

Features

- Very high speed: 1 MBit/s
- High isolation voltage between input and output (Viso =3750V rms)
- Operating Temperature: -40°C~100°C

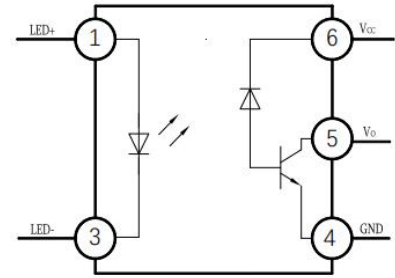
HF

Applications

- Ground loop elimination
- LSTTL to TTL, LSTTL or 5-volt CMOS
- Line receiver, data transmission
- Data multiplexing
- Switching power supplies
- Pulse transformer replacement
- Computer-peripheral interface

Mechanical Data

- Case: SOP5
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208



Truth Table:

LED	VO, OUTPUT
OFF	H
ON	L

Ordering Information

TWS M5XX (M) (G) (X) - (U) (N) (Y)

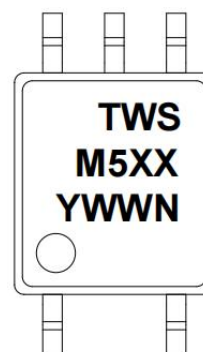
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- ① Brand(TWS)
- ② Product series(M501, M511)
- ③ Package type(SOP5:None)
- ④ Halogen option(None :Halogen free)
- ⑤ CTR Bank(None)
- ⑥ Lead frame (None: Copper)
- ⑦ Customer option 1 (0-9 or A-Z or None)
- ⑧ Customer option 2 (0-9 or A-Z or None)

Part Number	Package	Shipping Quantity	Marking Code
TWSM501	SOP5	3000 pcs / Tape & Reel	TWSM501

Marking Information

- "TWS" denotes brand
- "XX" denotes Product series: 01,11.
- "Y" denotes Year : A(2024), B(2025), C(2026)
- "WW" denotes Week's number
- "N" denotes the day of Week.



Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Emitter	Forward Current	I _F	50	mA
	Reverse Voltage	V _R	5	V
	Power Dissipation	P _D	45	mW
Detector	Collector Output	P _O	100	mW
	Output Current	I _O	16	mA
	Supply Voltage	V _{CC}	30	V
	Output Voltage	V _O	20	V

Thermal Characteristics

Parameter	Symbol	Value	Unit
Isolation Voltage *2	V _{ISO}	3750	V _{rms}
Operating Temperature	T _{OPR}	-40 ~ +100	°C
Storage Temperature Range	T _{STG}	-55 ~ +125	°C
Soldering Temperature *3	T _{SOL}	260	°C

Notes:

1. Pulse width ≤ 1μs, Duty ratio: 0.001
2. 40 to 60% RH, AC for 1 minute
3. For 10 seconds

Electrical Characteristics (@ T_A = 25°C unless otherwise specified)

Parameter		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage	V _F	I _F = 16mA	-	1.45	1.7	V
	Reverse Breakdown Voltage	B _{VR}	I _R = 10μA	5	20	-	V
	Diode Temperature Coefficient	ΔV _F /ΔT _A	I _F = 10mA	-	-1.6	-	mV/°C
Output	High Level Supply Current	I _{CCH}	V _{CC} = 15V, I _F = 0mA V _O = Open	-		1	μA
			T _A = 0-70°C			2	μA
	Low Level Supply Current	I _{CCL}	V _{CC} = 15V, I _F = 16mA, V _O = Open	-	120	800	μA
Transfer Characteristics	High Level Output Current	I _{OH}	I _F = 0mA, V _O = 5.5V V _{CC} = 5.5V		0.001	0.5	μA
			I _F = 0mA, V _O = 15V V _{CC} = 15V		0.005	1	
			T _A = 0-70°C			50	
	Low Level Output Voltage	V _{OL}	V _{CC} = 4.5V, I _F = 16mA I _O = 3mA	-	0.1	0.4	V
			V _{CC} = 4.5V, I _F = 16mA I _O = 2.4mA		0.1	0.5	V
	Current transfer ratio	CTR	I _F = 16mA, V _{CC} = 4.5V V _O = 0.4V	19	24	80	%
			I _F = 16mA, V _{CC} = 4.5V V _O = 0.5V	15	25		
	Isolation Resistance	R _{IO}	V _{IO} = 500Vdc 40~60% R.H.	-	1×10 ¹²	-	Ω
	Floating Capacitance	C _{IO}	f = 1MHz	-	0.6	-	pF

Switching Characteristics (@ $T_A = 25^\circ\text{C}$, $V_{CC} = 5\text{V}$, $I_F = 16\text{mA}$, unless otherwise specified)

Parameter		Symbol	Test Condition	Min.	Typ.	Max.	Unit
Propagation Delay Time to Output HIGH Level		T_{PLH}	$I_F = 16\text{mA}$, $R_L = 1.9\text{k}\Omega$, $T_A = 25^\circ\text{C}$	-	150	800	ns
			$I_F = 16\text{mA}$, $R_L = 1.9\text{k}\Omega$			800	
Propagation Delay Time to Output Low Level		T_{PHL}	$I_F = 16\text{mA}$, $R_L = 1.9\text{k}\Omega$, $T_A = 25^\circ\text{C}$	-	200	800	ns
			$I_F = 16\text{mA}$, $R_L = 1.9\text{k}\Omega$			800	
Common Mode Transient Immunity(at Logic High)	M501	$ C_{MH} $	$T_A = 25^\circ\text{C}$, $I_F = 0\text{mA}$ $ V_{CM} = 10\text{V(Peak)}$ $C_L = 15\text{pF}$, $R_L = 1.9\text{k}\Omega$	5000	-	-	V/ μs
	M511		$T_A = 25^\circ\text{C}$, $I_F = 0\text{mA}$ $ V_{CM} = 1500\text{V(Peak)}$ $C_L = 15\text{pF}$, $R_L = 1.9\text{k}\Omega$	15000	-	-	
Common Mode Transient Immunity (at Logic Low)	M501	$ C_{ML} $	$T_A = 25^\circ\text{C}$, $I_F = 16\text{mA}$ $ V_{CM} = 10\text{V(Peak)}$ $C_L = 15\text{pF}$, $R_L = 1.9\text{k}\Omega$	5000	-	-	V/ μs
	M511		$T_A = 25^\circ\text{C}$, $I_F = 16\text{mA}$ $ V_{CM} = 1500\text{V(Peak)}$ $C_L = 15\text{pF}$, $R_L = 1.9\text{k}\Omega$	15000	-	-	

Ratings and Characteristics Curves (@ $T_A = 25^\circ\text{C}$ unless otherwise specified)

Fig.1 Normalized CTR vs Forward Current

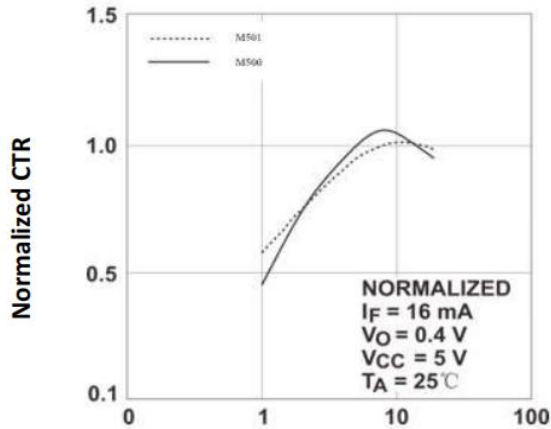


Fig.2 Normalized CTR vs Temperature

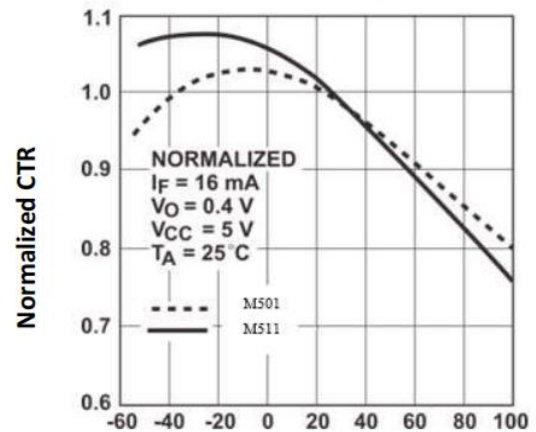


Fig.3 Output Current vs Output Voltage

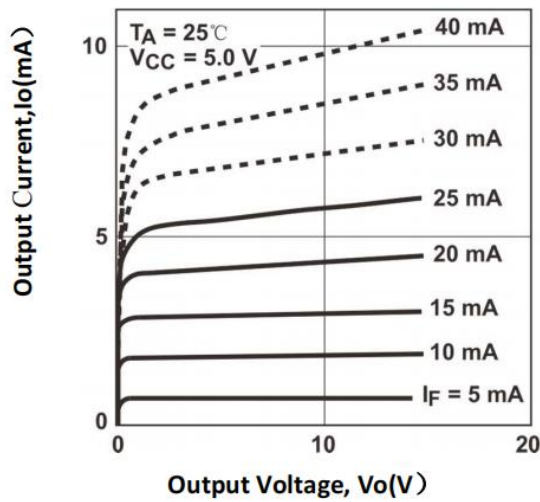


Fig.4 Logic High Output Current vs Temperature

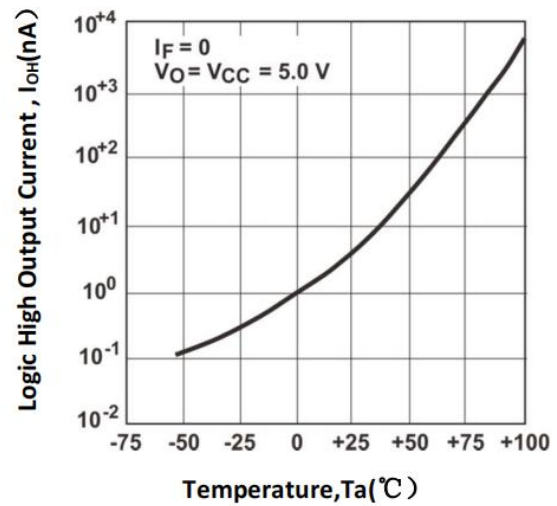


Fig. 5 Propagation Delay vs Temperature

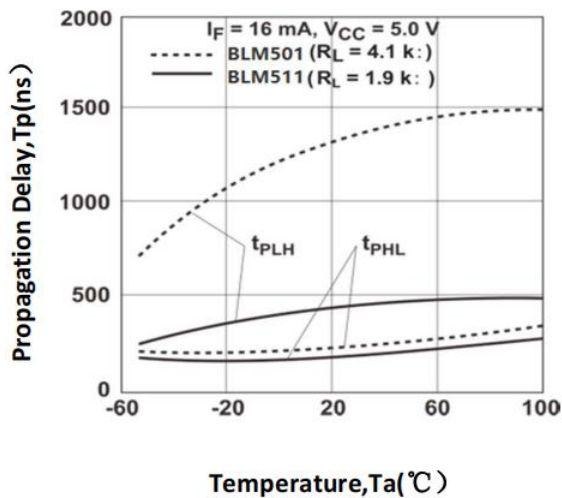


Fig.6 Propagation Delay vs Load Resistance

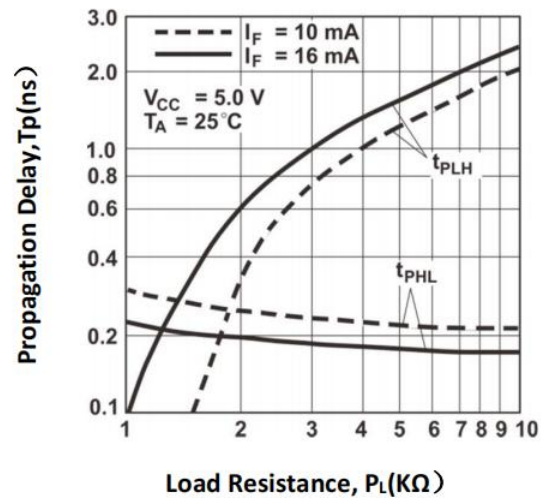


Fig.7 Test Circuit and Waveforms for t_{PLH} , t_{PHL} , t_r and t_f

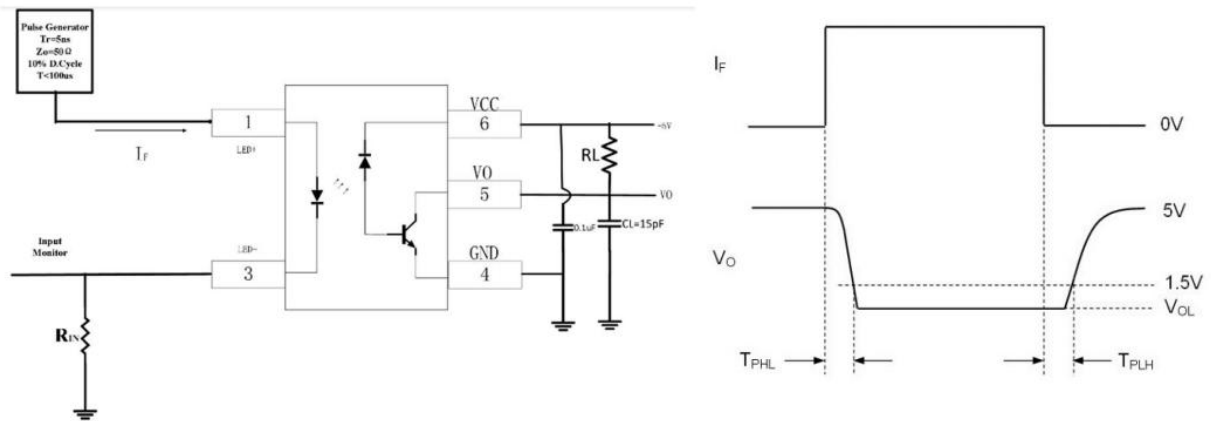
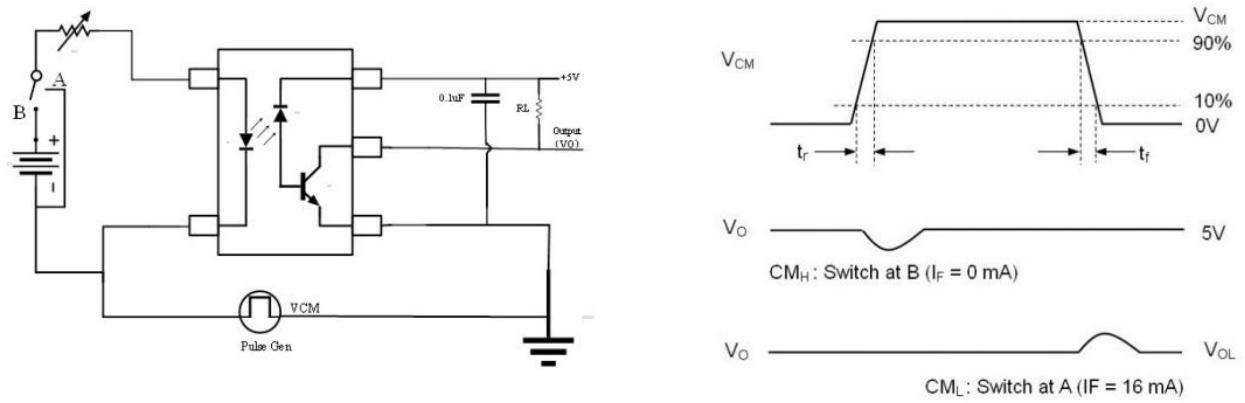
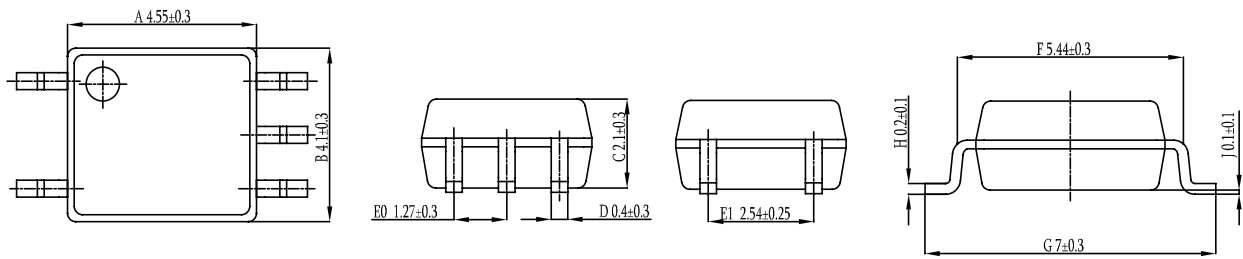


Fig.8 Test Circuit Common Mode Transient Immunity

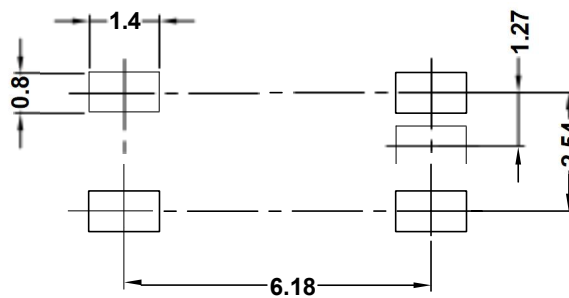


Package Outline Dimensions (unit: mm)

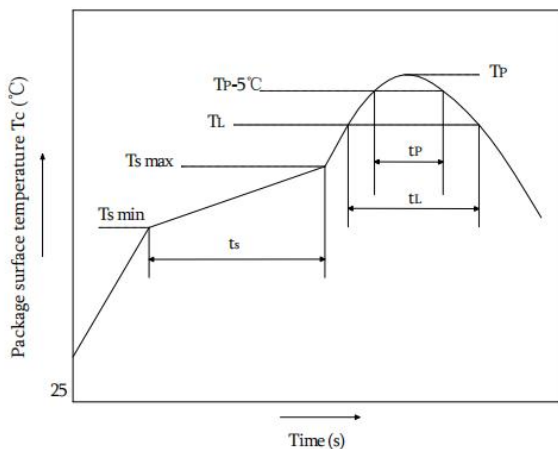
SOP5



SOLDERING FOOTPRINT (unit: mm)



Reflow soldering

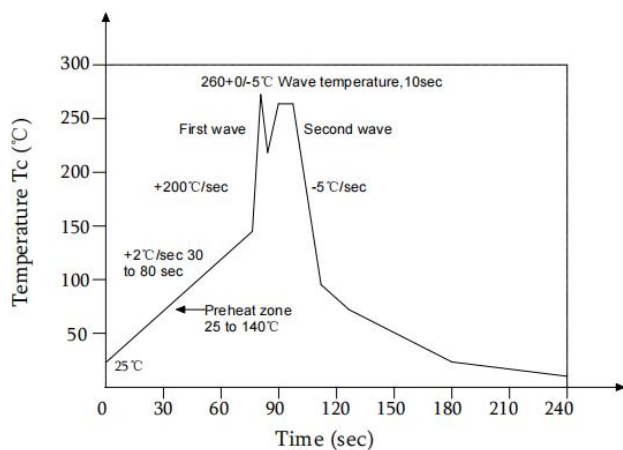


	Symbol	Min	Max	Unit
Preheat temperature	Ts	150	200	°C
Preheat time	ts	60	120	s
Ramp-up rate(TL to TP)			3	°C/s
Liquidus temperature	TL	217		°C
Time above TL	tL	60	150	s
Peak temperature	TP		260	°C
Time during which Tc is between (TP-5) and TP	tp		30	s
Ramp-down rate(TP to TL)			6	°C/s

Note:

Reflow soldering is recommended at the temperatures and times shown, no more than three times.

Wave soldering



Profile feature	
Average ramp-up rate	~200 °C/s
Heating rate during preheat	1 °C/s to 2 °C/s typical; 4 °C/s maximum
Final preheat temperature Ts	~130 °C
Preheat time (25°C to Ts)	>60s
Peak temperature TP	260 °C
Time within peak temperature tp	10s
Ramp-down rate	5 °C/s maximum

Soldering with hand soldering iron

- Hand soldering iron is only used for product rework or sample testing.
- Hand soldering iron requirements: Temperature: 360 °C ± 5 °C within 3s.

Packing

Package Type	Packing Form	Quantity per Tube &Reel	Quantity per Box	Quantity per Carton	Antistatic Bag Specification	Box Specification	Carton Specification	Note
SOP5	Reel($\phi 330$ mm)	3000 pcs/reel	2 reels /box	5 boxes /ctn	380*420mm	350*340*60mm	365*330*370mm	Leave 25 Spaces at the beginning and 50 Spaces at the end

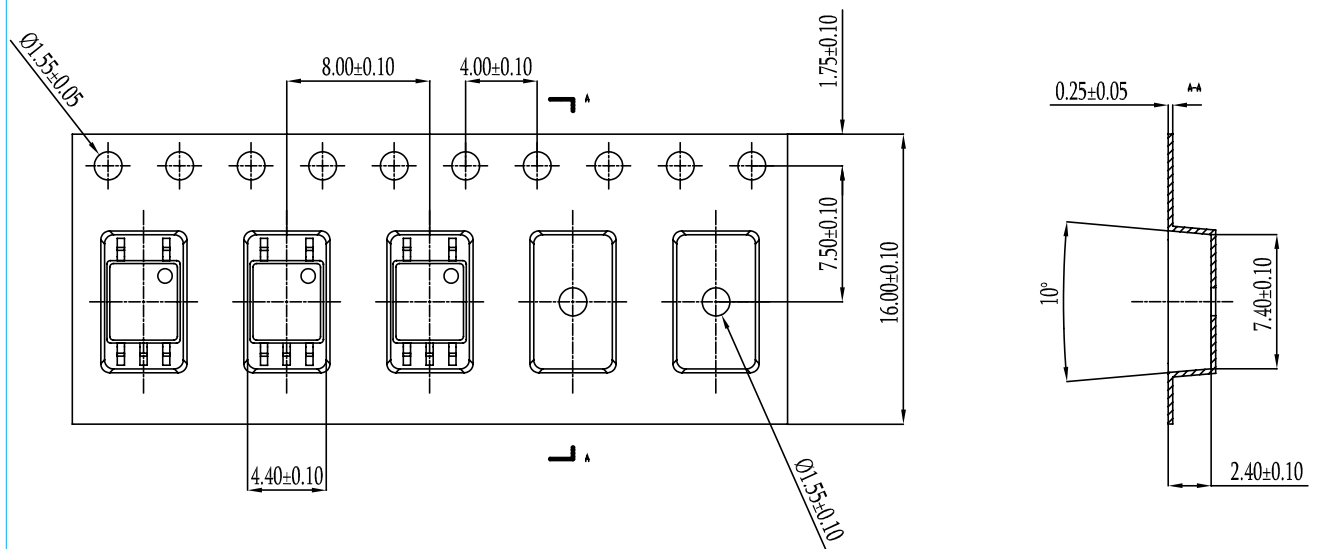
■Summary table

■SOP5 (Reel)

Qty/reel: 3000 pcs. Qty/box: 6000 pcs.

Qty/ctn : 30000 pcs.

Schematic : (unit:mm)



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