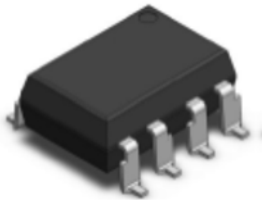
JOCHA14B-D8P/S Series

Rev.A.1.0

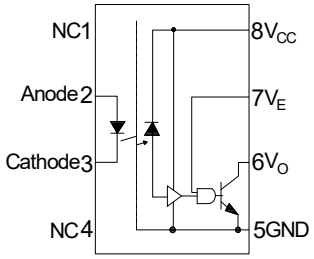
DESCRIPTION:

The products are 10MBd high-speed opto-couplers in a plastic DIP8 package with different lead forming options. The device consists of a high efficient AlGaAs Light Emitting Diode and a high speed optical detector. This design provides excellent AC and DC isolation between the input and output sides of the optocoupler. The output of the optical detector features an open collector Schottky clamped transistor. The enable function allows the optical detector to be strobed. A guaranteed common mode transient immunity is up to 10kV/μs at 3.3V. The optocoupler operational parameters are guaranteed over the temperature range from -40℃ ~ +110℃. The products are widely used in isolation in line receivers, digital isolation for A/D, D/A conversion, ground loop elimination, feedback element in switching mode power supplier, pulse transformer replacement, power transistor isolation in motor drives, interface between microprocessor system, computer and their peripheral.

JOCHA14B-D8P



JOCHA14B-D8S



MAIN FEATURES

High isolation 5000 VRMS
High speed – 10MBd typical
Operating temperature range -40°C to 110°C
REACH & RoHS compliance
HBM: H3A; MM: M4; CDM: C3
CQC approved
VDE approved
UL approved

Truth Table

INPUT	ENABLE	OUTPUT
H	H	L
L	H	H
H	L	H
L	L	H
H	NC	L
L	NC	H

ABSOLUTE MAXIMUM RATINGS (Temperature=25°C)

Parameter		Symbol	Value	Unit
Input	Forward Current	I_F	50	mA
	Peak Forward Current	I_{FP}	1①	A
	Reverse Voltage	V_R	6	V
	Input Power Dissipation	P_D	100	mW
Output	Supply Voltage	V_{CC}	7	V
	Output Voltage	V_O	7	V
	Output Current	I_O	50	mA
	Output Power Dissipation	P_O	85	mW
Total Power Dissipation		P_{tot}	200	mW
Isolation Voltage		V_{iso}	5000②	Vrms
Operating Temperature		T_{opr}	-40~110	℃
Junction Temperature		T_j	125	℃
Storage Temperature		T_{stg}	-55~125	℃
Soldering Temperature		T_{sol}	260	℃

NOTE1: 100μs pulse, 100Hz frequency

NOTE2: AC for 1minute, R.H.=40~60%

ELECTRICAL CHARACTERISTICS (Temperature=25°C)

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit
Input	Forward Voltage	V_F	I_F=10mA	-	1.35	1.6	V
	Reverse Current	I_R	V_R=6V	-	-	1	μA
	Input Capacitance	C_{in}	V=0, f=1MHz	-	34	-	pF
Output	High Level Output Current	I_{OH}	I_F=250μA, V_{CC}=3.3V, V_O=3.3V, V_E=2V	-	5	100	μA
	High Level Supply Current	I_{CCH}	V_{CC}=3.3V, I_F=0mA, V_E=0.5V	-	-	10	mA
	Low Level Supply Current	I_{CCL}	V_{CC}=3.3V, I_F=10mA, V_E=0.5V	-	-	13	mA

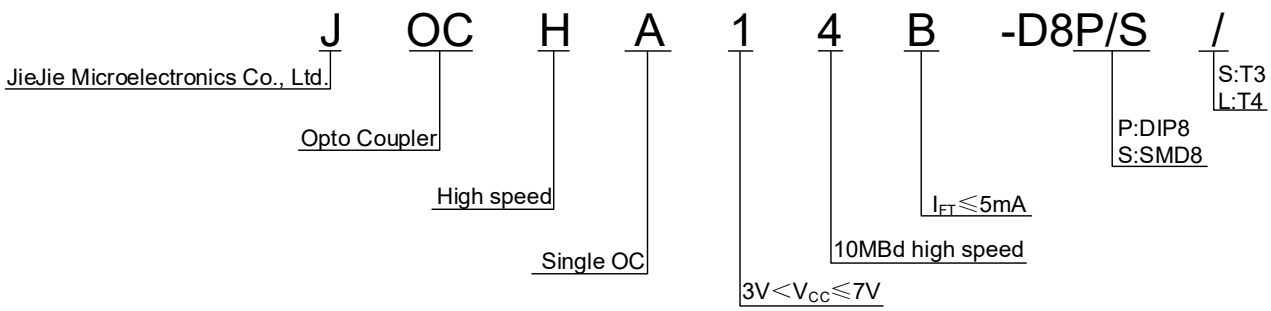
	Logic Low Output Voltage	V_{OL}	I_F=5mA, I_O=13mA, V_{CC}=3.3V, V_E=2V	-	0.3	0.6	V
	Isolation Resistance	R_{ISO}	DC500V 40~60%R.H.	-	10^{12}	-	Ω
	Floating Capacitance	C_{IO}	V=0, f=1MHz	-	1	-	pF
Switching Characteristics	Trigger LED Current	I_{FT}	V_{CC}=5V, V_O=V_{OL}	-	-	5	mA
	Propagation Delay Time to Logic Low	t_{PHL}	C_L=15pF, R_L=350Ω, I_F=7.5mA	-	-	60	ns
	Propagation Delay Time to Logic High	t_{PLH}		-	-	60	ns
	Pulse width distortion	$\|t_{PHL}-t_{PLH}\|$		-	-	35	ns
	Common Mode Transient Immunity at Logic High	CM_H	V_{CC}=3.3V, I_F=0mA, V_{CM}=1000V, R_L=350Ω	10	15	-	kV/μs
	Common Mode Transient Immunity at Logic Low	CM_L	V_{CC}=3.3V, I_F=10mA, V_{CM}=1000V, R_L=350Ω	10	15	-	kV/μs
	Rise Time	tr	C_L=15pF, R_L=350Ω, I_F=7.5mA	-	30	-	ns
	Fall Time	tf		-	30	-	ns

Recommended Operating Conditions

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Operating Temperature	T_a	-40	-	85	℃
Supply Voltage	V_{CC}	2.7	-	3.6	V
		4.5	-	5.5	
Low Level Input Current	I_{FL}	0	-	250	μA

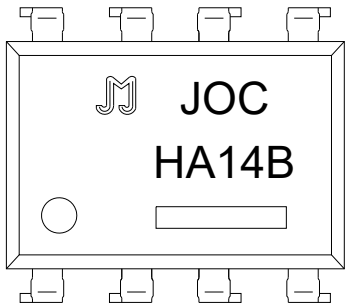
High Level Input Current	I_{FH}	7	-	15	mA
Output Pull-up Resistor	R_L	330	-	4k	Ω
Fan Out (at R_L=1kΩ per channel)	N	-	-	5	TTL Loads

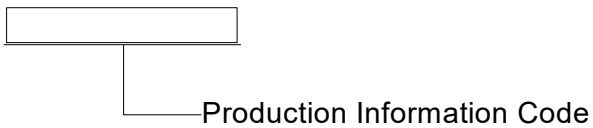
ORDERING INFORMATION



Packing Quantity			
Option	**Quantity**	**Quantity – Inner box**	**Quantity –Outer box**
DIP	50 Units/Tube	40 Tubes/Inner box	5 Inner box/Outer box =10k Units
SMD	1200 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box =12k Units

MARKING





Characteristics Curves

FIG.1: High Level Output Current vs. Ambient Temperature

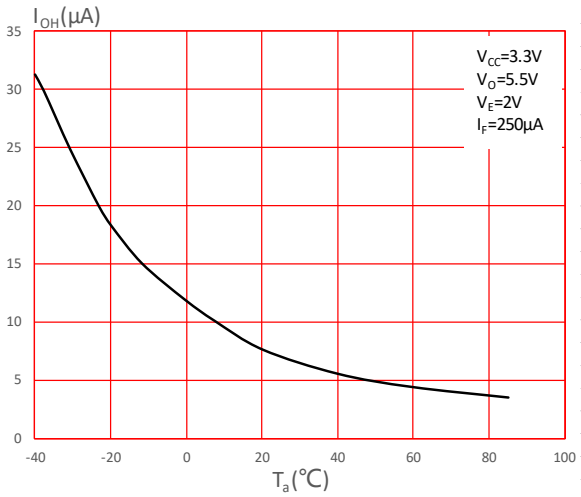


FIG.2: High Level Output Current vs. Ambient Temperature

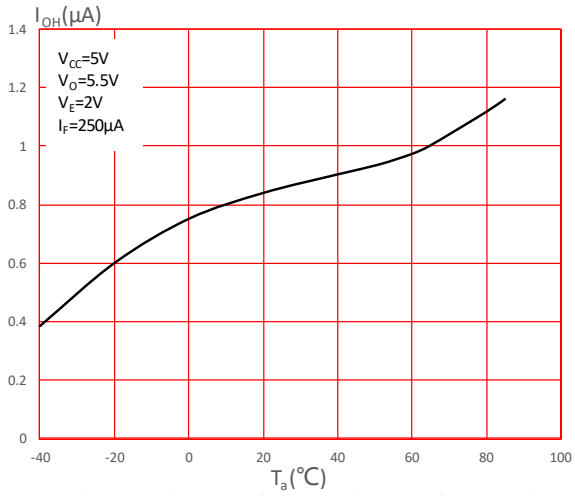


FIG.3: Input Threshold Current vs. Ambient Temperature

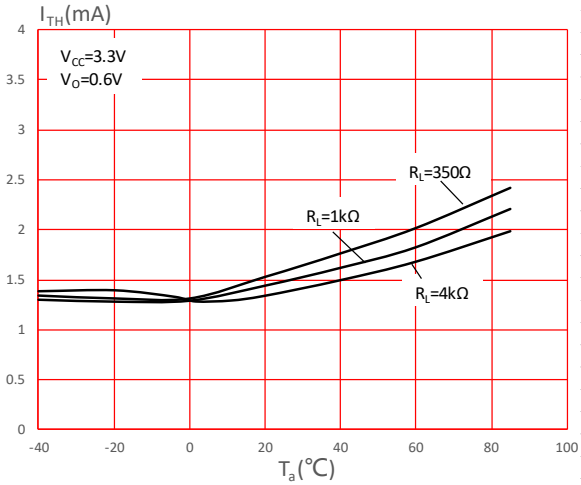


FIG.4: Input Threshold Current vs. Ambient Temperature

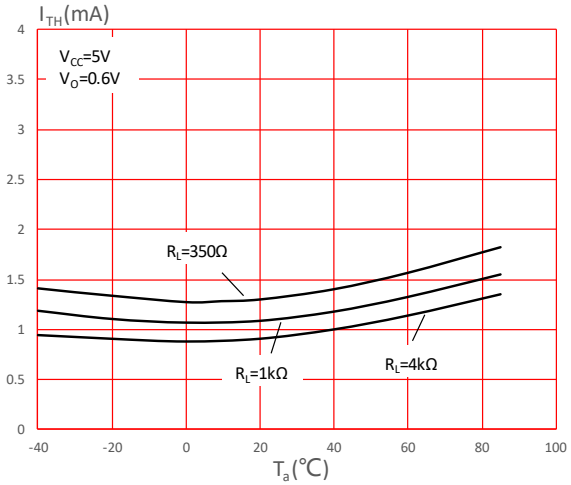


FIG.5: Low Level Output Voltage vs. Ambient Temperature

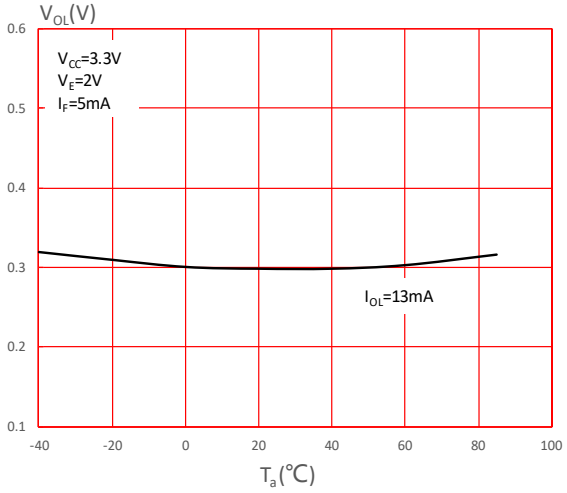


FIG.6: Low Level Output Voltage vs. Ambient Temperature

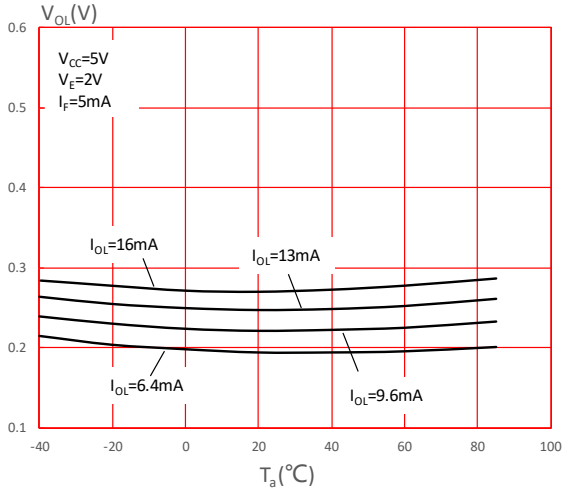


FIG.7: Low Level Output Current vs. Ambient Temperature

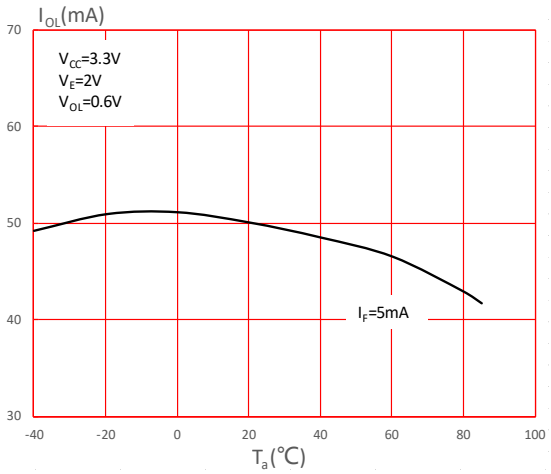


FIG.8: Low Level Output Current vs. Ambient Temperature

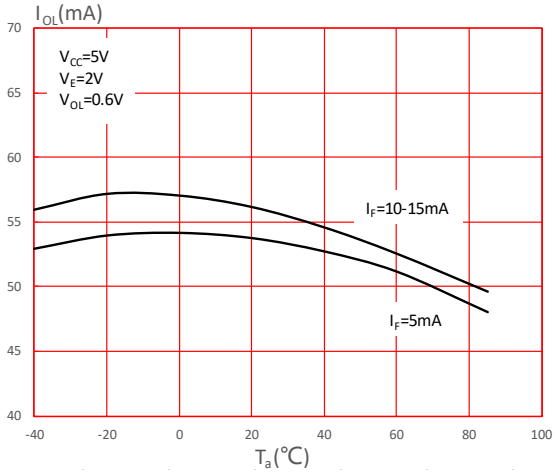


FIG.9: Input Forward Voltage vs. Input Forward Current

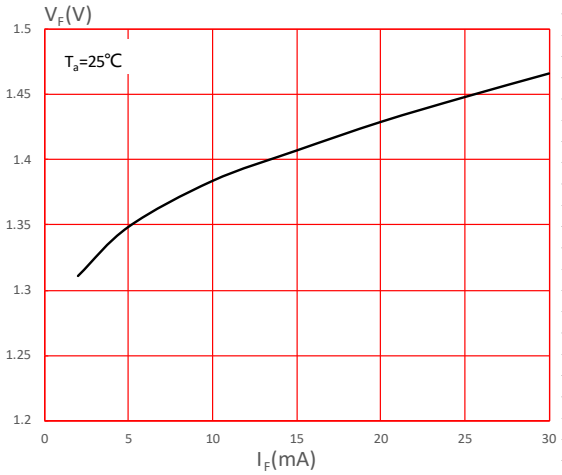


FIG.10: Forward Voltage vs. Ambient Temperature

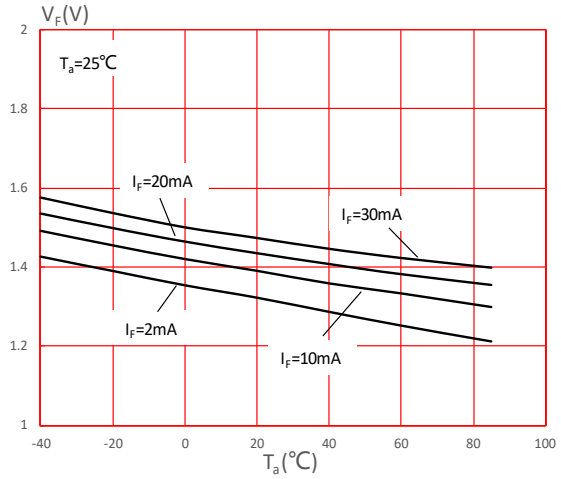


FIG.11: Propagation Delay vs. Ambient Temperature

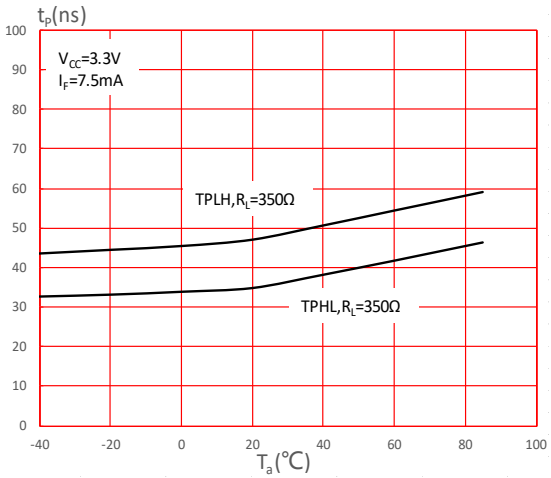


FIG.12: Propagation Delay vs. Ambient Temperature

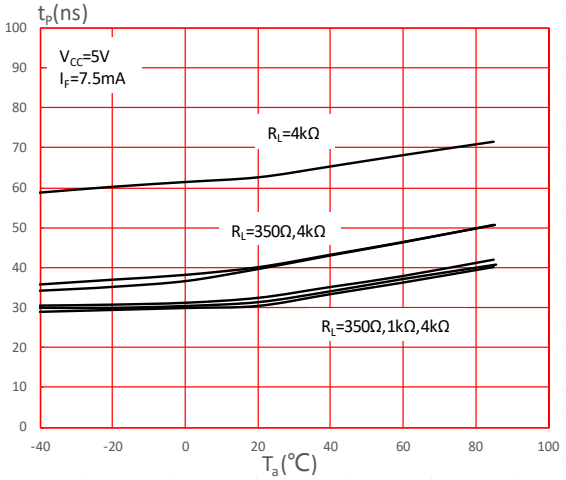


FIG.13: Pulse Width Distortion vs. Ambient Temperature

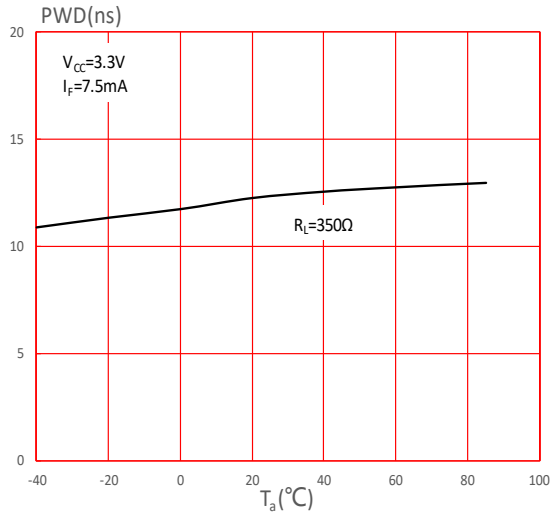
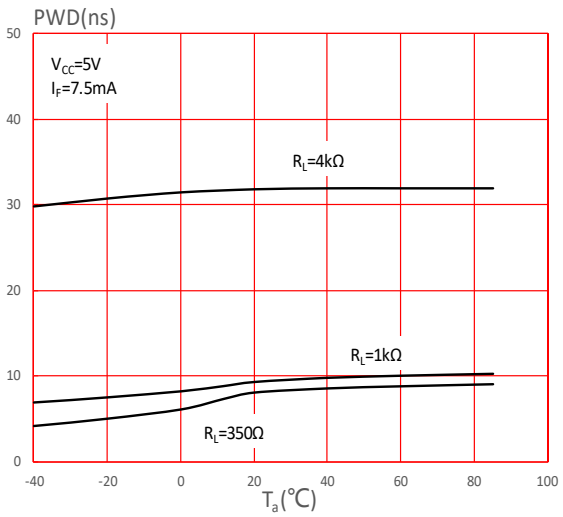


FIG.14: Pulse Width Distortion vs. Ambient Temperature



TEST CIRCUITS

Fig.15: Test Circuit for TPHL and TPLH

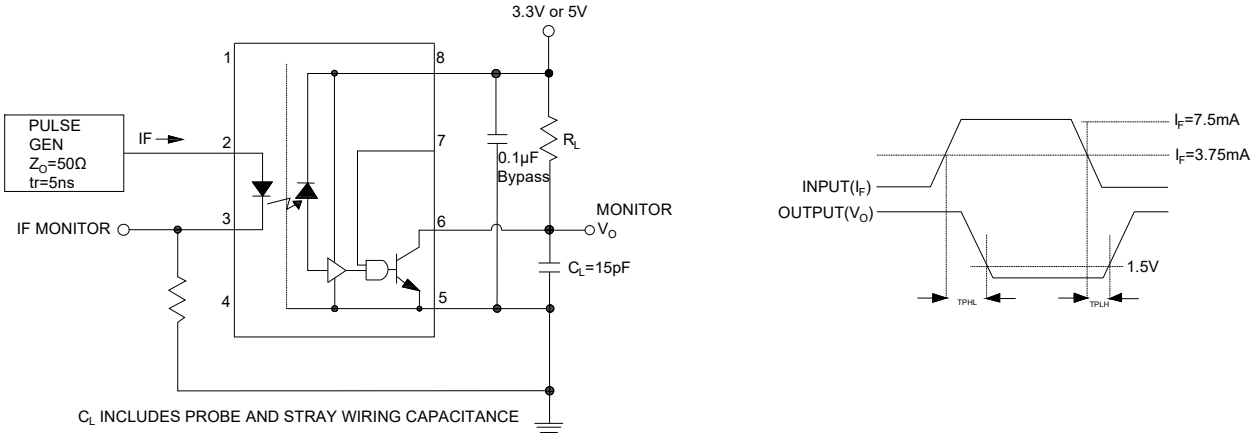


Fig.16: Single Channel Test Circuit for Common Mode Transient Immunity

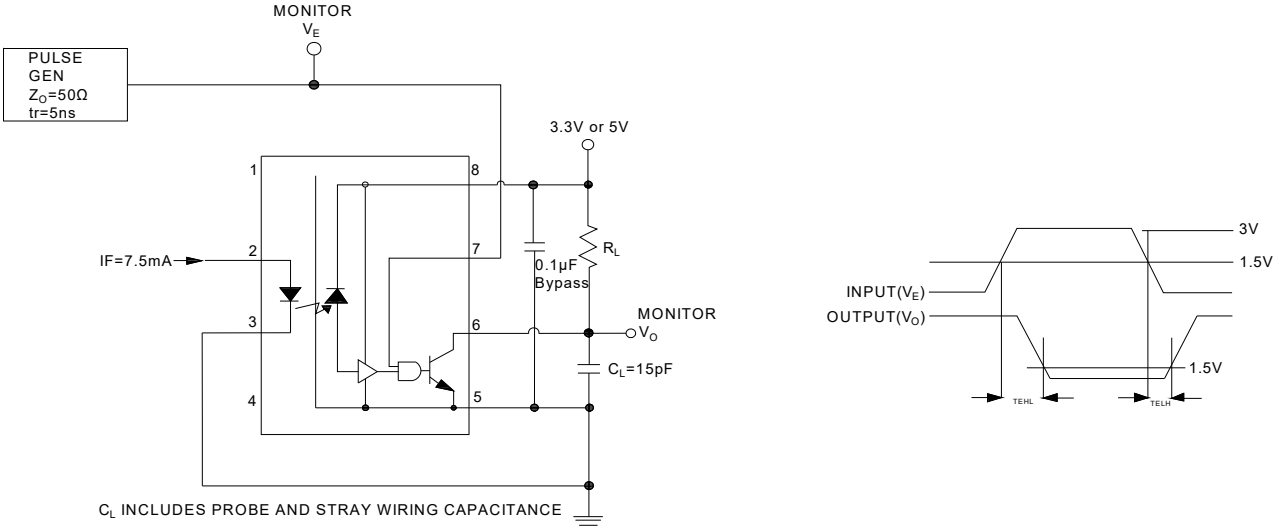
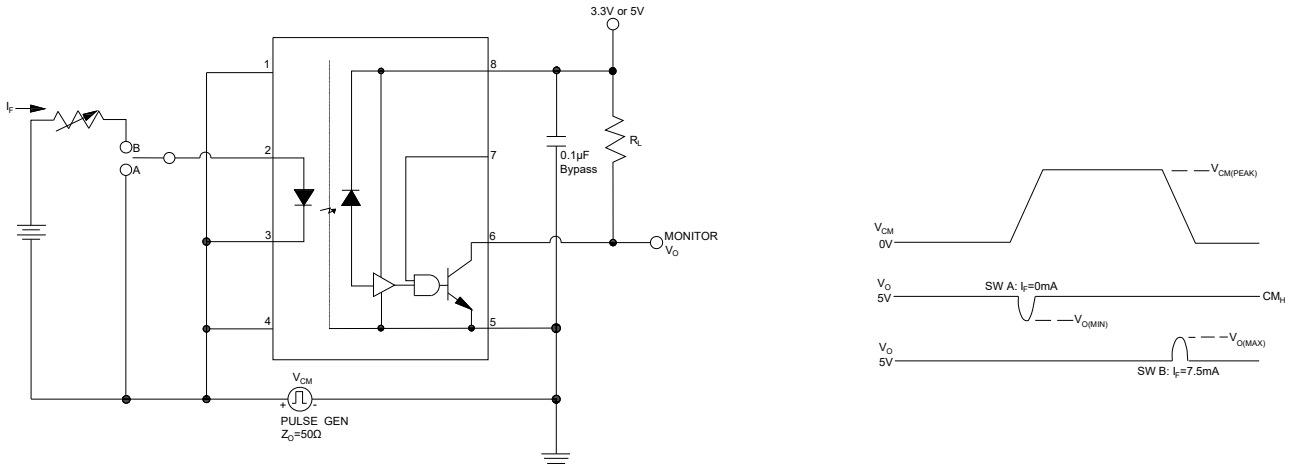
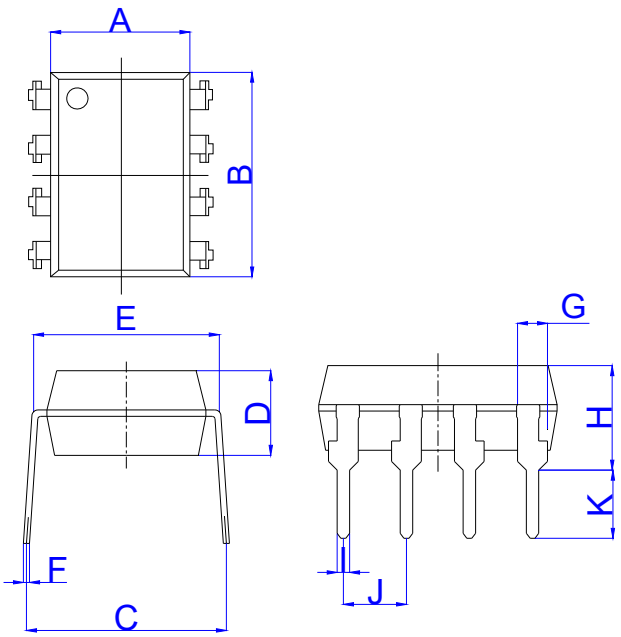


Fig.17: Single Channel Test Circuit for Common Mode Transient Immunity



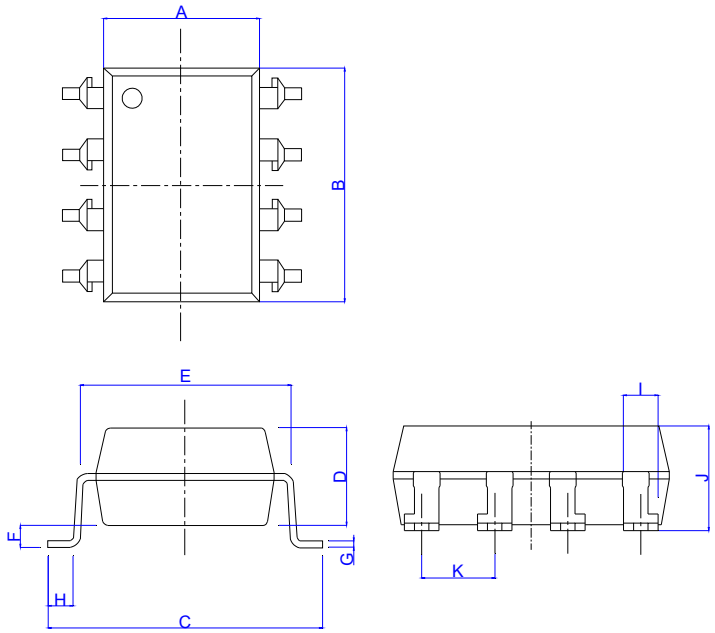
Package Dimension (Unit: mm)

Standard DIP Type:



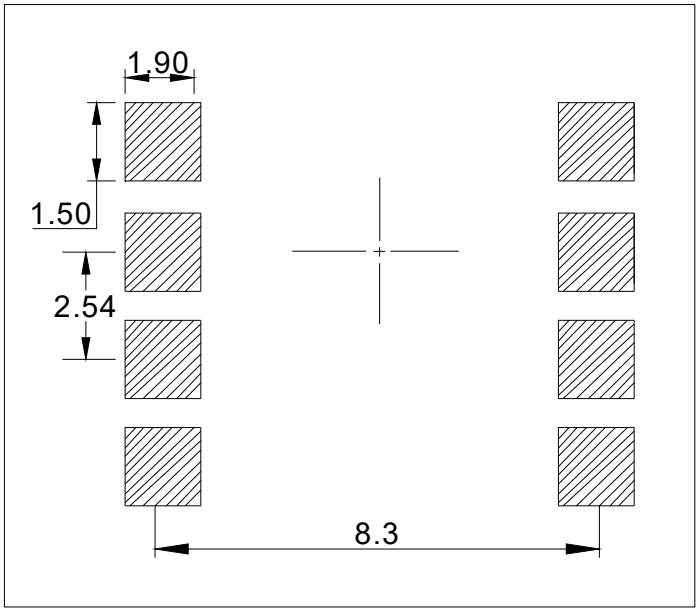
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.20		6.60	0.244		0.260
B	9.40		9.80	0.370		0.386
C	7.15		8.95	0.281		0.352
D	3.20		3.60	0.126		0.142
E	7.32		7.92	0.288		0.312
F	0.15		0.35	0.006		0.014
G	0.90		1.50	0.035		0.059
H	3.90		4.50	0.154		0.177
I	0.40		0.60	0.016		0.024
J	2.29		2.79	0.090		0.110
K	2.24		3.24	0.088		0.128

Option SMD Type:



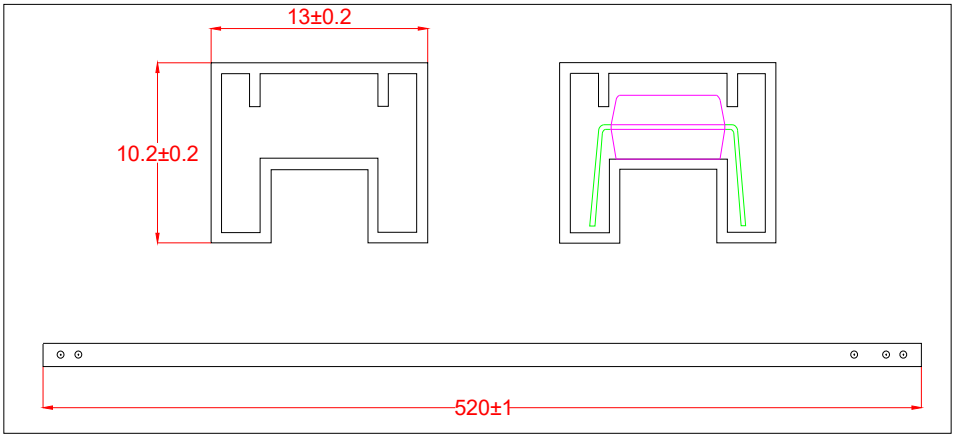
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	6.20		6.60	0.244		0.260
B	9.40		9.80	0.370		0.386
C	9.50		10.50	0.374		0.413
D	3.20		3.60	0.126		0.142
E	7.32		7.92	0.288		0.312
F	0.05		0.35	0.002		0.014
G	0.16		0.36	0.006		0.014
H	0.60		1.40	0.024		0.055
I	0.90		1.50	0.035		0.059
J	3.30		3.90	0.130		0.154
K	2.29		2.79	0.090		0.110

RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)



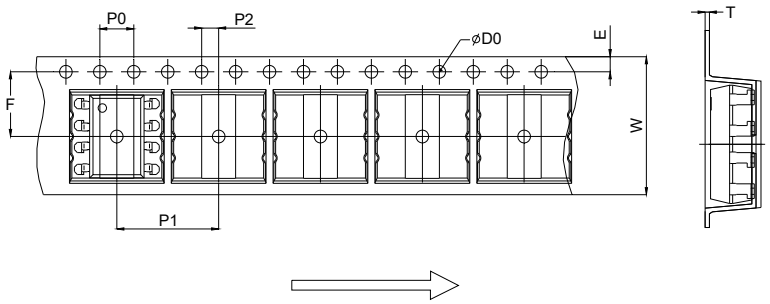
TUBE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Standard DIP



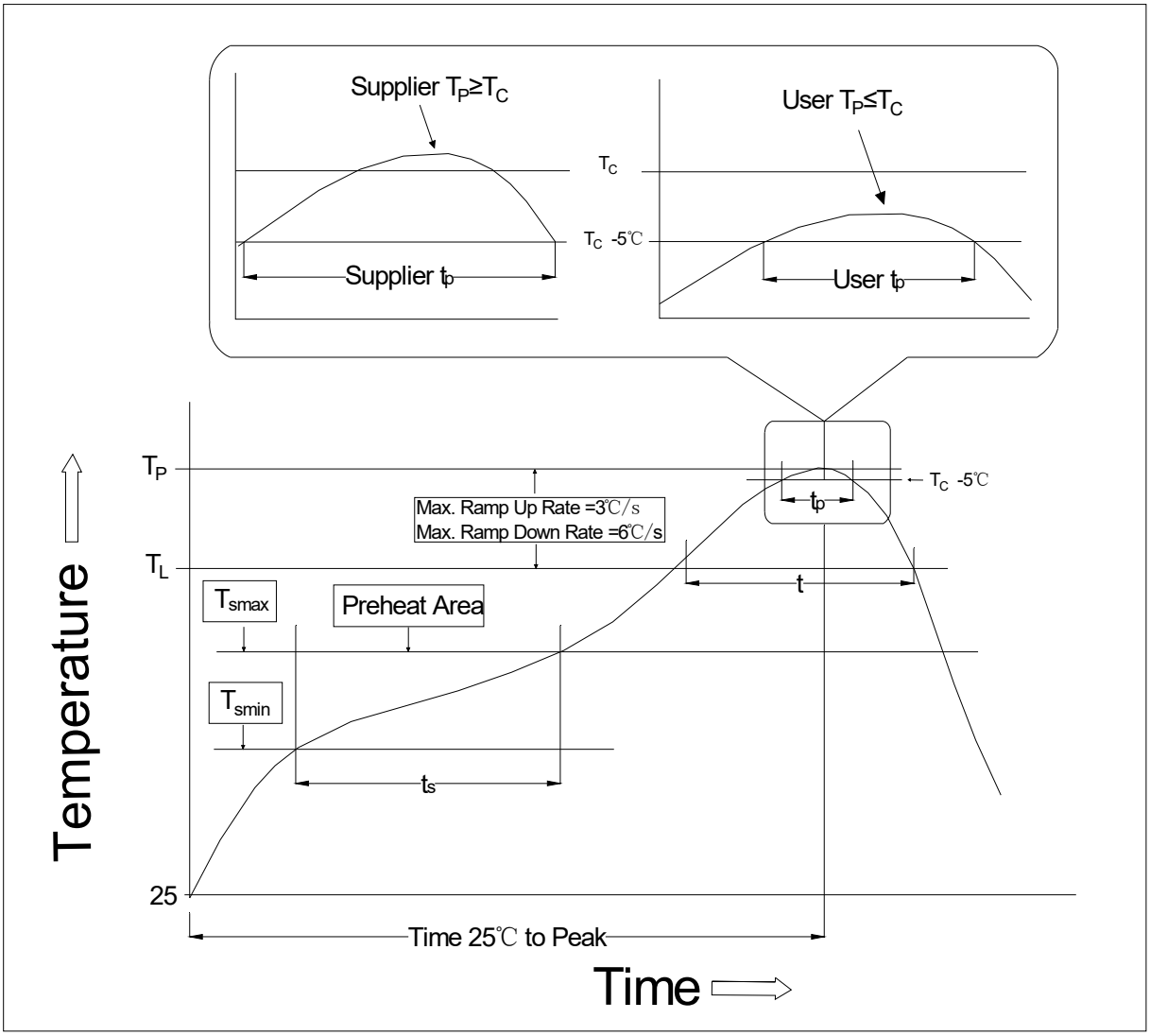
CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option S/L



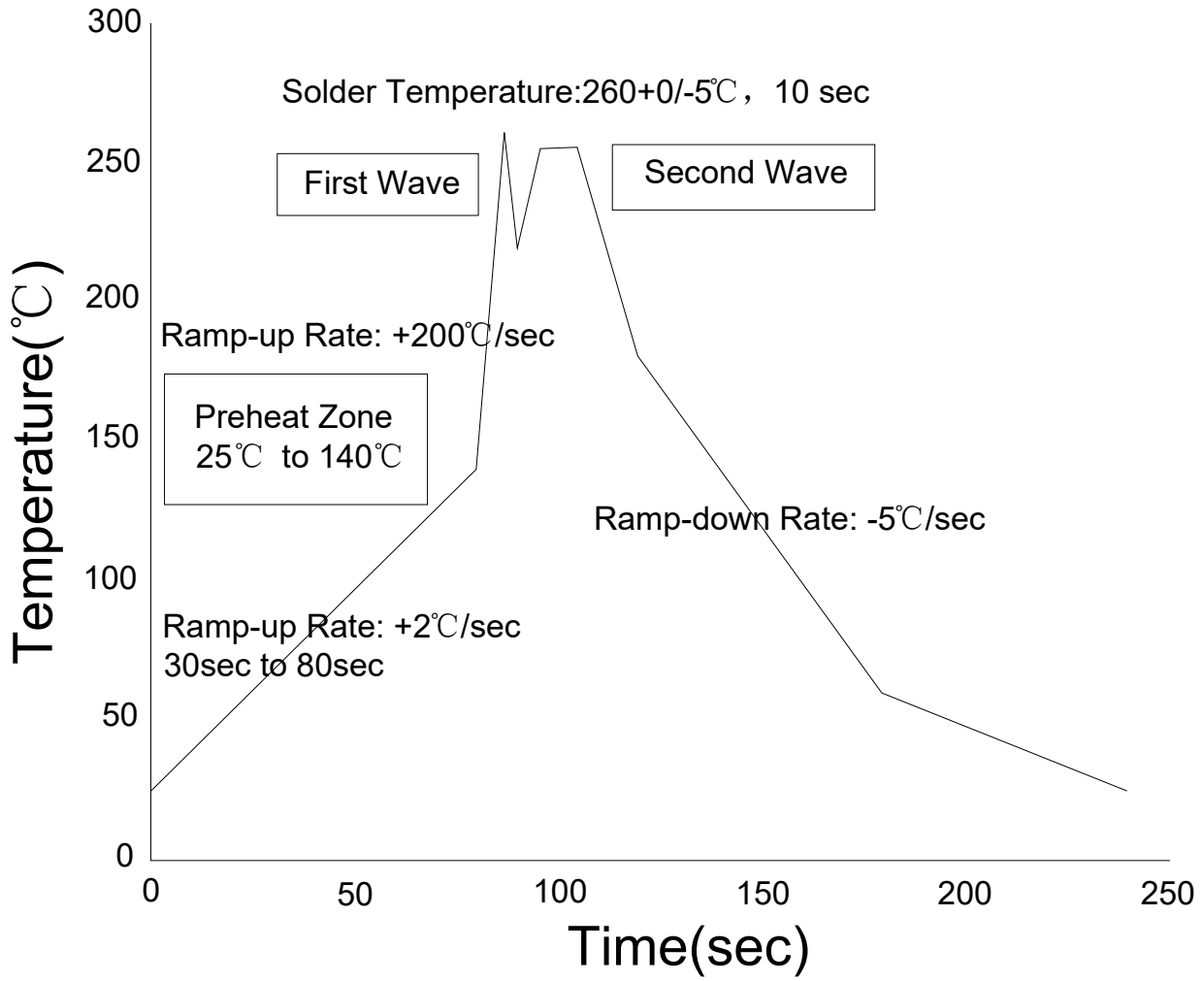
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
D0		1.50	1.60		0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	11.90	12.00	12.10	0.469	0.472	0.476
P2	1.90	2.00	2.10	0.075	0.079	0.083
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
T	0.35	0.40	0.45	0.014	0.016	0.018
W	15.90	16.00	16.20	0.626	0.630	0.638

REFLOW INFORMATION



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	100℃	150℃
Temperature Max. (Tsmax)	150℃	200℃
Time (ts) from (Tsmin to Tsmax)	60-120 seconds	60-120 seconds
Ramp-up Rate (tL to tP)	3℃/second max.	3℃/second max.
Liquidus Temperature (TL)	183℃	217℃
Time (tL) Maintained Above (TL)	60-150 seconds	60-150 seconds
Peak Body Package Temperature	235℃+0℃/-5℃	260℃+0℃/-5℃
Time (tP) within 5℃ of 260℃	10 seconds	10 seconds
Ramp-down Rate (TP to TL)	3-6℃/second	3-6℃/second
Time 25℃ to Peak Temperature	6 minutes max.	8 minutes max.

WAVE SOLDERING



HAND SOLDERING BY SOLDERING IRON	
Soldering Temperature	360±5℃
Soldering Time	3s max.

Note:

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

2. Avoid direct contact between the epoxy body and any tools or surfaces exceeding its maximum storage temperature.

3. Application of pressure on the epoxy body is prohibited at elevated temperatures. In specific scenarios, any applied force must not exceed 2.5N.

4. Ensure the component has cooled to ambient temperature before proceeding with any subsequent manufacturing steps.

5. The component has a shelf life of one year when stored under standard conditions.

6. Recommend storage Temp.: 0~40°C;

Recommend storage humidity: <60%;

MSL level: MSL 1