



BRIGHTTEK

BRIGHTTEK (EUROPE) LIMITED

Brighten up The World With LED!



ISO 9001:2008

ISO 14001:2004

IEC 60000 IECQ HSP9000

PRODUCT DATASHEET



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

TD3120R-GV



Release Date: 14 July 2025 Version: A00



APPLICATIONS:

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

TD3120R Series

DESCRIPTION:

The TD3120R series combine 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
- Rail to rail output
- Operating temperature range -55°C to +100°C
- REACH & RoHS compliance; Halogen free
- MSL class 1
- Regulatory Approvals:
 - UL - UL1577
 - VDE - EN60747-5-5 (VDE0884-5)
 - CQC - GB4943.1, GB8898
 - cUL - CSA Component Acceptance Service Notice 5A
- Packing: 45pcs/tube



Partner with:



NAMING & ORDERING INFORMATION:

Naming Information:

TD3120R - G V	
TD3120R	Part Number
G	Green Option
V	VDE Option

Ordering Information:

TD3120R-GV

Version No.	Original Release Date
Rev: A00	29/08/2024

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
3120R	Part Number
V	VDE Applicable
Y	Fiscal Year
A	Manufacturing Code
WW	Work Week

Labelling Information:

 BRIGHTTEK BRIGHTTEK (EUROPE) LIMITED Part No.: XXXXXXXXXXXX Bin Code: X  Lot No.: XXXXXXXX Date Code: XXXX QTY: XXX PCS  MSL: 1 Made in Quanzhou Fujian     	This product is manufactured by  for Brighttek (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	V _{rms}
Distance Through Insulation	D_{ti}	0.5	mm
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. $\leq 1\mu s$ 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 _{CC} H	---	1.66	3	mA	I _F =7~10mA V _O =OPEN
Low Level Supply Current	I _{CC} L	---	1.8	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} -0.3	V _{CC} -0.1	---	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 _{OP} H	-1	---	---	A	V _O =V _{CC} -1.5V
		-2.5	---	---	A	V _O =V _{CC} -4V
Low Level Output Current	I _{OP} L	1	---	---	A	V _O =V _{EE} +1.5V
		2.5	---	---	A	V _O =V _{EE} +4V
Input Threshold Current	I _{FL} H	---	2.38	5	mA	I _O =0mA, V _O >5V
Input Threshold Voltage	V _{FH} L	0.8	---	---	V	I _O =0mA, V _O <5V
Under Voltage Lockout Threshold	V _{UVLO} +	11	13.01	13.5	V	I _O =10mA, V _O >5V
	V _{UVLO} -	9.5	11.01	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

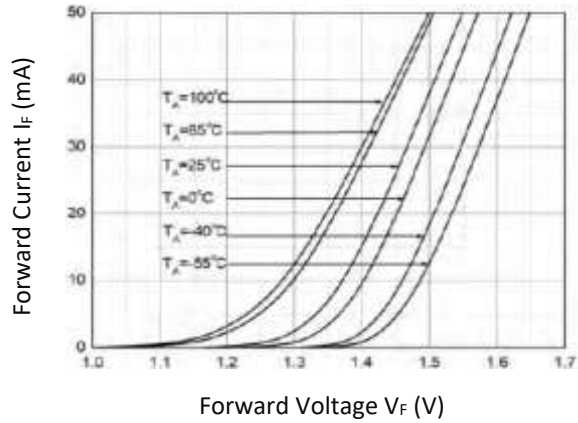
ELECTRICAL CHARACTERISTICS:

Electrical Optical Characteristics:

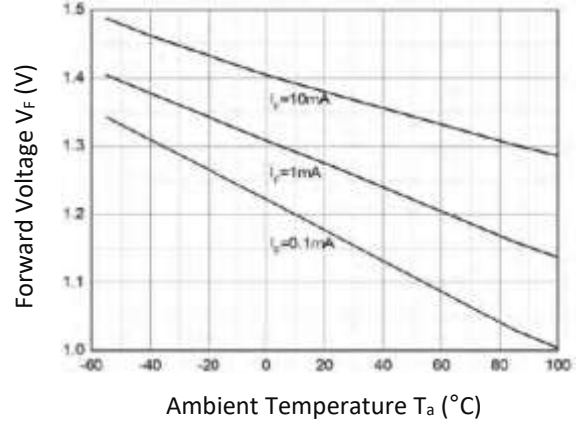
Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
SWITCHING CHARACTERISTICS (at T _a =25°C, V _{CC} =30V, V _{EE} =GND, unless specified otherwise)						
Propagation Delay Time to Output Low Level	T _{PHL}	50	103	500	ns	I _F =7~16mA C _L =10nF f=10kHz Duty=50% R _L =10Ω T _a =25°C
Propagation Delay Time to Output High Level	T _{PLH}	50	83	500	ns	
Pulse Width Distortion	T _{PHL} -T _{PLH}	---	20	200	ns	
Propagation Delay Skew	t _{PSK}	-100	---	100	ns	
Rise Time	t _r	---	13	---	ns	
Fall Time	t _f	---	13	---	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:

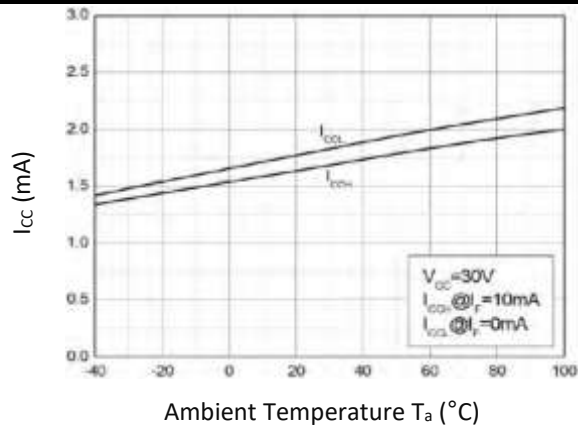
Forward Current v.s. Forward Voltage



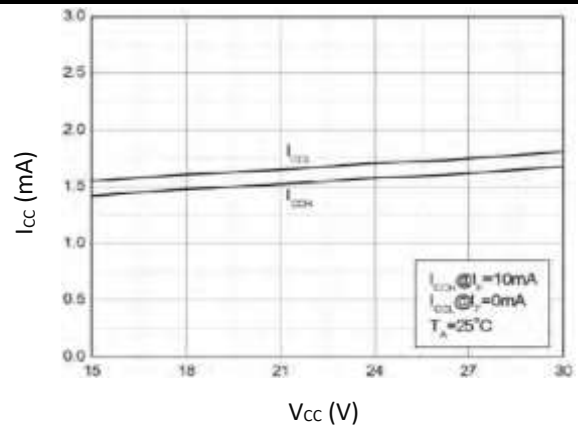
Forward Voltage v.s. Ambient Temperature



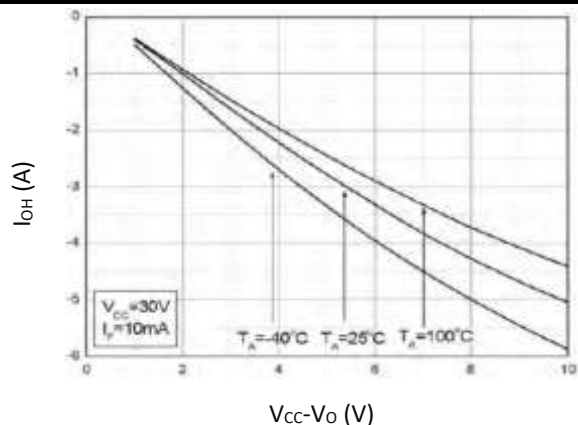
Supply Current v.s. Ambient Temperature



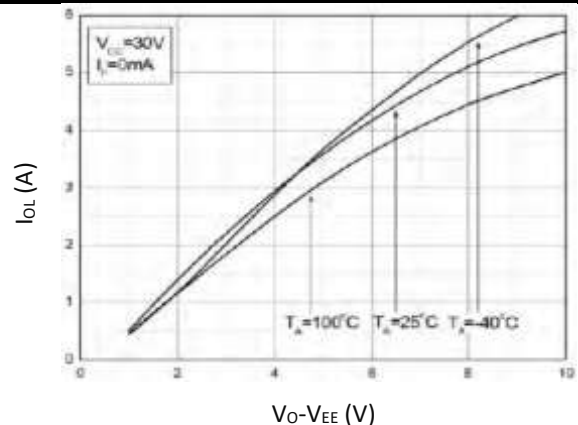
Supply Current v.s. Supply Voltage



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

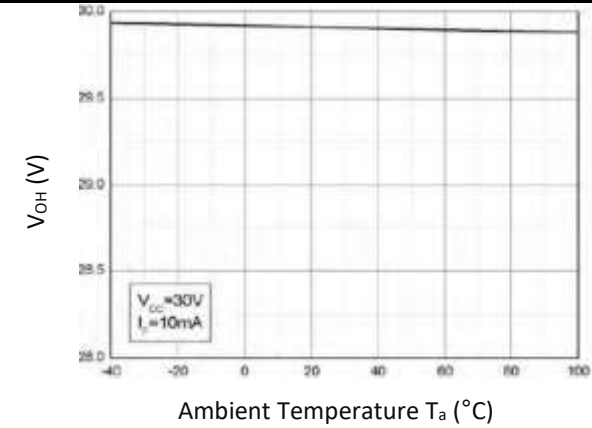


Low Level Output Voltage v.s. Low Level Output Current

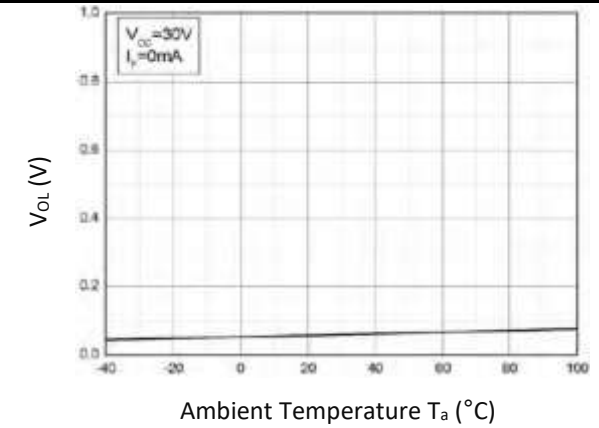


CHARACTERISTIC CURVES:

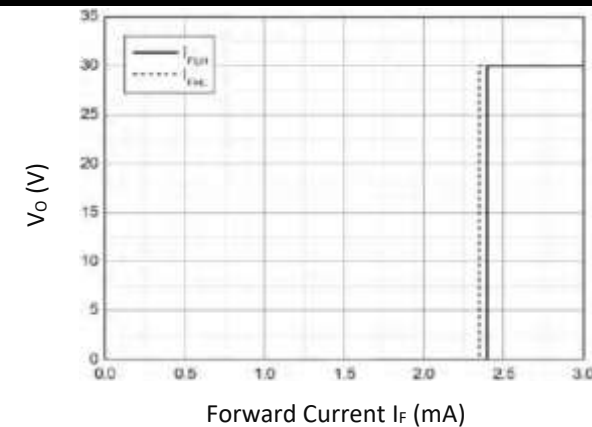
High Level Output Voltage v.s. Ambient Temperature



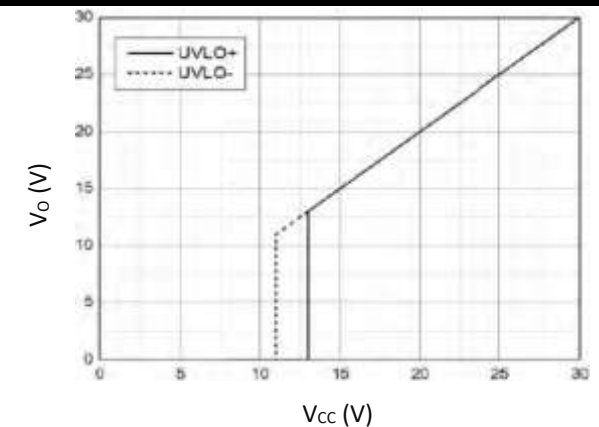
Low Level Output Voltage v.s. Ambient Temperature



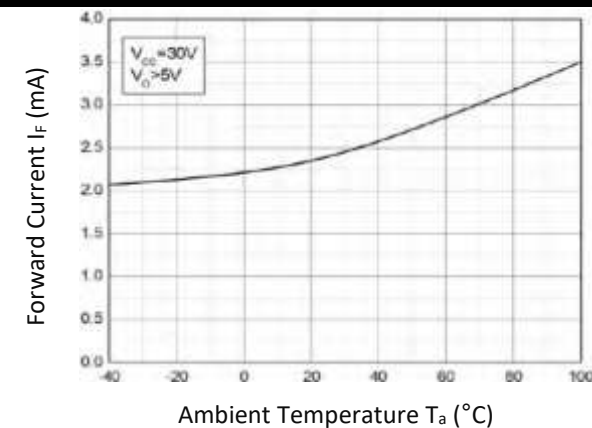
Output Voltage v.s. Forward Current



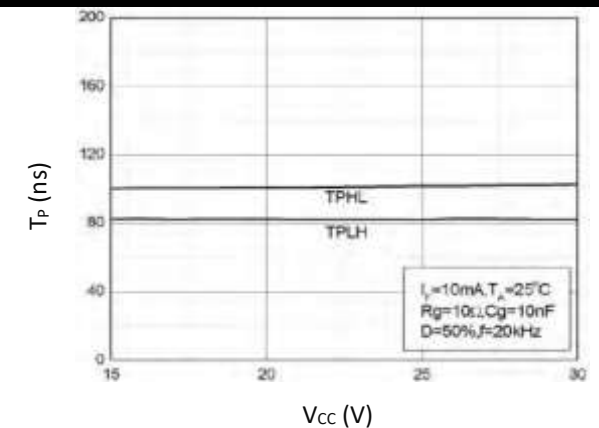
Output Voltage v.s. Supply Voltage



Forward Current v.s. Ambient Temperature

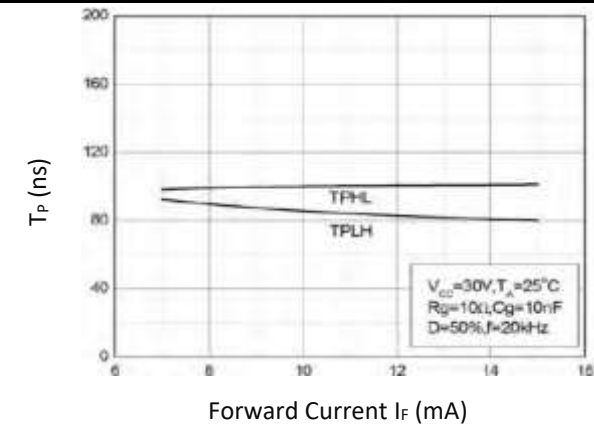


Propagation Delay v.s. Supply Voltage

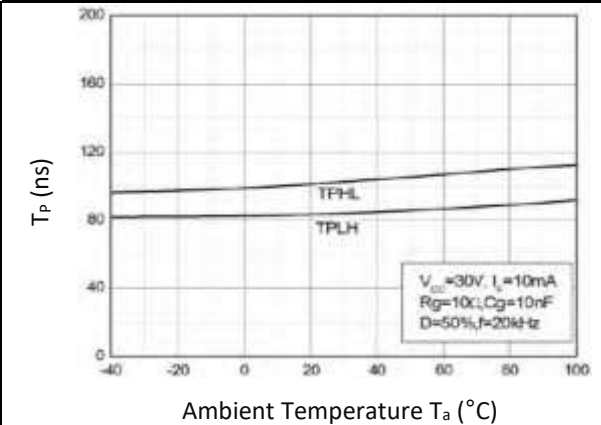


CHARACTERISTIC CURVES:

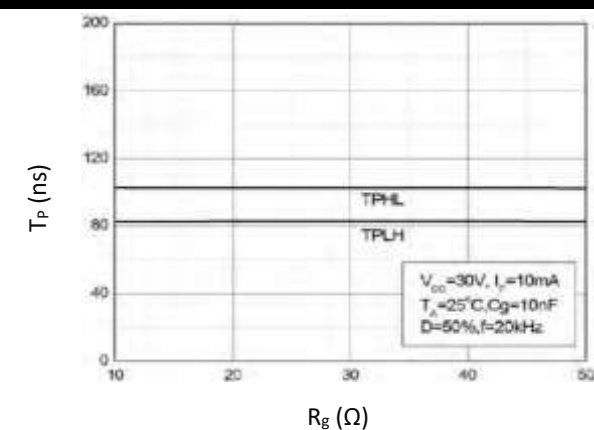
Propagation Delay v.s. Forward Current



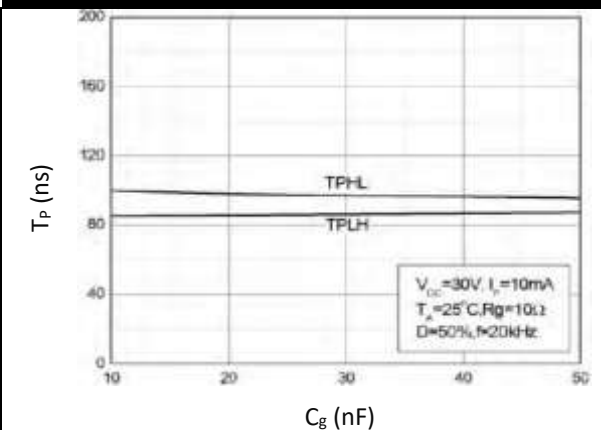
Propagation Delay v.s. Ambient Temperature



Propagation Delay v.s. Load Resistance

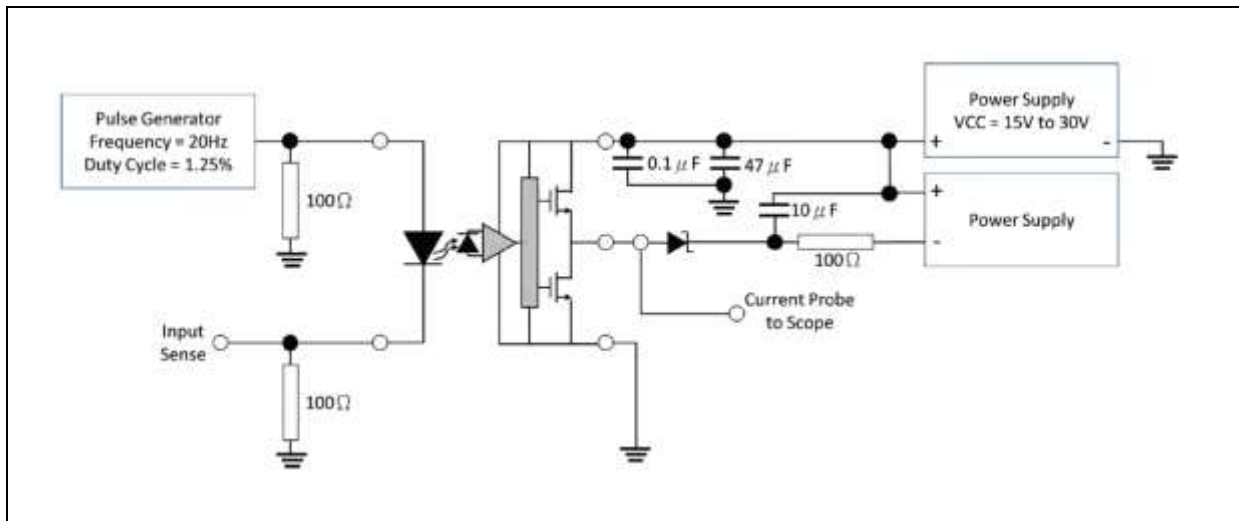


Propagation Delay v.s. Load Capacitance

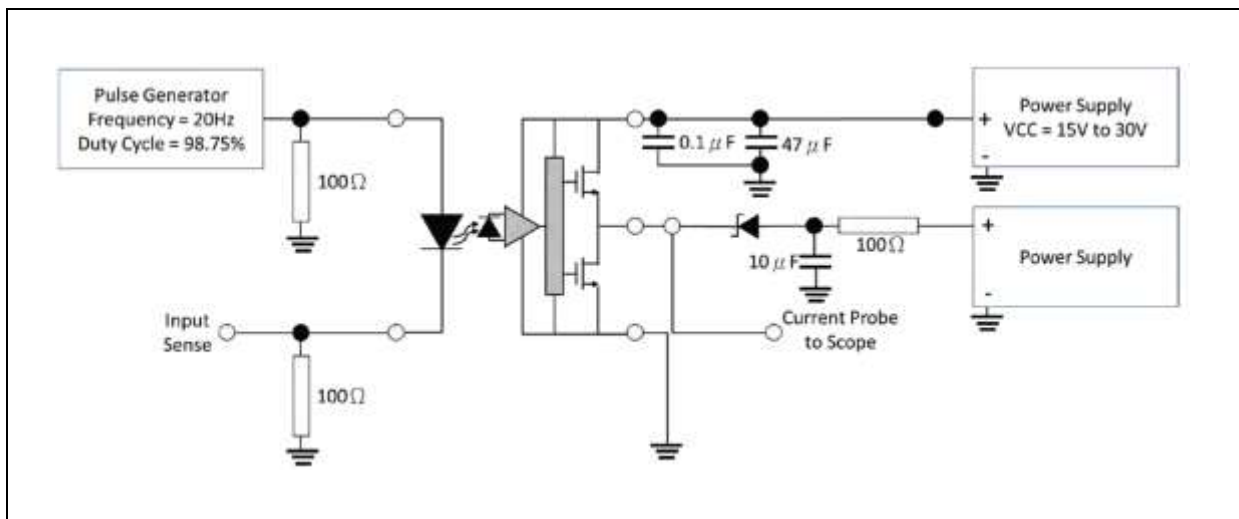


TEST CIRCUIT:

Test Circuit for IOH:

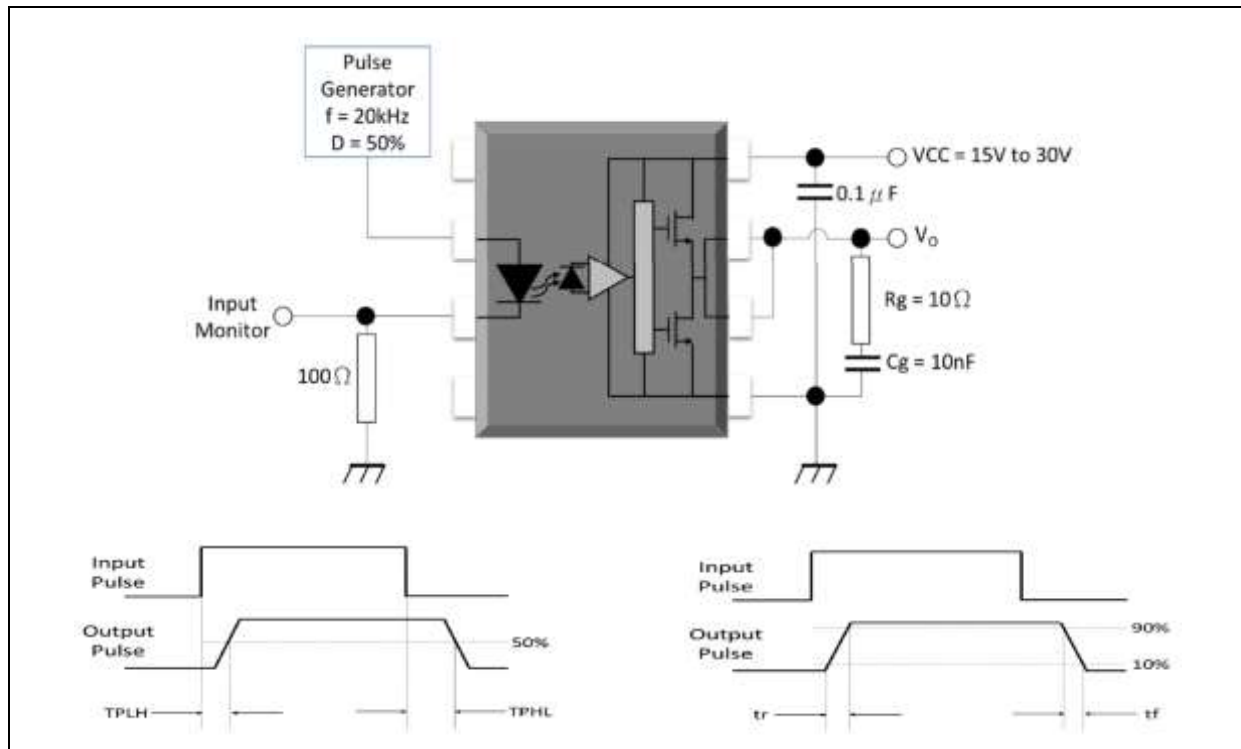


Test Circuit for IOL:

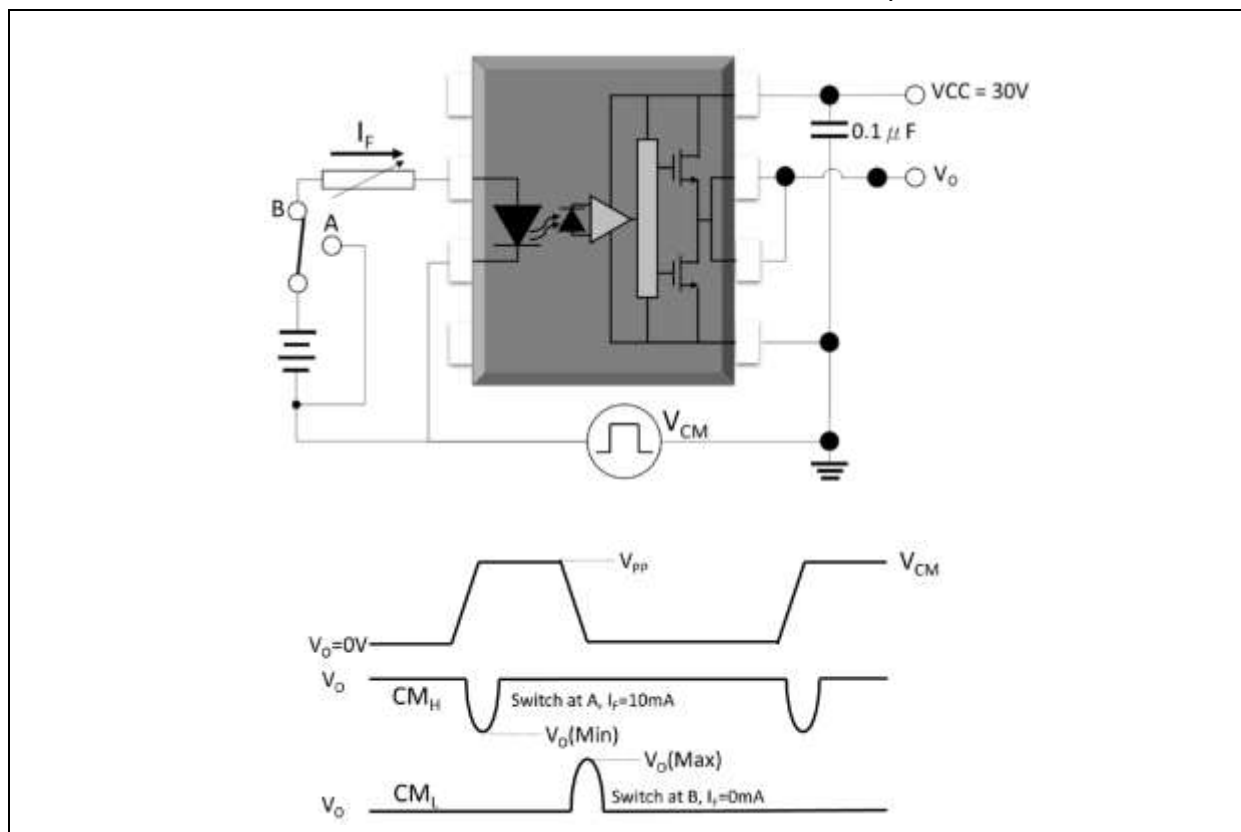


TEST CIRCUIT:

Test Circuit and Waveforms for TPHL, TPLH, t_r , t_f :

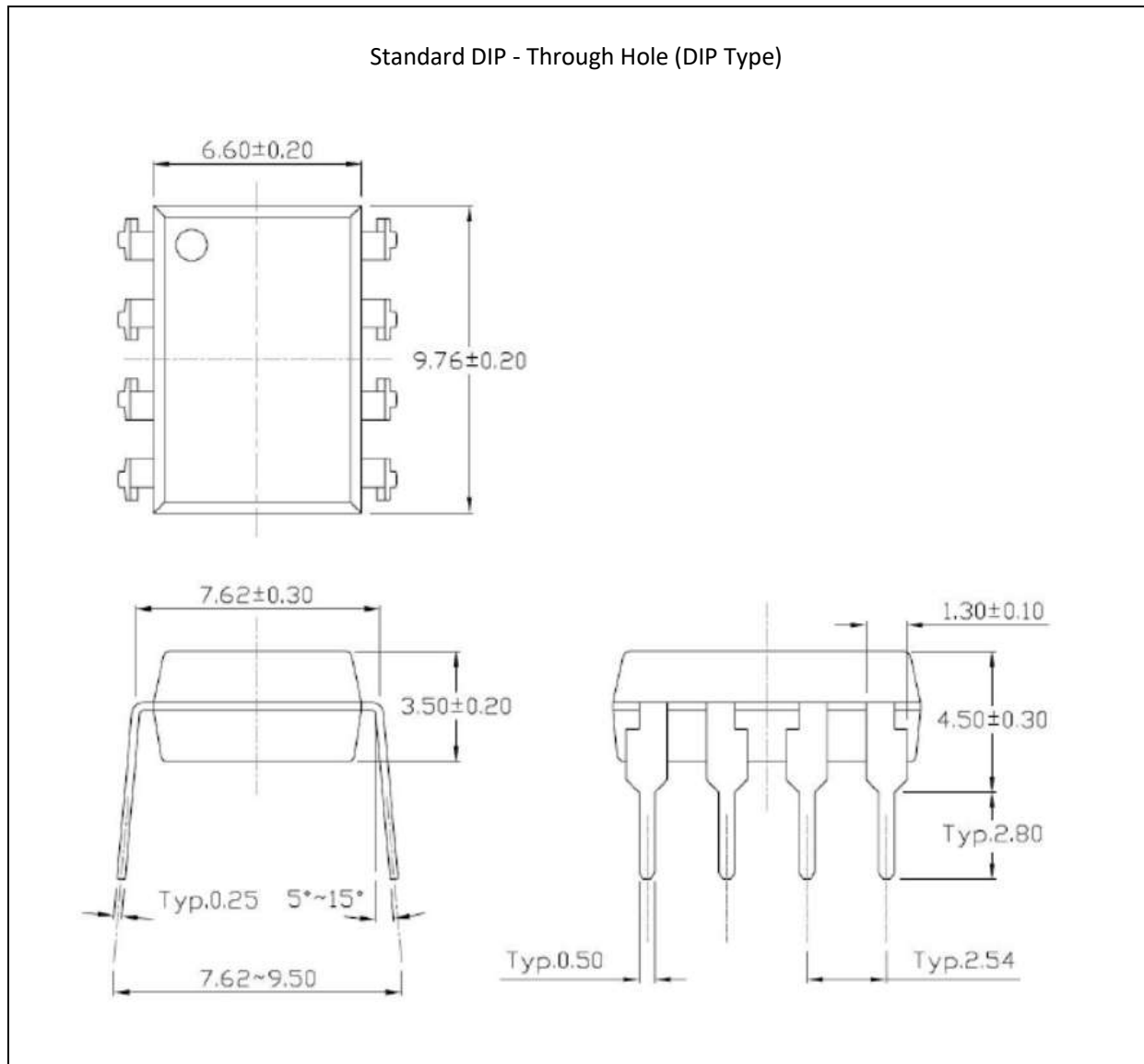


Test Circuit and Waveforms for Common Mode Transient Immunity:



OUTLINE DIMENSION:

Package Dimension:

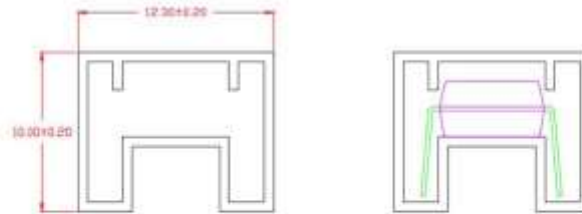


1. All dimensions are in millimetre (mm).

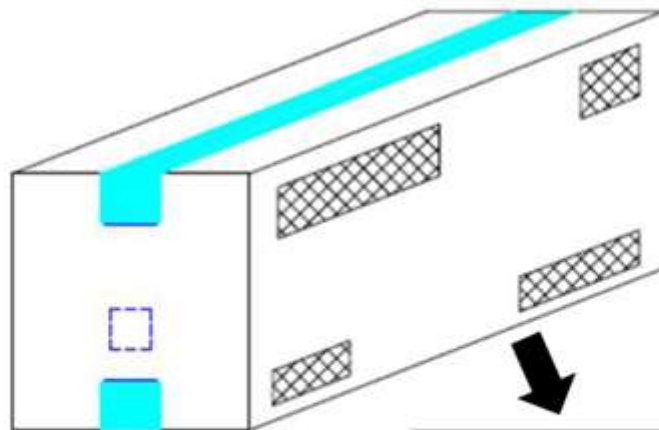
PACKING SPECIFICATION:

Tube Dimension:

45pcs/tube, 32 tube/inner box, 10 inner box (14.4Kpcs)/carton



● L x W x H = 52.5cm x 10.7cm x 4.7cm

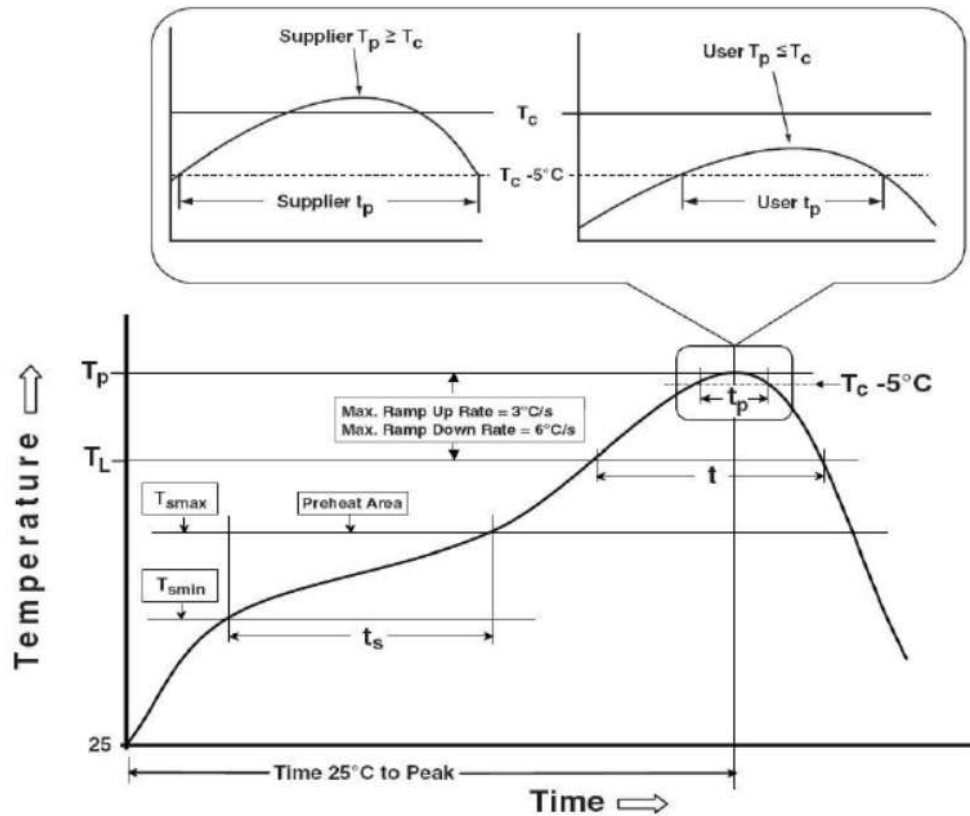


● L x W x H = 53.5cm x 23.5cm x 25.5cm



RECOMMENDED SOLDERING PROFILE:

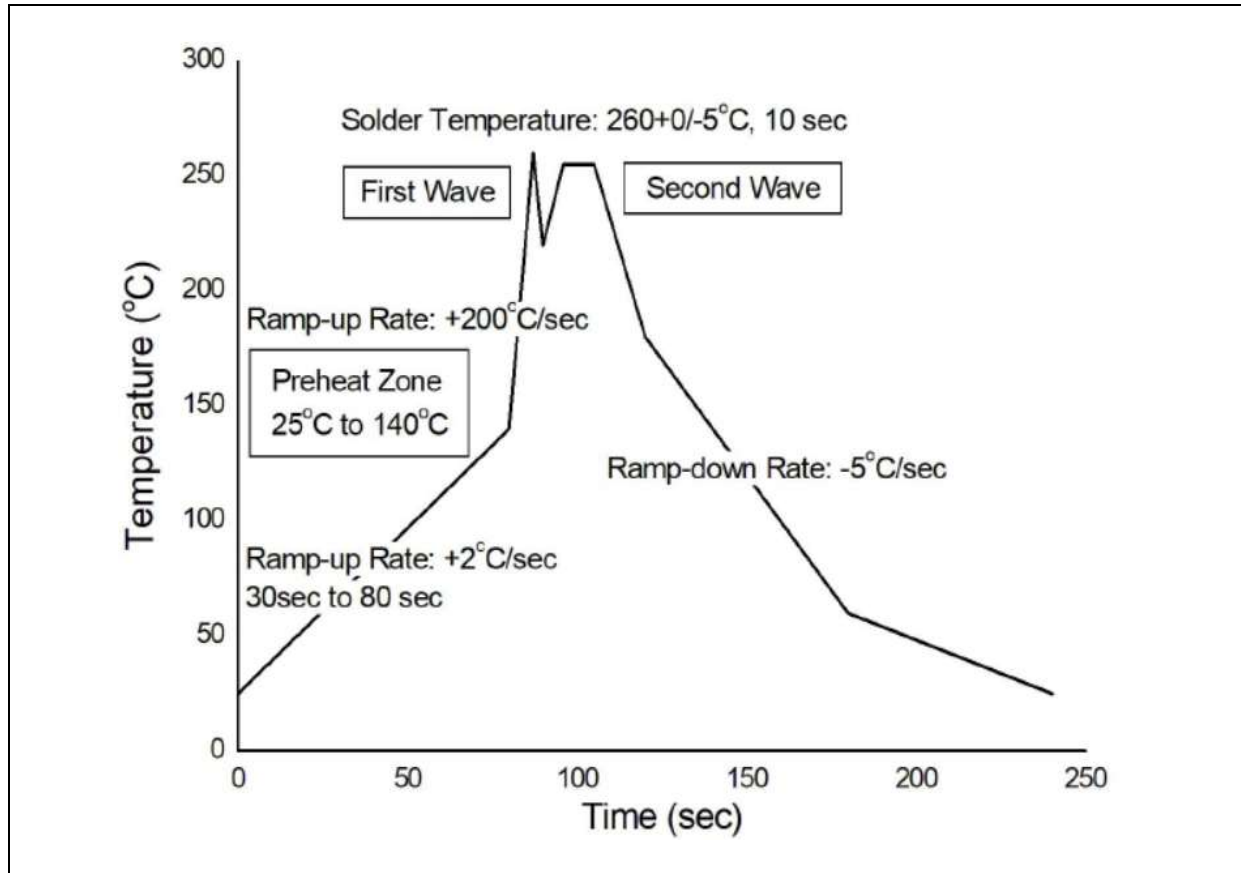
Reflow Information:



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.