

# PIONEER CIRCUITS, INC. TECHNOLOGY ROADMAP

TECHNOLOGY		2002		2003				2004				
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
<b>TECHNOLOGY DRIVER</b>	<b>PACKAGING</b>	LINE WIDTH/ SPACE	.004/.004		.004/.004		.003/.004					
		BLIND & BURIED VIAS	TO 16 LAYERS		TO 24 LAYERS		TO 28 LAYERS		30 LAYERS			
		MICROVIAS	0.006				0.005					
		MINIMUM THRU VIA SIZE	9 mil				8 mil			6 mil		
		ASPECT RATIO	8:1		9:1		10:1		12:1		14:1	
			Develop Process		Standard Production							
						0.0135		0.01		0.009		
		MAX LAYER COUNT	30 LAYERS		36 LAYERS		40 LAYERS		>40 LAYERS			
		EMBEDDED RESISTORS	Develop Process				Limited Production		Standard Production			
		EMBEDDED CAPACITANCE	Develop Process				Standard Production		Standard Production			
		THIN CORE	Develop Process		Standard Production							
		REGISTRATION					DRILL+ .014		DRILL +.012		DRILL +.010	
		Develop Process		Standard Production								
	<b>PRICE</b>	EPOXY RIGID LAMINATES & NO FLOW PREPREGS	Develop Process		Standard Production							
		Develop Process				Limited Production				Standard Production		
						Develop Process				Limited Production		
	<b>PERFORMANCE</b>	HIGH SIGNAL SPEED/ LOW LOSS MATERIALS (ROGERS 4000 SERIES)	Develop Process		Limited Production				Standard Production			
						Develop Process				Limited Production		
		CONTROLLED IMPEDANCE TOLERANCE (SINGLE ENDED)		+/- 10%		+/-7%		+/-5%				
		THERMAL MANAGEMENT		CONSTANTAN W/CONTROLLED RESISTANCE		"ADHESIVELESS" CONSTANTAN						