628. Maximum Product of Three Numbers

Given an integer array `nums`, *find three numbers whose product is maximum and return the maximum product*.

Example 1:

```
Input: nums = [1,2,3]
Output: 6
```

Example 2:

```
Input: nums = [1,2,3,4]
Output: 24
```

Example 3:

```
Input: nums = [-1,-2,-3]
Output: -6
```

Constraints:

- `3 <= nums.length <= 10**4`

- `-1000 <= nums[i] <= 1000`

-
    ```python
    def maximumProduct(self, nums: List[int]) -> int:
        if len(nums)==3:
            return nums[0]*nums[1]*nums[2]
        nums.sort()

        return max(nums[0]*nums[1]*nums[-1],nums[-1]*nums[-2]*nums[-3])
    ```

Method 2 single pass

```python
import sys
class Solution:
    def maximumProduct(self, nums: List[int]) -> int:
        if len(nums)==3:
            return nums[0]*nums[1]*nums[2]
        max1 = -sys.maxsize
        max2 = -sys.maxsize
        max3 = -sys.maxsize
```

```python
        min1 = sys.maxsize
        min2 = sys.maxsize

        for val in nums:

            #Check the maximums
            if val>=max1:
                max3 = max2
                max2 = max1
                max1 = val
            elif val>=max2:
                max3 = max2
                max2 = val
            elif val>=max3:
                max3 = val
            #Check for minimums
            if val<=min1:
                min2 = min1
                min1 = val
            elif val<=min2:
                min2 = val

        return max(max1*max2*max3,max1*min1*min2)
```