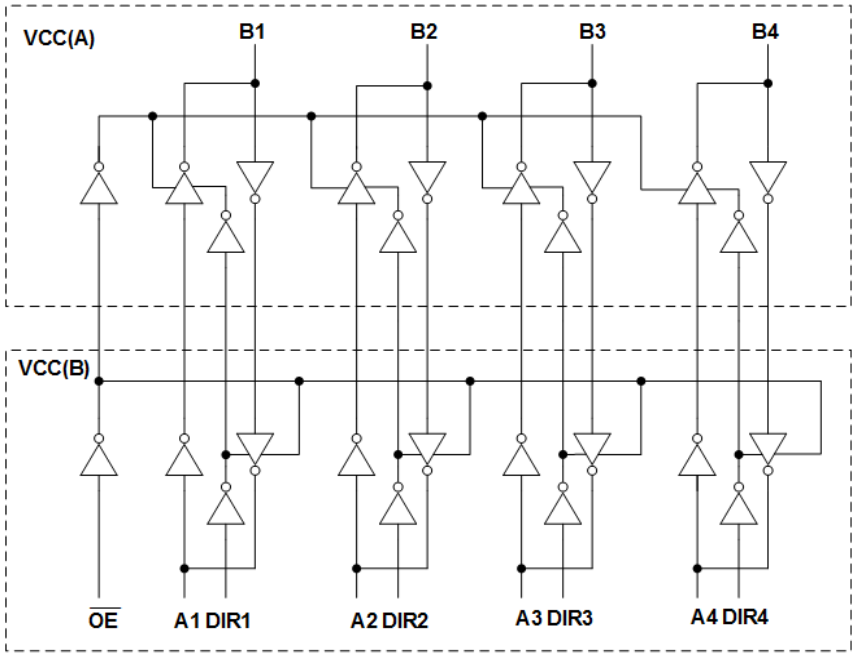


Figure2. Logic Symbol

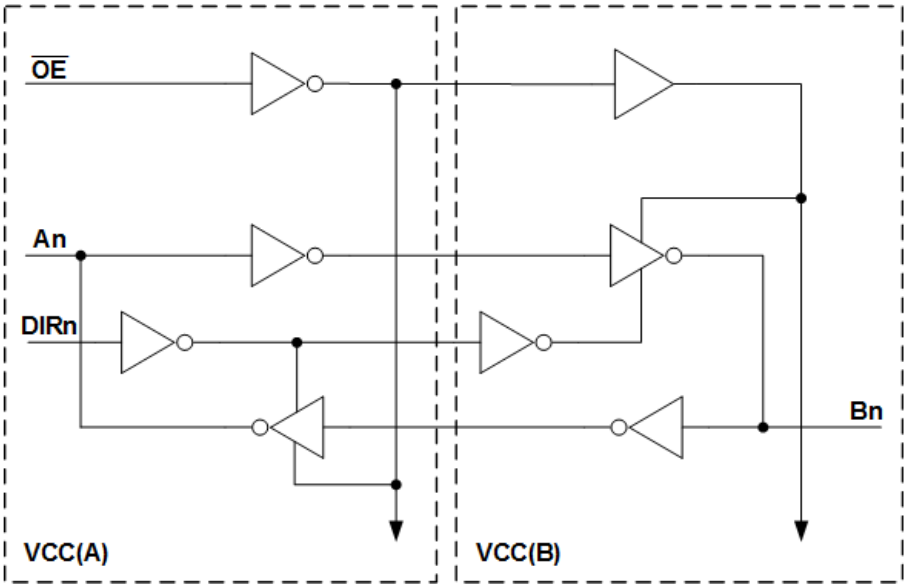


Figure3. Logic Diagram

Functional Description

Table1. Function table[1]

Supply Voltage	Input		Input / Output	
$V_{CC(A)}$, $V_{CC(B)}$	$\overline{OE}$[2]	DIR[2]	An[2]	Bn[2]
0.8V to 3.6V	L	L	An = Bn	Input
0.8V to 3.6V	L	H	Input	Bn = An
0.8V to 3.6V	H	X	Hi-Z	Hi-Z
GND[3]	X	X	Hi-Z	Hi-Z

Note1: H = High Voltage Level; L = Low Voltage Level; X = Don't Care; Z = High-impedance OFF-state.

Note2: The An, DIR and $\overline{OE}$ input circuit is referenced to $V_{CC(A)}$; The Bn input circuit is referenced to $V_{CC(B)}$.

Note3: If at least one of $V_{CC(A)}$ or $V_{CC(B)}$ is at GND level, the device goes into suspend mode.

Absolute Maximum Ratings

Symbol	Parameter	Conditions	Rating	Unit
$V_{CC(A)}$	Supply Voltage A Side (VCC(A) Pin)		-0.5~4.6	V
$V_{CC(B)}$	Supply Voltage B Side (VCC(B) Pin)		-0.5~4.6	V
I_{IK}	Input Clamping Current	V_I < 0V	-50	mA
V_I	Input Voltage[4]		-0.5~4.6	V
I_{OK}	Output Clamping Current	V_O < 0V	-50	mA
V_O	Output Voltage	Active Mode[5]	-0.5~V_{CCO} + 0.5	V
		Suspend or 3-state Mode	-0.5~4.6	V
I_O	Output Current	V_O = 0V to V_{CC}	±50	mA
I_{CC}	Supply Current	Per VCC(A) or VCC(B) Pin	100	mA
I_{GND}	Ground Current	Per GND Pin	-100	mA
T_{STG}	Storage Temperature		-65 to 150	°C
T_{LEAD}	Lead Temperature (Soldering, 10 sec)		260	°C
P_D	Power Dissipation	T_A = 25°C	500	mW
T_J	Operating Junction Range		-40 to 150	°C
V_{ESD}	Human Body Mode[6]		±4000	V
	Charged Device Mode[7]		±1500	V
I_{LU}	Latch-up Current[8]		±100	mA

Note4: I/O absolute maximum rating must be observed.

Note5: V_{CCO} is the supply voltage associated with the output port.

Note6: HBM tested per JEDEC JS-001.

Note7: CDM tested per JEDEC JS-002.

Note8: Latch-up Current Maximum Rating tested per JEDEC JESD78F.

Recommended Operating Conditions

Symbol	Parameter	Conditions	Rating	Unit
$V_{CC(A)}$	Supply Voltage A Side (VCC(A) Pin)		0.8~3.6	V
$V_{CC(B)}$	Supply Voltage B Side (VCC(B) Pin)		0.8~3.6	V
V_I	Input Voltage		0~3.6	V
V_O	Output Voltage	Active Mode	0~V_{CCO}	V
		Suspend or 3-state Mode	0~3.6	V
T_A	Operating Ambient Temperature		-40 to 125	°C
t_r, t_f	Input Rise and Fall Time	V_{CCI} = 0.8V to 3.6V [9]	10	ns/V

Note9: V_{CCI} is the supply voltage associated with the input port.

Electrical Characteristics

At recommended operating conditions; voltages are referenced to GND (ground = 0V).
V_{CCI} is the supply voltage associated with the data input port; V_{CCO} is the supply voltage associated with the output port.

Symbol	Parameter	Conditions	T_A = 25°C			Unit
			Min	Typ	Max	
V_{OH}	High-Level Output Voltage	V_I = V_{IH} or V_{IL}; I_O = -1.5mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 0.8V		0.69		V
V_{OL}	Low-Level Output Voltage	V_I = V_{IH} or V_{IL}; I_O = 1.5mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 0.8V		0.07		V
I_I	Input Leakage Current	DIR, $\overline{OE}$ Input; V_I = 0V or 3.6V; $V_{CC(A)}$ = $V_{CC(B)}$ = 0.8V to 3.6V		±0.025	±0.25	μA
I_{BHL}(10)	Bus Hold LOW Current	A or B Port; V_I = 0.42V; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.2V		26		μA
I_{BHH}(10)	Bus Hold HIGH Current	A or B Port; V_I = 0.78V; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.2V		-24		μA
I_{BHLO}(10) (11)	Bus Hold LOW Overdrive Current	$V_{CC(A)}$ = $V_{CC(B)}$ = 1.2V		27		μA
I_{BHHO}(10) (11)	Bus Hold HIGH Overdrive Current	$V_{CC(A)}$ = $V_{CC(B)}$ = 1.2V		-26		μA
I_{OZ}	Off-State Output Current	A or B Port; V_O = 0V or V_{CCO}; $V_{CC(A)}$ = $V_{CC(B)}$ = 3.6V		±0.5	±2.5	μA
		Suspend Mode A Port; V_O = 0V or V_{CCO};		±0.5	±2.5	μA
		Suspend Mode B Port; V_O = 0V or V_{CCO};		±0.5	±2.5	μA
I_{OFF}	Power-Off Leakage Current	A Port; V_I or V_O = 0V to 3.6V; $V_{CC(A)}$ = 0V; $V_{CC(B)}$ = 0.8V to 3.6V		±0.1	±1	μA
		B Port; V_I or V_O = 0V to 3.6V; $V_{CC(B)}$ = 0V; $V_{CC(A)}$ = 0.8V to 3.6V		±0.1	±1	μA
C_I	Input Capacitance	DIR,$\overline{OE}$ Input; V_I = 0V or 3.3V; $V_{CC(A)}$ = $V_{CC(B)}$ = 3.3V		2		pF
$C_{I/O}$	Input / Output Capacitance	A and B Port; V_O = 3.3V or 0V; $V_{CC(A)}$ = $V_{CC(B)}$ = 3.3V		4		pF

DC Electrical Characteristics (Continued)

Symbol	Parameter	Conditions	-40°C ≤ T_A ≤ 85°C		-40°C ≤ T_A ≤ 125°C		Unit
			Min	Max	Min	Max	
V_{IH}	High-Level Input Voltage	Data Input					
		V_{CCI} = 0.8V	0.70V_{CCI}		0.70V_{CCI}		V
		V_{CCI} = 1.1V to 1.95V					V
		V_{CCI} = 2.3V to 2.70V					V
		V_{CCI} = 3.0V to 3.60V					V
		DIR, $\overline{OE}$ Input					
		$V_{CC(A)}$ = 0.8V	0.70$V_{CC(A)}$		0.70$V_{CC(A)}$		V
		$V_{CC(A)}$ = 1.1V to 1.95V					V
		$V_{CC(A)}$ = 2.3V to 2.70V					V
		$V_{CC(A)}$ = 3.0V to 3.60V					V
V_{IL}	Low-Level Input Voltage	Data Input					
		V_{CCI} = 0.8V		0.30V_{CCI}		0.30V_{CCI}	V
		V_{CCI} = 1.1V to 1.95V		0.35V_{CCI}		0.35V_{CCI}	V
		V_{CCI} = 2.3V to 2.70V		0.7		0.7	V
		V_{CCI} = 3.0V to 3.60V		0.8		0.8	V
		DIR, $\overline{OE}$ Input					
		$V_{CC(A)}$ = 0.8V		0.30$V_{CC(A)}$		0.30$V_{CC(A)}$	V
		$V_{CC(A)}$ = 1.1V to 1.95V		0.35$V_{CC(A)}$		0.35$V_{CC(A)}$	V
		$V_{CC(A)}$ = 2.3V to 2.70V		0.7		0.7	V
		$V_{CC(A)}$ = 3.0V to 3.60V		0.8		0.8	V
V_{OH}	High-Level Output Voltage	V_I = V_{IH} or V_{IL}					
		I_O = -100μA; $V_{CC(A)}$ = $V_{CC(B)}$ = 0.8V to 3.6 V	V_{CCO} - 0.1		V_{CCO} - 0.1		V
		I_O = -3mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.1V	0.85		0.85		V
		I_O = -6mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.4V	1.05		1.05		V
		I_O = -8mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.65V	1.2		1.2		V
		I_O = -9mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 2.3V	1.75		1.75		V
		I_O = -12mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 3.0V	2.3		2.3		V
V_{OL}	Low-Level Output Voltage	V_I = V_{IH} or V_{IL}					
		I_O = 100μA; $V_{CC(A)}$ = $V_{CC(B)}$ = 0.8V to 3.6V		0.10		0.10	V
		I_O = 3mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.1V		0.25		0.25	V
		I_O = 6mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.4V		0.35		0.35	V
		I_O = 8mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.65V		0.45		0.45	V
		I_O = 9mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 2.3V		0.55		0.55	V
		I_O = 12mA; $V_{CC(A)}$ = $V_{CC(B)}$ = 3.0V		0.70		0.70	V

DC Electrical Characteristics (Continued)

Symbol	Parameter	Conditions	-40°C ≤ T_A ≤ 85°C		-40°C ≤ T_A ≤ 125°C		Unit
			Min	Max	Min	Max	
I_I	Input Leakage Current	DIR, $\overline{OE}$ Input; V_I = $V_{CC(A)}$ or GND; $V_{CC(A)}$ = $V_{CC(B)}$ = 0.8V to 3.6V		±1		±5	μA
I_{BHL}(10)	Bus Hold LOW Current	A or B Port					
		V_I = 0.49V; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.4V	15		15		μA
		V_I = 0.58V; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.65V	25		25		μA
		V_I = 0.70V; $V_{CC(A)}$ = $V_{CC(B)}$ = 2.3V	45		45		μA
		V_I = 0.80V; $V_{CC(A)}$ = $V_{CC(B)}$ = 3.3V	100		90		μA
I_{BHH}(10)	Bus Hold HIGH Current	A or B Port					
		V_I = 0.91V; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.4V	-15		-15		μA
		V_I = 1.07V; $V_{CC(A)}$ = $V_{CC(B)}$ = 1.65V	-25		-25		μA
		V_I = 1.60V; $V_{CC(A)}$ = $V_{CC(B)}$ = 2.3V	-45		-45		μA
		V_I = 2.00V; $V_{CC(A)}$ = $V_{CC(B)}$ = 3.3V	-100		-100		μA
I_{BHLO}(10) (11)	Bus Hold LOW Overdrive Current	A or B Port					
		$V_{CC(A)}$ = $V_{CC(B)}$ = 1.4V	125		125		μA
		$V_{CC(A)}$ = $V_{CC(B)}$ = 1.65V	200		200		μA
		$V_{CC(A)}$ = $V_{CC(B)}$ = 2.3V	300		300		μA
		$V_{CC(A)}$ = $V_{CC(B)}$ = 3.3V	500		500		μA
I_{BHHO}(10) (11)	Bus Hold HIGH Overdrive Current	A or B Port					
		$V_{CC(A)}$ = $V_{CC(B)}$ = 1.4V	-125		-125		μA
		$V_{CC(A)}$ = $V_{CC(B)}$ = 1.65V	-200		-200		μA
		$V_{CC(A)}$ = $V_{CC(B)}$ = 2.3V	-300		-300		μA
		$V_{CC(A)}$ = $V_{CC(B)}$ = 3.3V	-500		-500		μA
I_{OZ}	Off-State Output Current	A or B Port; V_O = 0V or V_{CCO}; $V_{CC(A)}$ = $V_{CC(B)}$ = 3.6V		±5		±30	μA
		Suspend Mode A Port; V_O = 0V or V_{CCO}; $V_{CC(A)}$ = 3.6V; $V_{CC(B)}$ = 0V		±5		±30	μA
		Suspend Mode B Port; V_O = 0V or V_{CCO}; $V_{CC(A)}$ = 0V; $V_{CC(B)}$ = 3.6V		±5		±30	μA
I_{OFF}	Power-Off Leakage Current	A Port; V_I or V_O = 0V to 3.6V; $V_{CC(A)}$ = 0V; $V_{CC(B)}$ = 0.8V to 3.6V		±5		±30	μA
		B Port; V_I or V_O = 0V to 3.6V; $V_{CC(B)}$ = 0V; $V_{CC(A)}$ = 0.8V to 3.6V		±5		±30	μA

Note10: '+/-' represents the direction of the current.

Note11: I_{BHL}, I_{BHH} means the bus hold current; I_{BHLO}, I_{BHHO} means the minimum overdrive current to flip the level.

DC Electrical Characteristics (Continued)

Symbol	Parameter	Conditions	-40°C ≤ T_A ≤ 85°C		-40°C ≤ T_A ≤ 125°C		Unit
			Min	Max	Min	Max	
I_{CC}	Supply Current	A Port; V_I = 0V or V_{CCI}; I_O = 0mA					
		$V_{CC(A)}$ = 0.8V to 3.6V; $V_{CC(B)}$ = 0.8V to 3.6V		10		55	μA
		$V_{CC(A)}$ = 1.1V to 3.6V; $V_{CC(B)}$ = 1.1V to 3.6V		8		50	μA
		$V_{CC(A)}$ = 3.6V; $V_{CC(B)}$ = 0V		8		50	μA
		$V_{CC(A)}$ = 0V; $V_{CC(B)}$ = 3.6V	-2		-12		μA
		B port; V_I = 0V or V_{CCI}; I_O= 0mA					
		$V_{CC(A)}$ = 0.8V to 3.6V; $V_{CC(B)}$ = 0.8V to 3.6V		10		55	μA
		$V_{CC(A)}$ = 1.1V to 3.6V; $V_{CC(B)}$ = 1.1V to 3.6V		8		50	μA
		$V_{CC(A)}$ = 3.6V; $V_{CC(B)}$ = 0V	-2		-12		μA
		$V_{CC(A)}$ = 0V; $V_{CC(B)}$ = 3.6V		8		50	μA
		A plus B Port ($I_{CC(A)}$ + $I_{CC(B)}$); I_O = 0A; V_I = 0V or V_{CCI}; $V_{CC(A)}$ = 1.2V to 3.6V; $V_{CC(B)}$ = 1.2V to 3.6V		16		65	μA

Table2. Typical Total Supply Current, T_A = 25°C ($I_{CC(A)}$ + $I_{CC(B)}$)

$V_{CC(A)}$	$V_{CC(B)}$							Unit
	0V	0.8V	1.2V	1.5V	1.8V	2.5V	3.3V	
0V	0	0.1	0.1	0.1	0.1	0.1	0.1	μA
0.8V	0.1	0.1	0.1	0.1	0.1	0.5	1.6	μA
1.2V	0.1	0.1	0.1	0.1	0.1	0.2	1.0	μA
1.5V	0.1	0.1	0.1	0.1	0.1	0.1	0.6	μA
1.8V	0.1	0.1	0.1	0.1	0.1	0.1	1.1	μA
2.5V	0.1	0.5	0.2	0.1	0.1	0.1	0.2	μA
3.3V	0.1	1.6	1.0	0.6	1.1	0.2	0.1	μA

Dynamic Characteristics

Typical switching characteristics at $V_{CC(A)}$ = 0.8V and T_A = 25°C (unless otherwise noted).

Voltages are referenced to GND (ground = 0V); for test circuit see Figure6; for wave forms see Figure4 and Figure5.

t_{pd} is the same as t_{PLH} and t_{PHL}; t_{dis} is the same as t_{PLZ} and t_{PHZ}; t_{en} is the same as t_{PZL} and t_{PZH}.

Symbol	Parameter	Conditions	$V_{CC(B)}$				Unit
			0.8V	1.2V	1.5V	1.8V	
t_{pd}	Propagation Delay	An to Bn	14.67	8.54	7.44	6.96	ns
		Bn to An	13.19	7.94	7.18	6.98	ns
t_{dis}	Disable Time	$\overline{OE}$ to An	20.03	13.55	11.98	11.8	ns
		$\overline{OE}$ to Bn	20.03	13.55	11.98	11.8	ns
t_{en}	Enable Time	$\overline{OE}$ to An	21.2	13.85	12.88	12.46	ns
		$\overline{OE}$ to Bn	21.2	13.85	12.88	12.46	ns

Typical switching characteristics at $V_{CC(B)}$ = 0.8V and T_A = 25°C (unless otherwise noted).

Voltages are referenced to GND (ground = 0V); for test circuit see Figure6; for wave forms see Figure4 and Figure5.

t_{pd} is the same as t_{PLH} and t_{PHL}; t_{dis} is the same as t_{PLZ} and t_{PHZ}; t_{en} is the same as t_{PZL} and t_{PZH}.

Symbol	Parameter	Conditions	$V_{CC(A)}$				Unit
			0.8V	1.2V	1.5V	1.8V	
t_{pd}	Propagation Delay	An to Bn	14.67	8.57	7.46	6.98	ns
		Bn to An	13.19	7.94	7.18	6.99	ns
t_{dis}	Disable Time	$\overline{OE}$ to An	20.03	9.02	6.81	6.20	ns
		$\overline{OE}$ to Bn	20.03	16.77	16.01	17.3	ns
t_{en}	Enable Time	$\overline{OE}$ to An	21.2	8.20	5.94	4.57	ns
		$\overline{OE}$ to Bn	21.2	16.64	15.47	15.16	ns

Dynamic Characteristics (Continued)

Voltages are referenced to GND (ground = 0V), T_A = 25°C.

Symbol	Parameter	Conditions	$V_{CC(A)} = V_{CC(B)}$						Unit
			0.8V	1.2V	1.5V	1.8V	2.5V	3.3V	
C_{PD} (12) (13)	Power Dissipation Capacitance	A Port: (Direction An to Bn); Output Enabled	0.2	0.2	0.2	0.2	0.3	0.4	pF
		A Port: (Direction An to Bn); Output Disabled	0.2	0.2	0.2	0.2	0.3	0.4	pF
		A Port: (Direction Bn to An); Output Enabled	9.5	9.7	9.8	9.9	10.7	11.9	pF
		A Port: (Direction Bn to An); Output Disabled	0.6	0.6	0.6	0.6	0.7	0.7	pF
		B Port: (Direction An to Bn); Output Enabled	9.5	9.7	9.8	9.9	10.7	11.9	pF
		B Port: (Direction An to Bn); Output Disabled	0.6	0.6	0.6	0.6	0.7	0.7	pF
		B Port: (Direction Bn to An); Output Enabled	0.2	0.2	0.2	0.2	0.3	0.4	pF
		B Port: (Direction Bn to An); Output Disabled	0.2	0.2	0.2	0.2	0.3	0.4	pF

Note12: C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

$P_D = C_{PD} \times V_{CC}{}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}{}^2 \times f_o)$ where:

f_i = input frequency in MHz;

f_o = output frequency in MHz;

C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

$\Sigma(C_L \times V_{CC}{}^2 \times f_o)$ = sum of outputs.

Note13: f_i = 10MHz; V_I = GND to V_{CC}; $t_r = t_f$ = 1ns; C_L = 0pF; R_L = ∞Ω.

Dynamic Characteristics (Continued)

Voltages are referenced to GND (ground = 0V), T_A = -40°C~85°C.

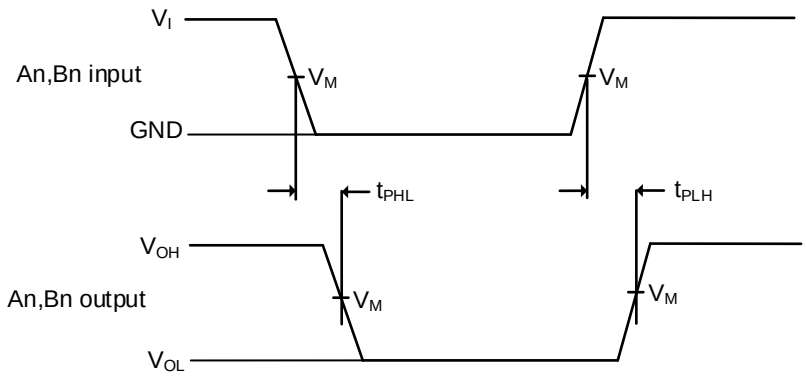
Symbol	Parameter	Conditions	$V_{CC(B)}$										Unit
			1.2V±0.1V		1.5V±0.1V		1.8V±0.15V		2.5V±0.2V		3.3V±0.3V		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
$V_{CC(A)}$ = 1.1V to 1.3V													
t_{pd}	Propagation Delay	An to Bn	4.80	10.23	4.19	8.21	3.93	7.25	3.57	6.42	3.40	6.43	ns
		Bn to An	5.17	10.21	4.19	8.22	3.93	7.26	3.57	6.42	3.40	6.43	ns
t_{dis}	Disable Time	$\overline{OE}$ to An	6.51	12.91	6.52	12.92	6.52	13.88	6.57	13.89	6.66	17.32	ns
		$\overline{OE}$ to Bn	7.86	14.36	6.68	11.99	6.70	11.36	5.57	9.74	5.97	9.97	ns
t_{en}	Enable Time	$\overline{OE}$ to An	6.18	12.17	6.18	12.26	6.18	13.27	6.18	13.24	6.18	16.67	ns
		$\overline{OE}$ to Bn	6.69	14.20	5.99	11.81	5.67	10.82	5.42	10.05	5.43	9.86	ns
$V_{CC(A)}$ = 1.4V to 1.6V													
t_{pd}	Propagation Delay	An to Bn	4.53	9.55	3.87	7.47	3.56	6.46	3.23	5.42	3.02	5.20	ns
		Bn to An	4.52	9.52	3.87	7.47	3.56	6.47	3.24	5.43	3.03	5.21	ns
t_{dis}	Disable Time	$\overline{OE}$ to An	5.19	9.71	5.19	9.71	5.23	10.51	5.18	10.52	5.15	13.07	ns
		$\overline{OE}$ to Bn	7.39	13.19	6.19	10.77	6.13	10.12	5.17	8.43	5.65	8.55	ns
t_{en}	Enable Time	$\overline{OE}$ to An	4.93	9.12	4.93	9.12	4.93	9.90	4.93	9.90	4.93	12.46	ns
		$\overline{OE}$ to Bn	6.00	12.61	5.28	10.12	4.94	10.66	4.63	7.96	4.56	7.65	ns
$V_{CC(A)}$ = 1.65V to 1.95V													
t_{pd}	Propagation Delay	An to Bn	4.39	9.24	3.71	7.12	3.38	6.09	3.06	5.0	2.84	4.61	ns
		Bn to An	4.38	9.19	3.71	7.11	3.38	6.09	3.06	5.01	2.84	4.61	ns
t_{dis}	Disable Time	$\overline{OE}$ to An	4.54	9.85	4.53	8.02	4.54	8.67	4.54	8.67	4.54	10.72	ns
		$\overline{OE}$ to Bn	7.18	12.61	5.89	10.17	5.85	9.5	4.86	8.32	5.38	7.86	ns
t_{en}	Enable Time	$\overline{OE}$ to An	4.31	7.53	4.31	7.47	4.31	8.02	4.31	8.10	4.31	10.22	ns
		$\overline{OE}$ to Bn	5.70	11.59	4.93	9.14	4.58	8.22	4.26	7.21	4.15	6.90	ns
$V_{CC(A)}$ = 2.3V to 2.7V													
t_{pd}	Propagation Delay	An to Bn	4.24	8.92	3.54	6.78	3.19	5.71	2.83	4.58	2.64	4.04	ns
		Bn to An	4.24	8.86	3.54	6.76	3.19	5.71	2.83	4.58	2.64	4.04	ns
t_{dis}	Disable Time	$\overline{OE}$ to An	3.81	6.04	3.81	6.04	3.81	6.48	3.81	6.48	3.81	7.86	ns
		$\overline{OE}$ to Bn	6.91	11.98	5.66	9.53	5.56	8.83	4.51	7.07	4.94	7.13	ns
t_{en}	Enable Time	$\overline{OE}$ to An	3.63	5.58	3.63	5.59	3.63	6.04	3.62	6.04	3.63	7.46	ns
		$\overline{OE}$ to Bn	5.38	10.86	4.57	8.22	4.18	7.16	3.83	6.21	3.70	5.68	ns
$V_{CC(A)}$ = 3.0V to 3.6V													
t_{pd}	Propagation Delay	An to Bn	4.16	8.77	3.46	6.63	3.10	5.55	2.71	4.38	2.54	3.82	ns
		Bn to An	4.16	8.70	3.46	6.60	3.10	5.54	2.71	4.38	2.54	3.82	ns
t_{dis}	Disable Time	$\overline{OE}$ to An	3.46	4.98	3.45	5.05	3.45	5.28	3.43	5.28	3.45	6.28	ns
		$\overline{OE}$ to Bn	6.79	11.65	5.51	10.35	5.42	8.63	4.39	8.14	4.79	6.76	ns
t_{en}	Enable Time	$\overline{OE}$ to An	3.15	4.74	3.17	4.74	3.28	4.89	3.28	4.88	3.28	5.92	ns
		$\overline{OE}$ to Bn	5.21	10.41	4.38	7.75	3.97	6.79	3.58	5.61	3.45	5.13	ns

Dynamic Characteristics (Continued)

Voltages are referenced to GND (ground = 0V), T_A = -40°C~125°C.

Symbol	Parameter	Conditions	$V_{CC(B)}$										Unit
			1.2V±0.1V		1.5V±0.1V		1.8V±0.15V		2.5V±0.2V		3.3V±0.3V		
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
$V_{CC(A)}$ = 1.1V to 1.3V													
t_{pd}	Propagation Delay	An to Bn	4.80	10.51	4.19	8.55	3.93	7.58	3.57	6.75	3.40	6.74	ns
		Bn to An	5.17	10.50	4.19	8.56	3.93	7.59	3.57	6.75	3.40	6.75	ns
t_{dis}	Disable Time	$\overline{OE}$ to An	6.51	13.17	6.52	13.30	6.52	14.23	6.57	14.24	6.66	17.70	ns
		$\overline{OE}$ to Bn	7.86	14.72	6.68	12.36	6.70	11.74	5.57	10.07	5.97	10.26	ns
t_{en}	Enable Time	$\overline{OE}$ to An	6.18	12.61	6.18	12.62	6.18	13.55	6.18	13.64	6.18	17.07	ns
		$\overline{OE}$ to Bn	6.69	14.81	5.99	12.23	5.67	11.23	5.42	10.30	5.43	10.25	ns
$V_{CC(A)}$ = 1.4V to 1.6V													
t_{pd}	Propagation Delay	An to Bn	4.53	9.85	3.87	7.83	3.56	6.81	3.23	5.73	3.02	5.53	ns
		Bn to An	4.52	9.82	3.87	7.83	3.56	6.82	3.24	5.74	3.03	5.53	ns
t_{dis}	Disable Time	$\overline{OE}$ to An	5.19	10.11	5.19	10.11	5.23	10.92	5.18	10.93	5.15	13.51	ns
		$\overline{OE}$ to Bn	7.39	13.61	6.19	11.21	6.13	10.55	5.17	8.8	5.65	8.90	ns
t_{en}	Enable Time	$\overline{OE}$ to An	4.93	9.35	4.93	9.57	4.93	10.31	4.93	10.30	4.93	12.98	ns
		$\overline{OE}$ to Bn	6.0	12.76	528	10.53	4.94	9.66	4.63	8.64	4.56	8.09	ns
$V_{CC(A)}$ = 1.65V to 1.95V													
t_{pd}	Propagation Delay	An to Bn	4.39	9.54	3.71	7.48	3.38	6.44	3.06	5.32	2.84	4.91	ns
		Bn to An	4.38	9.49	3.71	7.47	3.38	6.44	3.06	5.32	2.84	4.91	ns
t_{dis}	Disable Time	$\overline{OE}$ to An	4.54	9.85	4.53	8.42	4.54	9.07	4.54	9.07	4.54	11.13	ns
		$\overline{OE}$ to Bn	7.18	13.04	5.89	10.62	5.85	9.94	4.86	8.32	5.38	8.22	ns
t_{en}	Enable Time	$\overline{OE}$ to An	4.31	7.89	4.31	7.89	4.31	8.54	4.31	8.53	4.31	10.63	ns
		$\overline{OE}$ to Bn	5.70	11.89	4.93	9.59	4.58	8.67	4.26	7.64	4.15	7.18	ns
$V_{CC(A)}$ = 2.3V to 2.7V													
t_{pd}	Propagation Delay	An to Bn	4.24	9.22	3.54	7.13	3.19	6.05	2.83	4.87	2.64	4.30	ns
		Bn to An	4.24	9.16	3.54	7.11	3.19	6.05	2.83	4.88	2.64	4.31	ns
t_{dis}	Disable Time	$\overline{OE}$ to An	3.81	6.38	3.81	6.38	3.81	6.84	3.81	6.84	3.81	8.22	ns
		$\overline{OE}$ to Bn	6.91	12.41	5.66	9.98	5.56	9.27	4.51	7.46	4.94	7.49	ns
t_{en}	Enable Time	$\overline{OE}$ to An	3.63	5.96	3.63	5.94	3.63	6.40	3.62	6.34	3.63	7.83	ns
		$\overline{OE}$ to Bn	5.38	10.97	4.57	8.66	4.18	7.58	3.83	6.55	3.70	6.08	ns
$V_{CC(A)}$ = 3.0V to 3.6V													
t_{pd}	Propagation Delay	An to Bn	4.16	9.06	3.46	6.97	3.10	5.88	2.71	4.92	2.54	4.07	ns
		Bn to An	4.16	8.99	3.46	6.94	3.10	5.87	2.71	4.67	2.54	4.08	ns
t_{dis}	Disable Time	$\overline{OE}$ to An	3.46	5.32	3.45	5.32	3.45	5.58	3.43	5.59	3.45	6.59	ns
		$\overline{OE}$ to Bn	6.78	12.08	5.51	10.35	5.42	8.94	4.39	8.14	4.79	7.11	ns
t_{en}	Enable Time	$\overline{OE}$ to An	3.15	5.01	3.17	5.01	3.28	5.20	3.28	5.20	3.28	6.22	ns
		$\overline{OE}$ to Bn	5.21	10.73	4.38	8.33	3.97	7.19	3.58	6.03	3.45	5.59	ns

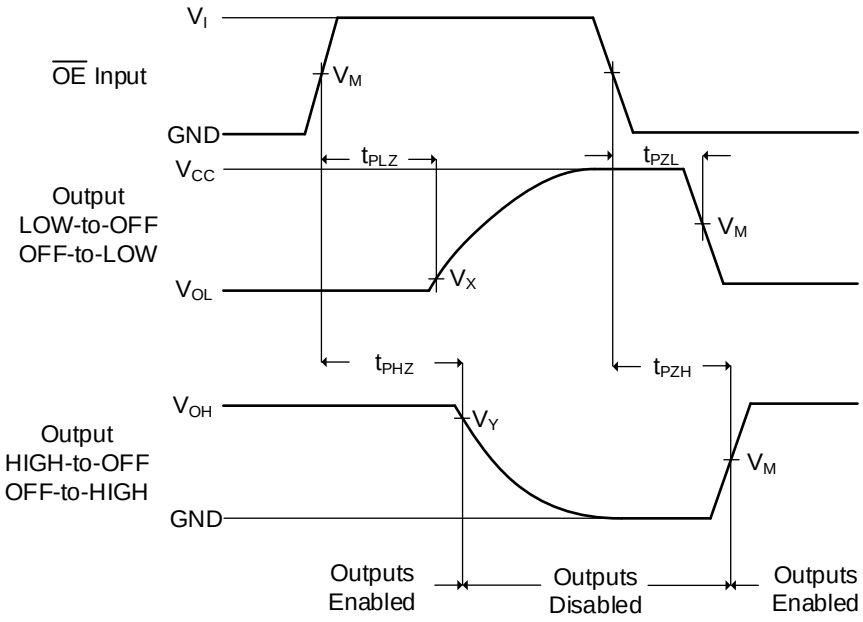
Test Circuit



Measurement points are given in Table 3.

V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Figure4. The data input (nAn, nBn) to output (nBn, nAn) propagation delay times



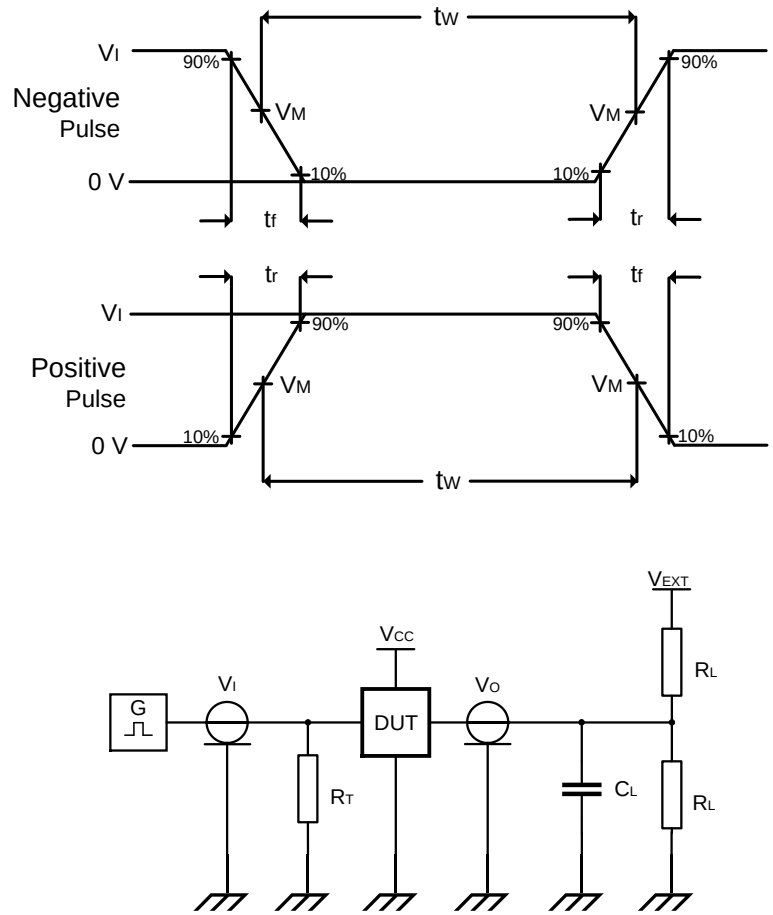
Measurement points are given in Table 3.

V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Figure5. Enable and disable times

Table 3. Measurement Points

Supply Voltage	Input	Output		
$V_{CC(A)}$, $V_{CC(B)}$	V_M	V_M	V_X	V_Y
0.8V to 1.6V	0.5 × V_{CCI}	0.5 × V_{CCO}	V_{OL} + 0.1V	V_{OH} - 0.1V
1.65V to 2.7V	0.5 × V_{CCI}	0.5 × V_{CCO}	V_{OL} + 0.15V	V_{OH} - 0.15V
3.0V to 3.6V	0.5 × V_{CCI}	0.5 × V_{CCO}	V_{OL} + 0.3V	V_{OH} - 0.3V



Measurement points are given in Table 4.

Definitions test circuit:

R_L = Load resistance;

C_L = Load capacitance including jig and probe capacitance;

R_T = Termination resistance should be equal to output impedance Z_O of the pulse generator;

V_{EXT} = External voltage for measuring switching times.

Figure6. Test circuit for measuring switching times

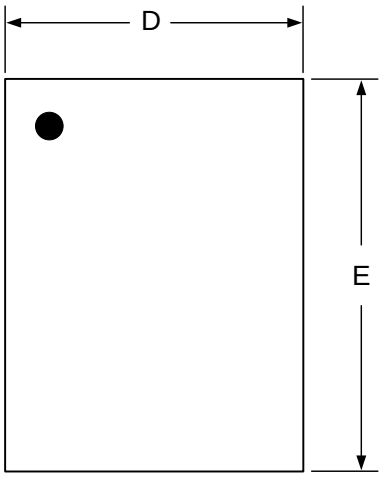
Table 4. Test Data

Supply Voltage	Input		Load		V_{EXT}		
$V_{CC(A)}$, $V_{CC(B)}$	V_I	$\Delta t/\Delta V$[14]	C_L	R_L	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ}
0.8V to 1.6V	V_{CCI}	≤ 1.0ns/V	15pF	2kΩ	Open	GND	2 × V_{CCO}
1.65V to 2.7V	V_{CCI}	≤ 1.0ns/V	15pF	2kΩ	Open	GND	2 × V_{CCO}
3.0V to 3.6V	V_{CCI}	≤ 1.0ns/V	15pF	2kΩ	Open	GND	2 × V_{CCO}

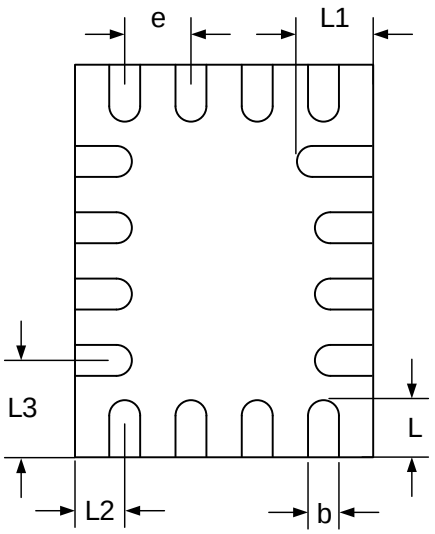
Note14: dV/dt ≥ 1.0V/ns

Package Dimension

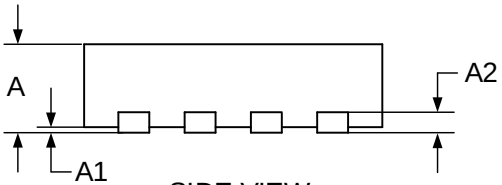
QFN16L (2.6mm x 1.8mm)



TOP VIEW



BOTTOM VIEW



SIDE VIEW

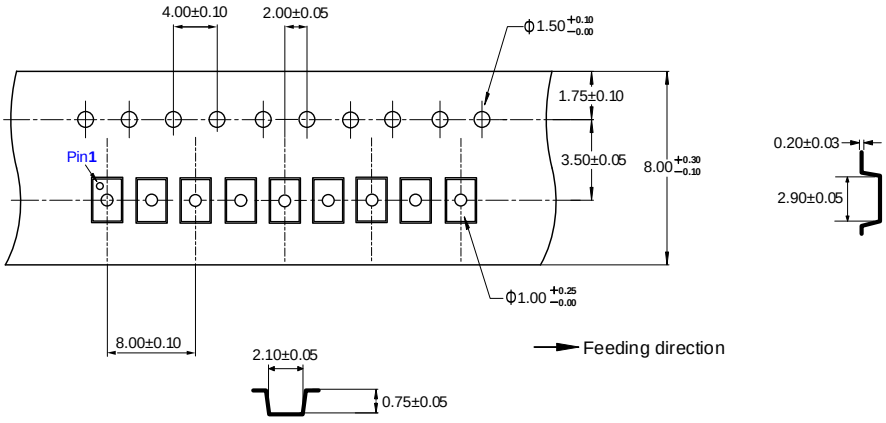
COMMON DIMENSIONS

(Unit: mm)

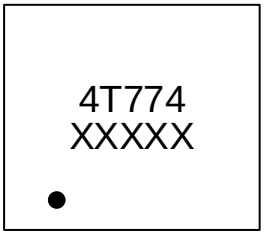
SYMBOL	MIN	NOM	MAX
A	0.50	0.55	0.60
A1	0.00	—	0.05
A2		0.15 TYP	
b	0.15	0.20	0.25
D	1.75	1.80	1.85
E	2.55	2.60	2.65
e		0.40 TYP	
L	0.30	0.40	0.50
L1		0.50 TYP	
L2		0.30 TYP	
L3		0.70 TYP	

Tape Information

QFN16L (1.8mm × 2.6mm)



Marking Information



ET74AVCH4T774

4T774 = Part Number

XXXXX = Tracking Number

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
0.0	2025-09-26	Preliminary Version	Yang xiaoxu	Li chenxuan	Liu jiaying
0.0.a	2025-09-28·	Update Pin Diagram	Yang xiaoxu	Li chenxuan	Liu jiaying
0.1	2025-10-20	Update Format	Wang anran	Yang xiaoxu	Liu jiaying
0.1.a	2026-04-14	Update Dynamic Characteristics Data	Yu yifan	Yang xiaoxu	Liu jiaying
0.1.b	2026-04-27	Update Dynamic Characteristics Data	Yu yifan	Yang xiaoxu	Liu jiaying
1.0	2026-07-15	Official Version	Wang qifan	Yang xiaoxu	Liu jiaying