

**Product Information** 

#### **Product Features**

- DC 3.5 GHz
- +18.6 dBm P1dB at 1 GHz
- +36 dBm OIP3 at 1 GHz
- 14.8 dB Gain at 1 GHz
- 5.5 dB Noise Figure at 2 GHz
- Available in SOT-86, SOT-89 and lead-free / green SOT-89 Package Styles
- Internally matched to  $50 \Omega$

#### **Applications**

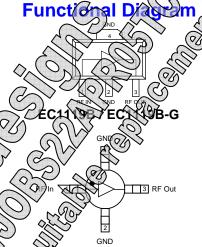
- Mobile Infrastructure
- CATV / DBS
- W-LAN / ISM
- RFID
- Defense / Homeland Security
- Fixed Wireless

#### **Product Description**

The EC1119 is a general-purpose buffer amplifier that offers high dynamic range in a low-cost surface-mount package. At 1 GHz, the EC1119 typically provides 14.8 dB of gain, +36 dBm Output IP3, and +18.6 dBm P1dB.

The EC1119 consists of Darlington pair amplifiers using the high reliability InGaP/GaAs HBT process technology and only requires DC-blocking capacitors, a bias residual and an inductive RF choke for operation. The devices ideal for wireless applications and is available in low-ost surface-mountable plastic SOT-86 and SOT-89 tackages. The EC1119 is also available in a lead-free/great these compliant SOT-89 package. All devices are to the RF and DC tested.

The broadband MMIC amplifier can be vicely applications various current and next generation whereas technologies such as GPRS, GSM, CDMA, and CDMA. In the EC1119 will work for other various applications within the DC to 3.5 GHz frequency cases such as TVV and fixed wireless.



EC1119C

# Specifications (1)

			_ <	
Parameter	Units	Min	TV	Max
Operational Bandwidth	MHz	DC	100	3500
Test Frequency	MHz		300	(Q)
Gain	dB		V4).8	6
Output P1dB	dBm	40	+18.6	
Output IP3 (2)	dBm	40	+36	
Test Frequency	MHz 🗸		2000	200
Gain	dB/C			
Large-signal Gain (3)	dB/	S	2	(4)
Input Return Loss	$(\mathcal{Q}_{\mathbb{D}})$		(S)0 (C	Z Z
Output Return Loss	700	0	247	5)
Output P1dB	dBm	8	(1) (A) (A)	)
Output IP3 (2)	/dBm	100	(3)	
Noise Figure	dB(	(C	2.5	
Device Voltage	N,	(2)	4.8	
Device Current		1200	80	
	$\sim$ ( $\odot$ )	V		<u> </u>

1. Test conditions unless once wise noted:  $\Sigma$  supply Voltage  $\pm 6$  V, Rbias = 15  $\Omega$ , 50  $\Omega$  System. 2. 30IP measured with two obes at an orbit over of  $\pm 5$  fixe tone separated by 1 MHz. The suppression on the largest IM3 profits is used to call ( $\Delta \sim 10^{-2}$ ) using a 2:1 rule.

# cal erformance (4)

	Office		ı y P	Ioui	
Frequency	MHz	500	900	1900	2140
S2	dB	15	14.8	13.8	13
(S)	dB	-32	-22.5	-20	-19.5
22	dB	-25.5	-25	-25	-25
Output P1dB	dBm	+19	+18.6	+18.6	+18.5
Output IP3 (2)	dBm	+36	+36	+33.2	+33
Noise Figure	dB	4.5	4.9	5	5.2

<sup>4.</sup> Test conditions:  $T = 25^{\circ}$  C, Supply Voltage = +6 V, Device Voltage = +6 V,  $R_{bias} = 15 \Omega$ ,  $50 \Omega$  System.

#### Absolute Maximum Rating

Parame Rating	
Operating Case Tells Fature -40 to +85 °C	
Storag -55 to +150 °C	
Device rreg 130 mA	
R Power continuous) +12 dBm	
on Teoperature +250 °C	

#### **Ordering Information**

Part No.	Description
EC1119B	InGaP HBT Gain Block (lead-tin SOT-89 Pkg)
EC1119B-G	InGaP HBT Gain Block (lead-free/green/RoHS-compliant SOT-89 Pkg)
EC1119C	InGaP HBT Gain Block (SOT-86 Pkg)

e above any of these parameters may cause permanent damage.

Large-signal gain is teled with an input of wer level of dB

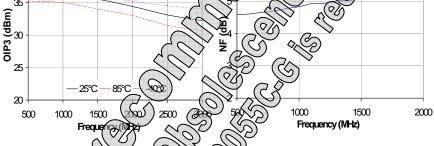


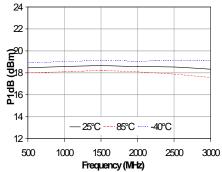
# Typical Device RF Performance Supply Bias = +6 V, $R_{bias}$ = 15 $\Omega$ , $I_{cc}$ = 80 mA

Frequency	MHz	100	500	900	1900	2140	2400	Co
S21	dB	15.2	15	15	14	13.5	13.3	1/2
S11	dB	-35	-33	-23	-20	-21	-212	N
S22	dB	-25	-25	-25	-25	-25	35	<b>)</b> -2
Output P1dB	dBm	+18.8	+18.6	+18.6	+18.6	+18/3	(485)	+1
Output IP3	dBm	+36	+36	+36	+33.2	+3200	32.4	72
Noise Figure	dB	4.4	4.6	4.8	5.1	5.2	5.4	
							/_	-

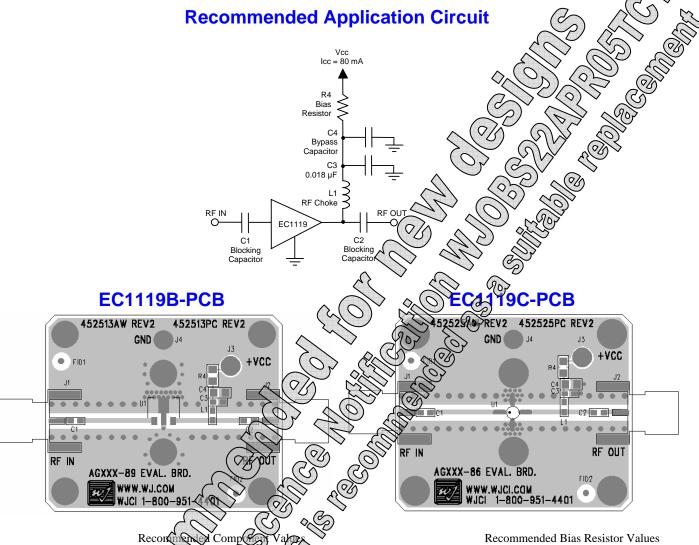
- 1. Test conditions:  $T = 25^{\circ}$  C, Supply Voltage = +6 V, Device Voltage = 4.8 V, Rbias = 15.0  $\Omega$ , Icc = 80 mA typical, 50  $\Omega$  System 2. 30IP measured with two tones at an output power of +5 dBm/tone separated by 1 MHz. The suppression on the largest IM3 pro 3. Data is shown as device performance only. Actual implementation for the desired frequency band will be determined by extern











3500

2200 2500 Designator 820 nH 22 nH 18 nH 15 nH C1, C2, C4 .018 uE 68 pF 56 pF 39 pF

1. The proper values for the ded frequency of operation.

Reference

50

2. The following values are	contained				adband performance:
NR.	Desiv.	Nalue / I	vie	Siz	e.

603 603
603
603
805

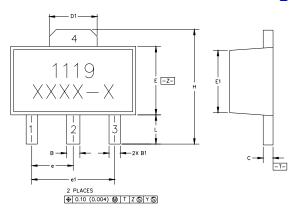
Supply Voltage	R1 value	Size
6 V	15.0 ohms	0805
7 V	27.5 ohms	1210
8 V	40 ohms	1210
9 V	53 ohms	2010
10 V	65 ohms	2010
12 V	90 ohms	2512

The proper value for R1 is dependent upon the supply voltage and allows for bias stability over temperature. WJ recommends a minimum supply bias of +6 V. A 1% tolerance resistor is recommended.

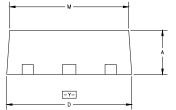
#### EC1119B (SOT-89 Package) Mechanical Information

This package may contain lead-bearing materials. The plating material on the leads is

#### **Outline Drawing**



SYMBOL	MIN	MAX	]
А	1,40 (.055)	1.60 (.063)	1
В	.44 (.017)	.56 (.022)	1
B1	.36 (.014)	.48 (.019)	]
С	.35 (.014)	.44 (.017)	
D	4.40 (.173)	4.60 (.181)	]
D1	1.62 (.064)	1.83 (.072)	
E	2.29 (.079)	2.60 (.102)	] .
E1	2.13 (.084)	2.29 (.090)	
e	(.0	BSC 59)	-
e1	(.1	BSC (18)	0/
н	3.94 (.155)	(167)	
	80	No	





- DIMENSIONS CONFORM WITH WHERE INDICATED.

#### 2. DIMENSIONS ARE EXPRESSED 3. DIMENSIONING AND TOLERANCE

or this part are the "Application

### SD Rating

Lion! ESD sensitive device.

ting: Class 1A

Passes between 250 and 500V Human Body Model (HBM) JEDEC Standard JESD22-A114

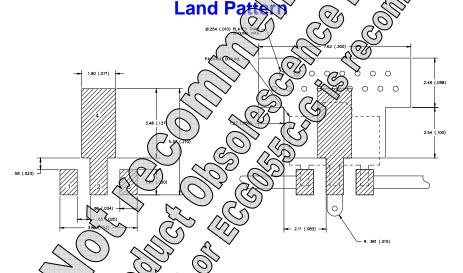
MSL Rating: Level 3 at +235° C convection reflow Standard: JEDEC Standard J-STD-020

# **Mounting Config. Notes**

- 1. Ground / thermal vias are critical for the proper performance of this device. Vias should use a .35mm (#80 / .0135") diameter drill and have a final plated thru diameter of .25 mm (.010").

  2. Add as much copper as possible to inner and outer layers near
- the part to ensure optimal thermal performance.
- Mounting screws can be added near the part to fasten the board to a heatsink. Ensure that the ground / thermal via region contacts the heatsink.
- 4. Do not put solder mask on the backside of the PC board in the region where the board contacts the heatsink.

  5. RF trace width depends upon the PC board material and
- construction.
- 6. Use 1 oz. Copper minimum.7. All dimensions are in millimeters (inches). Angles are in



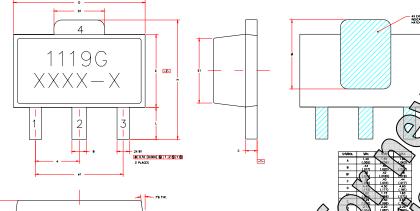


Product Information

#### EC1119B-G (Green / Lead-free SOT-89 Package) Mechanical Offerma

This package is lead-free/Green/RoHS-compliant. It is compatible with both lead-free (maximum 260°C reflow temperature) and laded (maximum 245°C reflow temperature) soldering processes. The plating material on the lead is the Au

#### **Outline Drawing**



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Tape and be pecific ons for this part are located to be well in the "Application Note" on the "Application of the control of t

### MSY ESD Rating

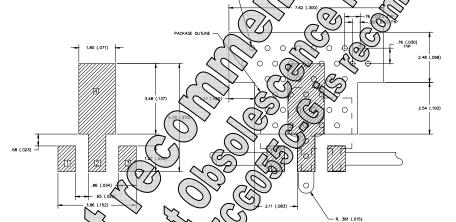
aution! ESD sensitive device.

Xating: Class 1A

Value: Passes between 250 and 500V Test: Human Body Model (HBM) Standard: JEDEC Standard JESD22-A114

MSL Rating: Level 3 at +260° C convection reflow Standard: JEDEC Standard J-STD-020

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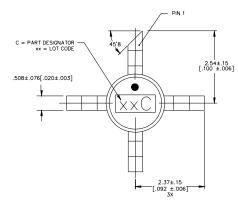
#### **Mounting Config. Notes**

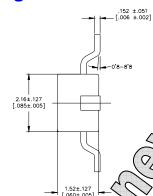
- 1. Ground / thermal vias are critical for the proper performance of this device. Vias should use a .35mm (#80 / .0135") diameter drill and have a final plated thru diameter of .25 mm (.010").
- Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.
- 3. Mounting screws can be added near the part to fasten the board to a heatsink. Ensure that the ground / thermal via region contacts the heatsink.
- Do not put solder mask on the backside of the PC board in the region where the board contacts the heatsink.
- RF trace width depends upon the PC board material and construction.
- 6. Use 1 oz. Copper minimum.
- 7. All dimensions are in millimeters (inches). Angles are in

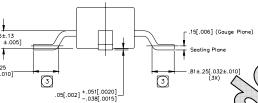


#### EC1119C (SOT-86 Package) Mechanical Information

#### **Outline Drawing**

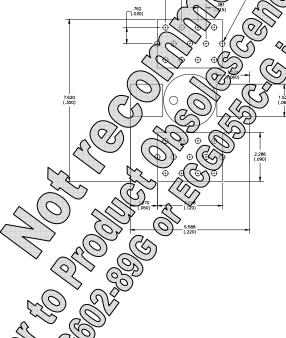








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on! ESD sensitive device.

Class 1A

Passes between 250 and 500V Human Body Model (HBM) JEDEC Standard JESD22-A114

SL Rating: Level 1 at +235° C convection reflow Standard: JEDEC Standard J-STD-020

### **Mounting Config. Notes**

- 1. Ground / thermal vias are critical for the proper performance of this device. Vias should use a .35mm (#80 / .0135") diameter drill and have a final plated thru diameter of .25 mm (.010").
- 2. Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.
- Mounting screws can be added near the part to fasten the board to a heatsink. Ensure that the ground / thermal via region contacts the heatsink.
- Do not put solder mask on the backside of the PC board in the region where the board contacts the heatsink.
- 5. RF trace width depends upon the PC board material and construction.
- Use 1 oz. Copper minimum.
- 7. All dimensions are in millimeters (inches). Angles are in degrees.



### Typical Device S-Parameters – EC1119B / EC1119B

S-Parameters ( $V_{device} = +4.8 \text{ V}$ ,  $I_{CC} = 80 \text{ mA}$ ,  $T = 25^{\circ}\text{C}$ , calibrated to device leads)

Freq (MHz)	S11 (dB)	S11 (ang)	S21 (dB)	S21 (ang)	S12 (dB)	S12 (ang)	S22 (JB)	S22 (ang)
50	-13.68	176.59	14.77	177.82	-18.65	-0.55	A-(6.68)	(3/2)
500	-14.01	153.66	14.53	159.01	-18.56	-7.01	( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	16,48
1000	-13.92	131.55	14.23	139.34	-18.53	-13.71	7	9123.Y1
1500	-13.50	111.69	13.78	120.21	-18.54	-20.59	P).64 (F	NO.08
2000	-13.09	94.24	13.37	101.77	-18.45	-27.67	-14.5	\$128.42
2500	-12.45	78.40	12.79	83.65	-18.45	-35.03	13-13-2 V	114
3000	-11.98	64.36	12.18	66.77	-18.45	-42.00	-13/14/VY	180
3500	-11.08	52.22	11.59	50.14	-18.54	-49.93	9080	89.41
4000	-10.24	41.68	11.01	34.26	-18.59	57.20	0	<b>(26)</b> 3.46
4500	-9.23	32.47	10.39	18.45	-18.76	63.04	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	67.58
5000	-8.35	25.22	9.77	3.11	-18.89	72.73	7.13	57.41
5500	-7.32	17.75	9.15	-11.87	-19.100	-80,58	-8000 CON	48.08
6000	-6.62	11.34	8.54	-26.85	-10:3	1-88/C	-500	38.50
					4-	111	(1)	

# **Typical Device S-Parar**

S-Parameters ( $V_{device} = +4.8$ ,  $I_{CC} = 80$  mA, T = 25°C, calibrated to  $\Phi$ 

	arameters (v			25 C, calibrate				gaa (370)	gaa ( )
F	req (MHz)	S11 (dB)	S11 (ang)	S21 (dB)	S21 (ang)	S12 (6.5)	S12 (2107)	S22 (dB)	S22 (ang)
	50	-29.84	171.31	15.62	178.01	-188340	(0)	-33.15	-0.11
	500	-27.21	114.27	15.45	161 35	( ( ( ) ) ( )	(98).23	-36.51	-20.37
	1000	-23.51	84.84	15.11	1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Man C	554.15	-38.59	-13.39
	1500	-21.04	60.73	14.59	7/120.59	N8.14 (	-6.46	-40.63	-110.86
	2000	-18.84	47.72	14:10	0 110.74	3×18.6	-8.51	-32.74	167.54
	2500	-18.08	38.70	13.440	> 356(0)	-18	-11.20	-27.40	153.51
	3000	-17.09	29.43			-630	-13.35	-22.54	141.19
	3500	-16.67	28.85	(16.30)	68.64	C. S.	-16.25	-20.09	131.04
	4000	-17.03	26.34	0	$-(2)^{20}$	8.24	-18.90	-17.22	125.60
	4500	-16.76	25.72	VZ)19 (	$C_{0}^{2/4}$ $C_{0}^{2}$	2-18.07	-22.13	-15.23	115.08
	5000	-17.03	33.78	70.75	30.35	) -17.98	-25.40	-13.55	108.62
	5500	-17.23	37.90	10.27	2 17.66	-17.87	-29.21	-12.07	99.49
	6000	-16.53	4534	9.88	5.47 for coload off	-17.79	-32.98	-10.88	92.53
					S)				
							Specifications a	nd information are	subject to chang
W.I.Communi	cations Inc.	Dhono 1 900 W I1	4404 - EAV: 400 F	77 6621 + 0 moi	il: coloc@wi.com. +	Mob cito: ununu uri	000		Dogo 7