

## Description

The 7805A can provide local on-card regulation, eliminating the distribution problems associated with single point regulation. Each employs internal current limiting, thermal shut-down and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.

## Features

- Output Current In Excess of 1A
- Output Voltage of 5V
- Internal Short-Circuit Current Limiting & Thermal Overload Protection
- Guaranteed In Extended Temperature Range

## Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ )

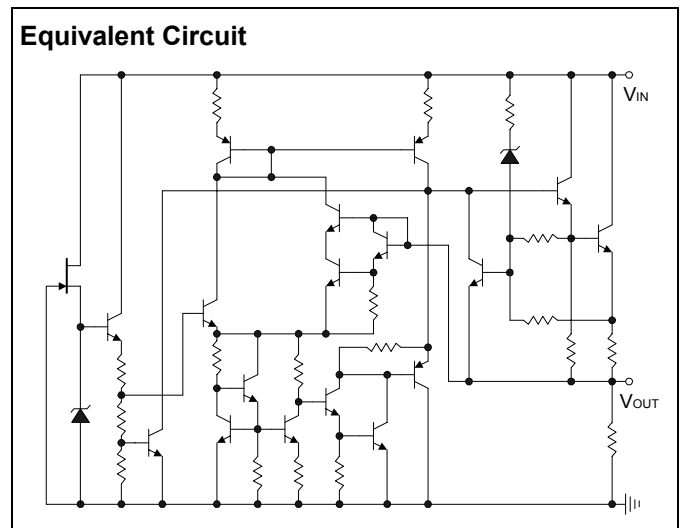
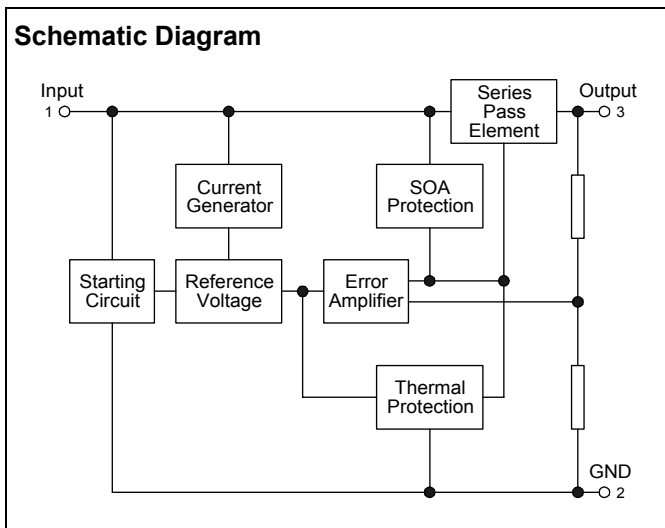
Characteristic	Symbol	Rating	Unit
Input Voltage	$V_{IN}$	40	V
Power Dissipation	$P_D$	Internally limited <sup>(Note)</sup>	
Operating Temperature	$T_{opr}$	-30 to 85	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to 150	$^\circ\text{C}$
Junction Temperature	$T_j$	150	$^\circ\text{C}$

Note: (1) $T_A=25^\circ\text{C}$ , TO-252: 1W, TO-220AB: 2.7W  
 (2) $T_C=25^\circ\text{C}$ , All package: 10W

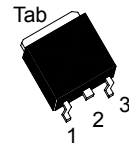
## Thermal Data

Characteristic	Symbol	TO-252	TO-220AB	Unit
Thermal Resistance Junction-Case	$R_{th(j-c)}$	12.5	12.5	$^\circ\text{C/W}$
Thermal Resistance Junction-Ambient	$R_{th(j-a)}$	125	47	$^\circ\text{C/W}$

## Schematic Diagram & Equivalent Circuit

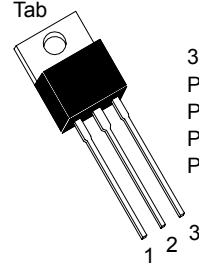


**7805AJ Pin Assignment**



3-Lead Plastic **TO-252**  
 Package Code: J  
 Pin 1:  $V_{IN}$   
 Pin 2 & Tab: GND  
 Pin 3:  $V_{OUT}$

**7805AE Pin Assignment**



3-Lead Plastic **TO-220AB**  
 Package Code: E  
 Pin 1:  $V_{IN}$   
 Pin 2 & Tab: GND  
 Pin 3:  $V_{OUT}$



**7805A**

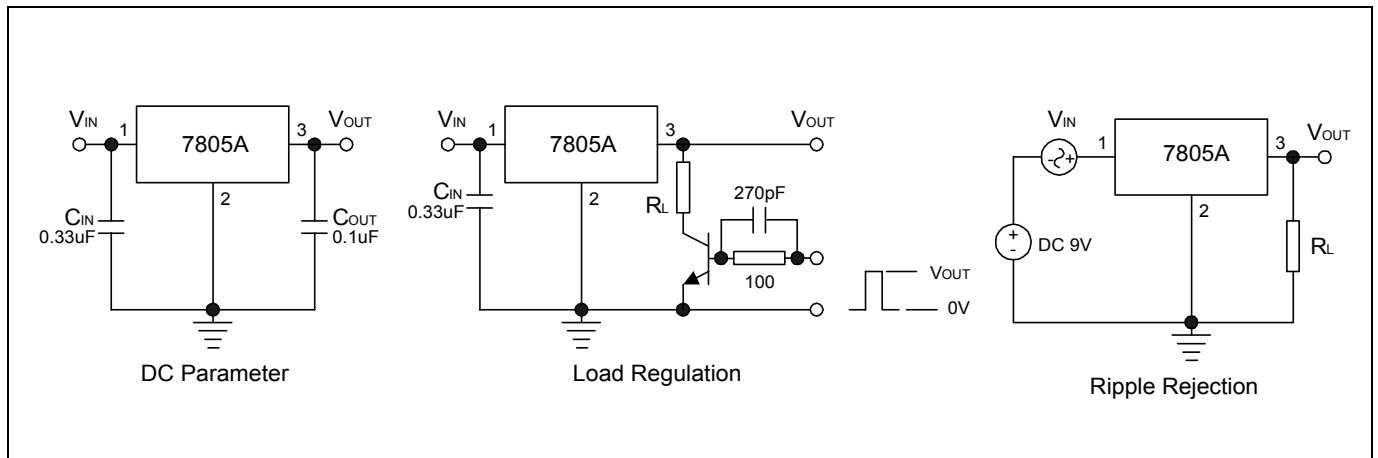
**3- Terminal Positive Voltage Regulators**

**7805A Series Electrical Characteristics**

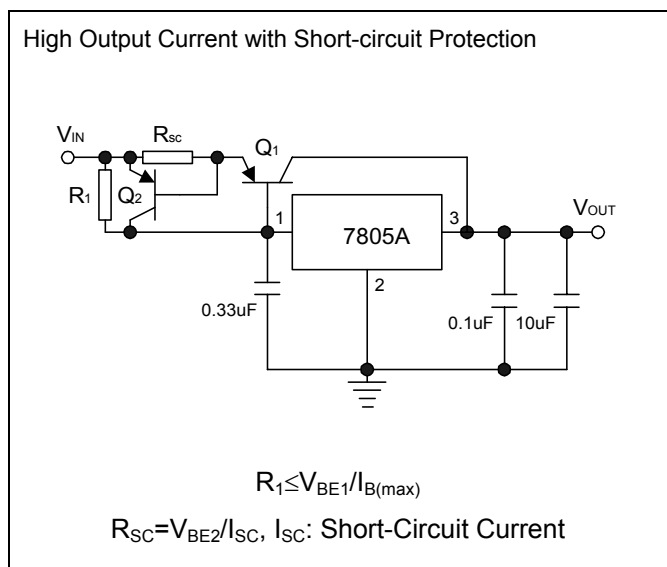
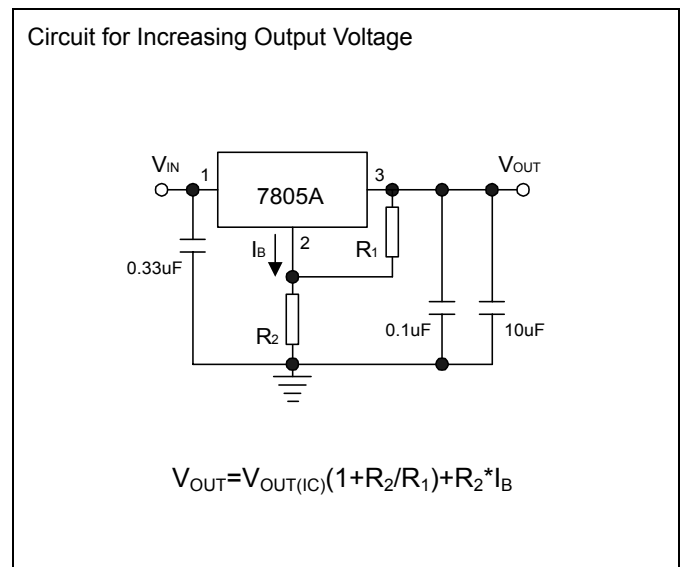
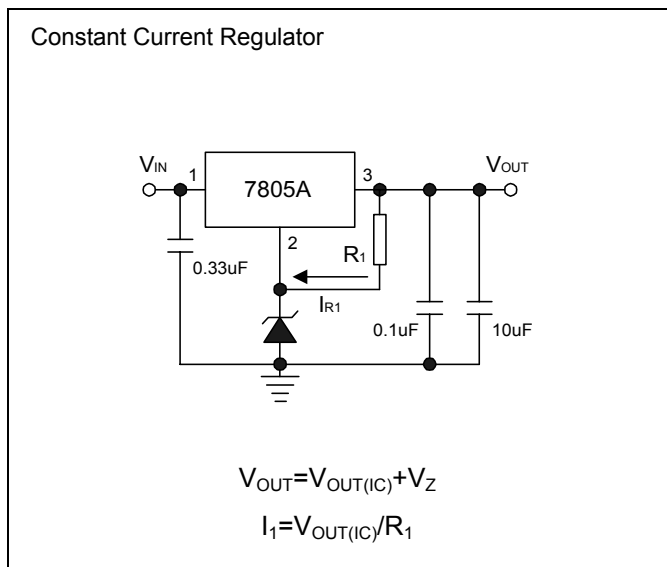
$V_{IN}=10V$ ,  $I_{OUT}=500mA$ ,  $C_{IN}=0.33\mu F$ ,  $C_{OUT}=0.1\mu F$ ,  $0^{\circ}C \leq T_J \leq 125^{\circ}C$  (unless otherwise specified)

Symbol	Parameter	Conditions	7805AJ/AE			Units
			Min	Typ	Max	
$V_O$	Output Voltage	$T_J=25^{\circ}C$ , $I_{OUT}=500mA$	4.85	5	5.15	V
		$5mA \leq I_{OUT} \leq 1A$	4.85	5	5.15	
		$7V \leq V_{IN} \leq 25V$ , $P_{OUT} \leq 15W$				
$\Delta V_O$	Line Regulation	$T_J=25^{\circ}C$ , $7V \leq V_{IN} \leq 25V$	-	3	50	mV
		$T_J=25^{\circ}C$ , $8V \leq V_{IN} \leq 12V$	-	1	25	
$\Delta V_O$	Load Regulation	$T_J=25^{\circ}C$ , $5mA \leq I_{OUT} \leq 1A$	-	15	100	mV
		$T_J=25^{\circ}C$ , $250mA \leq I_{OUT} \leq 750mA$	-	5	50	
$I_B$	Quiescent Current	$I_{OUT}=5mA$ , $T_J=25^{\circ}C$	-	3.9	8	mA
$\Delta I_B$	Quiescent Current Change	$I_{OUT}=500mA$ , $7V \leq V_{IN} \leq 25V$ , $T_J=25^{\circ}C$	-	-	1.3	mA
		$5mA \leq I_{OUT} \leq 1A$ , $V_{IN}=10V$ , $T_J=25^{\circ}C$	-	-	0.5	
$e_N$	Output Noise Voltage	$B=10Hz \sim 100KHz$ , $I_{OUT}=50mA$ , $T_J=25^{\circ}C$	-	50	-	$\mu V/V_O$
RR	Ripple Rejection	$10V \leq V_{IN} \leq 18V$ , $f=120Hz$ , $I_{OUT}=50mA$ , $T_J=25^{\circ}C$	57	73	-	dB
$V_D$	Dropout Voltage	$T_J=25^{\circ}C$ , $I_{OUT}=1A$	-	2	2.5	V
$R_O$	Output Resistance	$f=1KHz$	-	17	-	$m\Omega$
$I_{SC}$	Short Circuit Current	$T_J=25^{\circ}C$	-	2.3	2.8	A
$\Delta V_O/\Delta T$	Output Voltage Drift	$0^{\circ}C \leq T_J \leq 125^{\circ}C$	-	-	0.6	$mV/^{\circ}C$

### Test Circuits

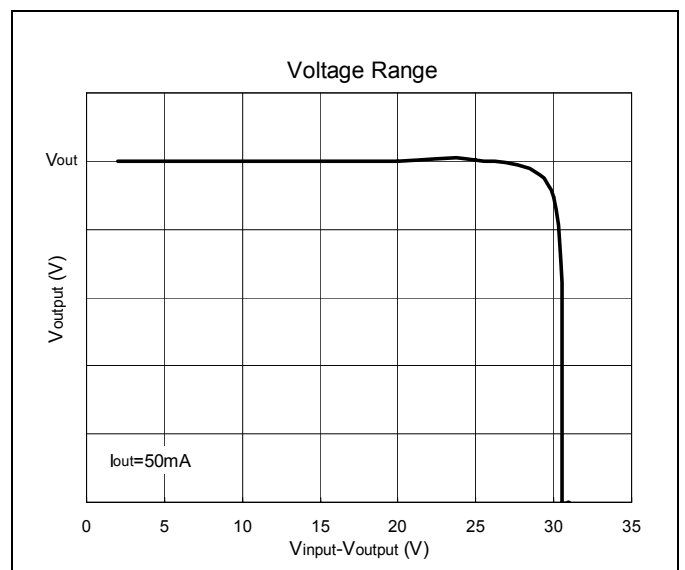
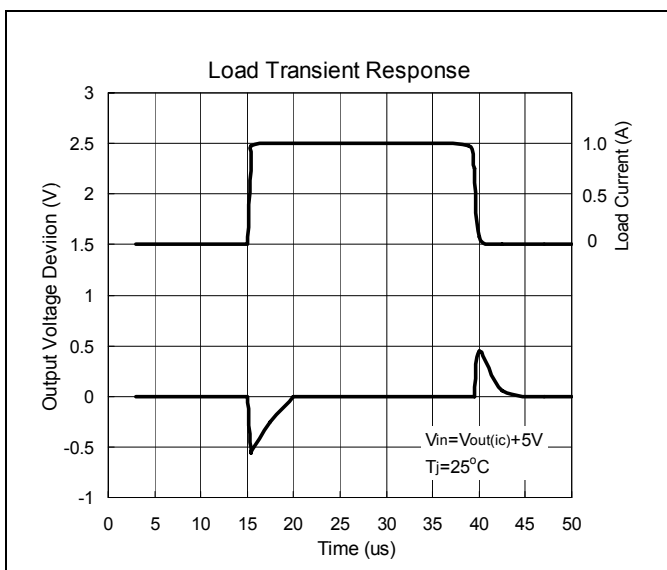
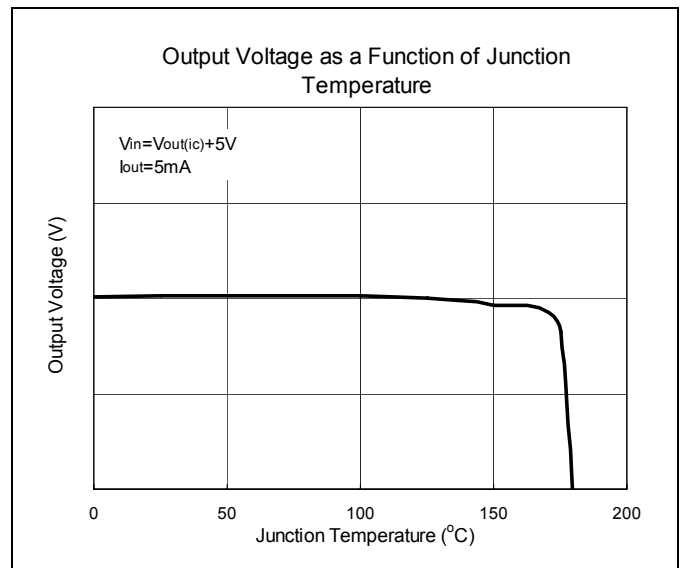
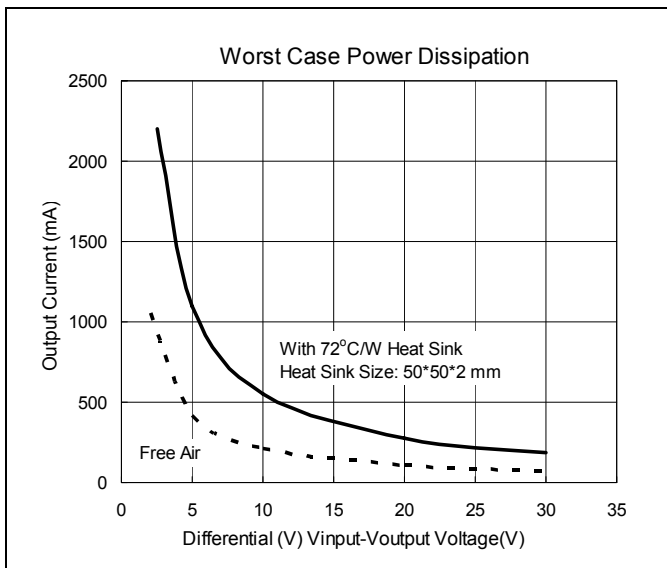
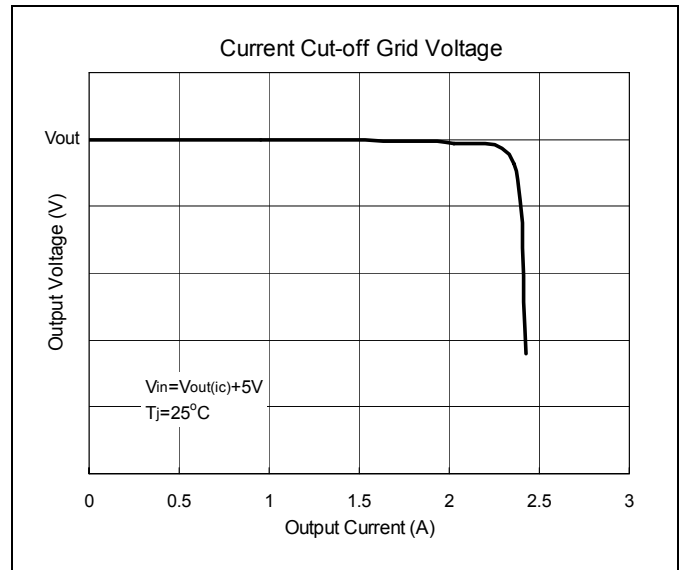
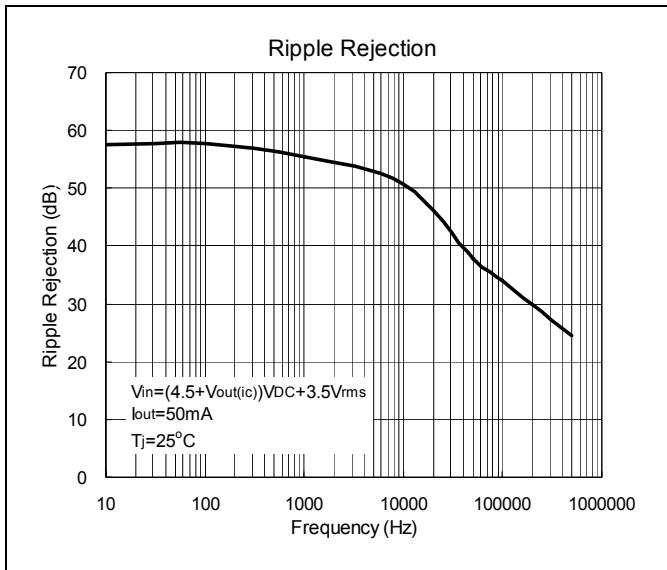


### Application Circuits





Characteristics Curve



### TO-252 Dimension

**Marking:**

Pb Free Mark  
Pb-Free: "●" (0424)  
Normal: None

Product Series (05,08,09,12)

Date Code      Control Code

Note: Green label is used for pb-free packing

Pin Style: 1.Input 2.Ground 3.Output

Material:

- Lead solder plating: Sn60/Pb40 (Normal), Sn/3.0Ag/0.5Cu or Pure-Tin (Pb-free)
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

DIM	Min.	Max.
A	0.45	0.55
B	1.70	1.90
C	0.90	1.50
D	0.45	0.60
E	6.40	6.80
F	5.40	5.80
G	2.20	2.80
H	-	*2.30
I	0.70	0.90
J	-	0.90
K	5.20	5.50
L	1.40	1.60

\*: Typical, Unit: mm

**3-Lead TO-252 Plastic Surface Mount Package**  
Package Code: J

Now all products are Pb-Free Packaged

### TO-220AB Dimension

**Marking:**

Pb Free Mark  
Pb-Free: "●" (0424)  
Normal: None

Product Series (05,08,09,12)

Date Code      Control Code

Note: Green label is used for pb-free packing

Pin Style: 1.Input 2.Ground 3.Output

Material:

- Lead solder plating: Sn60/Pb40 (Normal), Sn/3.0Ag/0.5Cu or Pure-Tin (Pb-free)
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

DIM	Min.	Max.
A	5.58	7.49
B	8.38	8.90
C	4.40	4.70
D	1.15	1.39
E	0.35	0.60
F	2.03	2.92
G	9.66	10.28
H	-	*16.25
I	-	*3.83
J	3.00	4.00
K	0.75	0.95
L	2.54	3.42
M	1.14	1.40
N	-	*2.54
O	12.70	14.27
P	14.48	15.87

\*: Typical, Unit: mm

**3-Lead TO-220AB Plastic Package**  
Package Code: E

Now all products are Pb-Free Packaged

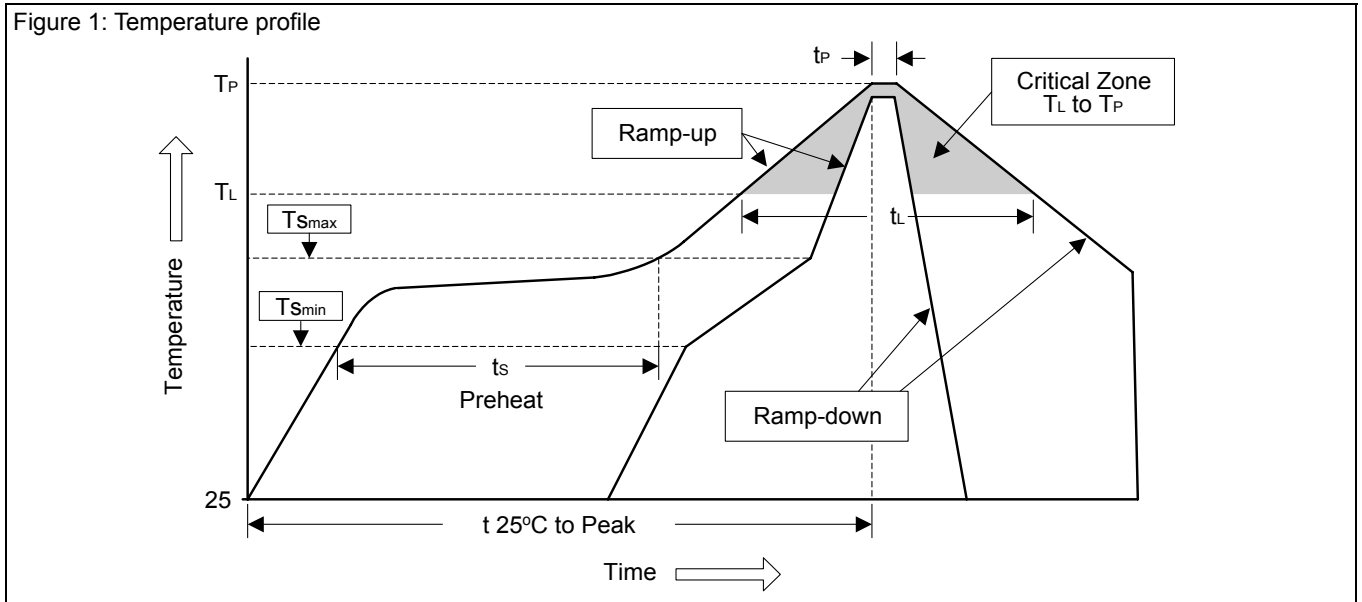
### Ordering Information

Part Number	V <sub>OUT</sub> :	Package
7805AJ	5V±0.15V	TO-252
7805AE	5V±0.15V	TO-220AB

### Soldering Methods for Orister's Products

1. Storage environment: Temperature=10°C~35°C Humidity=65%±15%
2. Reflow soldering of surface-mount devices

Figure 1: Temperature profile



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate ( $T_L$ to $T_P$ )	<3°C/sec	<3°C/sec
Preheat		
- Temperature Min ( $T_{smin}$ )	100°C	150°C
- Temperature Max ( $T_{smax}$ )	150°C	200°C
- Time (min to max) ( $t_s$ )	60~120 sec	60~180 sec
$T_{smax}$ to $T_L$		
- Ramp-up Rate	<3°C/sec	<3°C/sec
Time maintained above:		
- Temperature ( $T_L$ )	183°C	217°C
- Time ( $t_L$ )	60~150 sec	60~150 sec
Peak Temperature ( $T_P$ )	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature ( $t_p$ )	10~30 sec	20~40 sec
Ramp-down Rate	<6°C/sec	<6°C/sec
Time 25°C to Peak Temperature	<6 minutes	<8 minutes

### 3. Flow (wave) soldering (solder dipping)

Products	Peak temperature	Dipping time
Pb devices.	245°C ±5°C	5sec ±1sec
Pb-Free devices.	260°C +0/-5°C	5sec ±1sec