

8V Input, Low Quiescent Current Linear Regulator

UM1550S SOT23-3

UM1550Y SOT89-3

UM1550B SOT89-3

UM1550DA DFN6 2.0×2.0

UM1550DB DFN4 1.0×1.0

UM1560S SOT23-5

UM1560DA DFN6 2.0×2.0

UM1560DB DFN4 1.0×1.0

General Description

The UM1550/1560 series is a set of high input voltage low quiescent current regulator implemented in CMOS technology. They can deliver 250mA output current and allow an input voltage as high as 8V. They are available with several fixed output voltages ranging from 1.2V to 5.0V. CMOS technology ensures low voltage drop and low quiescent current.

The UM1550 is available in SOT23-3, SOT89-3, DFN6 2.0×2.0 and DFN4 1.0×1.0 packages. The UM1560 is available in SOT23-5, DFN6 2.0×2.0 and DFN4 1.0×1.0 packages.

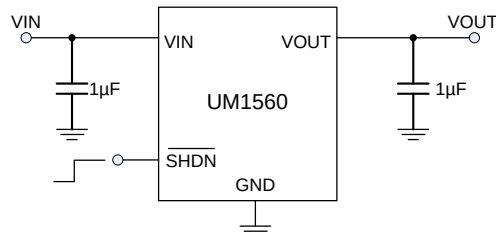
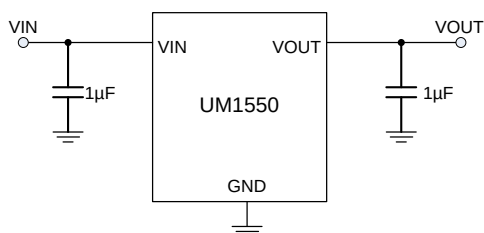
Applications

- Communication Equipments
- Audio/Video Equipments
- Portable Games
- Portable AV Equipments
- Battery-Powered Equipments

Features

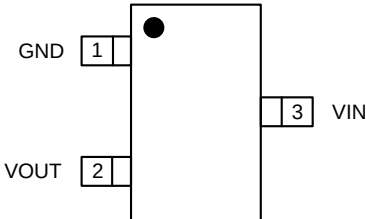
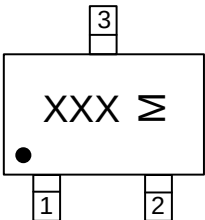
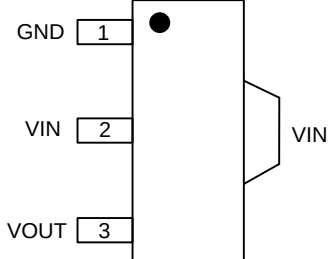
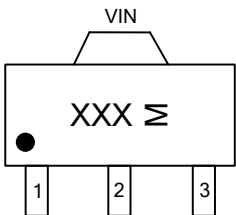
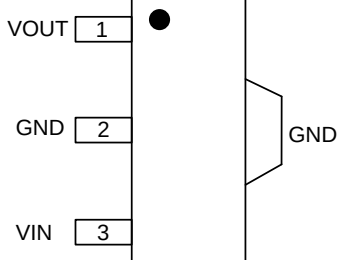
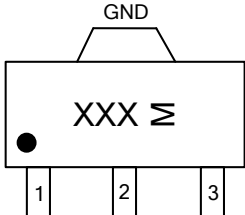
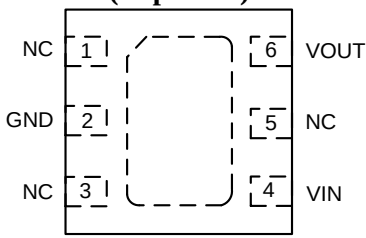
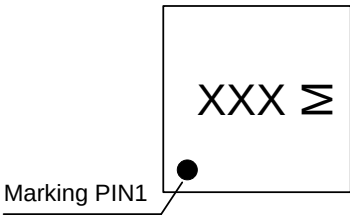
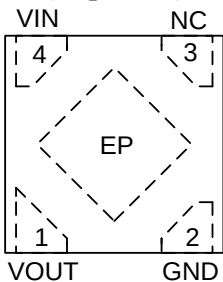
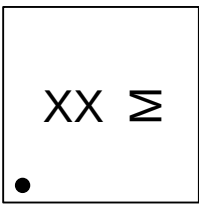
- Input Voltage Range: 1.8V to 8V
- 250mA Guaranteed Output Current
- Low Dropout Voltage:
250mV (Typical) at 200mA
- Low Quiescent Current:
2.5µA@V_{IN}=8V (Typical)
- Low Noise: 115µV_{RMS} (10Hz to 100kHz)
- Available Fixed Output Voltage from 1.2V to 5.0V with 0.1V Step
- With Shutdown Control (UM1560)
- Output Current Limit
- Low Profile SOT23-3, SOT23-5, SOT89-3, DFN6 2.0×2.0 and DFN4 1.0×1.0 Packages

Typical Application Circuits

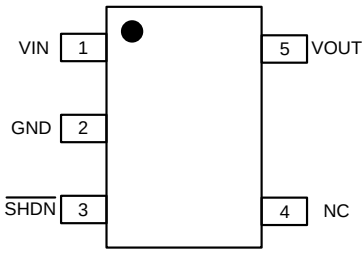
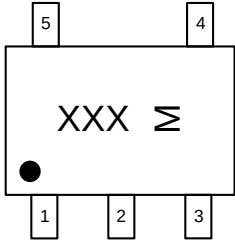
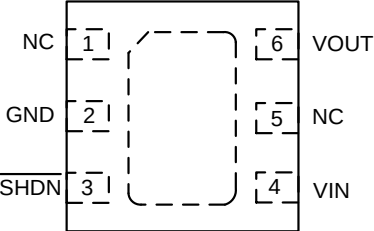
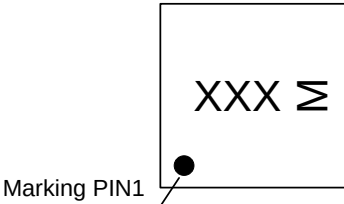
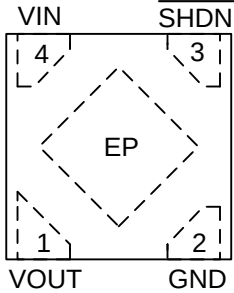
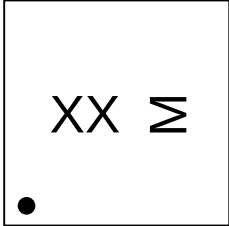


Pin Configurations

Top View

 UM1550S	 UM1550S M: Month Code SOT23-3
 UM1550Y	 UM1550Y M: Month Code SOT89-3
 UM1550B	 UM1550B M: Month Code SOT89-3
(Top View)  UM1550DA	 UM1550DA M: Month Code DFN6 2.0×2.0
(Top View)  UM1550DB	 UM1550DB M: Month Code DFN4 1.0×1.0

Pin Configurations
Top View

 UM1560S	 UM1560S M: Month Code SOT23-5
(Top View)  UM1560DA	 UM1560DA M: Month Code DFN6 2.0×2.0
(Top View)  UM1560DB	 UM1560DB M: Month Code DFN4 1.0×1.0

Pin Description

Pin Name	Pin Function
SHDN	Shutdown Control Input: High=Active LDO, Low=Shutdown LDO
GND	Ground
VIN	Supply Input
VOUT	Voltage Regulated Output
NC	Not Connected

Ordering Information

UM1550	□	□	-	□	□
UM1560	□	□	-	□	□
				Output Voltage	
				12: 1.2V	
				13: 1.3V	
					
				50: 5.0V	
				Package Type	
				S: SOT23-3, SOT23-5	
				Y: SOT89-3	
				B: SOT89-3	
				DA: DFN6 2.0×2.0	
				DB: DFN4 1.0×1.0	

Absolute Maximum Ratings (Note 1)

Symbol	Parameter		Value	Unit
V_{IN}	Supply Voltage on VIN Pin		-0.3 to +10	V
V_{OUT}	Voltage on VOUT Pin		-0.3 to +10	V
T_J	Operating Junction Temperature (Notes 2, 3)		-40 to +125	°C
T_{STG}	Storage Temperature Range		-65 to +150	°C
T_L	Lead Temperature for Soldering 10 seconds		+260	°C
P_D (Notes 4)	Power Dissipation@25 °C	SOT23-3	0.40	W
		SOT89-3	1.0	
		SOT23-5	0.43	
		DFN6 2.0×2.0	0.9	
		DFN4 1.0×1.0	0.4	
θ_{JA}	Package Thermal Resistance	SOT23-3	250	°C/W
		SOT89-5	100	
		SOT23-5	230	
		DFN6 2.0×2.0	110	
		DFN4 1.0×1.0	250	

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

Note 2: The UM1550/1560 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. Junction temperature will exceed 125 °C when over temperature protection is active. Continuous operation above the specified maximum operating junction temperature may impair device reliability.

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.

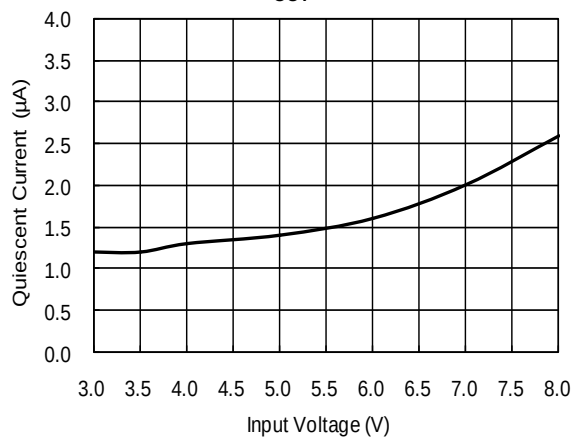
Electrical Characteristics
 $V_{IN} = V_{OUT} + 1V$, $C_{IN} = C_{OUT} = 1\mu F$, $T_A = 25\text{ }^{\circ}\text{C}$.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage Range		1.8		8	V
V_{OUT}	Output Voltage Range		1.2		5.0	V
I_Q	Operating Quiescent Current	$V_{IN}=8V$, $I_{OUT}=0mA$		2.5	3.5	μA
	Shut Down Quiescent Current	$V_{IN}=8V$, $\overline{SHDN} = GND$			1	μA
$I_{\overline{SHDN}}$	$\overline{SHDN}$ Input Current	$\overline{SHDN} = V_{IN}$ or GND			1	μA
I_{OUT}	Output Current		250			mA
	Output Voltage Accuracy	$1mA \leq I_{OUT} \leq 250mA$	-2.5		+2.5	%
ΔV_{DO}	Dropout Voltage	$I_{OUT}=200mA$		250	330	mV
I_{LIMIT}	Output Current Limit	$R_L=1\Omega$	280	360	500	mA
t	Startup Time Response	$V_{OUT}=3.3V$, $R_L=68\Omega$, $C_{OUT}=1\mu F$		80		μs
V_{IL}	$\overline{SHDN}$ Input Low Voltage	$V_{IN}=1.8V$ to 8V			0.4	V
V_{IH}	$\overline{SHDN}$ Input High Voltage	$V_{IN}=1.8V$ to 8V	1.2			V
	Output Voltage TC	-40 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$		60		ppm/ $^{\circ}\text{C}$
	Line Regulation	$V_{OUT}+0.3V \leq V_{IN} \leq 8.0V$ or $V_{IN} > 1.8V$ $I_{OUT}=10mA$			0.3	%/V
	Load Regulation	$V_{IN}=V_{OUT}+1V$ or $V_{IN} > 1.8V$ $1mA \leq I_{OUT} \leq 250mA$			0.6	%
	Output Voltage Noise	$V_{OUT}=3.0V$, $f=10Hz$ to 100kHz, $C_{IN}=1\mu F$, $I_{OUT}=100mA$		115		μV_{RMS}
PSRR	Power Supply Ripple Rejection	$V_{IN}=V_{OUT}+1V$ $I_{OUT}=100mA$	f=100Hz	56		dB
			f=1kHz	42		
	ESD Rating	Human Body Mode	2			kV

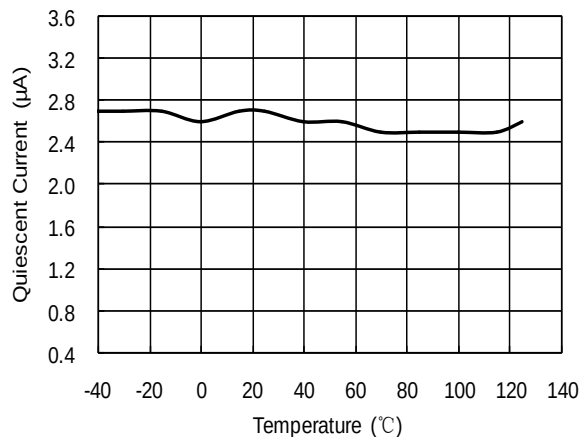
Typical Operating Characteristics (shown for 3.0V output option)

($C_{IN}=1.0\mu F$, $C_{OUT}=1.0\mu F$, $T_A=25^\circ C$, unless otherwise specified.)

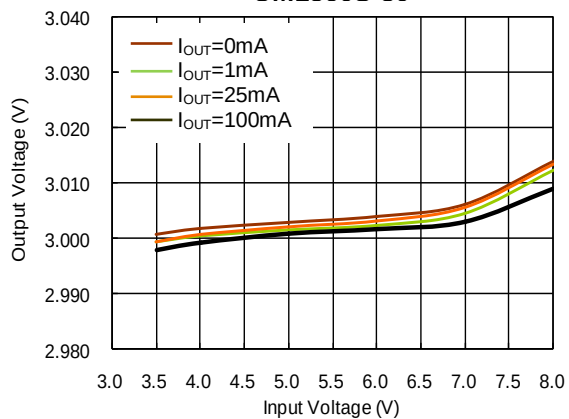
Quiescent Current vs. Input Voltage
 $I_{OUT}=0mA$



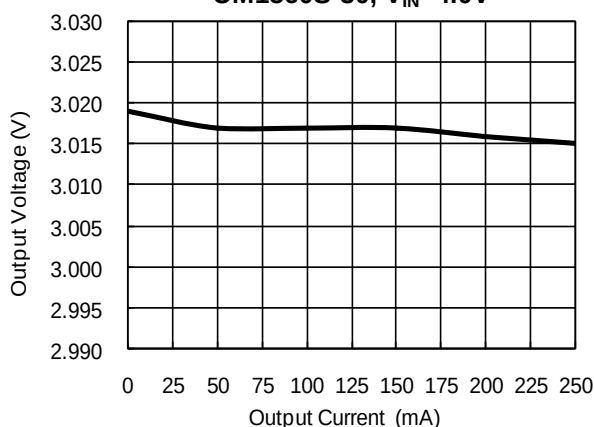
Quiescent Current vs. Temperature
 $V_{IN}=8V$, $I_{OUT}=0mA$



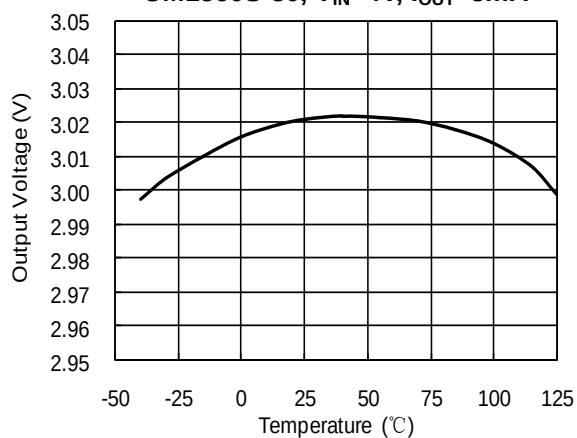
Output Voltage vs. Input Voltage
UM1560S-30



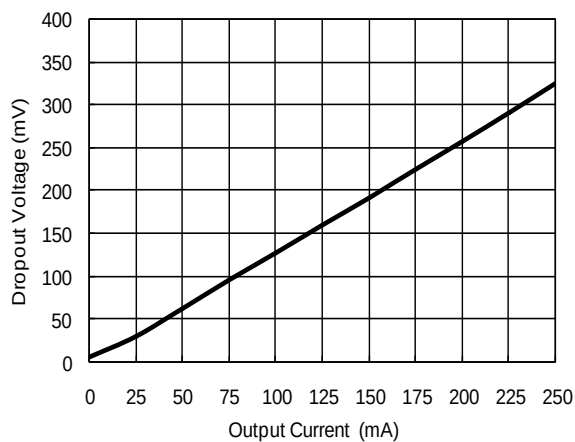
Output Voltage vs. Output Current
UM1560S-30, $V_{IN}=4.0V$



Output Voltage vs. Temperature
UM1560S-30, $V_{IN}=4V$, $I_{OUT}=3mA$



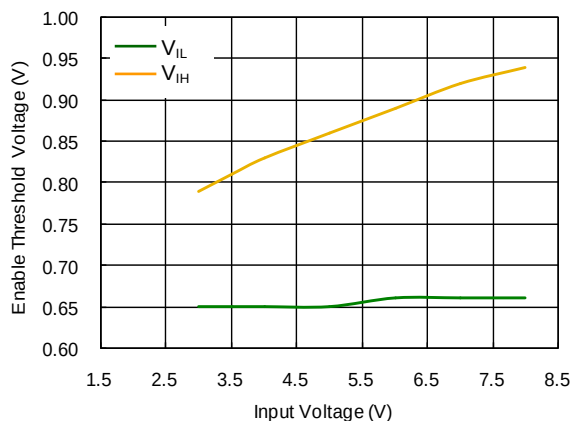
Dropout Voltage vs. Output Current



Typical Operating Characteristics (Continued) (shown for 3.0V output option)

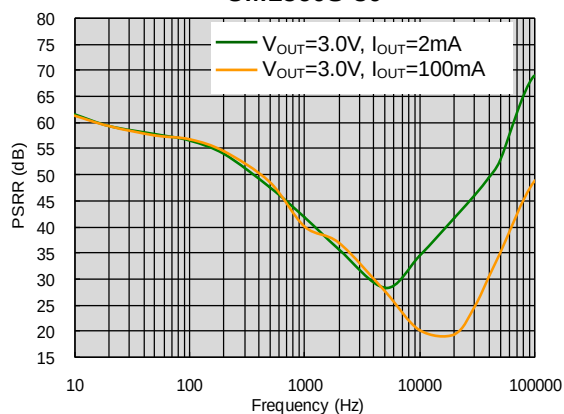
($C_{IN}=1.0\mu F$, $C_{OUT}=1.0\mu F$, $T_A=25^\circ C$, unless otherwise specified.)

Enable Threshold Voltage vs. Input Voltage

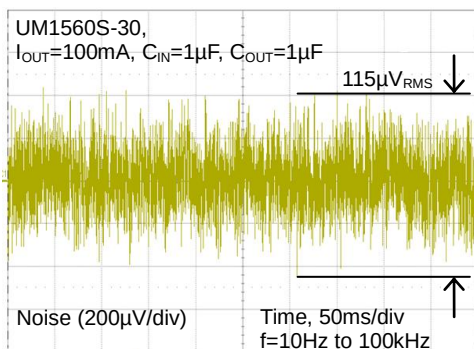


PSRR vs. Frequency

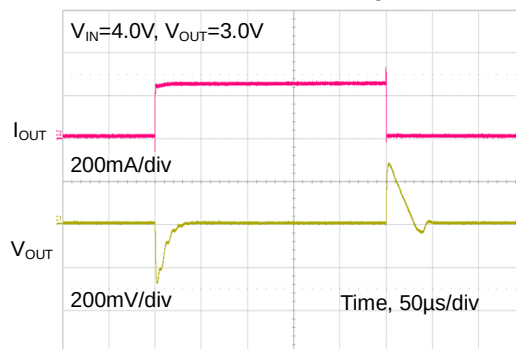
UM1560S-30



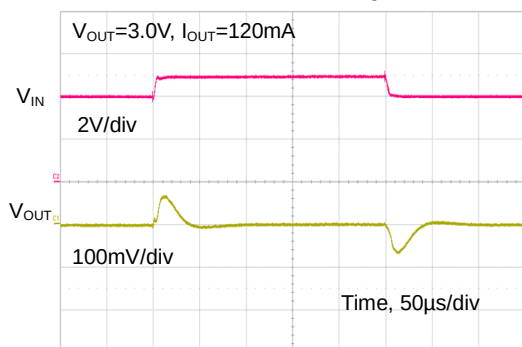
Noise



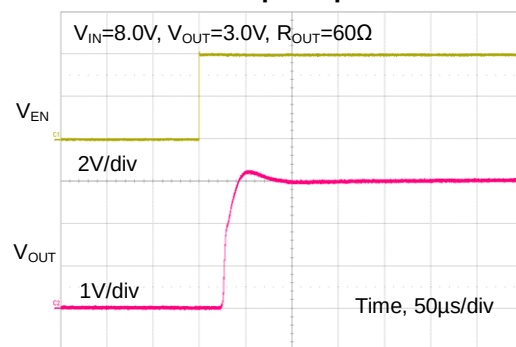
Load Transient Response



Line Transient Response



Start Up Response



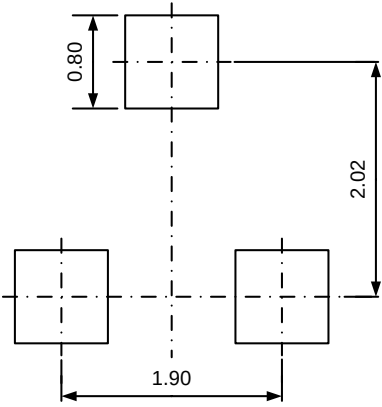
Package Information

UM1550S: SOT23-3

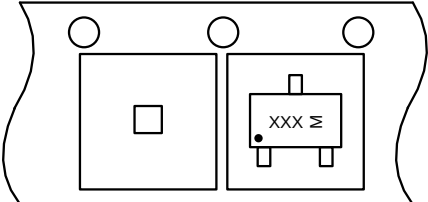
Outline Drawing

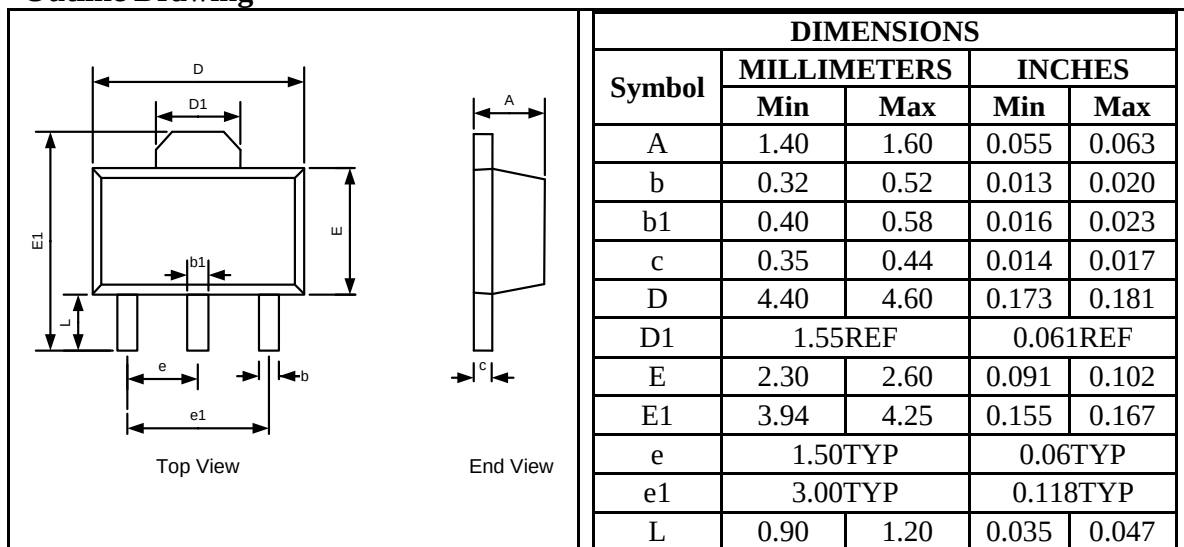
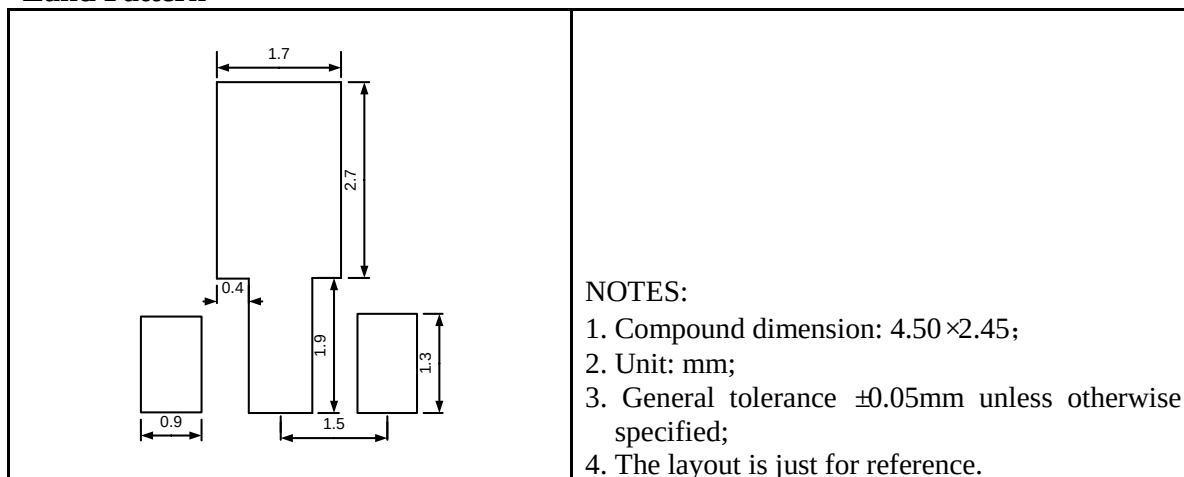
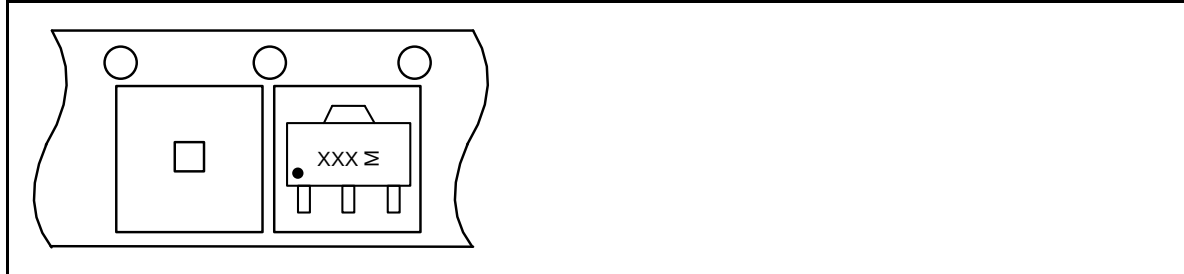
DIMENSIONS				
Symbol	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.05	1.25	0.041	0.049
A1	0.00	0.10	0.000	0.004
A2	1.05	1.15	0.041	0.045
b	0.30	0.50	0.012	0.020
c	0.10	0.20	0.004	0.008
D	2.82	3.02	0.111	0.119
E	1.50	1.70	0.059	0.067
E1	2.65	2.95	0.104	0.116
e	0.95REF		0.037REF	
e1	1.80	2.00	0.071	0.079
L	0.55REF		0.022REF	
L1	0.30	0.60	0.012	0.024
θ	0°	8°	0°	8°

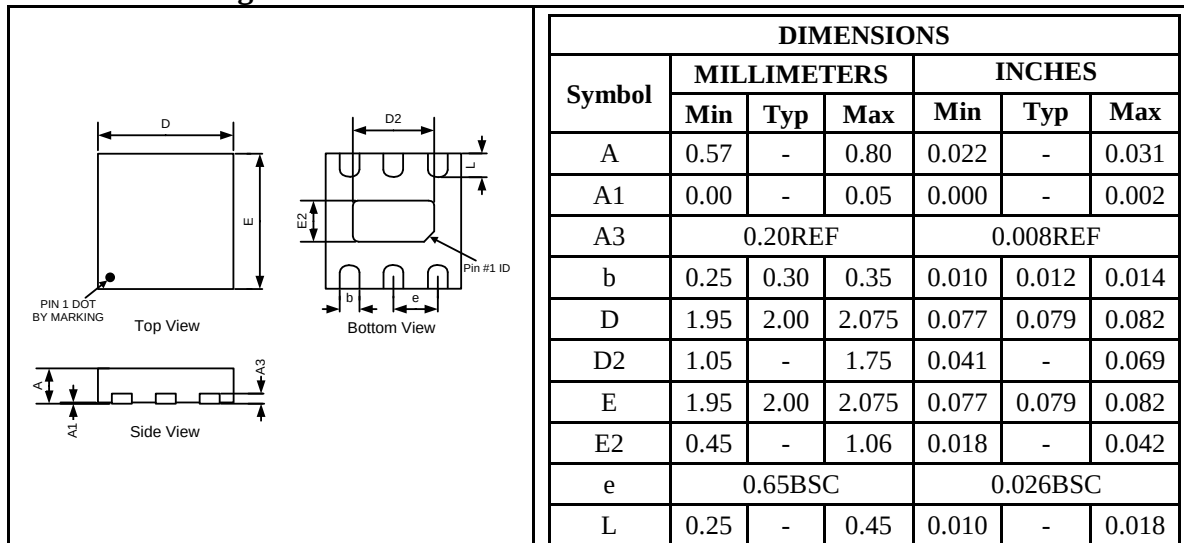
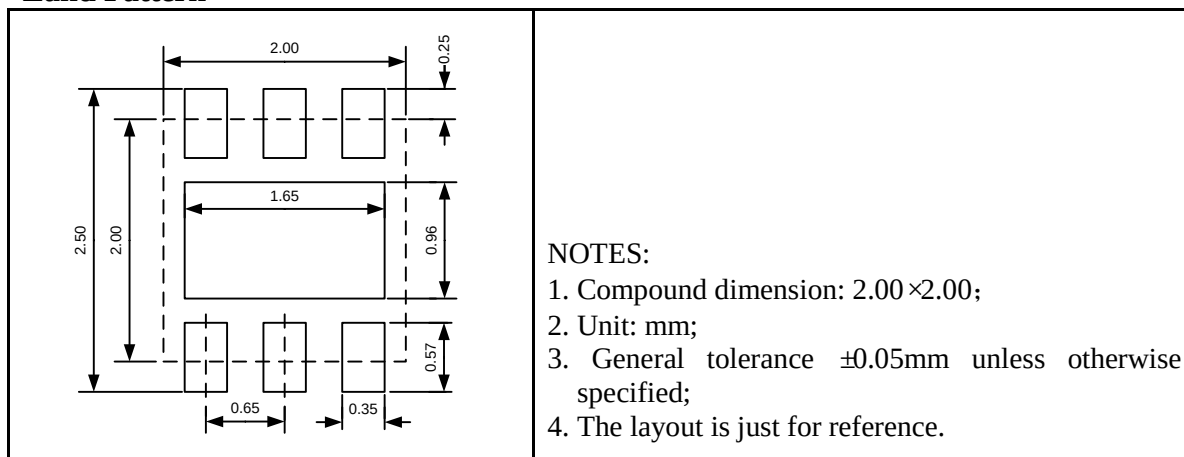
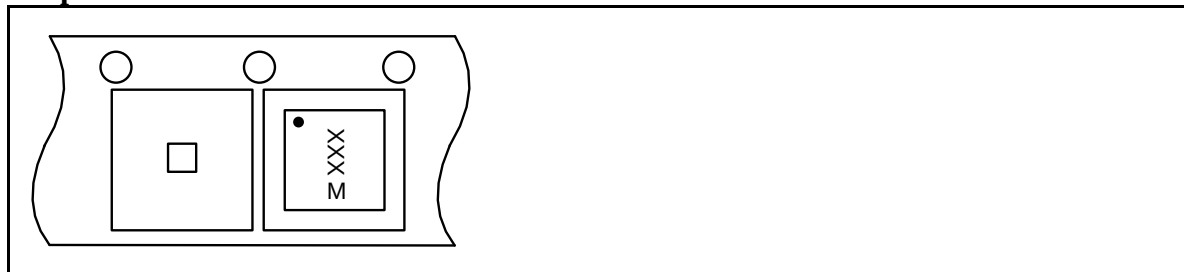
Land Pattern

	NOTES: - Compound dimension: 2.92 × 1.60; - Unit: mm; - General tolerance $\pm 0.05\text{mm}$ unless otherwise specified; - The layout is just for reference.
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Tape and Reel Orientation

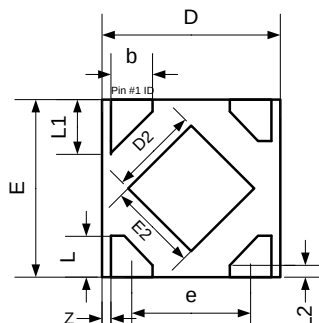


UM1550Y, UM1550B: SOT89-3
Outline Drawing

Land Pattern

Tape and Reel Orientation


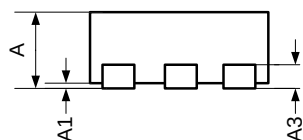
UM1550DA, UM1560DA: DFN6 2.0×2.0
Outline Drawing

Land Pattern

Tape and Reel Orientation


UM1550DB, UM1560DB: DFN4 1.0×1.0
Outline Drawing

DIMENSIONS			
Symbol	MILLIMETERS		
	Min	Typ	Max
A	-	0.39	0.40
A1	0.00	0.02	0.05
A3	-	0.13	-
b	0.20	0.25	0.30
D	0.95	1.00	1.05
E	0.95	1.00	1.05
D2	0.38	0.48	0.58
E2	0.38	0.48	0.58
e	0.65BSC		
L	0.20	0.25	0.30
L1	0.27	0.32	0.37
L2	0.02	0.07	0.12
Z	-	0.05	-

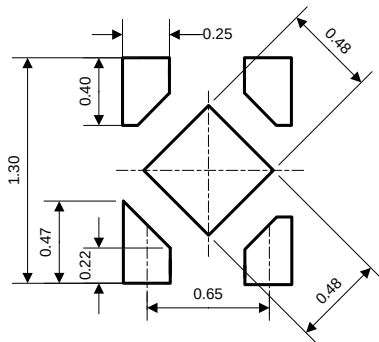


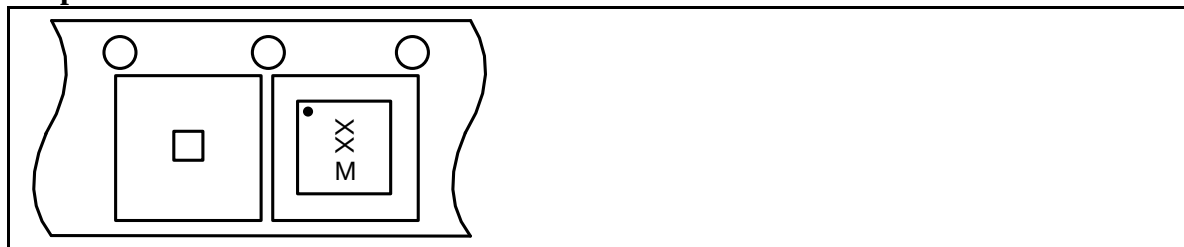
Bottom View

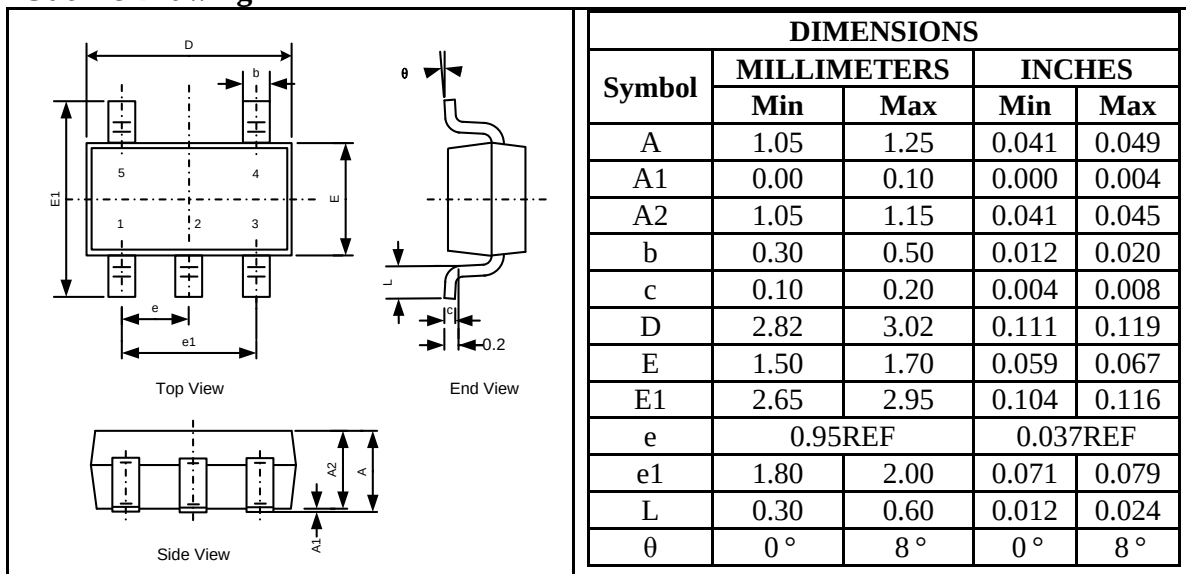
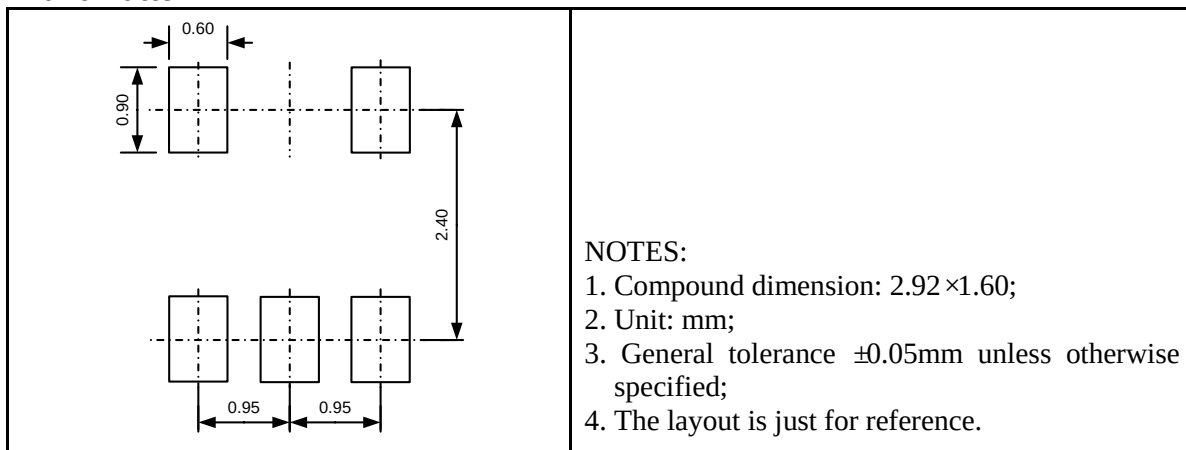


Side View

Land Pattern

	NOTES: 1. Compound dimension: 1.00×1.00; 2. Unit: mm; 3. General tolerance $\pm 0.05\text{mm}$ unless otherwise specified; 4. The layout is just for reference.
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Tape and Reel Orientation


UM1560S: SOT23-5
Outline Drawing

Land Pattern

Tape and Reel Orientation


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