

150mA, Low Noise, Low Dropout Regulator

UM1330S-xx SOT23-5

UM1330P-xx SOT353

UM1330DA-xx DFN6 2.0 × 2.0

General Description

The UM1330 series are 150mA low dropout regulators design for portable application. A 2.7V to 5.5V input operating voltage range, making them ideal for operation from a single cell lithium ion battery or fixed 3.3V and 5V systems. With low output noise ($56\mu\text{V}_{\text{RMS}}$) and high PSRR ($-58\text{dB}@1\text{kHz}$), the UM1330 series are ideal for noise sensitive applications such as RF. While the fast transient response and active shutdown circuitry make them well-suited for powering mixed signal circuitry.

Other features include stability with ultra low ESR ceramic capacitors as small as $1\mu\text{F}$, thermal overload protection, output current limiting and auto discharge the output voltage when disabled. The UM1330 series are available in low profile SOT23-5, SOT353 and DFN6 2.0×2.0 packages.

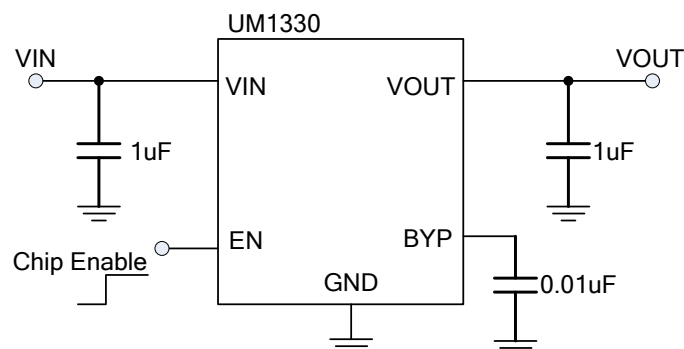
Applications

- Cellular Phones
- GPS Receivers
- Wireless Sensor Network
- Wireless LAN

Features

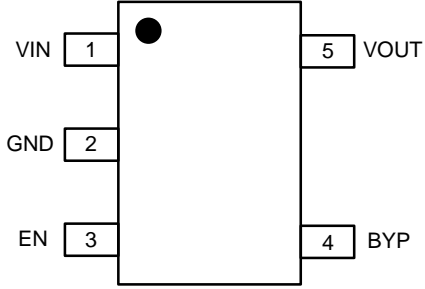
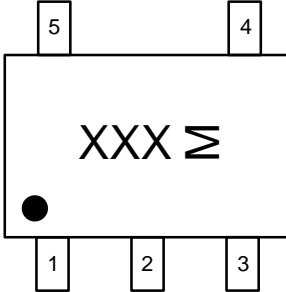
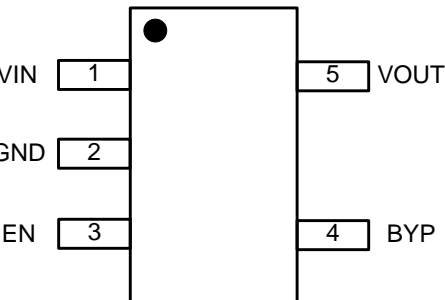
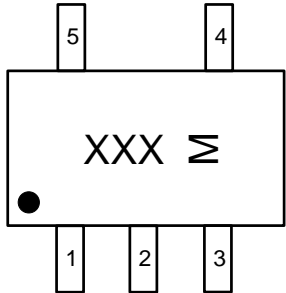
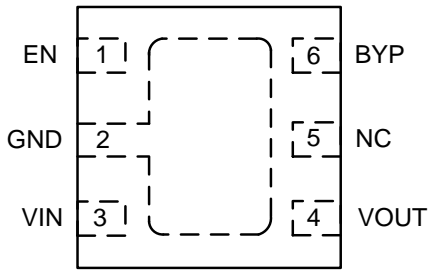
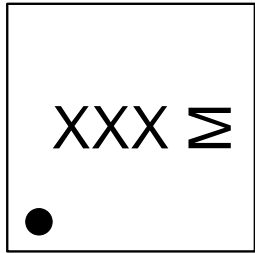
- Input voltage range: 2.7V to 5.5V
- Low dropout voltage: 170mV at 150mA
- Low quiescent current: $88\mu\text{A}$
- Low noise: $56\mu\text{V}_{\text{RMS}}$
- High PSRR: -58dB at 1kHz
- Fast transient response
- Active shutdown
- Stable with ceramic output capacitors
- Low profile SOT23-5, SOT353 and DFN6 2.0×2.0 packages

Typical Application Circuit



Pin Configurations

Top View

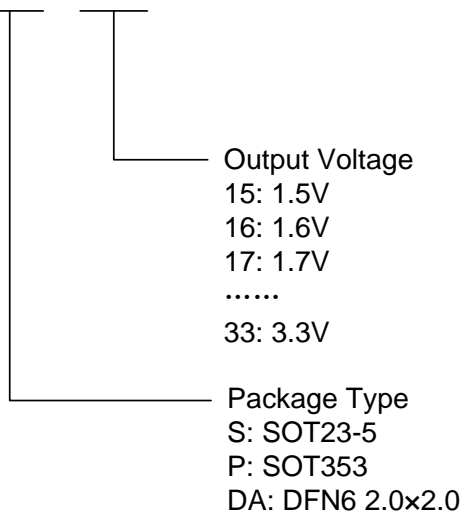
 <p>VIN 1</p> <p>GND 2</p> <p>EN 3</p> <p>5 VOUT</p> <p>4 BYP</p>	 <p>M: Month Code UM1330S-xx SOT23-5</p>
 <p>VIN 1</p> <p>GND 2</p> <p>EN 3</p> <p>5 VOUT</p> <p>4 BYP</p>	 <p>M: Month Code UM1330P-xx SOT353</p>
 <p>EN 1</p> <p>GND 2</p> <p>VIN 3</p> <p>6 BYP</p> <p>5 NC</p> <p>4 VOUT</p>	 <p>M: Month Code UM1330DA-xx DFN6 2.0×2.0</p>

Pin Description

Pin Number			Pin Name	Pin Function
UM1330S-xx	UM1330P-xx	UM1330DA-xx		
1	1	3	VIN	Supply Input
2	2	2	GND	Ground
3	3	1	EN	Enable/Shutdown (Input): CMOS compatible input. Logic high = enable; logic low = shutdown. Do not leave it open.
4	4	6	BYP	Reference Bypass: Connect external $0.01\mu\text{F} \leq C_{\text{BYP}} \leq 1.0\mu\text{F}$ capacitor to GND to reduce output noise. May be left open.
5	5	4	VOUT	Output Voltage
-	-	5	NC	Not connected.

Naming Information

UM1330 -



Available Voltage Version

Part Number	Output Voltage	Packaging Type	Marking Code	Shipping Qty
UM1330S-15	1.5V	SOT23-5	5K2	3000pcs/7Inch Tape & Reel
UM1330S-16	1.6V		5K3	
UM1330S-17	1.7V		5K4	
UM1330S-18	1.8V		5K5	
UM1330S-19	1.9V		5K8	
UM1330S-20	2.0V		5K9	
UM1330S-21	2.1V		5KB	
UM1330S-22	2.2V		5KC	
UM1330S-23	2.3V		5KD	
UM1330S-24	2.4V		5KE	
UM1330S-25	2.5V		5KF	
UM1330S-26	2.6V		5KH	
UM1330S-27	2.7V		5KL	
UM1330S-28	2.8V		5KM	
UM1330S-29	2.9V		5KJ	
UM1330S-30	3.0V		5KK	
UM1330S-31	3.1V		5KN	
UM1330S-32	3.2V		5KP	
UM1330S-33	3.3V		5KQ	
UM1330P-15	1.5V		SOT353	
UM1330P-16	1.6V	UN6		
UM1330P-17	1.7V	UN7		
UM1330P-18	1.8V	UN8		
UM1330P-19	1.9V	UN9		
UM1330P-20	2.0V	UNA		
UM1330P-21	2.1V	UNC		
UM1330P-22	2.2V	UP2		
UM1330P-23	2.3V	UP3		
UM1330P-24	2.4V	UP4		
UM1330P-25	2.5V	UP5		
UM1330P-26	2.6V	UP6		
UM1330P-27	2.7V	UP7		
UM1330P-28	2.8V	UP8		
UM1330P-29	2.9V	UP9		
UM1330P-30	3.0V	UPA		
UM1330P-31	3.1V	UPB		
UM1330P-32	3.2V	UPC		
UM1330P-33	3.3V	UPD		

Available Voltage Version (Continued)

Part Number	Output Voltage	Packaging Type	Marking Code	Shipping Qty
UM1330DA-15	1.5V	DFN6 2.0×2.0	AA5	3000pcs/7Inch Tape & Reel
UM1330DA-16	1.6V		AA6	
UM1330DA-17	1.7V		AA7	
UM1330DA-18	1.8V		AA8	
UM1330DA-19	1.9V		AA9	
UM1330DA-20	2.0V		AAA	
UM1330DA-21	2.1V		AAB	
UM1330DA-22	2.2V		AF2	
UM1330DA-23	2.3V		AF3	
UM1330DA-24	2.4V		AF4	
UM1330DA-25	2.5V		AF5	
UM1330DA-26	2.6V		AF6	
UM1330DA-27	2.7V		AF7	
UM1330DA-28	2.8V		AF8	
UM1330DA-29	2.9V		AF9	
UM1330DA-30	3.0V		AFA	
UM1330DA-31	3.1V		AFB	
UM1330DA-32	3.2V		AFC	
UM1330DA-33	3.3V		AFD	

Absolute Maximum Ratings (Note 1)

Symbol	Parameter	Value	Unit
V _{IN}	Supply Voltage on VIN Pin	-0.3 to +7	V
V _{EN}	Voltage on EN Pin	-0.3 to +7	V
P _D	Power Dissipation	Internally Limited (Note 2)	
T _J	Operating Junction Temperature	-40 to +125	°C
T _{STG}	Storage Temperature Range	-55 to +150	°C
T _L	Lead Temperature for Soldering 10 seconds	+260	°C
ESD	ESD Rating (Note 3)	±2	kV

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

Note 2: The maximum allowable power dissipation of any T_A (ambient temperature) is P_{D(max)} = (T_{J(max)} - T_A) / θ_{JA}. Exceeding the maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into thermal shutdown. The θ_{JA} of the UM1330S-xx, UM1330P-xx and UM1330DA-xx are 235 °C/W, 256 °C/W and 142 °C/W respectively.

Note 3: Devices are ESD sensitive. Handling precautions recommended. Human body model, 1.5k in series with 100pF.

Recommended Operating Conditions (Note 4)

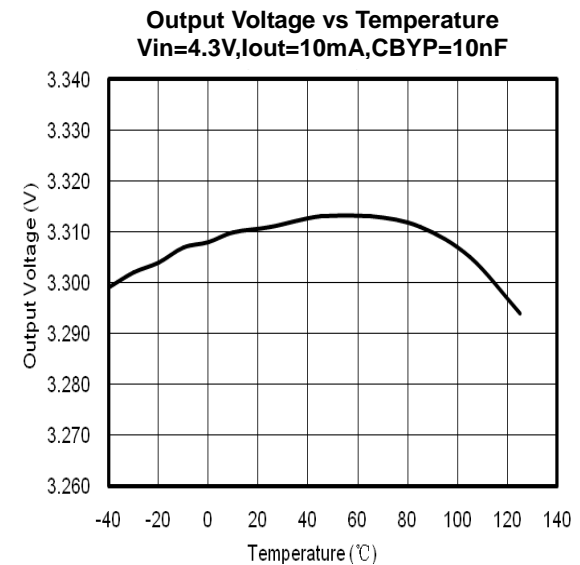
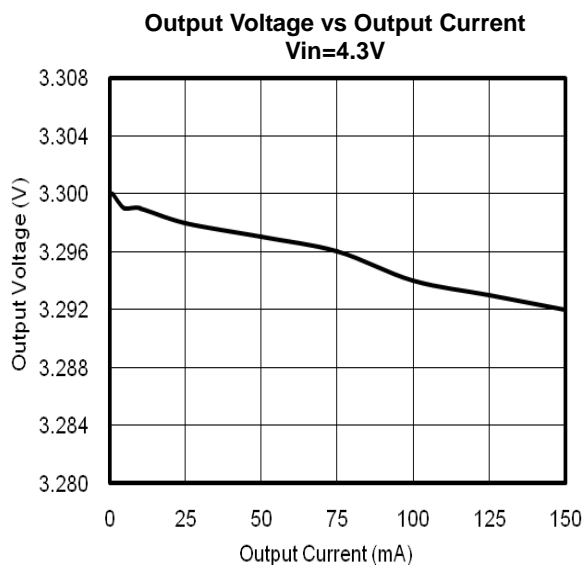
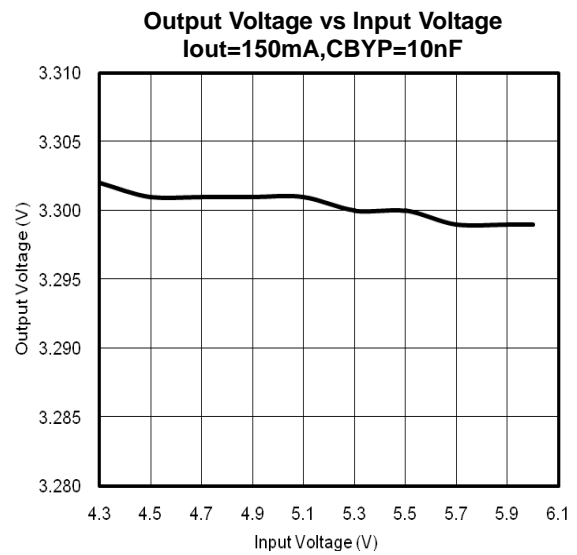
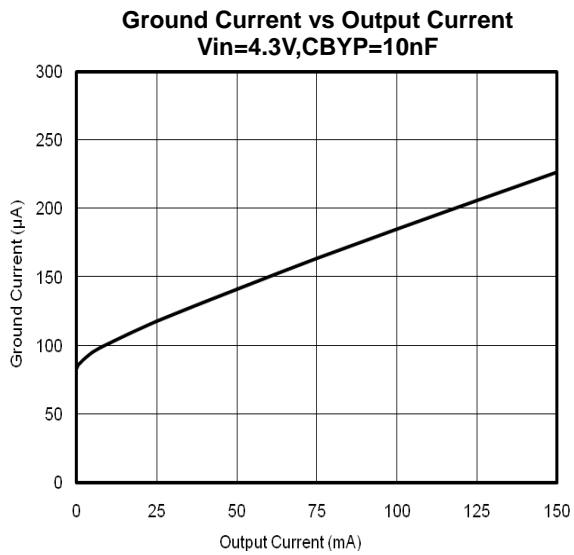
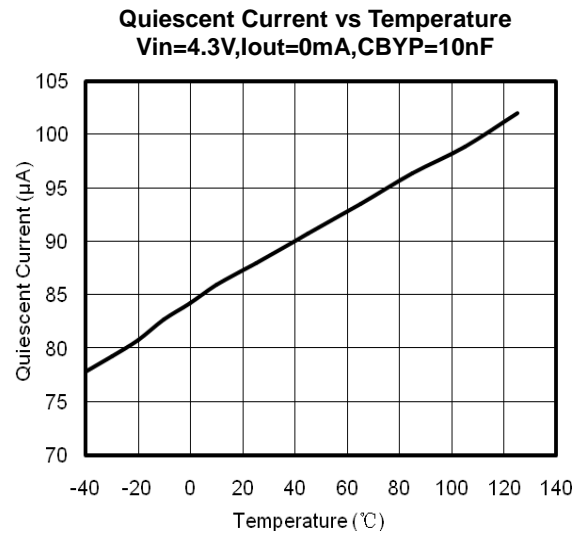
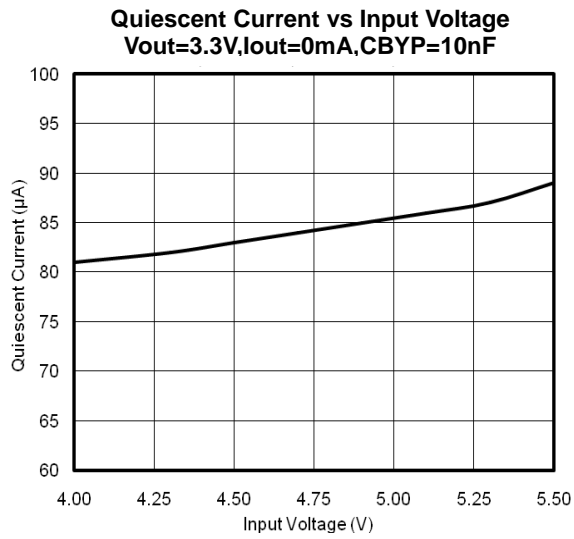
Symbol	Parameter	Value	Unit
V _{IN}	Supply Voltage on VIN Pin	+2.7 to +5.5	V
V _{EN}	Voltage on EN Pin	-0.3 to +V _{IN}	V
T _A	Ambient Temperature	-40 to +85	°C
θ _{JA}	Junction Thermal Resistance	SOT23-5	+235
		SOT353	+256
		DFN6 2.0×2.0	+142

Note 4: The device is not guaranteed to function outside its operating rating.

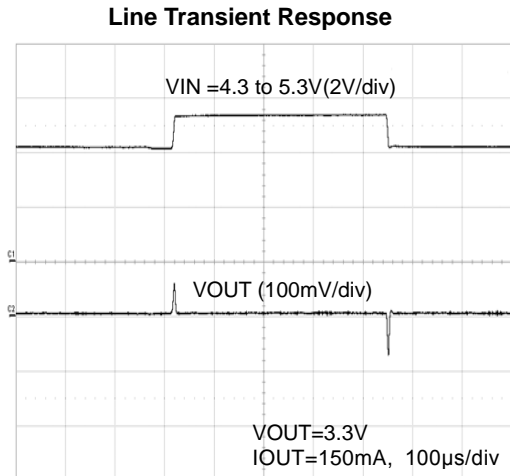
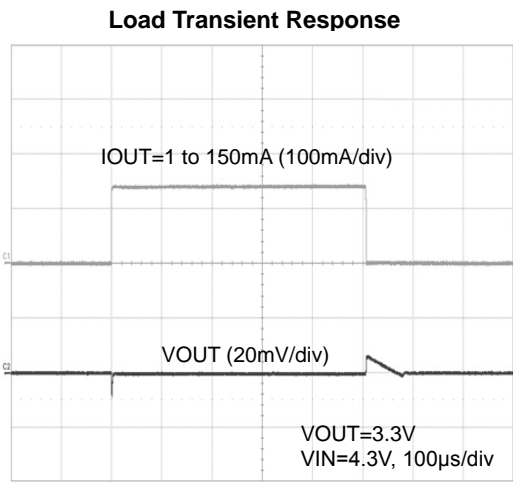
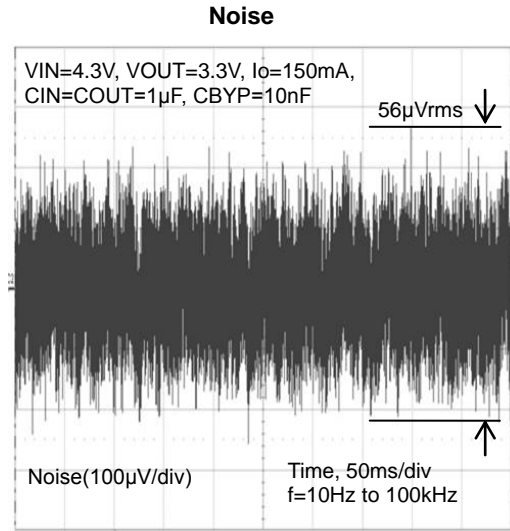
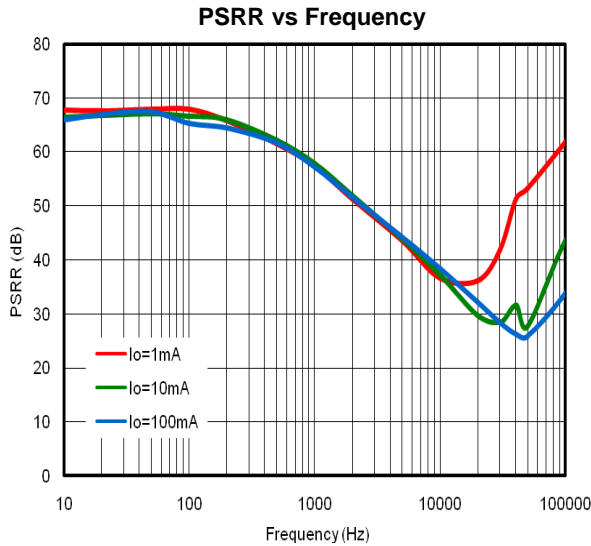
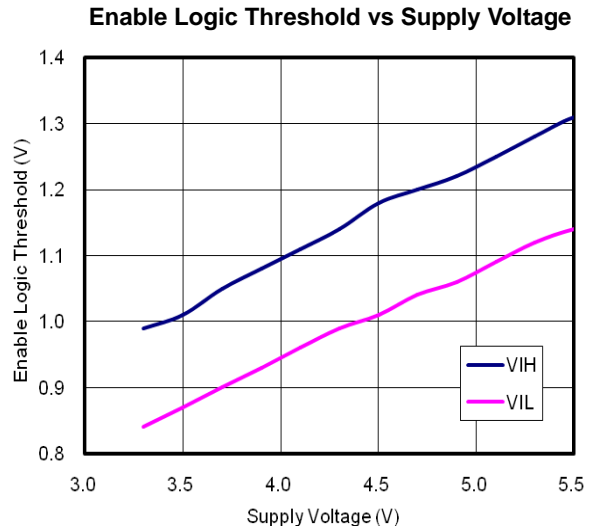
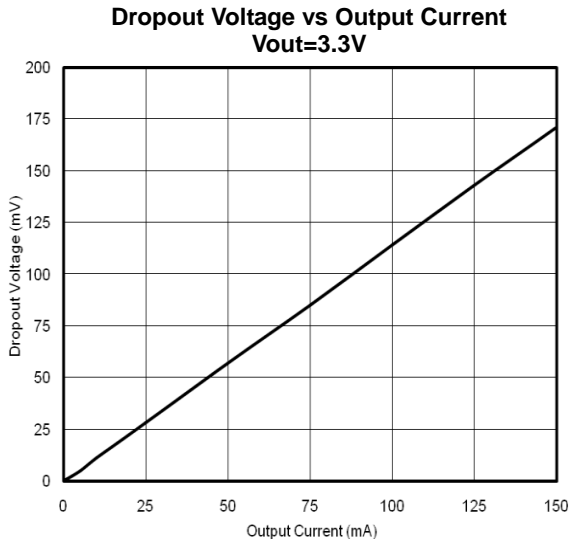
Electrical Characteristics
 $V_{EN} = V_{IN} = V_{OUT} + 1V$; $I_L = 100\mu A$; $C_L = 1.0\mu F$; $C_{BYP} = 0.01\mu F$ per output; $T_A = 25\text{ }^\circ\text{C}$, unless noted.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage		2.7		5.5	V
UVLO	Under Voltage Lock		1.4		2.5	V
V_{OUT}	Output Voltage		1.5		3.3	V
I_{OUT}	Output Current			150		mA
I_{SHDN}	Shutdown Current	$V_{EN} < 0.2V$		0.2	1	μA
	Ground Pin Current	$V_{IN}=4.3V, I_{OUT}=0mA$		88	103	μA
		$V_{IN}=4.3V, I_{OUT}=150mA$		230	320	
ΔV_{DO}	Dropout Voltage	$I_{OUT}=50mA$		55		mV
		$I_{OUT}=150mA$		170	220	
I_{LIMIT}	Output Current Limit	$V_{OUT}=0V$	200	250	350	mA
	Output Voltage Accuracy	$I_{OUT}=100\mu A, T_A=25\text{ }^\circ\text{C}$	-2.0		+2.0	%
		$I_{OUT}=100\mu A, -40\text{ }^\circ\text{C} < T_A < +85\text{ }^\circ\text{C}$	-3.0		+3.0	
LNR	Line Regulation	$V_{IN}=V_{OUT}+1V$ to 5.5V		0.05	0.4	%/V
LDR	Load Regulation	$I_{OUT}=0.1mA$ to 150mA		0.2	1	%
	Output Voltage Noise	$C_{OUT}=1.0\mu F, C_{BYP}=0.1\mu F, f=10Hz$ to 100kHz		56		μV_{RMS}
PSRR	Power Supply Ripple Rejection	$C_{BYP}=0.1\mu F, I_{LOAD}=50mA$	$f=100Hz$		67	dB
			$f=1kHz$		58	
			$f=10kHz$		37	
Enable Input						
V_{IL}	Enable Input Voltage Logic Low	$V_{IN}=2.7V$ to 5.5V, regulator shutdown			0.2	V
V_{IH}	Enable Input Voltage Logic High	$V_{IN}=2.7V$ to 5.5V, regulator enabled	1.4			
I_{EN}	Enable Input Current	$V_{IL} < 0.4V$, regulator shutdown		0.01	1	μA
		$V_{IH} > 1.6V$, regulator enabled		0.01	1	
Thermal Shutdown						
T_{SHDN}	Thermal Shutdown Temperature			155		$^\circ\text{C}$
ΔT_{SHDN}	Thermal-Shutdown Hysteresis			15		$^\circ\text{C}$
Turn-on/Turn-off Characteristics						
	Turn-on Time			30		μs
	Discharge Resistance			500		Ω

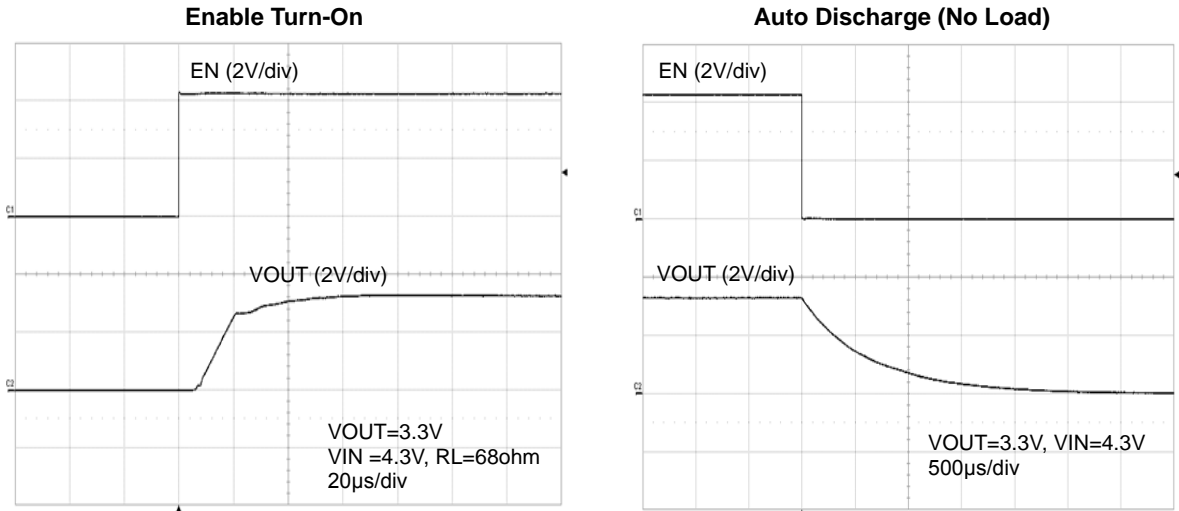
Typical Performance Characteristics



Typical Performance Characteristics (Continued)



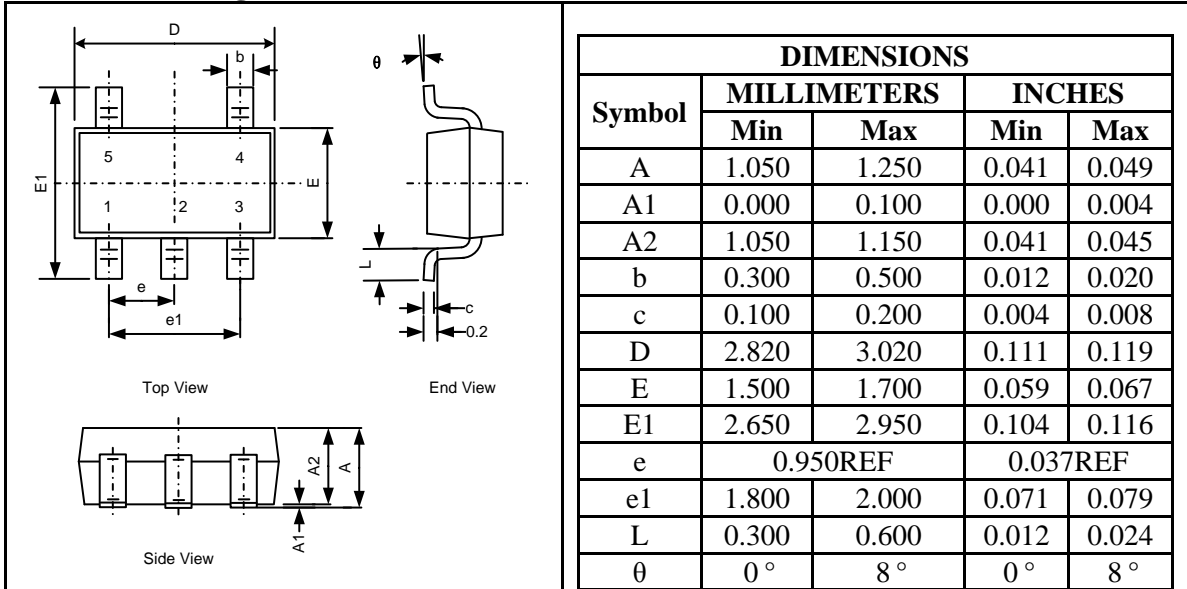
Typical Performance Characteristics (Continued)



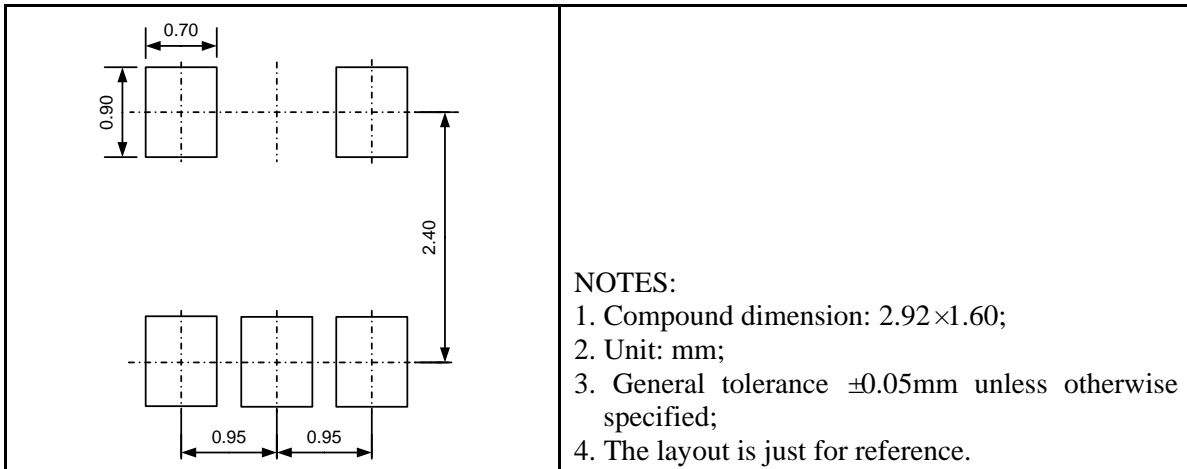
Package Information

UM1330S-xx SOT23-5

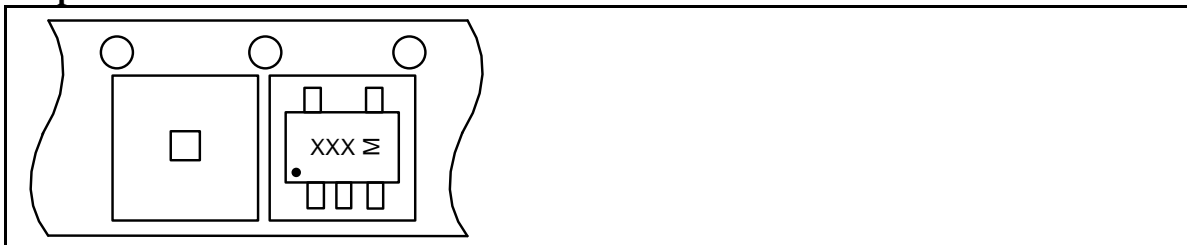
Outline Drawing



Land Pattern

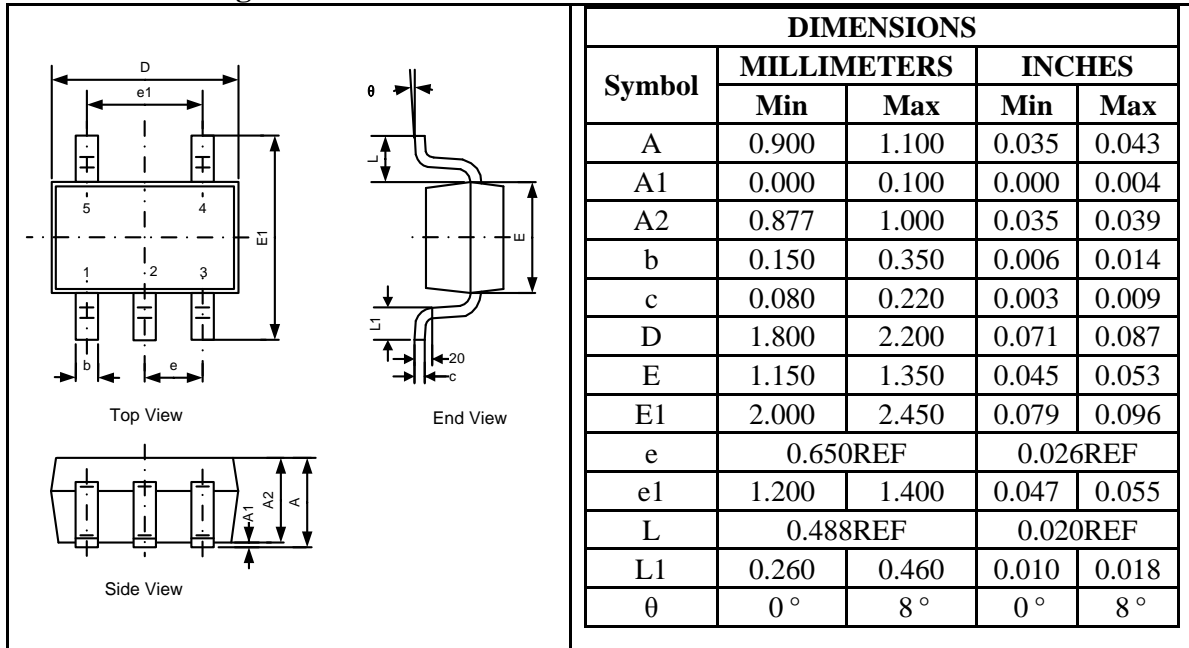


Tape and Reel Orientation

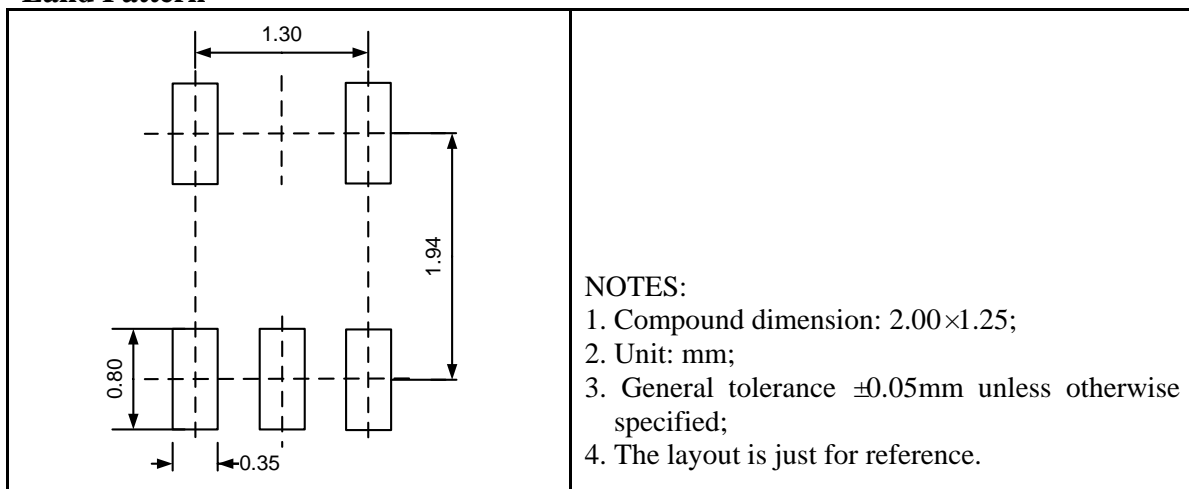


UM1330P-xx SOT353

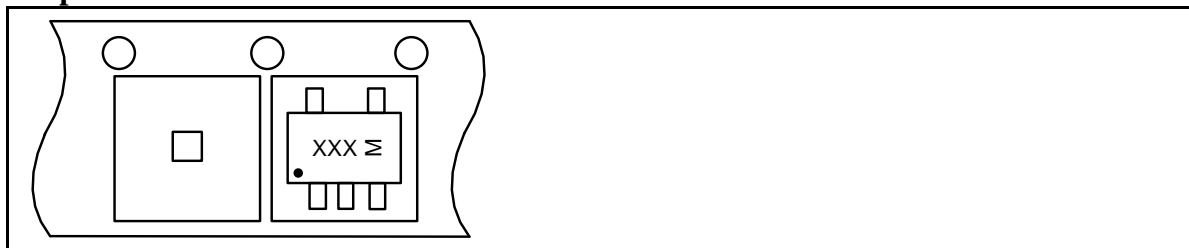
Outline Drawing



Land Pattern

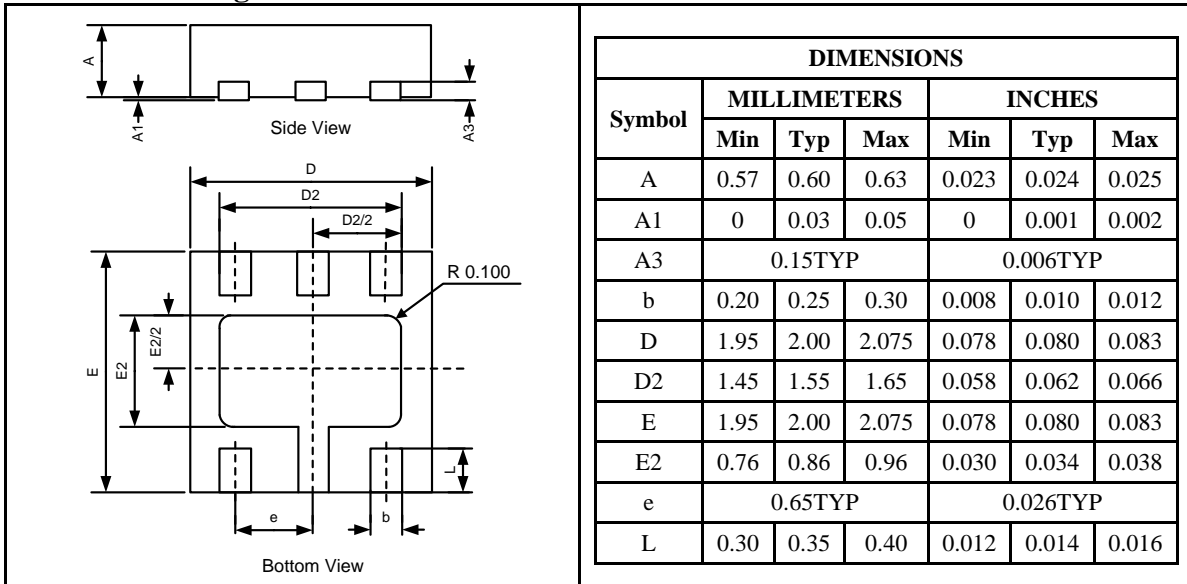


Tape and Reel Orientation

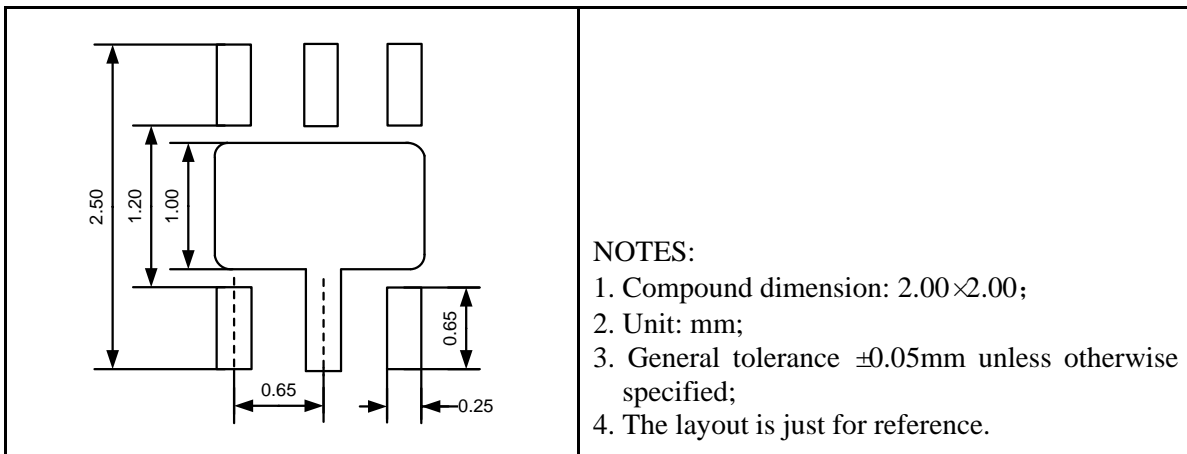


UM1330DA-xx DFN6 2.0×2.0

Outline Drawing



Land Pattern



Tape and Reel Orientation



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Union Semiconductor, Inc

Add: 2F, No. 3, Lane 647 Songtao Road, Shanghai 201203

Tel: 021-51093966

Fax: 021-51026018

Website: www.union-ic.com