

0.8Ω、低压单刀双掷 (SPDT) 模拟开关

UM4157 SOT363

描述

UM4157 是一款低导通电阻、低功率、单刀双掷 (SPDT) 模拟开关。该产品适用于蜂窝电话和便携式媒体播放器等应用中的音频信号切换。同时，该产品还具有 0.8Ω 超低导通电阻、低电流消耗和 1.65V 至 4.3V 的宽运行电压范围，适用于电池供电应用。UM4157 还具有双向运行和先开后合功能。此器件完全适用于在 1.8V、2.5V 和 3.3V 下运行。

应用

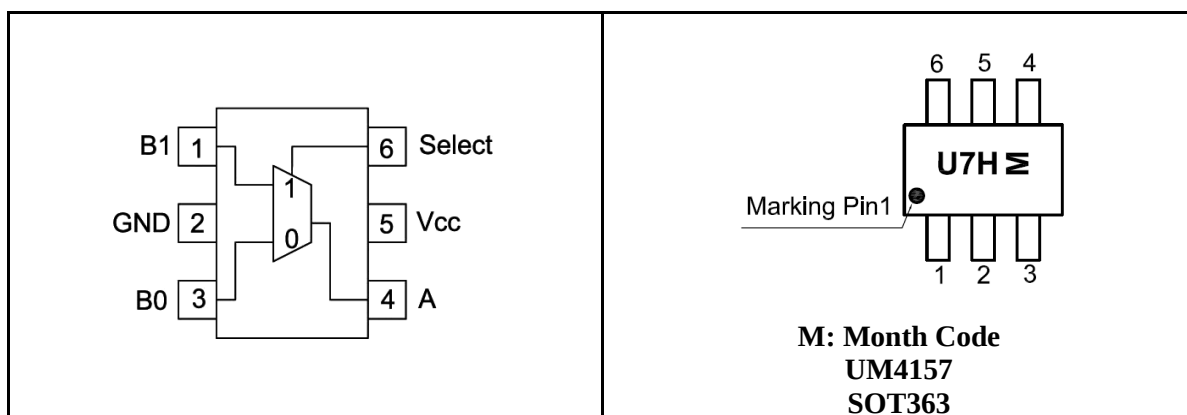
- 蜂窝电话
- PDA
- 便携式媒体播放器

特性

- 2.7V 电源供电时具有 0.8Ω 典型导通电阻 (R_{ON})
- 2.7V 电源供电时具有 0.23Ω 典型导通电阻平坦度
- 宽 V_{CC} 运行电压范围：1.65V 至 4.3V
- 低总谐波失真（在 32Ω 负载时典型值为 0.02%）
- 控制逻辑与 1.8 V CMOS 逻辑兼容

引脚配置

顶部视图



订购信息

芯片型号	封装类型	丝印编码	发货数量
UM4157	SOT363	U7H	3000pcs/7 Inch Tape & Reel

真值表

Select 引脚输入	作用
L	B0 连接到 A
H	B1 连接到 A

Absolute Maximum Ratings

Symbol	Parameter	Limit	Unit
V _{CC}	Supply Voltage	-0.5 to +5.5	V
V _S	DC Switch Voltage (Note 1)	-0.5 to (V _{CC} +0.3)	
V _{IN}	DC IN Voltage (Note 1)	-0.5 to +V _{CC}	
I _{IK}	DC Input Diode Current	-50	mA
I _{SW}	DC Switch Current	100	
I _{SWPEAK}	Peak Switch Current (Pulsed at 1ms Duration, <10% Duty Cycle)	150	
T _J	Junction Temperature Under Bias	+150	°C
T _{STG}	Storage Temperature Range	-65 to +150	
T _L	Junction Lead Temperature (Soldering, 10 Seconds)	+260	
ESD	Human Body Model	2000	V
P _D	SOT363 Package	180	mW

Note 1: The input and output negative voltage ratings may be exceeded if the input and output diode current ratings are observed.

Recommended Ratings

Symbol	Parameter	Limit	Unit
V _{CC}	Supply Voltage Operating	1.65 to 4.3	V
V _{IN}	Control Input Voltage (Note 2)	0 to V _{CC}	
V _{IN}	Switch Input Voltage	0 to V _{CC}	
T _A	Operating Temperature	-45 to +85	°C

Note 2: Unused inputs must be held HIGH or LOW, it must not float.

Electrical Characteristics

Symbol	Parameter	Test Conditions	V _{CC} (V)	Temp	Limits (-40 °C to 85 °C)			Unit
					Min	Typ	Max	
DC Electrical Characteristics								
I _{IN}	Control Leakage Current	0≤V _{IN} ≤V _{CC}	1.65 to 4.3	Full	-0.5		+0.5	μA
I _{OFF(NO/NC)}	OFF State Leakage Current	A=0.3V, V _{CC} =0.3V, B ₀ or B ₁ =0.3V, V _{CC} =0.3V or Floating	1.95 to 4.3	Room Full	-10 -50		+10 +50	nA
I _{ON(A)}	On State Leakage Current	A=0.3V, V _{CC} =0.3V, B ₀ or B ₁ =0.3V, V _{CC} =0.3V or Floating	1.95 to 4.3	Room Full	-20 -100		+20 +100	nA
V _{IH}	Input High Voltage		3.6 to 4.3	Full	1.4			V
			2.7 to 3.6		1.3			
			2.3 to 2.7		1.1			
			1.65 to 1.95		0.9			
V _{IL}	Input Low Voltage		3.6 to 4.3	Full			0.7	V
			2.7 to 3.6				0.5	
			2.3 to 2.7				0.4	
			1.65 to 1.95				0.4	
I _{CC}	Quiescent Supply Current	V _{IN} =V _{CC} or GND I _O =0	4.3	Full	-3		3	μA
R _{ON}	On-Resistance (Note 3)	I _{OUT} =100mA, B ₀ or B ₁ =0V,0.7V,3.6V,4.3V	4.3	Full		0.6	1.0	Ω
		I _{OUT} =100mA, B ₀ or B ₁ =0V,0.7V,2.0V,2.7V	2.7	Full		0.8	1.2	
		I _{OUT} =100mA, B ₀ or B ₁ =0V, 0.7V, 2.0V,2.3V	2.3	Full		0.9	1.3	
		I _{OUT} =100mA, B ₀ or B ₁ =0.7V	1.65	Room Full		1.5	2.5 3.0	
ΔR _{ON}	On Resistance Match Between Channels (Note 4)	I _{OUT} =100mA, B ₀ or B ₁ =0.7V	4.3	Full		0.04	0.75	Ω
			2.7	Full		0.06	0.13	
			2.3	Full		0.12	0.20	
			1.65	Full		1.0		
R _{FLAT}	On Resistance Flatness (Note 5)	I _{OUT} =100mA, B ₀ or B ₁ =0V to V _{CC}	4.3	Full		0.18	0.5	Ω
			2.7	Full		0.23	0.5	
			2.3	Full		0.28	0.6	
			1.65	Room		0.3		

Note 3: Measured by the voltage drop between A and B pins at the indicated current through the switch. On Resistance is determined by the lower of the voltages on the two (A or B Ports).

Note 4: ΔR_{ON} = | R_{ON(B0)} - R_{ON(B1)} | measured at identical V_{CC}, temperature and voltage levels.

Note 5: Flatness is defined as the difference between the maximum and minimum value of On Resistance over the specified range of input voltage.

Electrical Characteristics (Continued)

Symbol	Parameter	Test Conditions	V _{CC} (V)	Temp	Limits (-40 °C to 85 °C)			Unit
					Min	Typ	Max	
AC Electrical Characteristics								
t _{ON}	Turn-On Time	B ₀ or B ₁ =1.5V, R _L =50Ω, C _L =35pF	3.6 to 4.3	Room Full			55 60	ns
			2.7 to 3.6	Room Full			60 65	
			2.3 to 2.7	Room Full			65 70	
			1.65 to 1.95	Full		70	90	
t _{OFF}	Turn-Off Time	B ₀ or B ₁ =1.5V, R _L =50Ω, C _L =35pF	3.6 to 4.3	Room Full			30 35	ns
			2.7 to 3.6	Room Full			35 40	
			2.3 to 2.7	Room Full			40 45	
			1.65 to 1.95	Full		40	55	
t _{BBM}	Break Before Make Time	B ₀ or B ₁ =1.5V, R _L =50Ω, C _L =35pF	1.65 to 4.3	Full	5			ns
Q _{INJ}	Charge Injection	C _L =1.0nF, V _{GEN} =0V R _{GEN} =0Ω	3.6 to 4.3	Room		6		pC
			2.7 to 3.6	Room		6		
			2.3 to 2.7	Room		6		
			1.65 to 1.95	Room				
O _{IRR}	Off Isolation	f=100kHz, R _L =50Ω, C _L =5pF (Stray)	1.65 to 4.3	Room		-75		dB
Xtalk	Crosstalk	f=100kHz, R _L =50Ω, C _L =5pF (Stray)	3.6 to 4.3	Room		-75		dB
			2.7 to 3.6	Room		-75		
			2.3 to 2.7	Room		-75		
			1.65 to 1.95	Room		-70		
BW	-3dB Bandwidth	R _L =50Ω	1.65 to 4.3	Room		70		MHz
THD	Total Harmonic Distortion		3.6 to 4.3					%
		R _L =32Ω, V _{IN} =2V _{P-P} f=20Hz to 20kHz	2.7 to 3.6	Room		0.02		
		R _L =32Ω, V _{IN} =1.5V _{P-P} f=20Hz to 20kHz	2.3 to 2.7	Room		0.036		
		R _L =32Ω, V _{IN} =1.2V _{P-P} f=20Hz to 20kHz	1.65 to 1.95	Room		0.01		
Capacitance								
C _{IN}	Control Pin Input Capacitance	f=1MHz	0.0	Room		1.5		pF
C _{IO-B}	B Port Off Capacitance	f=1MHz	4.5	Room		21.0		pF
C _{IOA-ON}	A Port Capacitance when Switch is Enabled	f=1MHz	4.5	Room		90.0		pF

Typical Operating Characteristics

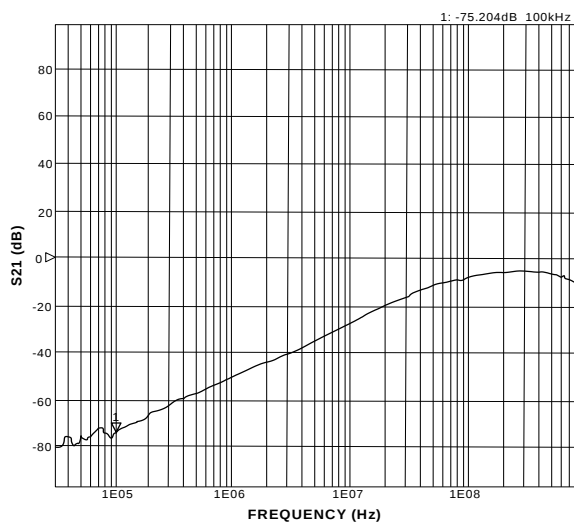


Figure 1. Off-Isolation at $V_{CC}=3.3V$

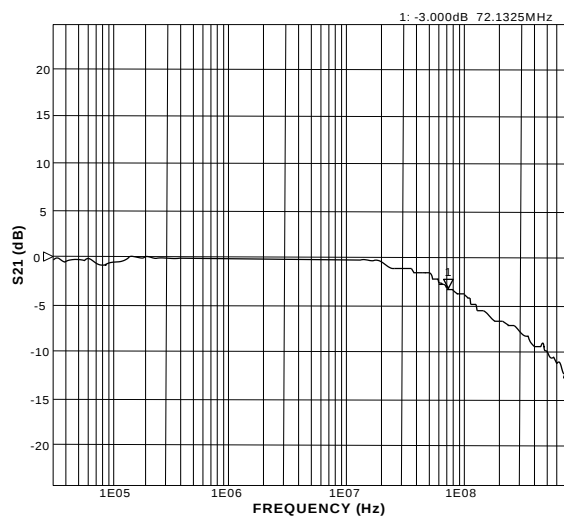


Figure 2. Bandwidth at $V_{CC}=-3.3V$

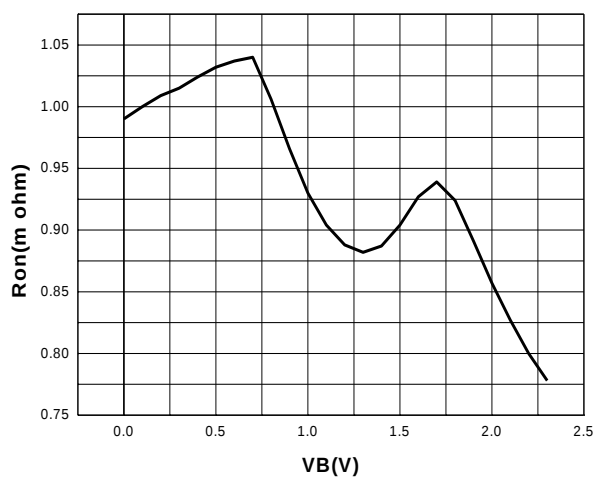


Figure 3. Switch On Resistance, $I_{on}=100mA$, $V_{CC}=2.3V$, B1

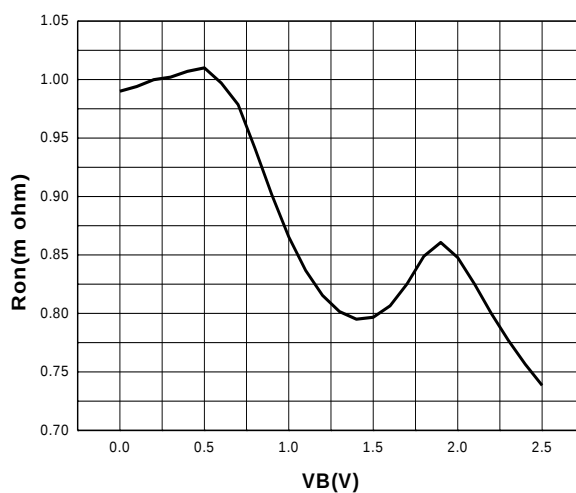


Figure 4. Switch On Resistance, $I_{on}=100mA$, $V_{CC}=2.5V$, B1

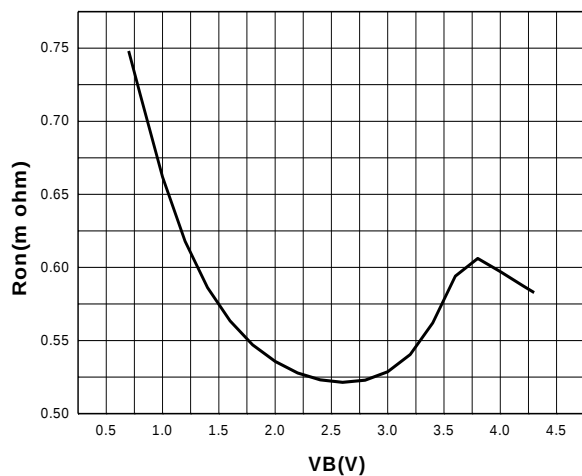
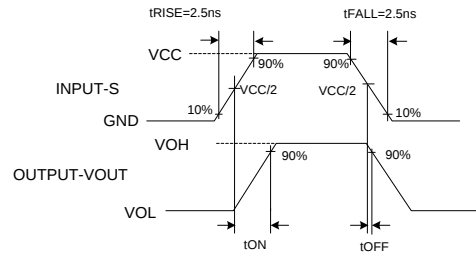
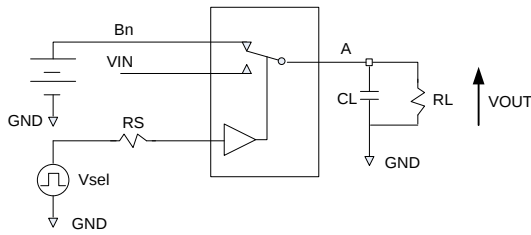


Figure 5. Switch On Resistance, $I_{on}=100mA$, $V_{cc}=4.3V$, B1

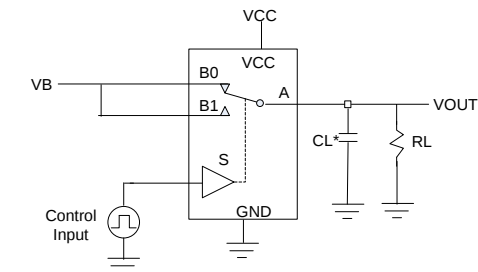
Test Circuits/Timing Diagrams



Note 6: R_L , R_S and C_L are functions of the application environment. (see AC Electrical table for specific values)

Note 7: C_L includes test fixture and stray capacitance.

Figure 6. Turn-Off Timing



C_L^* includes fixture and stray capacitance

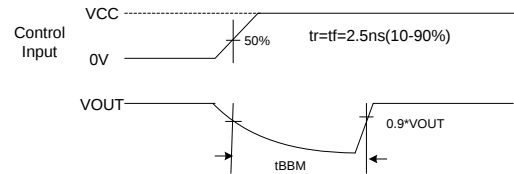
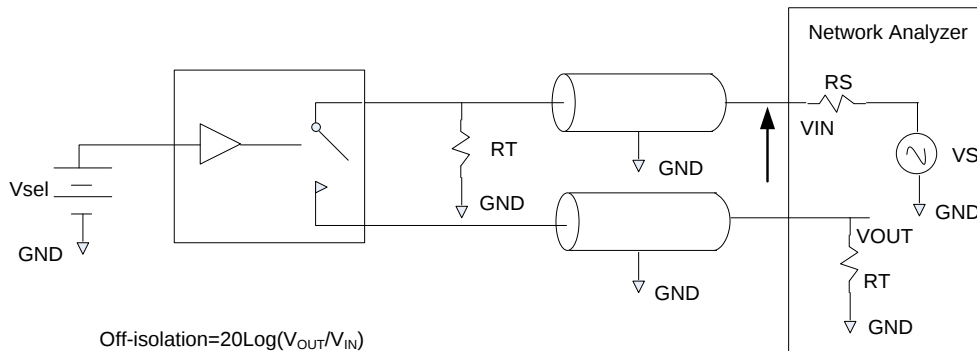


Figure 7. Break-Before-Make Timing



Off-isolation = $20\text{Log}(V_{OUT}/V_{IN})$

Figure 8. Off-Isolation

Test Circuits/Timing Diagrams (Continued)

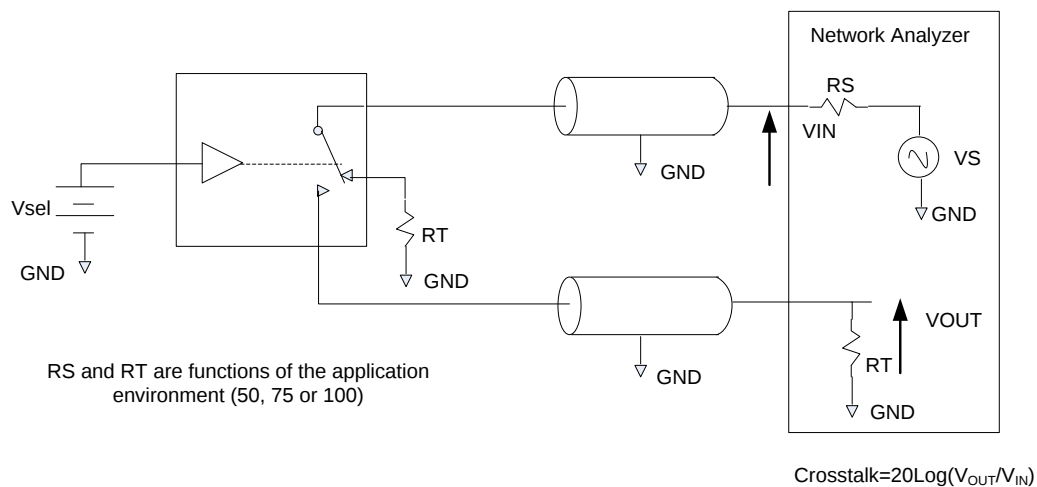


Figure 9. Non-Adjacent Channel-to-Channel Crosstalk

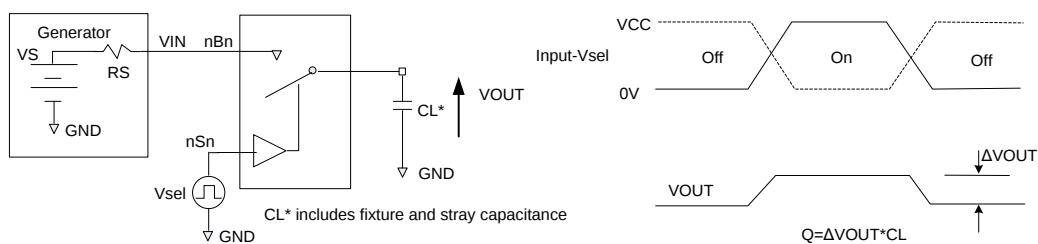


Figure 10. Charge Injection Test

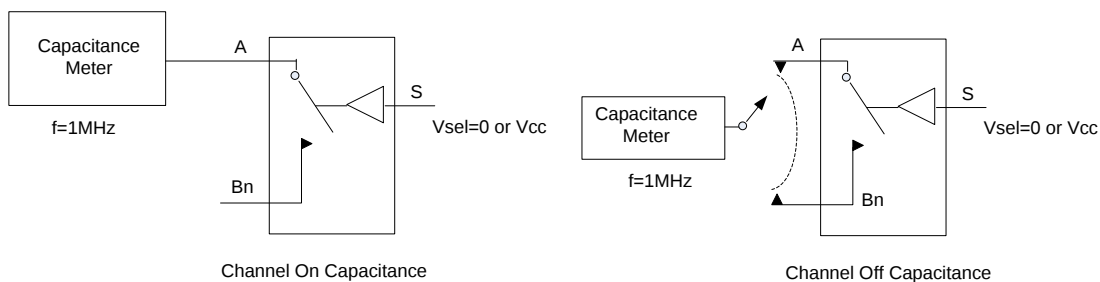


Figure 11. On/Off Capacitance Measurement Setup

Test Circuits/Timing Diagrams (Continued)

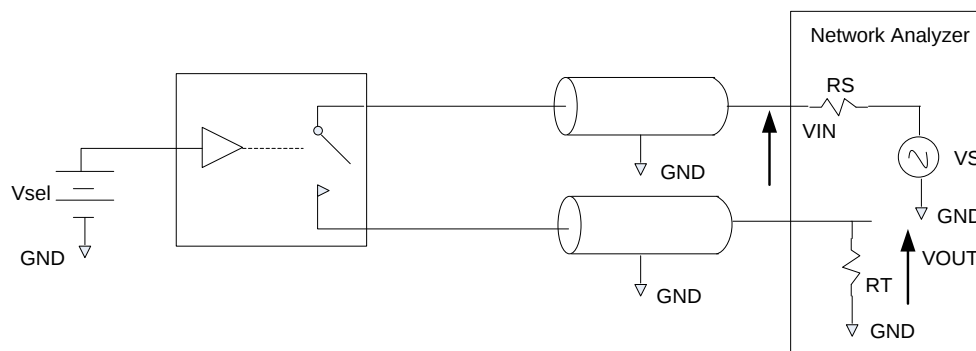


Figure 12. Bandwidth

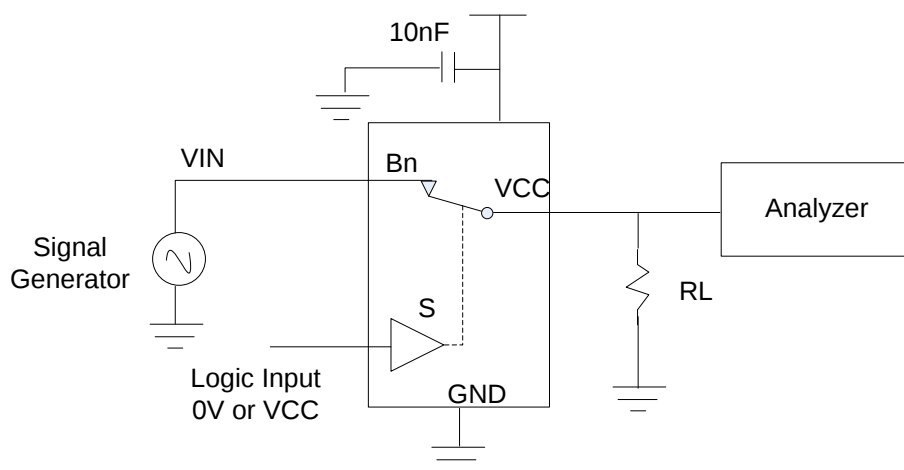
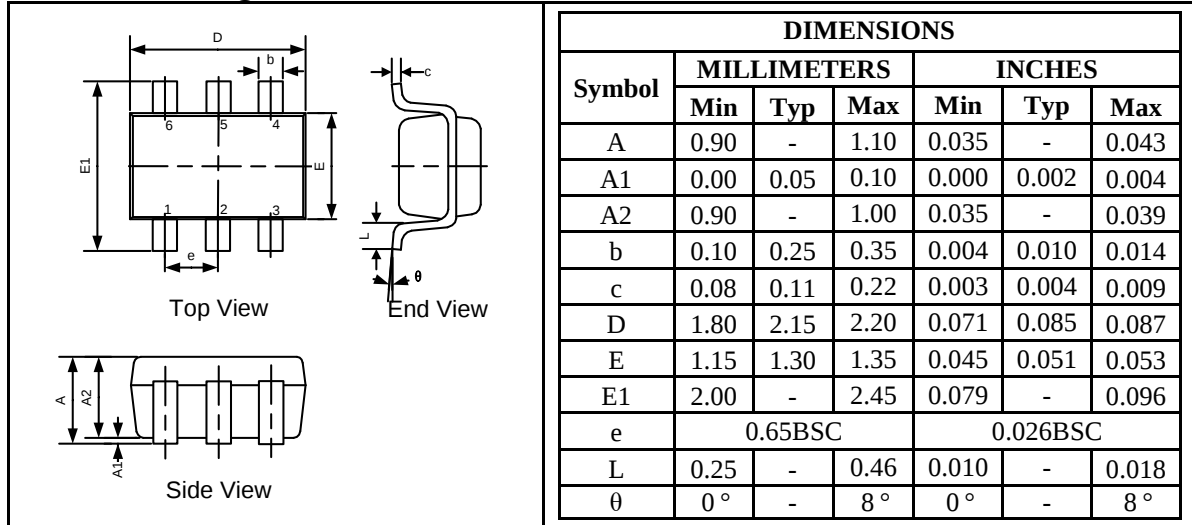


Figure 13. Harmonic Distortion

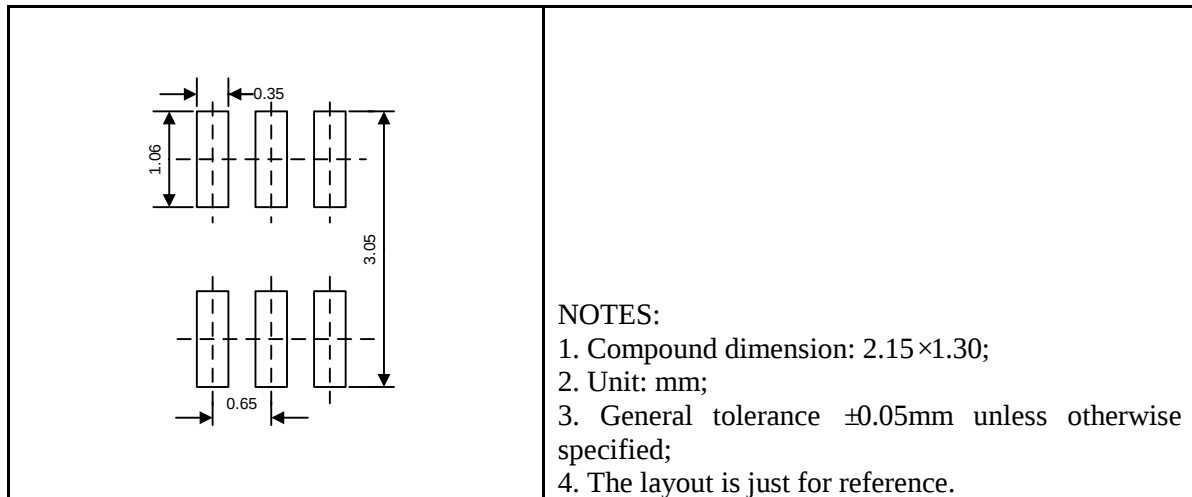
Package Information

UM4157 SOT363

Outline Drawing



Land Pattern



Tape and Reel Orientation



GREEN COMPLIANCE

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