Wafer Level Package Evaluation RC Filter Network

Features

- 6 Filters per device
- Ultra small footprint, 0.5mm pitch
- Silicon substrate
- 0.30mm Eutectic Solder Bumps

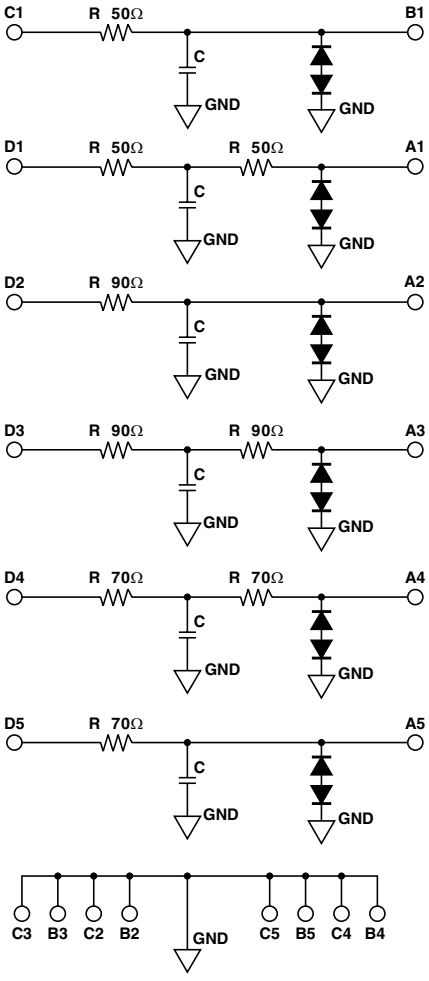
Applications

- EMI filter for Mobile Equipment (e.g. Cellular Phones)
- Evaluation Device

Product Description

The WLP200 consists of 6 RC filters with different filter characteristics in a wafer level package (WLP). All I/O pins are ESD protected for contact discharges up to 8KV per the IEC1000-4-2 level 4 specification. Two versions with different capacitor values are available. Cellular phone application frequently demands filtering of signals in the 800 to 2,700 MHz band. California Micro Devices' unique thin film Flip Chip filters provide a minimum of –30 dB of attenuation over this frequency band. The bump size and pitch of these filters are selected such that the device can be placed directly on a FR4 printed circuit board using conventional assembly techniques. Ground-bounce and cross-talk are minimized by a die design that provides eight solder bump contacts to the common supply connection. The solder bump contacts are a 63/37 Sn/Pb alloy and are nominally 0.30 mm in diameter.

SCHEMATIC DIAGRAM



C1460800

STANDARD VALUES	
Absolute Tolerance R	±10%
Absolute Tolerance C	±20%
TCR of Resistors	±100ppm
Operating Temperature Range	–40°C to 85°C
Leakage Current @ ±6V	<1µA
Power Rating/Resistor	100mW

ELECTRICAL CHARACTERISTICS OF WLP200-01							
Filter	**Filter Type**	**Input Pin**	**Output Pin**	**R(Ω)**	**C(pF)**	**Fc (Note 1)**	**Fc (Note 2)**
#1	TF	C1	B1	50	135	23.6MHz	36.0MHz
#2	T	D1	A1	50	135	23.6MHz	23.6MHz
#3	TF	D2	A2	90	135	13.1MHz	32.8MHz
#4	T	D3	A3	90	135	13.1MHz	18.5MHz
#5	T	D4	A4	70	135	16.8MHz	21.6MHz
#6	TF	D5	A5	70	135	16.8MHz	34.1MHz

ELECTRICAL CHARACTERISTICS OF WLP200-02							
Filter	**Filter Type**	**Input Pin**	**Output Pin**	**R(Ω)**	**C(pF)**	**Fc (Note 1)**	**Fc (Note 2)**
#1	TF	C1	B1	50	190	16.7MHz	25.7MHz
#2	T	D1	A1	50	190	16.7MHz	18.0MHz
#3	TF	D2	A2	90	190	9.30MHz	23.2MHz
#4	T	D3	A3	90	190	9.30MHz	13.2MHz
#5	T	D4	A4	70	190	12.0MHz	15.3MHz
#6	TF	D5	A5	70	190	12.0MHz	24.4MHz

* Note 1: Calculated with zero Source impedance and infinite Load impedance.
* Note 2: Calculated with 50Ω Source impedance and 50Ω Load impedance.

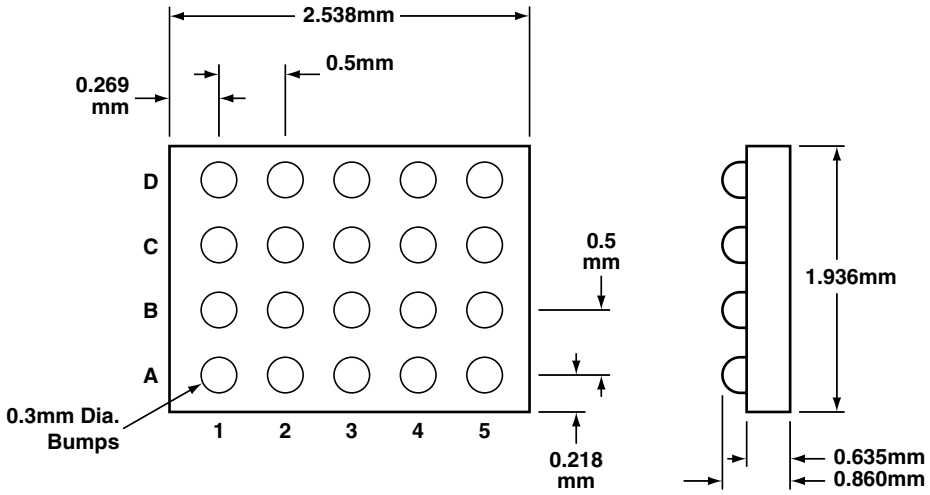


Figure 2. WLP200 Package Diagram (View of the Bump side)

PRINTED CIRCUIT BOARD RECOMMENDATIONS	
Pad Size on PCB	0.275mm
Pad Shape	Round
Pad Definition	Non Solder Mask Defined Pads (NSMD)
Solder Mask Opening	0.325mm
Solder Stencil Thickness	0.152mm
Solder Stencil Aperture Opening	0.33mm (sq.)
Solder Flux Ratio	50/50
No Clean Solder Paste	
Bond Trace Finish	OSP (Entek Cu Plus 106A)

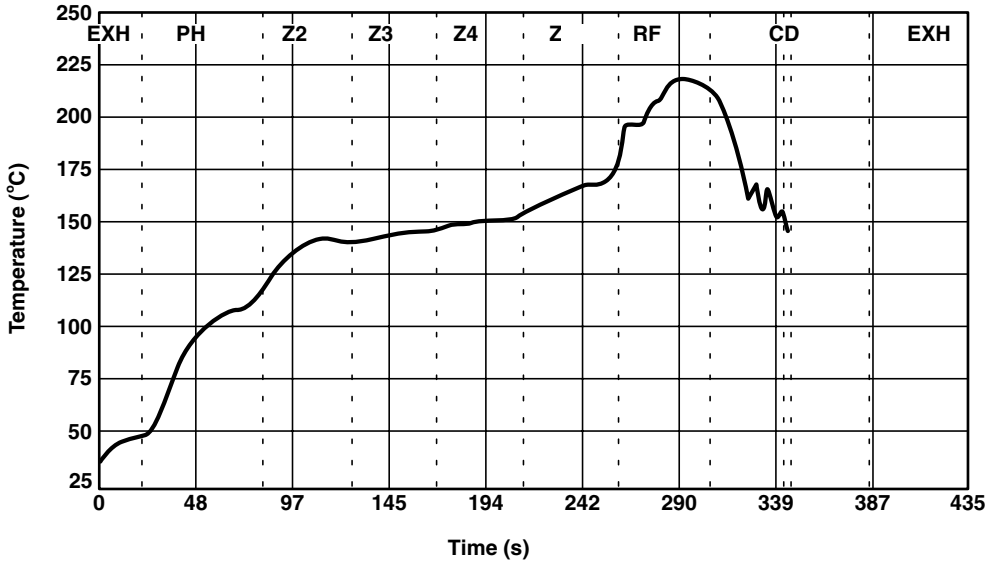
ESD SPECIFICATIONS		
ESD Protection (Guaranteed by Design)	**MIN**	**MAX**
Peak Discharge Voltage at any I/O, Human Body Model, Method 3015 (Note 1)	–15KV	15KV
In System Protection, IEC 1000-4-2, Level 4 (Note 2 & 3)	–8KV	8KV
Channel Clamp Voltage @ 8KV ESD Pulses, Human Body Model (Notes 1 & 2)	–30V	30V

Note 1: Human Body Model per MIL-STD-883, Method 3015
$C_{Discharge}$ = 100pF, $R_{Discharge}$ = 1.5KΩ, pins B2, C2, B3, C3, B4, C4, B5, C5 are at ground.
ESD Contact Discharge from pins B1, A1, A2, A3, A4 and A5 one at a time.

Note 2: Pins B2, C2, B3, C3, B4, C4, B5, C5 are grounded. ESD Contact Discharge between pins B1, A1, A2, A3, A4 and A5 and ground one at a time.

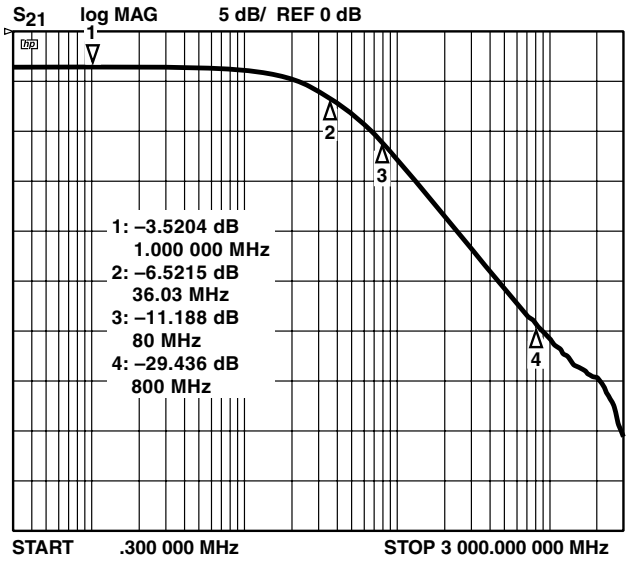
Note 3: Standard IEC 1000-4-2 with $C_{Discharge}$ = 150pF, $R_{Discharge}$ = 330Ω, pins B2, C2, B3, C3, B4, C4, B5, C5 are at ground.

Typical Solder Reflow Thermal Profile (No Clean Flux)

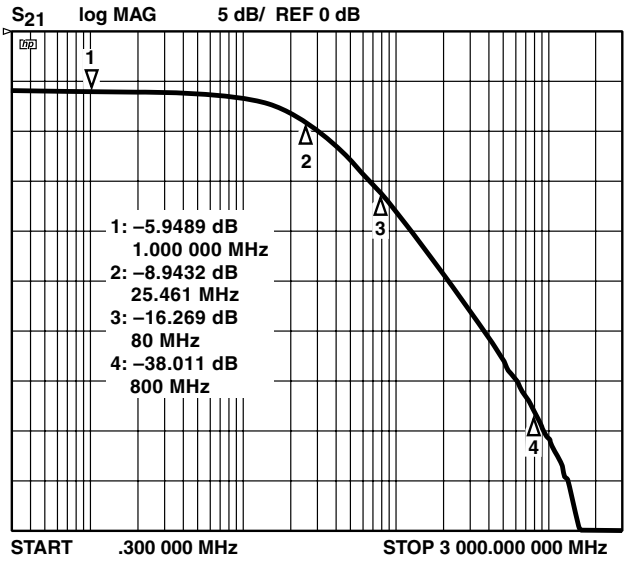


WLP200-01 FILTER CHARACTERISTICS (S21) MEASUREMENT

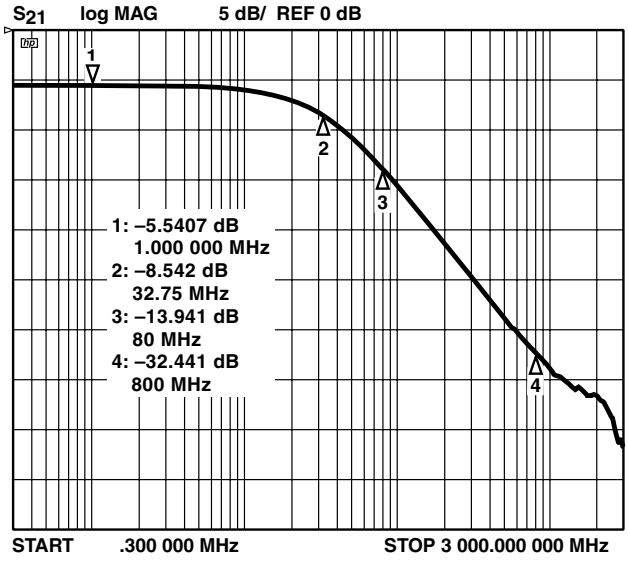
NOTE: All the measurements are done with 50Ω-source & 50Ω-load impedance using a HP8753C Network Analyzer with a HP85047A S-parameter Test Set.



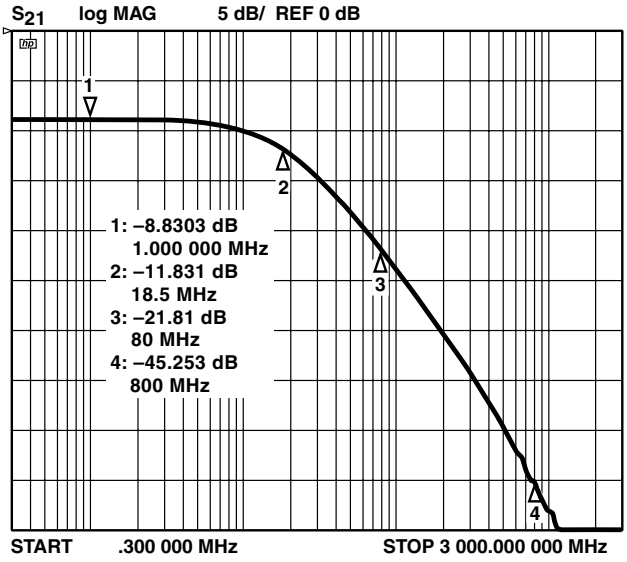
WLP200-01 Filter #1 C1-B1



WLP200-01 Filter #2 D1-A1



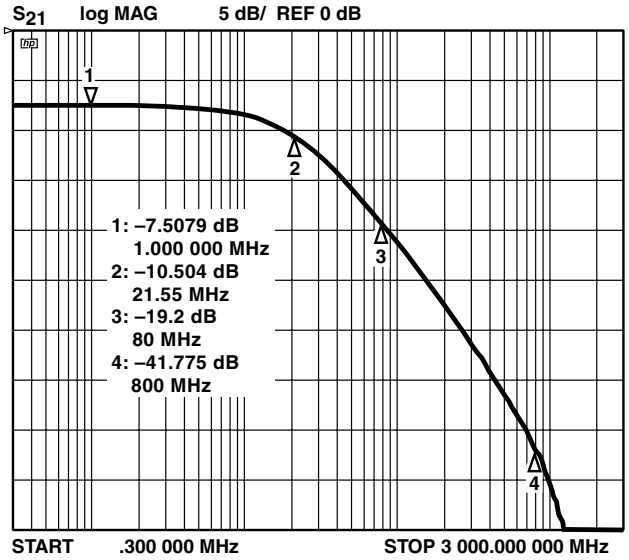
WLP200-01 Filter #3 D2-A2



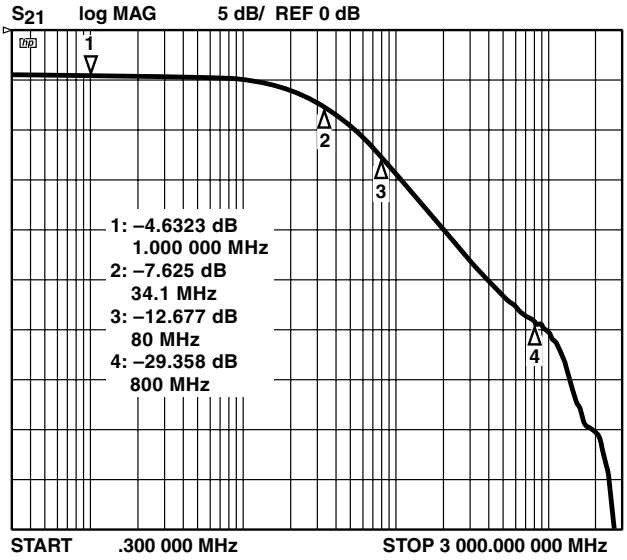
WLP200-01 Filter #4 D3-A3

WLP200-01 FILTER CHARACTERISTICS (S21) MEASUREMENT (Continued)

NOTE: All the measurements are done with 50Ω-source & 50Ω-load impedance using a HP8753C Network Analyzer with a HP85047A S-parameter Test Set.



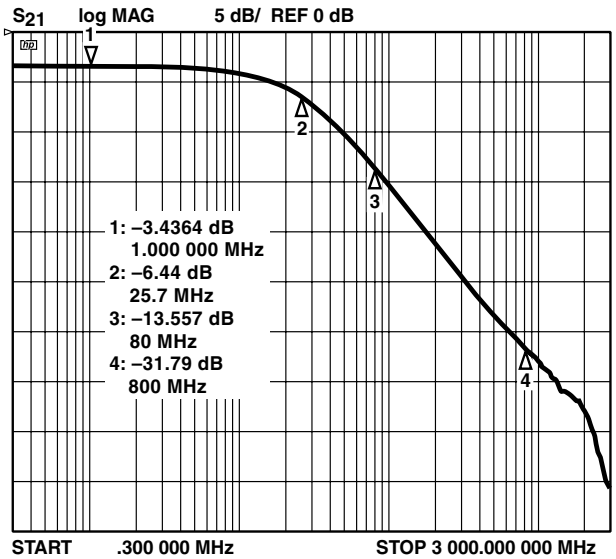
WLP200-01 Filter #5 D4-A4



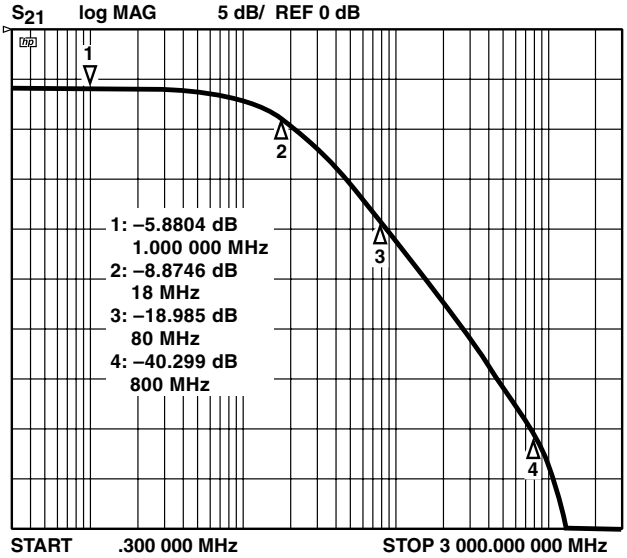
WLP200-01 Filter #6 D5-A5

WLP200-02 FILTER CHARACTERISTICS (S21) MEASUREMENT

NOTE: All the measurements are done with 50Ω-source & 50Ω-load impedance using a HP8753C Network Analyzer with a HP85047A S-parameter Test Set.



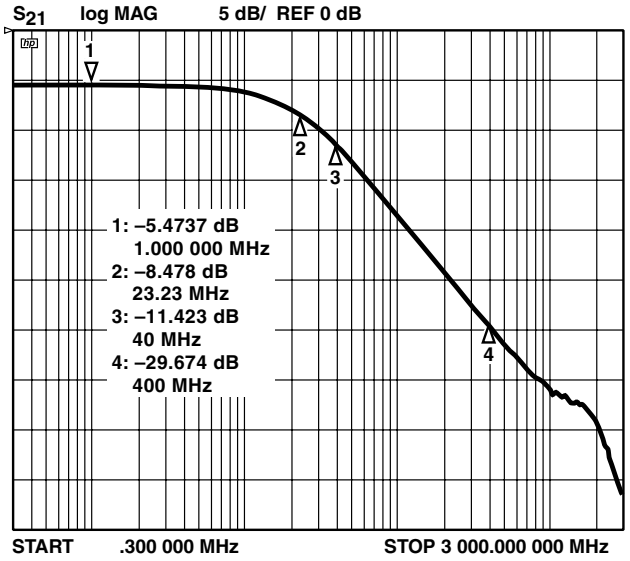
WLP200-02 Filter #1 C1-B1



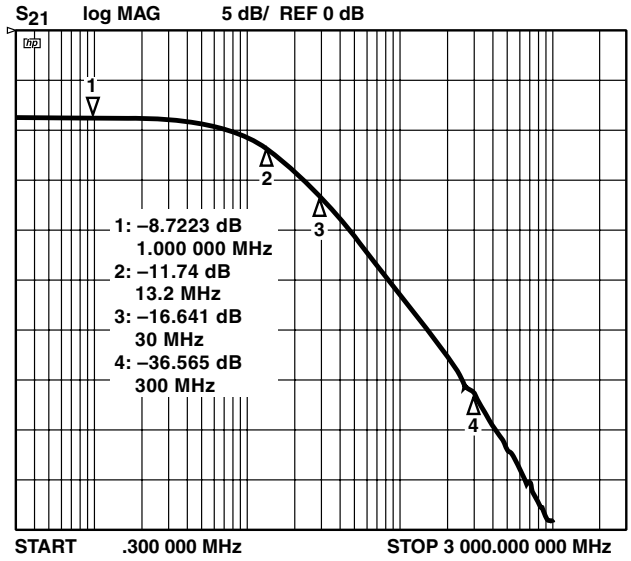
WLP200-02 Filter #2 D1-A1

WLP200-02 FILTER CHARACTERISTICS (S21) MEASUREMENT (Continued)

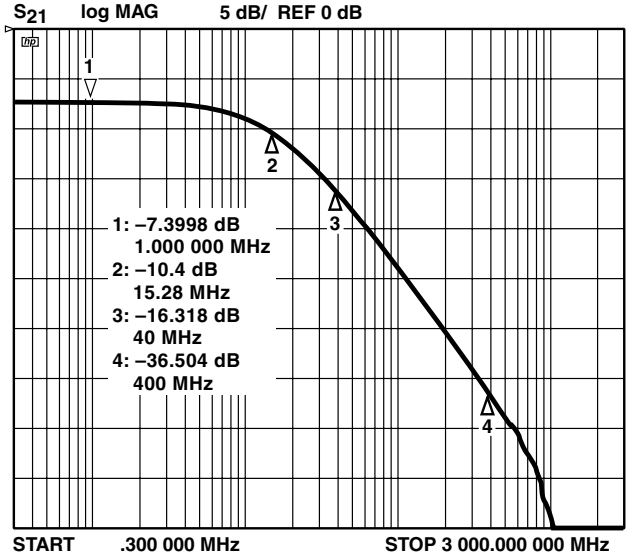
NOTE: All the measurements are done with 50Ω-source & 50Ω-load impedance using a HP8753C Network Analyzer with a HP85047A S-parameter Test Set.



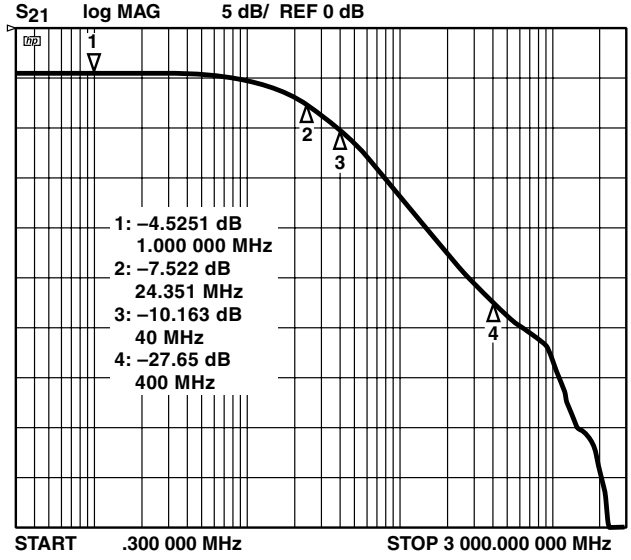
WLP200-02 Filter #3 D2-A2



WLP200-02 Filter #4 D3-A3



WLP200-02 Filter #5 D4-A4



WLP200-02 Filter #6 D5-A5