NEC's 6 PIN DIP 50 mΩ LOW ON-STATE RESISTANCE 2.5 A CONTINUOUS LOAD CURRENT 1-CH OPTICAL COUPLED MOSFET

PS710B-1A
PS710BL-1A

FEATURES

- **LOW ON-STATE RESISTANCE:**
  R_{ON} = 50 mΩ TYP
- **LARGE CONTINUOUS LOAD CURRENT:**
  I_L = 2.5 A
- **1 CHANNEL TYPE:**
  1a Output
- **LOW LED OPERATING CURRENT:**
  I_F = 2 mA
- **DESIGNED FOR AC/DC SWITCHING LINE CHANGER**
- **SMALL PACKAGE:**
  6 PIN DIP
- **LOW OFFSET VOLTAGE**
- **SURFACE MOUNT AVAILABLE**

DESCRIPTION

NEC's PS710B-1A and PS710BL-1A are solid state relays containing GaAs LEDs on the light emitting side (input side) and MOSFETs on the output side.

They are suitable for PLC, etc. because of their large continuous load current and low on-state resistance.

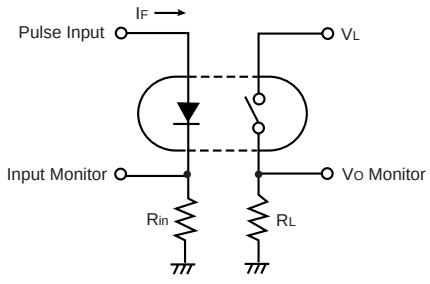
APPLICATIONS

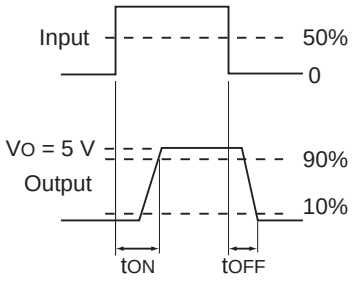
- **MEASUREMENT EQUIPMENT**
- **FACTORY AUTOMATION EQUIPMENT**

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

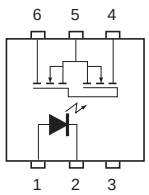
PART NUMBER					PS710B-1A, PS710BL-1A		
	SYMBOLS	PARAMETERS		UNITS	MIN	TYP	MAX
Diode	V_F	Forward Voltage, I_F = 10 mA		V		1.2	1.4
	I_R	Reverse Current, V_R = 5 V		μA			5.0
MOSFET	I_{Loff}	Off-State Leakage Current, V_D = 60 V		μA			1.0
	C_{OUT}	Output Capacitance, V_D = 0 V, f = 1 MHz		pF		500	
Coupled	I_{Fon}	LED On-state Current, I_L = 2.5 A		mA			2.0
	R_{on}	On-State Resistance, I_F = 10 mA, I_L = 2.5 A, t ≤10 ms		Ω		0.05	0.1
	t_{on}	Turn-On Time[1]	I_F = 10 mA, V_O = 5 V, R_L = 500 Ω, PW ≥ 10 ms	ms		2.5	5.0
	t_{off}	Turn-Off Time[1]				0.05	0.2
	R_{I-O}	Isolation Resistance, V_{in-out} = 1.0 kVDC		Ω	10^9		
	C_{I-O}	Isolation Capacitance, V = 0 V, f = 1 MHz		pF		0.5	

Note:
1. Test circuit of Switching Time.





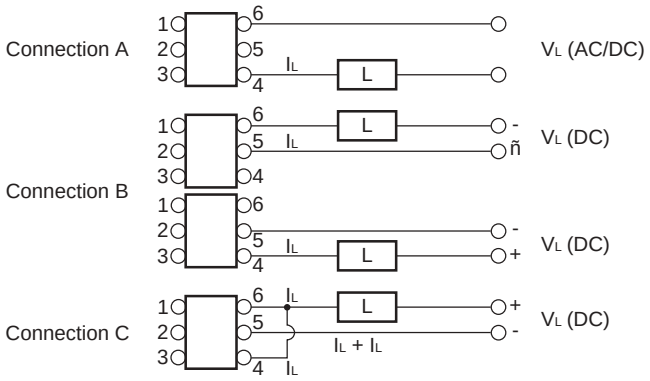
PS710B-1A
PS710BL-1A



ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
Diode			
V_R	Reverse Voltage	V	5
I_F	Forward Current (DC)	mA	50
P_D	Power Dissipation	mW	50
$I_{F\ (Peak)}$	Peak Forward Current[2]	A	1
MOSFET			
V_L	Break Down Voltage	V	60
I_L	Continuous Load Current[3]	A	
	Connection A		2.5
	Connection B		3.5
	Connection C		5.0
I_{LP}	Pulse Load Current[4] AC/DC Connection	A	5.0
P_D	Power Dissipation	mW	625
Coupled			
BV	Isolation Voltage[5]	Vr.m.s.	1500
P_T	Total Power Dissipation	mW	675
T_A	Operating Ambient Temp.	°C	-40 to +85
T_{STG}	Storage Temperature	°C	-40 to +100

Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
2. PW = 100 μs, Duty Cycle = 1 %
3. Conditions: $I_F \geq 2$ mA. The following types of load connections are available:



4. PW = 100 ms, 1 shot.
5. AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input and output.

RECOMMENDED OPERATING CONDITIONS (T_A = 25 °C)

SYMBOL	PARAMETER	UNITS	MIN	TYP	MAX
I_F	LED Operating Current	mA	2	10	20
V_F	LED Off Voltage	V	0		0.5

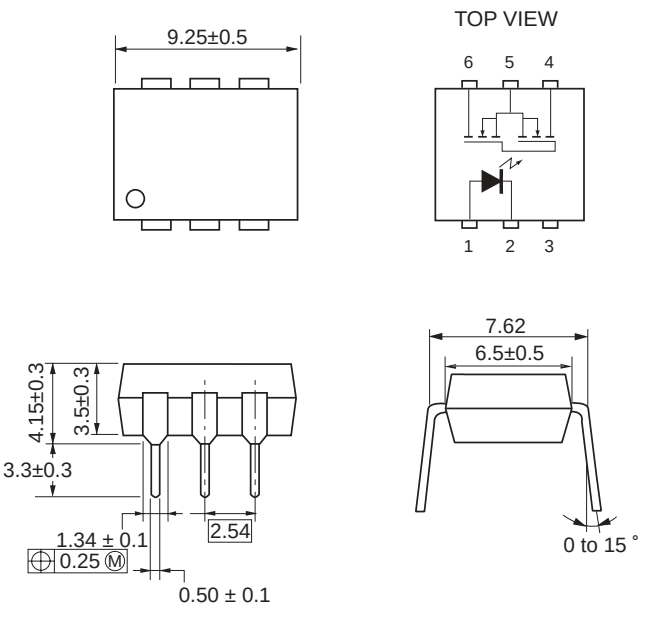
ORDERING INFORMATION

PART NUMBER	PACKAGE	PACKAGE STYLE	APPLIICATION PART NUMBER*
PS710B-1A	6-pin DIP	Magazine case 50 PCS	PS710B-1A
PS710BL-1A			PS710BL-1A
PS710BL-1A-E3		Embossed Tape 1000 pcs/reel	
PS710BL-1A-E4			

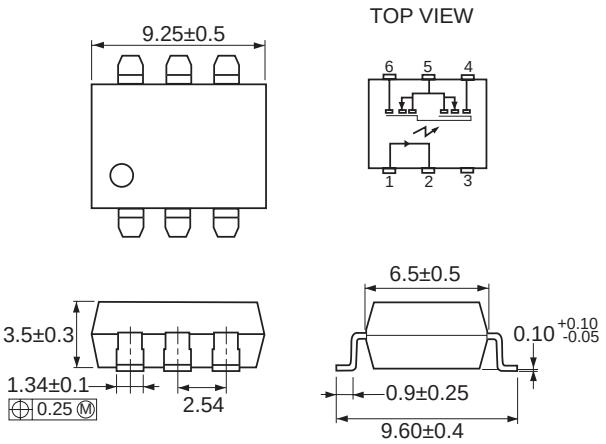
* For the application of the Safety Standard, following part number should be used.

OUTLINE DIMENSIONS (Units in mm)

PS710B-1A



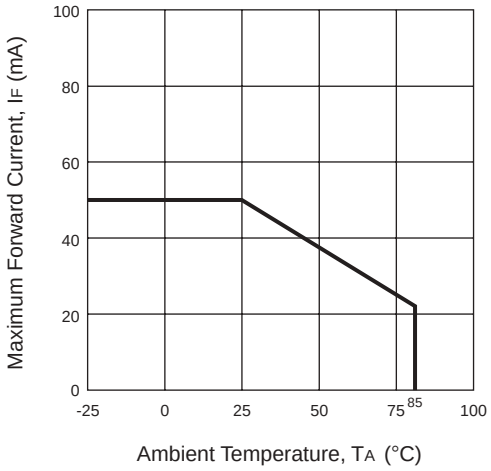
PS710BL-1A



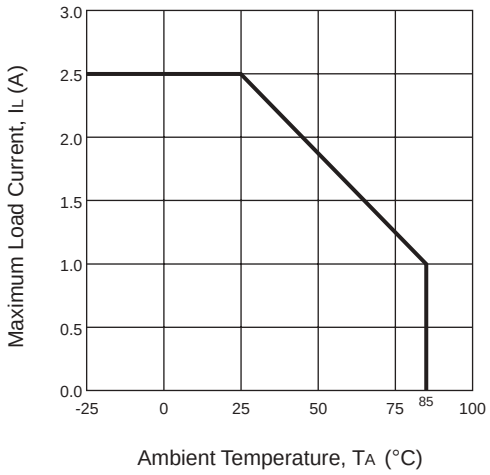
1. LED Anode
2. LED Cathode
3. NC
4. MOSFET Drain
5. MOSFET Source
6. MOSFET Drain

TYPICAL PERFORMANCE (T_A 25ºC)

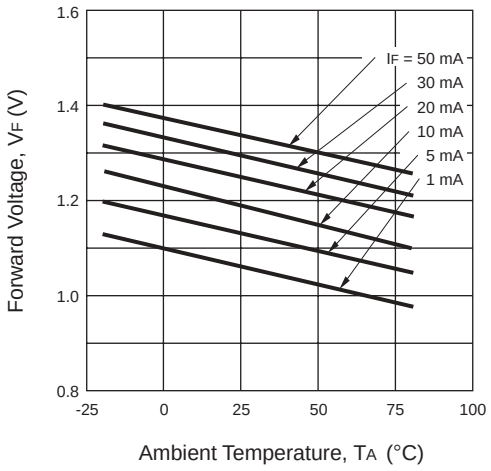
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



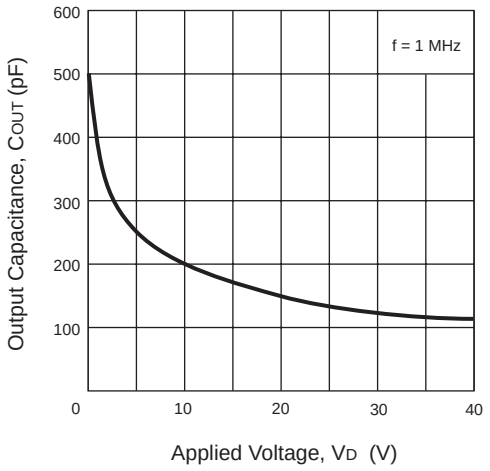
MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE



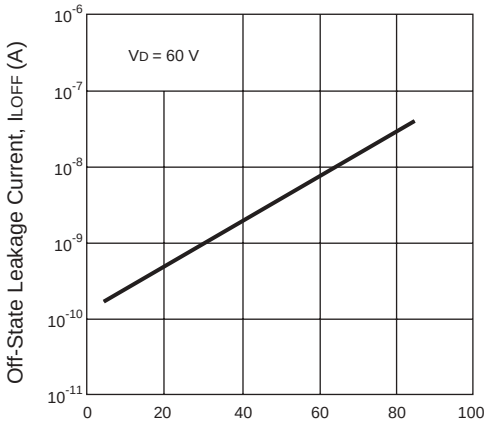
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



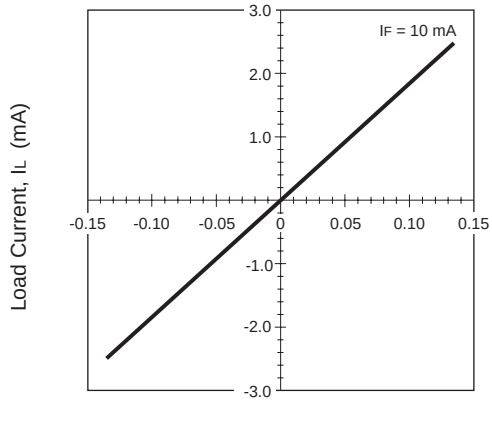
OUTPUT CAPACITANCE vs. APPLIED VOLTAGE



OFF-STATE LEAKAGE CURRENT vs. AMBIENT TEMPERATURE

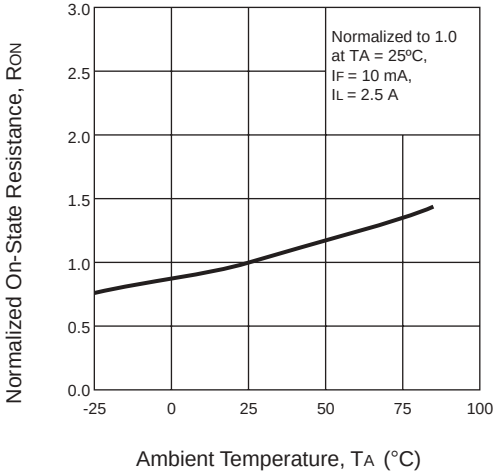


LOAD CURRENT vs. LOAD VOLTAGE

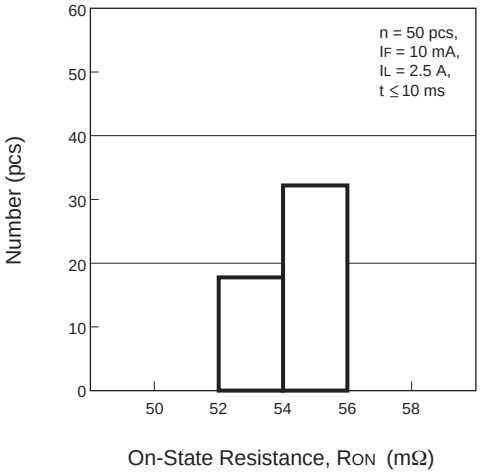


TYPICAL PERFORMANCE (TA 25ºC)

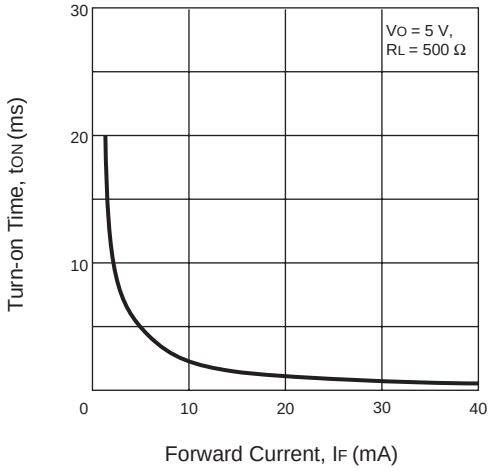
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



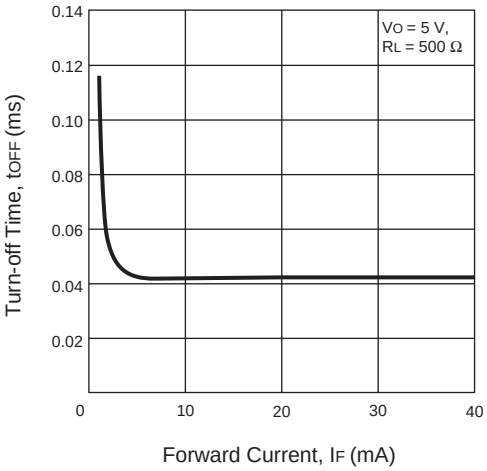
ON-STATE RESISTANCE DISTRIBUTION



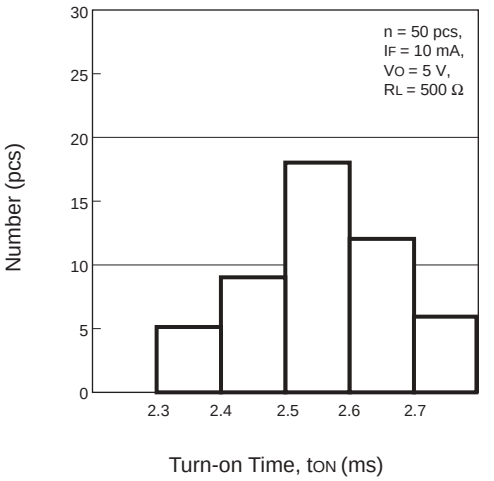
TURN-ON TIME vs. FORWARD CURRENT



TURN-OFF TIME vs. FORWARD CURRENT



TURN-ON TIME DISTRIBUTION



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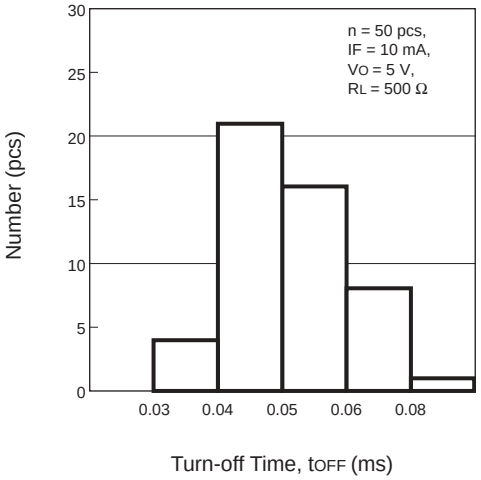
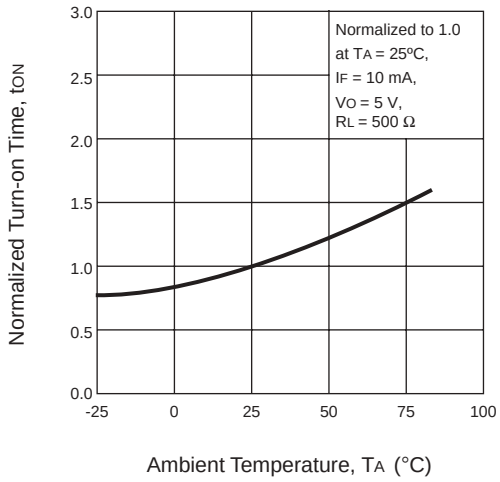
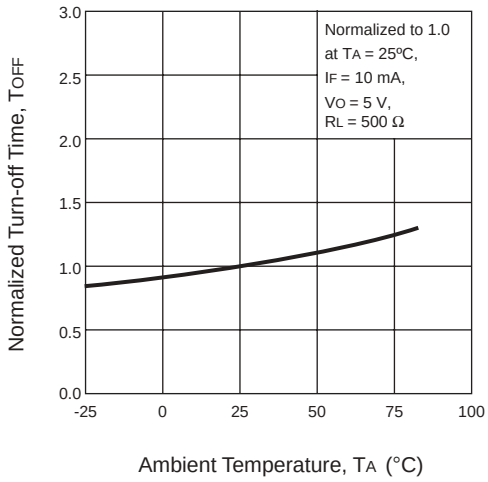


TYPICAL PERFORMANCE (T_A 25ºC)

NORMALIZED TURN-ON TIME vs. AMBIENT TEMPERATURE

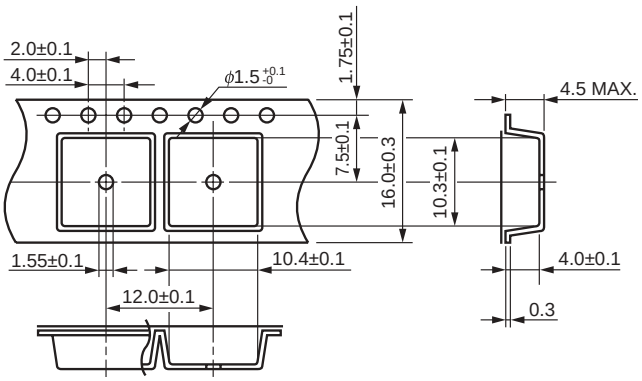


NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERATURE

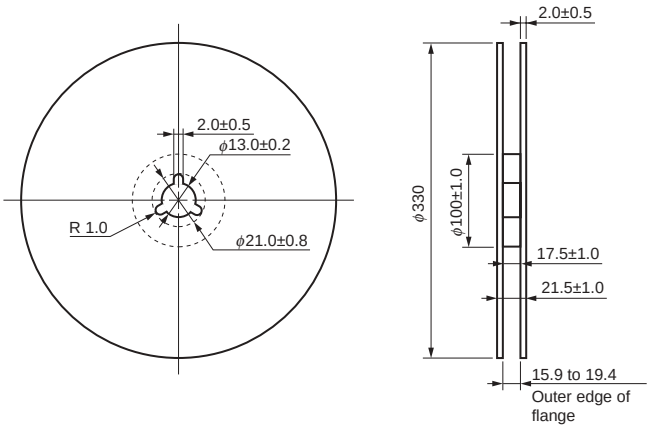


TAPING SPECIFICATIONS (Units in mm)

OUTLINE AND DIMENSIONS (TAPE)



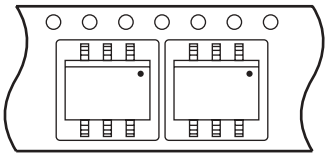
OUTLINE AND DIMENSIONS (REEL)



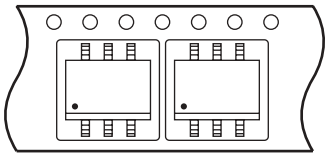
Packaging : 1000 pcs/reel

TAPING DIRECTION

PS710BL-1A-E3



PS710BL-1A-E4

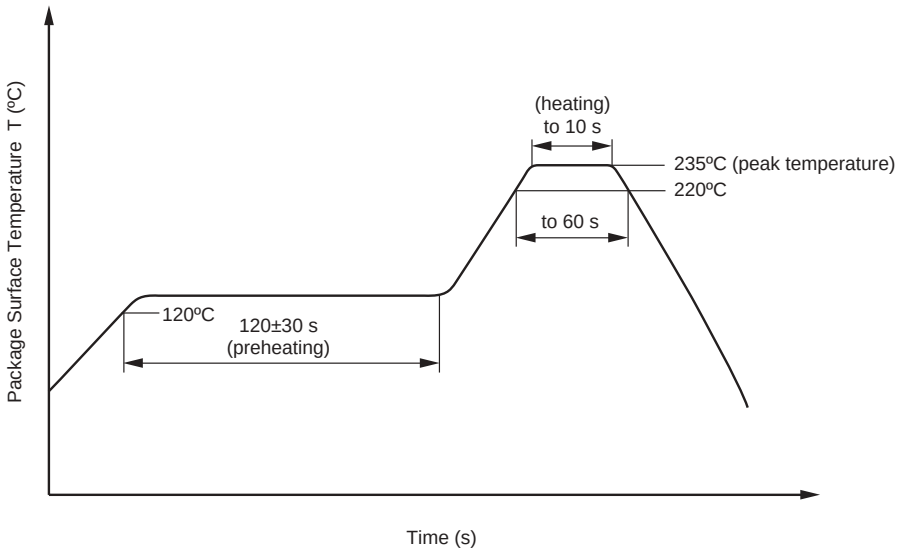


RECOMMENDED SOLDERING CONDITIONS

(1) Infrared reflow soldering

• Peak reflow temperature	260 °C or below (package surface temperature)
• Time of peak reflow temperature	10 seconds or less
• Time of temperature higher than 220 °C	60 seconds or less
• Time to preheat temperature from 120 to 180 °C	120±30 s
• Number of reflows	Three
• Flux	Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt % is recommended.)

Recommended Temperature Profile of Infrared Reflow



(2) Dip soldering

• Temperature	260 °C or below (molten solder temperature)
• Time	10 seconds or less
• Preheating conditions	120 °C or below (package surface temperature)
• Number of times	One
• Flux	Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt % is recommended.)

(3) Cautions

- Fluxes
  Avoid removing the residual flux with freon-based cleaning solvent.