



BRIGHTTEK

BRIGHTTEK (EUROPE) LIMITED

Brighten up The World With LED!



ISO/TS 16949:2009



BS EN ISO 14001:2004



QC 900000



IECQ HSP98

PRODUCT DATASHEET



- ▶ DC Input Photo Coupler
- ▶ SMD8
- ▶ High Speed Logic Gate 10Mbit/s

6N137(S)(T1)-GV



Release Date: 18 July 2025 Version: A00



6N137(S) Series

6N137(S) Series

DESCRIPTION:

The 6N137(S) series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon high speed integrated photo-detector logic gate with a strobable output in a plastic DIP8 package with SMD8 lead forming option.

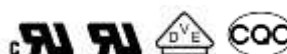


FEATURES:

- High isolation 5000Vrms
- DC input with logic gate output
- 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
 - cUL - CSA Component Acceptance Service Notice 5A
- Packing: 1000pcs/reel

APPLICATIONS:

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



Partner with:  LIGHTNING

NAMING & ORDERING INFORMATION:

Naming Information:

6N137 (S) (T1) - G V	
6N137	Part Number
S	Lead Form Option: SMD8
T1	Selection: Tape and Reel Option (T1(default)/T2)
G	Green Option
V	VDE Option

Ordering Information:

6N137(S)(T1)-GV

Version No.	Original Release Date
Rev: A00	22/06/2021

SCHEMATIC DIAGRAM & MARKING:

Schematic Diagram:

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

Marking Information:

Marking Definition	
TD	Manufacturer Code
6N137	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
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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
Reverse Voltage	V_R	5	V
Enable Voltage	V_E	$V_{CC}+0.5$	V
Input Power Dissipation	P_I	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
COMMON			
Total Power Dissipation	P_{tot}	200	mW
Isolation Voltage	V_{iso}	5000 * ³	V _{rms}
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. ≤1Ms 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
		Min.	Typ.	Max.	
Operating Temperature	T_a	-40	---	100	°C
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}	5	---	15	mA
Low Level Enable Voltage	V_{EL}	0	---	0.8	V
High Level Enable Voltage	V_{EH}	2	---	V_{CC}	V
Output Pull-up Resistor	R_L	330	---	4k	Ω
Fan Out (At $R_L=1k\Omega$ per channel)	N	---	---	5	TTL Loads

ELECTRICAL CHARACTERISTICS ($V_{CC}=3.3V$):

Electrical Optical Characteristics at $T_a=25^{\circ}C$:

Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
INPUT						
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 (V _{CC} =3.3V)						
High Level Supply Current	I _{CC} H	---	4.3	10	mA	I _F =0mA, V _E =0.5V V _{CC} =3.3V
Low Level Supply Current	I _{CC} L	---	6.4	13	mA	I _F =10mA V _{CC} =3.3V
High Level Enable Current	I _{EH}	---	-0.21	-1.6	mA	V _E =2.0V V _{CC} =3.3V
Low Level Enable Current	I _{EL}	---	-0.42	-1.6	mA	V _E =0.5V V _{CC} =3.3V
High Level Enable Voltage	V _{EH}	2.0	---	---	V	I _F =10mA V _{CC} =3.3V
Low Level Enable Voltage	V _{EL}	---	---	0.8	V	I _F =10mA V _{CC} =3.3V
TRANSFER CHARACTERISTICS (V _{CC} =3.3V, T _a =-40 to 85°C)						
High Level Output Current	I _{OH}	---	4.1	100	μA	V _{CC} =V _O =3.3V I _F =250μA, V _E =2.0V
Low Level Output Voltage	V _{OL}	---	0.29	0.6	V	V _{CC} =3.3V, I _F =5mA V _E =2V, I _{CL} =13mA
Input Threshold Current	I _{FT}	---	2.2	5	mA	V _{CC} =3.3V, V _O =0.6V V _E =2V, I _{OL} =13mA
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 ($V_{CC}=3.3V$):

Electrical Optical Characteristics:

Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
SWITCHING CHARACTERISTICS (T _a =-40 to 85°C, V _{CC} =3.3V, I _F =7.5mA unless specified otherwise)						
Propagation Delay Time to Output Low Level	T _{PHL}	---	35	75	ns	C _L =15pF, R _L =350Ω T _a =25°C
Propagation Delay Time to Output High Level	T _{PLH}	---	40	75	ns	C _L =15pF, R _L =350Ω T _a =25°C
Pulse Width Distortion	T _{PHL} -PLH	---	12	35	ns	C _L =15pF, R _L =350Ω
Rise Time	t _r	---	30	---	ns	C _L =15pF, R _L =350Ω
Fall Time	t _f	---	8.5	---	ns	C _L =15pF, R _L =350Ω
Enable Propagation Delay Time to Output Low Level	T _{EHL}	---	15	---	ns	I _F =7.5mA, V _{EH} =3.3V C _L =15pF, R _L =350Ω
Enable Propagation Delay Time to Output High Level	T _{ELH}	---	15	---	ns	I _F =7.5mA, V _{EH} =3.3V C _L =15pF, R _L =350Ω

ELECTRICAL CHARACTERISTICS ($V_{CC}=5.5V$):

Electrical Optical Characteristics at $T_a=25^{\circ}C$:

Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
INPUT						
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 (V _{CC} =5.5V)						
High Level Supply Current	I _{CC} H	---	6.3	10	mA	I _F =0mA, V _E =0.5V V _{CC} =5.5V
Low Level Supply Current	I _{CC} L	---	8.3	13	mA	I _F =10mA, V _{CC} =5.5V
High Level Enable Current	I _{EH}	---	-0.52	-1.6	mA	V _E =2.0V V _{CC} =5.5V
Low Level Enable Current	I _{EL}	---	-0.75	-1.6	mA	V _E =0.5V V _{CC} =5.5V
High Level Enable Voltage	V _{EH}	2.0	---	---	V	I _F =10mA V _{CC} =5.5V
Low Level Enable Voltage	V _{EL}	---	---	0.8	V	I _F =10mA V _{CC} =5.5V
TRANSFER CHARACTERISTICS (V _{CC} =5.5V, T _a =-40 to 85°C)						
High Level Output Current	I _{OH}	---	0.73	100	μA	V _{CC} =V _O =5.5V I _F =250μA, V _E =2.0V
Low Level Output Voltage	V _{OL}	---	0.28	0.6	V	V _{CC} =5.5V, I _F =5mA V _E =2V, I _{CL} =13mA
Input Threshold Current	I _{FT}	---	2.5	5	mA	V _{CC} =5.5V, V _O =0.6V V _E =2V, I _{OL} =13mA
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

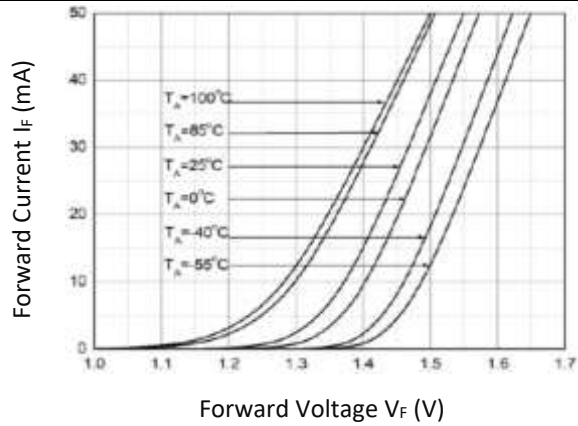
ELECTRICAL CHARACTERISTICS ($V_{CC}=5.5V$):

Electrical Optical Characteristics:

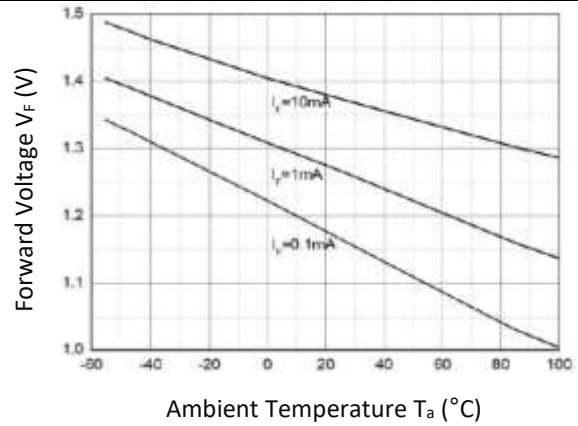
Parameter	Symbol	Values			Unit	Test Condition
		Min.	Typ.	Max.		
SWITCHING CHARACTERISTICS (T _a =-40 to 85°C, V _{CC} =5V, I _F =7.5mA unless specified otherwise)						
Propagation Delay Time to Output Low Level	T _{PHL}	---	35	75	ns	C _L =15pF, R _L =350Ω T _a =25°C
Propagation Delay Time to Output High Level	T _{PLH}	---	40	75	ns	C _L =15pF, R _L =350Ω T _a =25°C
Pulse Width Distortion	T _{PHL} -PLH	---	5	35	ns	C _L =15pF, R _L =350Ω
Rise Time	t _r	---	27	---	ns	C _L =15pF, R _L =350Ω
Fall Time	t _f	---	7	---	ns	C _L =15pF, R _L =350Ω
Enable Propagation Delay Time to Output Low Level	T _{EHL}	---	15	---	ns	I _F =7.5mA, V _{EH} =3.5V C _L =15pF, R _L =350Ω
Enable Propagation Delay Time to Output High Level	T _{ELH}	---	15	---	ns	I _F =7.5mA, V _{EH} =3.5V C _L =15pF, R _L =350Ω

CHARACTERISTIC CURVES:

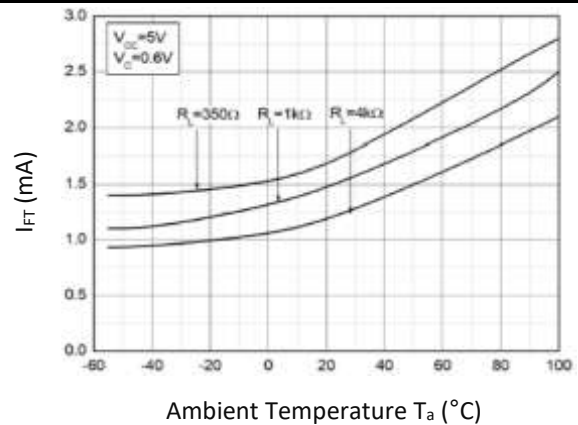
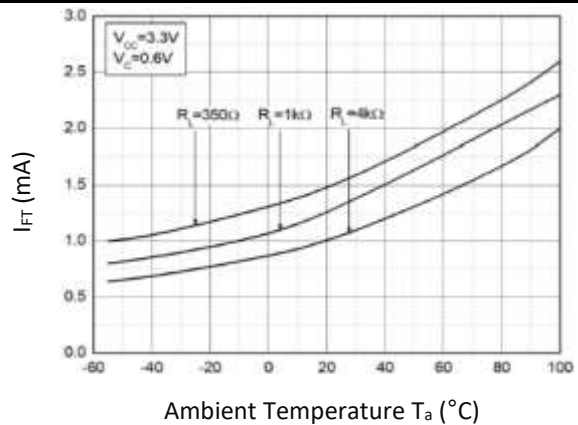
Forward Current v.s. Forward Voltage



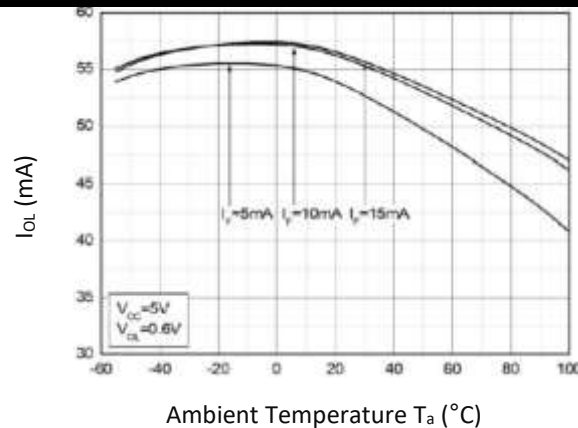
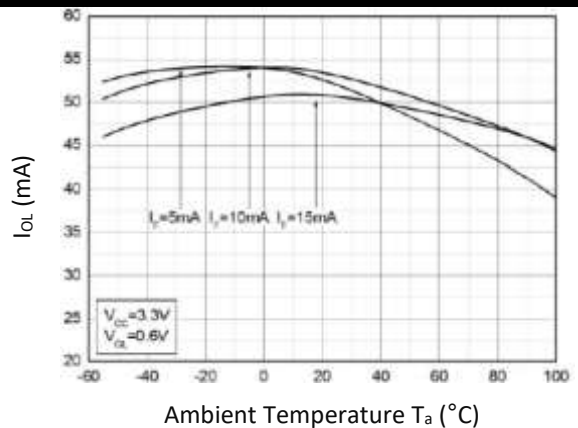
Forward Voltage v.s. Ambient Temperature



Input Threshold Current v.s. Ambient Temperature

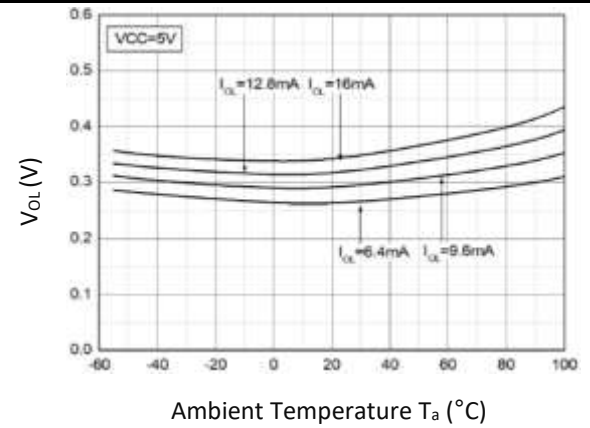
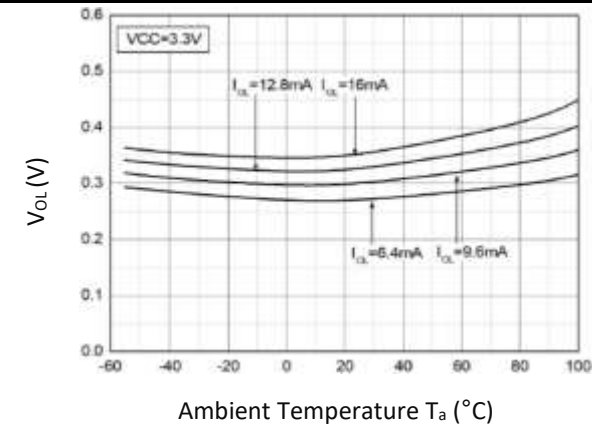


Low Level Output Current v.s. Ambient Temperature

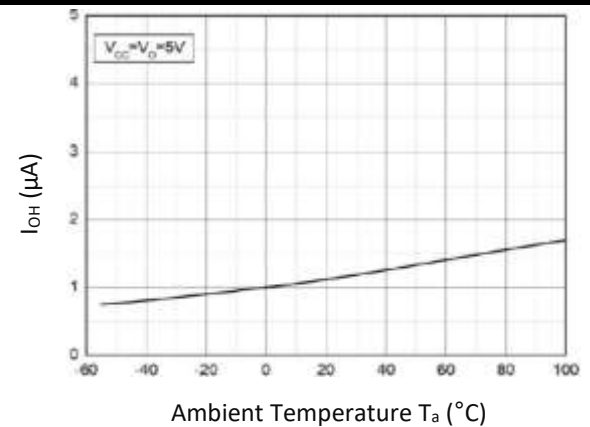
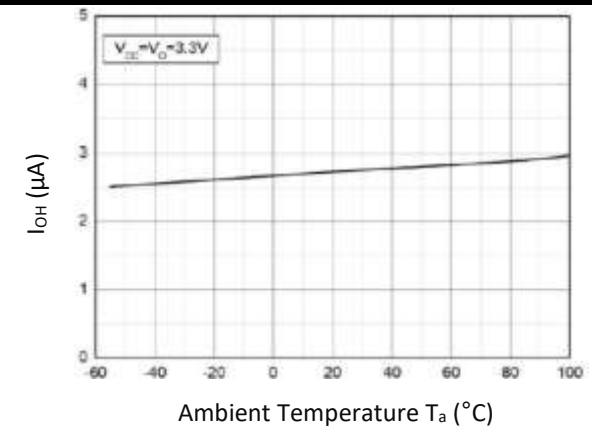


CHARACTERISTIC CURVES:

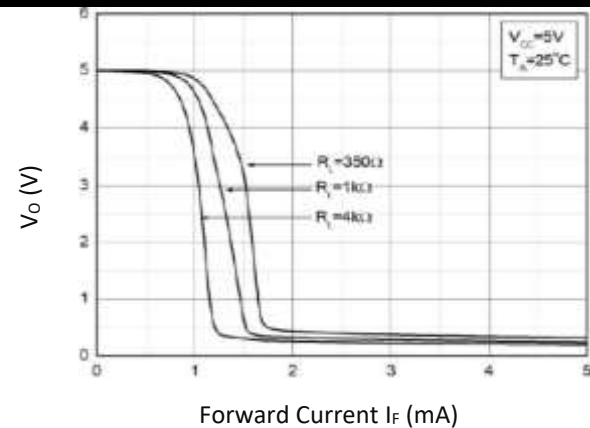
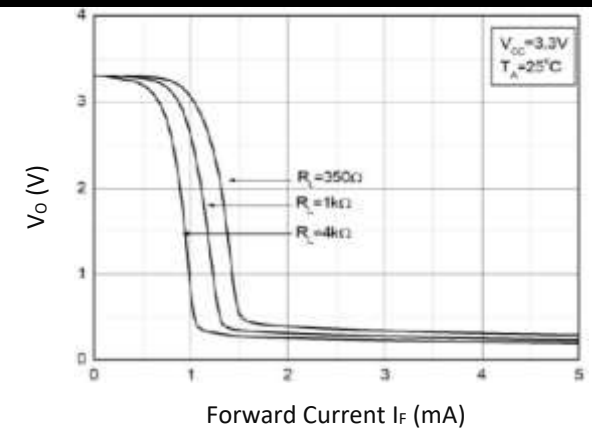
Low Level Output Voltage v.s. Ambient Temperature



High Level Output Current v.s. Ambient Temperature

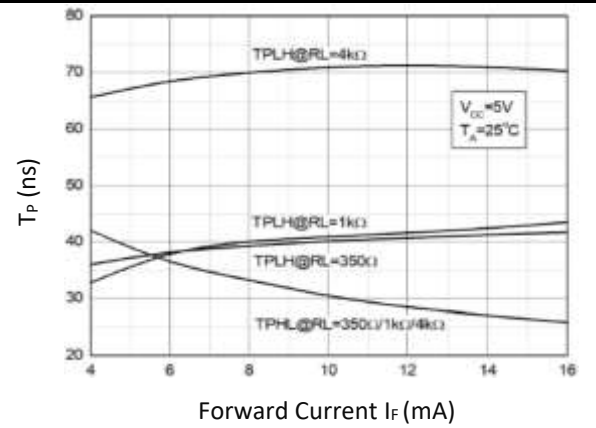
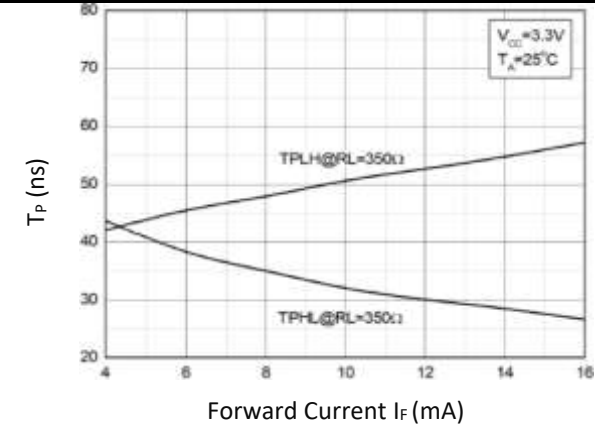


Output Voltage v.s. Forward Current

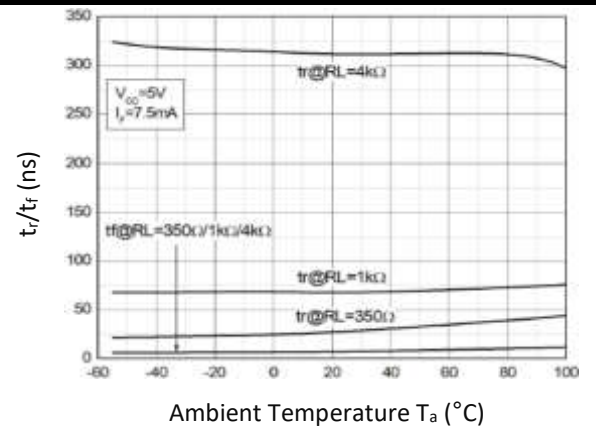
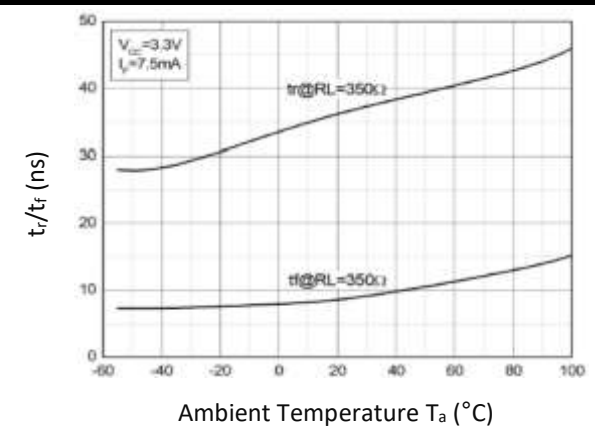


CHARACTERISTIC CURVES:

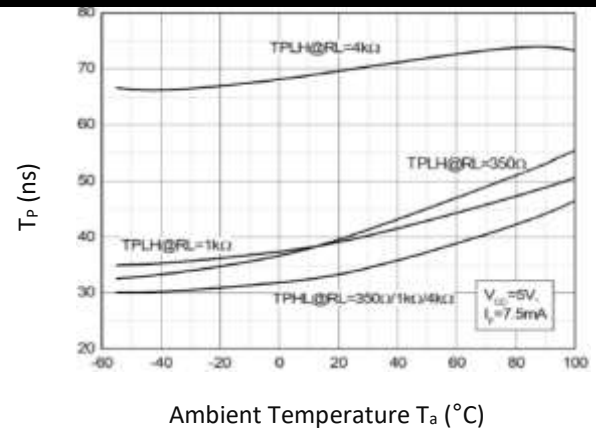
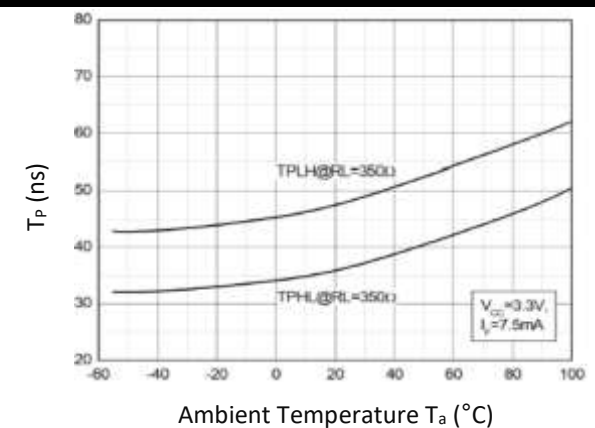
Propagation Delay v.s. Forward Current



Rise and Fall Time v.s. Ambient Temperature

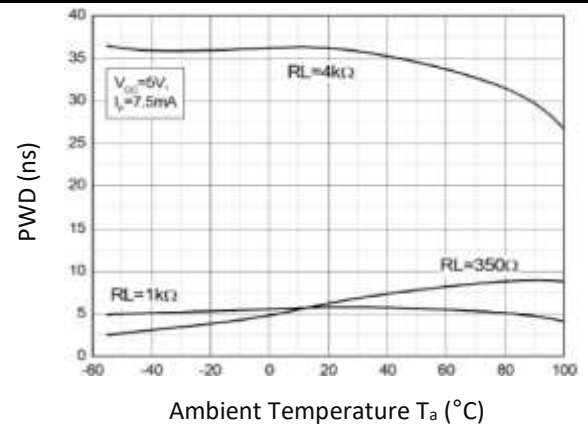
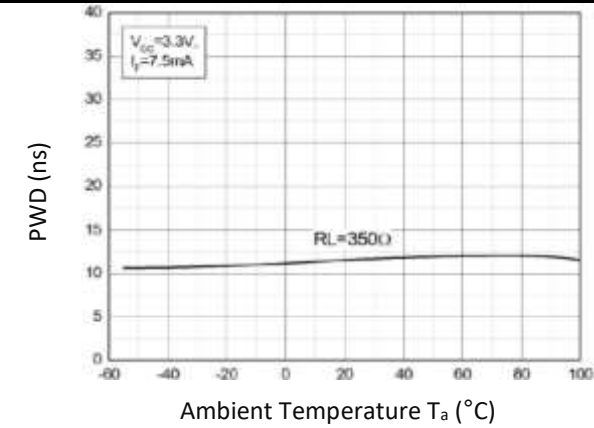


Propagation Delay v.s. Ambient Temperature

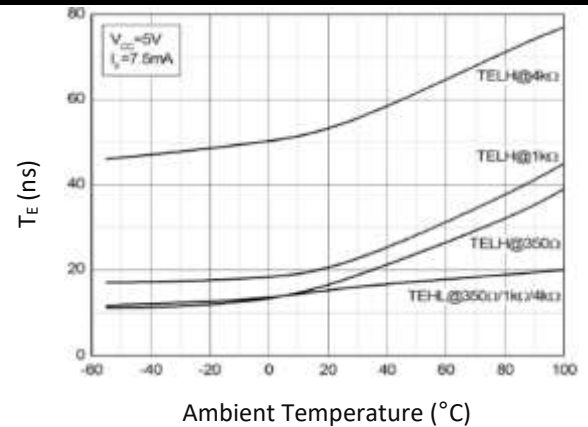
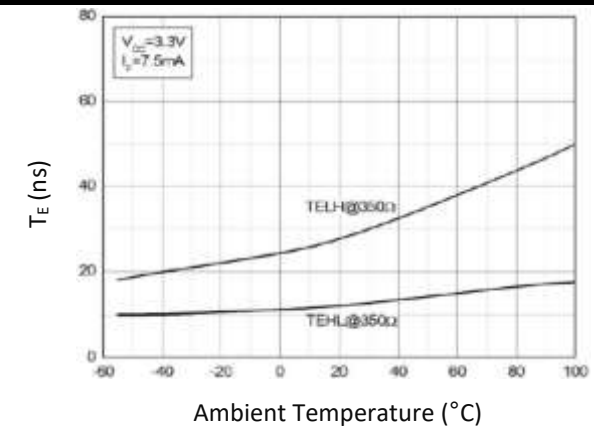


CHARACTERISTIC CURVES:

Pulse Width Distortion v.s. Ambient Temperature

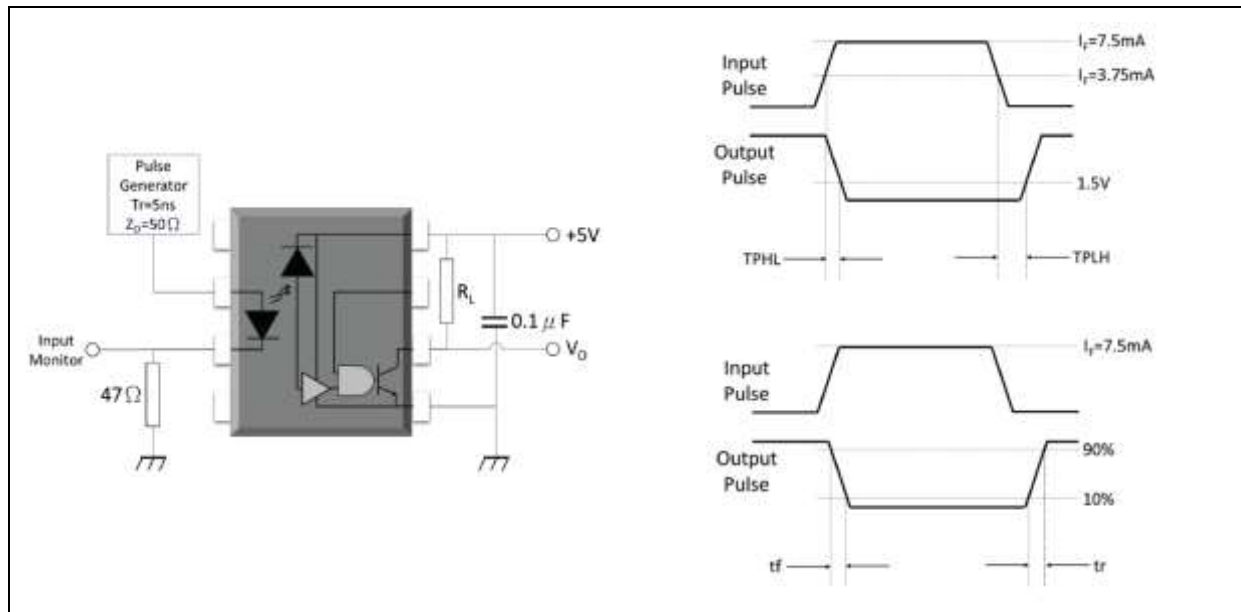


Enable Propagation Delay v.s. Ambient Temperature

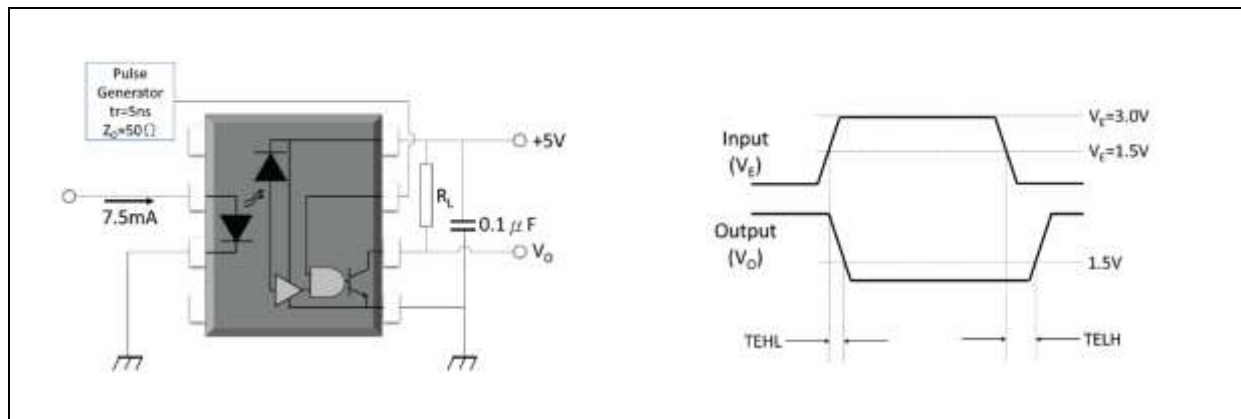


TEST CIRCUIT:

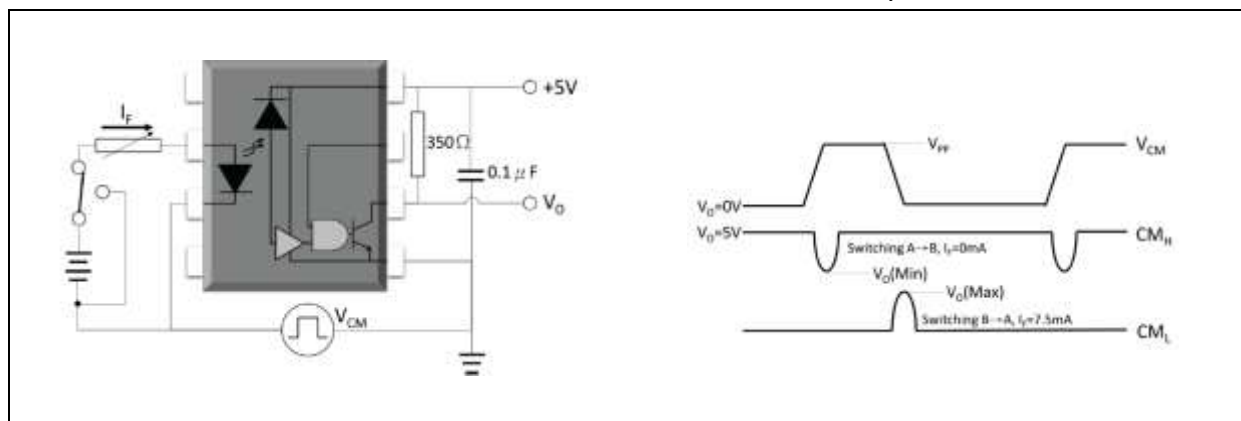
Test Circuit and Waveforms for TPHL, TPLH, t_r , t_f :



Test Circuit and Waveforms for TEHL, TELH:

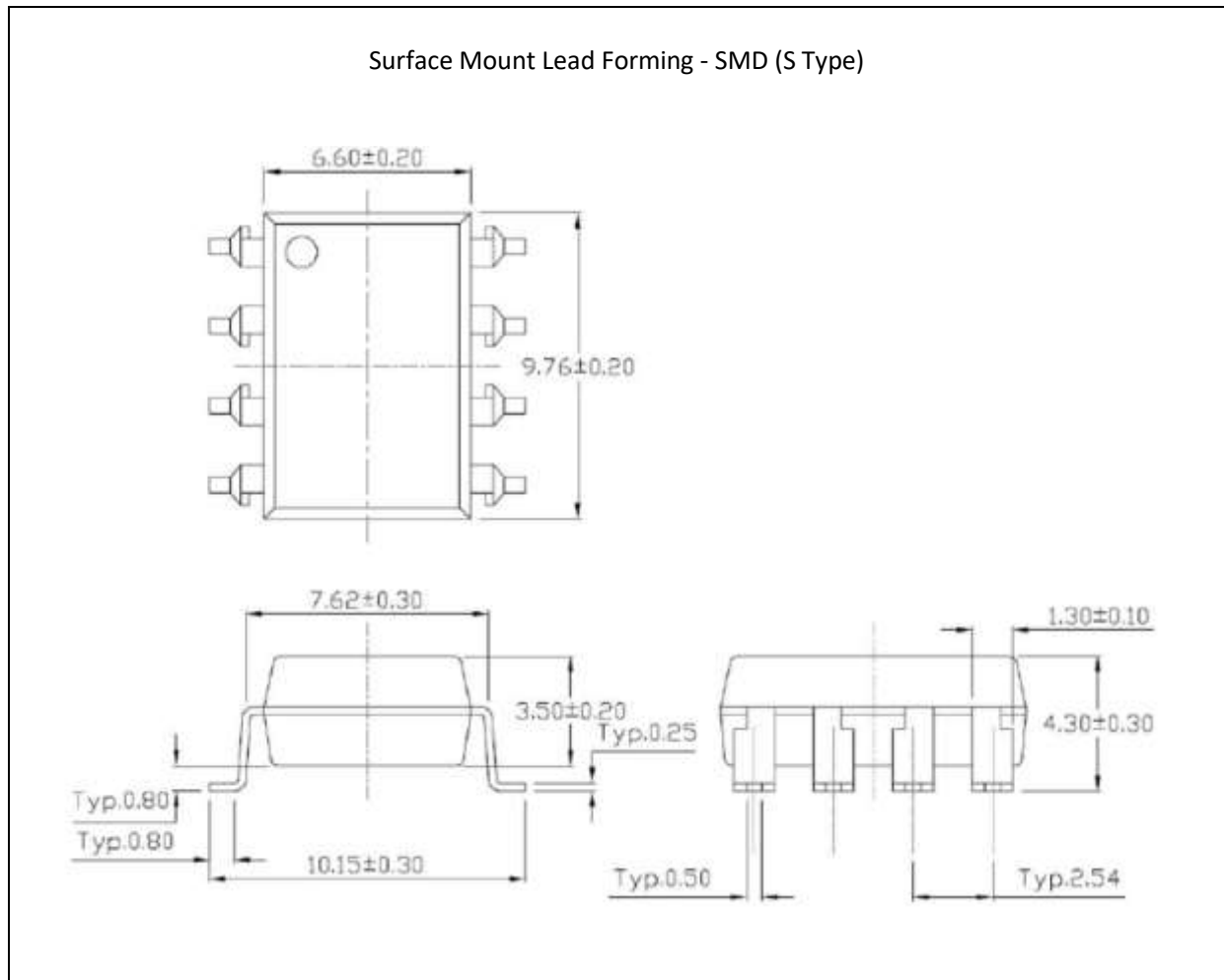


Test Circuit and Waveforms for Common Mode Transient Immunity:



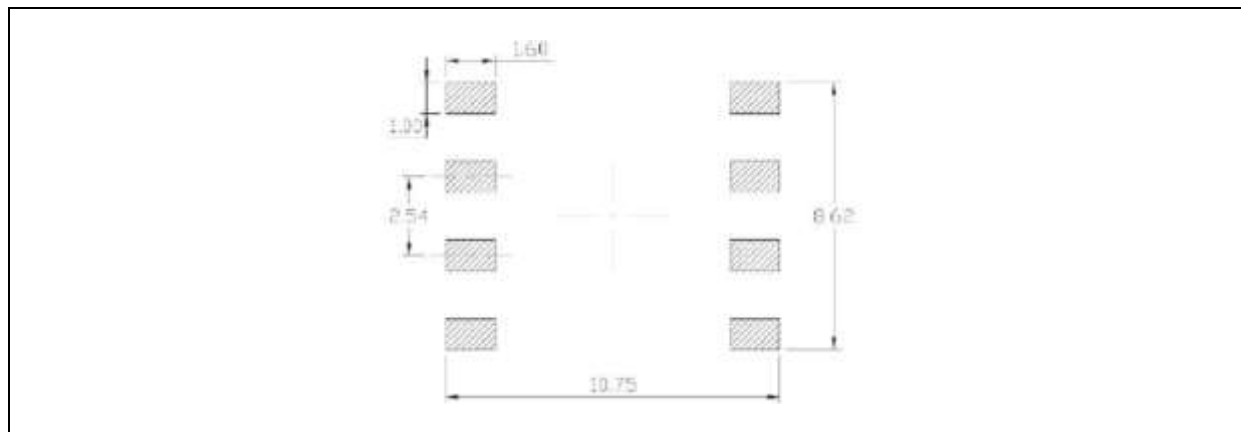
OUTLINE DIMENSION:

Package Dimension:



1. All dimensions are in millimetre (mm).

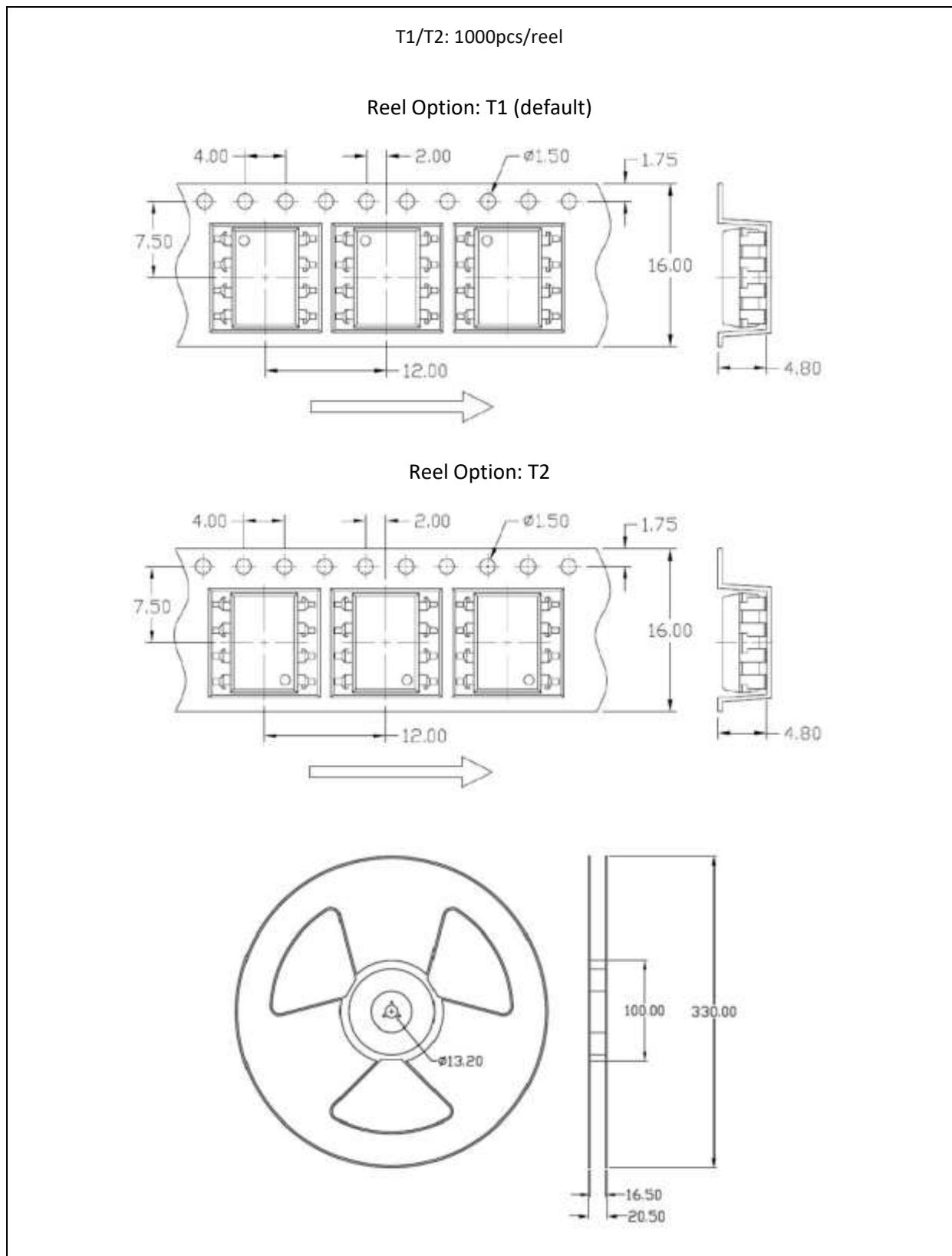
Recommended Soldering Mask:



1. Dimensions are in millimetre (mm).

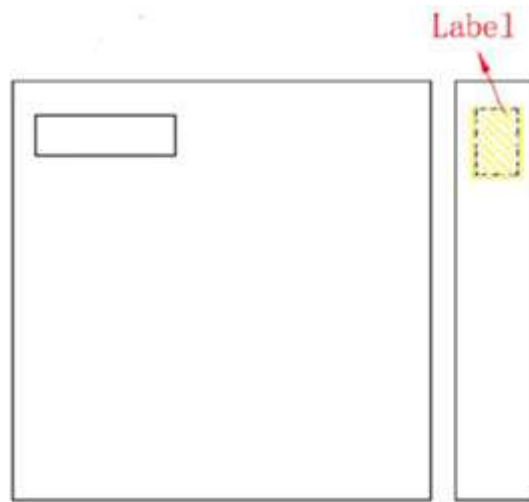
PACKING SPECIFICATION:

Reel Dimension:

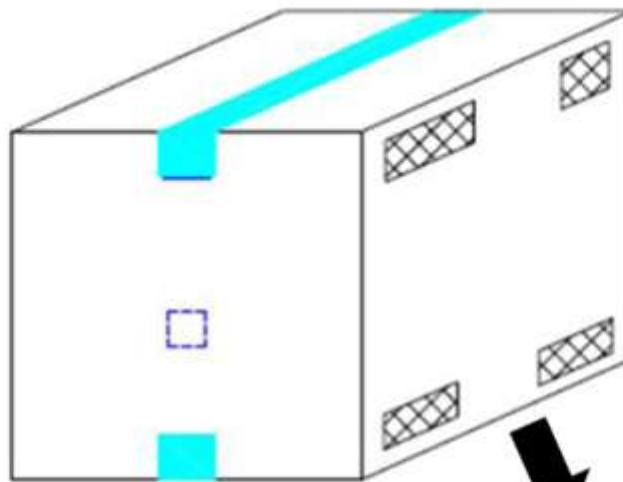


Box Dimension:

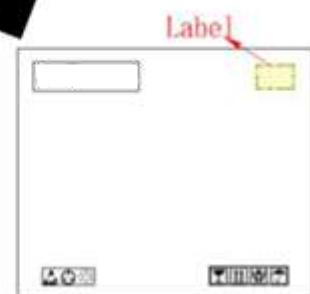
T1/T2: 3 reels (3Kpcs)/inner box, 5 inner boxes (15Kpcs)/carton



- L x W x H = 36cm x 36cm x 6.9cm

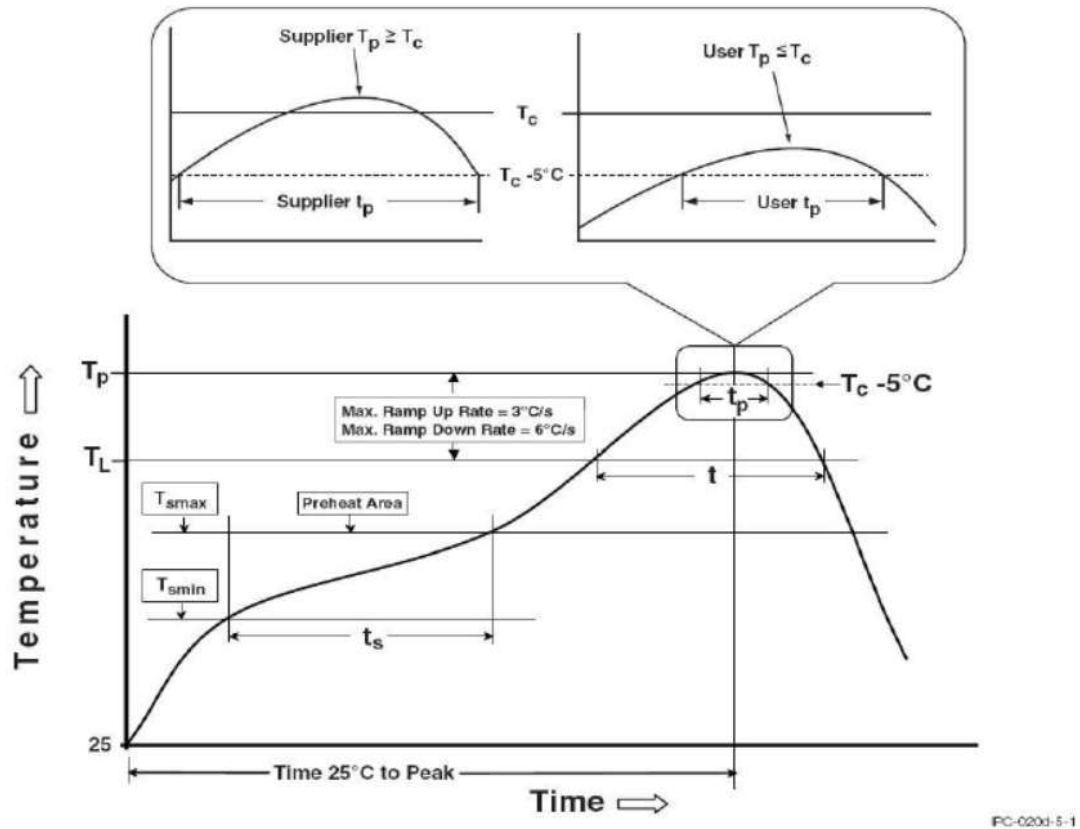


- L x W x H = 45cm x 38cm x 38cm



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.