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LMV321

Product specification

DESCRIPTION

The LMV321 is single low voltage (2.7V to 5.5V) operational amplifier which has rail-to-rail output swing capability. The input common-mode voltage range includes ground. The chip exhibits excellent speed-power ratio, achieving 1MHz of bandwidth and 1V/ μ s of slew rate with low supply current.

The LMV321 S is built with BiCMOS process. It has bipolar input and output stages for improved noise performance, low input offset and higher output current drive.

The LMV321 is available in the package of SC-70-5, which is approximately half the size of SOT-23-5. The small package saves space on pc boards, and enables the design of small portable electronic devices. It also allows the designer to place the device closer to the signal source to reduce noise pickup and increase signal integrity.

The LMV321 is also available in standard SOT-23-5 package.

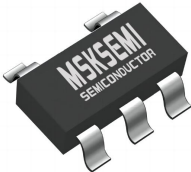

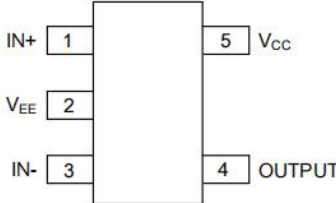

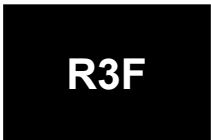
FEATURES (For VCC=5V and VEE=0V, Typical unless Otherwise Noted)

- Guaranteed 2.7V to 5.5V Performance
- No Crossover Distortion
- Gain-Bandwidth Product 1MHz
- Industrial Temperature Range: -40°C to +85°C
- Low Supply Current: 130 μ A
- Rail-to-Rail Output Swing under 10k Ω Load:
- VOH up to VCC- 10mV
- VOL near to VEE+65mV
- VCM : -0. 1V to VCC-0.8V

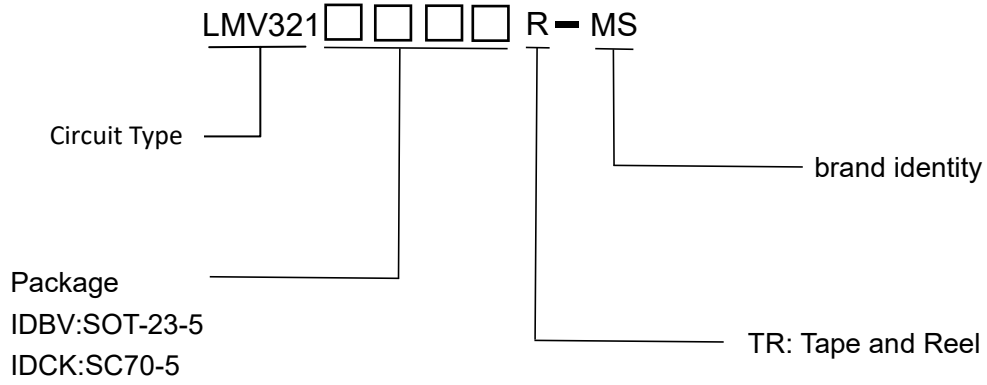
Applications

- Active Filters
- Low Power, Low Voltage Applications
- General Purpose Portable Devices
- Cellular Phone, Cordless Phone
- Battery-Powered Systems

Reference News

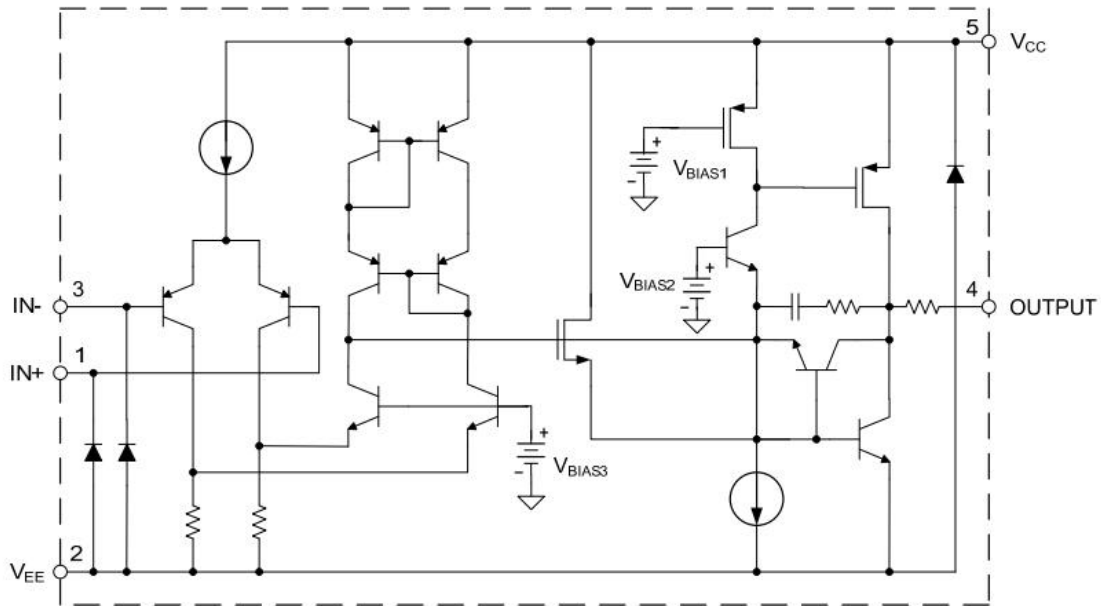
PACKAGE OUTLINE		PIN CONFIGURATION	Marking	
				
SOT-23-5	SC70-5	IDBV/IDCK Package (SC-70-5/SOT-23-5)	SOT-23-5	SC70-5

Ordering Information



Package	Temperature Range	Part Number		Marking ID		Packing Type
		Lead Free	Green	Lead Free	Green	
SC-70-5	-40 to 85°C		LMV321IDCKR-MS		R3F	Tape & Reel
SOT-23-5			LMV321IDBVR-MS		RC1F	Tape & Reel

Functional Block Diagram



Absolute Maximum Ratings (Note 1)

Symbol	Parameter	Rating	Unit
VCC	Power Supply Voltage	6	V
TJ	Operation Junction Temperature	150	°C
TSTG	Storage Temperature Range	-65 to 150	°C
TLEAD	Lead Temperature (Soldering, 10 Seconds)	260	°C
	ESD (Machine Model)	200	V
	ESD (Human Body Model)	2000	V

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
VCC	Supply Voltage	2.7	5.5	V
TA	Ambient Operating Temperature Range	-40	85	°C

Electrical Characteristics

LMV321-2.7V Electrical Characteristic(Asll limits are guaranteed for TA=25°C, VCC=2.7V, VEE=0V, VCM=1.0V, VO=VCC/2 and RL>1MΩ , limits in bold types are guaranteed for TA=-40°C to 85°C, unless otherwise specified. Note 2)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
VIO	Input Offset Voltage			1.7	7	mV
					9	
IB	Input Bias Current			11	250	nA
					500	
IIO	Input Offset Current			5	50	nA
					150	
VCM	Input Common Mode Voltage Range	for CMRR≥50dB	-0.1		1.9	V
ICC	Supply Current	VO=VCC/2, AVCL=1, no load		80	170	μA
					270	
CMRR	Common Mode Rejection Ratio	0≤VCM≤ 1.7V	50	65		dB
PSRR	Power Supply Rejection Ratio	2.7V≤VCC≤5V, VO=1V	50	60		dB
ISOURCE	Output Short Circuit Current	VO=0V	5	20		mA
ISINK		VO=2.7V	10	30		mA
VOH	Output Voltage Swing	RL=10kΩ to 1.35V	2.60	2.69		V
VOL				60	180	
GBWP	Gain Bandwidth Product	CL=200pF		1		MHz
OM	Phase Margin			60		Deg
GM	Gain Margin			10		dB

Note 2: Limits over the full temperature are guaranteed by design, but not tested in production.

Electrical Characteristics (Cont.)

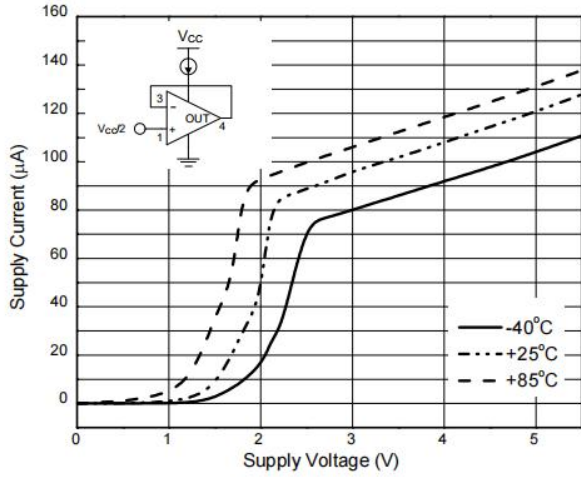
LMV321-5V Electrical Characteristics (All limits are guaranteed for TA=25°C, VCC=5V, VEE=0V, VCM=2.0V, VO=VCC/2 and RL>1MΩ, limits in bold types are guaranteed for TA=-40°C to 85°C, unless otherwise specified. Note 2)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
VIO	Input Offset Voltage			1.7	7	mV
					9	
IB	Input Bias Current			11	250	nA
					500	
IIO	Input Offset Current			5	50	nA
					150	
VCM	Input Common Mode Voltage Range	for CMRR≥50dB	-0.1		4.2	V
ICC	Supply Current	VO=VCC/2, AVCL=1, no load		130	250	μA
					350	
GV	Large Signal Voltage Gain	RL=2kΩ	84	100		dB
			80			
CMRR	Common Mode Rejection Ratio	0≤VCM≤4V	50	65		dB
PSRR	Power Supply Rejection Ratio	2.7V≤VCC≤5V, VO=1V, VCM=1V	50	60		dB
ISOURCE	Output Short Circuit Current	VO=0V	5	60		mA
ISINK		VO=5V	10	160		mA
VOH	Output Voltage Swing	RL=2kΩ to 2.5V	4.7	4.96		V
			4.6			
		RL=10kΩ to 2.5V	4.9	4.99		
			4.8			
VOL	Output Voltage Swing	RL=2kΩ to 2.5V		120	300	mV
					400	
		RL=10kΩ to 2.5V		65	180	
					280	
SR	Slew Rate			1		V/μS
GBWP	Gain Bandwidth Product	CL=200pF		1		MHz
OM	Phase Margin			60		Deg
GM	Gain Margin			10		dB

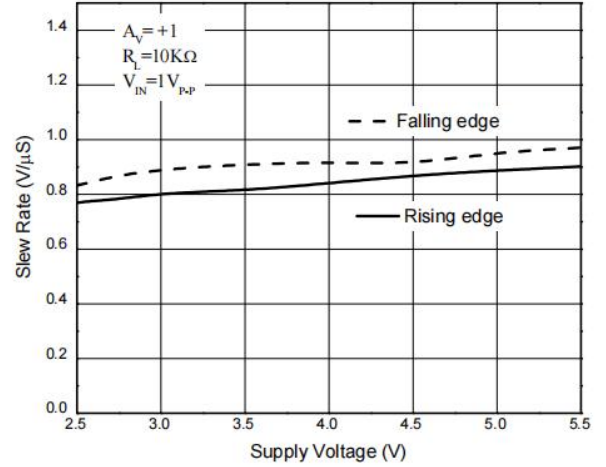
Note 2: Limits over the full temperature are guaranteed by design, but not tested in production.

Performance Characteristics

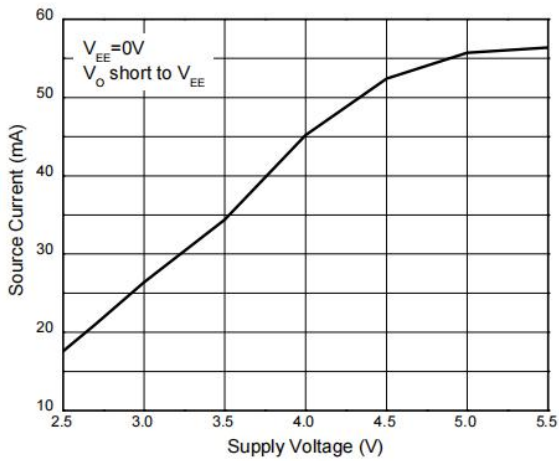
Supply Current vs. Supply Voltage



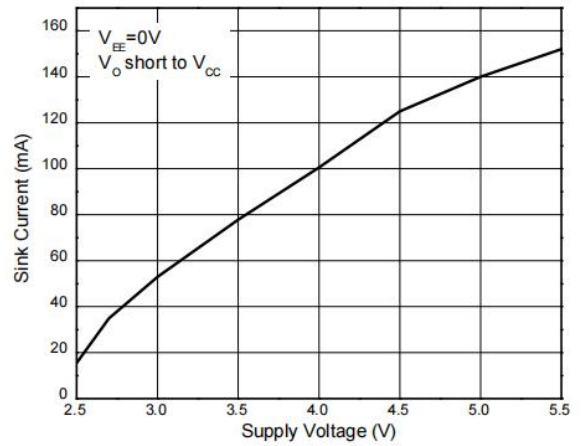
Slew Rate vs. Supply Voltage



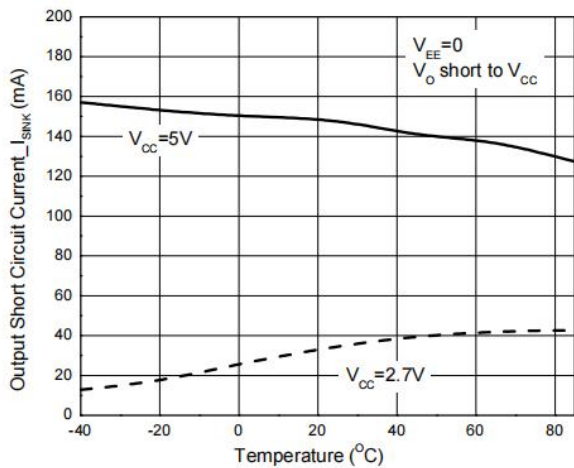
Output Source Current vs. Supply Voltage



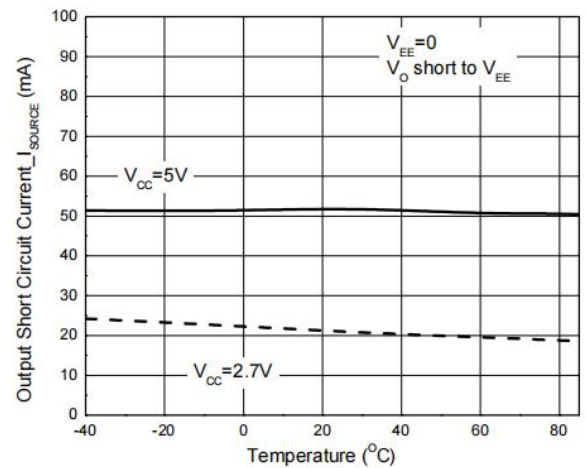
Output Sink Current vs. Supply Voltage



Short Circuit Current I_{SINK} vs. Temperature

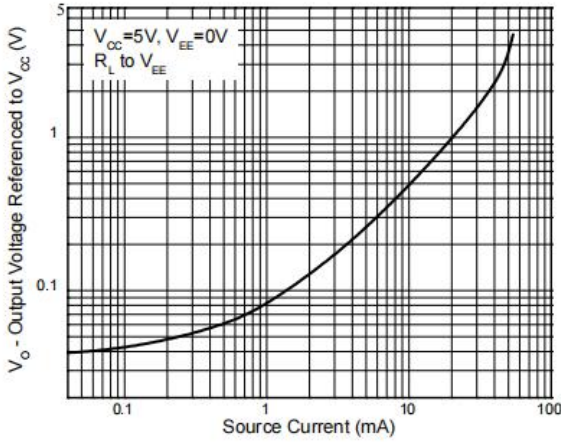


Short Circuit Current I_{SOURCE} vs. Temperature

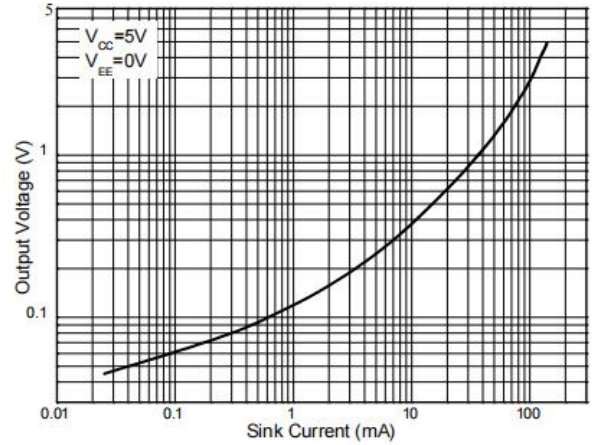


Performance Characteristics (Cont.)

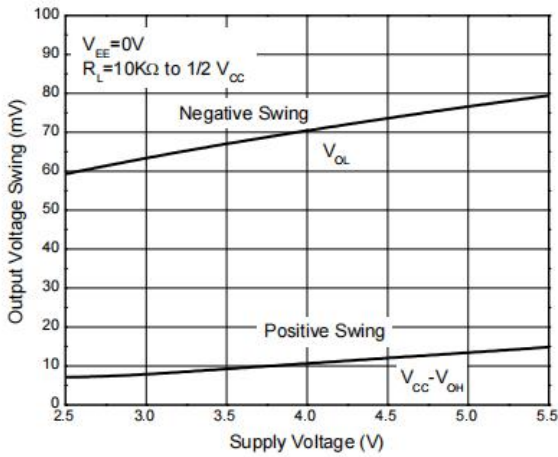
Output Voltage vs. Source Current



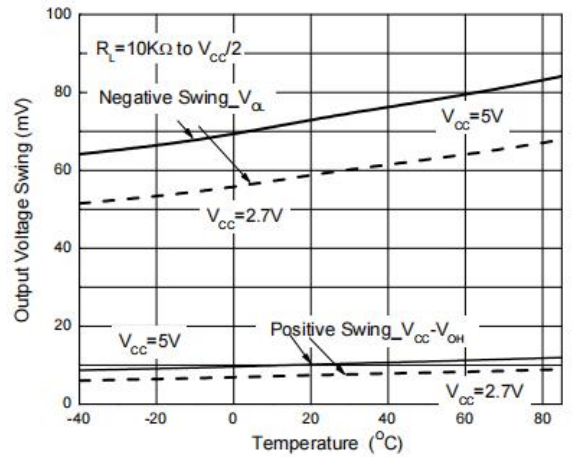
Output Voltage vs. Sink Current



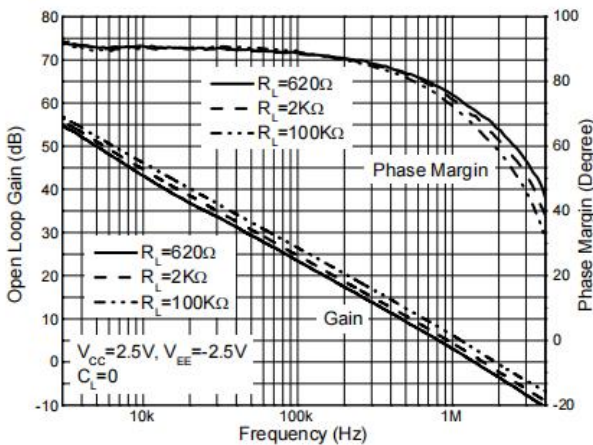
Output Voltage Swing vs. Supply Voltage



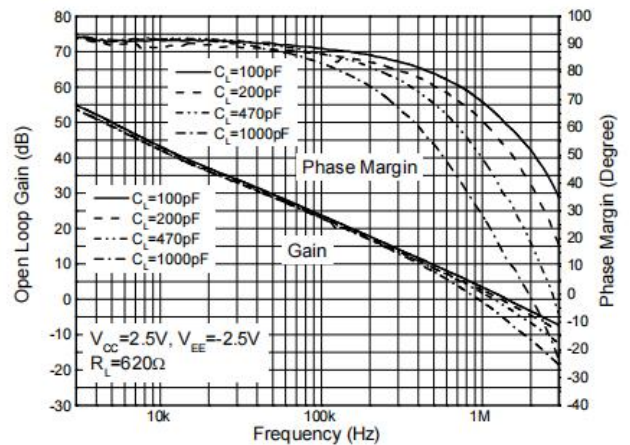
Output Voltage Swing vs. Temperature



Gain and Phase vs. Frequency and Resistive Load

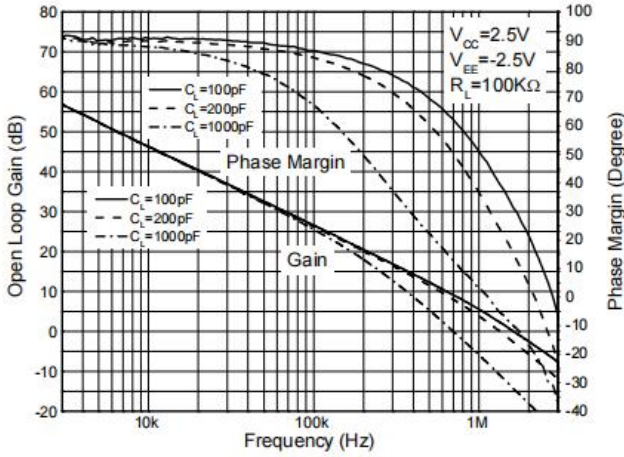


Gain and Phase vs. Frequency and Capacitive Load

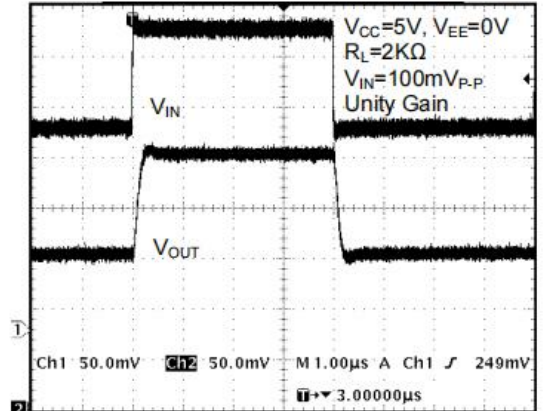


Performance Characteristics (Cont.)

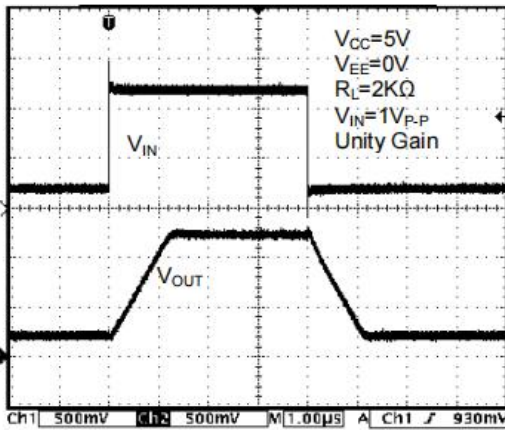
Gain and Phase vs. Frequency and Capacitive Load



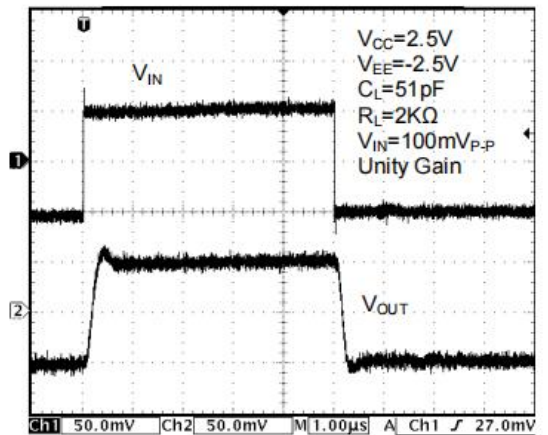
Non-Inverting Input Small Signal Pulse Response



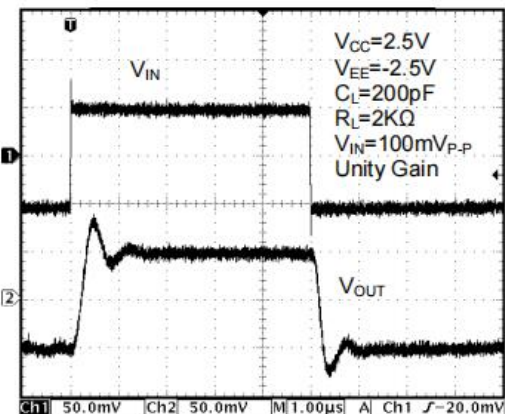
Non-Inverting Input Large Signal Pulse Response



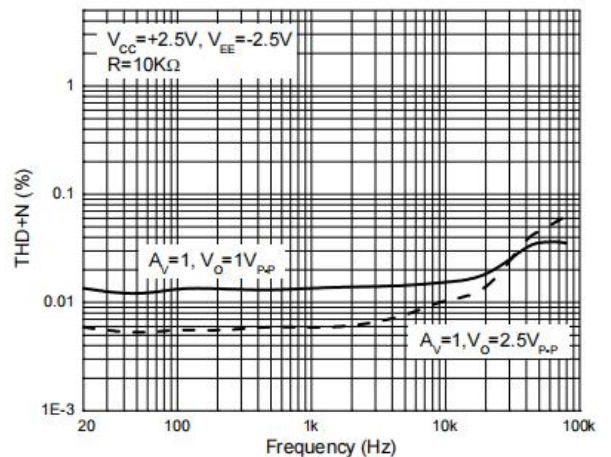
Output with Excessive Capacitive Load



Output with Excessive Capacitive Load

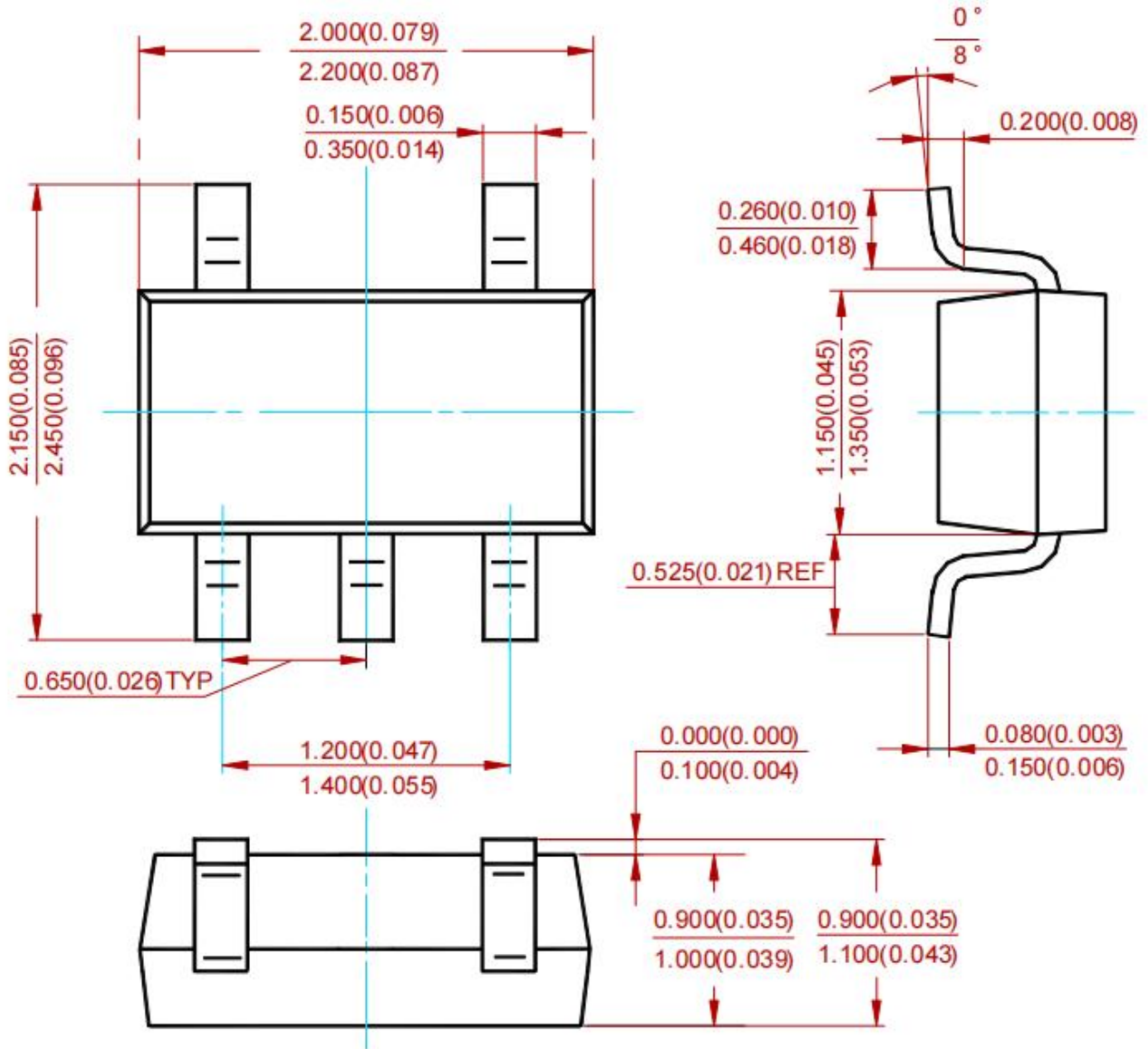


THD+N vs. Frequency



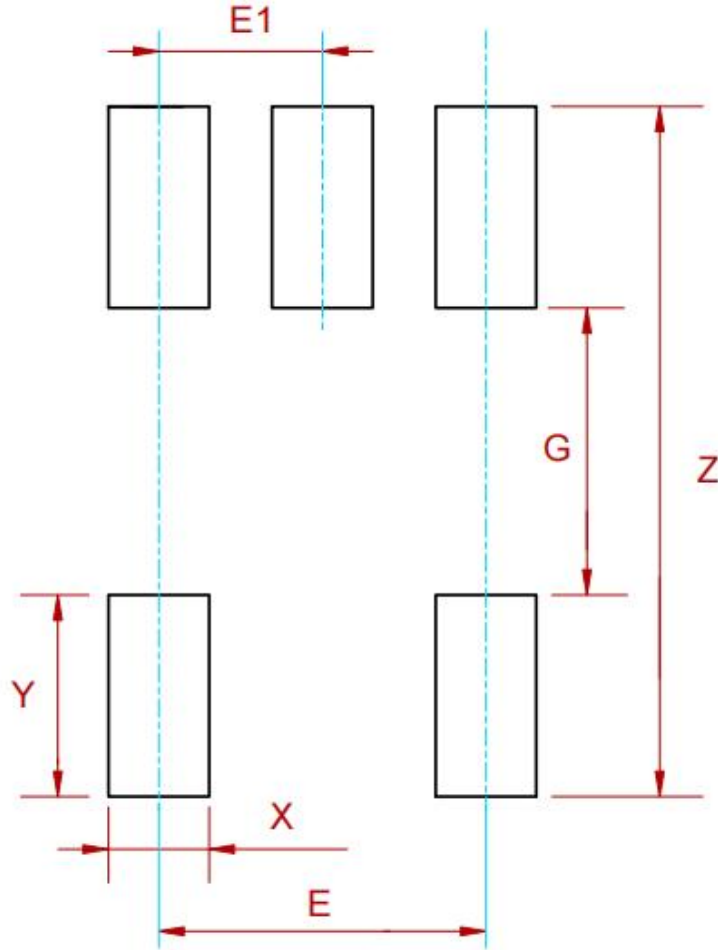
Package Outline Dimensions (All dimensions in mm(inch).)

SC-70-5



Suggested Pad Layout

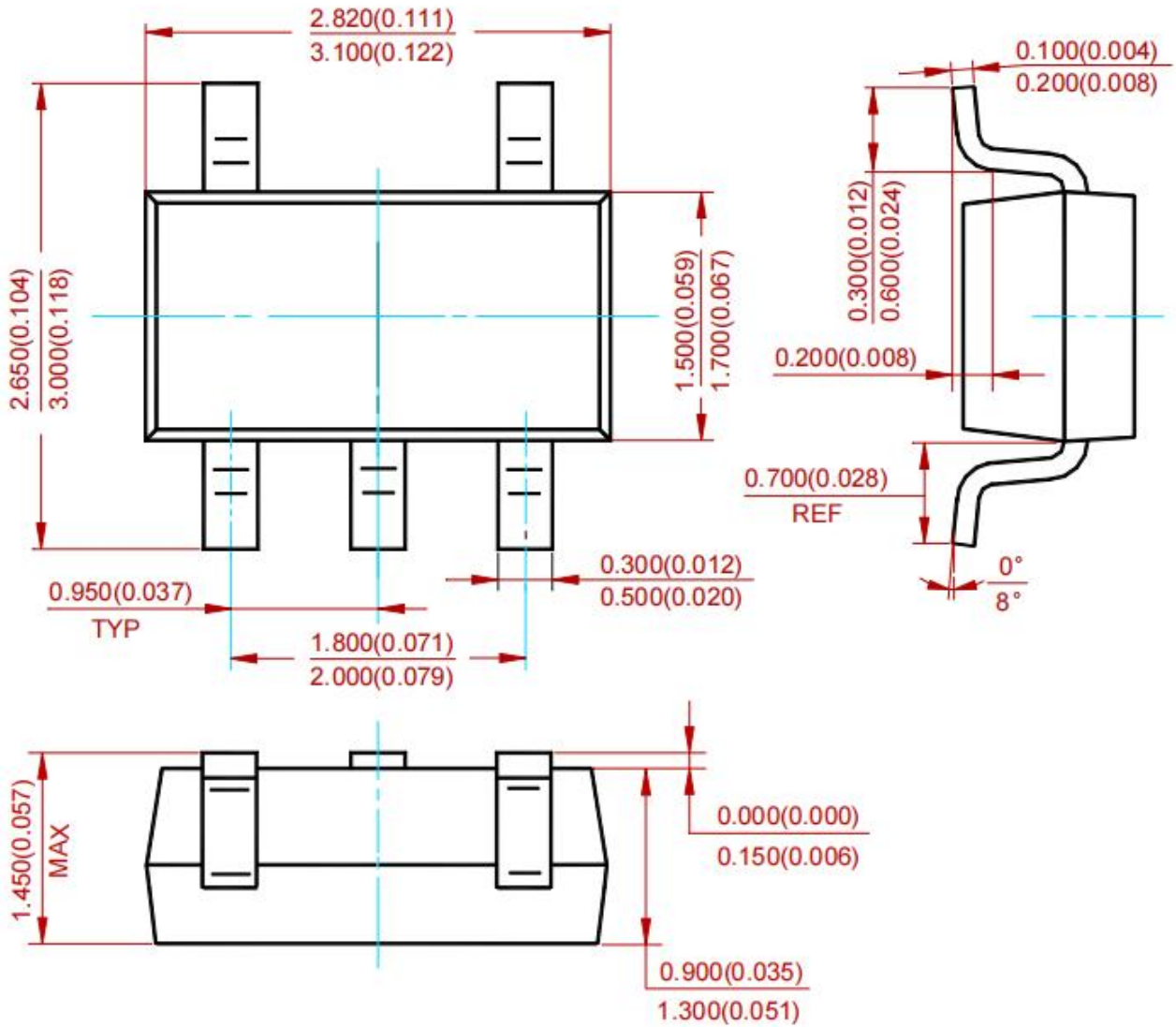
SC-70-5



Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X (mm)/(inch)	Y (mm)/(inch)	E (mm)/(inch)	E1 (mm)/(inch)
Value	2.740/0.108	1.140/0.045	0.400/0.016	0.800/0.031	1.300/0.051	0.650/0.026

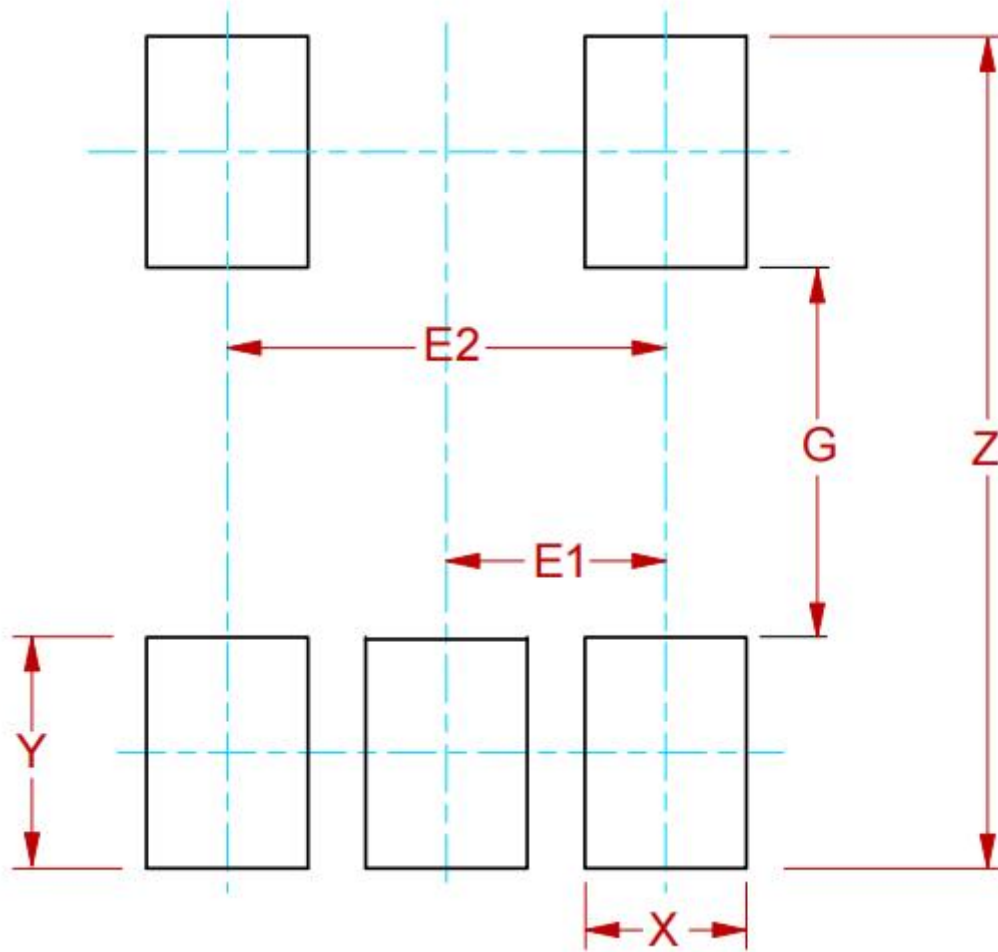
Package Outline Dimensions (All dimensions in mm(inch).)

SOT-23-5



Suggested Pad Layout

SOT-23-5



Dimensions	Z (mm)/(inch)	G (mm)/(inch)	X (mm)/(inch)	Y (mm)/(inch)	E1 (mm)/(inch)	E2 (mm)/(inch)
Value	3.600/0.142	1.600/0.063	0.700/0.028	1.000/0.039	0.950/0.037	1.900/0.075

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