

FEATURES

- **LOW C x R :**
C x R = 12.6 pF ·
- **LOW OUTPUT CAPACITANCE**
C_{OUT} = 1.2 pF
- **1 CHANNEL TYPE:**
1a output
- **DESIGNED FOR AC/DC SWITCHING LINE CHANGER**
- **ULTRA SMALL FLAT-LEAD PACKAGE:**
4.2 (L) X 2.5 (W) X 1.85 (H) mm
- **LOW OFFSET VOLTAGE**
- **ORDERING NUMBER OF TAPING PRODUCT:**
PS7801-1A-F3, F4 (3 500 pcs/reel)

DESCRIPTION

NEC's PS7801-1A is a low output capacitance solid state relay containing GaAs LEDs on the light emitting side (input side) and MOSFETs on the output side.

An ultra small flat-lead package has been provided which realizes a reduction in mounting area about 50% compared with the PS72xx series.

It is suitable for high frequency signal control, due to its low C x R, low on-state resistance, and low off-state leakage current.

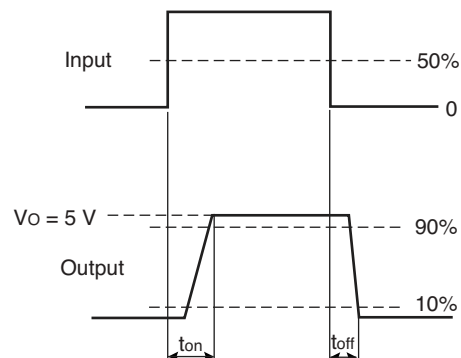
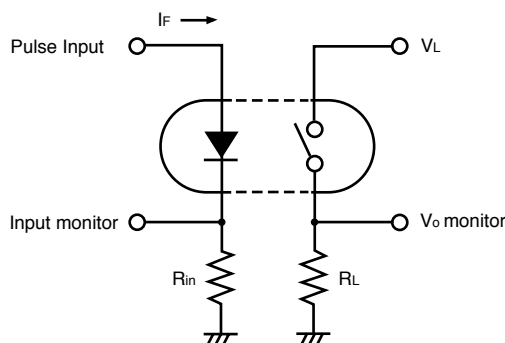
APPLICATIONS

- **MEASUREMENT EQUIPMENT**

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

PART NUMBER			PS7801-1A			
	SYMBOLS	PARAMETERS	MIN	TYP	MAX	UNITS
Diode	V _F	Forward Voltage, I _F = 5 mA		1.1	1.4	V
	I _R	Reverse Current, V _R = 5 V			5.0	A
MOS FET	I _{LOFF}	Off-State Leakage Current, V _D = 40 V		0.1	1	nA
	C _{out}	Output Capacitance, V _D = 0 V, f = 1 MHz		1.2		pF
Coupled	I _{Fon}	LED On-state Current I _L = 100 mA			2.0	mA
	R _{ON1}	On-State Resistance, I _F = 5 mA, I _L = 10 mA		10.5	14	
	R _{ON2}	On-State Resistance, I _F = 5 mA, I _L = 100 mA t ≤ 10 ms		11.5	15	
	t _{ON}	Turn-on Time, I _F = 5 mA, V _O = 5 V, R _L = 500 Ω, PW ≥ 10 ms		0.02	0.5	ms
	t _{OFF}	Turn-off Time, I _F = 5 mA, V _O = 5 V, R _L = 500 Ω, PW ≥ 10 ms		0.15	1.0	ms
	R _{I-O}	Isolation Resistance, V _{I-O} = 0.5 k VDC	10 ⁹			
	C _{I-O}	Isolation Capacitance, V = 0 V, f = 1 MHz		0.3		pF

1. Test Circuit for Switching Time



2. The turn-on time and turn-off time are specified as input-pulse width ≥ 10 ms. Please note that when the device operates with an input-pulse of under 10 ms, the turn-on time and turn-off time will increase.

ABSOLUTE MAXIMUM RATINGS¹ (TA = 25°C)

SYMBOLS	PARAMETERS	RATINGS	UNITS
Input	IF	Forward Current (DC)	50 mA
	VR	Reverse Voltage	5 V
	PD	Power Dissipation	50 mW
	IFP	Peak Forward Current ²	1 A
Output	VL	Break Down Voltage	40 V
	IL	Continuous Load Current	100 mA
	ILP	Pulse Load Current ³	200 mA
	PD	Power Dissipation	250 mW
Viso	Isolation Voltage ⁴	500 V	V
PT	Total Power Dissipation	300 mW	mW
TA	Operating Ambient Temp.	-40 to +85	°C
TSTG	Storage Temperature	-40 to +100	°C

Notes:

1. Operation in excess of any one of these parameters may result in permanent damage.
2. PW = 100 s, Duty Cycle = 1 %
3. PW = 100 ms, 1 shot
4. AC voltage for 1 minute at TA = 25°C, RH = 60% between input and output

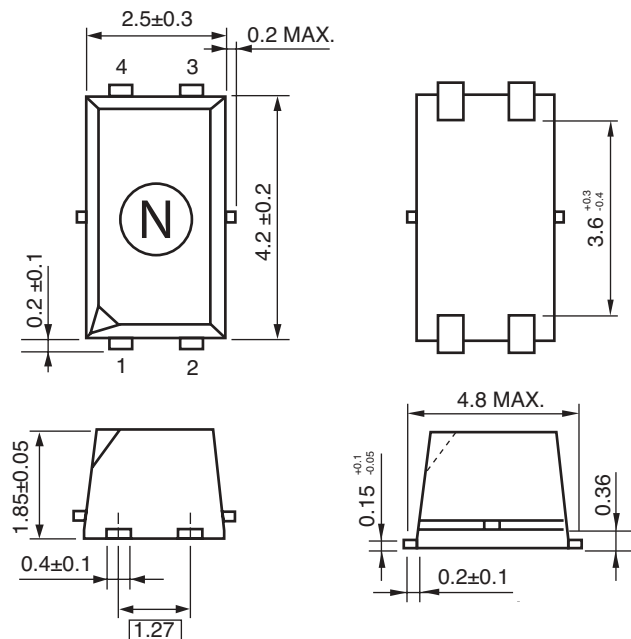
ORDERING INFORMATION

PART NUMBER	PACKAGE	PACKING STYLE
PS7801-A-F3	4-PIN SSOP	Embossed Tape 3 500 pcs
PS7801-A-F4		

RECOMMENDED OPERATING CONDITIONS (TA = 25°C)

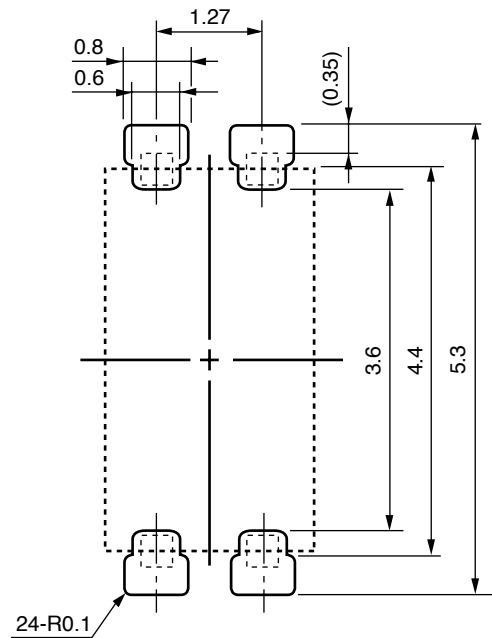
SYMBOL	PARAMETER	UNITS	MIN	TYP	MAX
IF	LED Operating Current	IF	2	5	20
VF	LED Off Voltage	VF	0		0.5

OUTLINE DIMENSIONS (Units in mm)

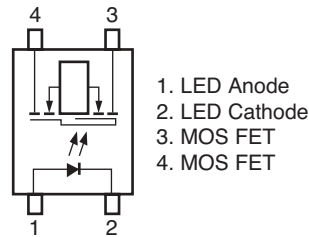


RECOMMENDED MOUNT PAD DIMENSIONS

(Units in mm)



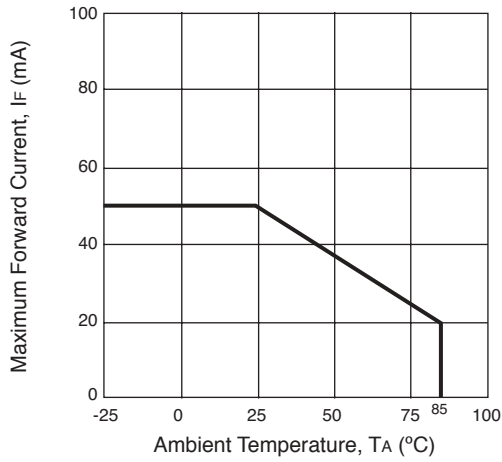
TOP VIEW



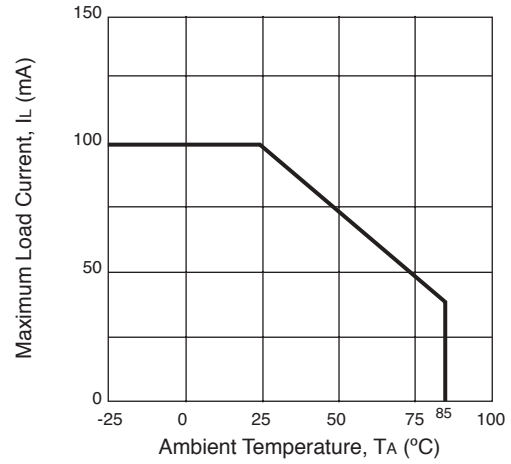
1. LED Anode
2. LED Cathode
3. MOS FET
4. MOS FET

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

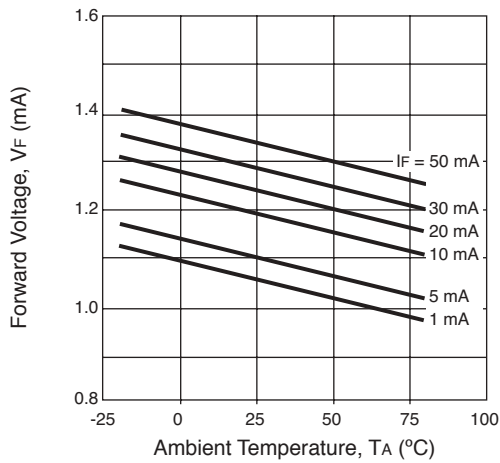
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



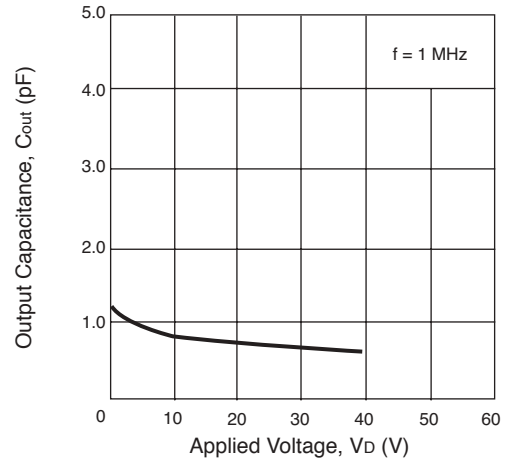
MAXIMUM LOAD CURRENT vs. AMBIENT TEMPERATURE



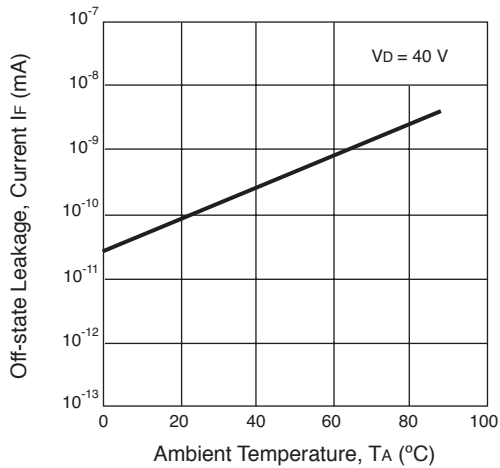
FORWARD VOLTAGE vs. AMBIENT TEMPERATURE



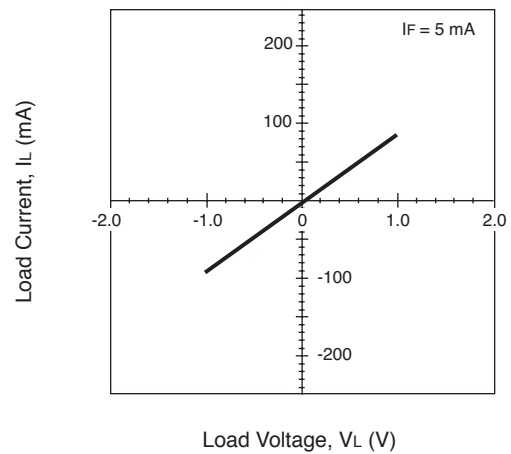
OUTPUT CAPACITANCE vs. APPLIED VOLTAGE



OFF-STATE LEAKAGE CURRENT vs. AMBIENT TEMPERATURE

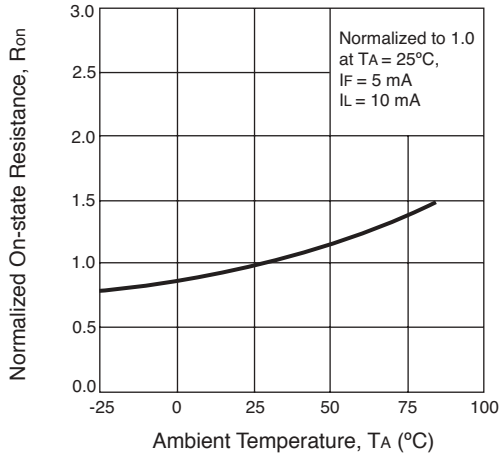


LOAD CURRENT vs. LOAD VOLTAGE

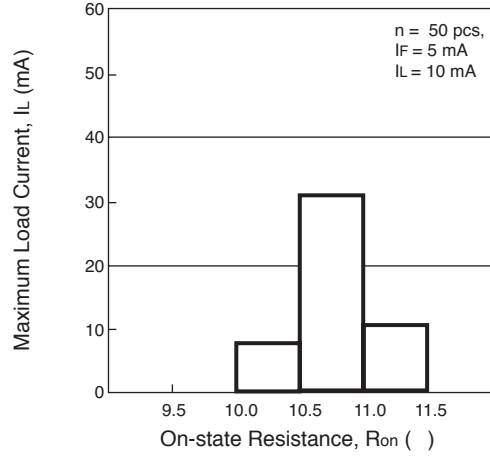


TYPICAL CHARACTERISTICS (TA = 25°C)

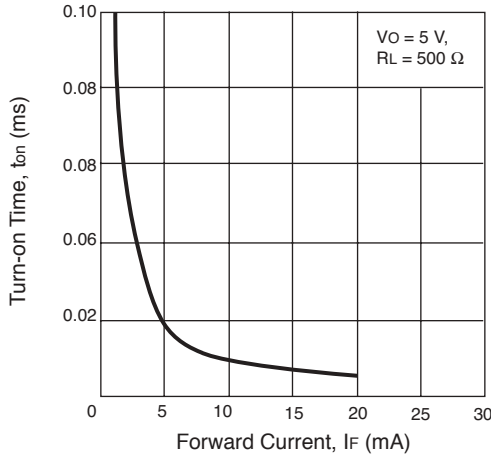
NORMALIZED ON-STATE RESISTANCE vs. AMBIENT TEMPERATURE



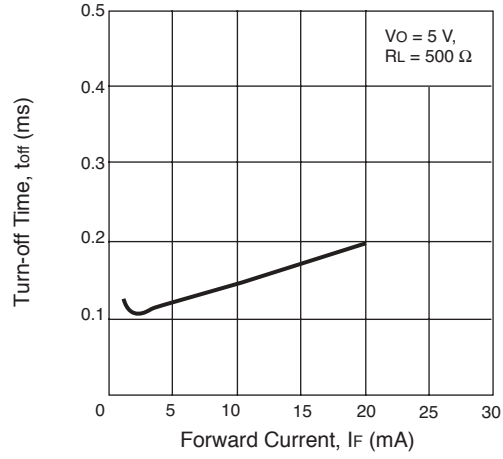
ON-STATE RESISTANCE DISTRIBUTION



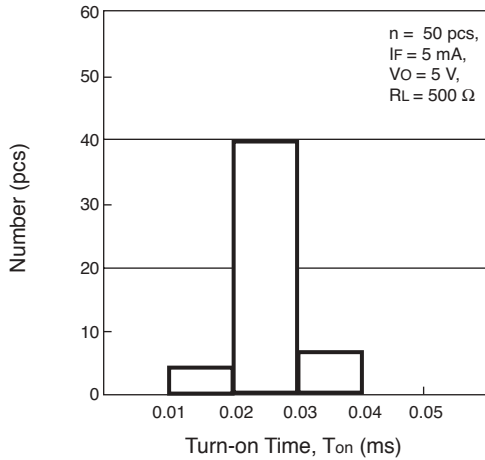
TURN-ON TIME vs. FORWARD CURRENT



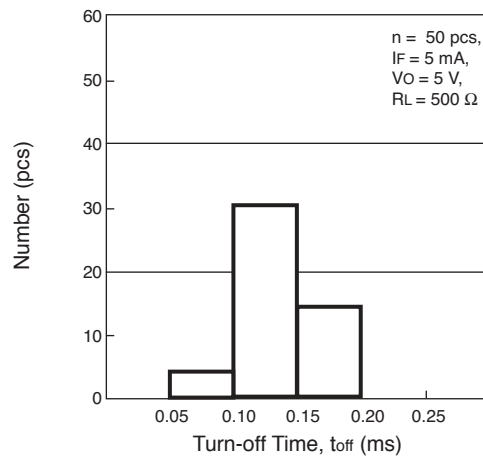
TURN-ON TIME vs. FORWARD CURRENT



TURN-ON TIME DISTRIBUTION

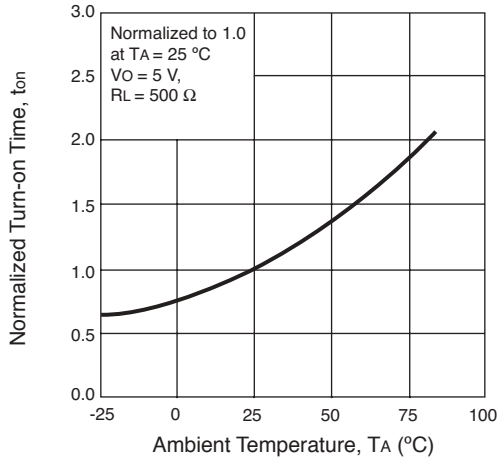


TURN-OFF TIME DISTRIBUTION

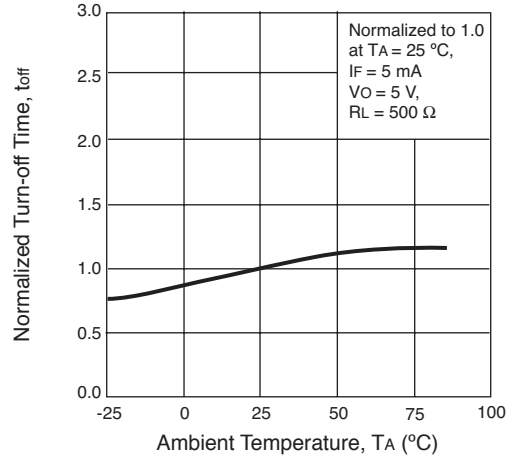


TYPICAL CHARACTERISTICS (TA = 25°C)

NORMALIZED TURN-ON TIME vs. AMBIENT TEMPERATURE

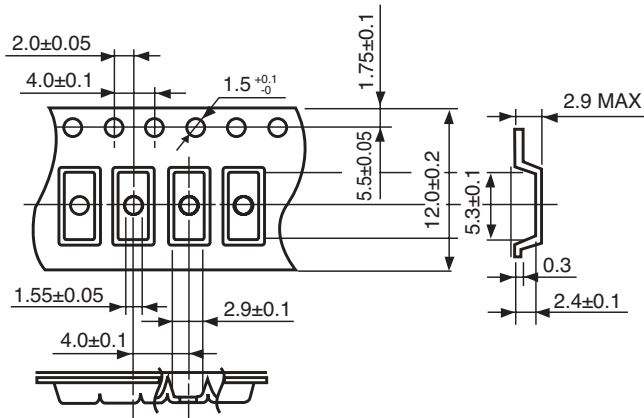


NORMALIZED TURN-OFF TIME vs. AMBIENT TEMPERATURE

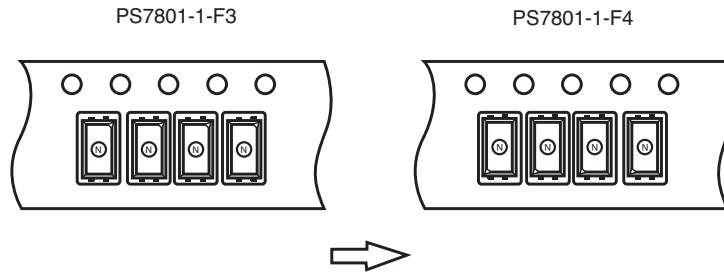


TAPING SPECIFICATIONS (Units in mm)

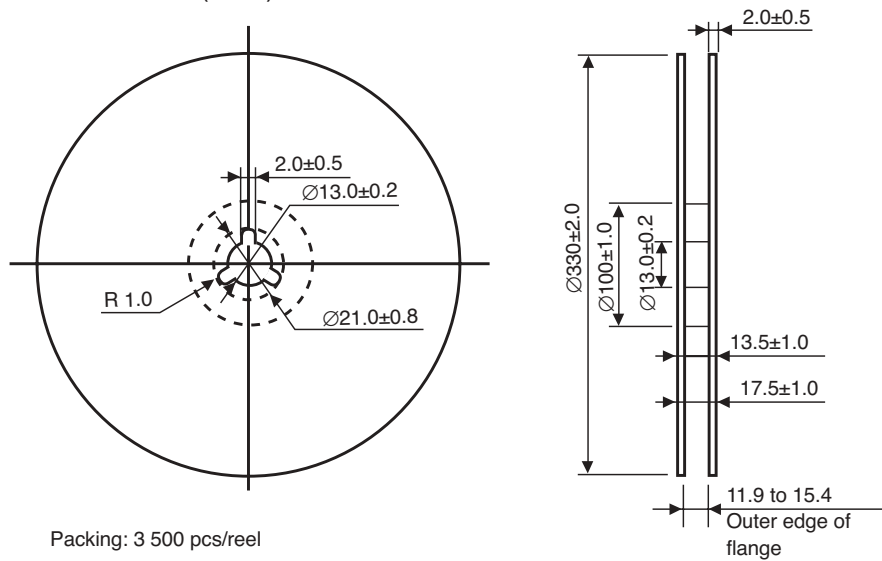
Outline and Dimensions (Tape)



Tape Direction



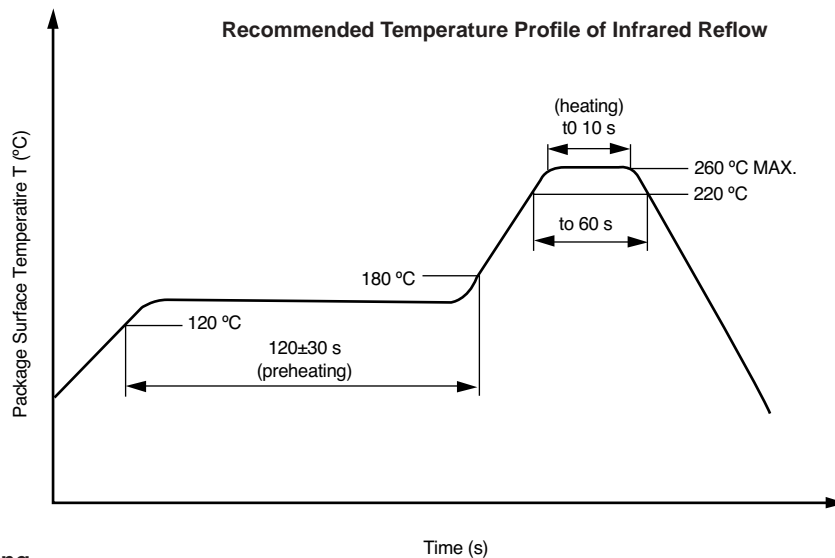
Outline and Dimensions (Reel)



RECOMMENDED SOLDERING CONDITIONS

(1) Infrared reflow soldering

- **Peak reflow temperature**
260 °C (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 max. chlorine content of 0.2 Wt % is recommended.)



(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
- **Flux**
Rosin flux containing small amount of chlorine (The flux with a max. chlorine content of 0.2 Wt % is recommended.)

(3) Cautions

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

Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

CEL California Eastern Laboratories, Your source for NEC RF, Microwave, Optoelectronic, and Fiber Optic Semiconductor Devices.
4590 Patrick Henry Drive • Santa Clara, CA 95054-1817 • (408) 988-3500 • FAX (408) 988-0279 • www.cel.com

DATA SUBJECT TO CHANGE WITHOUT NOTICE

03/16/2004