1.Description

The small size and low power consumption (34μA per chan-nel maximum) of the OPA347 make it ideal for portable and battery-powered applications.

The input range of the UMW OPA347 extends 200 mV beyond the rails, and the output range is within 5mV of the rails. The UMW OPA347 also features an excellent speed/power ratio with a bandwidth of 350kHz.

The UMW OPA347 can be operated with a single or dual power supply from 2.3V to 5.5V. All models are specified for operation from –55°C to +125°C.

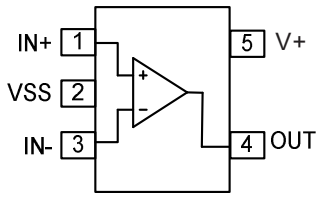
2.Features

- Low I_Q: 20μA
- High Speed/power Ratio With
- Bandwidth: 350kHz
- Rail-to-rail Input And Output
- Single Supply: 2.3V to 5.5V

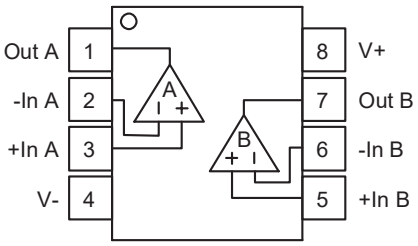
3.Applications

- Portable Equipment
- Battery-powered Equipment
- 2-wire Transmitters
- Smoke Detectors
- Co Detectors

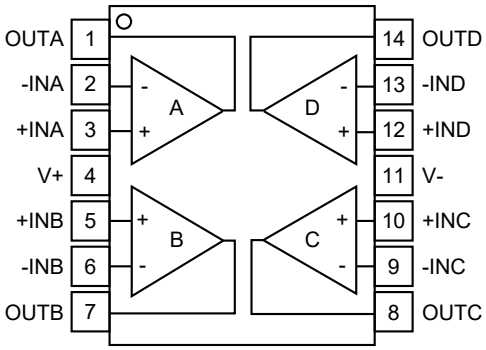
4.Pinning Information



OPA347
SC70-5



OPA2347
SOP-8



OPA4347
TSSOP-14/SOP-14

5.Absolute Maximum Ratings

Parameter	Value
Supply Voltage: V^+ - V^-	7.5V
Signal Input Terminals, Voltage	(V-) - 0.5V to (V+) + 0.5V
Current	10mA
Output Short-Circuit	Continuous
Operating Temperature	-65°C to 150°C
Storage Temperature	-65°C to 150°C
Junction Temperature	150°C

6.Electrical Characteristics:V_S=2.5V to 5.5V

Boldface limits apply over the specified temperature range, T_A=-55°C to +125°C.
At T_A=+25°C and R_L=100kΩ connected to V_S/2 V_{OUT}=V_S/2, unless otherwise noted.

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input Offset Voltage	V_{OS}	V_S=5.5V, V_{CM}=(V-) + 0.8V		2	6	mV
over Temperature				2	7	mV
Drift	dV_{OS}/dT			3		μV/°C
vs Power Supply	PSRR	V_S=2.5V to 5.5V, V_{CM}<(V+)-1.7V		60	175	μV/V
Over Temperature		V_S=2.5V to 5.5V, V_{CM}<(V+)-1.7V			300	μV/V
Channel Separation, DC				0.3		μV/V
		f=1kHz		128		dB
Common-Mode Voltage Range	V_{CM}		(V-)-0.2		(V+)+0.2	V
Common-Mode Rejection Ratio	CMRR	V_S=5.5V, (V-)-0.2V<V_{CM}<(V+)-1.7V	70	80		dB
Over Temperature		V_S=5.5V, V-<V_{CM}<(V+)-1.7V	66			dB
		V_S=5.5V, (V-)-0.2V<V_{CM}<(V+)+0.2V	54	70		dB
Over Temperature		V_S=5.5V, V-<V_{CM}<V+	48			dB
Input Bias Current	I_B			±0.5	±10	pA
Input Offset Current	I_{OS}			±0.5	±10	pA
Differential				10^{13}||3		Ω||pF
Common-Mode				10^{13}||6		Ω||pF
Noise		V_{CM}<(V+) - 1.7V				
Input Voltage Noise, f=0.1Hz to 10Hz				12		$μV_{PP}$
Input Voltage Noise Density, f=1kHz	e_n			60		nV/√Hz
Input Current Noise Density, f=1kHz	i_n			0.7		fA/√Hz
Open-Loop Voltage Gain	A_{OL}	V_S=5.5V, R_L=100kΩ 0.015V<V_O<5.485V	100	115		dB

Parameter	Symbol	Conditions	Min	Typ	Max	Units
over Temperature		V_S=5.5V, R_L=100kΩ 0.015V<V_O<5.485V	88			dB
		V_S=5.5V, R_L=5kΩ 0.125V<V_O<5.375V	100	115		dB
over Temperature (SC-70 only)	A_{OL}	V_S=5.5V, R_L=5kΩ	88			dB
		0.125V<V_O<5.375V	96	115		dB
Voltage Output Swing from Rail		R_L=100kΩ, A_{OL}>100dB		5	15	mV
over Temperature		R_L=100kΩ, A_{OL}>88dB			15	mV
		R_L=5kΩ, A_{OL}>100dB		90	125	mV
over Temperature		R_L=5kΩ, A_{OL}>88dB			125	mV
Short-Circuit Current	I_{SC}			±17		mA
Capacitive Load Drive	C_{LOAD}		See Typical Characteristics			
Frequency Response		C_L=100pF				
Gain-Bandwidth Product	GBW			350		kHz
Slew Rate	SR	G=+1		0.17		V/μs
Settling Time, 0.1%	t_s	V_S=5V, 2V Step, G=+1		21		μs
0.01%		V_S=5V, 2V Step, G=+1		27		μs
Overload Recovery Time		V_{IN} × Gain =V_S		23		μs
Specified Voltage Range	V_s		2.5		5.5	V
Minimum Operating Voltage				2.3		V
Minimum Operating Voltage (OPA347SA)				2.4		V
Quiescent Current (per amplifier)	I_Q	I_O=0		20	34	μA
over Temperature					38	μA

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Specified Range			-55		125	°C
Operating Range			-65		150	°C
Storage Range			-65		150	°C
Thermal Resistance	θ_{JA}					
SOT23-5 Surface-Mount				200		°C/W
SOT23-8 Surface-Mount				150		°C/W
SO-8 Surface-Mount				150		°C/W
SO-14 Surface-Mount				100		°C/W
TSSOP-14 Surface-Mount				100		°C/W
DIP-8				100		°C/W
SC70-5 Surface-Mount				250		°C/W
WCSP				250		°C/W

7.1 Typical characteristic

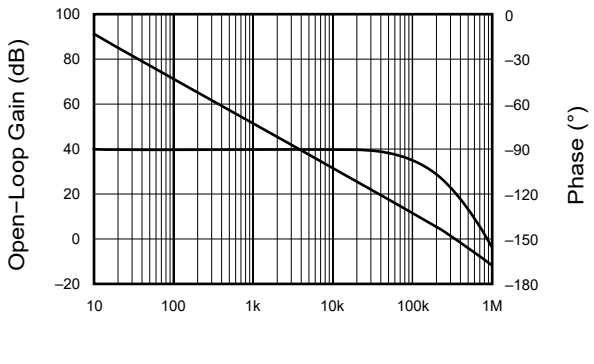


Figure 1: Open−loop Gain/phase vs Frequency

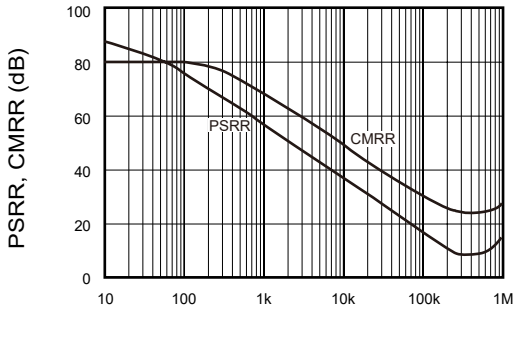


Figure 2: Power−supply Rejection Ratio And Common−mode Rejection Ratio vs Frequency

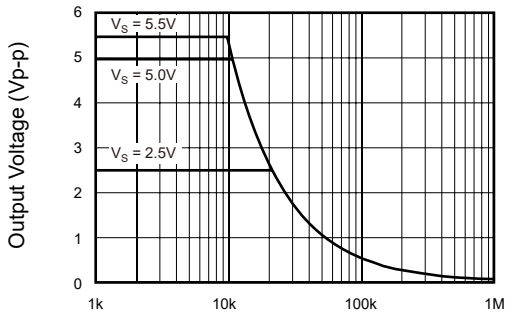


Figure 3: Maximum Output Voltage vs Frequency

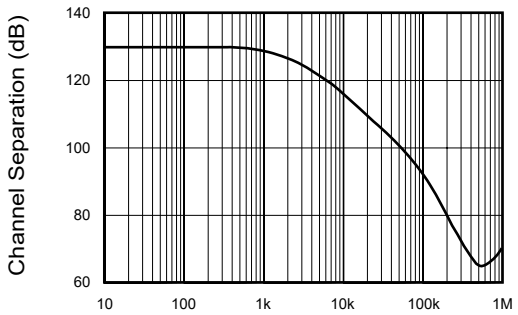


Figure 4: Channel Separation vs Frequency

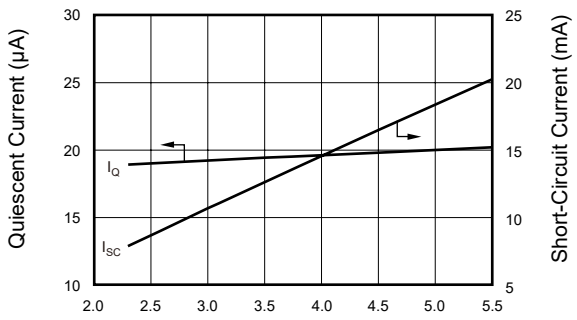


Figure 5: Quiescent And Short-circuit Current vs Supply Voltage

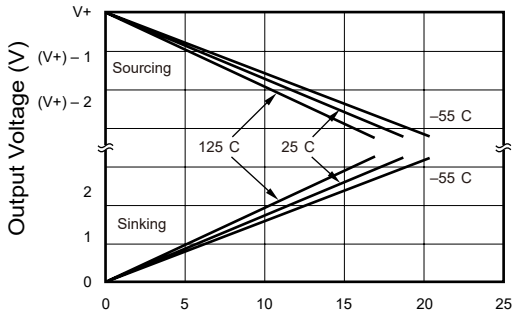


Figure 6: Output Voltage Swing vs Output Current

7.2 Typical characteristic

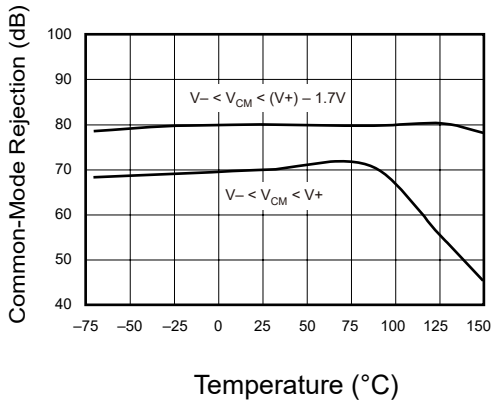


Figure 7: Common-mode Rejection vs Temperature

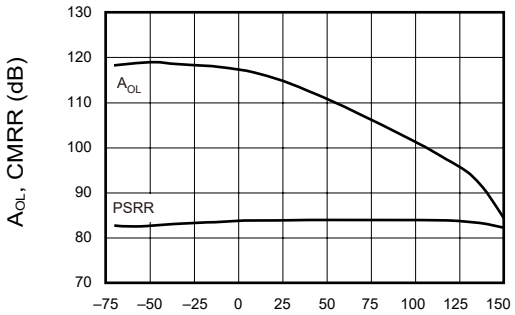


Figure 8: Open-loop Gain And Power-supply Rejection vs Temperature

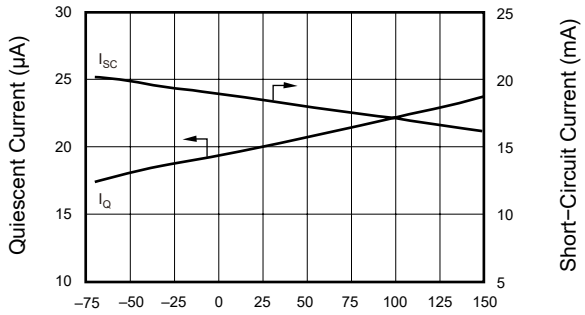


Figure 9: Quiescent And Short−circuit Current vs Temperature

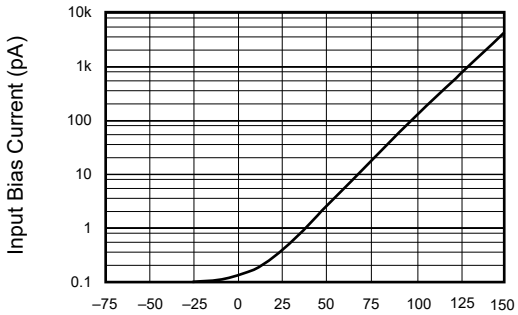


Figure 10: Input Bias Current vs Temperature

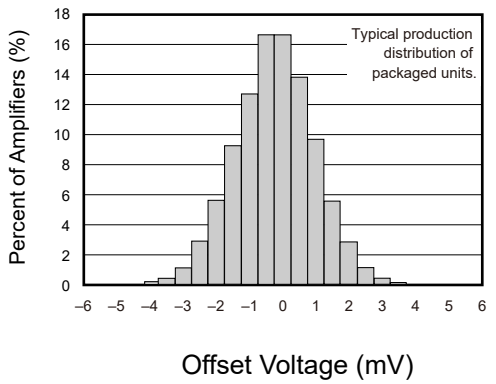


Figure 11: Offset Voltage Production Distribution

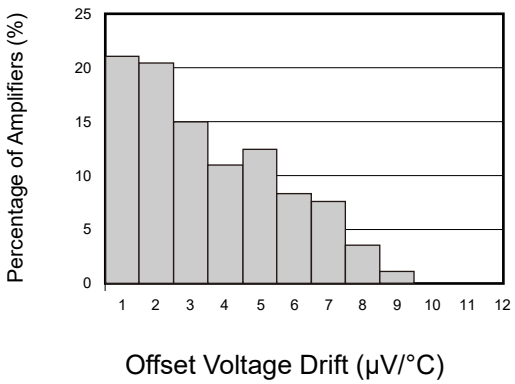


Figure 12: Offset Voltage Drift Magnitude Production Distribution

7.3 Typical characteristic

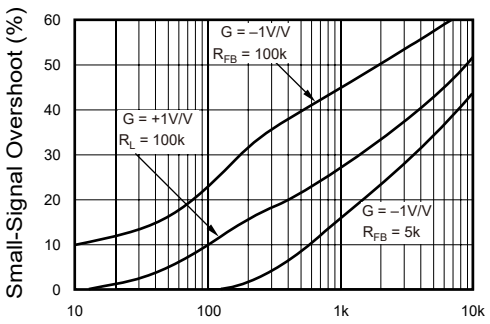


Figure 13: Small-signal Overshoot vs Load Capacitance

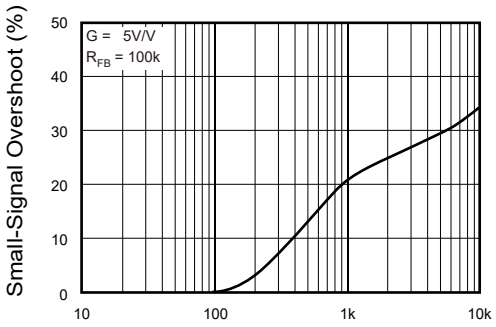


Figure 14: Small-signal Overshoot vs Load Capacitance

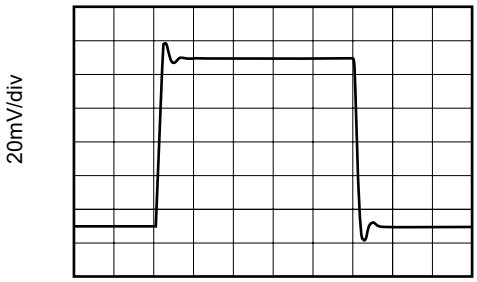


Figure 15: Small-signal Step Response G=+1V/V, R_L=100kΩ, C_L=100pF

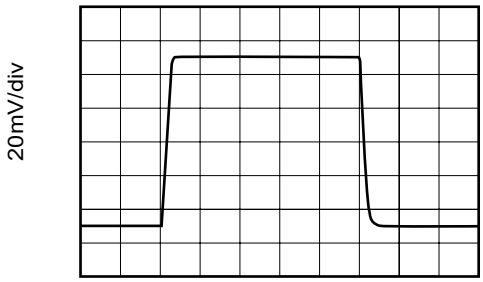


Figure 16: Small-signal Step Response G=+1V/V, R_L=5kΩ, C_L=100pF

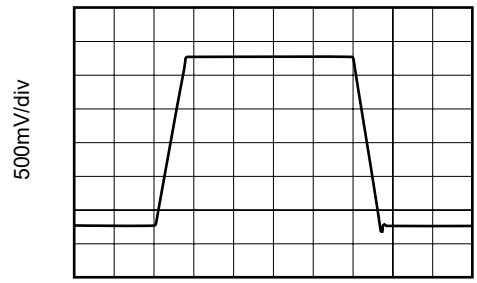


Figure 17: Large-signal Step Response G = +1V/V, R_L=100kΩ, C_L=100pF

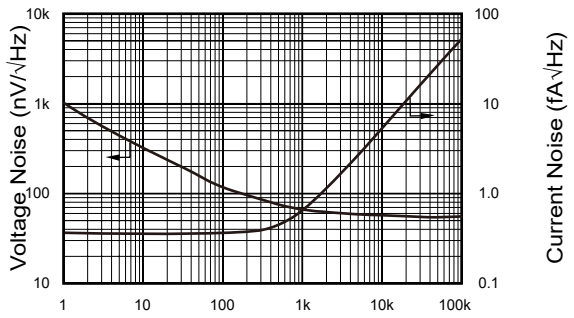
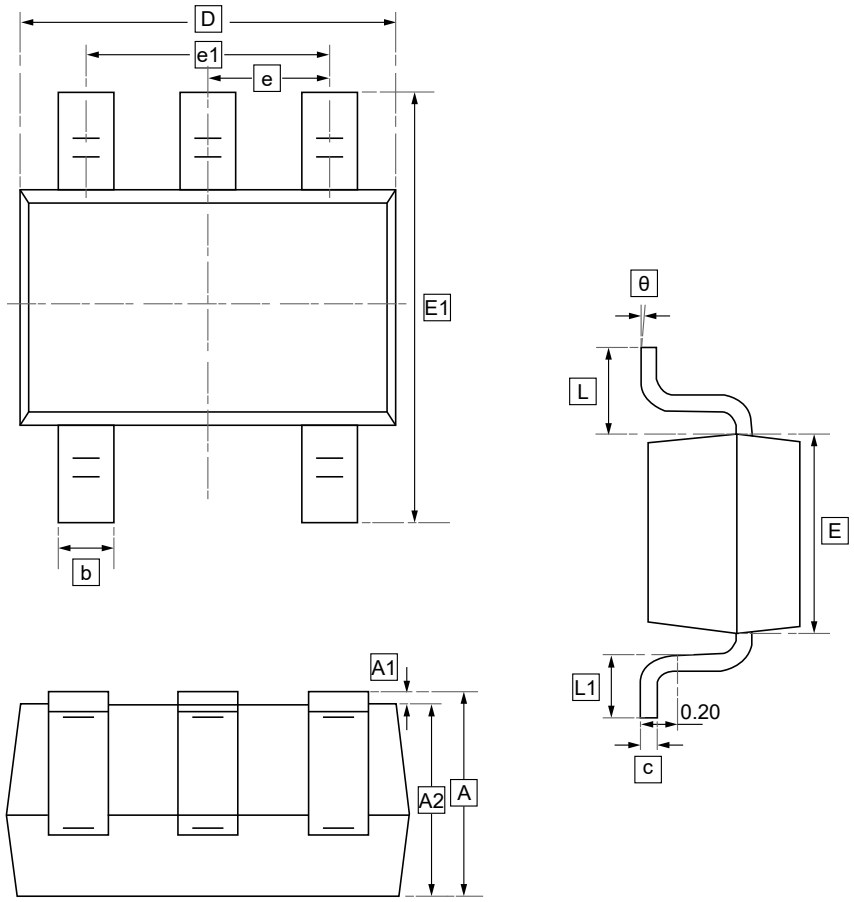


Figure 18: Input Voltage And Current Noise Spectral Density vs Frequency

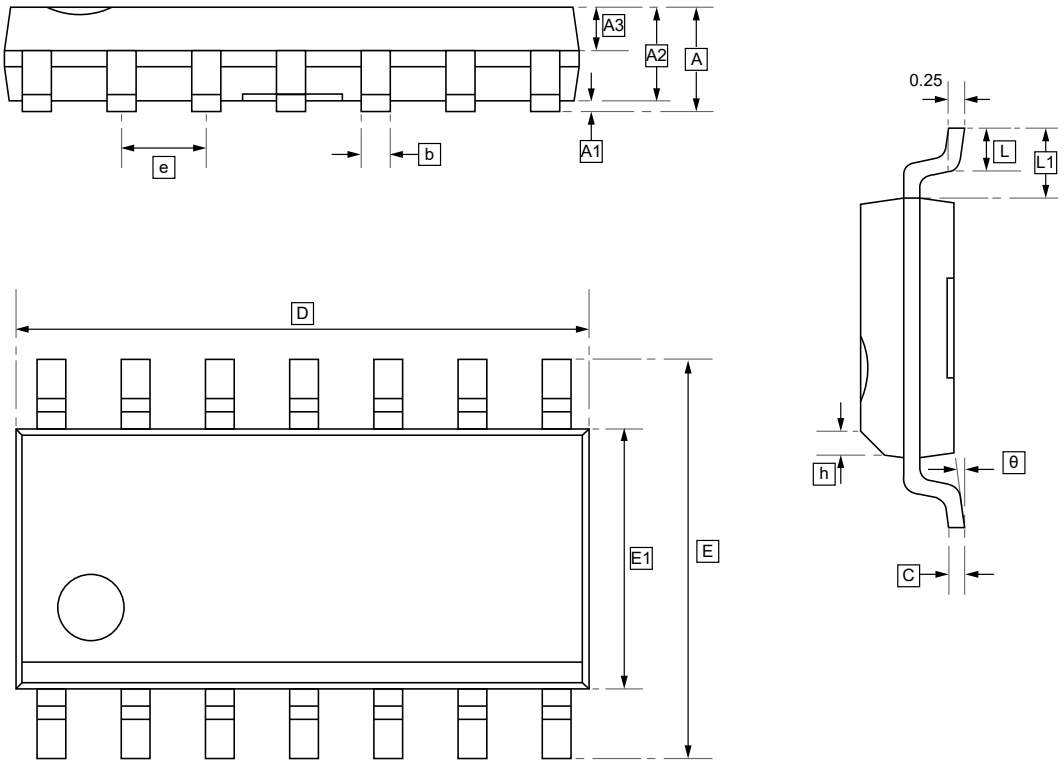
8.1 SC70-5 (SOT353) Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	e1	L	θ
Min	0.90	0.00	0.90	0.15	0.08	1.80	1.15	2.15	0.65	1.20	0.26	7°
Max	1.10	0.10	1.00	0.35	0.15	2.25	1.35	2.45	TYP	1.40	0.46	REF.

8.2 SOP-14 Package Outline Dimensions

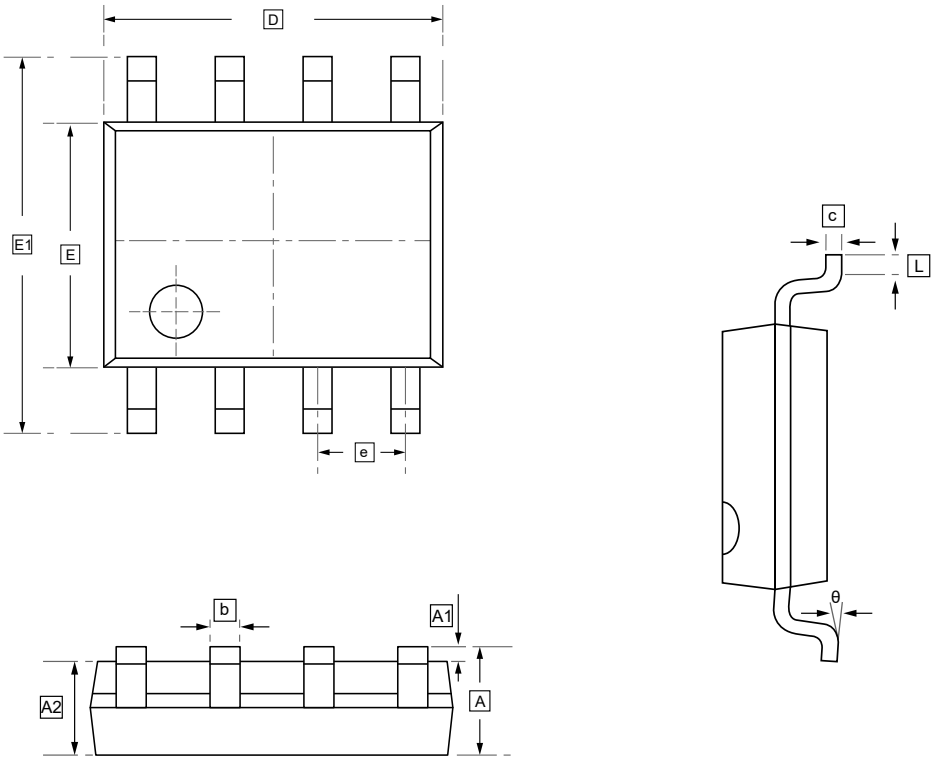


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	b	C	D	E	E1	e	h	L
Min	-	0.05	1.35	0.65	0.203	0.17	8.45	5.80	3.80	1.24	0.25	0.40
Max	1.75	0.25	1.55	0.75	0.305	0.25	8.85	6.20	4.00	1.30	0.50	0.80

Symbol	L1	θ
Min	1.00	0°
Max	1.10	8°

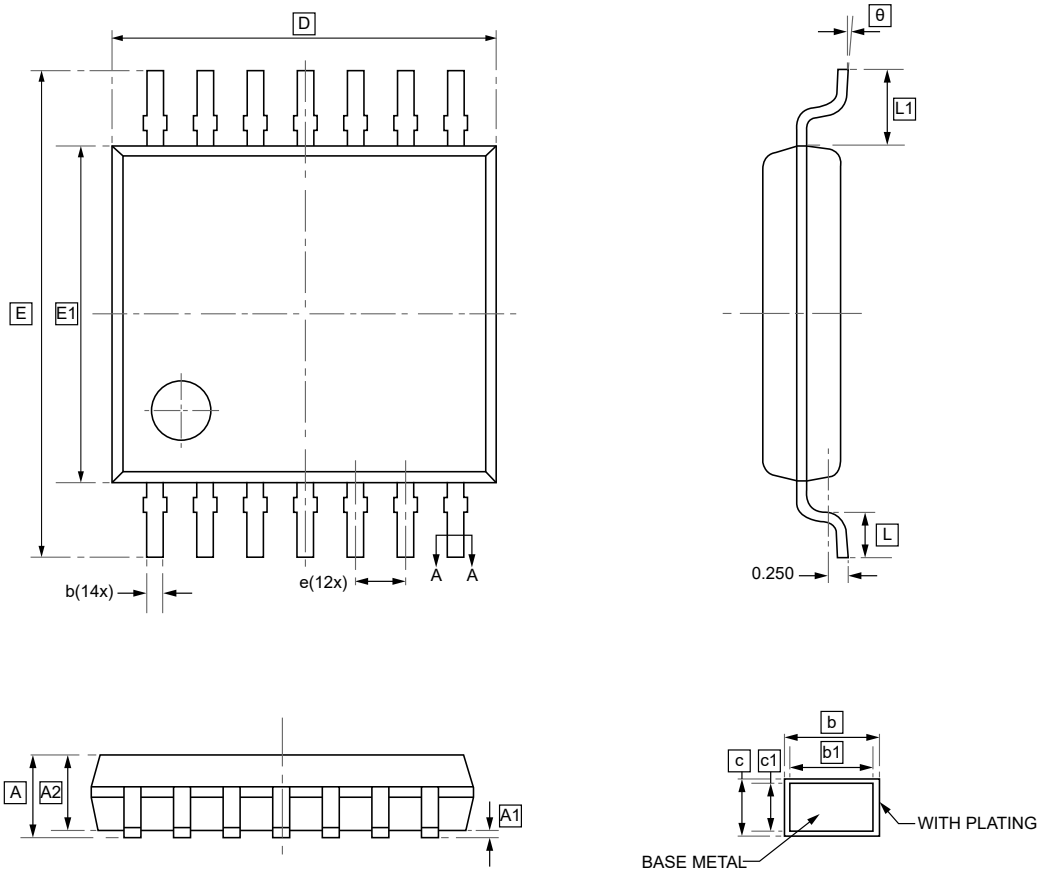
8.3 SOP-8 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	L	θ
Min	1.350	0.000	1.350	0.330	0.170	4.700	3.800	5.800	1.270	0.400	0°
Max	1.750	0.100	1.550	0.510	0.250	5.100	4.000	6.200	BSC	1.270	8°

8.4 TSSOP-14 Package Outline Dimensions



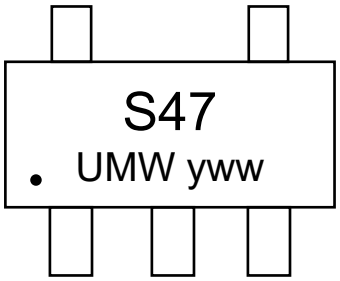
DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	b1	c	c1	D	E	E1	e	L1
Min	-	0.05	0.90	0.20	0.19	0.13	0.120	4.90	6.20	4.30	0.65	0.85
Max	1.20	0.15	1.05	0.28	0.25	0.17	0.14	5.10	6.60	4.50	BSC	1.15

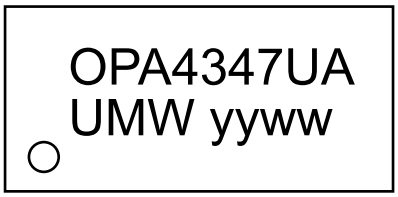
Symbol	L	θ
Min	0.45	0°
Max	0.75	8°

9.Ordering Information

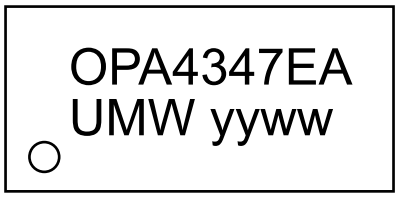
SC70-5



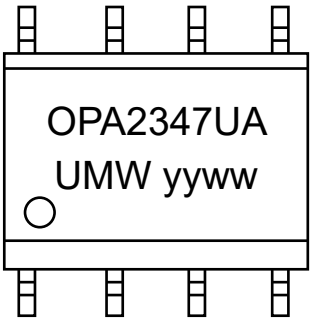
SOP-14



TSSOP-14



SOP-8



y: Year Code
yy: Year Code
ww: Week Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW OPA347SA	S47	SC70-5	3000	Tape and reel
UMW OPA4347UA	OPA4347UA	SOP-14	2500	Tape and reel
UMW OPA2347UA	OPA2347UA	SOP-8	2500	Tape and reel
UMW OPA4347EA	OPA4347EA	TSSOP-14	4000	Tape and reel

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