

Features

- High isolation 5000 V_{RMS}
- DC input with logic gate output
- Operating temperature range - 40 °C to 100 °C
- REACH compliance
- Halogen free (Optional)
- MSL class 1
- Regulatory Approvals (Pending Approved)
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC - GB4943.1

Applications

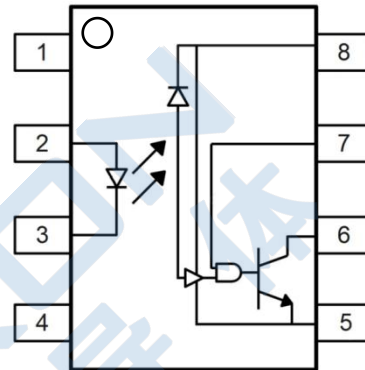
- Ground loop elimination
- LSTTL to TTL, LSTTL or CMOS
- Line receiver, data transmission
- Data multiplexing
- Switching power supply
- Pulse transformer replacement
- Computer-peripheral interface



RoHS

Description

The 6N137 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 different lead forming options.



Truth Table

Input	Enable	Output
H	H	L
L	H	H
H	L	H
L	L	H
H	NC	L
L	NC	H

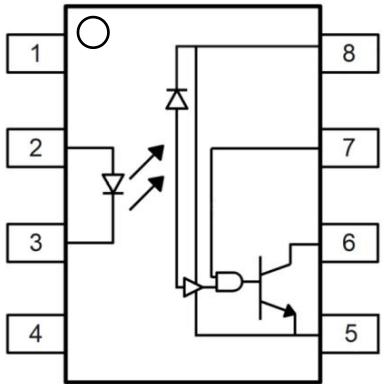
ORDERING INFORMATION

Outline	Part Number	Package	Marking	Packing	Packing Size	Quantity
	6N137-000E	DIP8	6N137 /YYWW A	Tube	500mm	45
	6N137-100E	DIP8-M		Tube	500mm	45
	6N137-500E	DIP8-SL		Reel	13 "	1000

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PIN CONFIGURATION AND FUNCTIONS

	Pin	Name
	1	NC
	2	Anode
	3	Cathode
	4	NC
	5	GND
	6	V _O
	7	V _E
	8	V _{CC}

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit	Note
INPUT				
Forward Current	I _F	25	mA	
Peak Forward Current	I _{FP}	50	mA	1
Peak Transient Current	I _{F(trans)}	1	A	2
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	V _{rms}	3
Operating Temperature	T _{opr}	-40~100	°C	
Storage Temperature	T _{stg}	-55~125	°C	
Soldering Temperature	T _{sol}	260	°C	4

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

RECOMMENDED OPERATION CONDITIONS

Parameter	Symbol	Min.	Max.	Unit
Operating Temperature	T _A	-40	100	°C
Supply Voltage	V _{CC}	2.7	3.6	V
	V _{CC}	4.5	5.5	V
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 =1kΩ per channel)	N	-	5	TTL Loads

ELECTRICAL OPTICAL CHARACTERISTICS (T_a=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition	Note
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							
High Level Supply Current	I _{CCH}	-	4.3	10	mA	I _F =0mA, V _E =0.5V, V _{CC} =3.3V	
Low Level Supply Current	I _{CCL}	-	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 (T _a = -40 to 85°C)							
High Level Output Current	I _{OH}	-	4.1	100	μA	V _{CC} =3.3V, 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 =2.0V, I _{CL} =13mA	
Input Threshold Current	I _{FT}	-	2.2	5	mA	V _{CC} =3.3V, V _O =0.6V, V _E =2.0V, 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 OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition	Note
SWITCHING CHARACTERISTICS ($T_a = -40$ to 85°C , $V_{CC}=3.3\text{V}$, $I_F=7.5\text{mA}$ unless specified otherwise)							
Propagation Delay Time to Output Low Level	t_{PHL}	-	35	75	ns	$C_L=15\text{pF}$, $R_L=350\Omega$, $T_a=25^\circ\text{C}$	
Propagation Delay Time to Output High Level	t_{PLH}	-	47	75	ns	$C_L=15\text{pF}$, $R_L=350\Omega$, $T_a=25^\circ\text{C}$	
Pulse Width Distortion	$ t_{PHL}-t_{PLH} $	-	12	35	ns	$C_L=15\text{pF}$, $R_L=350\Omega$	
Rise Time	t_r	-	30	-	ns	$C_L=15\text{pF}$, $R_L=350\Omega$	
Fall Time	t_f	-	8.5	-	ns	$C_L=15\text{pF}$, $R_L=350\Omega$	
Enable Propagation Delay Time to Output Low Level	t_{EHL}	-	15	-	ns	$I_F=7.5\text{mA}$, $V_{EH}=3.3\text{V}$, $C_L=15\text{pF}$, $R_L=350\Omega$	
Enable Propagation Delay Time to Output High Level	t_{ELH}	-	15	-	ns	$I_F=7.5\text{mA}$, $V_{EH}=3.3\text{V}$, $C_L=15\text{pF}$, $R_L=350\Omega$	
Common Mode Transient Immunity at Logic High	CM_H	-	-	-	V/ μs	$I_F = 7.5\text{mA}$, $V_{OH}=2.0\text{V}$, $R_L=350\Omega$, $T_a=25^\circ\text{C}$ $V_{CM}=10\text{Vp-p}$	
Common Mode Transient Immunity at Logic Low	CM_L	-	-	-	V/ μs	$I_F = 0\text{mA}$, $V_{OH}=0.8\text{V}$, $R_L=350\Omega$, $T_a=25^\circ\text{C}$ $V_{CM}=10\text{Vp-p}$	

CHARACTERISTIC CURVES

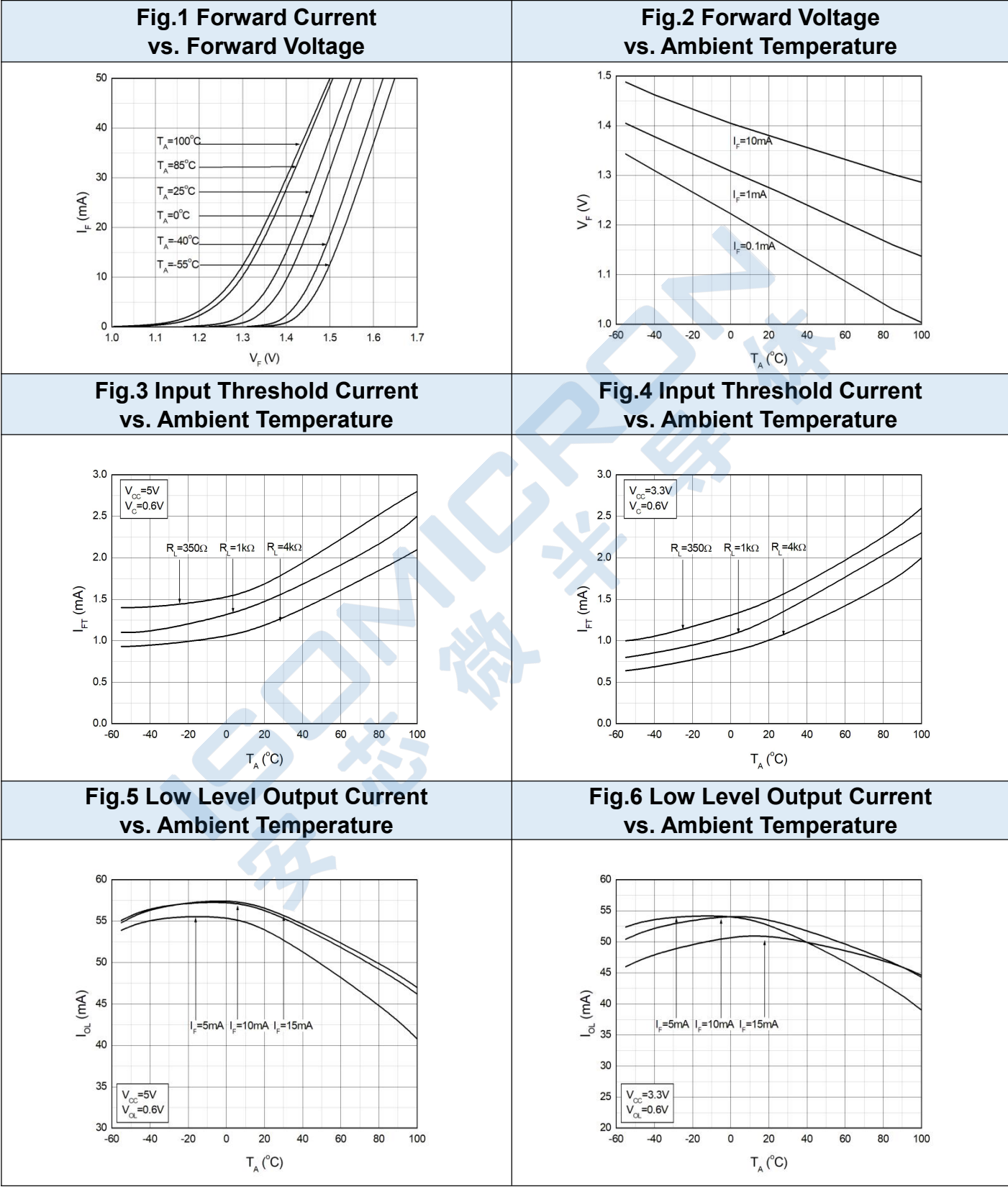


Fig.7 Low Level Output Voltage
vs. Ambient Temperature

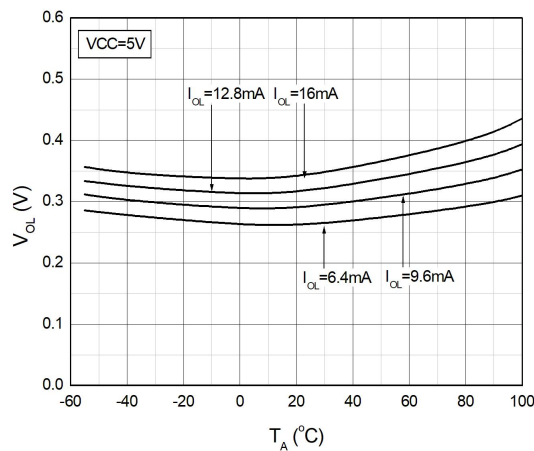


Fig.8 Low Level Output Voltage
vs. Ambient Temperature

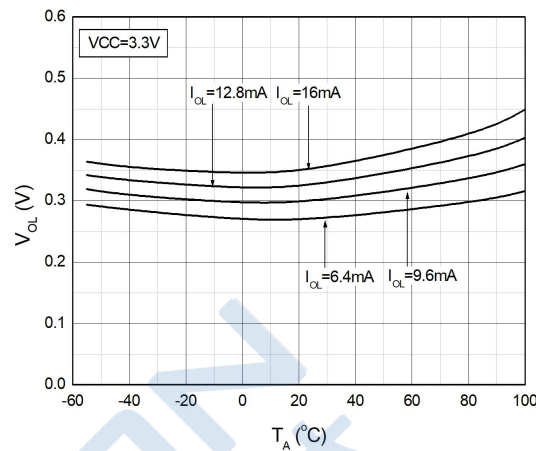


Fig.9 High Level Output Current
vs. Ambient Temperature

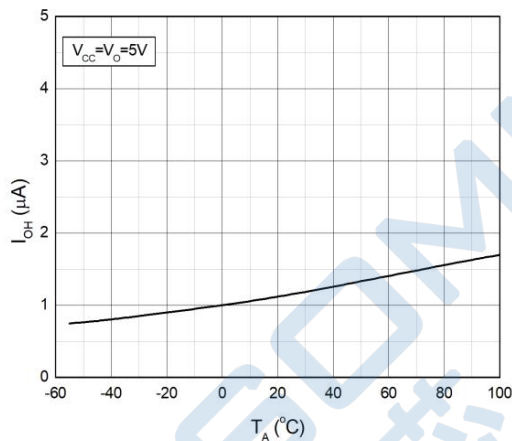


Fig.10 High Level Output Current
vs. Ambient Temperature

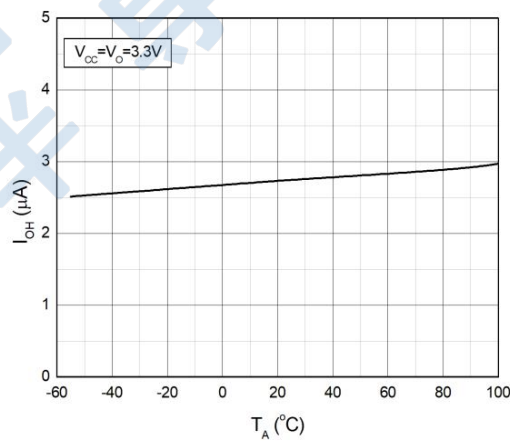


Fig.11 Output Voltage
vs. Forward Current

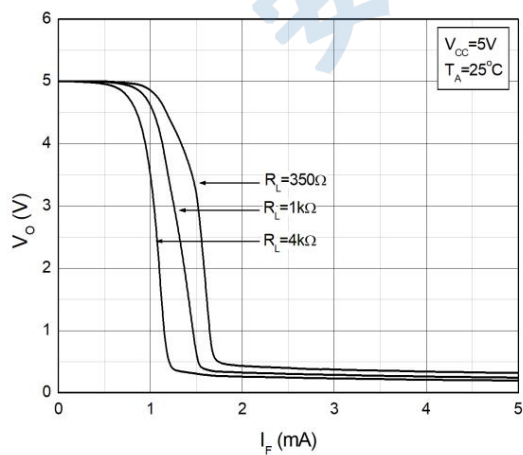


Fig.12 Output Voltage
vs. Forward Current

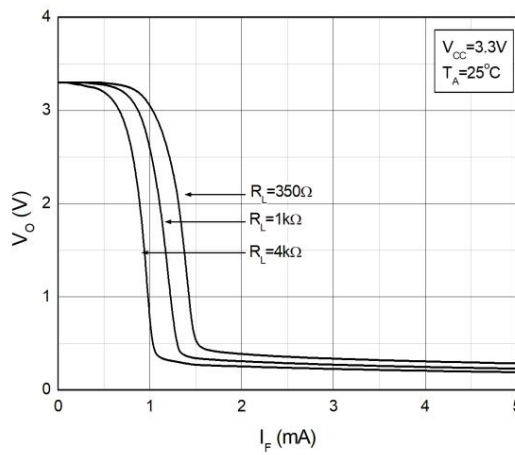


Fig.13 Propagation Delay
vs. Forward Current

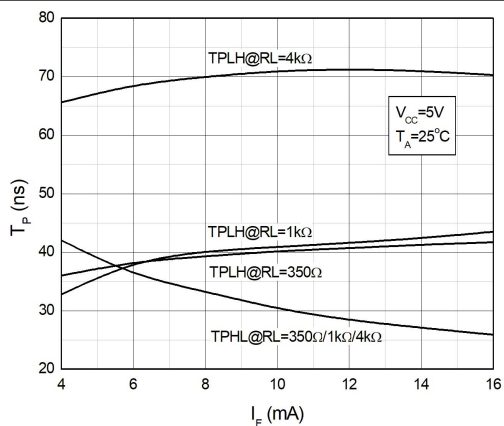


Fig.14 Propagation Delay
vs. Forward Current

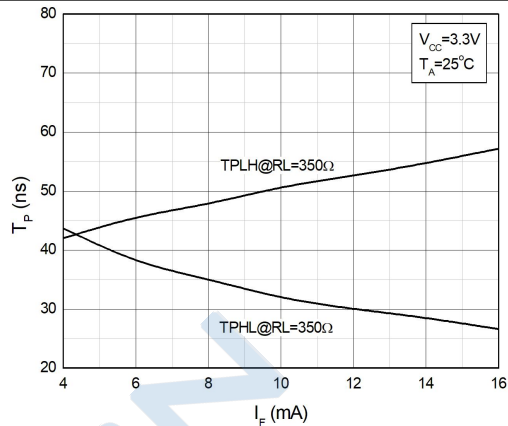


Fig.15 Rise and Fall Time
vs. Ambient Temperature

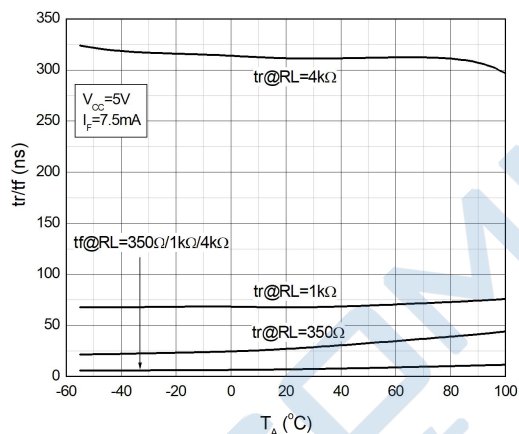


Fig.16 Rise and Fall Time
vs. Ambient Temperature

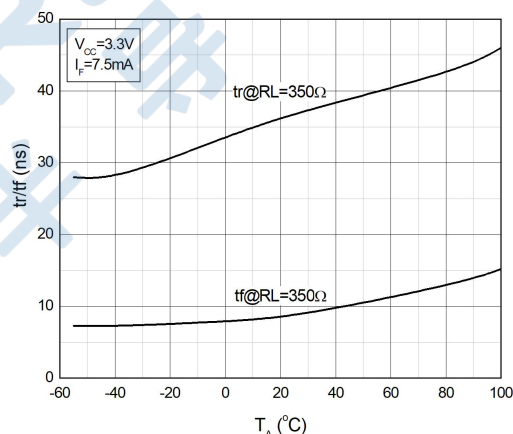


Fig.17 Propagation Delay
vs. Ambient Temperature

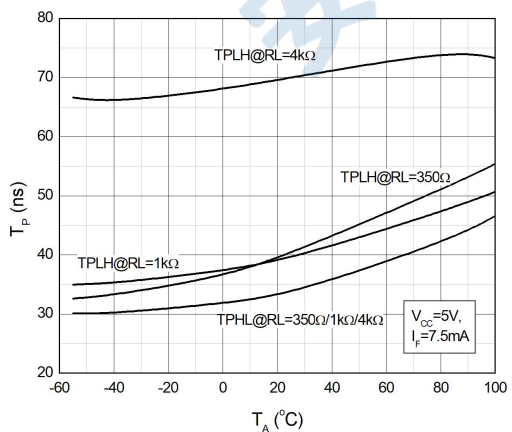


Fig.18 Propagation Delay
vs. Ambient Temperature

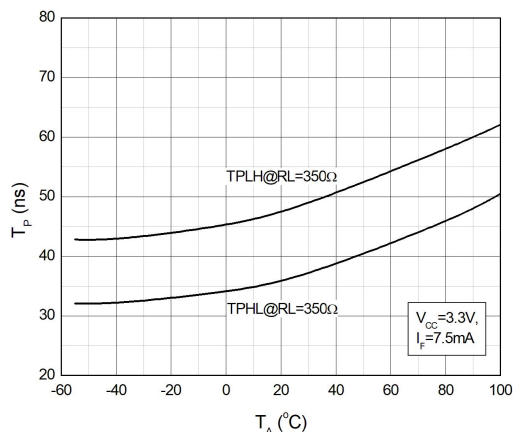


Fig.19 Pulse Width Distortion
vs. Ambient Temperature

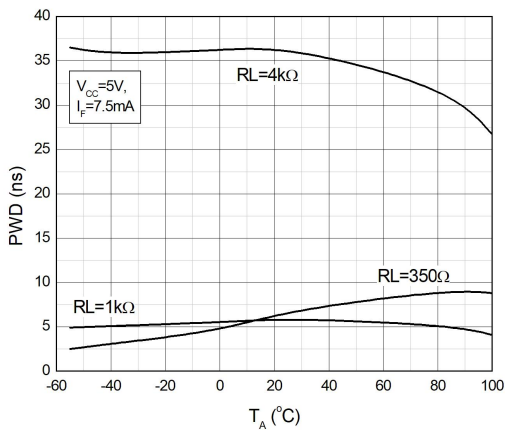


Fig.20 Pulse Width Distortion
vs. Ambient Temperature

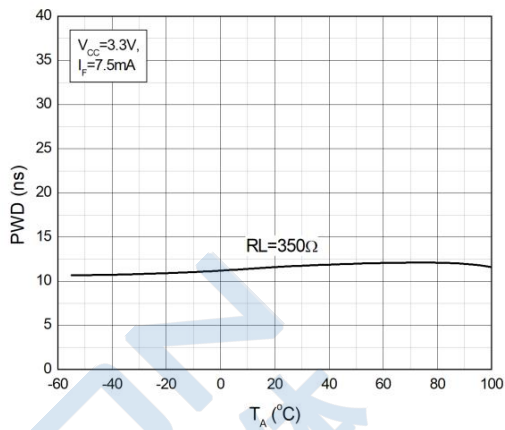


Fig.21 Enable Propagation Delay
vs. Ambient Temperature

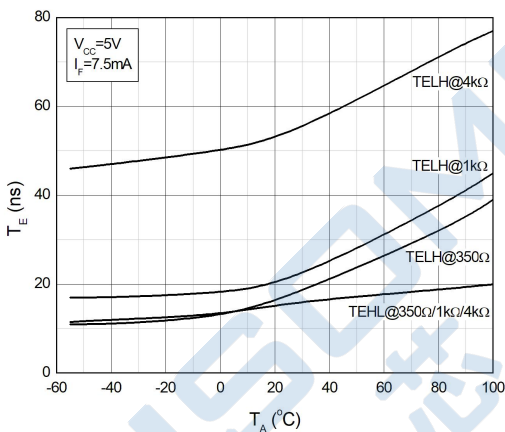
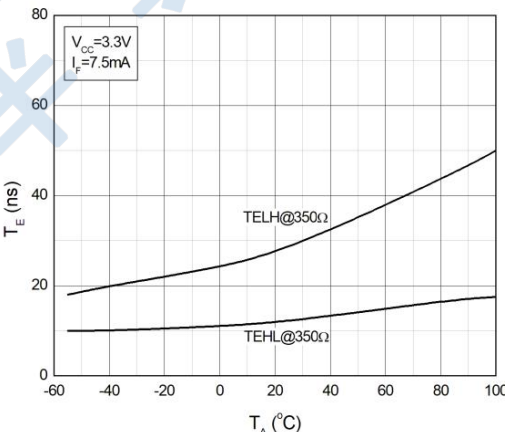


Fig.22 Enable Propagation Delay
vs. Ambient Temperature



TEST CIRCUITS

Fig.23 Test Circuits for t_{PHL} , t_{PLH} , t_r , t_f

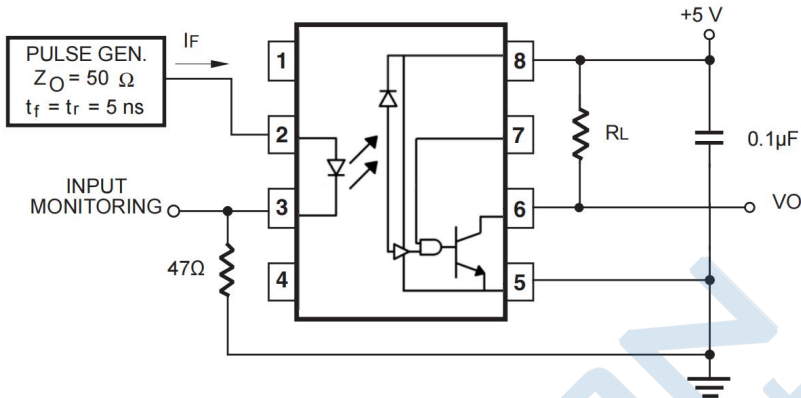


Fig.24 Waveforms of t_{PHL} , t_{PLH} , t_r , t_f

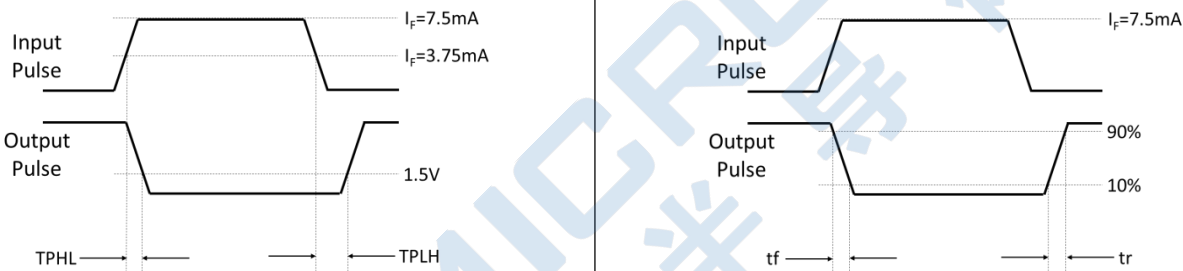


Fig.25 Test Circuits for t_{EHL} , t_{ELH}

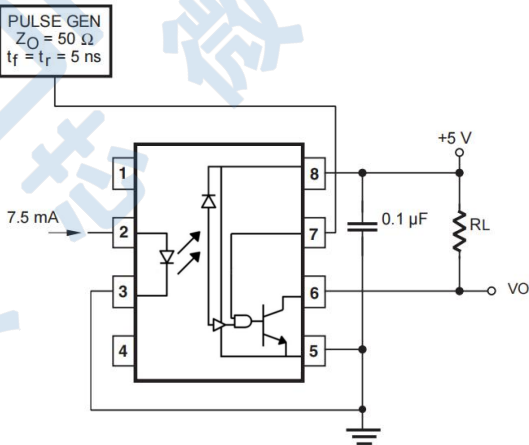
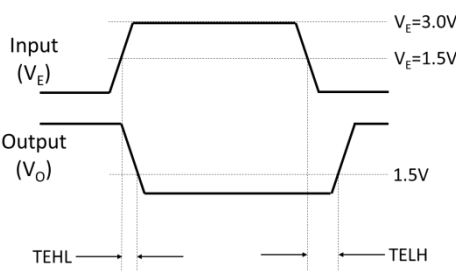


Fig.26 Waveforms of t_{EHL} , t_{ELH}



TEST CIRCUITS

Fig.25 Test Circuits for Common Mode Transient Immunity

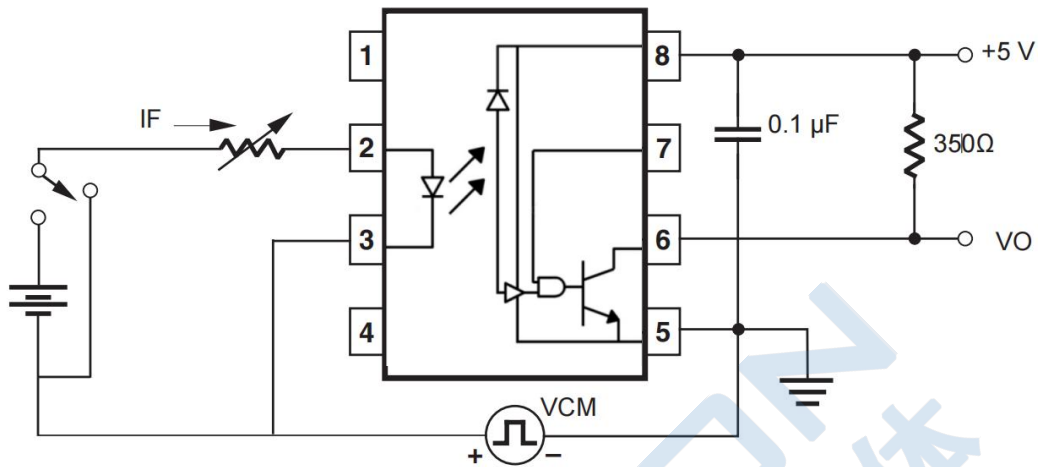
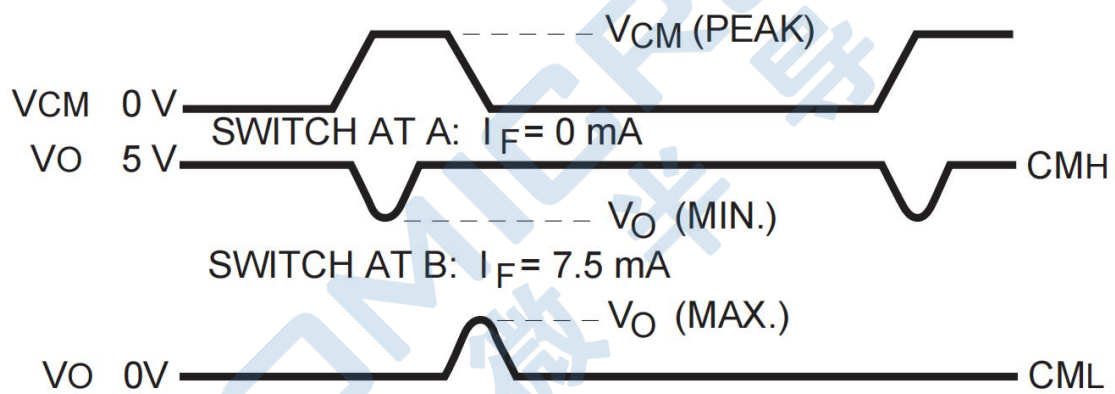
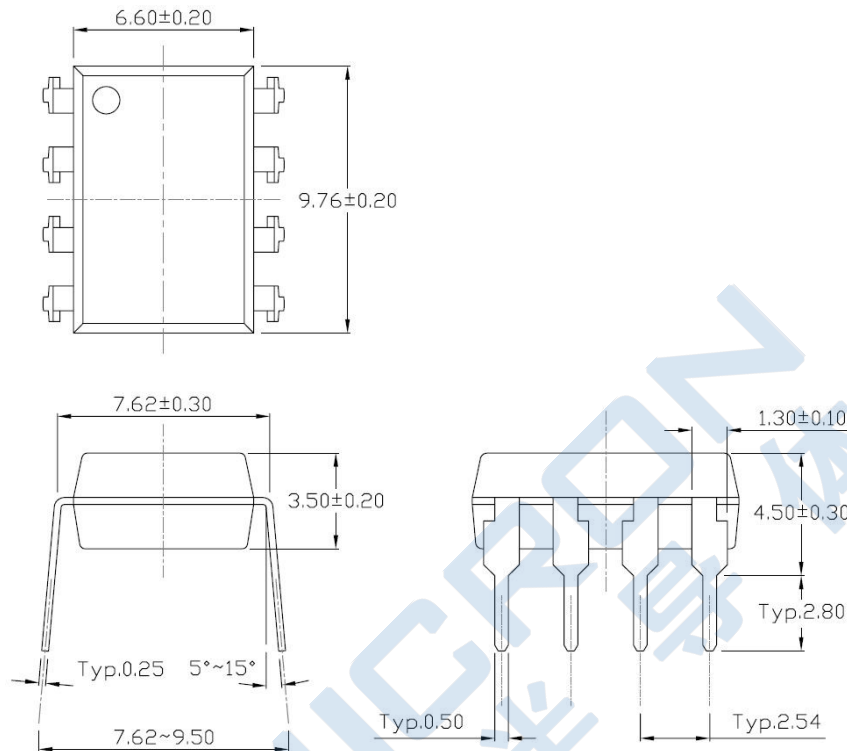


Fig.26 Waveforms of Common Mode Transient Immunity

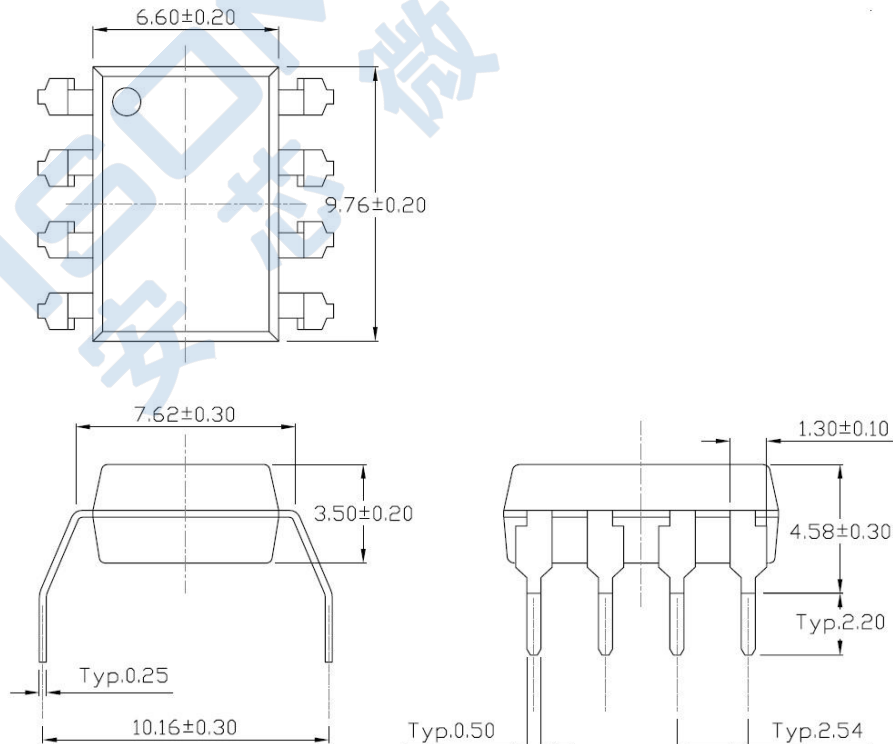


PACKAGE DIMENSIONS

Standard DIP – Through Hole (DIP Type)

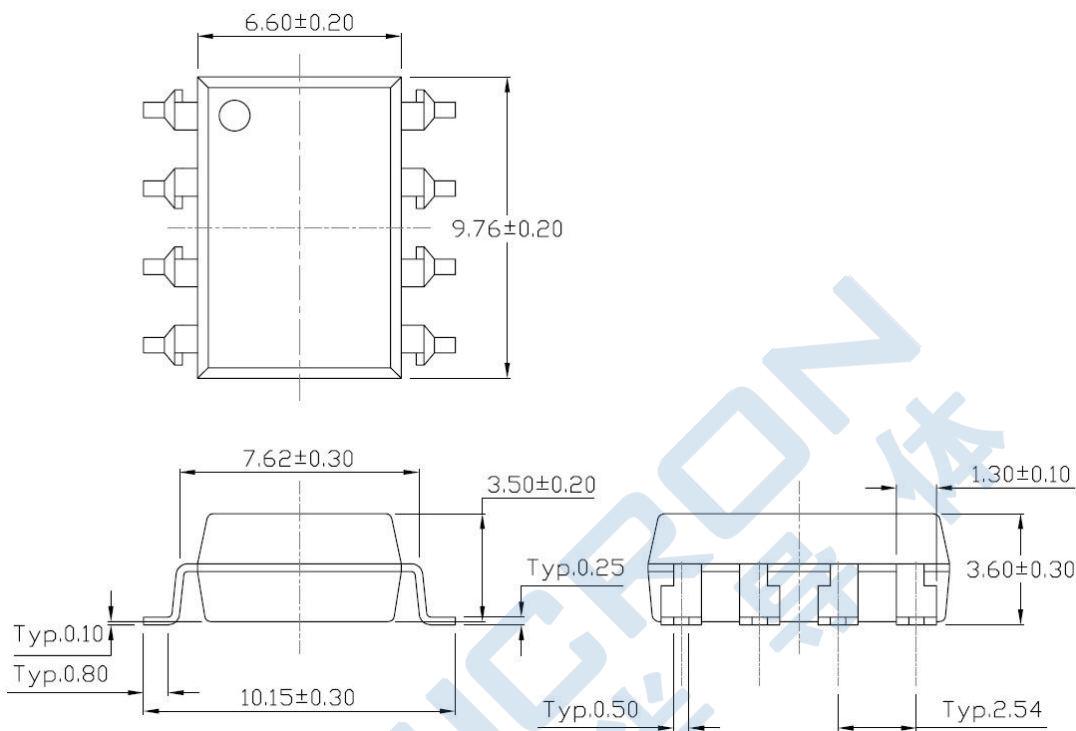


Gullwing (400mil) Lead Forming – Through Hole (M Type)



PACKAGE DIMENSIONS

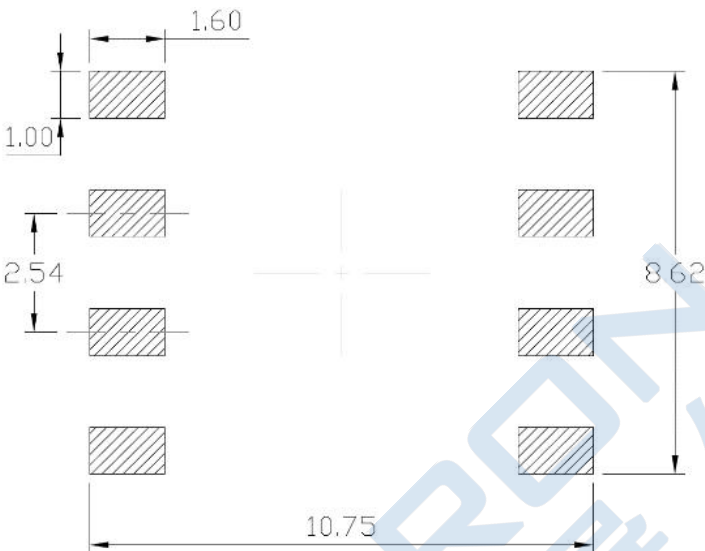
Surface Mount (Low Profile) Lead Forming (SL Type)



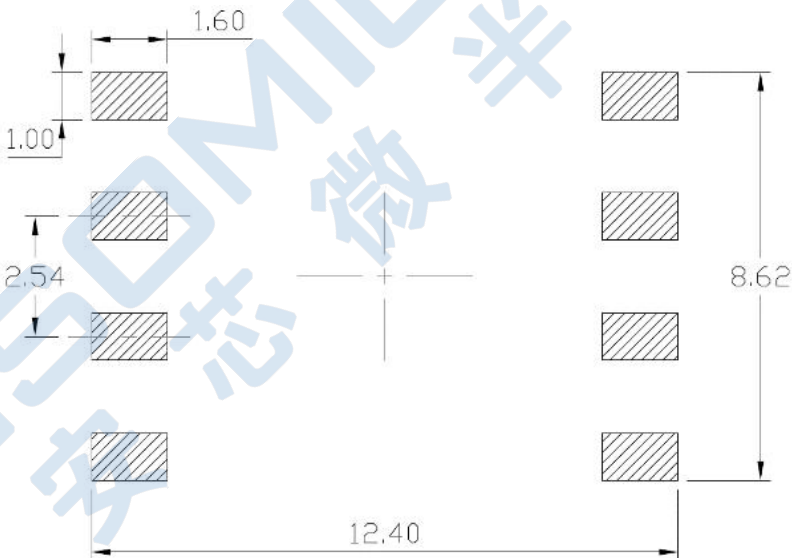
- Dimensions in mm unless otherwise stated

RECOMMENDED SOLDER MASK

Surface Mount (Low Profile) Lead Forming



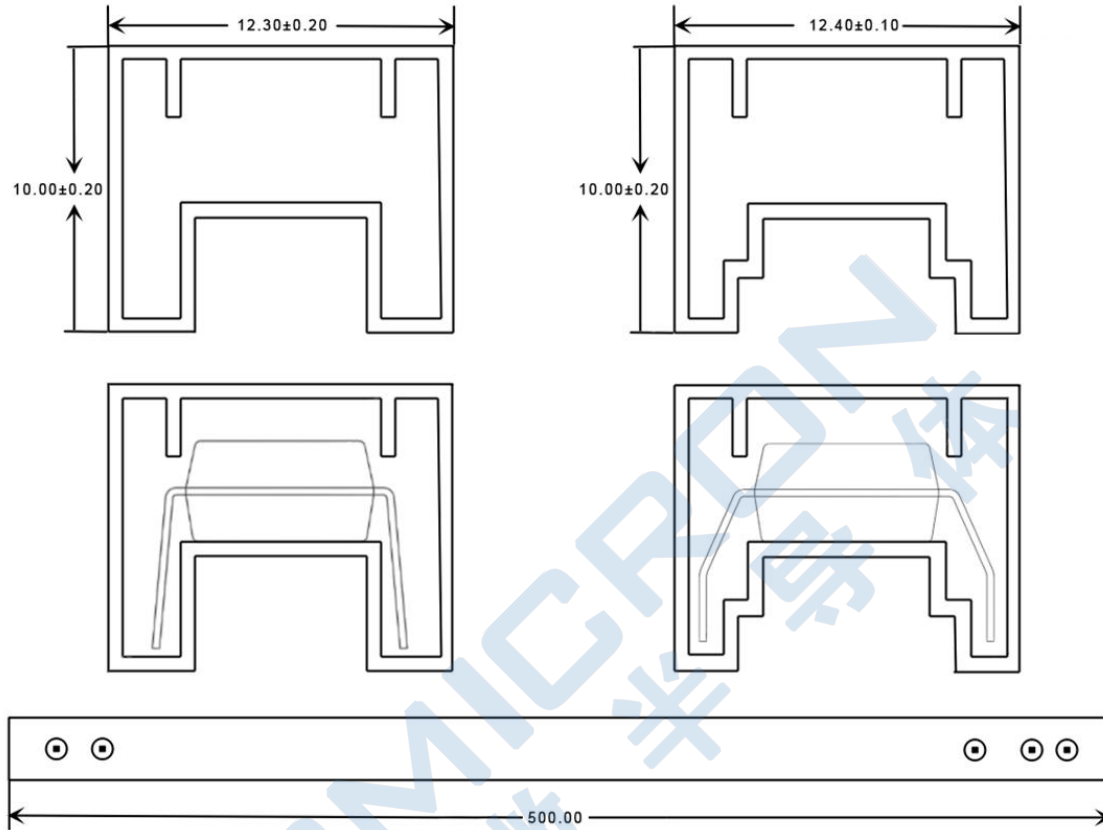
Lead Forming(Gullwing)



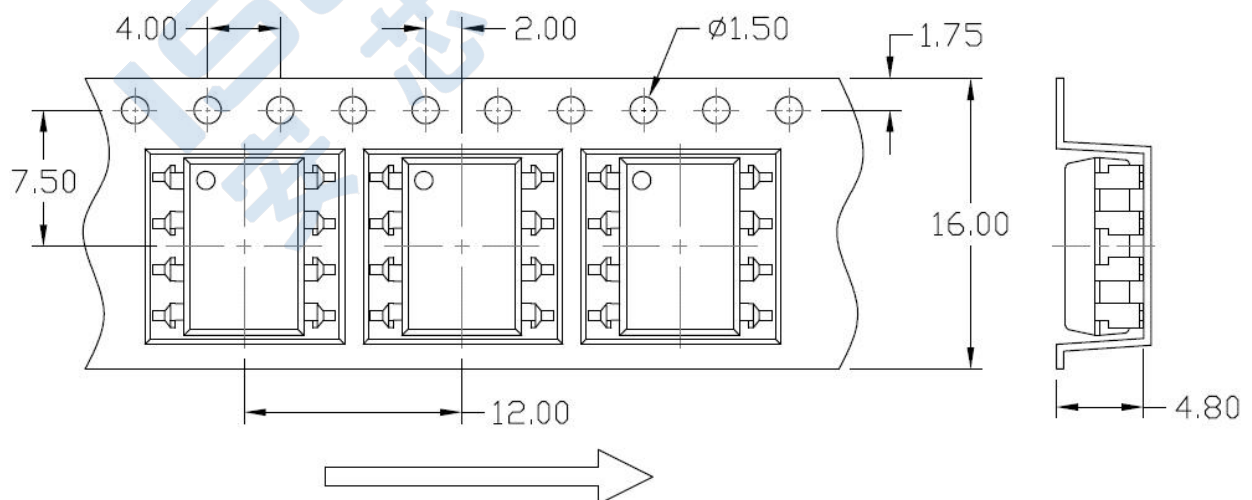
● Dimensions in mm unless otherwise stated

CARRIER TAPE SPECIFICATIONS

Option DIP8 & DIP8-M

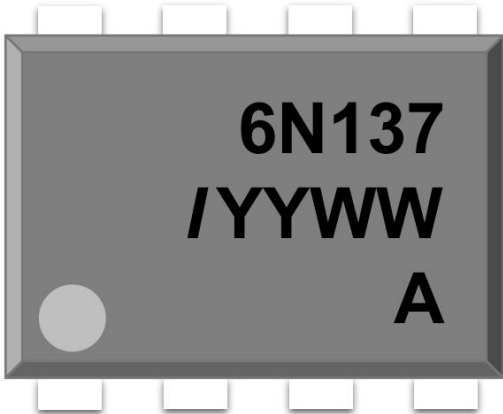


Option DIP8-SL

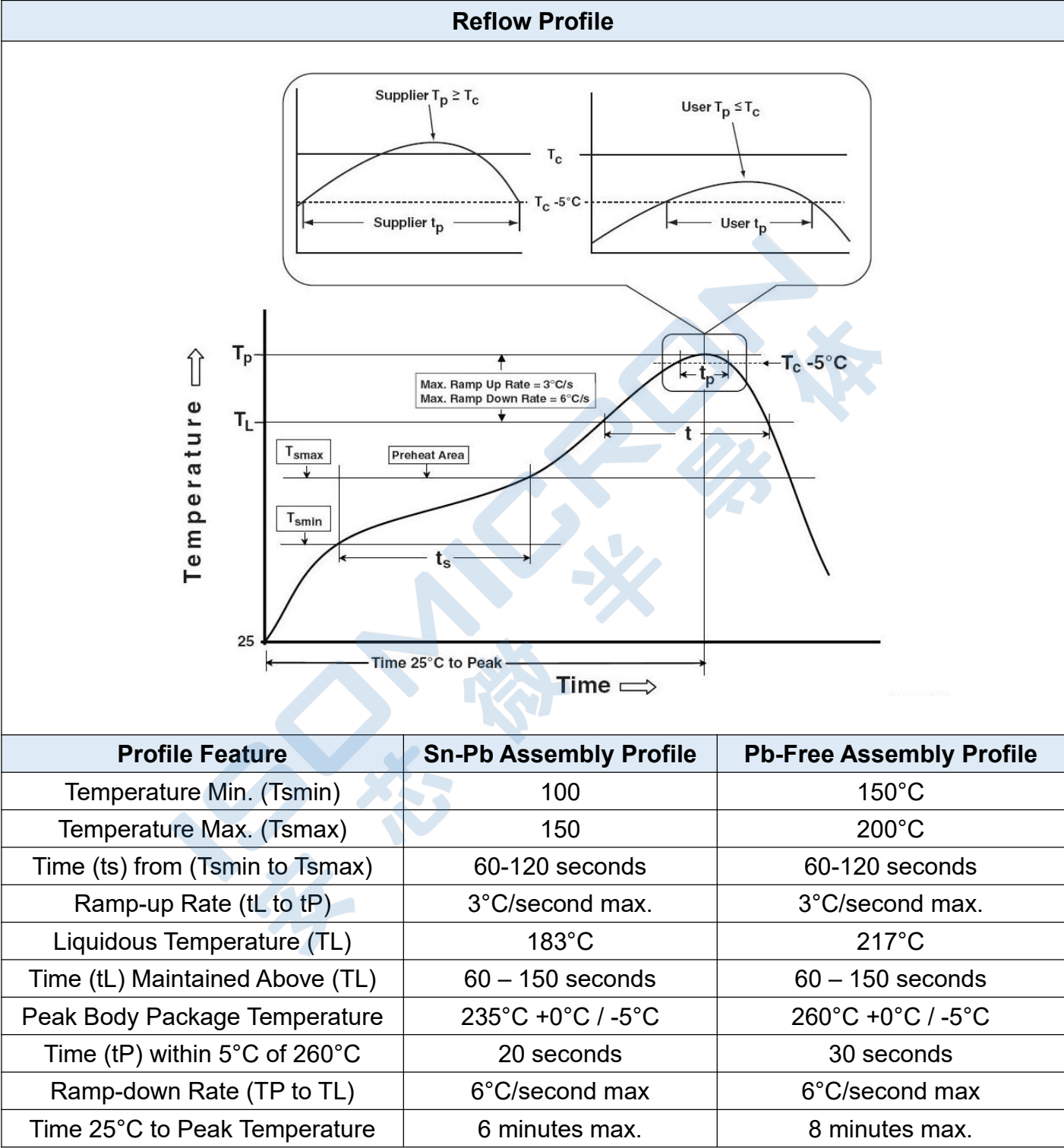


● **Dimensions in mm unless otherwise stated**

ORDERING AND MARKING INFORMATION

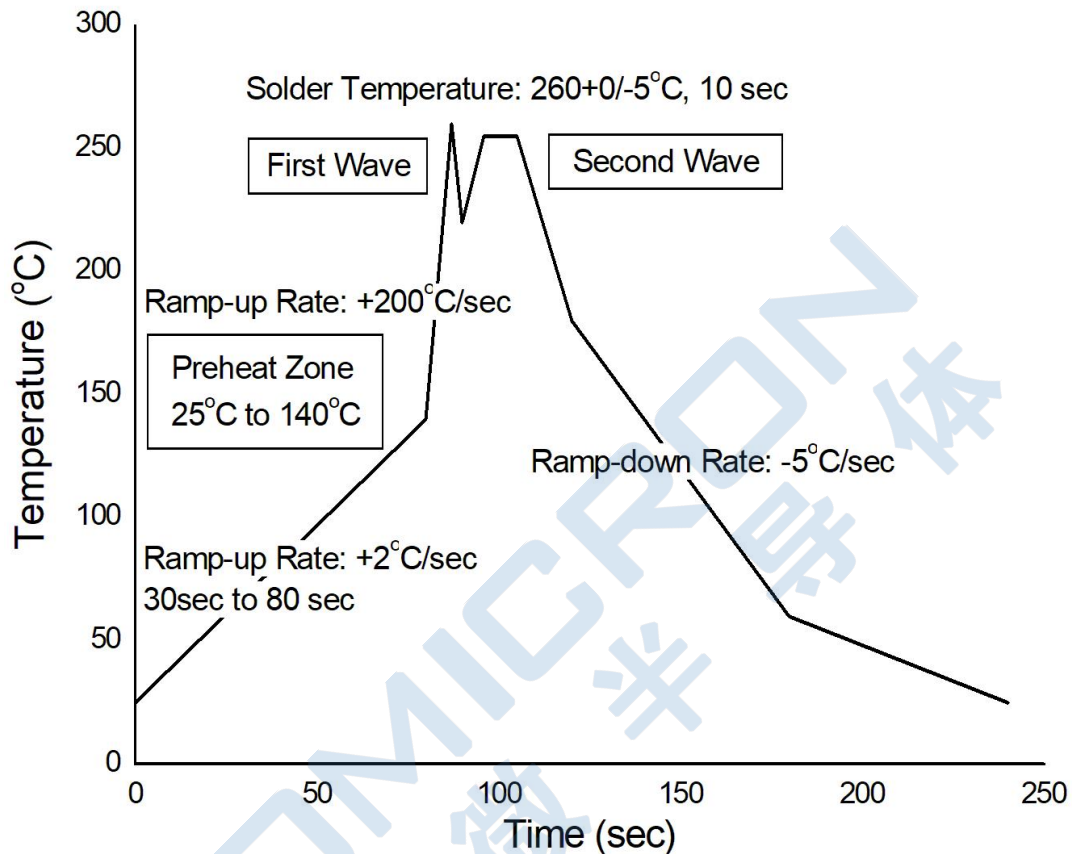
Marking Information			
		6N137 : Product Series&Rank / : ISOMICRON YY : Fiscal Year WW : Work Week A : Manufacturing Code	
Order Code			
Product Series ← Lead Forming ← 0: DIP-Standard 1: DIP-M 5: SM-SL		6N137 - 5 0 0 E Halogen Free: E: Halogen-free,Lead-free Z: Halogen, Lead-free CTR Rank: None Performance 0: Normal 1: Enhanced	
Packing Quantity			
Option	Quantity	Quantity – Inner box	Quantity – Outer box
DIP-Standard	45 Units/Tube	25 Tube/ Inner box	6 Inner box/Outer box=6.75k Units
DIP-M	45 Units/Tube	25 Tube/ Inner box	6 Inner box/Outer box=6.75k Units
SM-SL	1000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 10k Units

REFLOW INFORMATION



TEMPERATURE PROFILE OF SOLDERING

Wave Soldering (JESD22-A111 Compliant)



Hand Soldering By Soldering Iron

Soldering Temperature	380±0/-5°C
Soldering Time	3 sec max.

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

DISCLAIMER

- ISOMICRON is continually improving the quality, reliability, function and design. ISOMICRON reserves the right to make changes without further notices.
- The characteristic curves shown in this datasheet are representing typical performance which are not guaranteed.
- ISOMICRON makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, ISOMICRON disclaims (a) any and all liability arising out of the application or use of any product, (b) any and all liability, including without limitation special, consequential or incidental damages, and (c) any and all implied warranties, including warranties of fitness for particular
- The products shown in this publication are designed for the general use in electronic applications such as office automation, equipment, communications devices, audio/visual equipment, electrical application and instrumentation purpose, non-infringement and merchantability.
- This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or lifesaving applications or any other application which can result in human injury or death.
- Please contact ISOMICRON sales agent for special application request.
- Immerge unit's body in solder paste is not recommended.
- Parameters provided in datasheets may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated in each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify ISOMICRON's terms and conditions of purchase, including but not limited to the warranty expressed therein.
- Discoloration might be occurred on the package surface after soldering, reflow or long-time use. It neither impacts the performance nor reliability.