BRIGHTEK

BRIGHTEK (EUROPE) LIMITED

Brighten Up The World With LED!

PRODUCT DATASHEET

- ▶ DC Input Photo Coupler
- ▶ Standard DIP8
- ▶ 2.5A Gate Driver

Release Date: 14 July 2025 Version: 0.1

TD3120-GV

TD3120 Series

TD3120 Series

RoHS Compliant

DESCRIPTION:

The TD3120 series combines an AlGaAs infrared emitting diode as the emitter which is optically coupled to an integrated circuit with a power output stage in a plastic DIP8 package with different lead forming options.

FEATURES:

- High isolation 5000Vrms
- DC input with a high-speed driver
- Operating temperature range -55°C to +100°C
- REACH & RoHS compliance
- MSL class 1
- Regulatory Approvals:
  - UL - UL1577
  - VDE - EN60747-5-5 (VDE0884-5)
  - CQC - GB4943.1, GB8898
- Packing: 50pcs/tube

APPLICATIONS:

- Isolated IGBT/Power MOSFET gate drive
- Industrial Inverter
- AC brushless and DC motor drives
- Induction Heating

Partner with: LIGHTNING

NAMING & ORDERING INFORMATION:

Naming Information:

TD3120 - G V	
TD3120	Part Number
G	Green Option
V	VDE Option

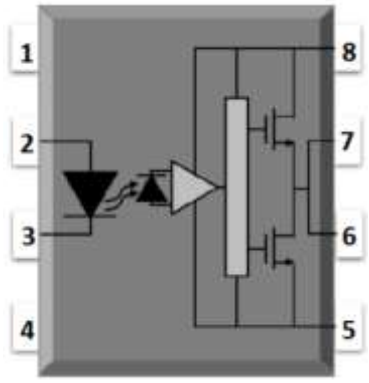
Ordering Information:

TD3120-GV

Version No.	Original Release Date
Rev: 0.1	27/07/2018

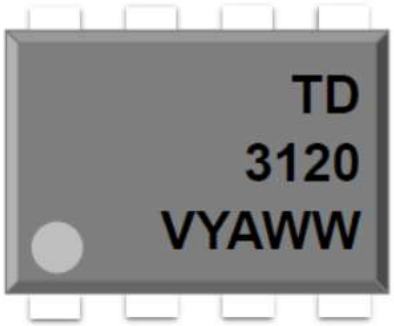
SCHEMATIC DIAGRAM & MARKING:

Schematic Diagram:



PIN Definition	
1	NC
2	Anode
3	Cathode
4	NC
5	GND
6	VO
7	VO
8	VCC

Marking Information:



Marking Definition	
TD	Manufacturer Code
3120	Part Number
V	VDE Applicable
Y	Fiscal Year
A	Manufacturing Code
WW	Work Week

Labelling Information:

This product is manufactured by

for Brightek (Europe) Limited

ABSOLUTE CHARACTERISTICS:

Absolute Maximum Ratings:

Parameter	Symbol	Ratings	Unit
INPUT			
Forward Current	I_F	25	mA
Peak Forward Current	I_{FP}	50 *1	mA
Peak Transient Current	$I_{F(trans)}$	1 *2	A
Operating Frequency	f	50	kHz
Reverse Voltage	V_R	5	V
Input Power Dissipation	P_I	100	mW
OUTPUT			
Supply Voltage	V_{CC}	35	V
Output Voltage	V_O	35	V
Peak Output Current	I_O	2.5	A
Output Power Dissipation	P_O	250	mW
COMMON			
Total Power Dissipation	P_{tot}	295	mW
Isolation Voltage	V_{iso}	5000 *3	Vrms
Operating Temperature	T_{opr}	-55~+100	°C
Storage Temperature	T_{stg}	-55~+125	°C
Soldering Temperature	T_{sol}	260 *4	°C

*1. 50% duty, 1ms P.W.
*2. ≤1μs P.W., 300pps.
*3. AC for 1 minute, R.H.=40~60%.
*4. For 10 seconds.

ELECTRICAL CHARACTERISTICS:

Recommended Operation Conditions:

Parameter	Symbol	Ratings	Unit
Operating Temperature	T_{OPR}	-40~+100	˚C
Supply Voltage	V_{CC}	15~30	V
Input Current (ON)	$I_{F(ON)}$	7~16	mA
Input Voltage (OFF)	$V_{F(OFF)}$	0~0.8	V

Truth Table:

LED	V_{DD}-V_{SS} "Positive Going" (Turn-on)	V_{DD}-V_{SS} "Negative Going" (Turn-off)	V_O
Off	0~30V	0~30V	Low
On	0~11.5V	0~10V	Low
On	11.5~13.5V	10~12V	Transition
On	13.5~30V	12~30V	High

ELECTRICAL CHARACTERISTICS:

Electrical Optical Characteristics:

Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
INPUT (at T_a=25°C, V_{CC}=30V, V_{EE}=GND, unless specified otherwise)						
Forward Voltage	V_F	---	1.38	1.8	V	I_F=10mA
Reverse Current	I_R	---	---	10	μA	V_R=5V
Input Capacitance	C_{IN}	---	13	---	pF	V=0, f=1MHz
OUTPUT (at T_a=25°C, V_{CC}=30V, V_{EE}=GND, unless specified otherwise)						
High Level Supply Current	I_{CCH}	---	1.75	3	mA	I_F=7~10mA V_O=OPEN
Low Level Supply Current	I_{CCL}	---	1.85	3	mA	V_F=0~0.8V V_O=OPEN
TRANSFER CHARACTERISTICS (at T_a=25°C, V_{CC}=30V, V_{EE}=GND, unless specified otherwise)						
High Level Output Voltage	V_{OH}	V_{CC}-1.5	V_{CC}-1.2	---	V	I_F= 10mA I_O=-100mA
Low Level Output Voltage	V_{OL}	---	V_{EE}+0.1	V_{EE}+0.25	V	I_F= 0mA I_O=100mA
High Level Output Current	I_{OPH}	-1	---	---	A	V_O=V_{CC}-3.5V
		-2.5	---	---	A	V_O=V_{CC}-6.0V
Low Level Output Current	I_{OPL}	1	---	---	A	V_O=V_{EE}+1.5V
		2.5	---	---	A	V_O=V_{EE}+3.5V
Input Threshold Current	I_{FLH}	---	2	5	mA	I_O=0mA, V_O>5V
Input Threshold Voltage	V_{FHL}	0.8	---	---	V	I_O=0mA, V_O<5V
Under Voltage Lockout Threshold	V_{UVLO+}	11	11.68	13.5	V	I_O=10mA, V_O>5V
	V_{UVLO-}	9.5	10.68	12	V	I_O=10mA, V_O<5V
Isolation Resistance	R_{iso}	10^{12}	10^{14}	---	Ω	DC500V 40~60% R.H.
Floating Capacitance	C_{IO}	---	1.0	---	pF	V=0, f=1MHz

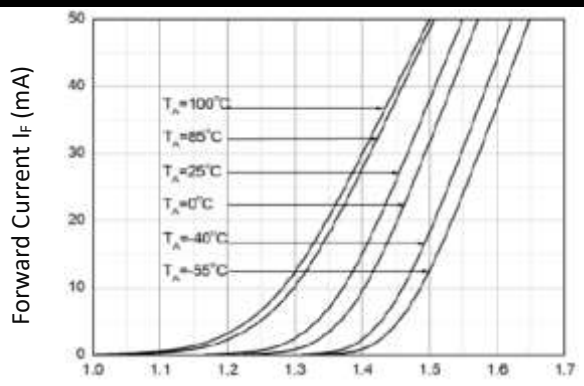
ELECTRICAL CHARACTERISTICS:

Electrical Optical Characteristics:

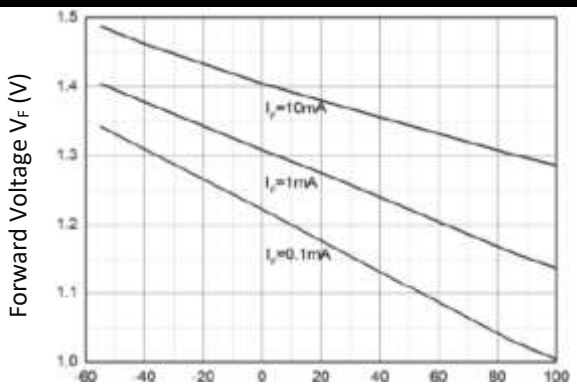
Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
SWITCHING CHARACTERISTICS (at T_a=25°C, V_{CC}=30V, V_{EE}=GND, unless specified otherwise)						
Propagation Delay Time to Output Low Level	T_{PHL}	50	195	500	ns	I_F=7~16mA C_L=10nF f=10kHz Duty=50% R_L=10Ω T_a=25°C
Propagation Delay Time to Output High Level	T_{PLH}	50	255	500	ns	
Pulse Width Distortion	$\lvert T_{PHL}-T_{PLH}\rvert$	---	60	200	ns	
Propagation Delay Skew	t_{PSK}	-200	---	200	ns	
Rise Time	t_r	---	30	---	ns	
Fall Time	t_f	---	30	---	ns	
UVLO Turn On Delay	$t_{UVLO(ON)}$	---	1.6	---	µs	I_F=10mA, V_O>5V
UVLO Turn Off Delay	$t_{UVLO(OFF)}$	---	0.4	---	µs	I_F=10mA, V_O<5V
Common Mode Transient Immunity at Logic High	CM_H	-20	---	---	kV/µs	I_F=7~16mA V_{CC}=30V, V_{CM}=2kV T_a=25°C
Common Mode Transient Immunity at Logic Low	CM_L	20	---	---	kV/µs	I_F=0mA V_{CC}=30V, V_{CM}=2kV T_a=25°C

CHARACTERISTIC CURVES:

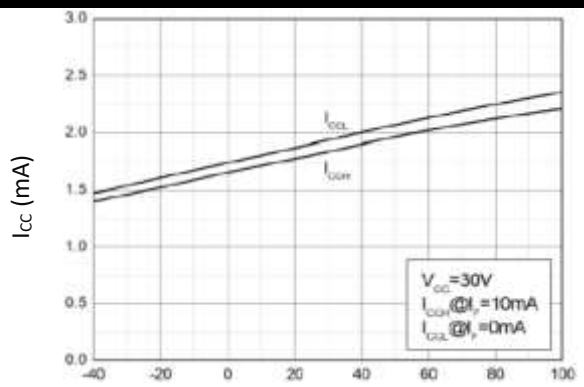
Forward Current v.s. Forward Voltage



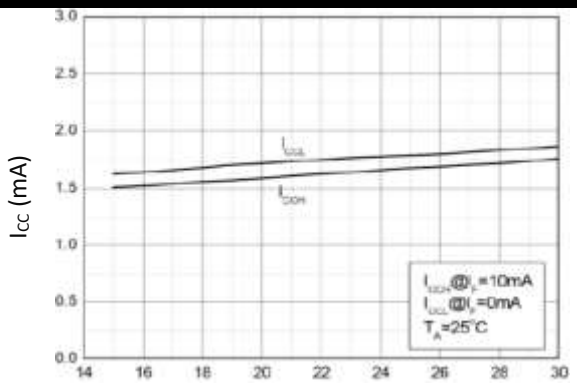
Forward Voltage v.s. Ambient Temperature



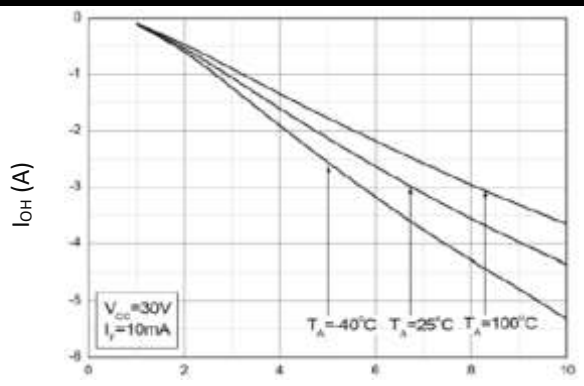
Supply Current v.s. Ambient Temperature



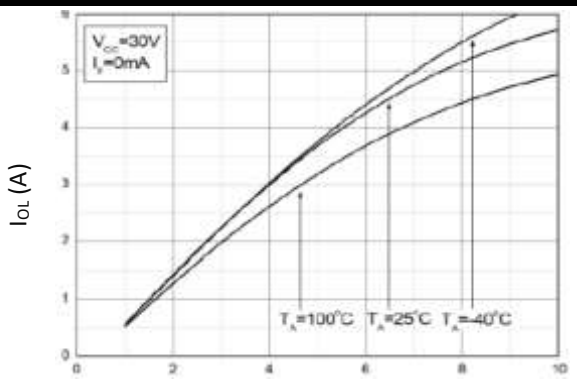
Supply Current v.s. Supply Voltage



High Level Output Voltage v.s. High Level Output Current

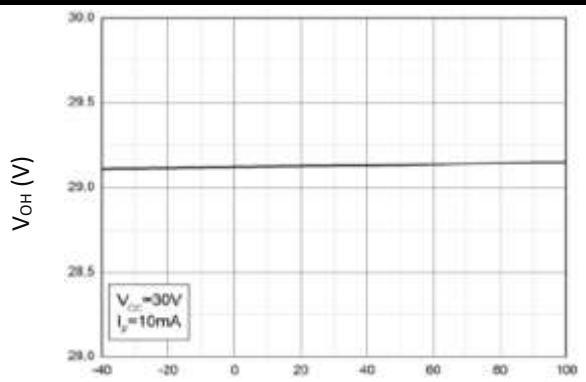


Low Level Output Voltage v.s. Low Level Output Current

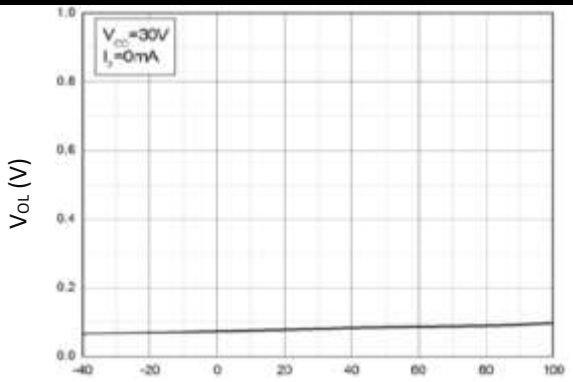


CHARACTERISTIC CURVES:

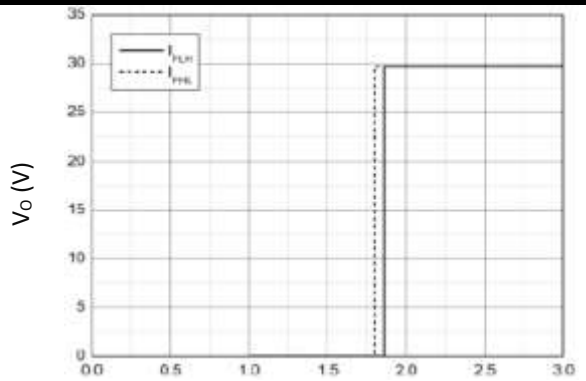
High Level Output Voltage v.s. Ambient Temperature



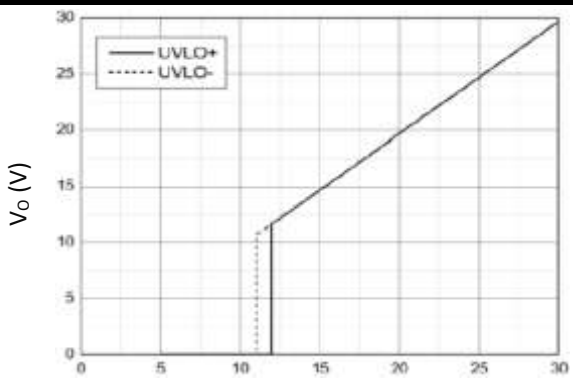
Low Level Output Voltage v.s. Ambient Temperature



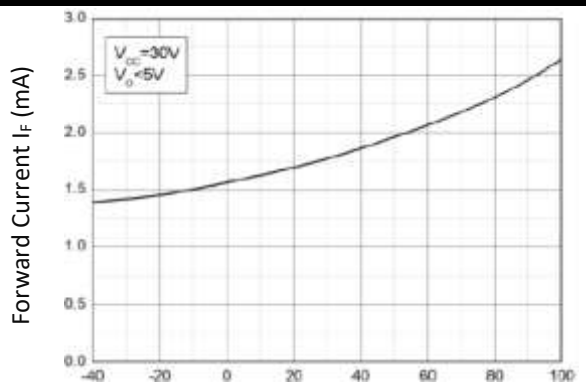
Output Voltage v.s. Forward Current



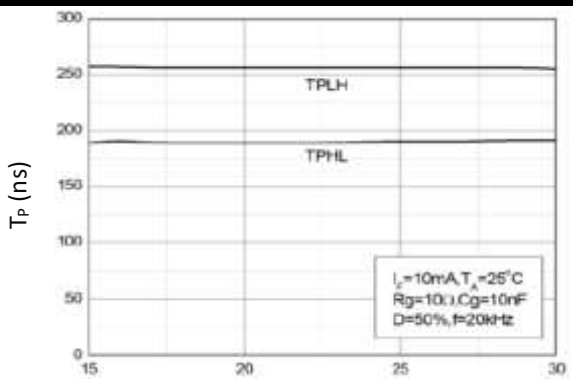
Output Voltage v.s. Supply Voltage



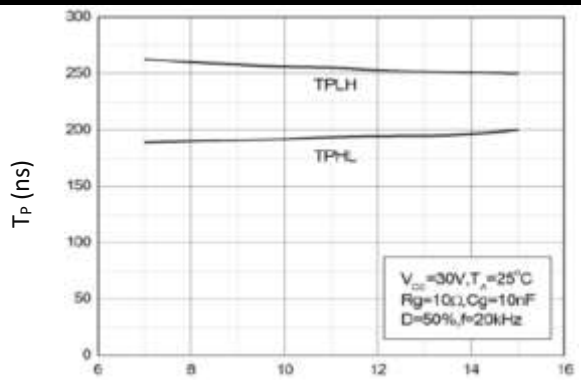
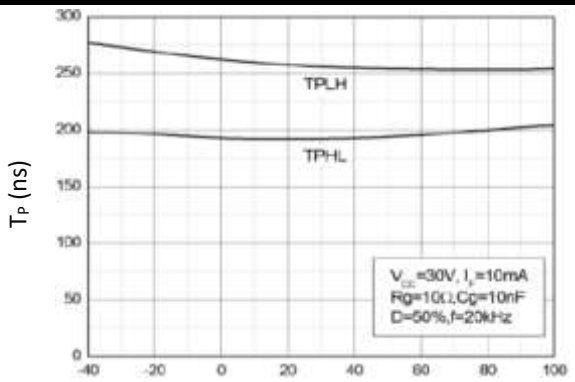
Forward Current v.s. Ambient Temperature

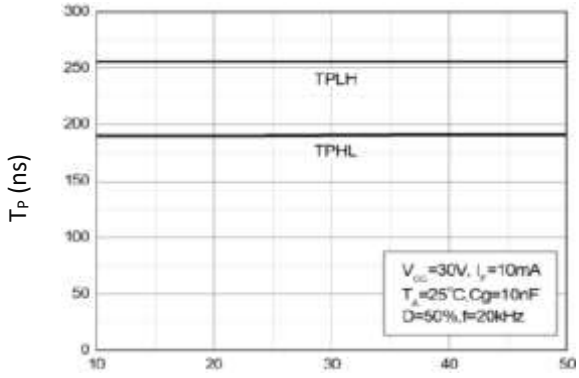
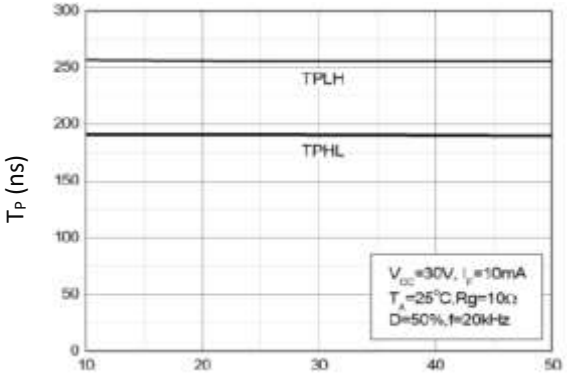


Propagation Delay v.s. Supply Voltage



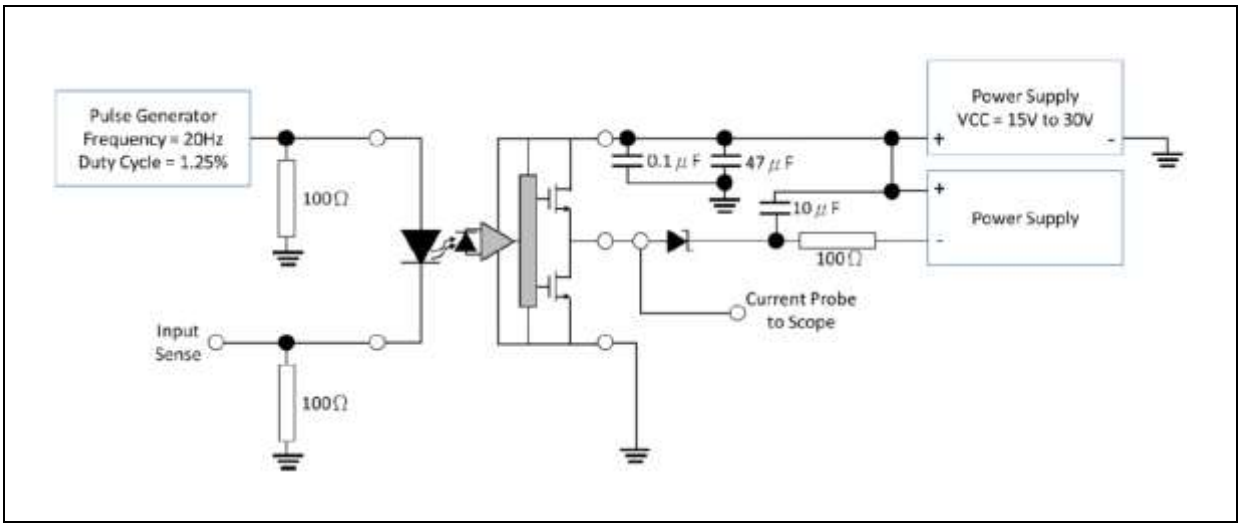
CHARACTERISTIC CURVES:

Propagation Delay v.s. Forward Current	Propagation Delay v.s. Ambient Temperature
	
Forward Current I_F (mA)	Ambient Temperature T_a (°C)

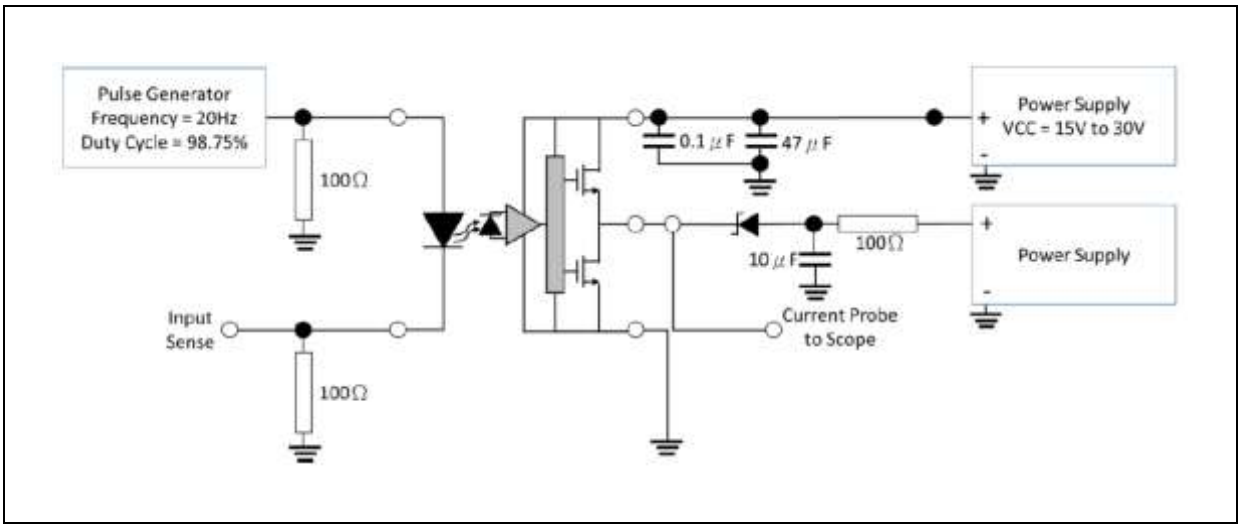
Propagation Delay v.s. Load Resistance	Propagation Delay v.s. Load Capacitance
	
R_g (Ω)	C_g (nF)

TEST CIRCUIT:

Test Circuit for IOH:

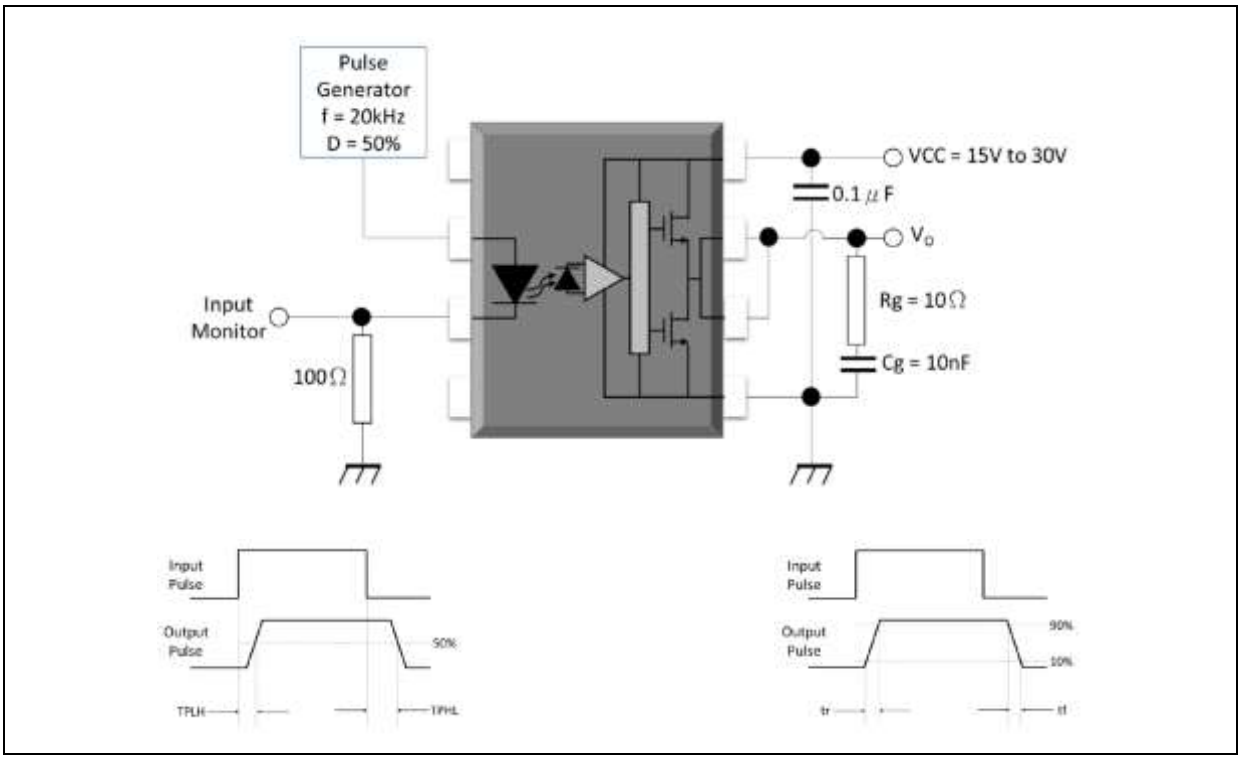


Test Circuit for IOL:

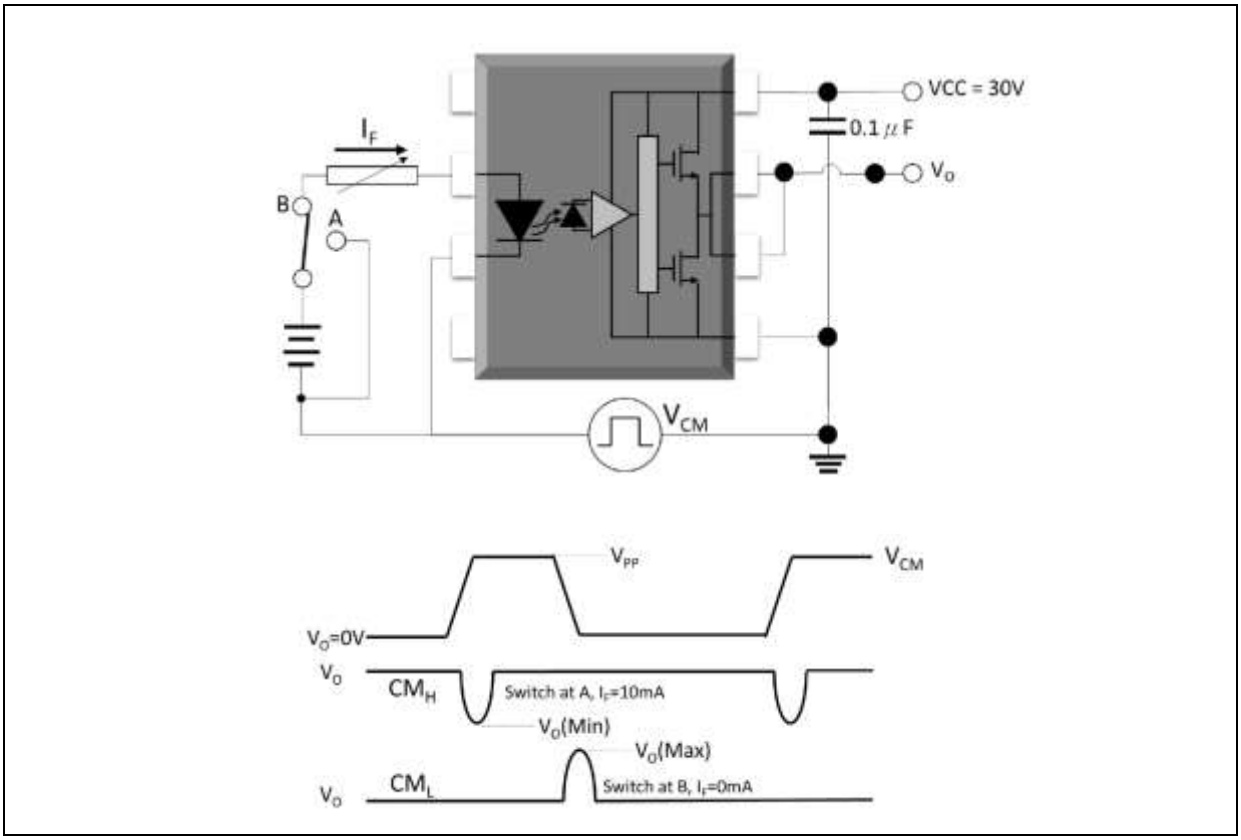


TEST CIRCUIT:

Test Circuit and Waveforms for TPHL, TPLH, tr, tf:



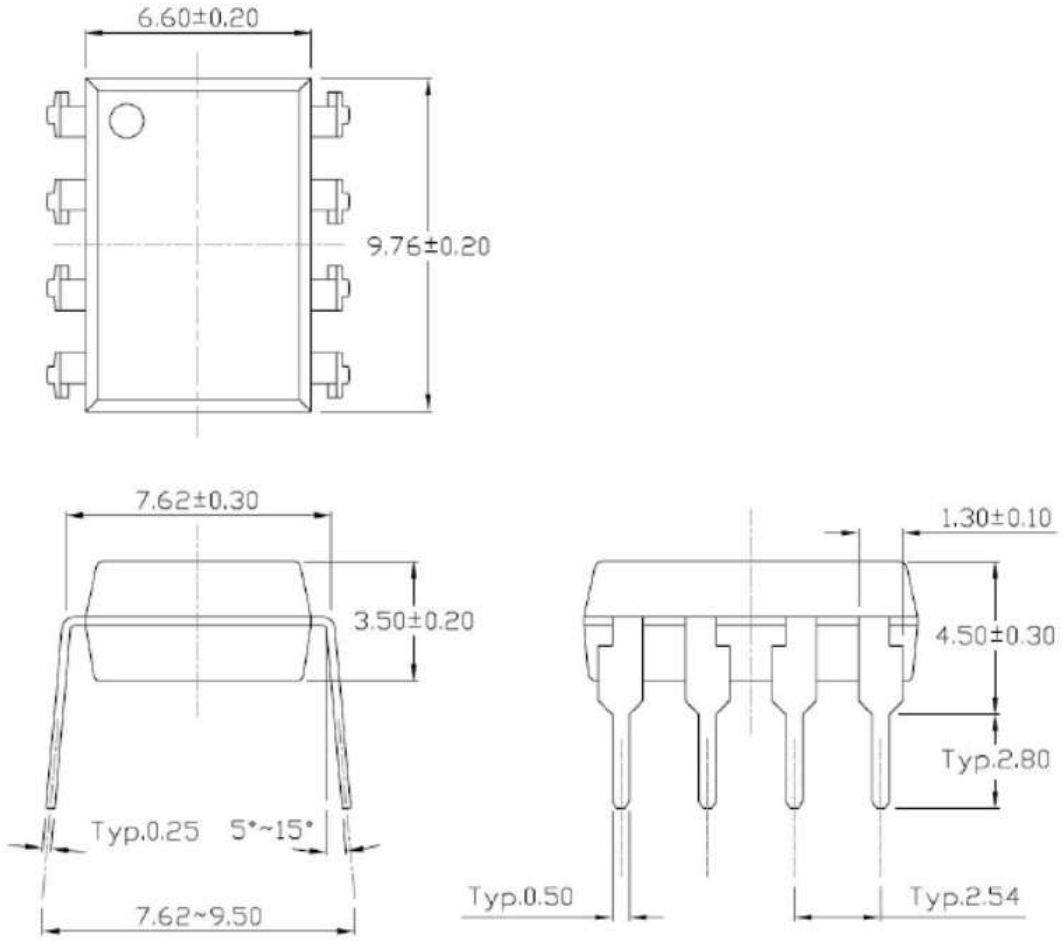
Test Circuit and Waveforms for Common Mode Transient Immunity:



OUTLINE DIMENSION:

Package Dimension:

Standard DIP - Through Hole (DIP Type)

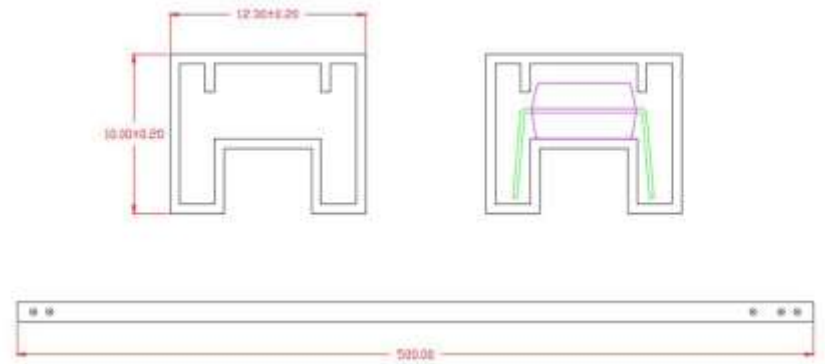


1. All dimensions are in millimetre (mm).

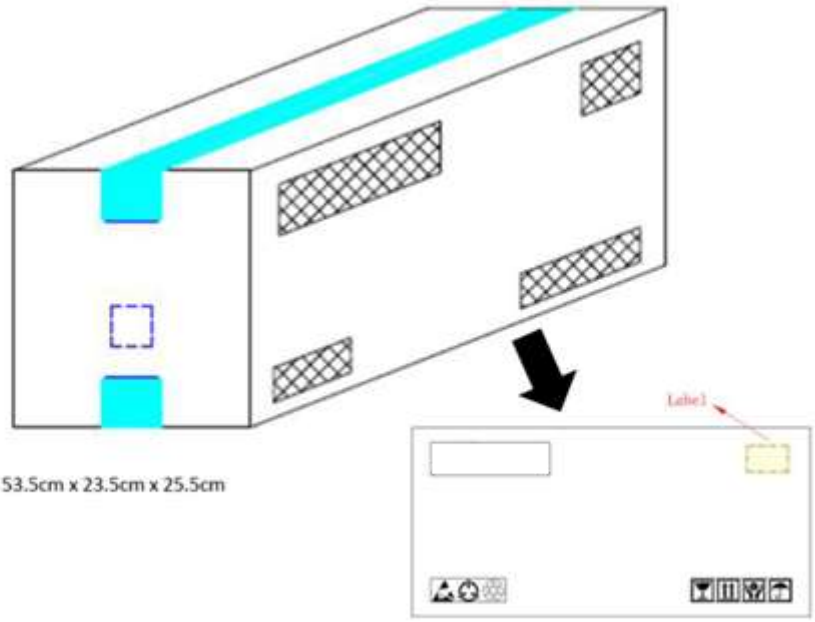
PACKING SPECIFICATION:

Tube Dimension:

50pcs/tube, 32 tube/inner box, 10 inner box (16Kpcs)/carton



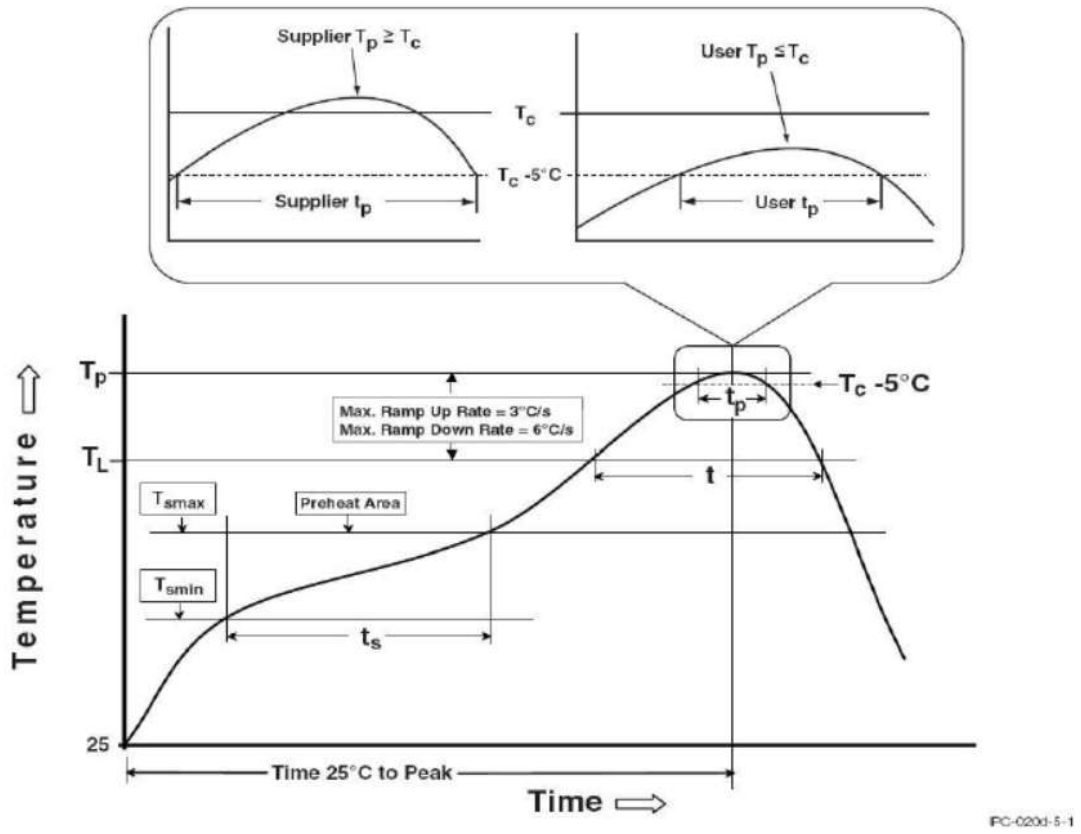
- L x W x H = 52.5cm x 10.7cm x 4.7cm



- L x W x H = 53.5cm x 23.5cm x 25.5cm

RECOMMENDED SOLDERING PROFILE:

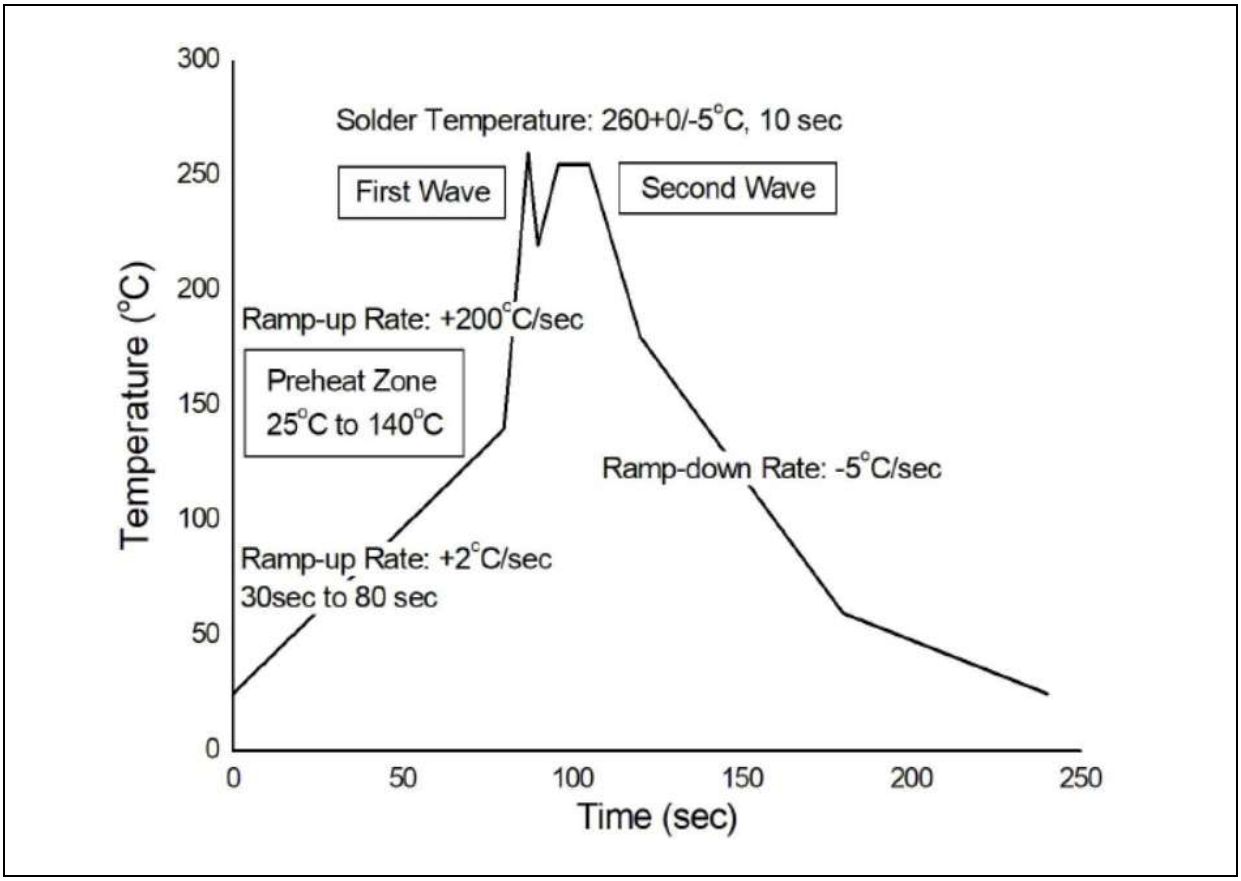
Reflow Information:



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T_{smin})	100°C	150°C
Temperature Max. (T_{smax})	150°C	200°C
Time (t_s) from (T_{smin} to T_{smax})	60-120 seconds	60-120 seconds
Ramp-up Rate (t_L to t_P)	3°C/second max.	3°C/second max.
Liquidous Temperature (T_L)	183°C	217°C
Time (t_L) Maintained Above (T_L)	60-150 seconds	60-150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (t_P) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T_P to T_L)	6°C/second max.	6°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

RECOMMENDED SOLDERING PROFILE:

Wave Soldering (JESD22-A111 Compliant):



Hand Soldering:

Soldering Temperature	380±5°C
Soldering Time	3 sec max.

Note:

- One time soldering is recommended for all soldering methods.
- Do not solder more than three times for IR reflow soldering.