

## 150mA、微功率、低压差线性稳压器

**UM3730DA-xx DFN4 1.0×1.0**
**UM3730P-xx SOT353**

### 描述

UM3730 系列是专为低功耗、便携式应用设计的低压差线性稳压器。其典型输出噪声仅为  $220\mu\text{V}_{\text{RMS}}$ ，并且在负载电流为 150mA 时，典型压降为 155mV。UM3730 空载时电流仅为 29 $\mu\text{A}$ ，是采用电池供电应用的理想之选。在使能引脚为低电平时，UM3730 会激活自动放电功能。

UM3730 还具有 2% 的输出电压精度、出色的瞬态响应、在使用 1 $\mu\text{F}$  的超低 ESR 陶瓷电容器时具有较好的稳定性、过温保护和输出电流限制等特性。

UM3730 系列采用扁平的 DFN4 1.0×1.0 和 SOT353 封装。

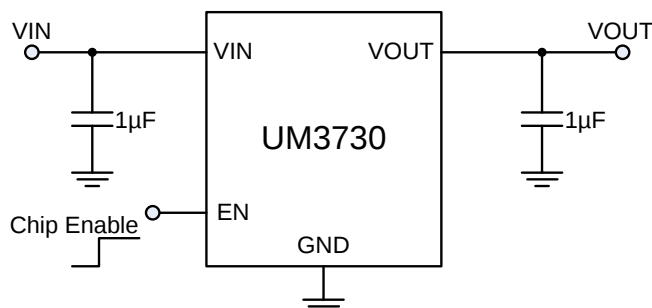
### 应用

- 数码相机
- PDA 和笔记本电脑
- 便携式设备和电池供电系统
- 手机

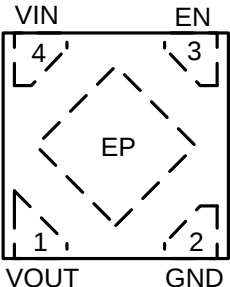
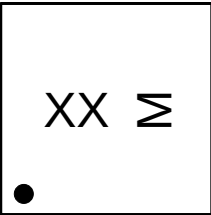
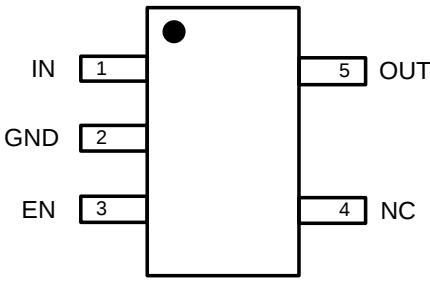
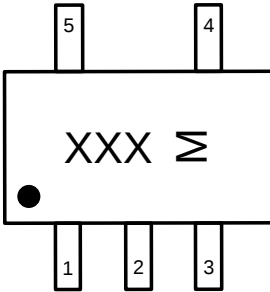
### 特性

- 输入电压范围：2.5V 至 5.5V
- 保证 150mA 输出电流
- 150mA 输出电流时具有  $\pm 2\%$  电压精度
- 低压差电压：在负载为 150mA 输出电流时典型值为 155mV
- 低静态电流：29 $\mu\text{A}$ （典型值）
- 低噪声：220 $\mu\text{V}_{\text{RMS}}$  (10Hz 至 100kHz)
- 固定输出电压范围：1.0V 至 3.3V（步径为 0.1V）
- 输出电流限制
- 过温保护
- 带 1 $\mu\text{F}$  输出电容，具有良好的稳定性
- 采用扁平的 DFN4 1.0×1.0 和 SOT353 封装

### 典型应用电路



**Pin Configurations**
**Top View**

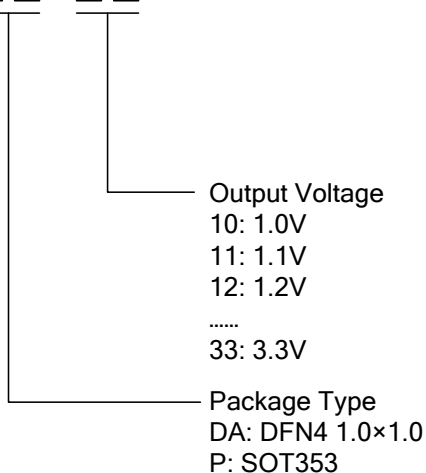
|                                                                                                                                        |                                                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p style="text-align: center;"><b>(Top View)</b></p> |  <p><b>M: Month Code</b><br/><b>UM3730DA-xx</b><br/><b>DFN4 1.0×1.0</b></p> |
|                                                      |  <p><b>M: Month Code</b><br/><b>UM3730P-xx</b><br/><b>SOT353</b></p>       |

**Pin Description**

| Pin Number | Pin Name     |        | Pin Function                                |
|------------|--------------|--------|---------------------------------------------|
|            | DFN4 1.0×1.0 | SOT353 |                                             |
| 1          | VOUT         | -      | Output Voltage                              |
| 1          | -            | IN     | Supply Input                                |
| 2          | GND          | GND    | Ground                                      |
| 3          | EN           | EN     | Enable Input: Active High. High=ON, Low=Off |
| 4          | VIN          | -      | Supply Input                                |
| 4          | -            | NC     | Not Connected                               |
| 5          | -            | OUT    | Output Voltage                              |
| EP         | HS Pad       | -      | Exposed Heat Sink Pad                       |

**Naming Information**

UM3730 □ □ - □ □


**Available Voltage Version**

| Part Number | Output Voltage | Packaging Type | Marking Code | Shipping Qty                  |
|-------------|----------------|----------------|--------------|-------------------------------|
| UM3730DA-10 | 1.0V           | DFN4 1.0×1.0   | JA           | 10000pcs/7Inch<br>Tape & Reel |
| UM3730DA-11 | 1.1V           |                | JB           |                               |
| UM3730DA-12 | 1.2V           |                | J2           |                               |
| UM3730DA-13 | 1.3V           |                | J3           |                               |
| UM3730DA-14 | 1.4V           |                | J4           |                               |
| UM3730DA-15 | 1.5V           |                | J5           |                               |
| UM3730DA-16 | 1.6V           |                | J6           |                               |
| UM3730DA-17 | 1.7V           |                | J7           |                               |
| UM3730DA-18 | 1.8V           |                | J8           |                               |
| UM3730DA-19 | 1.9V           |                | J9           |                               |
| UM3730DA-20 | 2.0V           |                | JC           |                               |
| UM3730DA-21 | 2.1V           |                | KB           |                               |
| UM3730DA-22 | 2.2V           |                | K2           |                               |
| UM3730DA-23 | 2.3V           |                | K3           |                               |
| UM3730DA-24 | 2.4V           |                | K4           |                               |
| UM3730DA-25 | 2.5V           |                | K5           |                               |
| UM3730DA-26 | 2.6V           |                | K6           |                               |
| UM3730DA-27 | 2.7V           |                | K7           |                               |
| UM3730DA-28 | 2.8V           |                | K8           |                               |
| UM3730DA-29 | 2.9V           |                | K9           |                               |
| UM3730DA-30 | 3.0V           |                | KC           |                               |
| UM3730DA-31 | 3.1V           |                | NB           |                               |
| UM3730DA-32 | 3.2V           |                | N2           |                               |
| UM3730DA-33 | 3.3V           |                | N3           |                               |

**Available Voltage Version (Continued)**

| Part Number | Output Voltage | Packaging Type | Marking Code | Shipping Qty                 |
|-------------|----------------|----------------|--------------|------------------------------|
| UM3730P-10  | 1.0V           | SOT353         | UJA          | 3000pcs/7Inch<br>Tape & Reel |
| UM3730P-11  | 1.1V           |                | UJB          |                              |
| UM3730P-12  | 1.2V           |                | UJ2          |                              |
| UM3730P-13  | 1.3V           |                | UJ3          |                              |
| UM3730P-14  | 1.4V           |                | UJ4          |                              |
| UM3730P-15  | 1.5V           |                | UJ5          |                              |
| UM3730P-16  | 1.6V           |                | UJ6          |                              |
| UM3730P-17  | 1.7V           |                | UJ7          |                              |
| UM3730P-18  | 1.8V           |                | UJ8          |                              |
| UM3730P-19  | 1.9V           |                | UJ9          |                              |
| UM3730P-20  | 2.0V           |                | UJC          |                              |
| UM3730P-21  | 2.1V           |                | UKB          |                              |
| UM3730P-22  | 2.2V           |                | UK2          |                              |
| UM3730P-23  | 2.3V           |                | UK3          |                              |
| UM3730P-24  | 2.4V           |                | UK4          |                              |
| UM3730P-25  | 2.5V           |                | UK5          |                              |
| UM3730P-26  | 2.6V           |                | UK6          |                              |
| UM3730P-27  | 2.7V           |                | UK7          |                              |
| UM3730P-28  | 2.8V           |                | UK8          |                              |
| UM3730P-29  | 2.9V           |                | UK9          |                              |
| UM3730P-30  | 3.0V           |                | UKC          |                              |
| UM3730P-31  | 3.1V           |                | UNB          |                              |
| UM3730P-32  | 3.2V           |                | UN2          |                              |
| UM3730P-33  | 3.3V           |                | UN3          |                              |

**Absolute Maximum Ratings (Note 1)**

| Symbol                      | Parameter                                  |              | Value        | Unit |
|-----------------------------|--------------------------------------------|--------------|--------------|------|
| V <sub>IN</sub>             | Supply Voltage on VIN Pin                  |              | -0.3 to +7.5 | V    |
| V <sub>OUT</sub>            | Voltage on VOUT Pin                        |              | -0.3 to +7.5 | V    |
| T <sub>J</sub>              | Operating Junction Temperature (Note 2, 3) |              | -40 to +125  | ℃    |
| T <sub>STG</sub>            | Storage Temperature Range                  |              | -55 to +150  | ℃    |
| T <sub>L</sub>              | Lead Temperature for Soldering 10 Seconds  |              | +260         | ℃    |
| θ <sub>JA</sub><br>(Note 4) | Package Thermal Resistance                 | DFN4 1.0×1.0 | 250          | ℃/W  |
|                             |                                            | SOT353       | 256          |      |

Note 1: Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

Note 2: The UM3730 is tested and specified under pulse load conditions such that  $T_J \approx T_A$ . Specifications over the -40 ℃ to 125 ℃ operating junction temperature range are assured by design, characterization and correlation with statistical process controls.

Note 3: This IC includes over temperature protection that is intended to protect the device during momentary overload conditions.

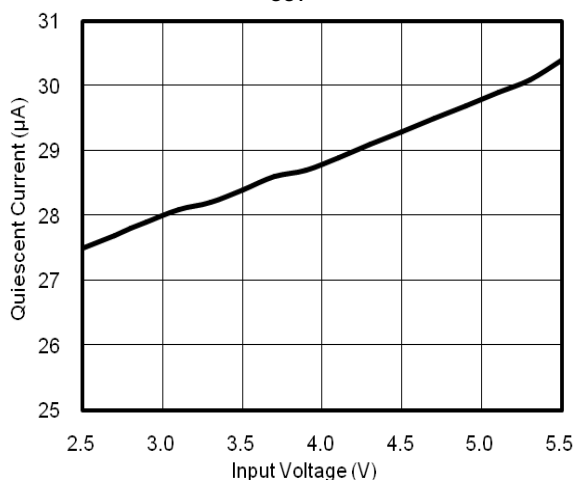
Note 4: The maximum allowable power dissipation of any T<sub>A</sub> (ambient temperature) is  $P_{DMAX} = (T_{JMAX} - T_A) / \theta_{JA}$ . Exceeding the maximum allowable power dissipation will result in excessive die temperature and the regulator will go into thermal shutdown.

**Electrical Characteristics**
 $V_{IN}=V_{EN}=V_{OUT}+1V$ ,  $C_{IN}=C_{OUT}=1\mu F$ ,  $T_A=25\text{ }^{\circ}\text{C}$ .

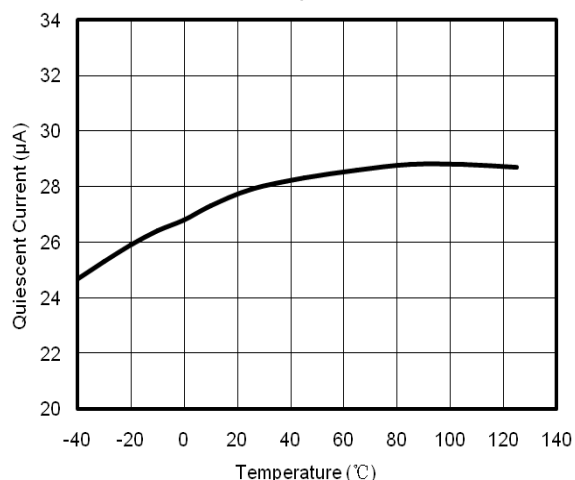
| Symbol            | Parameter                     | Test Conditions                                                             |         | Min  | Typ | Max  | Unit                    |
|-------------------|-------------------------------|-----------------------------------------------------------------------------|---------|------|-----|------|-------------------------|
| $V_{IN}$          | Input Voltage Range           |                                                                             |         | 2.5  |     | 5.5  | V                       |
| $V_{OUT}$         | Output Voltage Range          |                                                                             |         | 1.0  |     | 3.3  | V                       |
| $I_Q$             | Operating Quiescent Current   | $I_{OUT}=0mA$                                                               |         |      | 29  | 39   | $\mu A$                 |
| $I_{SHDN}$        | Shutdown Leakage Current      |                                                                             |         |      |     | 1    | $\mu A$                 |
| $I_{EN}$          | Enable Input Current          | $V_{EN}=V_{IN}$ or GND                                                      |         |      |     | 1    | $\mu A$                 |
| $I_{OUT}$         | Output Current                |                                                                             |         | 150  |     |      | mA                      |
|                   | Output Voltage Accuracy       | $I_{OUT}=150mA$                                                             |         | -2.0 |     | +2.0 | %                       |
| $\Delta V_{DO}$   | Dropout Voltage               | $I_{OUT}=50mA$ , $V_{OUT}\geq 2.8V$                                         |         |      | 55  | 110  | mV                      |
|                   |                               | $I_{OUT}=150mA$ , $V_{OUT}\geq 2.8V$                                        |         |      | 155 | 310  | mV                      |
|                   |                               | $I_{OUT}=50mA$ , $V_{OUT}< 2.8V$                                            |         |      | 60  | 135  | mV                      |
|                   |                               | $I_{OUT}=150mA$ , $V_{OUT}< 2.8V$                                           |         |      | 180 | 380  | mV                      |
| $I_{LIMIT}$       | Output Current Limit          | $V_{OUT}=0V$                                                                |         | 200  | 325 | 500  | mA                      |
| t                 | Startup Time Response         | $I_{OUT}=150mA$ , $C_{OUT}=1\mu F$                                          |         |      | 30  |      | $\mu s$                 |
| $V_{IL}$          | Enable Input Low Voltage      | $V_{IN}=2.5V$ to $5.5V$                                                     |         |      |     | 0.4  | V                       |
| $V_{IH}$          | Enable Input High Voltage     | $V_{IN}=2.5V$ to $5.5V$                                                     |         | 1.2  |     |      | V                       |
|                   | Output Voltage TC             |                                                                             |         |      | 100 |      | ppm/ $^{\circ}\text{C}$ |
| $T_{SHDN}$        | Thermal-Shutdown Temperature  |                                                                             |         |      | 160 |      | $^{\circ}\text{C}$      |
| $\Delta T_{SHDN}$ | Thermal-Shutdown Hysteresis   |                                                                             |         |      | 20  |      | $^{\circ}\text{C}$      |
| LNR               | Line Regulation               | $V_{OUT}+1V\leq V_{IN}\leq 5.5V$<br>( $V_{IN}\geq 2.5V$ )<br>$I_{OUT}=10mA$ |         |      | 0.1 | 0.3  | %/V                     |
| LDR               | Load Regulation               | $V_{IN}=V_{OUT}+1V$ ( $V_{IN}\geq 2.5V$ )<br>$1mA\leq I_{OUT}\leq 150mA$    |         |      | 0.8 | 1.5  | %                       |
|                   | Output Voltage Noise          | $V_{OUT}=1.8V$ ,<br>10Hz to 100kHz,<br>$C_{IN}=1\mu F$ , $I_{OUT}=100mA$    |         |      | 220 |      | $\mu V_{RMS}$           |
| PSRR              | Power Supply Ripple Rejection | $V_{IN}=V_{OUT}+1V$<br>( $V_{IN}\geq 2.5V$ )<br>$I_{OUT}=100mA$             | f=1kHz  |      | 45  |      | dB                      |
|                   |                               |                                                                             | f=10kHz |      | 30  |      |                         |
|                   | Auto-Discharge Resistance     | $V_{IN}=3.6V$ ,<br>$V_{EN}=0V$                                              |         |      | 10  |      | $\Omega$                |

## Typical Performance Characteristics

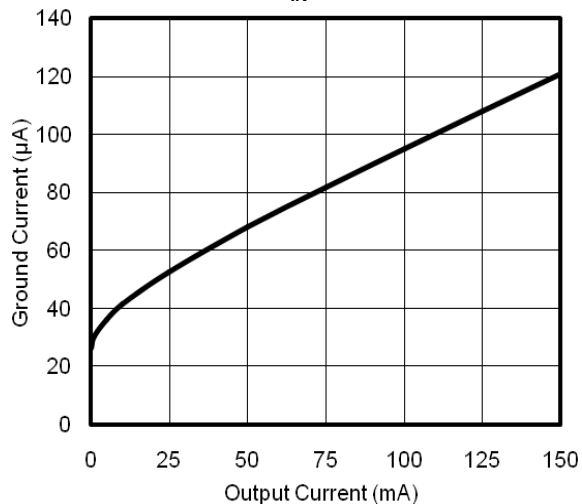
**Quiescent Current vs. Input Voltage**  
 $I_{OUT}=0mA$



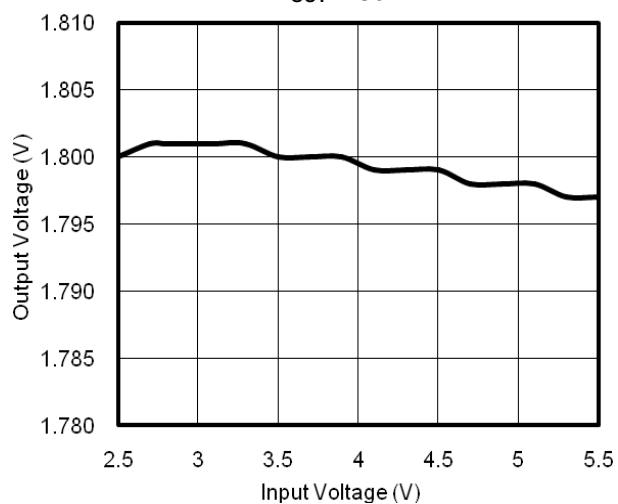
**Quiescent Current vs. Temperature**  
 $V_{IN}=2.8V, I_{OUT}=0mA$



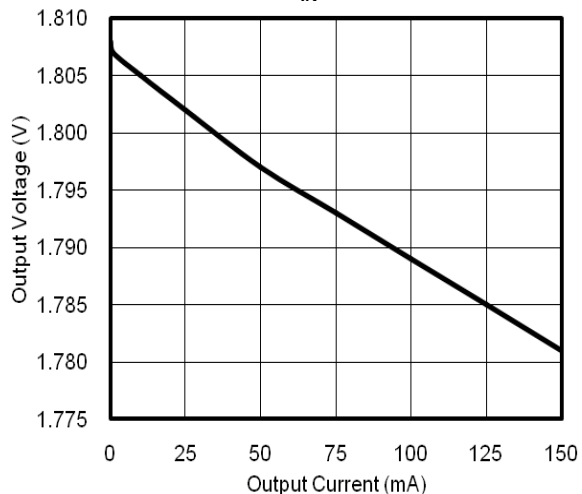
**Ground Current vs. Output Current**  
 $V_{IN}=2.8V$



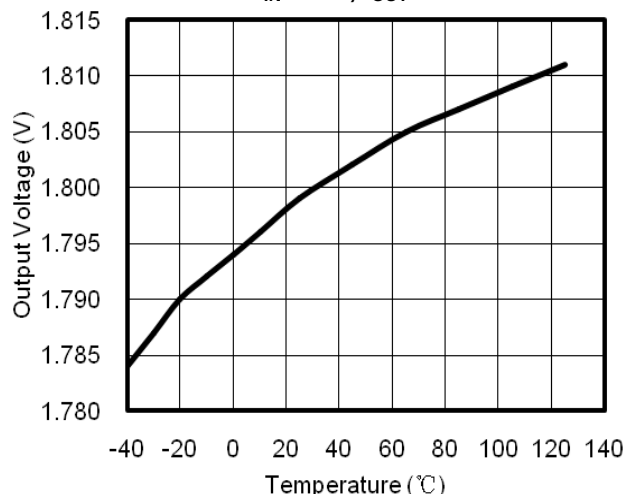
**Output Voltage vs. Input Voltage**  
 $I_{OUT}=150mA$

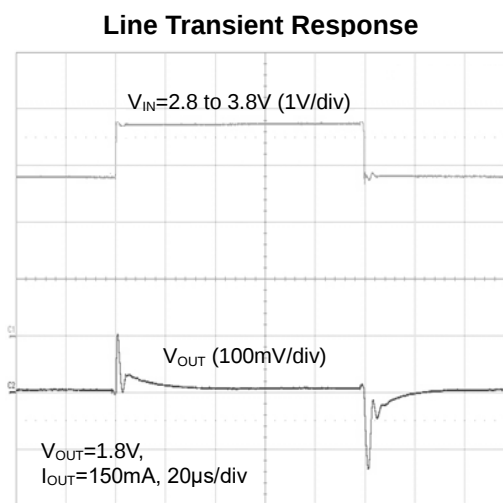
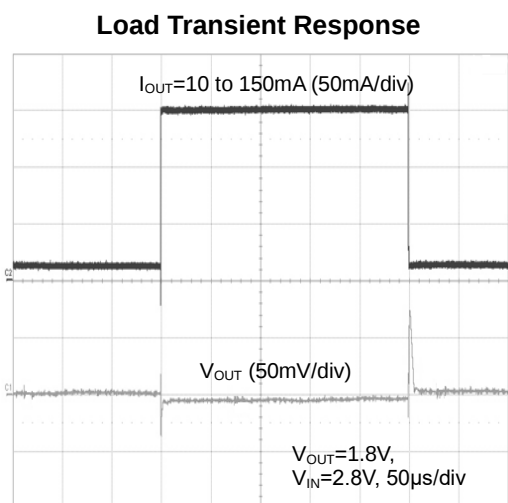
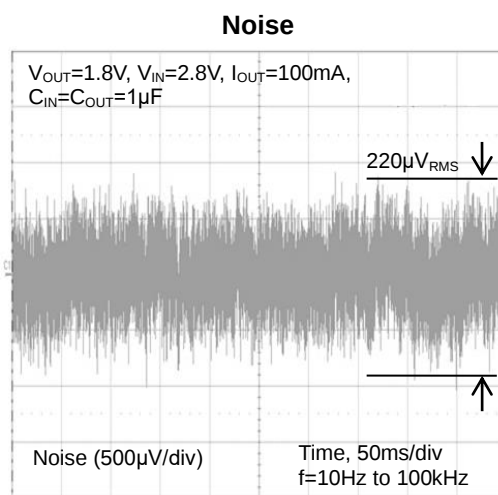
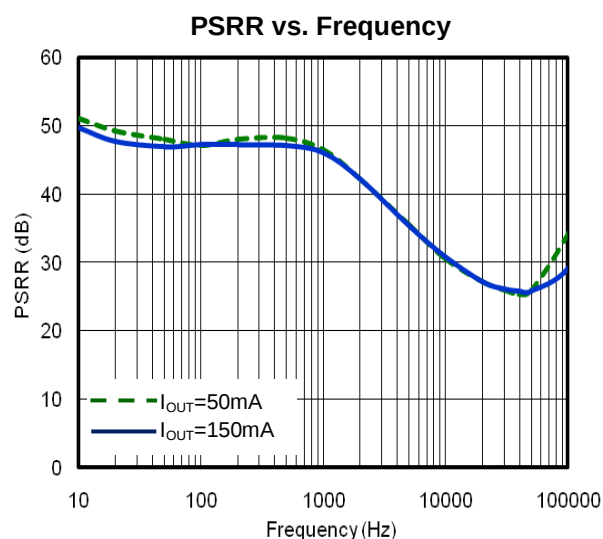
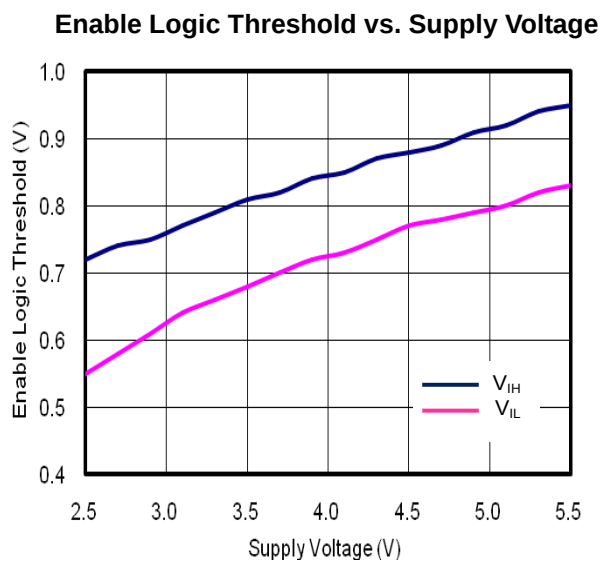
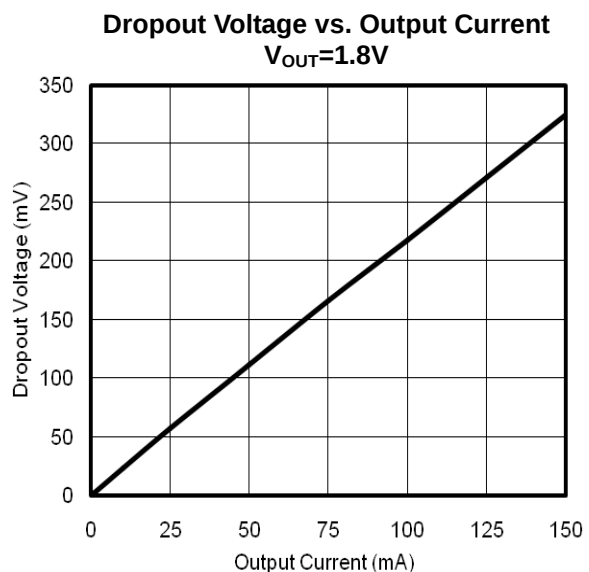


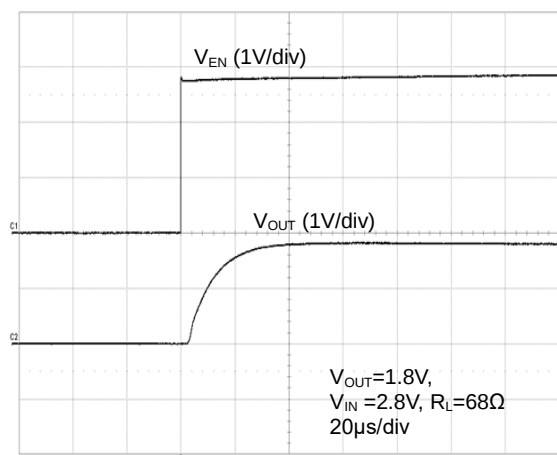
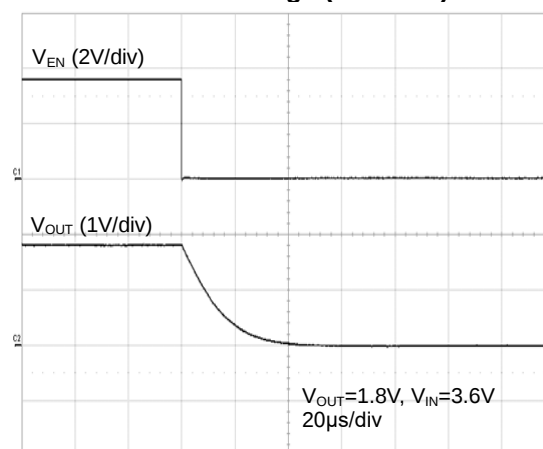
**Output Voltage vs. Output Current**  
 $V_{IN}=2.8V$



**Output Voltage vs. Temperature**  
 $V_{IN}=2.8V, I_{OUT}=1mA$



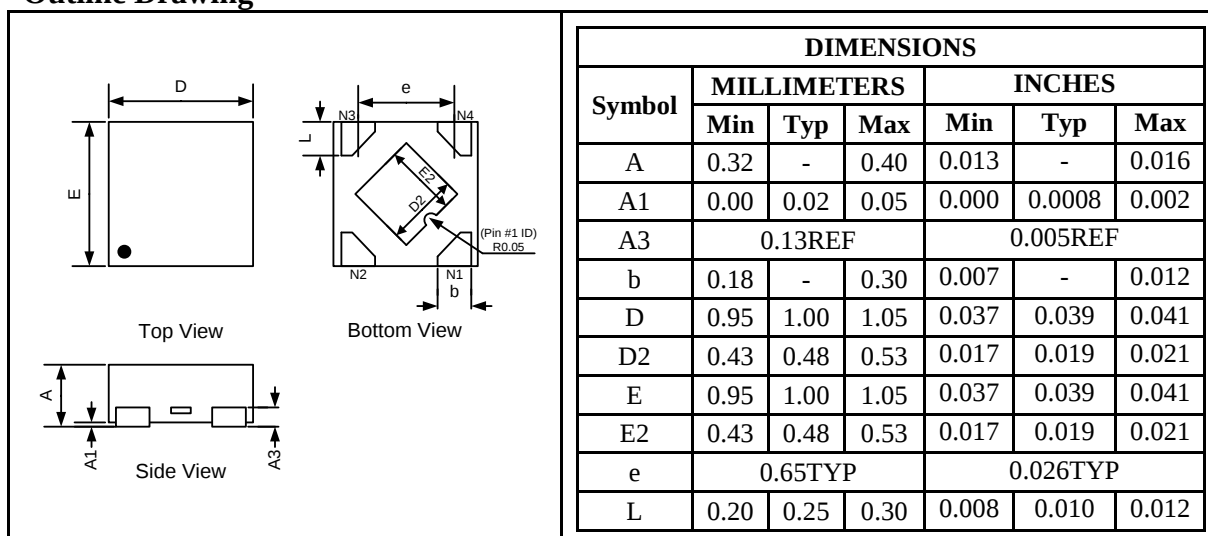
**Typical Performance Characteristics (Continued)**


**Typical Performance Characteristics (Continued)**
**Enable Turn-On**

**Auto Discharge (No Load)**


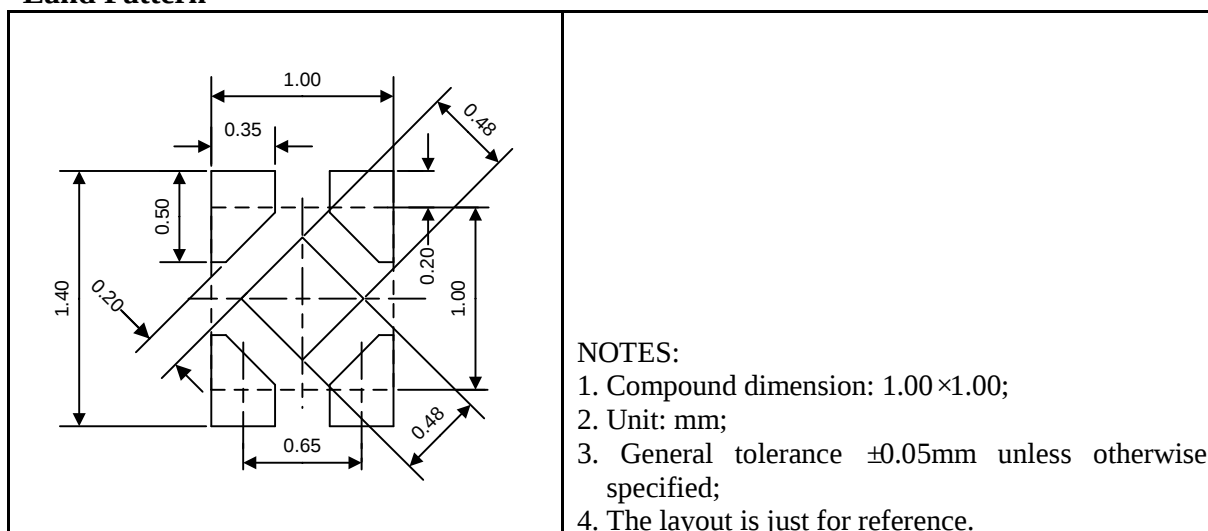
## Package Information

### UM3730DA-xx DFN4 1.0×1.0

#### Outline Drawing



#### Land Pattern



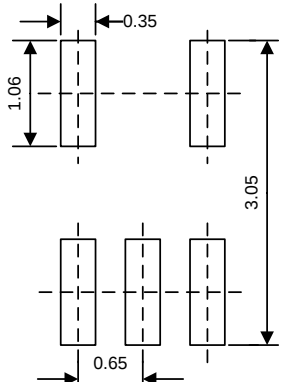
#### Tape and Reel Orientation



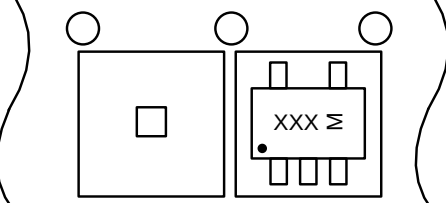
**UM3730P-xx SOT353**
**Outline Drawing**

| DIMENSIONS |             |      |      |          |       |       |
|------------|-------------|------|------|----------|-------|-------|
| Symbol     | MILLIMETERS |      |      | INCHES   |       |       |
|            | Min         | Typ  | Max  | Min      | Typ   | Max   |
| A          | 0.85        | -    | 1.10 | 0.033    | -     | 0.043 |
| A1         | 0.00        | -    | 0.10 | 0.000    | -     | 0.004 |
| A2         | 0.80        | -    | 1.00 | 0.031    | -     | 0.039 |
| b          | 0.10        | -    | 0.35 | 0.004    | -     | 0.014 |
| c          | 0.08        | -    | 0.22 | 0.003    | -     | 0.009 |
| D          | 1.80        | 2.15 | 2.20 | 0.071    | 0.085 | 0.087 |
| E          | 1.15        | 1.30 | 1.35 | 0.045    | 0.051 | 0.053 |
| E1         | 2.00        | -    | 2.45 | 0.079    | -     | 0.096 |
| e          | 0.65BSC     |      |      | 0.026REF |       |       |
| L          | 0.25        | -    | 0.46 | 0.010    | -     | 0.018 |
| $\theta$   | 0°          | -    | 8°   | 0°       | -     | 8°    |

**Land Pattern**

|                                                                                     |                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>NOTES:</p> <ol style="list-style-type: none"> <li>Compound dimension: 2.15×1.30;</li> <li>Unit: mm;</li> <li>General tolerance <math>\pm 0.05\text{mm}</math> unless otherwise specified;</li> <li>The layout is just for reference.</li> </ol> |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Tape and Reel Orientation**

|                                                                                     |
|-------------------------------------------------------------------------------------|
|  |
|-------------------------------------------------------------------------------------|

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