NEC

4 PIN SOP, 0.9 Ω, LOW ON-STATE RESISTANCE 80 V BREAK DOWN VOLTAGE, 500 mA CONTINUOUS LOAD CURRENT 1-CH OPTICAL COUPLED MOSFET

PS7205B-1A

FEATURES

- **LOW ON-STATE RESISTANCE:**
  Ron = 0.9 Ω TYP
- **LARGE CONTINUOUS LOAD CURRENT:**
  I_L = 500 mA
- **HIGH-SPEED SWITCHING TIME:**
  ton, toff = 0.5 ms MAX
- **1 CHANNEL TYPE**
  1 a output
- **DESIGNED FOR AC/DC SWITCHING LINE CHANGER**
- **SMALL AND THIN PACKAGE**:
  4-pin SOP, Height = 2.1 mm
- **HIGH ISOLATION VOLTAGE:**
  BV = 1 500 Vr.m.s.
- **LOW OFFSET VOLTAGE**
- **AVAILABLE IN TAPE AND REEL**:
  PS7205B-1A-E3, E4, F3, F4

DESCRIPTION

The PS7205B-1A is a low on-state resistance solid state relay containing a GaAs LED on the input side and MOS FETs on the output side. It is suitable for PLC, etc. because of its large continuous load current and low on-state resistance.

APPLICATIONS

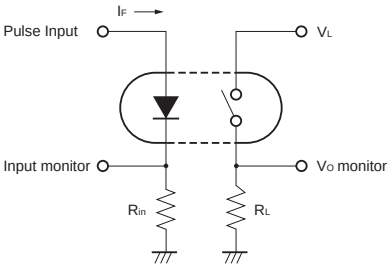
- **MEASUREMENT EQUIPMENT**
- **FA EQUIPMENT**

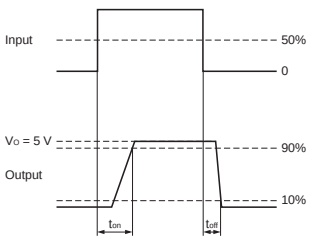
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

PART NUMBER					PS7205B-1A		
	SYMBOLS	PARAMETERS		UNITS	MIN	TYP	MAX
Diode	V_F	Forward Voltage	I_F = 5 mA	V		1.1	1.4
	I_R	Reverse Current	V_R = 5 V	μA			5.0
MOSFET	I_{Loff}	Off-state Leakage Current	V_D = 80 V	nA		0.15	5.0
	C_{out}	Output Capacitance	V_D = 0 V, f = 1 MHz	pF		30	
Coupled	I_{Fon}	LED On-state Current	I_L = 500 mA	mA			2.0
	R_{on}	On-state Resistance	I_F = 5 mA, I_L = 500 mA, t ≤ 10 ms	Ω		0.9	1.2
	t_{on}	Turn-on Time[1, 2]	I_F = 5 mA, V_O = 5 V, R_L = 500 Ω,	ms		0.18	0.5
	t_{off}	Turn-off Time[1, 2]	PW ≥ 10 ms			0.04	0.5
	R_{I-O}	Isolation Resistance	V_{I-O} = 1.0 kVDC	Ω	10^9		
	C_{I-O}	Isolation Capacitance	V = 0 V, f = 1 MHz	pF		0.5	

Notes:

1.Test Circuit for Switching Time:





2. The turn-on time and turn-off time are specified as input-pulse width ≥ 10 ms.

Be aware that when the device operates with an input-pulse width of under 10 ms, the turn-on time and turn-off time will increase.

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

SYMBOLS	PARAMETERS	UNITS	RATINGS
Diode			
I_F	Forward Current (DC)	mA	50
V_R	Reverse Voltage	V	5.0
P_D	Power Dissipation	mW	50
I_{FP}	Peak Forward Current[2]	A	1
MOS FET			
V_L	Break Down Voltage	V	80
I_L	Continuous Load Current	mA	500
I_{LP}	Pulse Load Current (AC/DC Connection)	A	1
P_D	Power Dissipation	mW	300
Coupled			
BV	Isolation Voltage[4]	Vr.m.s.	1 500
P_T	Total Power Dissipation	mW	350
T_A	Operating Ambient Temperature	°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. PW = 100 ms, 1 shot.
4. AC voltage for 1 minute at T_A = 25°C, RH = 60% between input and output.

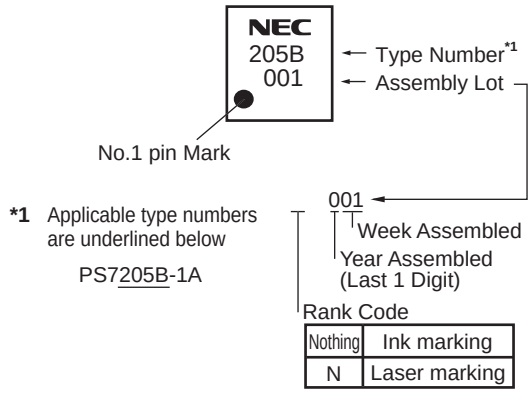
RECOMMENDED OPERATING CONDITIONS (T_A = 25°C)

SYMBOLS	PARAMETER	UNITS	MIN	TYP	MAX
I_F	LED Operating Current	mA	2	5	20
V_F	LED Off Voltage	V	0		0.5

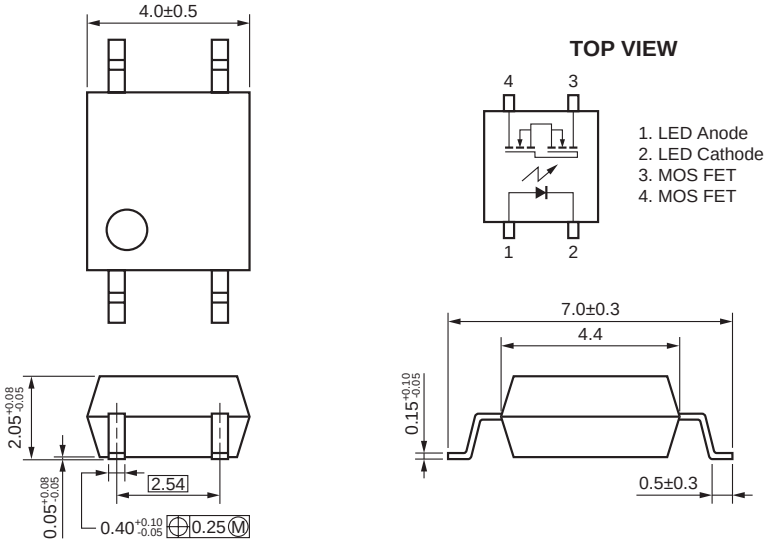
ORDERING INFORMATION

PART NUMBER	PACKAGE	PACKING STYLE
PS7205B-1A	4-pin SOP	Magazine case 100 pcs
PS7205B-1A-E3		Embossed Tape 900 pcs/reel
PS7205B-1A-E4		
PS7205B-1A-F3		Embossed Tape 3 500 pcs/reel
PS7205B-1A-F4		

MARKING

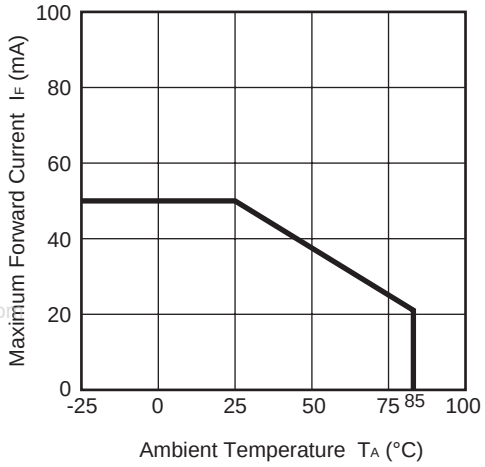


OUTLINE DIMENSIONS (Units in mm)

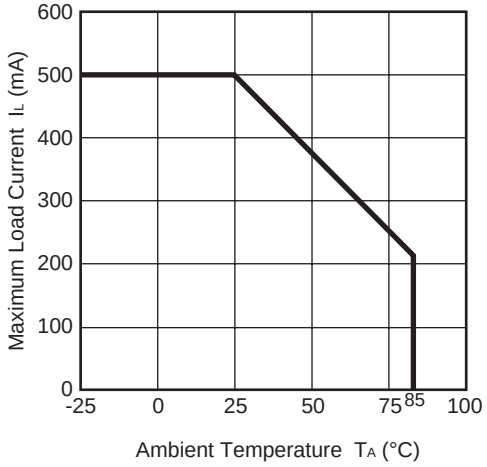


TYPICAL PERFORMANCE CURVES (TA = 25 °C, unless otherwise specified)

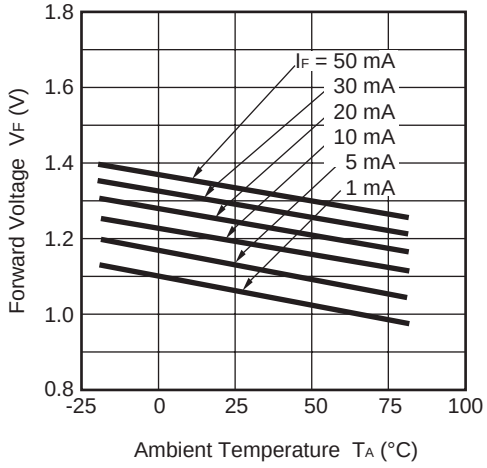
MAXIMUM FORWARD CURRENT vs AMBIENT TEMPERATURE



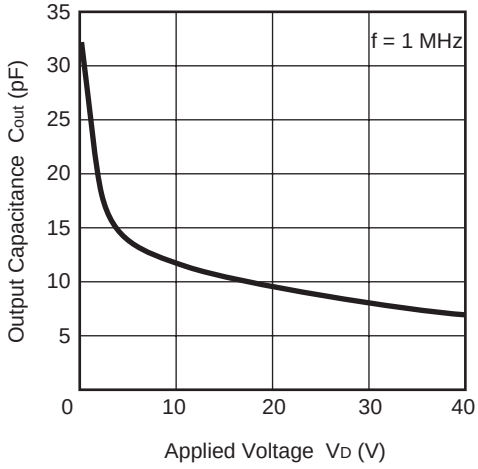
MAXIMUM LOAD CURRENT vs AMBIENT TEMPERATURE



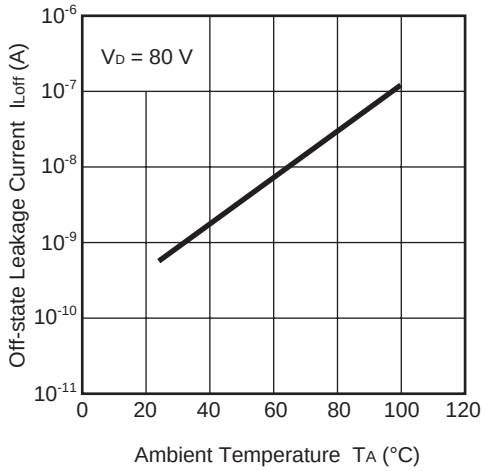
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



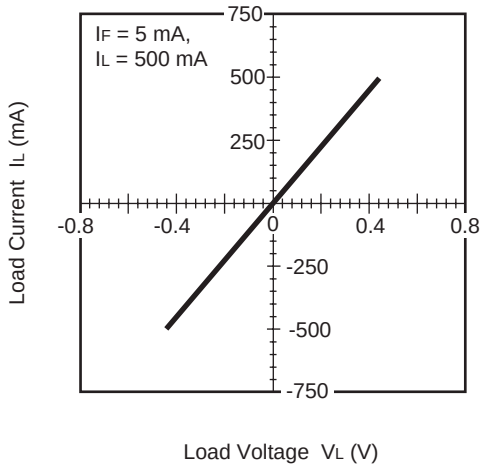
OUTPUT CAPACITANCE vs. APPLIED VOLTAGE



OFF-STATE LEAKAGE CURRENT vs. AMBIENT TEMPERATURE

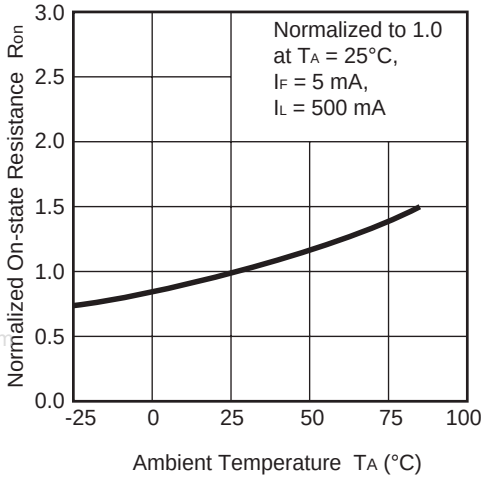


LOAD CURRENT vs. LOAD VOLTAGE

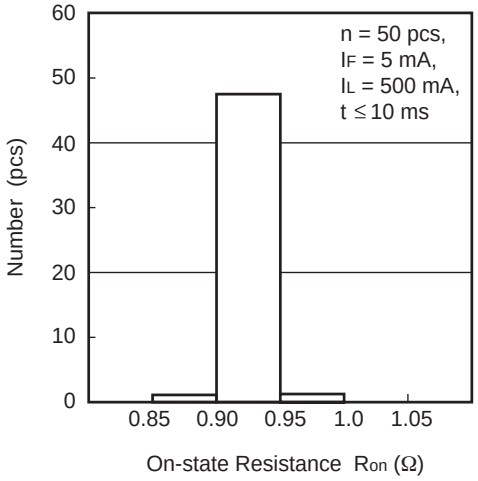


TYPICAL PERFORMANCE CURVES (TA = 25 °C, unless otherwise specified)

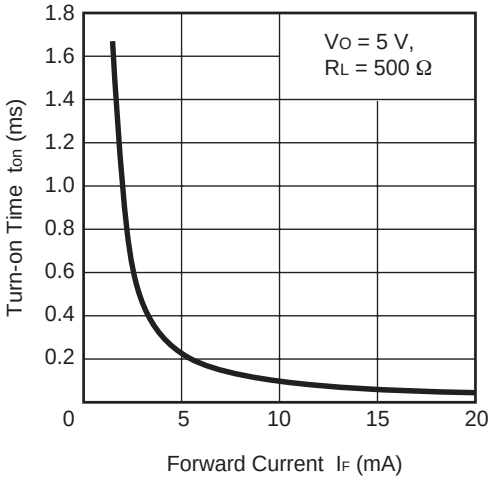
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



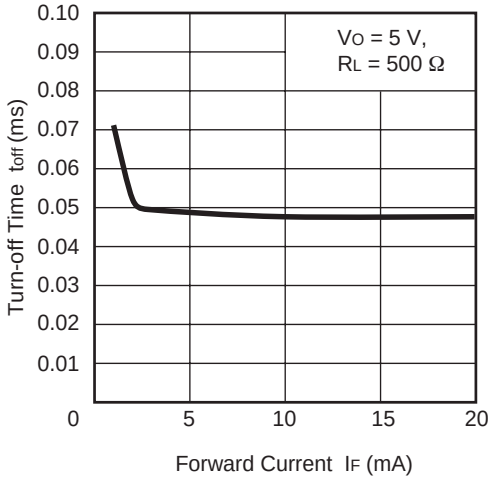
ON-STATE RESISTANCE DISTRIBUTION



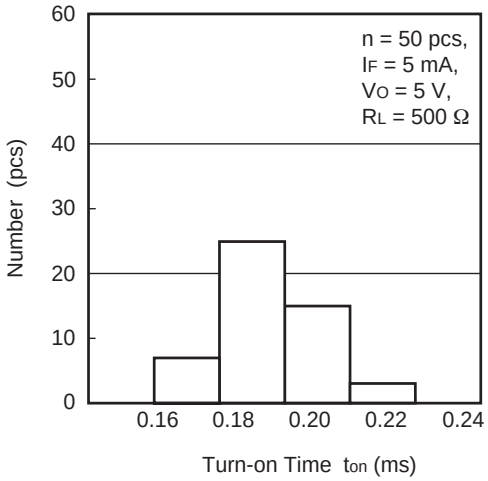
TURN-ON TIME vs. FORWARD CURRENT



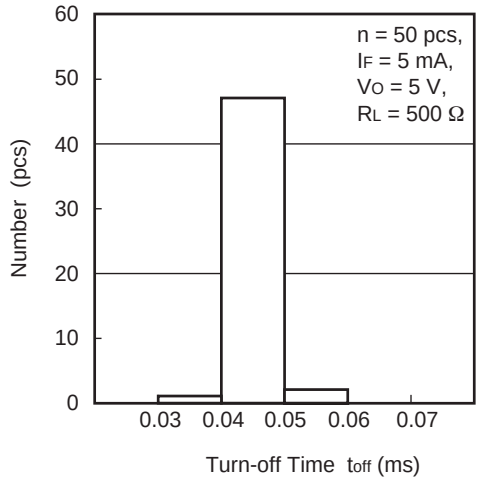
TURN-OFF TIME vs. FORWARD CURRENT



TURN-ON TIME DISTRIBUTION

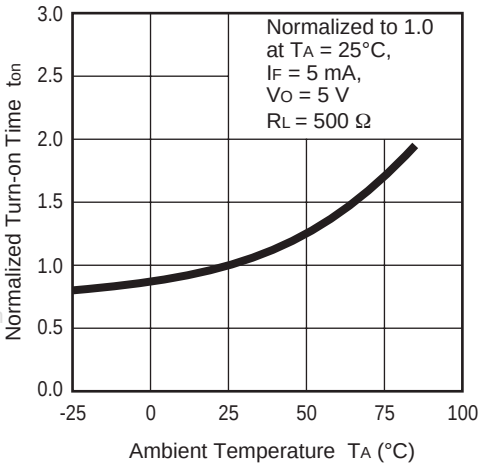


TURN-OFF TIME DISTRIBUTION

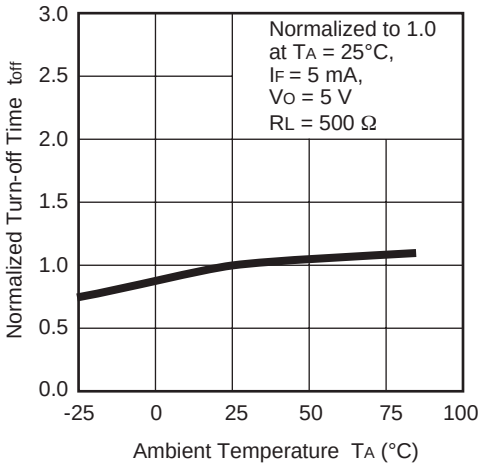


TYPICAL PERFORMANCE CURVES (TA = 25 °C, unless otherwise specified)

NORMALIZED TURN-ON TIME vs. AMBIENT TEMPERATURE

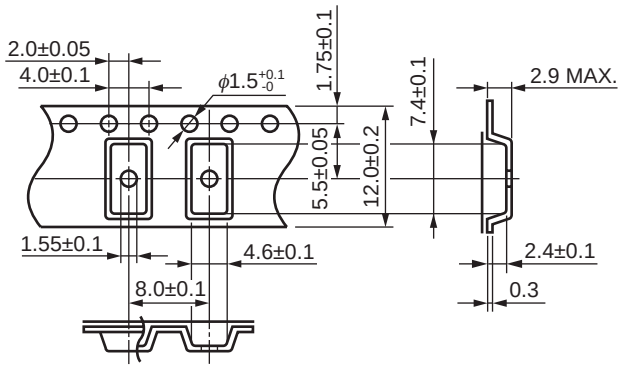


NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERATURE

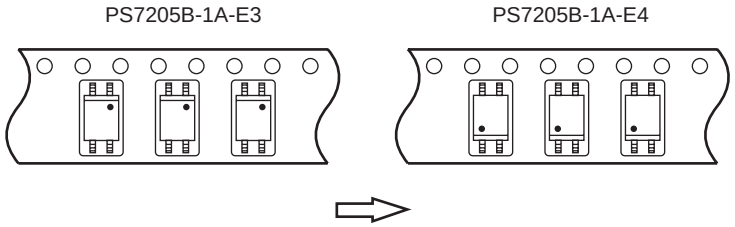


TAPING SPECIFICATIONS (Units in mm)

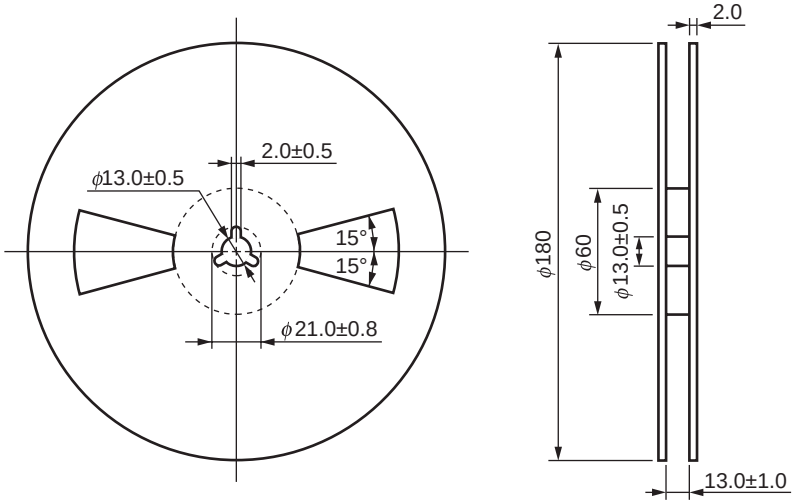
Tape Outline and Dimensions



Tape Direction



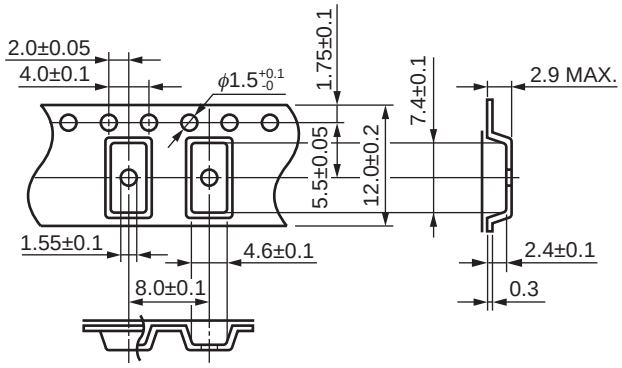
Reel Outline and Dimensions



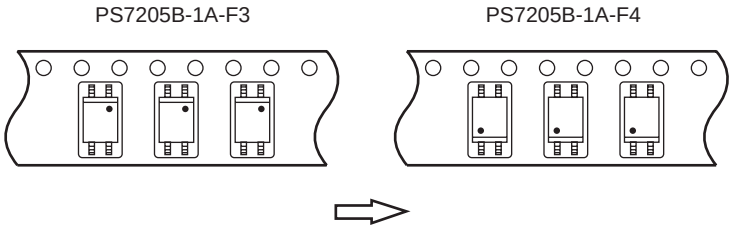
Packing: 900 pcs/reel

TAPING SPECIFICATIONS (Units in mm)

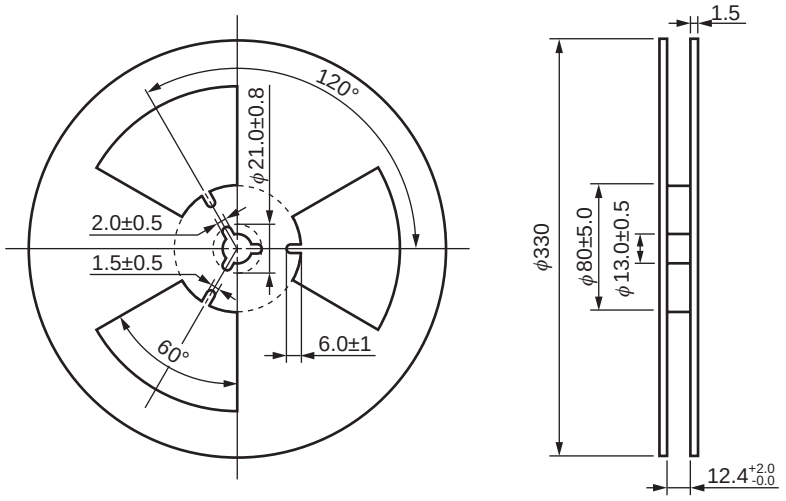
Tape Outline and Dimensions



Tape Direction



Reel Outline and Dimensions



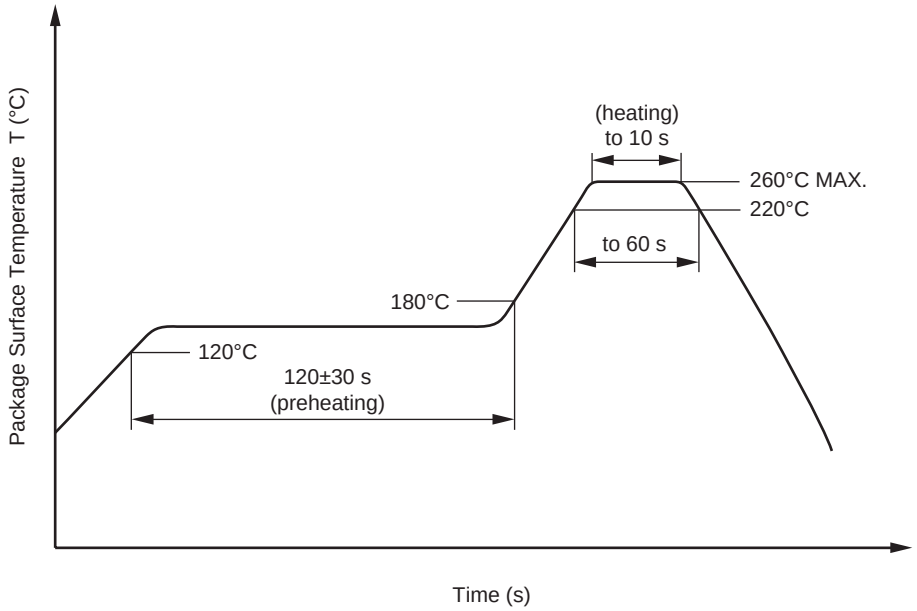
Packing: 3 500 pcs/reel

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) Wave 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 (Allowed to be dipped in solder including plastic mold portion.)
• 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.