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 220μV_{RMS} and typical dropout voltage is 155mV at the load current of 150mA. Ideal for battery powered applications, the UM3730 draws only 29μA 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 1μF, thermal overload protection and output current limiting.

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

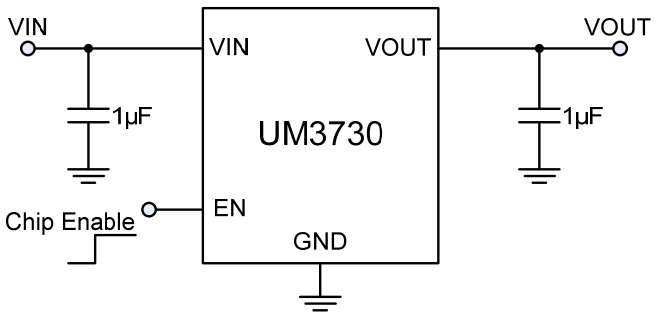
Applications

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

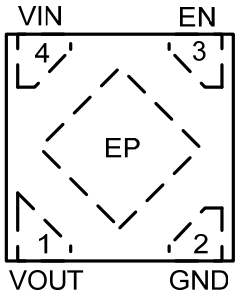
Features

- Input Voltage Range: 2.5V to 5.5V
- Guaranteed 150mA Output Current
- ±2% Voltage Accuracy at 150mA
- Low Dropout Voltage: 155mV (Typical) at 150mA
- Low Quiescent Current: 29μA (Typical)
- Low Noise: 220μV_{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 1μF Output Capacitor
- Low Profile DFN4 1.0×1.0 and SOT353 Packages

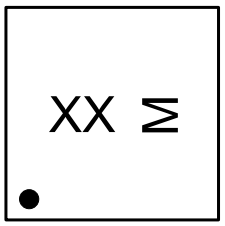
Typical Application Circuit



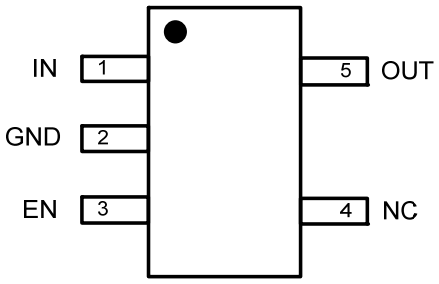
Pin Configurations **Top View**

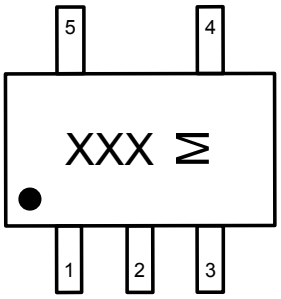


(Top View)



M: Month Code
UM3730DA-xx
DFN4 1.0×1.0



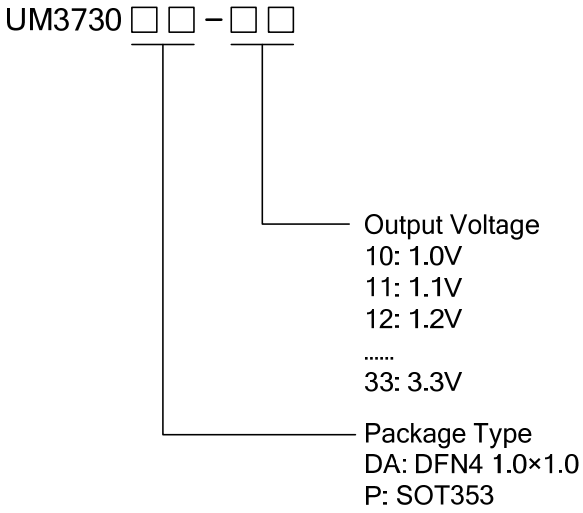


M: Month Code
UM3730P-xx
SOT353

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	°C/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°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 $P_{DMAX} = (T_{JMAX}-T_A)/\theta_{JA}$. Exceeding the maximum allowable power dissipation will result in excessive die temperature and the regulator will go into thermal shutdown.

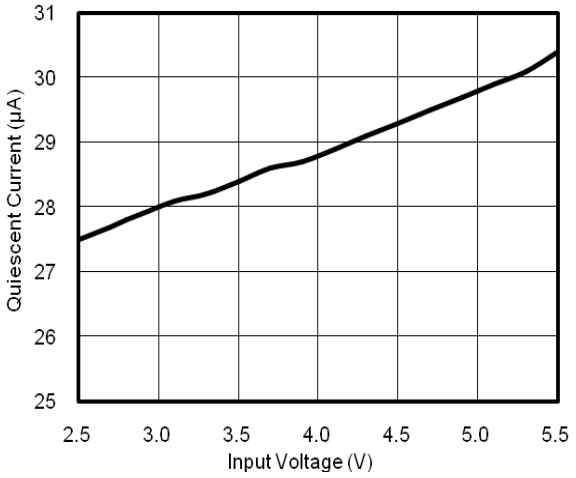
Electrical Characteristics

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

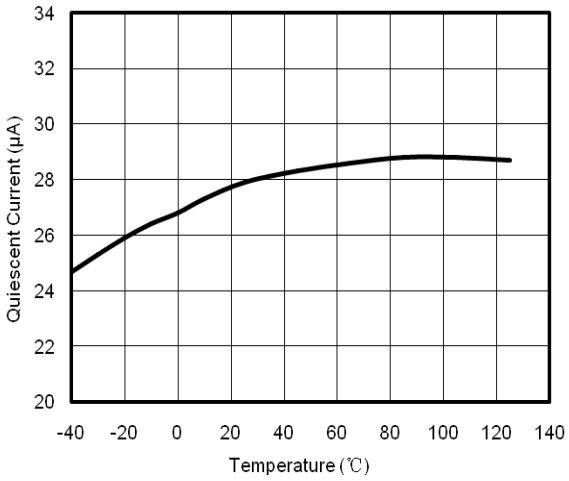
Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_{IN}	Input Voltage Range			2.5		5.5	V
V_{OUT}	Output Voltage Range			1.0		3.3	V
I_Q	Operating Quiescent Current	I_{OUT}=0mA			29	39	μA
I_{SHDN}	Shutdown Leakage Current					1	μA
I_{EN}	Enable Input Current	$V_{EN}=V_{IN}$ or GND				1	μA
I_{OUT}	Output 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_{LIMT}	Output Current Limit	V_{OUT} =0V		200	325	500	mA
t	Startup Time Response	I_{OUT}=150mA, C_{OUT}=1μF			30		μs
V_{IL}	Enable Input Low Voltage	V_{IN}=2.5V to5.5V				0.4	V
V_{IH}	Enable Input High Voltage	V_{IN}=2.5V to5.5V		1.2			V
	Output Voltage TC				100		ppm/°C
T_{SHDN}	Thermal-Shutdown Temperature				160		°C
ΔT_{SHDN}	Thermal-Shutdown Hysteresis				20		°C
LNR	Line Regulation	$V_{OUT}+1V\leq V_{IN}\leq5.5V$ ($V_{IN}\geq2.5V$) I_{OUT}=10mA			0.1	0.3	%/V
LDR	Load Regulation	$V_{IN}=V_{OUT}+1V$ ($V_{IN}\geq2.5V$) $1mA\leq I_{OUT}\leq150mA$			0.8	1.5	%
	Output Voltage Noise	V_{OUT}=1.8V, 10Hz to 100kHz, C_{IN}=1μF, I_{OUT}=100mA			220		μV_{RMS}
PSRR	Power Supply Ripple Rejection	$V_{IN}=V_{OUT}+1V$ ($V_{IN}\geq2.5V$) 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

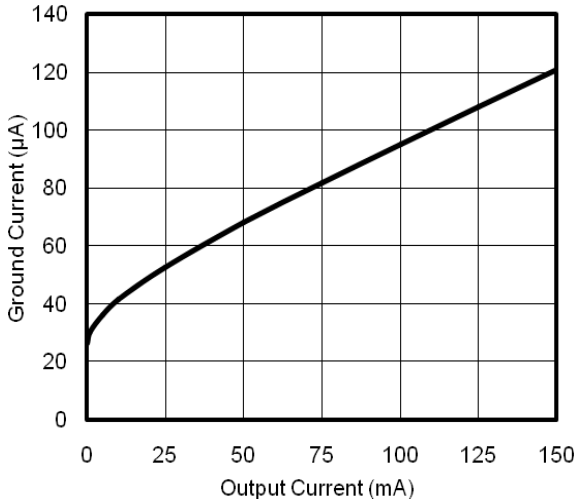
Quiescent Current vs. Input Voltage
I_{OUT}=0mA



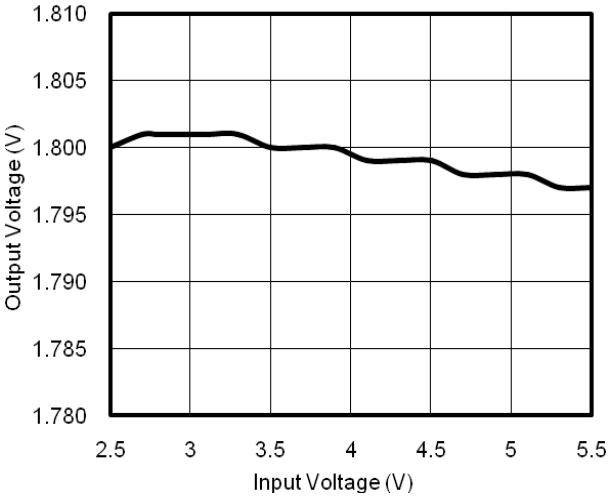
Quiescent Current vs. Temperature
V_{IN}=2.8V, I_{OUT}=0mA



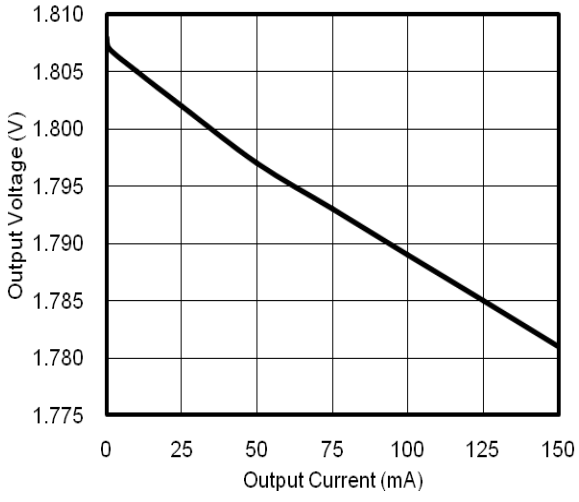
Ground Current vs. Output Current
V_{IN}=2.8V



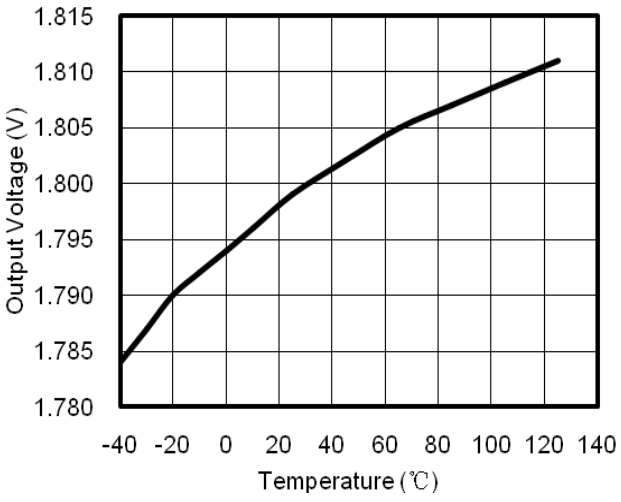
Output Voltage vs. Input Voltage
I_{OUT}=150mA



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

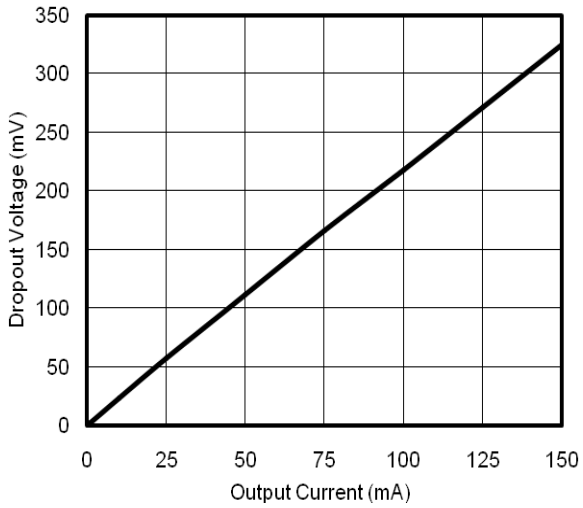


Output Voltage vs. Temperature
V_{IN}=2.8V, I_{OUT}=1mA

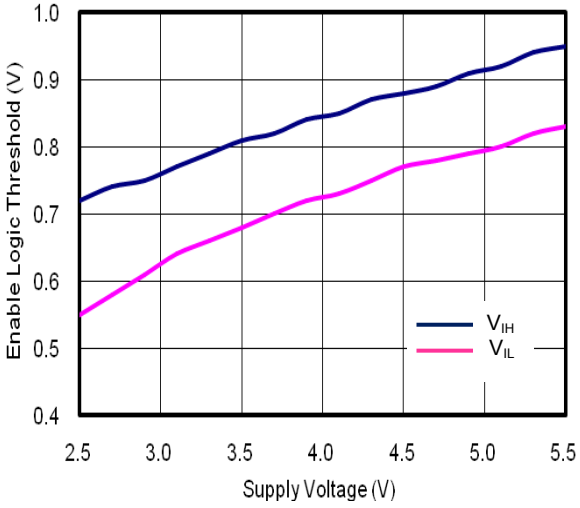


Typical Performance Characteristics (Continued)

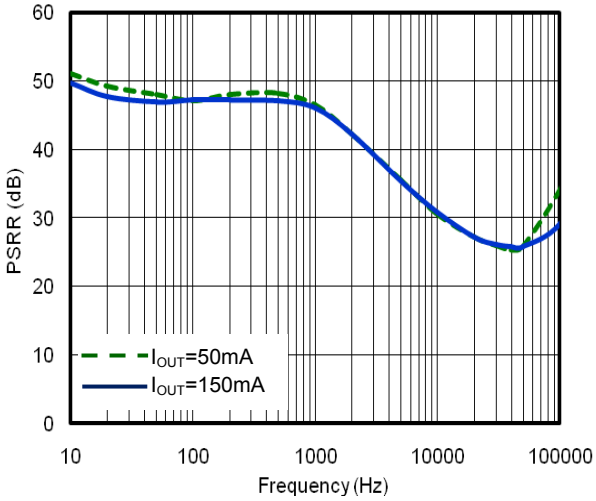
Dropout Voltage vs. Output Current
V_{OUT}=1.8V



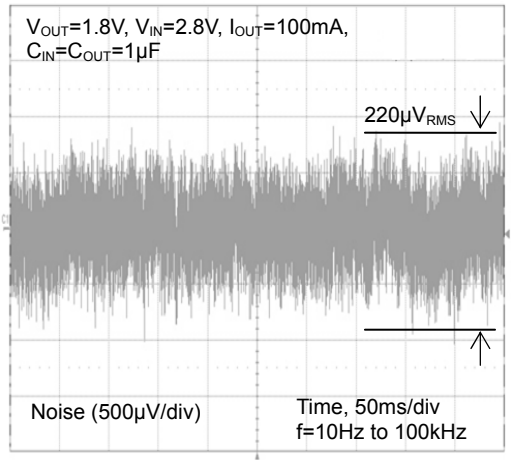
Enable Logic Threshold vs. Supply Voltage



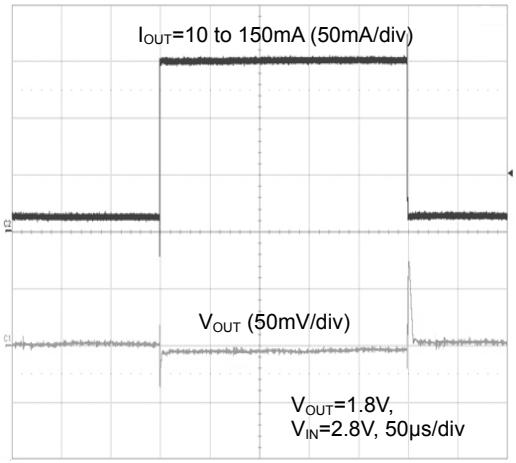
PSRR vs. Frequency



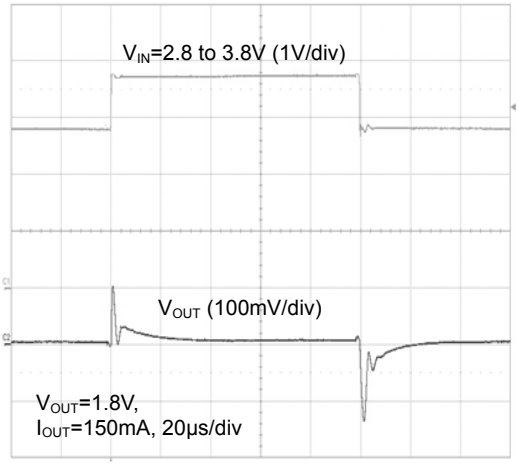
Noise



Load Transient Response

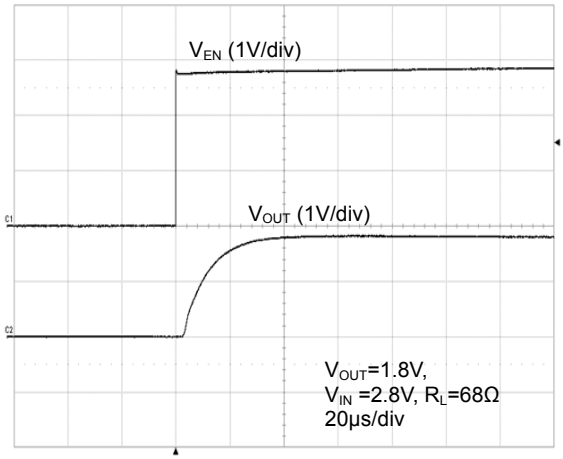


Line Transient Response

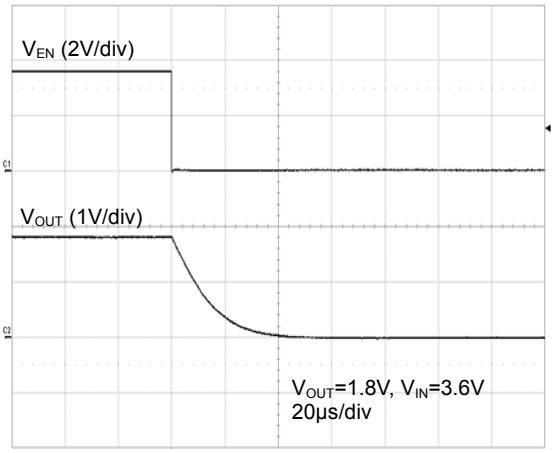


Typical Performance Characteristics (Continued)

Enable Turn-On



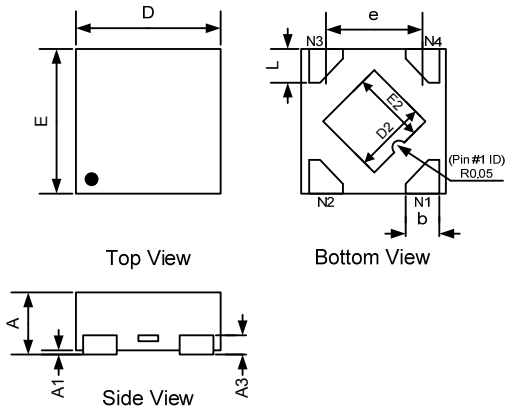
Auto Discharge (No Load)



Package Information

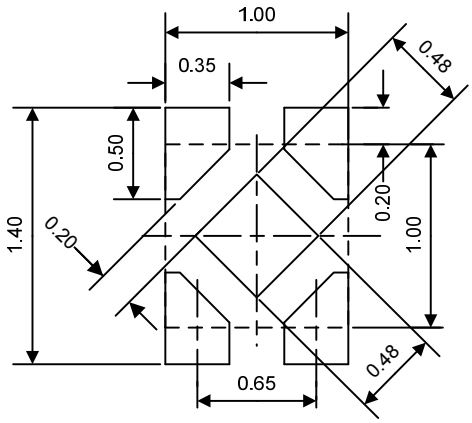
UM3730DA-xx DFN4 1.0×1.0

Outline Drawing



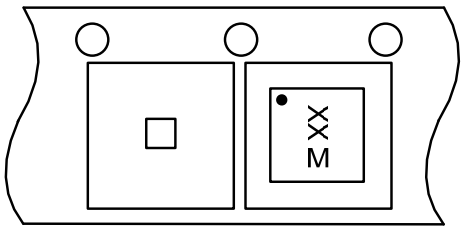
DIMENSIONS						
Symbol	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	0.32	-	0.40	0.013	-	0.016
A1	0.00	0.02	0.05	0.000	0.0008	0.002
A3	0.13REF			0.005REF		
b	0.18	-	0.30	0.007	-	0.012
D	0.95	1.00	1.05	0.037	0.039	0.041
D2	0.43	0.48	0.53	0.017	0.019	0.021
E	0.95	1.00	1.05	0.037	0.039	0.041
E2	0.43	0.48	0.53	0.017	0.019	0.021
e	0.65TYP			0.026TYP		
L	0.20	0.25	0.30	0.008	0.010	0.012

Land Pattern



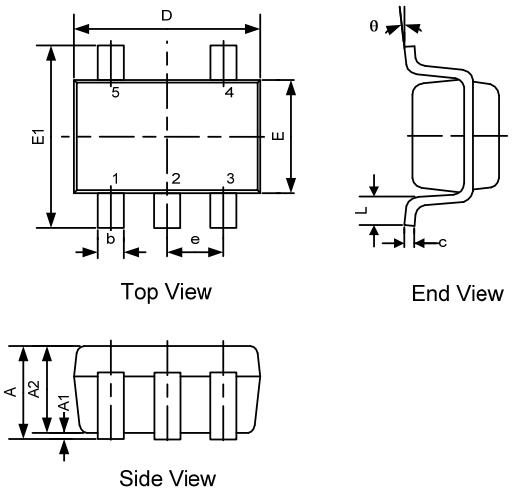
NOTES:
1. Compound dimension: 1.00×1.00;
2. Unit: mm;
3. General tolerance ±0.05mm unless otherwise specified;
4. The layout is just for reference.

Tape and Reel Orientation



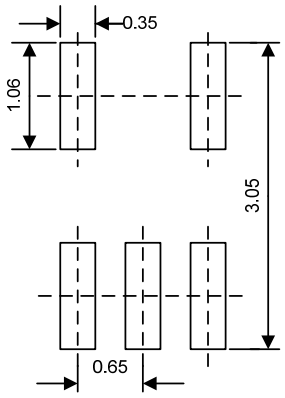
UM3730P-xx SOT353

Outline Drawing



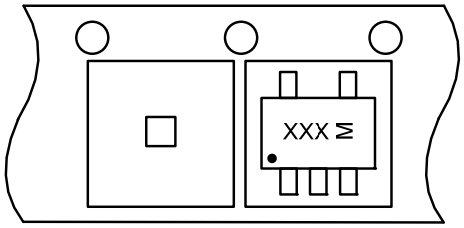
DIMENSIONS						
Symbol	MILLIMETERS			INCHES		
	Min	Typ	Max	Min	Typ	Max
A	0.85	-	1.10	0.033	-	0.043
A1	0.00	-	0.10	0.000	-	0.004
A2	0.80	-	1.00	0.031	-	0.039
b	0.10	-	0.35	0.004	-	0.014
c	0.08	-	0.22	0.003	-	0.009
D	1.80	2.15	2.20	0.071	0.085	0.087
E	1.15	1.30	1.35	0.045	0.051	0.053
E1	2.00	-	2.45	0.079	-	0.096
e	0.65BSC			0.026REF		
L	0.25	-	0.46	0.010	-	0.018
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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http://www.union-ic.com/index.aspx?cat_code=RoHSDeclaration

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