

### FEATURES

- **LOW ON-STATE RESISTANCE:**  
Ron = 0.9  $\Omega$  TYP
- **LARGE CONTINUOUS LOAD CURRENT:**  
IL = 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

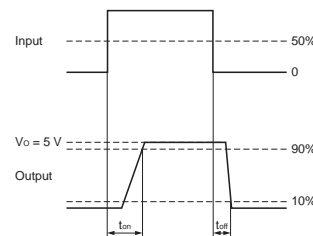
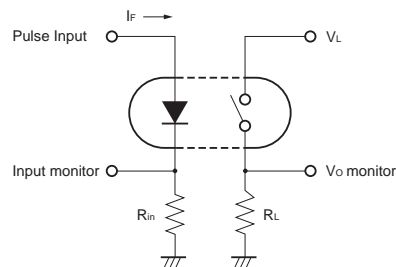
- MEASUREMENT EQUIPMENT
- FA EQUIPMENT

### ELECTRICAL CHARACTERISTICS (TA = 25 °C)

PART NUMBER				PS7205B-1A			
SYMBOLS		PARAMETERS		UNITS	MIN	TYP	MAX
Diode	VF	Forward Voltage	IF = 5 mA	V		1.1	1.4
	IR	Reverse Current	VR = 5 V	$\mu$ A			5.0
MOSFET	Iloff	Off-state Leakage Current	VD = 80 V	nA		0.15	5.0
	Cout	Output Capacitance	VD = 0 V, f = 1 MHz	pF		30	
Coupled	IFon	LED On-state Current	IL = 500 mA	mA			2.0
	Ron	On-state Resistance	IF = 5 mA, IL = 500 mA, t $\leq$ 10 ms	$\Omega$		0.9	1.2
	ton	Turn-on Time <sup>1,2</sup>	IF = 5 mA, VO = 5 V, RL = 500 $\Omega$ , PW $\geq$ 10 ms	ms		0.18	0.5
	toff	Turn-off Time <sup>1,2</sup>				0.04	0.5
	RI-O	Isolation Resistance	VI-O = 1.0 kVDC	$\Omega$	10 <sup>9</sup>		
CI-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  $\geq$  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.

# PS7205B-1A

## ABSOLUTE MAXIMUM RATINGS<sup>1</sup> (T<sub>A</sub> = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
Diode			
I <sub>F</sub>	Forward Current (DC)	mA	50
V <sub>R</sub>	Reverse Voltage	V	5.0
P <sub>D</sub>	Power Dissipation	mW	50
I <sub>FP</sub>	Peak Forward Current <sup>2</sup>	A	1
MOS FET			
V <sub>L</sub>	Break Down Voltage	V	80
I <sub>L</sub>	Continuous Load Current	mA	500
I <sub>LP</sub>	Pulse Load Current (AC/DC Connection)	A	1
P <sub>D</sub>	Power Dissipation	mW	300
Coupled			
BV	Isolation Voltage <sup>4</sup>	Vr.m.s.	1 500
P <sub>T</sub>	Total Power Dissipation	mW	350
T <sub>A</sub>	Operating Ambient Temperature	°C	-40 to +85
T <sub>stg</sub>	Storage Temperature	°C	-40 to +100

### Notes:

- Operation in excess of any one of these parameters may result in permanent damage.
- PW = 100 μs, Duty Cycle = 1%.
- PW = 100 ms, 1 shot.
- AC voltage for 1 minute at T<sub>A</sub> = 25°C, RH = 60% between input and output.

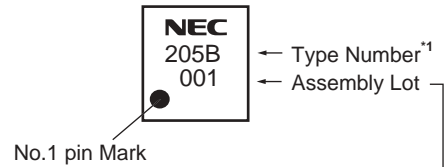
## RECOMMENDED OPERATING CONDITIONS (T<sub>A</sub> = 25°C)

SYMBOLS	PARAMETER	UNITS	MIN	TYP	MAX
I <sub>F</sub>	LED Operating Current	mA	2	5	20
V <sub>F</sub>	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



\*1 Applicable type numbers are underlined below

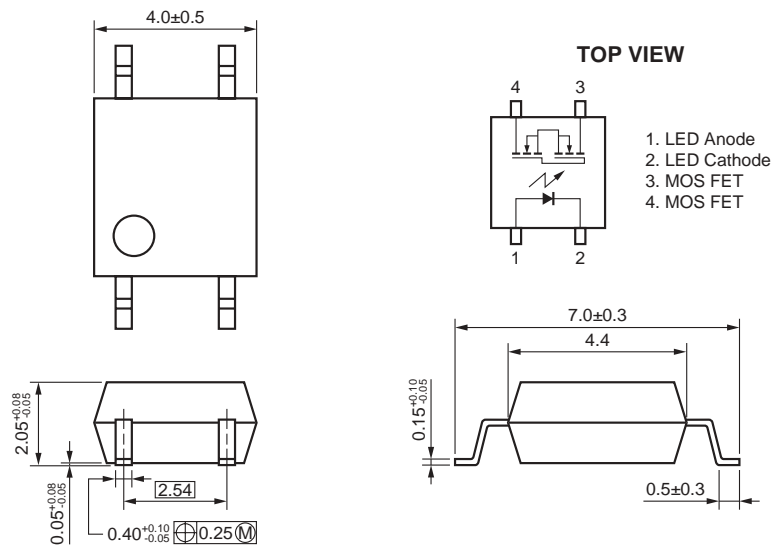
PS7205B-1A

001  
 |  
 | Week Assembled  
 | Year Assembled  
 | (Last 1 Digit)

Rank Code

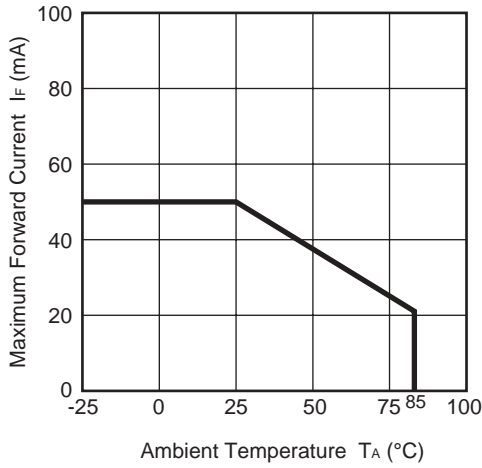
Nothing	Ink marking
N	Laser marking

## OUTLINE DIMENSIONS (Units in mm)

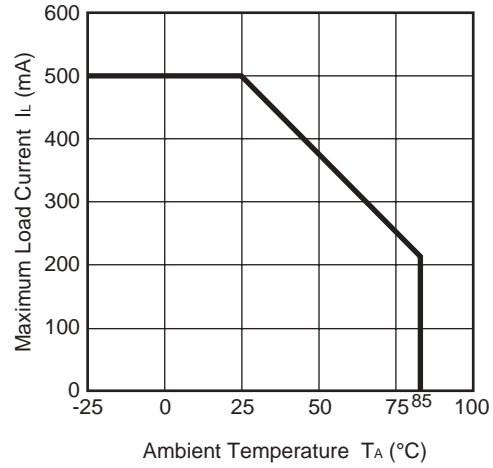


**TYPICAL PERFORMANCE CURVES** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

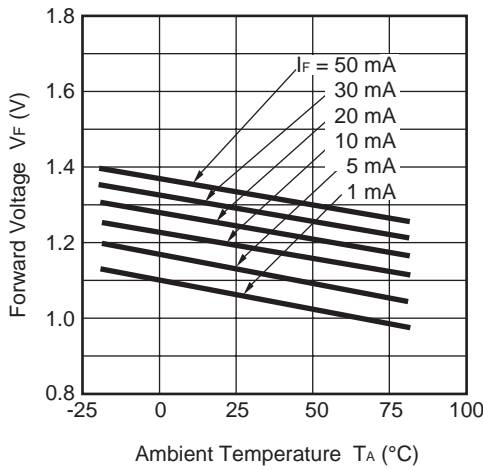
**MAXIMUM FORWARD CURRENT vs AMBIENT TEMPERATURE**



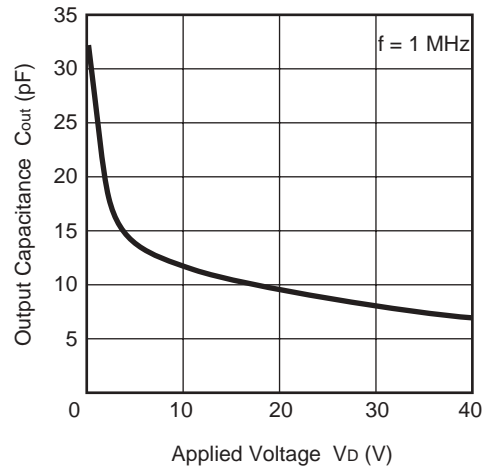
**MAXIMUM LOAD CURRENT vs AMBIENT TEMPERATURE**



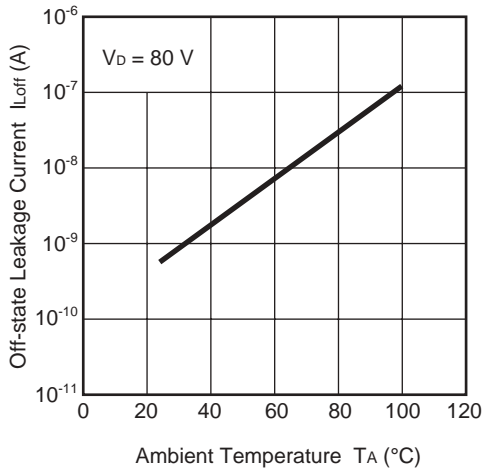
**FORWARD VOLTAGE vs. AMBIENT TEMPERATURE**



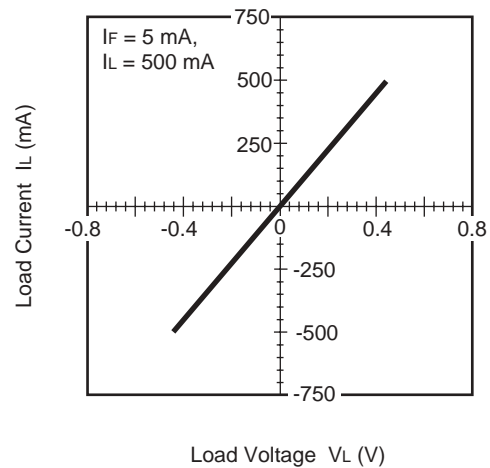
**OUTPUT CAPACITANCE vs. APPLIED VOLTAGE**



**OFF-STATE LEAKAGE CURRENT vs. AMBIENT TEMPERATURE**

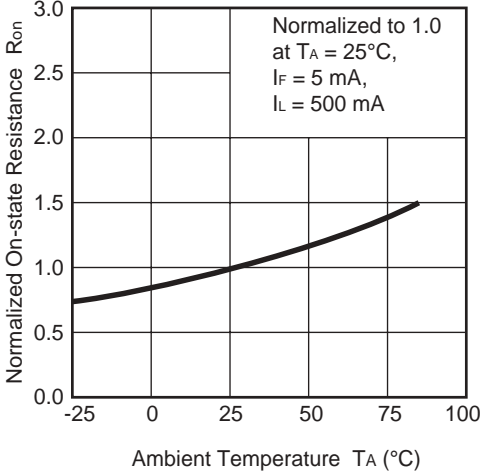


**LOAD CURRENT vs. LOAD VOLTAGE**

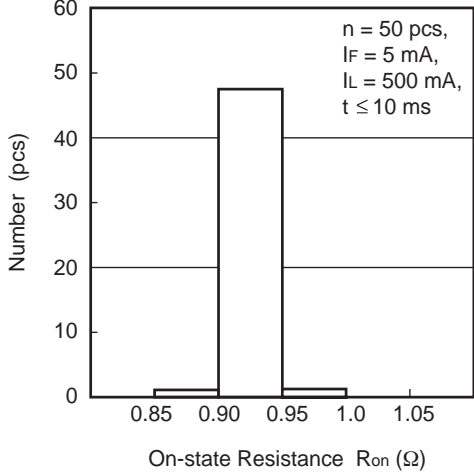


**TYPICAL PERFORMANCE CURVES** ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)

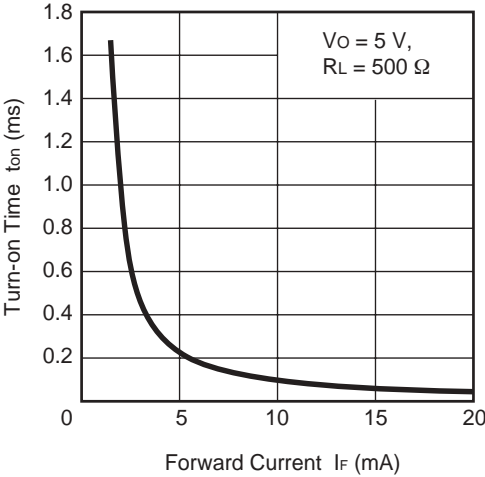
**NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE**



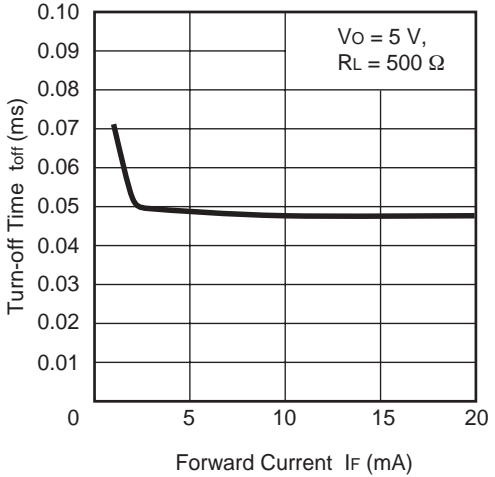
**ON-STATE RESISTANCE DISTRIBUTION**



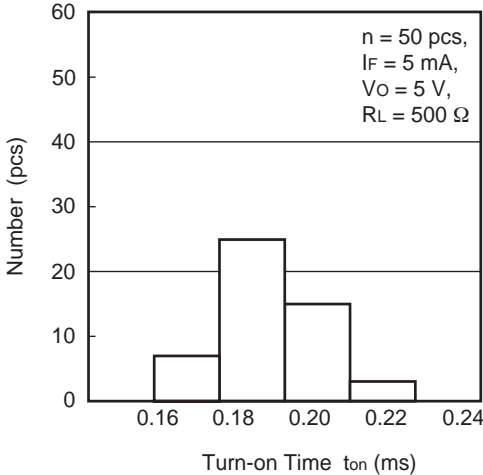
**TURN-ON TIME vs. FORWARD CURRENT**



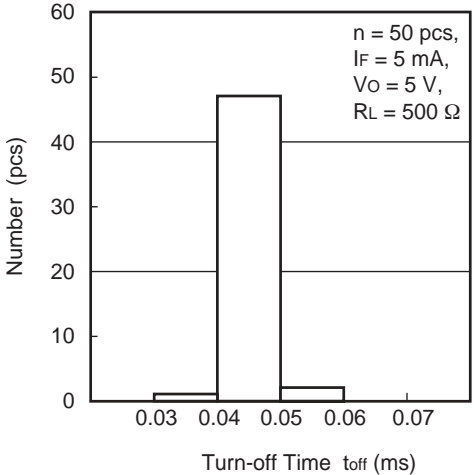
**TURN-OFF TIME vs. FORWARD CURRENT**



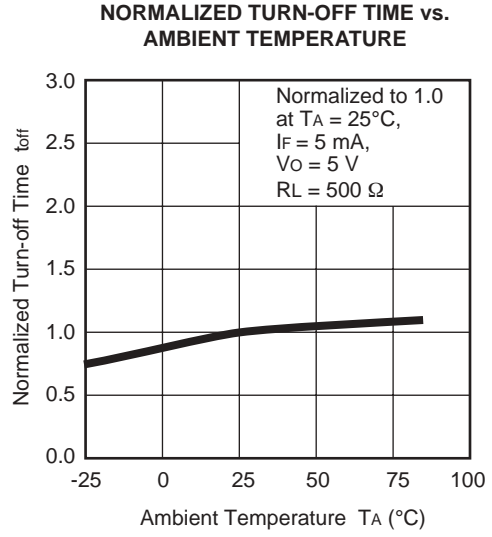
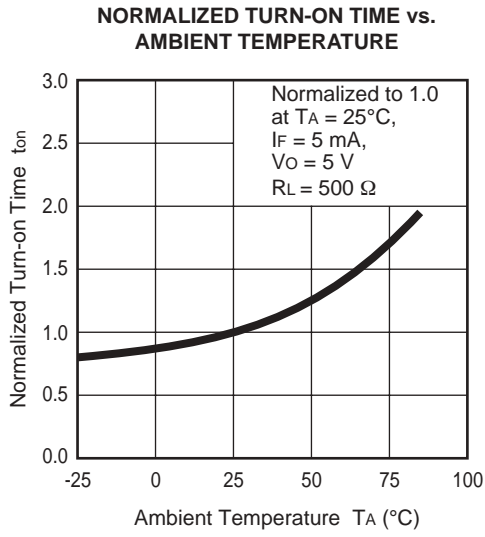
**TURN-ON TIME DISTRIBUTION**



**TURN-OFF TIME DISTRIBUTION**

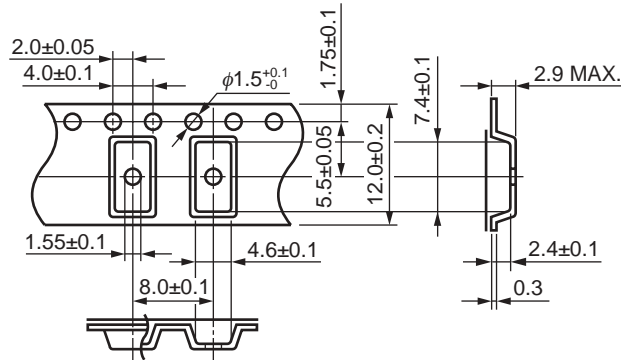


**TYPICAL PERFORMANCE CURVES** ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified)

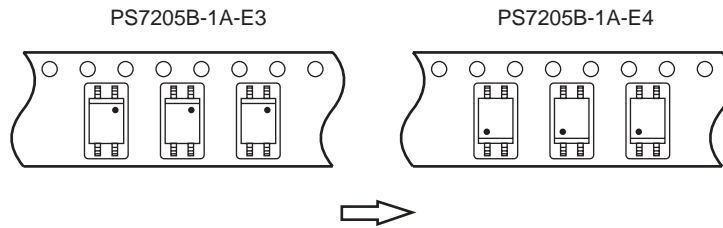


**TAPING SPECIFICATIONS** (Units in mm)

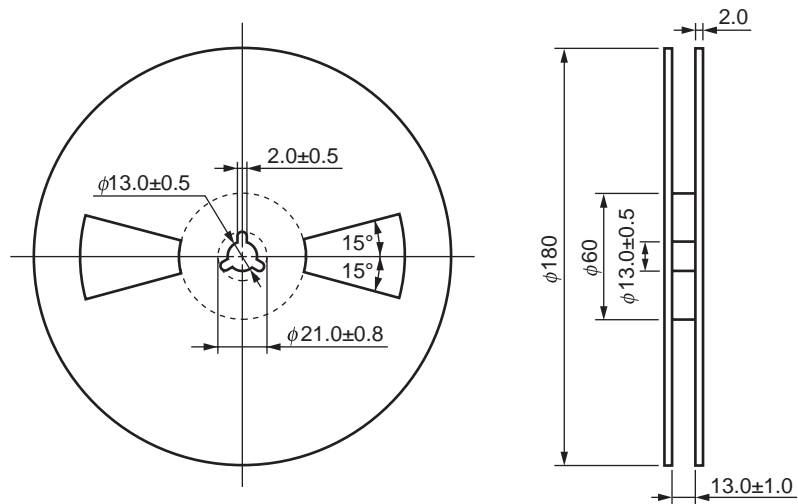
Tape Outline and Dimensions



Tape Direction



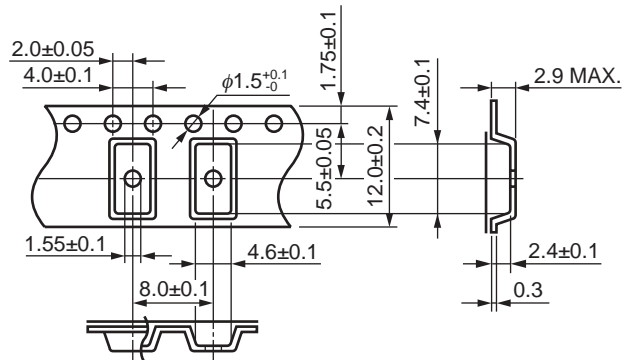
Reel Outline and Dimensions



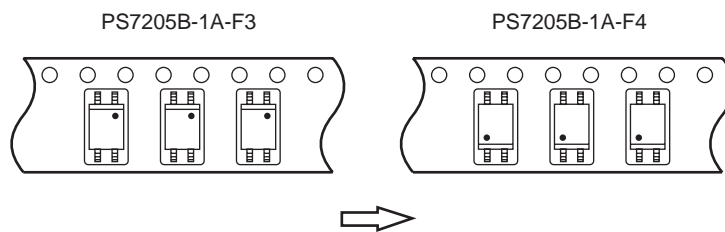
Packing: 900 pcs/reel

**TAPING SPECIFICATIONS** (Units in mm)

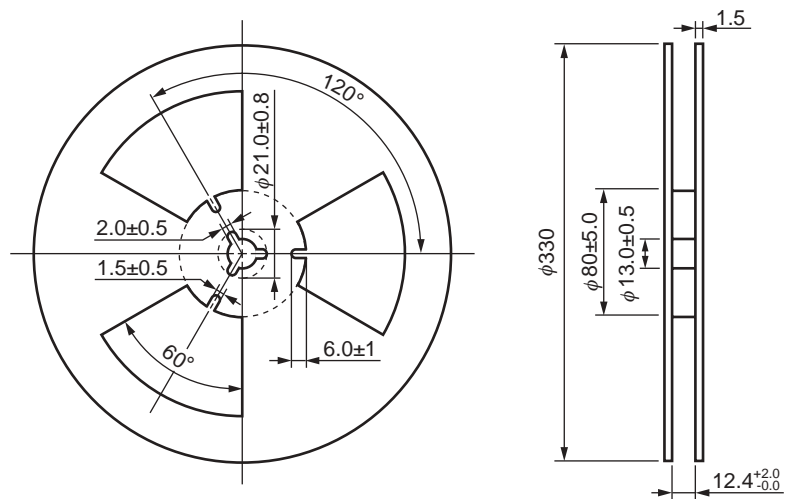
Tap Outline and Dimensions



Tap Direction



Reel Outline and Dimensions



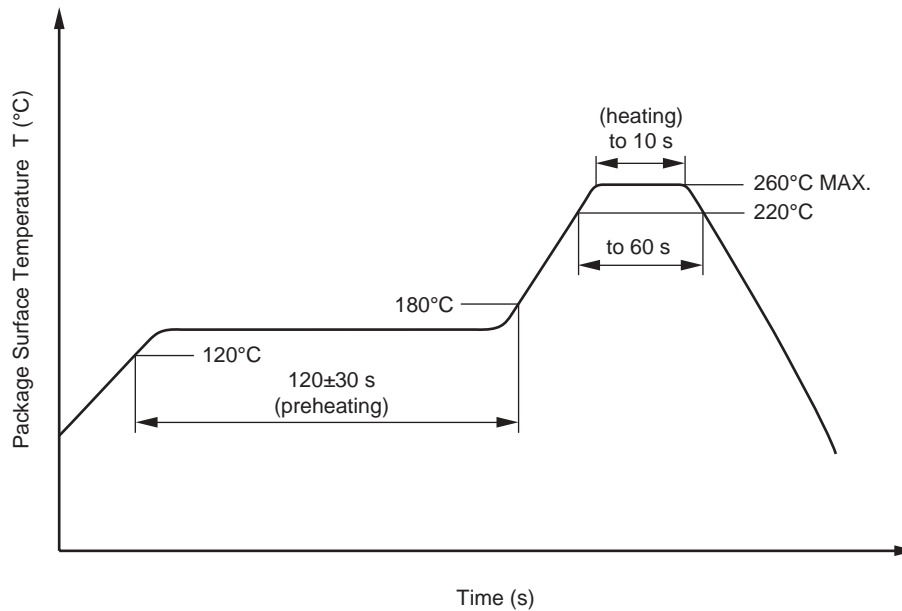
Packing: 3 500 pcs/reel

## 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.

EXCLUSIVE NORTH AMERICAN AGENT FOR NEC RF, MICROWAVE & OPTOELECTRONIC SEMICONDUCTORS

**CBI** CALIFORNIA EASTERN LABORATORIES • Headquarters • 4590 Patrick Henry Drive • Santa Clara, CA 95054-1817 • (408) 988-3500 • Telex 34-6393 • FAX (408) 988-0279  
DATA SUBJECT TO CHANGE WITHOUT NOTICE

Internet: <http://WWW.CEL.COM>

03/04/2002