

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.

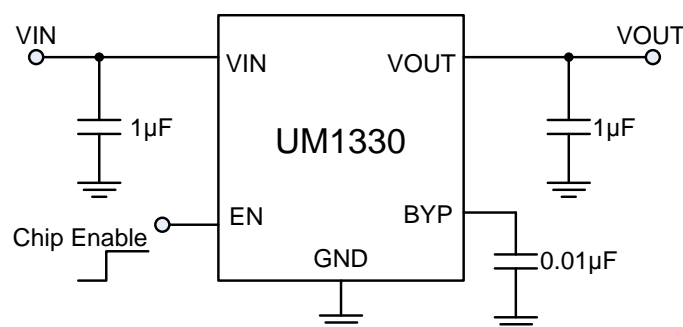
Applications

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

Features

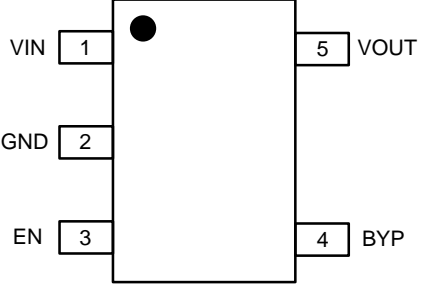
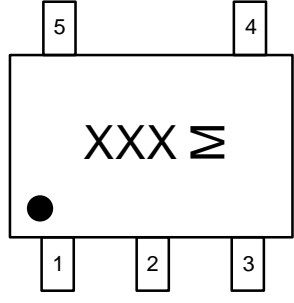
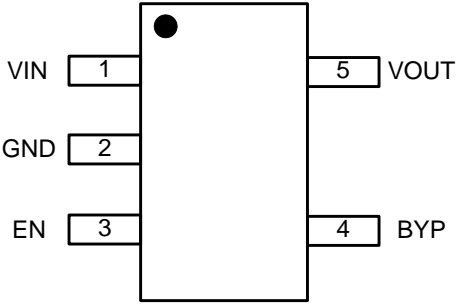
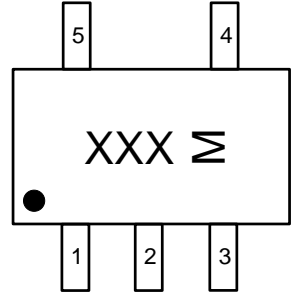
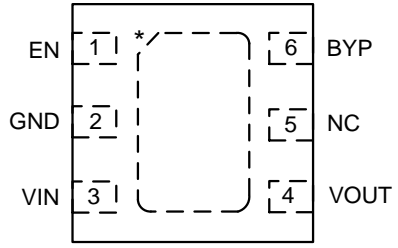
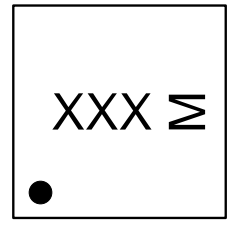
- Input Voltage Range: 2.7V to 5.5V
- Low Dropout Voltage:
170mV at 150mA
- Low Quiescent Current: $88\mu\text{A}$
- Low Noise: $56\mu\text{V}_{\text{RMS}}$
- High PSRR: -58dB at 1kHz
- Fast Transient Response
- Active Shutdown
- Stable with Ceramic Output Capacitors
- Low Profile SOT23-5, SOT353 and DFN6
2.0×2.0 Packages

Typical Application Circuit



Pin Configurations

Top View

	 <p>M: Month Code UM1330S-xx SOT23-5</p>
	 <p>M: Month Code UM1330P-xx SOT353</p>
 <p>(Top View)</p>	 <p>M: Month Code UM1330DA-xx DFN6 2.0x2.0</p>

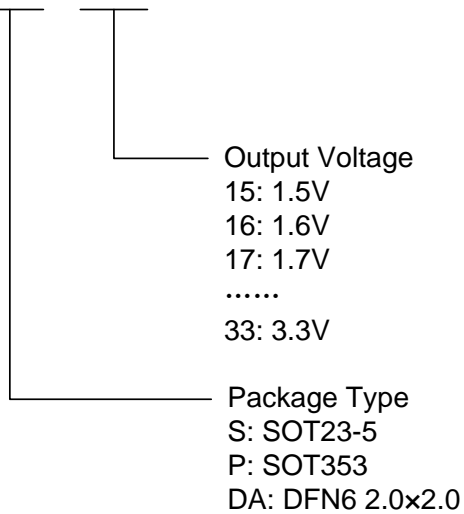
* The tab on the bottom of the package enhances thermal performance and is electrically connected to GND (substrate level). It is recommended that the tab be connected to the ground plane on the board. If not, the tab can be left open.

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

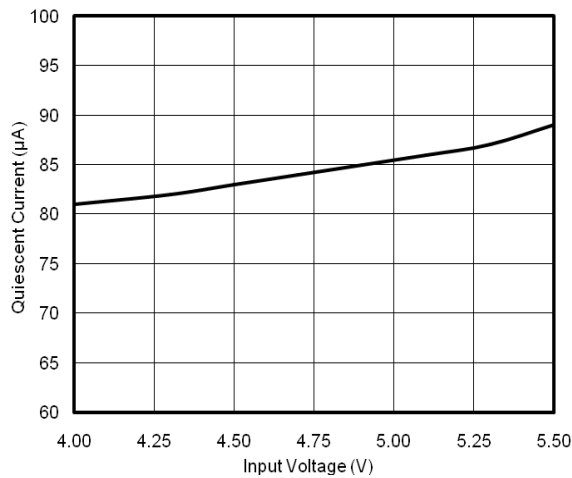
Note 4: The device is not guaranteed to function outside its operating rating.

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; $T_A=25^\circ C$, unless noted.

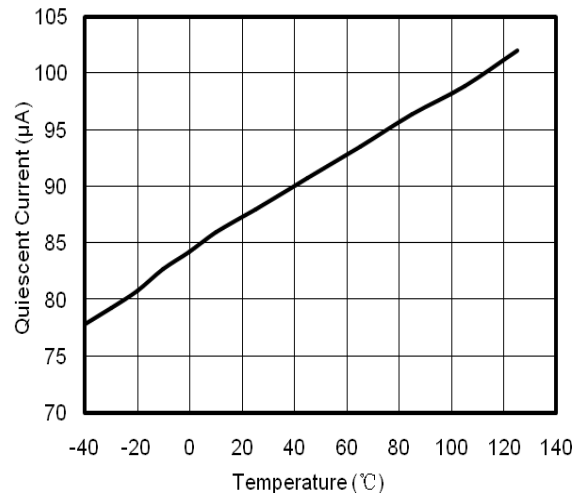
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage		2.7		5.5	V
UVLO	Under Voltage Lock		1.4		2.5	V
V_{OUT}	Output Voltage		1.5		3.3	V
I_{OUT}	Output Current			150		mA
I_{SHDN}	Shutdown Current	$V_{EN}<0.2V$		0.2	1	μA
	Ground Pin Current	$V_{IN}=4.3V, I_{OUT}=0mA$		88	103	μA
		$V_{IN}=4.3V, I_{OUT}=150mA$		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	$I_{OUT}=100\mu A, T_A=25^\circ C$	-2.0		+2.0	%
		$I_{OUT}=100\mu A, -40^\circ C<T_A<+85^\circ C$	-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		$^\circ C$
ΔT_{SHDN}	Thermal-Shutdown Hysteresis			15		$^\circ C$
Turn-on/Turn-off Characteristics						
	Turn-on Time			30		μs
	Discharge Resistance			500		Ω

Typical Performance Characteristics

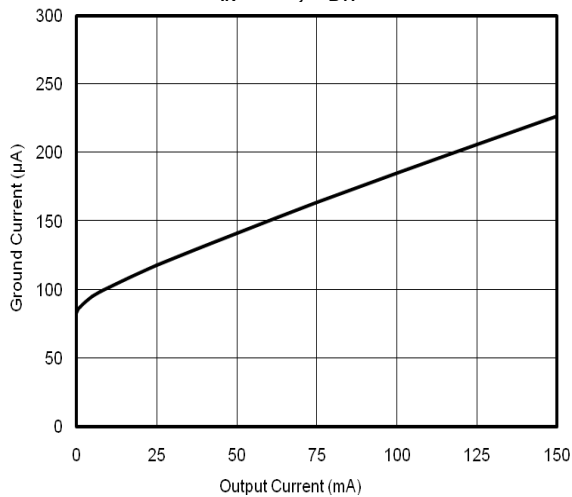
Quiescent Current vs. Input Voltage
 $V_{OUT}=3.3V, I_{OUT}=0mA, C_{BYP}=10nF$



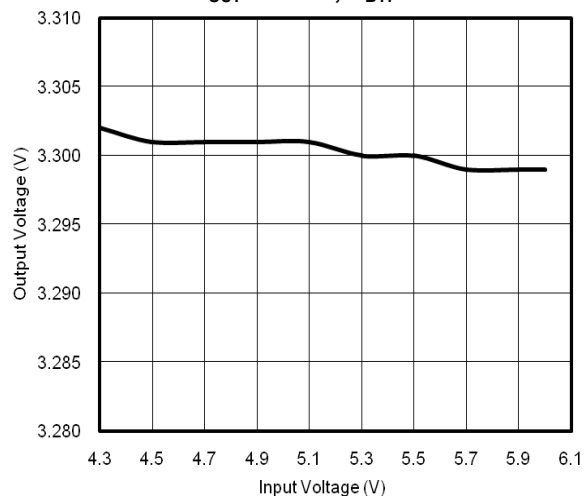
Quiescent Current vs. Temperature
 $V_{IN}=4.3V, I_{OUT}=0mA, C_{BYP}=10nF$



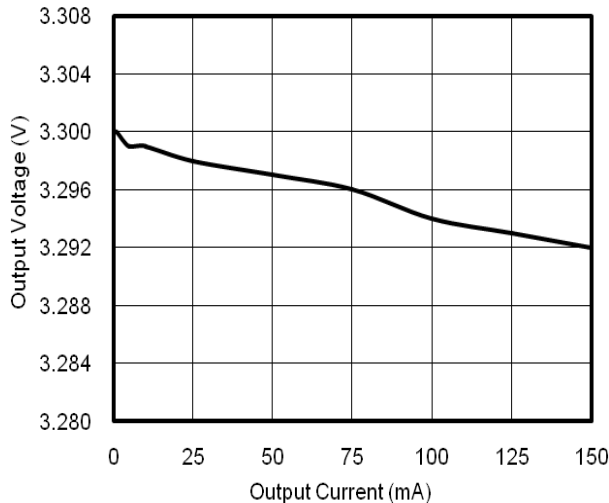
Ground Current vs. Output Current
 $V_{IN}=4.3V, C_{BYP}=10nF$



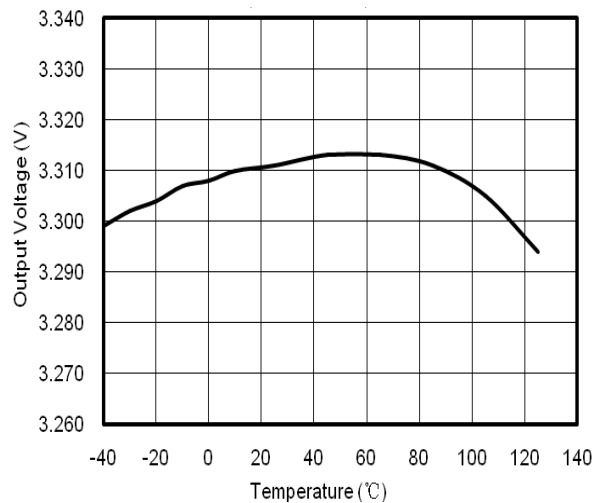
Output Voltage vs. Input Voltage
 $I_{OUT}=150mA, C_{BYP}=10nF$



Output Voltage vs. Output Current
 $V_{IN}=4.3V$

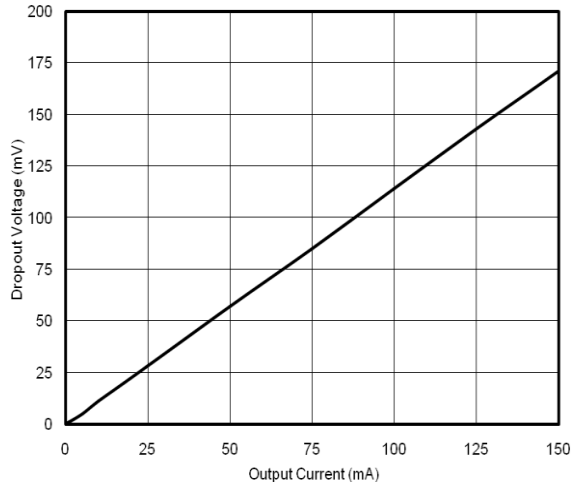


Output Voltage vs. Temperature
 $V_{IN}=4.3V, I_{OUT}=10mA, C_{BYP}=10nF$

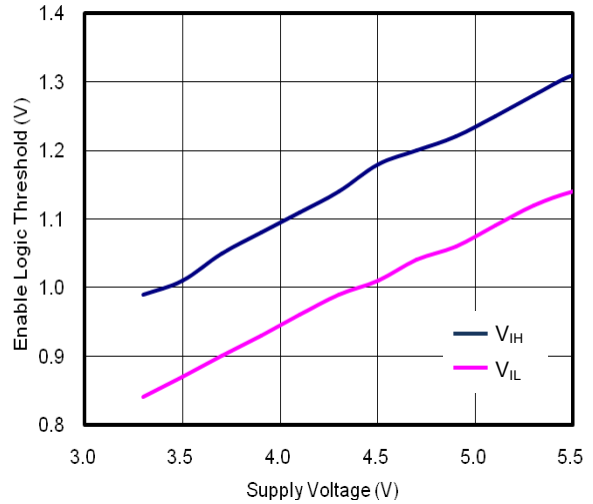


Typical Performance Characteristics (Continued)

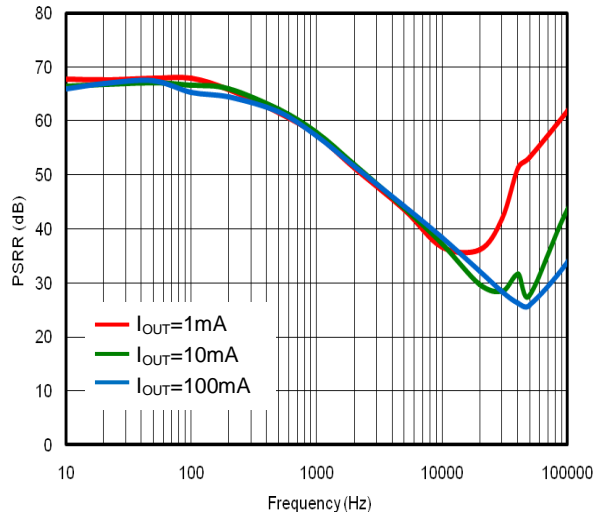
Dropout Voltage vs. Output Current
 $V_{OUT}=3.3V$



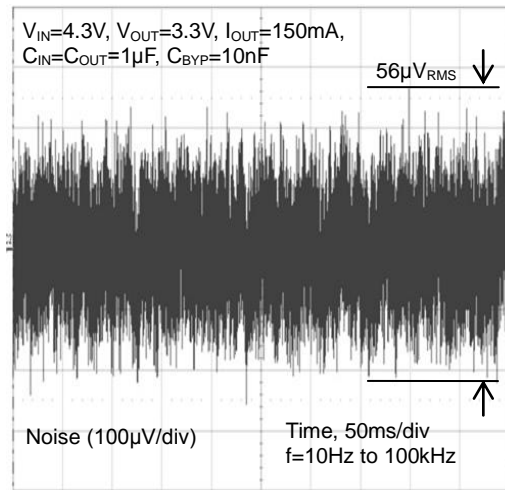
Enable Logic Threshold vs. Supply Voltage



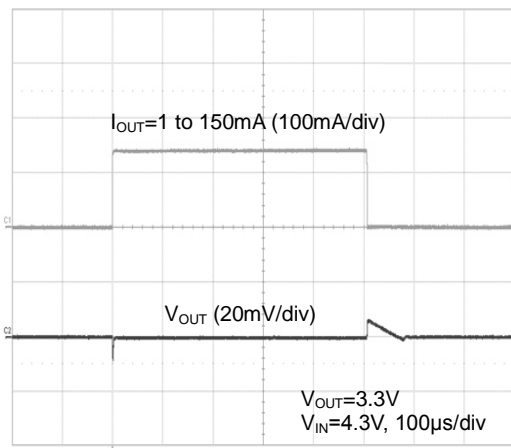
PSRR vs. Frequency



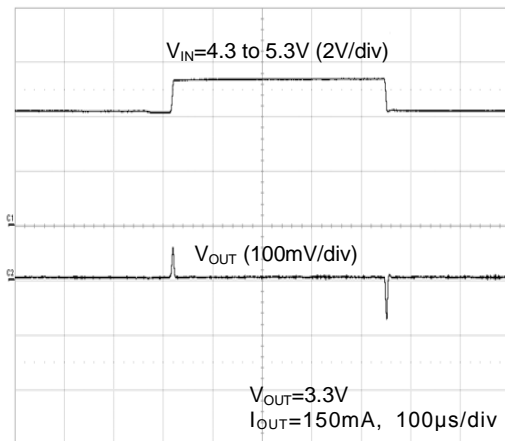
Noise



Load Transient Response

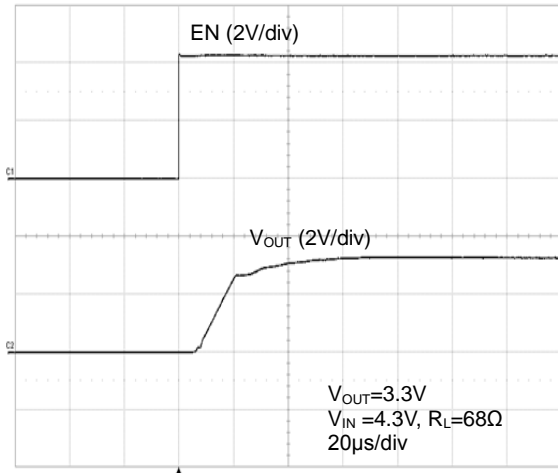


Line Transient Response

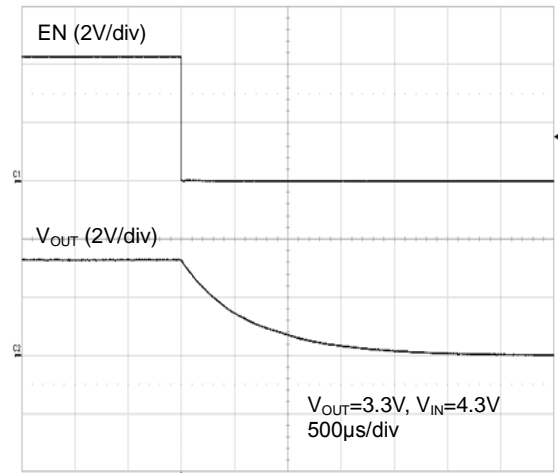


Typical Performance Characteristics (Continued)

Enable Turn-On



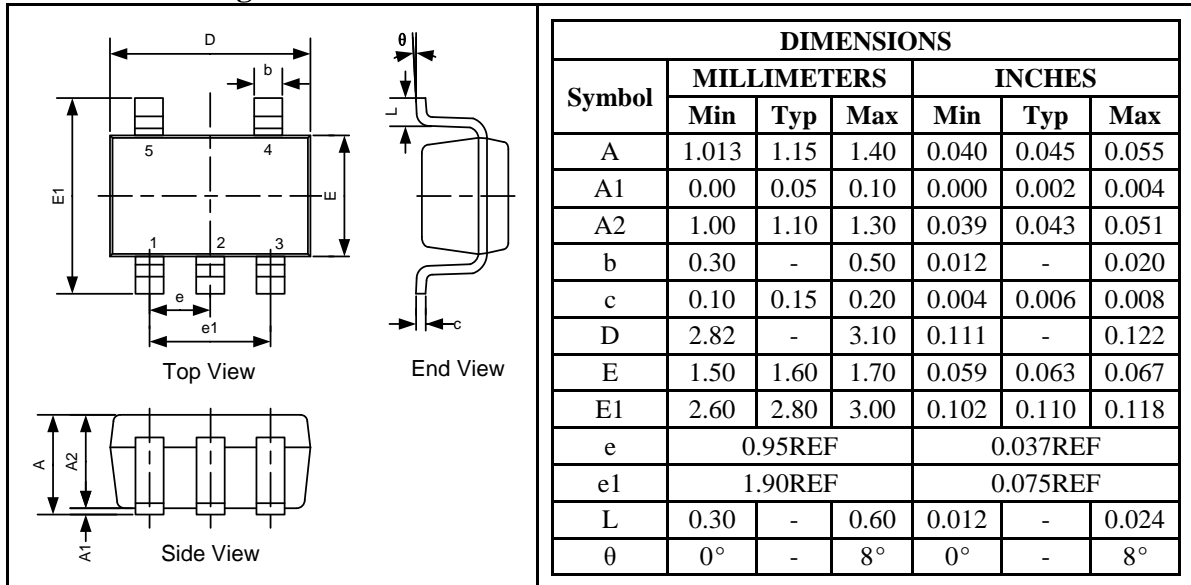
Auto Discharge (No Load)



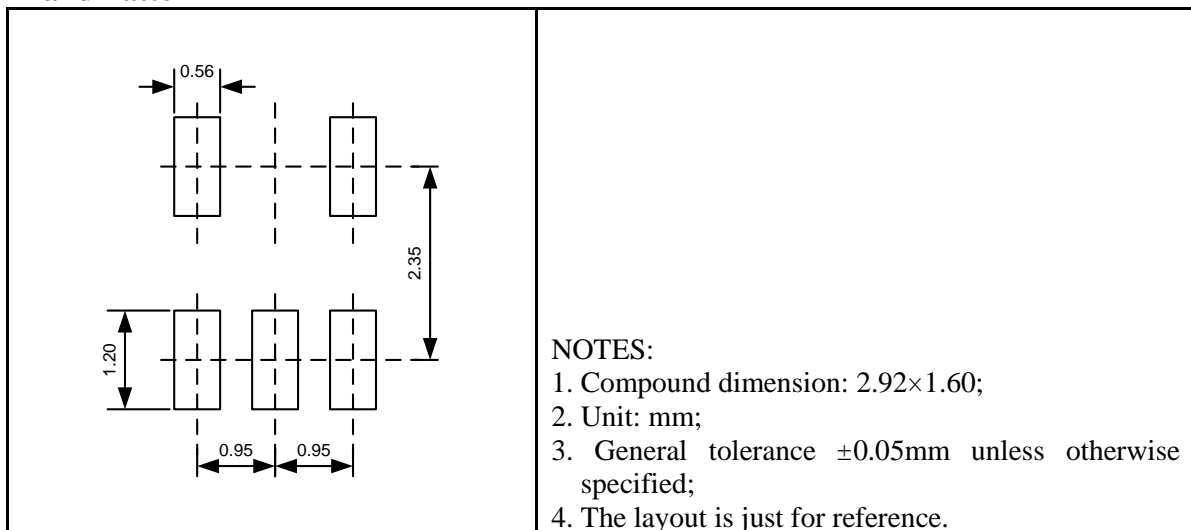
Package Information

UM1330S-xx SOT23-5

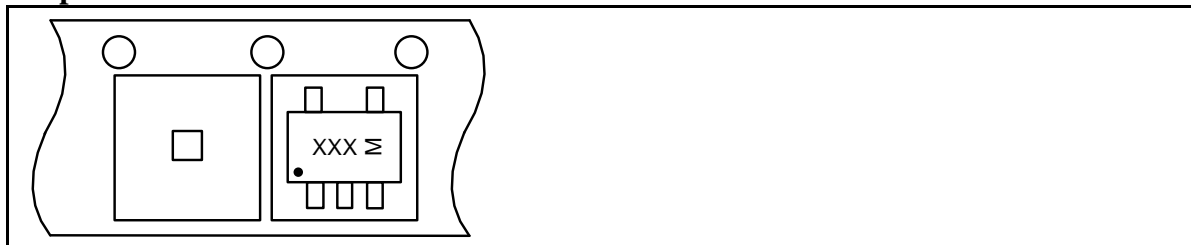
Outline Drawing



Land Pattern

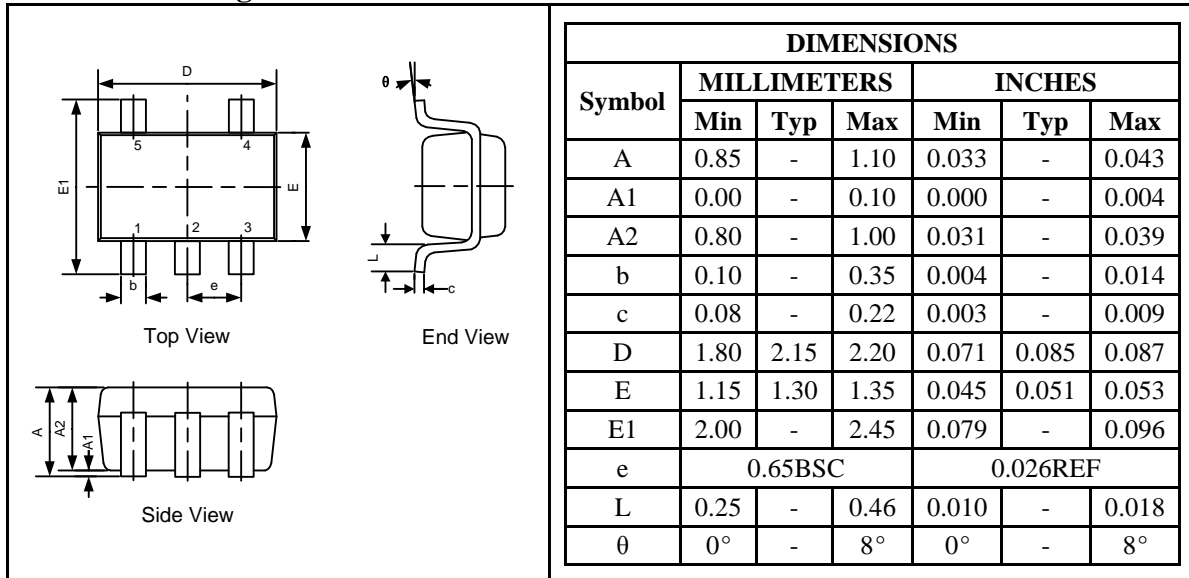


Tape and Reel Orientation

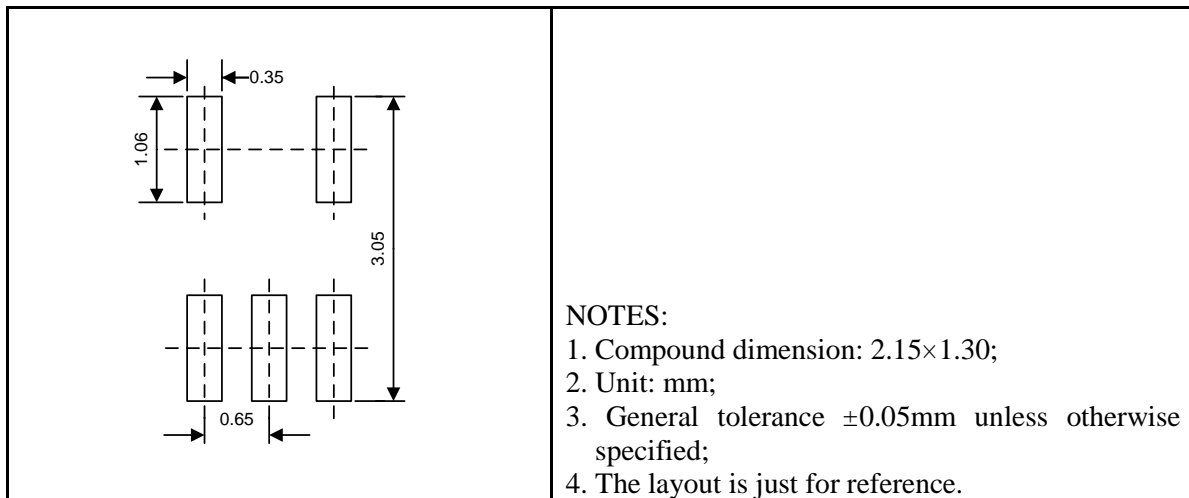


UM1330P-xx SOT353

Outline Drawing



Land Pattern

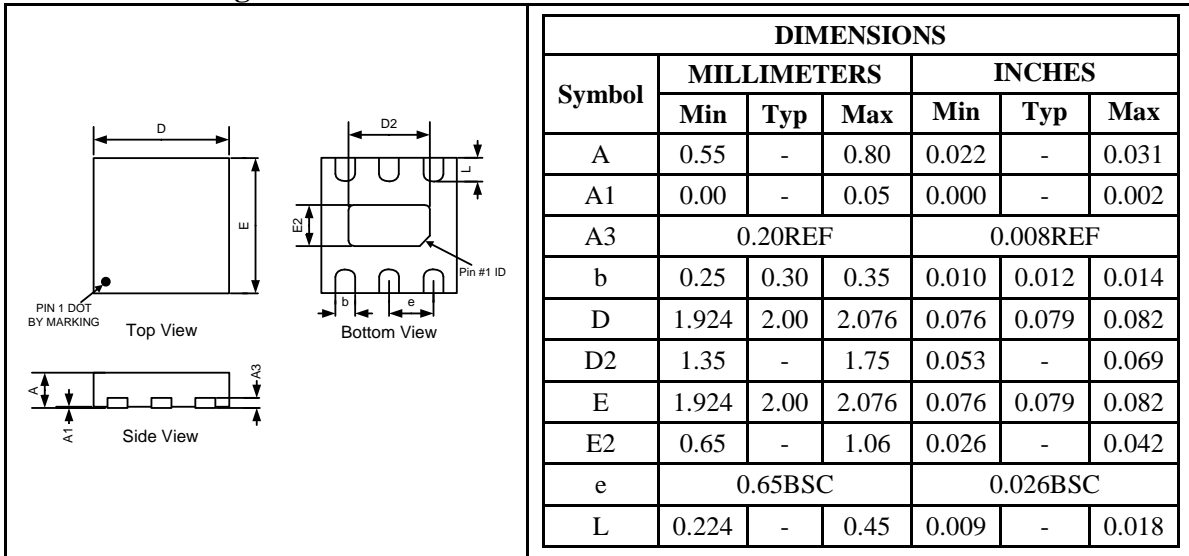


Tape and Reel Orientation

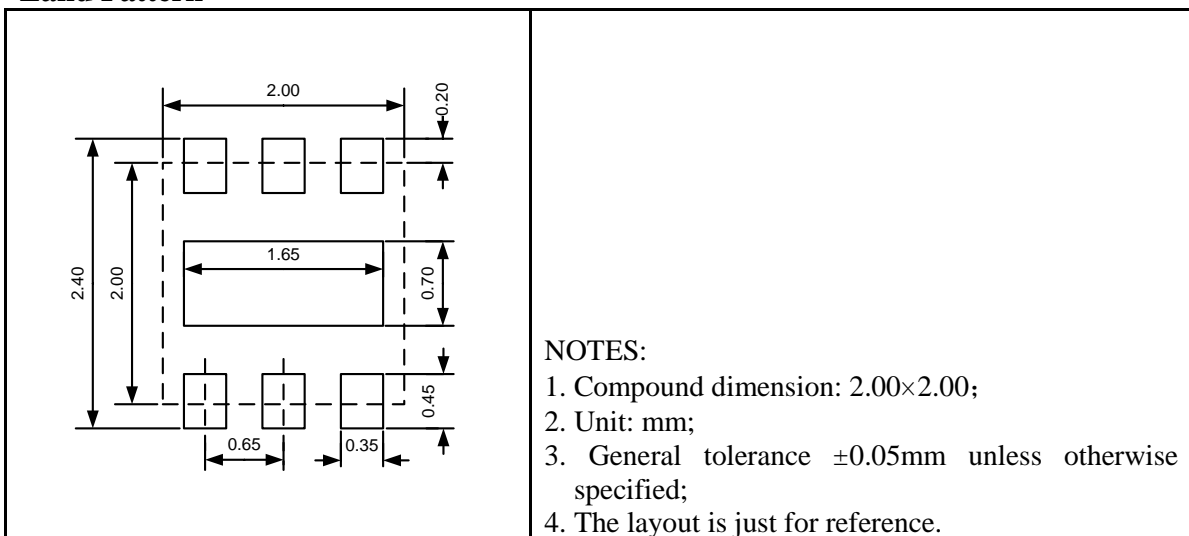


UM1330DA-xx DFN6 2.0x2.0

Outline Drawing



Land Pattern



Tape and Reel Orientation



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