

150mA, Micropower, Low Dropout Linear Regulator

UM3730DA-xx DFN4 1.0×1.0

UM3730P-xx SOT353

General Description

The UM3730 series are low dropout linear regulators designed for low power portable applications. Typical output noise is only $220\mu\text{V}_{\text{RMS}}$ and typical dropout voltage is 155mV at the load current of 150mA. Ideal for battery powered applications, the UM3730 draws only $29\mu\text{A}$ current during no load operation. The UM3730 includes an auto-discharge feature that is activated when the enable pin is low.

Other features include 2% output voltage accuracy, excellent transient response, stability with ultra low ESR ceramic capacitors as small as $1\mu\text{F}$, thermal overload protection and output current limiting.

The UM3730 series are available in low profile DFN4 1.0×1.0 and SOT353 packages.

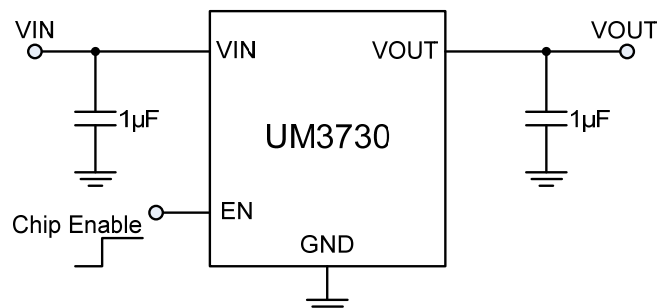
Applications

- Digital Camera
- PDAs and Notebook Computers
- Portable Instruments and Battery-Powered Systems
- Cellular Phones

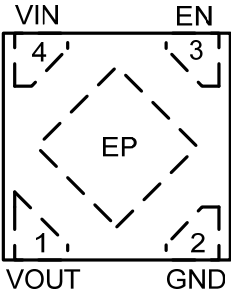
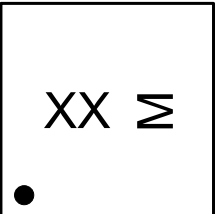
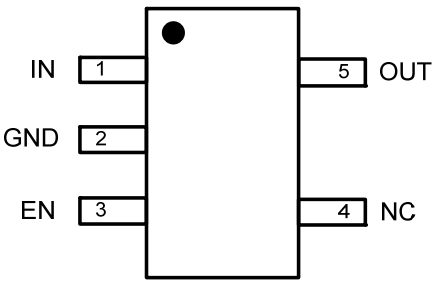
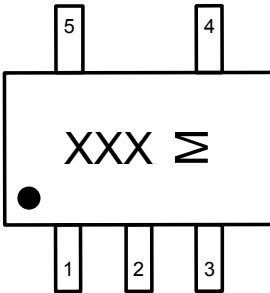
Features

- Input Voltage Range: 2.5V to 5.5V
- Guaranteed 150mA Output Current
- $\pm 2\%$ Voltage Accuracy at 150mA
- Low Dropout Voltage: 155mV (Typical) at 150mA
- Low Quiescent Current: $29\mu\text{A}$ (Typical)
- Low Noise: $220\mu\text{V}_{\text{RMS}}$ (10Hz to 100kHz)
- Available Fixed Output Voltage from 1.0V to 3.3V with 0.1V Step
- Output Current Limit
- Thermal Overload Protection
- Stable with $1\mu\text{F}$ Output Capacitor
- Low Profile DFN4 1.0×1.0 and SOT353 Packages

Typical Application Circuit



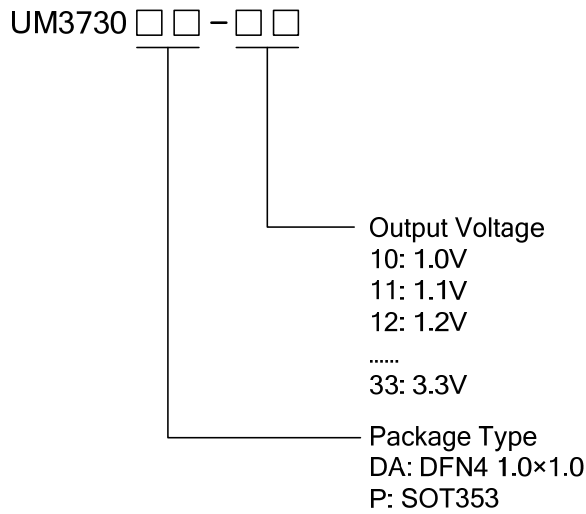
Pin Configurations
Top View

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



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 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 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 _{IN}	Supply Voltage on VIN Pin	-0.3 to +7.5	V
V _{OUT}	Voltage on VOUT Pin	-0.3 to +7.5	V
T _J	Operating Junction Temperature (Note 2, 3)	-40 to +125	°C
T _{STG}	Storage Temperature Range	-55 to +150	°C
T _L	Lead Temperature for Soldering 10 Seconds	+260	°C
θ _{JA} (Note 4)	Package Thermal Resistance	DFN4 1.0×1.0	250
		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 ≈ T_A. Specifications over the -40°C to 125°C 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.

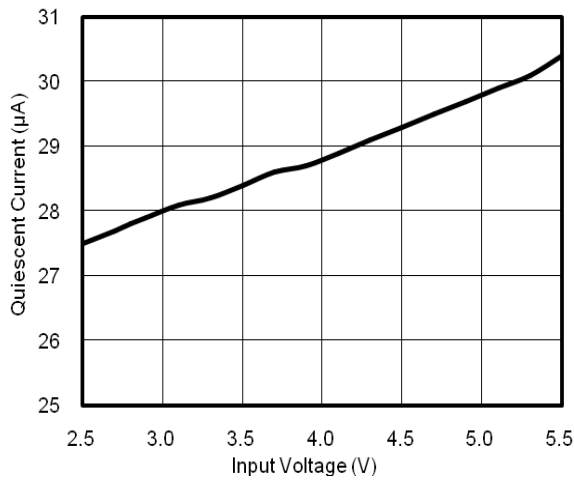
Note 4: The maximum allowable power dissipation of any T_A (ambient temperature) is P_{DMAX} = (T_{JMAX} - T_A) / θ_{JA}. Exceeding the maximum allowable power dissipation will result in excessive die temperature and the regulator will go into thermal shutdown.

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

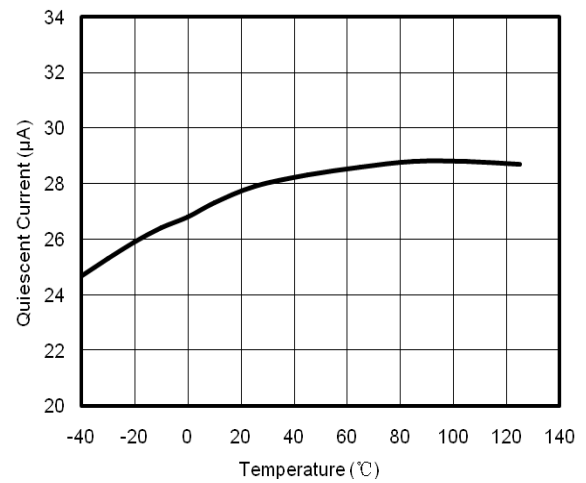
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage Range		2.5		5.5	V
V_{OUT}	Output Voltage Range		1.0		3.3	V
I_Q	Operating Quiescent Current	$I_{OUT}=0mA$		29	39	μA
I_{SHDN}	Shutdown Leakage Current				1	μA
I_{EN}	Enable Input Current	$V_{EN}=V_{IN}$ or GND			1	μA
I_{OUT}	Output Current		150			mA
	Output Voltage Accuracy	$I_{OUT}=150mA$	-2.0		+2.0	%
ΔV_{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		μs
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/ $^\circ C$
T_{SHDN}	Thermal-Shutdown Temperature			160		$^\circ C$
ΔT_{SHDN}	Thermal-Shutdown Hysteresis			20		$^\circ C$
LNR	Line Regulation	$V_{OUT}+1V\leq V_{IN}\leq 5.5V$ ($V_{IN}\geq 2.5V$) $I_{OUT}=10mA$		0.1	0.3	%/V
LDR	Load Regulation	$V_{IN}=V_{OUT}+1V$ ($V_{IN}\geq 2.5V$) $1mA\leq I_{OUT}\leq 150mA$		0.8	1.5	%
	Output Voltage Noise	$V_{OUT}=1.8V$, 10Hz to 100kHz, $C_{IN}=1\mu F$, $I_{OUT}=100mA$		220		μV_{RMS}
PSRR	Power Supply Ripple Rejection	$V_{IN}=V_{OUT}+1V$ ($V_{IN}\geq 2.5V$) $I_{OUT}=100mA$	f=1kHz	45		dB
			f=10kHz	30		
	Auto-Discharge Resistance	$V_{IN}=3.6V$, $V_{EN}=0V$		10		Ω

Typical Performance Characteristics

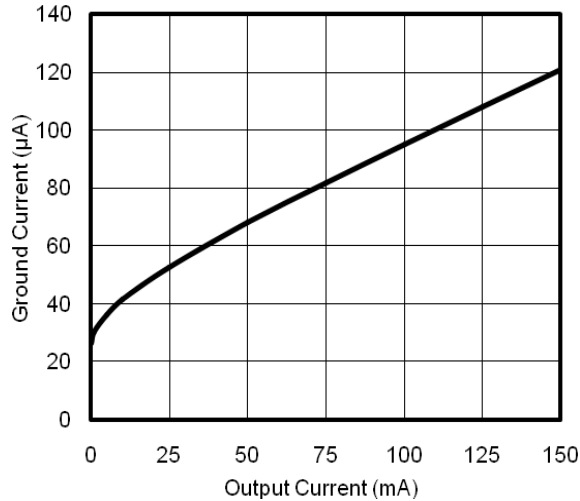
Quiescent Current vs. Input Voltage
 $I_{OUT}=0mA$



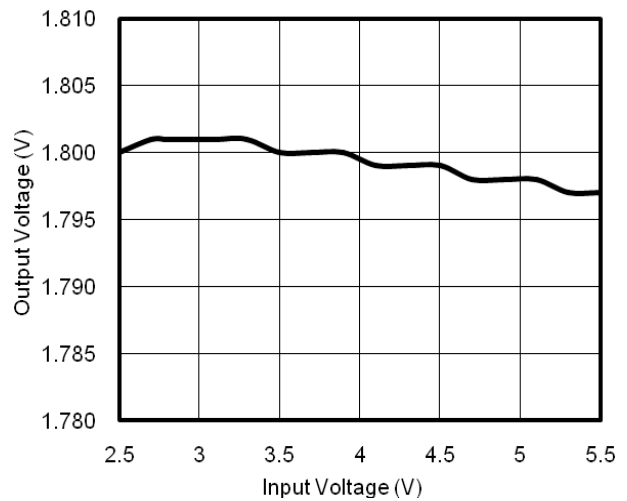
Quiescent Current vs. Temperature
 $V_{IN}=2.8V, I_{OUT}=0mA$



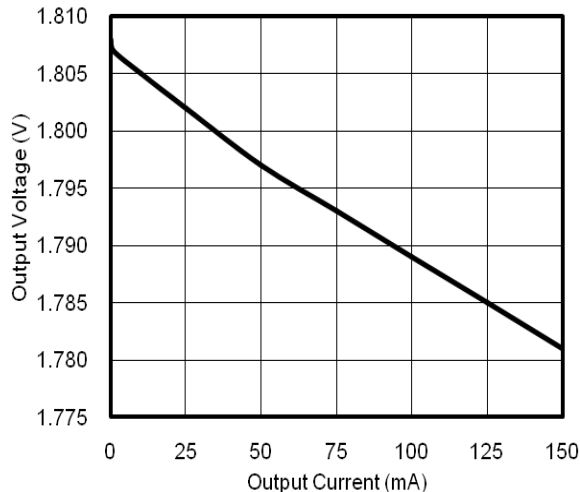
Ground Current vs. Output Current
 $V_{IN}=2.8V$



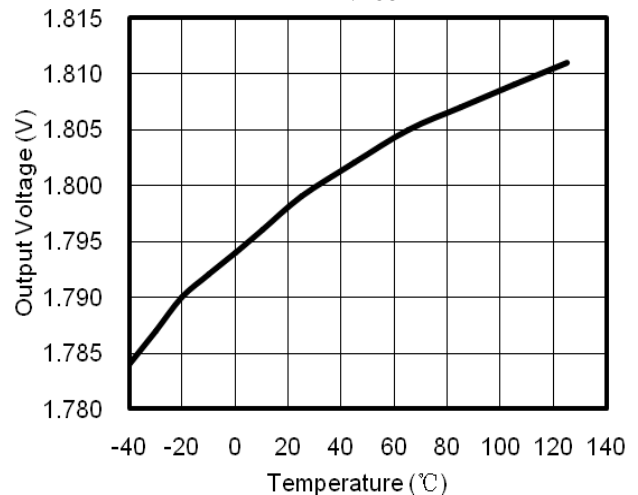
Output Voltage vs. Input Voltage
 $I_{OUT}=150mA$



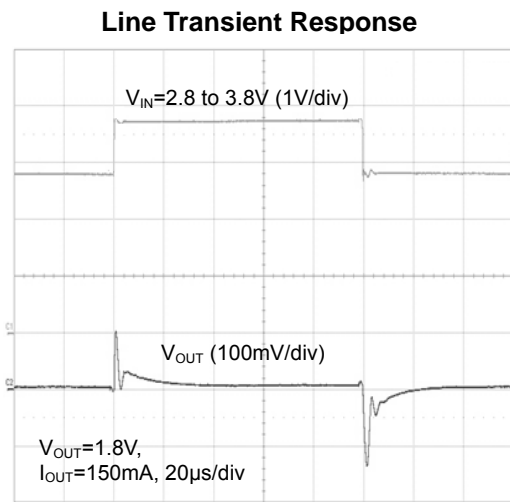
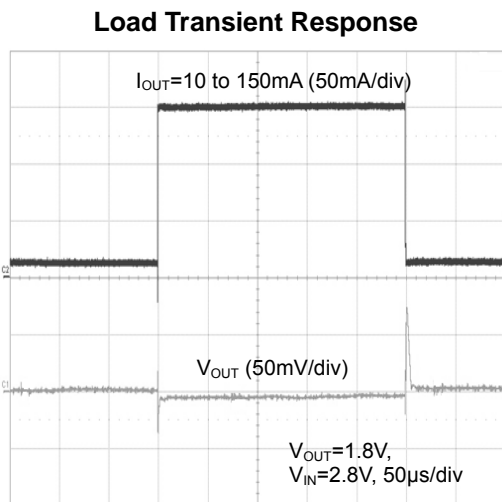
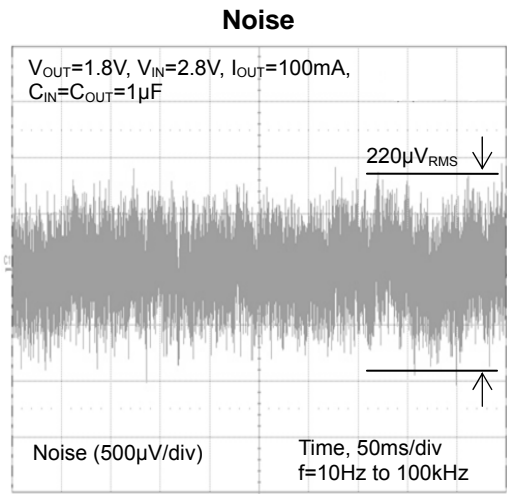
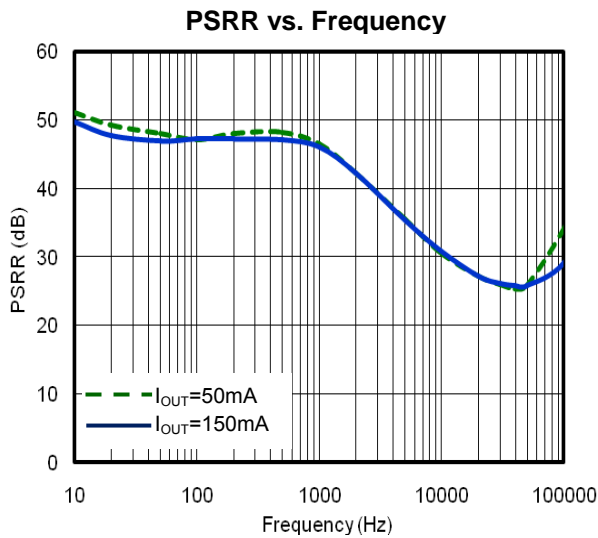
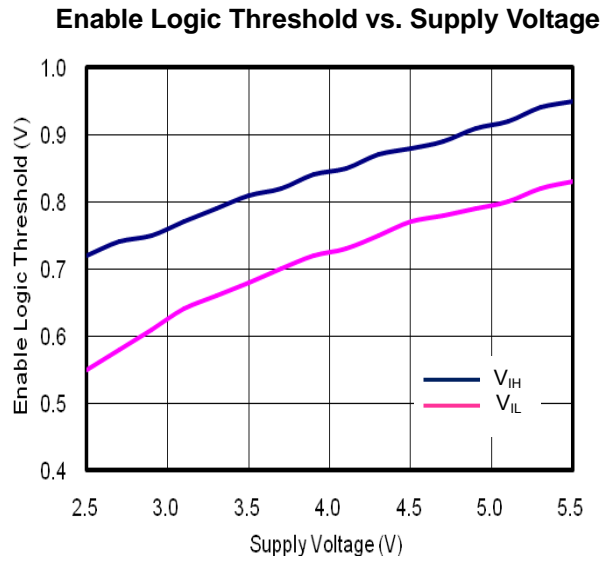
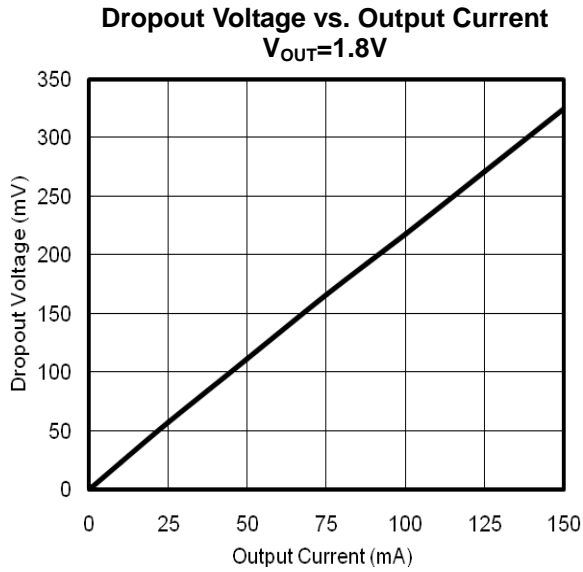
Output Voltage vs. Output Current
 $V_{IN}=2.8V$



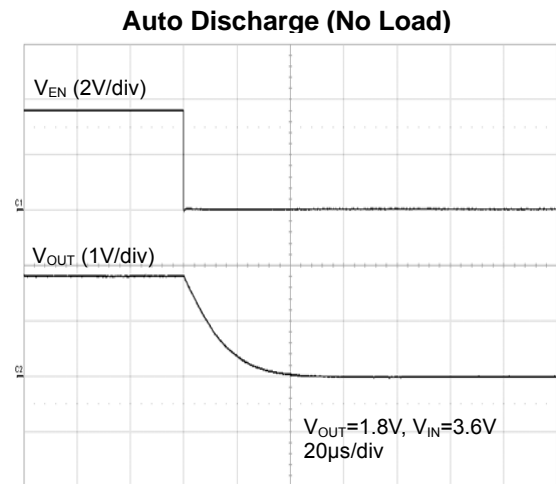
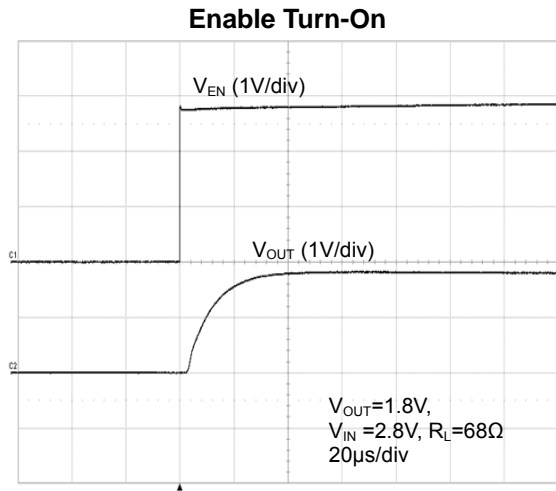
Output Voltage vs. Temperature
 $V_{IN}=2.8V, I_{OUT}=1mA$



Typical Performance Characteristics (Continued)



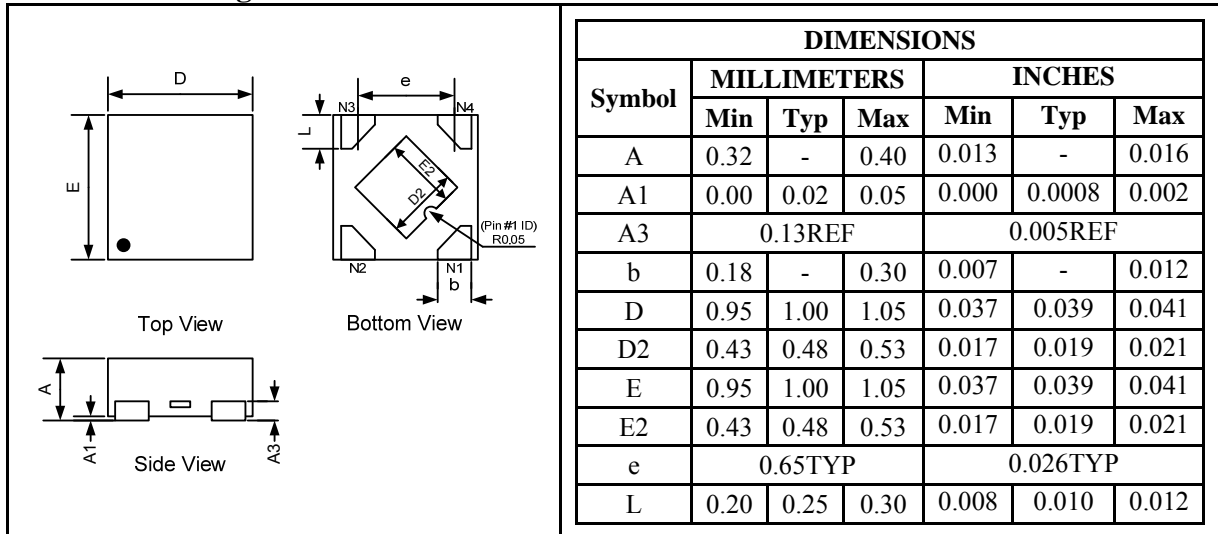
Typical Performance Characteristics (Continued)



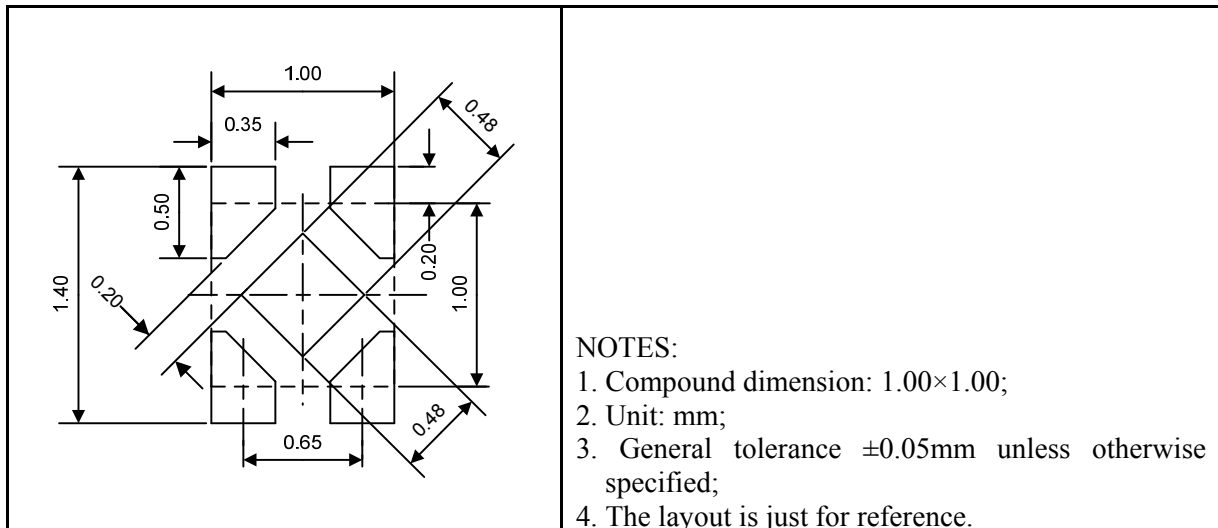
Package Information

UM3730DA-xx DFN4 1.0×1.0

Outline Drawing



Land Pattern

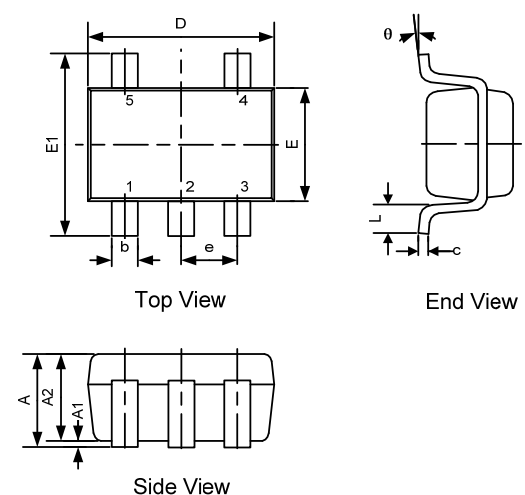


Tape and Reel Orientation



UM3730P-xx SOT353

Outline Drawing



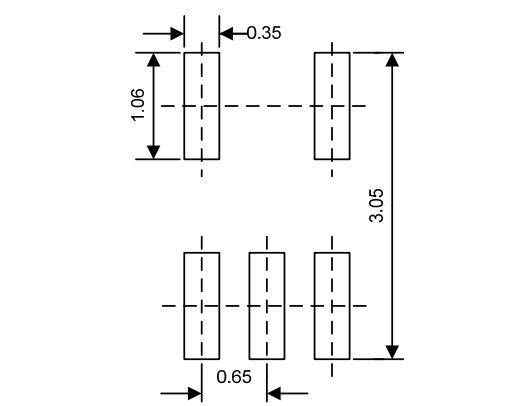
Top View

End View

Side View

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
θ	0°	-	8°	0°	-	8°

Land Pattern



NOTES:

1. Compound dimension: 2.15×1.30;
2. Unit: mm;
3. General tolerance ±0.05mm unless otherwise specified;
4. The layout is just for reference.

Tape and Reel Orientation



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