OpenGL Capabilities Tables

 Developer

OpenGL Capabilities Tables
This table lists Legacy OpenGL extensions and parameter values reported for macOS 10.7.5. Click the name of a reported extension to view its specification.

	HD Graphics 4000	HD Graphics 3000	GMA X3100	GMA 950	GeForce 650	Quadro FX 4800	GeForce 9400/285/320/330	Quadro FX 5600	GeForce 8600/8800/9600/120/130	Quadro FX 4500	GeForce 7300/7600	Radeon HD 5670/5750/5770/5870/6630/6750/6770/6970	Radeon HD 6490	Radeon HD 2600/4670/4850/4870	Radeon HD 2400	Radeon X1600/X1900	Software Renderer
OpenGL Version	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	1.4	2.1	2.1	2.1
GLSL Version	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
ARB_color_buffer_float	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓			✓	✓
ARB_depth_buffer_float	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓			✓	✓
ARB_depth_clamp	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
ARB_depth_texture	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_draw_buffers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
ARB_draw_elements_base_vertex	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_draw_instanced	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓			✓	✓
ARB_fragment_program	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_fragment_program_shadow	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_fragment_shader	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_framebuffer_object	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓			✓	✓
ARB_framebuffer_sRGB	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓			✓	✓
ARB_half_float_pixel	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
ARB_half_float_vertex	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
ARB_imaging	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
ARB_instanced_arrays	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_multisample	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	~	~	✓	✓
ARB_multitexture	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_occlusion_query	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
ARB_pixel_buffer_object	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_point_parameters	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_point_sprite	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_provoking_vertex	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
ARB_seamless_cube_map	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓			✓	✓
ARB_shader_objects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_shader_texture_lod	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
ARB_shading_language_100	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_shadow	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_shadow_ambient	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_sync	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_border_clamp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_compression	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_compression_rgtc	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓			✓	✓

Extension																	
ARB_texture_cube_map	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_env_add	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_env_combine	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_env_crossbar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_env_dot3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_float	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_mirrored_repeat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_non_power_of_two	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_rectangle	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_rg	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_transpose_matrix	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_vertex_array_bgra	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_vertex_blend	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_vertex_buffer_object	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_vertex_program	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_vertex_shader	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_window_pos	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_abgr	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_bgra	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_bindable_uniform	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓				
EXT_blend_color	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_blend_equation_separate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_blend_func_separate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_blend_minmax	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_blend_subtract	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_clip_volume_hint	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_debug_label																	
EXT_debug_marker																	
EXT_depth_bounds_test	✓						✓	✓	✓	✓	✓	✓	✓				
EXT_draw_buffers2	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓		✓	✓	✓
EXT_draw_range_elements	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_fog_coord	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_framebuffer_blit	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_framebuffer_multisample	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓		✓	✓	✓
EXT_framebuffer_multisample_blit_scaled	✓								✓	✓	✓	✓	✓				
EXT_framebuffer_object	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_framebuffer_sRGB	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_geometry_shader4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_gpu_program_parameters	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_gpu_shader4	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓				
EXT_multi_draw_arrays	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_packed_depth_stencil	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_packed_float	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓		✓	✓	✓
EXT_provoking_vertex	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_rescale_normal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_secondary_color	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_separate_specular_color	✓	✓	✓	✓	✓	✓	~	~	~	~	~	~	~	✓	✓	✓	✓
EXT_shadow_funcs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_stencil_two_side	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_stencil_wrap	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_array	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_compression_dxt1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_compression_s3tc	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_env_add	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_filter_anisotropic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_integer	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓		✓	✓	✓

Extension																
EXT_texture_lod_bias	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_mirror_clamp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
EXT_texture_rectangle	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_shared_exponent	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓			✓	✓
EXT_texture_sRGB	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_sRGB_decode	✓		✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_timer_query			✓	✓	✓	✓			✓	✓	✓	✓	✓				
EXT_transform_feedback	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
EXT_vertex_array_bgra	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	
APPLE_aux_depth_stencil	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
APPLE_client_storage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_element_array	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_fence	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_float_pixels	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
APPLE_flush_buffer_range	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_flush_render	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_object_purgeable		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_packed_pixels	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_pixel_buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_rgb_422	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_row_bytes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_specular_vector	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_texture_range	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_transform_hint	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_vertex_array_object	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_vertex_array_range	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_vertex_point_size	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_vertex_program_evaluators	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_ycbcr_422	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ATI_blend_equation_separate		✓	✓	✓	✓	✓											
ATI_blend_weighted_minmax		✓	✓	✓	✓	✓											
ATI_separate_stencil	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
ATI_texture_compression_3dc	✓	✓	✓	✓	✓	✓											
ATI_texture_env_combine3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ATI_texture_float	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
ATI_texture_mirror_once	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
IBM_rasterpos_clip	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_blend_square	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_conditional_render	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
NV_depth_clamp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
NV_fog_distance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
NV_fragment_program2							✓	✓	✓	✓	✓	✓	✓				
NV_fragment_program_option							✓	✓	✓	✓	✓	✓	✓				
NV_light_max_exponent	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_multisample_filter_hint							✓	✓	✓	✓	✓	✓	✓				
NV_point_sprite							✓	✓	✓	✓	✓	✓	✓				
NV_texgen_reflection	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_texture_barrier																	
NV_vertex_program2_option							✓	✓	✓	✓	✓	✓	✓				
NV_vertex_program3							✓	✓	✓	✓	✓	✓	✓				
SGI_color_matrix	~	✓	✓	✓	✓	✓	~	~	~	~	~	~	~				
SGIS_generate_mipmap	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SGIS_texture_edge_clamp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SGIS_texture_lod	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MAX_COLOR_ATTACHMENTS	8	4	8	8	8	8	4	4	8	8	8	8	8	1	8	8	8
MAX_DRAW_BUFFERS	8	4	8	8	8	8	4	4	8	8	8	8	8	1	8	8	8

MAX_RENDERBUFFER_SIZE	16384	4096	8192	8192	16384	16384	4096	4096	8192	8192	8192	8192	16384	2048	2048	8192	16384
MAX_SAMPLES	16	6	4	8	4	8	0	0	8	8	8	8	8	0	0	4	8
MAX_VIEWPORT_DIMS	16384 16384	4096 4096	8192 8192	8192 8192	16384 16384	16384 16384	4096 4096	4096 4096	8192 8192	8192 8192	8192 8192	8192 8192	16384 16384	2048 2048	2048 2048	8192 8192	16384 16384
MIN_PBUFFER_VIEWPORT_DIMS_APPLE	1 1	32 32	32 32	32 32	32 32	32 32	32 32	32 32	32 32	32 32	32 32	32 32	32 32	2 2	2 2	2 2	2 2
SUBPIXEL_BITS	10	7	8	8	8	8	12	12	8	8	8	8	8	4	4	8	8
ALIASED_LINE_WIDTH_RANGE	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 10.0	1.0 10.0	1.0 10.0	1.0 10.0	1.0 10.0	1.0 10.0	1.0 10.0	1.0 7.0	1.0 7.0	1.0 7.0	1.0 7.0
ALIASED_POINT_SIZE_RANGE	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 63.0	1.0 63.0	1.0 63.0	1.0 63.0	1.0 63.0	1.0 63.0	1.0 63.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0
SMOOTH_LINE_WIDTH_GRANULARITY	0.0001	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.5	0.5	0.125	0.125
SMOOTH_LINE_WIDTH_RANGE	0.1 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	0.5 10.0	0.5 10.0	0.5 10.0	0.5 10.0	0.5 10.0	0.5 10.0	0.5 10.0	0.5 7.0	0.5 7.0	0.125 7.0	0.125 7.0
SMOOTH_POINT_SIZE_GRANULARITY	0.0001	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
SMOOTH_POINT_SIZE_RANGE	0.1 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 63.375	1.0 63.375	1.0 63.375	1.0 63.375	1.0 63.375	1.0 63.375	1.0 63.375	1.0 64.0	1.0 64.0	0.125 64.0	0.125 64.0
MAX_TEXTURE_SIZE	16384	4096	8192	8192	16384	16384	4096	4096	8192	8192	8192	8192	16384	2048	2048	8192	16384
MAX_RECTANGLE_TEXTURE_SIZE_EXT	16384	4096	8192	8192	16384	16384	4096	4096	8192	8192	8192	8192	16384	2048	2048	8192	16384
MAX_3D_TEXTURE_SIZE	16384	4096	8192	8192	16384	16384	512	512	2048	2048	2048	2048	2048	128	128	2048	2048
MAX_CUBE_MAP_TEXTURE_SIZE	16384	4096	8192	8192	16384	16384	4096	4096	8192	8192	8192	8192	16384	1024	1024	8192	16384
MAX_ARRAY_TEXTURE_LAYERS_EXT	16384	0	512	512	512	512	0	0	512	512	512	512	2048	0	0	512	512
MAX_TEXTURE_LOD_BIAS	16.0	16.0	16.0	16.0	16.0	16.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	16.0	16.0	16.0	16.0
MAX_TEXTURE_MAX_ANISOTROPY_EXT	16	16	16	16	16	16	16	16	16	16	16	16	16	4	16	16	16
MAX_TEXTURE_UNITS	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
NUM_COMPRESSED_TEXTURE_FORMATS	4 DXT1 DXT3 DXT5 3Dc	4 DXT1 DXT3 DXT5 3Dc	4 DXT1 DXT3 DXT5 3Dc	4 DXT1 DXT3 DXT5 3Dc	4 DXT1 DXT3 DXT5 3Dc	4 DXT1 DXT3 DXT5 3Dc	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5
MAX_ATTRIB_STACK_DEPTH	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_CLIENT_ATTRIB_STACK_DEPTH	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_COLOR_MATRIX_STACK_DEPTH	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
MAX_MODELVIEW_STACK_DEPTH	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
MAX_NAME_STACK_DEPTH	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128
MAX_PROGRAM_MATRIX_STACK_DEPTH_ARB	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
MAX_PROJECTION_STACK_DEPTH	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
MAX_TEXTURE_STACK_DEPTH	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
MAX_PROGRAM_ADDRESS_REGISTERS_ARB	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
MAX_PROGRAM_ATTRIBS_ARB	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
MAX_PROGRAM_ENV_PARAMETERS_ARB	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256
MAX_PROGRAM_INSTRUCTIONS_ARB	256K	256K	256K	256K	256K	256K	256K	256K	256K	256K	256K	256K	256K	256K	256K	256K	256K
MAX_PROGRAM_LOCAL_PARAMETERS_ARB	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
MAX_PROGRAM_MATRICES_ARB	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_PROGRAM_NATIVE_ADDRESS_REGISTERS_ARB	1	1	1	1	1	1	2	2	2	2	2	2	2	0	1	1	1
MAX_PROGRAM_NATIVE_ATTRIBS_ARB	32	16	16	16	16	16	16	16	16	16	16	16	16	0	18	18	18
MAX_PROGRAM_NATIVE_INSTRUCTIONS_ARB	256K	256	4096	4096	4096	4096	512	512	16384	65536	16384	65536	16384	0	16384	16384	16384
MAX_PROGRAM_NATIVE_PARAMETERS_ARB	1024	256	256	256	256	256	256	256	1024	1024	1024	1024	1024	0	512	512	512
MAX_PROGRAM_NATIVE_TEMPORARIES_ARB	65535	32	64	64	64	64	48	48	4096	4096	4096	4096	4096	0	100	100	1024
MAX_PROGRAM_PARAMETERS_ARB	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
MAX_PROGRAM_TEMPORARIES_ARB	65535	65535	65535	65535	65535	65535	65535	65535	65535	65535	65535	65535	65535	65535	65535	65535	65535
MAX_PROGRAM_CALL_DEPTH_NV	0	0	4	4	4	4	8	8	32	32	32	32	32	0	0	4	4
MAX_PROGRAM_EXEC_INSTRUCTIONS_NV	0	0	4096	4096	4096	4096	65536	65536	16M	16M	16M	16M	16M	0	0	65536	65536
MAX_PROGRAM_ALU_INSTRUCTIONS_ARB	256K	512	2048	2048	2048	2048	4096	32768	16384	65536	16384	65536	16384	64	16384	16384	16384
MAX_PROGRAM_ATTRIBS_ARB	32	10	10	10	10	10	16	16	16	16	16	16	16	11	18	18	18
MAX_PROGRAM_ENV_PARAMETERS_ARB	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128
MAX_PROGRAM_INSTRUCTIONS_ARB	256K	1024	4096	4096	4096	4096	4096	32768	16384	65536	16384	65536	16384	96	16384	16384	16384
MAX_PROGRAM_LOCAL_PARAMETERS_ARB	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024

MAX_PROGRAM_NATIVE_ALU_INSTRUCTIONS_ARB	256K	512	2048	2048	2048	2048	4096	32768	16384	65536	16384	65536	16384	64	16384	16384	16384
MAX_PROGRAM_NATIVE_ATTRIBS_ARB	32	10	10	10	10	10	16	16	16	16	16	16	16	11	18	18	18
MAX_PROGRAM_NATIVE_INSTRUCTIONS_ARB	256K	1024	4096	4096	4096	4096	4096	32768	16384	65536	16384	65536	16384	96	16384	16384	16384
MAX_PROGRAM_NATIVE_PARAMETERS_ARB	1024	64	256	256	256	256	1024	1024	1024	1024	1024	1024	1024	32	512	512	512
MAX_PROGRAM_NATIVE_TEMPORARIES_ARB	65535	64	64	64	64	64	32	32	4096	4096	4096	4096	4096	16	1024	1024	1024
MAX_PROGRAM_NATIVE_TEX_INDIRECTIONS_ARB	256K	4	2048	2048	2048	2048	4096	32768	16384	65536	16384	65536	16384	4	16384	16384	16384
MAX_PROGRAM_NATIVE_TEX_INSTRUCTIONS_ARB	256K	512	2048	2048	2048	2048	4096	32768	16384	65536	16384	65536	16384	32	16384	16384	16384
MAX_PROGRAM_PARAMETERS_ARB	1024	64	256	256	256	256	1024	1024	1024	1024	1024	1024	1024	32	512	512	512
MAX_PROGRAM_TEMPORARIES_ARB	65535	64	64	64	64	64	32	32	4096	4096	4096	4096	4096	16	1024	1024	1024
MAX_PROGRAM_TEX_INDIRECTIONS_ARB	256K	4	2048	2048	2048	2048	4096	32768	16384	65536	16384	65536	16384	4	16384	16384	16384
MAX_PROGRAM_TEX_INSTRUCTIONS_ARB	256K	512	2048	2048	2048	2048	4096	32768	16384	65536	16384	65536	16384	32	16384	16384	16384
MAX_PROGRAM_CALL_DEPTH_NV	0	0	4	4	4	4	4	4	32	32	32	32	32	0	0	4	4
MAX_PROGRAM_EXEC_INSTRUCTIONS_NV	0	0	4096	4096	4096	4096	65536	65536	16M	16M	16M	16M	16M	0	0	65536	65536
MAX_PROGRAM_IF_DEPTH_NV	0	0	32	32	32	32	48	48	64	64	64	64	64	0	0	48	48
MAX_PROGRAM_LOOP_COUNT_NV	0	0	255	255	255	255	255	255	16M	16M	16M	16M	16M	0	0	255	255
MAX_PROGRAM_LOOP_DEPTH_NV	0	0	32	32	32	32	4	4	64	64	64	64	64	0	0	32	32
MAX_COMBINED_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_FRAGMENT_UNIFORM_COMPONENTS	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096
MAX_TEXTURE_COORDS	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_VARYING_FLOATS	128	40	128	128	128	128	32	32	60	60	60	60	124	32	60	60	60
MAX_VERTEX_ATTRIBS	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_VERTEX_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_VERTEX_UNIFORM_COMPONENTS	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096
MAX_GEOMETRY_OUTPUT_VERTICES_EXT	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
MAX_GEOMETRY_TEXTURE_IMAGE_UNITS_EXT	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_GEOMETRY_TOTAL_OUTPUT_COMPONENTS_EXT	4096	4096	4096	4096	16384	16384	4096	4096	1024	1024	1024	1024	1024	4096	4096	4096	4096
MAX_GEOMETRY_UNIFORM_COMPONENTS_EXT	4096	4096	4096	4096	1024	1024	4096	4096	2048	2048	2048	2048	2048	4096	4096	4096	4096
MAX_GEOMETRY_VARYING_COMPONENTS_EXT	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128
MAX_VARYING_COMPONENTS_EXT	128	40	128	128	128	128	32	32	60	60	60	60	124	32	60	60	60
MAX_VERTEX_VARYING_COMPONENTS_EXT	128	40	128	128	128	128	128	128	64	64	64	64	128	32	60	64	64
MIN_PROGRAM_TEXEL_OFFSET_EXT	-8	0	-8	-8	-8	-8	0	0	-8	-8	-8	-8	-8	0	0	-8	-8
MAX_PROGRAM_TEXEL_OFFSET_EXT	7	0	7	7	7	7	0	0	7	7	7	7	7	0	0	7	7
MAX_XFB_INTERLEAVED_COMPONENTS_EXT	64	64	512	512	512	512	64	64	64	64	64	64	64	64	64	64	64
MAX_XFB_SEPARATE_ATTRIBS_EXT	16	16	4	4	4	4	16	16	4	4	4	4	4	16	16	16	16
MAX_XFB_SEPARATE_COMPONENTS_EXT	32	32	4	4	4	4	32	32	16	16	16	16	16	32	32	32	32
PRIMITIVES_GENERATED_EXT (query bits)	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
XFB_PRIMITIVES_WRITTEN_EXT (query bits)	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
MAX_BINDABLE_UNIFORM_SIZE_EXT	1M	0	65536	65536	65536	65536	0	0	65536	65536	65536	65536	65536	0	0	0	0
MAX_VERTEX_BINDABLE_UNIFORMS_EXT	256	0	12	12	12	12	0	0	12	12	12	12	12	0	0	0	0
MAX_GEOMETRY_BINDABLE_UNIFORMS_EXT	256	0	12	12	12	12	0	0	12	12	12	12	12	0	0	0	0
MAX_FRAGMENT_BINDABLE_UNIFORMS_EXT	256	0	12	12	12	12	0	0	12	12	12	12	12	0	0	0	0
MAX_CLIP_PLANES	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
MAX_CONVOLUTION_HEIGHT	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
MAX_CONVOLUTION_WIDTH	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
MAX_ELEMENTS_INDICES	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000
MAX_ELEMENTS_VERTICES	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M
MAX_EVAL_ORDER	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
MAX_LIGHTS	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_LIST_NESTING	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64
MAX_PIXEL_MAP_TABLE	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256
MAX_SHININESS_NV	128	128	128	128	128	128	1024	1024	1024	1024	1024	1024	1024	128	128	128	128
MAX_SPOT_EXPONENT_NV	128	128	128	128	128	128	1024	1024	1024	1024	1024	1024	1024	128	128	128	128
MAX_VERTEX_ARRAY_RANGE_ELEMENT_APPLE	1M	65535	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	65535	65535	65535	65535
MAX_VERTEX_UNITS_ARB	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
QUADS_FOLLOW_PROVOKING_VERTEX_CONVENTION	1	0	1	1	1	1	0	0	1	1	1	1	1	1	0	0	0

SAMPLES_PASSED (query bits)	32	32	63	63	63	63	32	32	32	32	32	32	32	0	32	64	64
TIME_ELAPSED_EXT (query bits)	32	–	63	63	63	63	–	–	32	32	32	32	32	–	–	64	64
MAX_SERVER_WAIT_TIMEOUT	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E
Off Screen	✓																
Full Screen		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hardware Accelerated		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Robust	✓																
Backing Store	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MP Safe	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Window	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Multi Screen	✓																
Compliant	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Monoscopic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stereoscopic		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
Single Buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Double Buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Color Buffer Modes (bpp RGB-A)	24-8 96-32f	15-1 24-8 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15-1 24-8	24-8	24-8 48-16h 96-32f	24-8 48-16h 96-32f
Accum Buffer Modes (bpp RGB-A)	96-32f	24-8 48-16	96-32f	96-32f	96-32f	96-32f	24-8 48-16	24-8 48-16	96-32f	96-32f	96-32f	96-32f	96-32f	24-8 48-16	24-8 48-16	96-32f	96-32f
Depth Buffer Modes (bpp)	0 32	0 16 24 32	0 16 24 32	0 16 24 32	0 16 24 32	0 16 24 32	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24
Stencil Buffer Modes (bpp)	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8
Max Aux Buffers	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Max Sample Buffers	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1
Max Samples	16	6	4	8	4	8	4	4	8	8	8	8	8	0	0	4	8
Supersampling	✓	✓	✓	✓	✓	✓											
Multisampling		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
Alphasampling	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
GPU Vertex Processing		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GPU Fragment Processing		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Video Memory (megabytes)	0	128 256 512	128	256 512	256	256 512 1024 2048	128 256	512	128 256 512	1536	256 512 1024	1536	512 1024 2048 4096	64	128	256 384 512	384 512 768 1024

Notes

- This data describes functionality only. Actual rendering results may differ across renderers with identical reported capabilities; always verify your results on the real hardware.
- Renderers based on the same chipset (variants such as Pro/Mobility) are condensed into single columns here. The exported capabilities are identical, the performance differs.
- SGI_color_matrix functionality is implied by ARB_imaging, but not exported on renderers marked by "~"
- EXT_separate_specular_color functionality is implied by OpenGL 1.2, but not exported on renderers marked by "~"
- ARB_multisample functionality is implied by OpenGL 1.3, but not exported on renderers marked by "~"

OpenGL Capabilities Tables

This table lists Legacy OpenGL extensions and parameter values reported for macOS 10.8.5. Click the name of a reported extension to view its specification.

Columns (left to right) correspond to:

- HD Graphics 5000/Iris
- HD Graphics 4000
- HD Graphics 3000
- GeForce 640/650/660/675/680/750/755/775/780
- Quadro FX 4800
- GeForce 9400/285/320/330
- Quadro FX 5600
- GeForce 8600/8800/9600/120/130
- Radeon HD 5670/5750/5770/5870/6630/6750/6770/6970
- Radeon HD 6490
- Radeon HD 2600/4670/4850/4870
- Radeon HD 2400
- Software Renderer

OpenGL Version	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
GLSL Version	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
ARB_color_buffer_float	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_depth_buffer_float	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_depth_clamp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_depth_texture	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_draw_buffers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_draw_elements_base_vertex	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_draw_instanced	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_fragment_program	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_fragment_program_shadow	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_fragment_shader	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_framebuffer_object	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_framebuffer_sRGB	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_half_float_pixel	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_half_float_vertex	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_imaging	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
ARB_instanced_arrays	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_multisample	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_multitexture	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_occlusion_query	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_pixel_buffer_object	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_point_parameters	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_point_sprite	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_provoking_vertex	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_seamless_cube_map	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
ARB_shader_objects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_shader_texture_lod	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_shading_language_100	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Extension	1	2	3	4	5	6	7	8	9	10	11	12	13
ARB_shadow	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_shadow_ambient	✓	✓	✓	✓	✓								
ARB_sync	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_border_clamp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_compression	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_compression_rgtc	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_cube_map	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_env_add	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_env_combine	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_env_crossbar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_env_dot3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_float	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_mirrored_repeat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_non_power_of_two	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_rectangle	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_rg	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_transpose_matrix	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_vertex_array_bgra	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_vertex_blend	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_vertex_buffer_object	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_vertex_program	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_vertex_shader	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_window_pos	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_abgr	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_bgra	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_bindable_uniform	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
EXT_blend_color	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_blend_equation_separate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_blend_func_separate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_blend_minmax	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_blend_subtract	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_clip_volume_hint	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_debug_label													
EXT_debug_marker													
EXT_depth_bounds_test	✓					✓	✓	✓	✓	✓			
EXT_draw_buffers2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_draw_range_elements	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_fog_coord	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_framebuffer_blit	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_framebuffer_multisample	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_framebuffer_multisample_blit_scaled	✓					✓	✓	✓	✓	✓			
EXT_framebuffer_object	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_framebuffer_sRGB	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_geometry_shader4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_gpu_program_parameters	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_gpu_shader4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Extension													
EXT_multi_draw_arrays	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_packed_depth_stencil	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_packed_float	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_provoking_vertex	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_rescale_normal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_secondary_color	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_separate_specular_color	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_shadow_funcs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_stencil_two_side	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_stencil_wrap	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_array	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_compression_dxt1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_compression_s3tc	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_env_add	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_filter_anisotropic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_integer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_lod_bias	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_mirror_clamp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
EXT_texture_rectangle	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
EXT_texture_shared_exponent	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_sRGB	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_sRGB_decode	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_timer_query	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_transform_feedback	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_vertex_array_bgra	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_aux_depth_stencil	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_client_storage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_element_array	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_fence	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_float_pixels	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_flush_buffer_range	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_flush_render	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
APPLE_object_purgeable		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_packed_pixels	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_pixel_buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_rgb_422	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_row_bytes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_specular_vector	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_texture_range	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_transform_hint	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_vertex_array_object	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_vertex_array_range	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_vertex_point_size	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_vertex_program_evaluators	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_ycbcr_422	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ATI_blend_equation_separate		✓	✓	✓	✓						✓	✓	✓

Feature	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
ATI_blend_weighted_minmax		✓	✓	✓	✓								
ATI_separate_stencil	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ATI_texture_compression_3dc	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ATI_texture_env_combine3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ATI_texture_float	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ATI_texture_mirror_once	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IBM_rasterpos_clip	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_blend_square	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_conditional_render	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_depth_clamp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_fog_distance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_fragment_program2						✓	✓	✓	✓	✓			
NV_fragment_program_option						✓	✓	✓	✓	✓			
NV_light_max_exponent	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_multisample_filter_hint						✓	✓	✓	✓	✓			
NV_point_sprite						✓	✓	✓	✓	✓			
NV_texgen_reflection	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_texture_barrier													
NV_vertex_program2_option						✓	✓	✓	✓	✓			
NV_vertex_program3						✓	✓	✓	✓	✓			
SGI_color_matrix	~	✓	✓	✓	✓	~	~	~	~	~			
SGIS_generate_mipmap	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SGIS_texture_edge_clamp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SGIS_texture_lod	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MAX_COLOR_ATTACHMENTS	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_DRAW_BUFFERS	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_RENDERBUFFER_SIZE	16384	8192	8192	16384	16384	8192	8192	8192	8192	16384	8192	16384	16384
MAX_SAMPLES	16	4	8	4	8	8	8	8	8	8	4	8	8
MAX_VIEWPORT_DIMS	16384 16384	8192 8192	8192 8192	16384 16384	16384 16384	8192 8192	8192 8192	8192 8192	8192 8192	16384 16384	8192 8192	16384 16384	16384 16384
MIN_PBUFFER_VIEWPORT_DIMS_APPLE	1 1	32 32	32 32	32 32	32 32	32 32	32 32	32 32	32 32	32 32	2 2	2 2	2 2
SUBPIXEL_BITS	10	8	8	8	8	8	8	8	8	8	8	8	8
ALIASED_LINE_WIDTH_RANGE	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 10.0	1.0 10.0	1.0 10.0	1.0 10.0	1.0 10.0	1.0 7.0	1.0 7.0	1.0 7.0
ALIASED_POINT_SIZE_RANGE	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 63.0	1.0 63.0	1.0 63.0	1.0 63.0	1.0 63.0	1.0 64.0	1.0 64.0	1.0 64.0
SMOOTH_LINE_WIDTH_GRANULARITY	0.0001	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
SMOOTH_LINE_WIDTH_RANGE	0.1 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	0.5 10.0	0.5 10.0	0.5 10.0	0.5 10.0	0.5 10.0	0.125 7.0	0.125 7.0	0.125 7.0
SMOOTH_POINT_SIZE_GRANULARITY	0.0001	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
SMOOTH_POINT_SIZE_RANGE	0.1 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 63.375	1.0 63.375	1.0 63.375	1.0 63.375	1.0 63.375	0.125 64.0	0.125 64.0	0.125 64.0
MAX_TEXTURE_SIZE	16384	8192	8192	16384	16384	8192	8192	8192	8192	16384	8192	16384	16384
MAX_RECTANGLE_TEXTURE_SIZE_EXT	16384	8192	8192	16384	16384	8192	8192	8192	8192	16384	8192	16384	16384
MAX_3D_TEXTURE_SIZE	16384	8192	8192	16384	16384	2048	2048	2048	2048	2048	2048	2048	2048
MAX_CUBE_MAP_TEXTURE_SIZE	16384	8192	8192	16384	16384	8192	8192	8192	8192	16384	8192	16384	16384

MAX_ARRAY_TEXTURE_LAYERS_EXT	16384	512	512	2048	2048	512	512	512	512	2048	512	2048	2048
MAX_TEXTURE_LOD_BIAS	16.0	16.0	16.0	16.0	16.0	15.0	15.0	15.0	15.0	15.0	16.0	16.0	16.0
MAX_TEXTURE_MAX_ANISOTROPY_EXT	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_TEXTURE_UNITS	8	8	8	8	8	8	8	8	8	8	8	8	8
NUM_COMPRESSED_TEXTURE_FORMATS	4 DXT1 DXT3 DXT5 3Dc	4 DXT1 DXT3 DXT5 3Dc	4 DXT1 DXT3 DXT5 3Dc	4 DXT1 DXT3 DXT5 3Dc	4 DXT1 DXT3 DXT5 3Dc	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5
MAX_ATTRIB_STACK_DEPTH	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_CLIENT_ATTRIB_STACK_DEPTH	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_COLOR_MATRIX_STACK_DEPTH	10	10	10	10	10	10	10	10	10	10	10	10	10
MAX_MODELVIEW_STACK_DEPTH	32	32	32	32	32	32	32	32	32	32	32	32	32
MAX_NAME_STACK_DEPTH	128	128	128	128	128	128	128	128	128	128	128	128	128
MAX_PROGRAM_MATRIX_STACK_DEPTH_ARB	2	2	2	2	2	2	2	2	2	2	2	2	2
MAX_PROJECTION_STACK_DEPTH	10	10	10	10	10	10	10	10	10	10	10	10	10
MAX_TEXTURE_STACK_DEPTH	10	10	10	10	10	10	10	10	10	10	10	10	10
MAX_PROGRAM_ADDRESS_REGISTERS_ARB	2	2	2	2	2	2	2	2	2	2	2	2	2
MAX_PROGRAM_ATTRIBS_ARB	32	32	32	32	32	32	32	32	32	32	32	32	32
MAX_PROGRAM_ENV_PARAMETERS_ARB	256	256	256	256	256	256	256	256	256	256	256	256	256
MAX_PROGRAM_INSTRUCTIONS_ARB	256K	256K	256K	256K	256K	256K	256K	256K	256K	256K	256K	256K	256K
MAX_PROGRAM_LOCAL_PARAMETERS_ARB	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
MAX_PROGRAM_MATRICES_ARB	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_PROGRAM_NATIVE_ADDRESS_REGISTERS_ARB	1	1	1	1	1	2	2	2	2	2	1	1	1
MAX_PROGRAM_NATIVE_ATTRIBS_ARB	32	16	16	16	16	16	16	16	16	16	18	18	18
MAX_PROGRAM_NATIVE_INSTRUCTIONS_ARB	256K	4096	4096	4096	4096	16384	65536	16384	65536	16384	16384	16384	16384
MAX_PROGRAM_NATIVE_PARAMETERS_ARB	1024	256	256	256	256	1024	1024	1024	1024	1024	512	512	512
MAX_PROGRAM_NATIVE_TEMPORARIES_ARB	65535	64	64	64	64	4096	4096	4096	4096	4096	100	1024	1024
MAX_PROGRAM_PARAMETERS_ARB	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
MAX_PROGRAM_TEMPORARIES_ARB	65535	65535	65535	65535	65535	65535	65535	65535	65535	65535	65535	65535	65535
MAX_PROGRAM_CALL_DEPTH_NV	0	4	4	4	4	32	32	32	32	32	4	4	4
MAX_PROGRAM_EXEC_INSTRUCTIONS_NV	0	4096	4096	4096	4096	16M	16M	16M	16M	16M	65536	65536	65536
MAX_PROGRAM_ALU_INSTRUCTIONS_ARB	256K	2048	2048	2048	2048	16384	65536	16384	65536	16384	16384	16384	16384
MAX_PROGRAM_ATTRIBS_ARB	32	10	10	10	10	16	16	16	16	16	18	18	18
MAX_PROGRAM_ENV_PARAMETERS_ARB	128	128	128	128	128	128	128	128	128	128	128	128	128
MAX_PROGRAM_INSTRUCTIONS_ARB	256K	4096	4096	4096	4096	16384	65536	16384	65536	16384	16384	16384	16384
MAX_PROGRAM_LOCAL_PARAMETERS_ARB	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
MAX_PROGRAM_NATIVE_ALU_INSTRUCTIONS_ARB	256K	2048	2048	2048	2048	16384	65536	16384	65536	16384	16384	16384	16384
MAX_PROGRAM_NATIVE_ATTRIBS_ARB	32	10	10	10	10	16	16	16	16	16	18	18	18
MAX_PROGRAM_NATIVE_INSTRUCTIONS_ARB	256K	4096	4096	4096	4096	16384	65536	16384	65536	16384	16384	16384	16384
MAX_PROGRAM_NATIVE_PARAMETERS_ARB	1024	256	256	256	256	1024	1024	1024	1024	1024	512	512	512
MAX_PROGRAM_NATIVE_TEMPORARIES_ARB	65535	64	64	64	64	4096	4096	4096	4096	4096	1024	1024	1024
MAX_PROGRAM_NATIVE_TEX_INDIRECTIONS_ARB	256K	2048	2048	2048	2048	16384	65536	16384	65536	16384	16384	16384	16384
MAX_PROGRAM_NATIVE_TEX_INSTRUCTIONS_ARB	256K	2048	2048	2048	2048	16384	65536	16384	65536	16384	16384	16384	16384
MAX_PROGRAM_PARAMETERS_ARB	1024	256	256	256	256	1024	1024	1024	1024	1024	512	512	512
MAX_PROGRAM_TEMPORARIES_ARB	65535	64	64	64	64	4096	4096	4096	4096	4096	1024	1024	1024
MAX_PROGRAM_TEX_INDIRECTIONS_ARB	256K	2048	2048	2048	2048	16384	65536	16384	65536	16384	16384	16384	16384

Parameter													
MAX_PROGRAM_TEX_INSTRUCTIONS_ARB	256K	2048	2048	2048	2048	16384	65536	16384	65536	16384	16384	16384	16384
MAX_PROGRAM_CALL_DEPTH_NV	0	4	4	4	4	32	32	32	32	32	4	4	4
MAX_PROGRAM_EXEC_INSTRUCTIONS_NV	0	4096	4096	4096	4096	16M	16M	16M	16M	16M	65536	65536	65536
MAX_PROGRAM_IF_DEPTH_NV	0	32	32	32	32	64	64	64	64	64	48	48	48
MAX_PROGRAM_LOOP_COUNT_NV	0	255	255	255	255	16M	16M	16M	16M	16M	255	255	255
MAX_PROGRAM_LOOP_DEPTH_NV	0	32	32	32	32	64	64	64	64	64	32	32	32
MAX_COMBINED_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_FRAGMENT_UNIFORM_COMPONENTS	4096	4096	4096	4096	4096	2048	2048	2048	2048	2048	4096	4096	4096
MAX_TEXTURE_COORDS	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_VARYING_FLOATS	128	128	128	128	128	60	60	60	60	124	60	60	60
MAX_VERTEX_ATTRIBS	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_VERTEX_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_VERTEX_UNIFORM_COMPONENTS	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096
MAX_GEOMETRY_OUTPUT_VERTICES_EXT	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
MAX_GEOMETRY_TEXTURE_IMAGE_UNITS_EXT	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_GEOMETRY_TOTAL_OUTPUT_COMPONENTS_EXT	16384	16384	16384	16384	16384	1024	1024	1024	1024	1024	16384	16384	16384
MAX_GEOMETRY_UNIFORM_COMPONENTS_EXT	4096	4096	4096	1024	1024	2048	2048	2048	2048	2048	4096	4096	4096
MAX_GEOMETRY_VARYING_COMPONENTS_EXT	128	128	128	128	128	128	128	128	128	128	128	128	128
MAX_VARYING_COMPONENTS_EXT	128	128	128	128	128	60	60	60	60	124	60	60	60
MAX_VERTEX_VARYING_COMPONENTS_EXT	128	128	128	128	128	64	64	64	64	128	64	64	64
MIN_PROGRAM_TEXEL_OFFSET_EXT	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
MAX_PROGRAM_TEXEL_OFFSET_EXT	7	7	7	7	7	7	7	7	7	7	7	7	7
MAX_XFB_INTERLEAVED_COMPONENTS_EXT	64	512	512	512	512	64	64	64	64	64	64	64	64
MAX_XFB_SEPARATE_ATTRIBS_EXT	4	4	4	4	4	4	4	4	4	4	4	4	4
MAX_XFB_SEPARATE_COMPONENTS_EXT	32	4	4	4	4	4	4	4	4	4	32	32	32
PRIMITIVES_GENERATED_EXT (query bits)	32	32	32	32	32	32	32	32	32	32	32	32	32
XFB_PRIMITIVES_WRITTEN_EXT (query bits)	32	32	32	32	32	32	32	32	32	32	32	32	32
MAX_BINDABLE_UNIFORM_SIZE_EXT	1M	65536	65536	65536	65536	65536	65536	65536	65536	65536	0	0	0
MAX_VERTEX_BINDABLE_UNIFORMS_EXT	256	12	12	12	12	12	12	12	12	14	0	0	0
MAX_GEOMETRY_BINDABLE_UNIFORMS_EXT	256	12	12	12	12	12	12	12	12	14	0	0	0
MAX_FRAGMENT_BINDABLE_UNIFORMS_EXT	256	12	12	12	12	12	12	12	12	14	0	0	0
MAX_CLIP_PLANES	6	6	6	6	6	6	6	6	6	6	6	6	6
MAX_CONVOLUTION_HEIGHT	11	11	11	11	11	11	11	11	11	11	11	11	11
MAX_CONVOLUTION_WIDTH	11	11	11	11	11	11	11	11	11	11	11	11	11
MAX_ELEMENTS_INDICES	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000
MAX_ELEMENTS_VERTICES	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M
MAX_EVAL_ORDER	10	10	10	10	10	10	10	10	10	10	10	10	10
MAX_LIGHTS	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_LIST_NESTING	64	64	64	64	64	64	64	64	64	64	64	64	64
MAX_PIXEL_MAP_TABLE	256	256	256	256	256	256	256	256	256	256	256	256	256
MAX_SHININESS_NV	128	128	128	128	128	1024	1024	1024	1024	1024	128	128	128
MAX_SPOT_EXPONENT_NV	128	128	128	128	128	1024	1024	1024	1024	1024	128	128	128
MAX_VERTEX_ARRAY_RANGE_ELEMENT_APPLE	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	65535	65535	65535
MAX_VERTEX_UNITS_ARB	4	4	4	4	4	4	4	4	4	4	4	4	4
QUADS_FOLLOW_PROVOKING_VERTEX_CONVENTION	1	1	1	1	1	1	1	1	1	1	0	0	0

SAMPLES_PASSED (query bits)	32	63	63	63	63	32	32	32	32	32	64	64	64
TIME_ELAPSED_EXT (query bits)	32	63	63	63	63	32	32	32	32	32	64	64	64
MAX_SERVER_WAIT_TIMEOUT	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E
Off Screen													
Full Screen		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hardware Accelerated		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Robust	✓												
Backing Store	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MP Safe	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Window	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Multi Screen	✓												
Compliant	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Monoscopic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stereoscopic		✓	✓	✓	✓	✓	✓	✓	✓				
Single Buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Double Buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Color Buffer Modes (bpp RGB-A)	24-8 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	24-8 48-16h 96-32f	24-8 48-16h 96-32f	24-8 48-16h 96-32f
Accum Buffer Modes (bpp RGB-A)	96-32f	96-32f	96-32f	96-32f	96-32f	96-32f	96-32f	96-32f	96-32f	96-32f	96-32f	96-32f	96-32f
Depth Buffer Modes (bpp)	0 32	0 16 24 32	0 16 24 32	0 16 24 32	0 16 24 32	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24
Stencil Buffer Modes (bpp)	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8
Max Aux Buffers	4	2	2	2	2	2	2	2	2	2	2	2	2
Max Sample Buffers	1	1	1	1	1	1	1	1	1	1	1	1	1
Max Samples	16	4	8	4	8	8	8	8	8	8	4	8	8
Supersampling	✓	✓	✓	✓	✓								
Multisampling		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alphasampling	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GPU Vertex Processing		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GPU Fragment Processing		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Video Memory (megabytes)	0	128 512	256	256	256 512 1024 2048	128 256 512	1536	256 512 1024	1536	512 1024 2048 4096	256 384 512	384 512 768 1024	1024

Notes

- This data describes functionality only. Actual rendering results may differ across renderers with identical reported capabilities; always verify your results on the real hardware.
- Renderers based on the same chipset (variants such as Pro/ Mobility) are condensed into single columns here. The exported capabilities are identical, the performance differs.
- SGI_color_matrix functionality is implied by ARB_imaging, but not exported on renderers marked by "~"

OpenGL Capabilities Tables

This table lists Legacy OpenGL extensions and parameter values reported for macOS 10.9. Click the name of a reported extension to view its specification.

Column headers (left to right):
1. HD Graphics 5000/Iris
2. HD Graphics 4000
3. HD Graphics 3000
4. GeForce 640/650/660/675/680/750/755/775/780
5. Quadro FX 4800
6. GeForce 9400/285/320/330
7. Quadro FX 5600
8. GeForce 8600/8800/9600/120/130
9. Radeon HD 5670/5750/5770/5870/6630/6750/6770/6970
10. Radeon HD 6490
11. Radeon HD 2600/4670/4850/4870
12. Radeon HD 2400
13. Software Renderer

	1	2	3	4	5	6	7	8	9	10	11	12	13
OpenGL Version	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
GLSL Version	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
ARB_color_buffer_float	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_depth_buffer_float	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_depth_clamp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_depth_texture	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_draw_buffers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_draw_elements_base_vertex	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_draw_instanced	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_fragment_program	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_fragment_program_shadow	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_fragment_shader	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_framebuffer_object	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_framebuffer_sRGB	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_half_float_pixel	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_half_float_vertex	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_imaging	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
ARB_instanced_arrays	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_multisample	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_multitexture	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_occlusion_query	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_pixel_buffer_object	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_point_parameters	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_point_sprite	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_provoking_vertex	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_seamless_cube_map	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
ARB_shader_objects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_shader_texture_lod	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_shading_language_100	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Extension												
ARB_shadow	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_shadow_ambient	✓	✓	✓	✓	✓							
ARB_sync	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_border_clamp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_compression	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_compression_rgtc	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_cube_map	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_env_add	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_env_combine	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_env_crossbar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_env_dot3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_float	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_mirrored_repeat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_non_power_of_two	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_rectangle	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_rg	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_transpose_matrix	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_vertex_array_bgra	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_vertex_blend	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_vertex_buffer_object	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_vertex_program	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_vertex_shader	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_window_pos	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_abgr	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_bgra	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_bindable_uniform	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
EXT_blend_color	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_blend_equation_separate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_blend_func_separate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_blend_minmax	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_blend_subtract	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_clip_volume_hint	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_debug_label	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_debug_marker	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_depth_bounds_test	✓					✓	✓	✓	✓	✓		
EXT_draw_buffers2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_draw_range_elements	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_fog_coord	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_framebuffer_blit	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_framebuffer_multisample	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_framebuffer_multisample_blit_scaled	✓					✓	✓	✓	✓	✓		
EXT_framebuffer_object	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_framebuffer_sRGB	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_geometry_shader4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_gpu_program_parameters	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_gpu_shader4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

[EXT_multi_draw_arrays]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_packed_depth_stencil]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_packed_float]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_provoking_vertex]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_rescale_normal]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_secondary_color]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_separate_specular_color]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_shadow_funcs]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_stencil_two_side]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_stencil_wrap]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_texture_array]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_texture_compression_dxt1]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_texture_compression_s3tc]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_texture_env_add]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_texture_filter_anisotropic]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_texture_integer]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_texture_lod_bias]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_texture_mirror_clamp]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
[EXT_texture_rectangle]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
[EXT_texture_shared_exponent]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_texture_sRGB]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_texture_sRGB_decode]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_timer_query]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_transform_feedback]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[EXT_vertex_array_bgra]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_aux_depth_stencil]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_client_storage]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_element_array]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_fence]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_float_pixels]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_flush_buffer_range]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_flush_render	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_object_purgeable]		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_packed_pixels]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_pixel_buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_rgb_422]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_row_bytes]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_specular_vector]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_texture_range]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_transform_hint]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_vertex_array_object]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_vertex_array_range]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_vertex_point_size	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_vertex_program_evaluators]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
[APPLE_ycbcr_422]	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ATI_blend_equation_separate		✓	✓	✓	✓								

Feature	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
ATI_blend_weighted_minmax		✓	✓	✓	✓								
ATI_separate_stencil	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ATI_texture_compression_3dc	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ATI_texture_env_combine3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ATI_texture_float	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ATI_texture_mirror_once	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IBM_rasterpos_clip	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_blend_square	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_conditional_render	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_depth_clamp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_fog_distance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_fragment_program2						✓	✓	✓	✓	✓			
NV_fragment_program_option						✓	✓	✓	✓	✓			
NV_light_max_exponent	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_multisample_filter_hint						✓	✓	✓	✓	✓			
NV_point_sprite						✓	✓	✓	✓	✓			
NV_texgen_reflection	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_texture_barrier	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_vertex_program2_option						✓	✓	✓	✓	✓			
NV_vertex_program3						✓	✓	✓	✓	✓			
SGI_color_matrix	~	✓	✓	✓	✓	~	~	~	~	~			
SGIS_generate_mipmap	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SGIS_texture_edge_clamp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SGIS_texture_lod	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MAX_COLOR_ATTACHMENTS	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_DRAW_BUFFERS	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_RENDERBUFFER_SIZE	16384	8192	8192	16384	16384	8192	8192	8192	8192	16384	8192	16384	16384
MAX_SAMPLES	16	4	8	4	8	8	8	8	8	8	4	8	8
MAX_VIEWPORT_DIMS	16384 16384	8192 8192	8192 8192	16384 16384	16384 16384	8192 8192	8192 8192	8192 8192	8192 8192	16384 16384	8192 8192	16384 16384	16384 16384
MIN_PBUFFER_VIEWPORT_DIMS_APPLE	1 1	32 32	32 32	32 32	32 32	32 32	32 32	32 32	32 32	32 32	2 2	2 2	2 2
SUBPIXEL_BITS	10	8	8	8	8	8	8	8	8	8	8	8	8
ALIASED_LINE_WIDTH_RANGE	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 10.0	1.0 10.0	1.0 10.0	1.0 10.0	1.0 10.0	1.0 7.0	1.0 7.0	1.0 7.0
ALIASED_POINT_SIZE_RANGE	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 63.0	1.0 63.0	1.0 63.0	1.0 63.0	1.0 63.0	1.0 64.0	1.0 64.0	1.0 64.0
SMOOTH_LINE_WIDTH_GRANULARITY	0.0001	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
SMOOTH_LINE_WIDTH_RANGE	0.1 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	0.5 10.0	0.5 10.0	0.5 10.0	0.5 10.0	0.5 10.0	0.125 7.0	0.125 7.0	0.125 7.0
SMOOTH_POINT_SIZE_GRANULARITY	0.0001	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
SMOOTH_POINT_SIZE_RANGE	0.1 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 63.375	1.0 63.375	1.0 63.375	1.0 63.375	1.0 63.375	0.125 64.0	0.125 64.0	0.125 64.0
MAX_TEXTURE_SIZE	16384	8192	8192	16384	16384	8192	8192	8192	8192	16384	8192	16384	16384
MAX_RECTANGLE_TEXTURE_SIZE_EXT	16384	8192	8192	16384	16384	8192	8192	8192	8192	16384	8192	16384	16384
MAX_3D_TEXTURE_SIZE	16384	8192	8192	16384	16384	2048	2048	2048	2048	2048	2048	2048	2048
MAX_CUBE_MAP_TEXTURE_SIZE	16384	8192	8192	16384	16384	8192	8192	8192	8192	16384	8192	16384	16384

MAX_ARRAY_TEXTURE_LAYERS_EXT	16384	512	512	2048	2048	512	512	512	512	2048	512	2048	2048
MAX_TEXTURE_LOD_BIAS	16.0	16.0	16.0	16.0	16.0	15.0	15.0	15.0	15.0	15.0	16.0	16.0	16.0
MAX_TEXTURE_MAX_ANISOTROPY_EXT	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_TEXTURE_UNITS	8	8	8	8	8	8	8	8	8	8	8	8	8
NUM_COMPRESSED_TEXTURE_FORMATS	4 DXT1 DXT3 DXT5 3Dc	4 DXT1 DXT3 DXT5 3Dc	4 DXT1 DXT3 DXT5 3Dc	4 DXT1 DXT3 DXT5 3Dc	4 DXT1 DXT3 DXT5 3Dc	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5
MAX_ATTRIB_STACK_DEPTH	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_CLIENT_ATTRIB_STACK_DEPTH	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_COLOR_MATRIX_STACK_DEPTH	10	10	10	10	10	10	10	10	10	10	10	10	10
MAX_MODELVIEW_STACK_DEPTH	32	32	32	32	32	32	32	32	32	32	32	32	32
MAX_NAME_STACK_DEPTH	128	128	128	128	128	128	128	128	128	128	128	128	128
MAX_PROGRAM_MATRIX_STACK_DEPTH_ARB	2	2	2	2	2	2	2	2	2	2	2	2	2
MAX_PROJECTION_STACK_DEPTH	10	10	10	10	10	10	10	10	10	10	10	10	10
MAX_TEXTURE_STACK_DEPTH	10	10	10	10	10	10	10	10	10	10	10	10	10
MAX_PROGRAM_ADDRESS_REGISTERS_ARB	2	2	2	2	2	2	2	2	2	2	2	2	2
MAX_PROGRAM_ATTRIBS_ARB	32	32	32	32	32	32	32	32	32	32	32	32	32
MAX_PROGRAM_ENV_PARAMETERS_ARB	256	256	256	256	256	256	256	256	256	256	256	256	256
MAX_PROGRAM_INSTRUCTIONS_ARB	256K	256K	256K	256K	256K	256K	256K	256K	256K	256K	256K	256K	256K
MAX_PROGRAM_LOCAL_PARAMETERS_ARB	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
MAX_PROGRAM_MATRICES_ARB	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_PROGRAM_NATIVE_ADDRESS_REGISTERS_ARB	1	1	1	1	1	2	2	2	2	2	1	1	1
MAX_PROGRAM_NATIVE_ATTRIBS_ARB	32	16	16	16	16	16	16	16	16	16	18	18	18
MAX_PROGRAM_NATIVE_INSTRUCTIONS_ARB	256K	4096	4096	4096	4096	16384	65536	16384	65536	16384	16384	16384	16384
MAX_PROGRAM_NATIVE_PARAMETERS_ARB	1024	256	256	256	256	1024	1024	1024	1024	1024	1024	1024	1024
MAX_PROGRAM_NATIVE_TEMPORARIES_ARB	65535	64	64	64	64	4096	4096	4096	4096	4096	100	1024	1024
MAX_PROGRAM_PARAMETERS_ARB	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
MAX_PROGRAM_TEMPORARIES_ARB	65535	65535	65535	65535	65535	65535	65535	65535	65535	65535	65535	65535	65535
MAX_PROGRAM_CALL_DEPTH_NV	0	4	4	4	4	32	32	32	32	32	4	4	4
MAX_PROGRAM_EXEC_INSTRUCTIONS_NV	0	4096	4096	4096	4096	16M	16M	16M	16M	16M	65536	65536	65536
MAX_PROGRAM_ALU_INSTRUCTIONS_ARB	256K	2048	2048	2048	2048	16384	65536	16384	65536	16384	16384	16384	16384
MAX_PROGRAM_ATTRIBS_ARB	32	10	10	10	10	16	16	16	16	16	18	18	18
MAX_PROGRAM_ENV_PARAMETERS_ARB	128	128	128	128	128	128	128	128	128	128	128	128	128
MAX_PROGRAM_INSTRUCTIONS_ARB	256K	4096	4096	4096	4096	16384	65536	16384	65536	16384	16384	16384	16384
MAX_PROGRAM_LOCAL_PARAMETERS_ARB	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
MAX_PROGRAM_NATIVE_ALU_INSTRUCTIONS_ARB	256K	2048	2048	2048	2048	16384	65536	16384	65536	16384	16384	16384	16384
MAX_PROGRAM_NATIVE_ATTRIBS_ARB	32	10	10	10	10	16	16	16	16	16	18	18	18
MAX_PROGRAM_NATIVE_INSTRUCTIONS_ARB	256K	4096	4096	4096	4096	16384	65536	16384	65536	16384	16384	16384	16384
MAX_PROGRAM_NATIVE_PARAMETERS_ARB	1024	256	256	256	256	1024	1024	1024	1024	1024	1024	1024	1024
MAX_PROGRAM_NATIVE_TEMPORARIES_ARB	65535	64	64	64	64	4096	4096	4096	4096	4096	1024	1024	1024
MAX_PROGRAM_NATIVE_TEX_INDIRECTIONS_ARB	256K	2048	2048	2048	2048	16384	65536	16384	65536	16384	16384	16384	16384
MAX_PROGRAM_NATIVE_TEX_INSTRUCTIONS_ARB	256K	2048	2048	2048	2048	16384	65536	16384	65536	16384	16384	16384	16384
MAX_PROGRAM_PARAMETERS_ARB	1024	256	256	256	256	1024	1024	1024	1024	1024	1024	1024	1024
MAX_PROGRAM_TEMPORARIES_ARB	65535	64	64	64	64	4096	4096	4096	4096	4096	1024	1024	1024
MAX_PROGRAM_TEX_INDIRECTIONS_ARB	256K	2048	2048	2048	2048	16384	65536	16384	65536	16384	16384	16384	16384

MAX_PROGRAM_TEX_INSTRUCTIONS_ARB	256K	2048	2048	2048	2048	16384	65536	16384	65536	16384	16384	16384	16384
MAX_PROGRAM_CALL_DEPTH_NV	0	4	4	4	4	32	32	32	32	32	4	4	4
MAX_PROGRAM_EXEC_INSTRUCTIONS_NV	0	4096	4096	4096	4096	16M	16M	16M	16M	16M	65536	65536	65536
MAX_PROGRAM_IF_DEPTH_NV	0	32	32	32	32	64	64	64	64	64	48	48	48
MAX_PROGRAM_LOOP_COUNT_NV	0	255	255	255	255	16M	16M	16M	16M	16M	255	255	255
MAX_PROGRAM_LOOP_DEPTH_NV	0	32	32	32	32	64	64	64	64	64	32	32	32
MAX_COMBINED_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_FRAGMENT_UNIFORM_COMPONENTS	4096	3072	3072	3072	3072	2048	2048	2048	2048	2048	4096	4096	4096
MAX_TEXTURE_COORDS	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_VARYING_FLOATS	128	128	128	128	128	60	60	60	60	124	60	60	60
MAX_VERTEX_ATTRIBS	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_VERTEX_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_VERTEX_UNIFORM_COMPONENTS	4096	3072	3072	3072	3072	4096	4096	4096	4096	4096	4096	4096	4096
MAX_GEOMETRY_OUTPUT_VERTICES_EXT	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
MAX_GEOMETRY_TEXTURE_IMAGE_UNITS_EXT	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_GEOMETRY_TOTAL_OUTPUT_COMPONENTS_EXT	16384	16384	16384	16384	16384	1024	1024	1024	1024	1024	16384	16384	16384
MAX_GEOMETRY_UNIFORM_COMPONENTS_EXT	4096	3072	3072	3072	3072	2048	2048	2048	2048	2048	4096	4096	4096
MAX_GEOMETRY_VARYING_COMPONENTS_EXT	128	128	128	128	128	128	128	128	128	128	128	128	128
MAX_VARYING_COMPONENTS_EXT	128	128	128	128	128	60	60	60	60	124	60	60	60
MAX_VERTEX_VARYING_COMPONENTS_EXT	128	128	128	128	128	64	64	64	64	128	64	128	128
MIN_PROGRAM_TEXEL_OFFSET_EXT	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
MAX_PROGRAM_TEXEL_OFFSET_EXT	7	7	7	7	7	7	7	7	7	7	7	7	7
MAX_XFB_INTERLEAVED_COMPONENTS_EXT	64	64	64	64	64	64	64	64	64	64	64	64	64
MAX_XFB_SEPARATE_ATTRIBS_EXT	4	4	4	4	4	4	4	4	4	4	4	4	4
MAX_XFB_SEPARATE_COMPONENTS_EXT	4	4	4	4	4	4	4	4	4	4	4	4	4
PRIMITIVES_GENERATED_EXT (query bits)	32	32	32	32	32	32	32	32	32	32	32	32	32
XFB_PRIMITIVES_WRITTEN_EXT (query bits)	32	32	32	32	32	32	32	32	32	32	32	32	32
MAX_BINDABLE_UNIFORM_SIZE_EXT	65536	65536	65536	65536	65536	65536	65536	65536	65536	65536	0	0	0
MAX_VERTEX_BINDABLE_UNIFORMS_EXT	16	12	12	12	12	12	12	12	12	14	0	0	0
MAX_GEOMETRY_BINDABLE_UNIFORMS_EXT	16	12	12	12	12	12	12	12	12	14	0	0	0
MAX_FRAGMENT_BINDABLE_UNIFORMS_EXT	16	12	12	12	12	12	12	12	12	14	0	0	0
MAX_CLIP_PLANES	6	6	6	6	6	6	6	6	6	6	6	6	6
MAX_CONVOLUTION_HEIGHT	11	11	11	11	11	11	11	11	11	11	11	11	11
MAX_CONVOLUTION_WIDTH	11	11	11	11	11	11	11	11	11	11	11	11	11
MAX_ELEMENTS_INDICES	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000
MAX_ELEMENTS_VERTICES	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M
MAX_EVAL_ORDER	10	10	10	10	10	10	10	10	10	10	10	10	10
MAX_LIGHTS	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_LIST_NESTING	64	64	64	64	64	64	64	64	64	64	64	64	64
MAX_PIXEL_MAP_TABLE	256	256	256	256	256	256	256	256	256	256	256	256	256
MAX_SHININESS_NV	128	128	128	128	128	1024	1024	1024	1024	1024	128	128	128
MAX_SPOT_EXPONENT_NV	128	128	128	128	128	1024	1024	1024	1024	1024	128	128	128
MAX_VERTEX_ARRAY_RANGE_ELEMENT_APPLE	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	65535	65535	65535
MAX_VERTEX_UNITS_ARB	4	4	4	4	4	4	4	4	4	4	4	4	4
QUADS_FOLLOW_PROVOKING_VERTEX_CONVENTION	1	1	1	1	1	1	1	1	1	1	0	0	0

SAMPLES_PASSED (query bits)	32	63	63	63	63	32	32	32	32	32	64	64	64
TIME_ELAPSED_EXT (query bits)	32	32	32	32	32	32	32	32	32	32	32	32	32
MAX_SERVER_WAIT_TIMEOUT	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E
Off Screen													
Full Screen		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hardware Accelerated		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Robust	✓												
Backing Store	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MP Safe	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Window	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Multi Screen	✓												
Compliant	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Monoscopic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stereoscopic		✓	✓	✓	✓	✓	✓	✓	✓				
Single Buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Double Buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Color Buffer Modes (bpp RGB-A)	24-8 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	24-8 48-16h 96-32f	24-8 48-16h 96-32f	24-8 48-16h 96-32f
Accum Buffer Modes (bpp RGB-A)	96-32f	96-32f	96-32f	96-32f	96-32f	96-32f	96-32f	96-32f	96-32f	96-32f	96-32f	96-32f	96-32f
Depth Buffer Modes (bpp)	0 32	0 16 24 32	0 16 24 32	0 16 24 32	0 16 24 32	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24
Stencil Buffer Modes (bpp)	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8
Max Aux Buffers	4	2	2	2	2	2	2	2	2	2	2	2	2
Max Sample Buffers	1	1	1	1	1	1	1	1	1	1	1	1	1
Max Samples	16	4	8	4	8	8	8	8	8	8	4	8	8
Supersampling	✓	✓	✓	✓	✓								
Multisampling		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alphasampling	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GPU Vertex Processing		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GPU Fragment Processing		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Video Memory (megabytes)	0	128 512	256	256	256 512 1024 2048	128 256 512	1536	256 512 1024	1536	512 1024 2048 4096	256 384 512	384 512 768 1024	1024

Notes

- This data describes functionality only. Actual rendering results may differ across renderers with identical reported capabilities; always verify your results on the real hardware.
- Renderers based on the same chipset (variants such as Pro/Mobility) are condensed into single columns here. The exported capabilities are identical, the performance differs.
- SGI_color_matrix functionality is implied by ARB_imaging, but not exported on renderers marked by "~"

OpenGL Capabilities Tables

This table lists Core OpenGL extensions and parameter values reported for macOS 10.7.5. Click the name of a reported extension to view its specification.

	HD Graphics 4000	HD Graphics 3000	GeForce 650	GeForce 320/330	GeForce 9400/285/Quadro FX 4800	GeForce 8600/8800/9600/120/130/Quadro FX 5600	Radeon HD 5670/5750/5770/6630/6750/6770/6970	Radeon HD 6490	Radeon HD 5870	Radeon HD 2600/4670/4850/4870	Radeon HD 2400	Software Renderer
OpenGL Version	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
GLSL Version	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
ARB_blend_func_extended												
ARB_draw_buffers_blend												
ARB_draw_indirect												
ARB_ES2_compatibility												
ARB_explicit_attrib_location												
ARB_gpu_shader5												
ARB_gpu_shader_fp64												
ARB_instanced_arrays	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_internalformat_query												
ARB_occlusion_query2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_sample_shading												
ARB_sampler_objects												
ARB_separate_shader_objects												
ARB_shader_bit_encoding	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_shader_subroutine												
ARB_shading_language_include												
ARB_tessellation_shader												
ARB_texture_buffer_object_rgb32												
ARB_texture_cube_map_array												
ARB_texture_gather												
ARB_texture_query_lod												
ARB_texture_rgb10_a2ui												
ARB_texture_storage												
ARB_texture_swizzle												
ARB_timer_query	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_transform_feedback2												

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
ARB_transform_feedback3												
ARB_vertex_attrib_64bit												
ARB_vertex_type_2_10_10_10_rev												
ARB_viewport_array												
EXT_debug_label												
EXT_debug_marker												
EXT_depth_bounds_test	✓						✓	✓	✓	✓		
EXT_framebuffer_multisample_blit_scaled	✓						✓	✓	✓	✓		
EXT_texture_compression_s3tc	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_filter_anisotropic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_mirror_clamp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
EXT_texture_sRGB_decode	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_client_storage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_container_object_shareable	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_flush_render												
APPLE_object_purgeable		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_rgb_422	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_row_bytes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_texture_range	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ATI_texture_mirror_once												
NV_texture_barrier												
MAX_RENDERBUFFER_SIZE	16384	8192	8192	16384	16384	16384	8192	8192	8192	16384	8192	16384
MAX_VIEWPORTS	-	-	-	-	-	-	-	-	-	-	-	-
MAX_VIEWPORT_DIMS	16384.0 16384.0	8192.0 8192.0	8192.0 8192.0	16384.0 16384.0	16384.0 16384.0	16384.0 16384.0	8192.0 8192.0	8192.0 8192.0	8192.0 8192.0	16384.0 16384.0	8192.0 8192.0	16384.0 16384.0
VIEWPORT_BOUNDS_RANGE	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
LAYER_PROVOKING_VERTEX	-	-	-	-	-	-	-	-	-	-	-	-
VIEWPORT_INDEX_PROVOKING_VERTEX	-	-	-	-	-	-	-	-	-	-	-	-
VIEWPORT_SUBPIXEL_BITS	-	-	-	-	-	-	-	-	-	-	-	-
SUBPIXEL_BITS	10	8	8	8	8	8	8	8	8	8	8	8
MAX_CLIP_DISTANCES	8	8	8	8	8	8	8	8	8	8	8	8
MAX_ELEMENTS_INDICES	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000
MAX_ELEMENTS_VERTICES	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M
POINT_SIZE_RANGE	0.1 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 63.375	1.0 63.375	1.0 63.375	1.0 63.375	0.125 64.0	0.125 64.0
POINT_SIZE_GRANULARITY	0.0001	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
ALIASED_LINE_WIDTH_RANGE	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0
SMOOTH_LINE_WIDTH_RANGE	0.1 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	0.5 1.0	0.5 1.0	0.5 1.0	0.5 1.0	0.125 1.0	0.125 1.0
SMOOTH_LINE_WIDTH_GRANULARITY	0.0001	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
MAX_COLOR_ATTACHMENTS	8	8	8	8	8	8	8	8	8	8	8	8
MAX_DRAW_BUFFERS	8	8	8	8	8	8	8	8	8	8	8	8

MAX_DUAL_SOURCE_DRAW_BUFFERS	–	–	–	–	–	–	–	–	–	–	–	–
MAX_SAMPLE_MASK_WORDS	1	1	1	1	1	1	1	1	1	1	1	1
MAX_SAMPLES	16	4	8	8	4	8	8	8	8	8	4	8
MAX_INTEGER_SAMPLES	1	1	1	1	1	1	1	1	1	1	1	1
MAX_COLOR_TEXTURE_SAMPLES	16	4	8	8	4	8	8	8	8	8	4	8
MAX_DEPTH_TEXTURE_SAMPLES	16	1	1	1	1	1	8	8	8	8	4	8
MAX_TEXTURE_SIZE	16384	8192	8192	16384	16384	16384	8192	8192	8192	16384	8192	16384
MAX_RECTANGLE_TEXTURE_SIZE	16384	8192	8192	16384	16384	16384	8192	8192	8192	16384	8192	16384
MAX_3D_TEXTURE_SIZE	16384	8192	8192	16384	16384	16384	2048	2048	2048	2048	2048	2048
MAX_CUBE_MAP_TEXTURE_SIZE	16384	8192	8192	16384	16384	16384	8192	8192	8192	16384	8192	16384
MAX_ARRAY_TEXTURE_LAYERS	16384	512	512	512	512	512	512	512	512	2048	512	512
MAX_TEXTURE_BUFFER_SIZE	2G	128M	128M	128M	128M	128M	128M	128M	128M	128M	64M	64M
MAX_TEXTURE_LOD_BIAS	16.0	16.0	16.0	16.0	16.0	16.0	15.0	15.0	15.0	15.0	16.0	16.0
MAX_TEXTURE_MAX_ANISOTROPY_EXT	16	16	16	16	16	16	16	16	16	16	16	16
NUM_COMPRESSED_TEXTURE_FORMATS	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5
MAX_VERTEX_ATTRIBS	16	16	16	16	16	16	16	16	16	16	16	16
MAX_VERTEX_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16
MAX_VERTEX_UNIFORM_BLOCKS	64	14	14	14	14	14	12	12	12	12	13	13
MAX_VERTEX_UNIFORM_COMPONENTS	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096
MAX_VERTEX_UNIFORM_VECTORS	–	–	–	–	–	–	–	–	–	–	–	–
MAX_VERTEX_OUTPUT_COMPONENTS	128	128	128	128	128	128	64	64	64	128	64	64
MAX_PATCH_VERTICES	–	–	–	–	–	–	–	–	–	–	–	–
MAX_TESS_CONTROL_INPUT_COMPONENTS	–	–	–	–	–	–	–	–	–	–	–	–
MAX_TESS_CONTROL_TEXTURE_IMAGE_UNITS	–	–	–	–	–	–	–	–	–	–	–	–
MAX_TESS_CONTROL_UNIFORM_BLOCKS	–	–	–	–	–	–	–	–	–	–	–	–
MAX_TESS_CONTROL_UNIFORM_COMPONENTS	–	–	–	–	–	–	–	–	–	–	–	–
MAX_TESS_CONTROL_OUTPUT_COMPONENTS	–	–	–	–	–	–	–	–	–	–	–	–
MAX_TESS_PATCH_COMPONENTS	–	–	–	–	–	–	–	–	–	–	–	–
MAX_TESS_CONTROL_TOTAL_OUTPUT_COMPONENTS	–	–	–	–	–	–	–	–	–	–	–	–
MAX_TESS_GEN_LEVEL	–	–	–	–	–	–	–	–	–	–	–	–
MAX_TESS_EVALUATION_INPUT_COMPONENTS	–	–	–	–	–	–	–	–	–	–	–	–
MAX_TESS_EVALUATION_TEXTURE_IMAGE_UNITS	–	–	–	–	–	–	–	–	–	–	–	–
MAX_TESS_EVALUATION_UNIFORM_BLOCKS	–	–	–	–	–	–	–	–	–	–	–	–
MAX_TESS_EVALUATION_UNIFORM_COMPONENTS	–	–	–	–	–	–	–	–	–	–	–	–
MAX_TESS_EVALUATION_OUTPUT_COMPONENTS	–	–	–	–	–	–	–	–	–	–	–	–
MAX_GEOMETRY_INPUT_COMPONENTS	128	128	128	128	128	128	64	64	64	128	64	64
MAX_GEOMETRY_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16
MAX_GEOMETRY_UNIFORM_BLOCKS	64	64	64	14	14	14	12	12	12	12	13	13
MAX_GEOMETRY_UNIFORM_COMPONENTS	4096	4096	4096	1024	1024	1024	2048	2048	2048	2048	4096	4096
MAX_GEOMETRY_OUTPUT_COMPONENTS	128	128	128	128	128	128	128	128	128	128	128	128
MAX_GEOMETRY_TOTAL_OUTPUT_COMPONENTS	4096	4096	4096	16384	16384	16384	1024	1024	1024	1024	4096	4096

MAX_GEOMETRY_OUTPUT_VERTICES	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
MAX_GEOMETRY_SHADER_INVOCATIONS	-	-	-	-	-	-	-	-	-	-	-	-
MAX_FRAGMENT_INPUT_COMPONENTS	128	128	128	128	128	128	128	128	128	128	128	128
MAX_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16
MAX_FRAGMENT_UNIFORM_BLOCKS	64	14	14	14	14	14	12	12	12	12	13	13
MAX_FRAGMENT_UNIFORM_COMPONENTS	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096
MAX_FRAGMENT_UNIFORM_VECTORS	-	-	-	-	-	-	-	-	-	-	-	-
MIN_FRAGMENT_INTERPOLATION_OFFSET	-	-	-	-	-	-	-	-	-	-	-	-
MAX_FRAGMENT_INTERPOLATION_OFFSET	-	-	-	-	-	-	-	-	-	-	-	-
FRAGMENT_INTERPOLATION_OFFSET_BITS	-	-	-	-	-	-	-	-	-	-	-	-
MIN_PROGRAM_TEXEL_OFFSET	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
MAX_PROGRAM_TEXEL_OFFSET	7	7	7	7	7	7	7	7	7	7	7	7
MIN_PROGRAM_TEXTURE_GATHER_OFFSET	-	-	-	-	-	-	-	-	-	-	-	-
MAX_PROGRAM_TEXTURE_GATHER_OFFSET	-	-	-	-	-	-	-	-	-	-	-	-
MAX_PROGRAM_TEXTURE_GATHER_COMPONENTS_ARB	-	-	-	-	-	-	-	-	-	-	-	-
MAX_COMBINED_TEXTURE_IMAGE_UNITS	48	48	48	48	48	48	48	48	48	48	48	48
MAX_COMBINED_VERTEX_UNIFORM_COMPONENTS	16388K	228K	228K	228K	228K	228K	196K	196K	196K	196K	212K	212K
MAX_COMBINED_TESS_CONTROL_UNIFORM_COMPONENTS	-	-	-	-	-	-	-	-	-	-	-	-
MAX_COMBINED_TESS_EVALUATION_UNIFORM_COMPONENTS	-	-	-	-	-	-	-	-	-	-	-	-
MAX_COMBINED_GEOMETRY_UNIFORM_COMPONENTS	16388K	1028K	1028K	225K	225K	225K	194K	194K	194K	194K	212K	212K
MAX_COMBINED_FRAGMENT_UNIFORM_COMPONENTS	16388K	228K	228K	228K	228K	228K	196K	196K	196K	196K	212K	212K
MAX_COMBINED_UNIFORM_BLOCKS	64	64	64	64	64	64	36	36	36	60	39	39
MAX_UNIFORM_BLOCK_SIZE	1M	65536	65536	65536	65536	65536	65536	65536	65536	65536	65536	65536
MAX_UNIFORM_BUFFER_BINDINGS	64	42	42	42	42	42	36	36	36	60	39	39
UNIFORM_BUFFER_OFFSET_ALIGNMENT	256	256	256	256	256	256	256	256	256	256	256	256
MAX_SUBROUTINES	-	-	-	-	-	-	-	-	-	-	-	-
MAX_SUBROUTINE_UNIFORM_LOCATIONS	-	-	-	-	-	-	-	-	-	-	-	-
MAX_VARYING_VECTORS	-	-	-	-	-	-	-	-	-	-	-	-
SHADER_COMPILER	-	-	-	-	-	-	-	-	-	-	-	-
NUM_SHADER_BINARY_FORMATS	-	-	-	-	-	-	-	-	-	-	-	-
NUM_PROGRAM_BINARY_FORMATS	-	-	-	-	-	-	-	-	-	-	-	-
MAX_XFB_INTERLEAVED_COMPONENTS	64	512	512	512	512	512	64	64	64	64	64	64
MAX_XFB_SEPARATE_ATTRIBS	16	4	4	4	4	4	4	4	4	4	16	16
MAX_XFB_SEPARATE_COMPONENTS	32	4	4	4	4	4	16	16	16	16	32	32
MAX_XFB_BUFFERS	-	-	-	-	-	-	-	-	-	-	-	-
MAX_VERTEX_STREAMS	-	-	-	-	-	-	-	-	-	-	-	-
PRIMITIVES_GENERATED (query bits)	32	32	32	32	32	32	32	32	32	32	32	32
XFB_PRIMITIVES_WRITTEN (query bits)	32	32	32	32	32	32	32	32	32	32	32	32
SAMPLES_PASSED (query bits)	32	63	63	63	63	63	32	32	32	32	64	64
TIME_ELAPSED (query bits)	32	63	63	63	63	63	32	32	32	32	64	64
TIMESTAMP (query bits)	0	0	0	0	0	0	0	0	0	0	0	0
MAX_SERVER_WAIT_TIMEOUT	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E
Hardware Accelerated		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
Backing Store	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Compliant	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Monoscopic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stereoscopic		✓	✓	✓	✓	✓	✓	✓	✓			
Single Buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Double Buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Color Buffer Modes (bpp RGB-A)	24-8 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	24-8 48-16h 96-32f	24-8 48-16h 96-32f
Depth Buffer Modes (bpp)	0 32	0 16 24 32	0 16 24 32	0 16 24 32	0 16 24 32	0 16 24 32	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24
Stencil Buffer Modes (bpp)	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8
Max Sample Buffers	1	1	1	1	1	1	1	1	1	1	1	1
Max Samples	16	4	8	8	4	8	8	8	8	8	4	8
Supersampling	✓	✓	✓	✓	✓	✓						
Multisampling		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alphasampling	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GPU Vertex Processing		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GPU Fragment Processing		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Video Memory (megabytes)	0	128 512	256	1024	256	256 512 1024 2048	128 256 512 1536	256	256 512 1024 1536	512 1024 2048 4096	256 384 512	384 512 768 1024

Notes

- This data describes functionality only. Actual rendering results may differ across renderers with identical reported capabilities; always verify your results on the real hardware.
- Renderers based on the same chipset (variants such as Pro/Mobility) are condensed into single columns here. The exported capabilities are identical, the performance differs.

OpenGL Capabilities Tables

This table lists Core OpenGL extensions and parameter values reported for macOS 10.8.5. Click the name of a reported extension to view its specification.

	Software Renderer	Radeon HD 2400	Radeon HD 2600/4670/4850/4870	Radeon HD 5870	Radeon HD 6490	Radeon HD 5670/5750/5770/6630/6750/6770/6970	GeForce 8600/8800/9600/120/130/Quadro FX 5600	GeForce 9400/285/Quadro FX 4800	GeForce 320/330	GeForce 640/650/660/675/680/750/755/775/780	HD Graphics 3000	HD Graphics 4000	HD Graphics 5000/Iris
OpenGL Version	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
GLSL Version	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
ARB_blend_func_extended													
ARB_draw_buffers_blend													
ARB_draw_indirect													
ARB_ES2_compatibility													
ARB_explicit_attrib_location	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_gpu_shader5													
ARB_gpu_shader_fp64													
ARB_instanced_arrays	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_internalformat_query													
ARB_occlusion_query2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_sample_shading													
ARB_sampler_objects													
ARB_separate_shader_objects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
ARB_shader_bit_encoding	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_shader_subroutine													
ARB_shading_language_include													
ARB_tessellation_shader													
ARB_texture_buffer_object_rgb32													
ARB_texture_cube_map_array													
ARB_texture_gather													
ARB_texture_query_lod													
ARB_texture_rgb10_a2ui													
ARB_texture_storage													
ARB_texture_swizzle	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
ARB_timer_query	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_transform_feedback2													
ARB_transform_feedback3													

	1	2	3	4	5	6	7	8	9	10	11	12	13
ARB_vertex_attrib_64bit													
ARB_vertex_type_2_10_10_10_rev													
ARB_viewport_array													
EXT_debug_label													
EXT_debug_marker													
EXT_depth_bounds_test	✓						✓	✓	✓	✓			
EXT_framebuffer_multisample_blit_scaled	✓						✓	✓	✓	✓			
EXT_texture_compression_s3tc	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_filter_anisotropic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_mirror_clamp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
EXT_texture_sRGB_decode	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_client_storage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_container_object_shareable	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_flush_render													
APPLE_object_purgeable		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_rgb_422	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_row_bytes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_texture_range	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ATI_texture_mirror_once	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_texture_barrier													
MAX_RENDERBUFFER_SIZE	16384	8192	8192	16384	16384	16384	8192	8192	8192	16384	8192	16384	16384
MAX_VIEWPORTS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_VIEWPORT_DIMS	16384.0 16384.0	8192.0 8192.0	8192.0 8192.0	16384.0 16384.0	16384.0 16384.0	16384.0 16384.0	8192.0 8192.0	8192.0 8192.0	8192.0 8192.0	16384.0 16384.0	8192.0 8192.0	16384.0 16384.0	16384.0 16384.0
VIEWPORT_BOUNDS_RANGE	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
LAYER_PROVOKING_VERTEX	-	-	-	-	-	-	-	-	-	-	-	-	-
VIEWPORT_INDEX_PROVOKING_VERTEX	-	-	-	-	-	-	-	-	-	-	-	-	-
VIEWPORT_SUBPIXEL_BITS	-	-	-	-	-	-	-	-	-	-	-	-	-
SUBPIXEL_BITS	10	8	8	8	8	8	8	8	8	8	8	8	8
MAX_CLIP_DISTANCES	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_ELEMENTS_INDICES	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000
MAX_ELEMENTS_VERTICES	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M
POINT_SIZE_RANGE	0.1 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 63.375	1.0 63.375	1.0 63.375	1.0 63.375	0.125 64.0	0.125 64.0	0.125 64.0
POINT_SIZE_GRANULARITY	0.0001	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
ALIASED_LINE_WIDTH_RANGE	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0
SMOOTH_LINE_WIDTH_RANGE	0.1 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	0.5 1.0	0.5 1.0	0.5 1.0	0.5 1.0	0.125 1.0	0.125 1.0	0.125 1.0
SMOOTH_LINE_WIDTH_GRANULARITY	0.0001	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
MAX_COLOR_ATTACHMENTS	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_DRAW_BUFFERS	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_DUAL_SOURCE_DRAW_BUFFERS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_SAMPLE_MASK_WORDS	1	1	1	1	1	1	1	1	1	1	1	1	1
MAX_SAMPLES	16	4	8	8	4	8	8	8	8	8	4	8	8
MAX_INTEGER_SAMPLES	1	1	1	1	1	1	1	1	1	1	1	1	1

MAX_COLOR_TEXTURE_SAMPLES	16	4	8	8	4	8	8	8	8	8	4	8	8
MAX_DEPTH_TEXTURE_SAMPLES	16	1	1	8	4	8	8	8	8	8	4	8	8
MAX_TEXTURE_SIZE	16384	8192	8192	16384	16384	16384	8192	8192	8192	16384	8192	16384	16384
MAX_RECTANGLE_TEXTURE_SIZE	16384	8192	8192	16384	16384	16384	8192	8192	8192	16384	8192	16384	16384
MAX_3D_TEXTURE_SIZE	16384	8192	8192	16384	16384	16384	2048	2048	2048	2048	2048	2048	2048
MAX_CUBE_MAP_TEXTURE_SIZE	16384	8192	8192	16384	16384	16384	8192	8192	8192	16384	8192	16384	16384
MAX_ARRAY_TEXTURE_LAYERS	16384	512	512	2048	2048	2048	512	512	512	2048	512	2048	2048
MAX_TEXTURE_BUFFER_SIZE	2G	128M	128M	128M	128M	128M	128M	128M	128M	128M	64M	64M	64M
MAX_TEXTURE_LOD_BIAS	16.0	16.0	16.0	16.0	16.0	16.0	15.0	15.0	15.0	15.0	16.0	16.0	16.0
MAX_TEXTURE_MAX_ANISOTROPY_EXT	16	16	16	16	16	16	16	16	16	16	16	16	16
NUM_COMPRESSED_TEXTURE_FORMATS	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5
MAX_VERTEX_ATTRIBS	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_VERTEX_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_VERTEX_UNIFORM_BLOCKS	64	14	14	14	14	14	12	12	12	14	13	13	15
MAX_VERTEX_UNIFORM_COMPONENTS	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096
MAX_VERTEX_UNIFORM_VECTORS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_VERTEX_OUTPUT_COMPONENTS	128	128	128	128	128	128	64	64	64	128	64	64	64
MAX_PATCH_VERTICES	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_TESS_CONTROL_INPUT_COMPONENTS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_TESS_CONTROL_TEXTURE_IMAGE_UNITS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_TESS_CONTROL_UNIFORM_BLOCKS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_TESS_CONTROL_UNIFORM_COMPONENTS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_TESS_CONTROL_OUTPUT_COMPONENTS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_TESS_PATCH_COMPONENTS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_TESS_CONTROL_TOTAL_OUTPUT_COMPONENTS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_TESS_GEN_LEVEL	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_TESS_EVALUATION_INPUT_COMPONENTS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_TESS_EVALUATION_TEXTURE_IMAGE_UNITS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_TESS_EVALUATION_UNIFORM_BLOCKS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_TESS_EVALUATION_UNIFORM_COMPONENTS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_TESS_EVALUATION_OUTPUT_COMPONENTS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_GEOMETRY_INPUT_COMPONENTS	128	128	128	128	128	128	64	64	64	128	64	64	64
MAX_GEOMETRY_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_GEOMETRY_UNIFORM_BLOCKS	64	64	64	14	14	14	12	12	12	14	13	13	15
MAX_GEOMETRY_UNIFORM_COMPONENTS	4096	4096	4096	1024	1024	1024	2048	2048	2048	2048	4096	4096	4096
MAX_GEOMETRY_OUTPUT_COMPONENTS	128	128	128	128	128	128	128	128	128	128	128	128	128
MAX_GEOMETRY_TOTAL_OUTPUT_COMPONENTS	16384	16384	16384	16384	16384	16384	1024	1024	1024	1024	16384	16384	16384
MAX_GEOMETRY_OUTPUT_VERTICES	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
MAX_GEOMETRY_SHADER_INVOCATIONS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_FRAGMENT_INPUT_COMPONENTS	128	128	128	128	128	128	128	128	128	128	128	128	128
MAX_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_FRAGMENT_UNIFORM_BLOCKS	64	14	14	14	14	14	12	12	12	14	13	13	15
MAX_FRAGMENT_UNIFORM_COMPONENTS	4096	4096	4096	4096	4096	4096	2048	2048	2048	2048	4096	4096	4096
MAX_FRAGMENT_UNIFORM_VECTORS	-	-	-	-	-	-	-	-	-	-	-	-	-

MIN_FRAGMENT_INTERPOLATION_OFFSET	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_FRAGMENT_INTERPOLATION_OFFSET	-	-	-	-	-	-	-	-	-	-	-	-	-
FRAGMENT_INTERPOLATION_OFFSET_BITS	-	-	-	-	-	-	-	-	-	-	-	-	-
MIN_PROGRAM_TEXEL_OFFSET	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
MAX_PROGRAM_TEXEL_OFFSET	7	7	7	7	7	7	7	7	7	7	7	7	7
MIN_PROGRAM_TEXTURE_GATHER_OFFSET	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_PROGRAM_TEXTURE_GATHER_OFFSET	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_PROGRAM_TEXTURE_GATHER_COMPONENTS_ARB	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_COMBINED_TEXTURE_IMAGE_UNITS	48	48	48	48	48	48	48	48	48	48	48	48	48
MAX_COMBINED_VERTEX_UNIFORM_COMPONENTS	16388K	228K	228K	228K	228K	228K	196K	196K	196K	228K	212K	212K	244K
MAX_COMBINED_TESS_CONTROL_UNIFORM_COMPONENTS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_COMBINED_TESS_EVALUATION_UNIFORM_COMPONENTS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_COMBINED_GEOMETRY_UNIFORM_COMPONENTS	16388K	1028K	1028K	225K	225K	225K	194K	194K	194K	226K	212K	212K	244K
MAX_COMBINED_FRAGMENT_UNIFORM_COMPONENTS	16388K	228K	228K	228K	228K	228K	194K	194K	194K	226K	212K	212K	244K
MAX_COMBINED_UNIFORM_BLOCKS	64	64	64	64	64	64	36	36	36	64	39	64	64
MAX_UNIFORM_BLOCK_SIZE	1M	65536	65536	65536	65536	65536	65536	65536	65536	65536	65536	65536	65536
MAX_UNIFORM_BUFFER_BINDINGS	64	42	42	42	42	42	36	36	36	64	39	64	64
UNIFORM_BUFFER_OFFSET_ALIGNMENT	256	256	256	256	256	256	256	256	256	256	256	256	256
MAX_SUBROUTINES	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_SUBROUTINE_UNIFORM_LOCATIONS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_VARYING_VECTORS	-	-	-	-	-	-	-	-	-	-	-	-	-
SHADER_COMPILER	-	-	-	-	-	-	-	-	-	-	-	-	-
NUM_SHADER_BINARY_FORMATS	-	-	-	-	-	-	-	-	-	-	-	-	-
NUM_PROGRAM_BINARY_FORMATS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_XFB_INTERLEAVED_COMPONENTS	64	512	512	512	512	512	64	64	64	64	64	64	64
MAX_XFB_SEPARATE_ATTRIBS	4	4	4	4	4	4	4	4	4	4	4	4	4
MAX_XFB_SEPARATE_COMPONENTS	32	4	4	4	4	4	4	4	4	4	32	32	32
MAX_XFB_BUFFERS	-	-	-	-	-	-	-	-	-	-	-	-	-
MAX_VERTEX_STREAMS	-	-	-	-	-	-	-	-	-	-	-	-	-
PRIMITIVES_GENERATED (query bits)	32	32	32	32	32	32	32	32	32	32	32	32	32
XFB_PRIMITIVES_WRITTEN (query bits)	32	32	32	32	32	32	32	32	32	32	32	32	32
SAMPLES_PASSED (query bits)	32	63	63	63	63	63	32	32	32	32	64	64	64
TIME_ELAPSED (query bits)	32	63	63	63	63	63	32	32	32	32	64	64	64
TIMESTAMP (query bits)	0	0	0	0	0	0	0	0	0	0	0	0	0
MAX_SERVER_WAIT_TIMEOUT	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E
Hardware Accelerated		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Backing Store	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Compliant	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Monoscopic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stereoscopic		✓	✓	✓	✓	✓	✓	✓	✓				
Single Buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Double Buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Color Buffer Modes (bpp RGB-A)	24-8 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	24-8 48-16h 96-32f	24-8 48-16h 96-32f	24-8 48-16h 96-32f
Depth Buffer Modes (bpp)	0 32	0 16 24 32	0 16 24 32	0 16 24 32	0 16 24 32	0 16 24 32	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24
Stencil Buffer Modes (bpp)	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8
Max Sample Buffers	1	1	1	1	1	1	1	1	1	1	1	1	1
Max Samples	16	4	8	8	4	8	8	8	8	8	4	8	8
Supersampling	✓	✓	✓	✓	✓	✓							
Multisampling		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alphasampling	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GPU Vertex Processing		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GPU Fragment Processing		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Video Memory (megabytes)	0	128	256 512	1024	256	256 512 1024 2048	128 256 512 1536	256 1024 1536	256 512	512 1024 2048 4096	256 384 512	384 512 768 1024	1024

Notes

- This data describes functionality only. Actual rendering results may differ across renderers with identical reported capabilities; always verify your results on the real hardware.
- Renderers based on the same chipset (variants such as Pro/Mobility) are condensed into single columns here. The exported capabilities are identical, the performance differs.

OpenGL Capabilities Tables

This table lists Core OpenGL extensions and parameter values reported for macOS 10.9. Click the name of a reported extension to view its specification.

	HD Graphics 5000/Iris	HD Graphics 4000	HD Graphics 3000	GeForce 640/650/660/675/680/750/755/775/780	GeForce 320/330	GeForce 9400/285/Quadro FX 4800	GeForce 8600/8800/9600/120/130/Quadro FX 5600	Radeon HD 5670/5750/5770/6630/6750/6770/6970	Radeon HD 6490	Radeon HD 5870	Radeon HD 2600/4670/4850/4870	Radeon HD 2400	Software Renderer
OpenGL Version	4.1	3.3	3.3	4.1	4.1	4.1	3.3	3.3	3.3	4.1	3.3	4.1	4.1
GLSL Version	4.10	3.30	3.30	4.10	4.10	4.10	3.30	3.30	3.30	4.10	3.30	4.10	4.10
ARB_blend_func_extended	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_draw_buffers_blend	✓	✓	✓	✓	✓	✓			✓	✓		✓	✓
ARB_draw_indirect	✓			✓	✓	✓				✓		✓	✓
ARB_ES2_compatibility	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_explicit_attrib_location	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_gpu_shader5	✓			✓	✓	✓				✓		✓	✓
ARB_gpu_shader_fp64	✓			✓	~	~				✓		✓	✓
ARB_instanced_arrays	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_internalformat_query	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_occlusion_query2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_sample_shading	✓			✓	✓	✓				✓		✓	✓
ARB_sampler_objects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_separate_shader_objects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_shader_bit_encoding	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_shader_subroutine	✓			✓	✓	✓				✓		✓	✓
ARB_shading_language_include	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_tessellation_shader	✓			✓	✓	✓				✓		✓	✓
ARB_texture_buffer_object_rgb32	✓	✓	✓	✓	✓	✓				✓		✓	✓
ARB_texture_cube_map_array	✓			✓	✓	✓			✓	✓		✓	✓
ARB_texture_gather	✓			✓	✓	✓				✓		✓	✓
ARB_texture_query_lod	✓			✓	✓	✓				✓	✓	✓	✓
ARB_texture_rgb10_a2ui	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_storage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_texture_swizzle	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_timer_query	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_transform_feedback2	✓			✓	✓	✓				✓		✓	✓
ARB_transform_feedback3	✓			✓	✓	✓				✓		✓	✓

ARB_vertex_attrib_64bit	✓			✓	~	~				✓		✓	✓
ARB_vertex_type_2_10_10_10_rev	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ARB_viewport_array	✓			✓	✓	✓	✓	✓	✓	✓		✓	✓
EXT_debug_label	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_debug_marker	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_depth_bounds_test	✓						✓	✓	✓	✓			
EXT_framebuffer_multisample_blit_scaled	✓						✓	✓	✓	✓			
EXT_texture_compression_s3tc	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_filter_anisotropic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_mirror_clamp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EXT_texture_sRGB_decode	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_client_storage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_container_object_shareable	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_flush_render	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_object_purgeable		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_rgb_422	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_row_bytes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
APPLE_texture_range	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ATI_texture_mirror_once	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NV_texture_barrier	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MAX_RENDERBUFFER_SIZE	16384	8192	8192	16384	16384	16384	8192	8192	8192	16384	8192	16384	16384
MAX_VIEWPORTS	16	1	1	16	16	16	16	16	16	16	1	16	16
MAX_VIEWPORT_DIMS	16384.0 16384.0	8192.0 8192.0	8192.0 8192.0	16384.0 16384.0	16384.0 16384.0	16384.0 16384.0	8192.0 8192.0	8192.0 8192.0	8192.0 8192.0	16384.0 16384.0	8192.0 8192.0	16384.0 16384.0	16384.0 16384.0
VIEWPORT_BOUNDS_RANGE	-32768.0 32767.0	0.0 0.0	0.0 0.0	-32768.0 32767.0	-32768.0 32767.0	-32768.0 32767.0	-16384.0 16384.0	-16384.0 16384.0	-16384.0 16384.0	-32768.0 32768.0	0.0 0.0	-32768.0 32767.0	-32768.0 32767.0
LAYER_PROVOKING_VERTEX	undef	0	0	provoking	provoking	provoking	provoking	provoking	provoking	provoking	0	first	first
VIEWPORT_INDEX_PROVOKING_VERTEX	undef	0	0	first	first	first	provoking	provoking	provoking	provoking	0	first	first
VIEWPORT_SUBPIXEL_BITS	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBPIXEL_BITS	10	8	8	8	8	8	8	8	8	8	8	8	8
MAX_CLIP_DISTANCES	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_ELEMENTS_INDICES	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000	150000
MAX_ELEMENTS_VERTICES	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M
POINT_SIZE_RANGE	0.1 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 64.0	1.0 63.375	1.0 63.375	1.0 63.375	1.0 63.375	0.125 64.0	0.125 64.0	0.125 64.0
POINT_SIZE_GRANULARITY	0.0001	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
ALIASED_LINE_WIDTH_RANGE	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0
SMOOTH_LINE_WIDTH_RANGE	0.1 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	1.0 1.0	0.5 1.0	0.5 1.0	0.5 1.0	0.5 1.0	0.125 1.0	0.125 1.0	0.125 1.0
SMOOTH_LINE_WIDTH_GRANULARITY	0.0001	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
MAX_COLOR_ATTACHMENTS	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_DRAW_BUFFERS	8	8	8	8	8	8	8	8	8	8	8	8	8
MAX_DUAL_SOURCE_DRAW_BUFFERS	1	1	1	1	1	1	1	1	1	1	1	1	1
MAX_SAMPLE_MASK_WORDS	1	1	1	1	1	1	1	1	1	1	1	1	1
MAX_SAMPLES	16	4	8	8	4	8	8	8	8	8	4	8	8
MAX_INTEGER_SAMPLES	1	1	1	1	1	1	1	1	1	1	1	1	1

MAX_COLOR_TEXTURE_SAMPLES	16	4	8	8	4	8	8	8	8	8	4	8	8
MAX_DEPTH_TEXTURE_SAMPLES	16	1	1	8	4	8	8	8	8	8	4	8	8
MAX_TEXTURE_SIZE	16384	8192	8192	16384	16384	16384	8192	8192	8192	16384	8192	16384	16384
MAX_RECTANGLE_TEXTURE_SIZE	16384	8192	8192	16384	16384	16384	8192	8192	8192	16384	8192	16384	16384
MAX_3D_TEXTURE_SIZE	16384	8192	8192	16384	16384	16384	2048	2048	2048	2048	2048	2048	2048
MAX_CUBE_MAP_TEXTURE_SIZE	16384	8192	8192	16384	16384	16384	8192	8192	8192	16384	8192	16384	16384
MAX_ARRAY_TEXTURE_LAYERS	16384	512	512	2048	2048	2048	512	512	512	2048	512	2048	2048
MAX_TEXTURE_BUFFER_SIZE	2G	128M	128M	128M	128M	128M	128M	128M	128M	128M	64M	64M	64M
MAX_TEXTURE_LOD_BIAS	16.0	16.0	16.0	16.0	16.0	16.0	15.0	15.0	15.0	15.0	16.0	16.0	16.0
MAX_TEXTURE_MAX_ANISOTROPY_EXT	16	16	16	16	16	16	16	16	16	16	16	16	16
NUM_COMPRESSED_TEXTURE_FORMATS	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5	3 DXT1 DXT3 DXT5
MAX_VERTEX_ATTRIBS	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_VERTEX_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_VERTEX_UNIFORM_BLOCKS	16	14	14	14	14	14	12	12	12	14	13	15	15
MAX_VERTEX_UNIFORM_COMPONENTS	4096	3072	3072	3072	3072	3072	4096	4096	4096	4096	4096	4096	4096
MAX_VERTEX_UNIFORM_VECTORS	1024	768	768	768	768	768	1024	1024	1024	1024	1024	1024	1024
MAX_VERTEX_OUTPUT_COMPONENTS	128	128	128	128	128	128	64	64	64	128	64	128	128
MAX_PATCH_VERTICES	32	0	0	32	32	32	0	0	0	32	0	32	32
MAX_TESS_CONTROL_INPUT_COMPONENTS	128	0	0	128	128	128	0	0	0	128	0	128	128
MAX_TESS_CONTROL_TEXTURE_IMAGE_UNITS	16	0	0	16	16	16	0	0	0	16	0	16	16
MAX_TESS_CONTROL_UNIFORM_BLOCKS	16	0	0	14	14	14	0	0	0	14	0	15	15
MAX_TESS_CONTROL_UNIFORM_COMPONENTS	4096	0	0	3072	3072	3072	0	0	0	2048	0	4096	4096
MAX_TESS_CONTROL_OUTPUT_COMPONENTS	128	0	0	128	128	128	0	0	0	128	0	128	128
MAX_TESS_PATCH_COMPONENTS	120	0	0	120	120	120	0	0	0	120	0	120	120
MAX_TESS_CONTROL_TOTAL_OUTPUT_COMPONENTS	4216	0	0	4216	4216	4216	0	0	0	4216	0	4216	4216
MAX_TESS_GEN_LEVEL	64	0	0	64	64	64	0	0	0	64	0	64	64
MAX_TESS_EVALUATION_INPUT_COMPONENTS	128	0	0	128	128	128	0	0	0	128	0	128	128
MAX_TESS_EVALUATION_TEXTURE_IMAGE_UNITS	16	0	0	16	16	16	0	0	0	16	0	16	16
MAX_TESS_EVALUATION_UNIFORM_BLOCKS	16	0	0	14	14	14	0	0	0	14	0	15	15
MAX_TESS_EVALUATION_UNIFORM_COMPONENTS	4096	0	0	3072	3072	3072	0	0	0	2048	0	4096	4096
MAX_TESS_EVALUATION_OUTPUT_COMPONENTS	128	0	0	128	128	128	0	0	0	128	0	128	128
MAX_GEOMETRY_INPUT_COMPONENTS	128	128	128	128	128	128	64	64	64	128	64	128	128
MAX_GEOMETRY_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_GEOMETRY_UNIFORM_BLOCKS	16	14	14	14	14	14	12	12	12	14	13	15	15
MAX_GEOMETRY_UNIFORM_COMPONENTS	4096	3072	3072	3072	3072	3072	2048	2048	2048	2048	4096	4096	4096
MAX_GEOMETRY_OUTPUT_COMPONENTS	128	128	128	128	128	128	128	128	128	128	128	128	128
MAX_GEOMETRY_TOTAL_OUTPUT_COMPONENTS	16384	16384	16384	16384	16384	16384	1024	1024	1024	1024	16384	16384	16384
MAX_GEOMETRY_OUTPUT_VERTICES	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
MAX_GEOMETRY_SHADER_INVOCATIONS	32	1	1	32	32	32	1	1	1	32	1	32	32
MAX_FRAGMENT_INPUT_COMPONENTS	128	128	128	128	128	128	128	128	128	128	128	128	128
MAX_TEXTURE_IMAGE_UNITS	16	16	16	16	16	16	16	16	16	16	16	16	16
MAX_FRAGMENT_UNIFORM_BLOCKS	16	14	14	14	14	14	12	12	12	14	13	15	15
MAX_FRAGMENT_UNIFORM_COMPONENTS	4096	3072	3072	3072	3072	3072	2048	2048	2048	2048	4096	4096	4096
MAX_FRAGMENT_UNIFORM_VECTORS	1024	768	768	768	768	768	512	512	512	512	1024	1024	1024

MIN_FRAGMENT_INTERPOLATION_OFFSET	-0.5	0.0	0.0	-0.5	-0.5	-0.5	0.0	0.0	0.0	-0.5	0.0	-0.5	-0.5
MAX_FRAGMENT_INTERPOLATION_OFFSET	0.5	0.0	0.0	0.5	0.5	0.5	0.0	0.0	0.0	0.5	0.0	0.5	0.5
FRAGMENT_INTERPOLATION_OFFSET_BITS	4	0	0	4	4	4	0	0	0	4	0	4	4
MIN_PROGRAM_TEXEL_OFFSET	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8
MAX_PROGRAM_TEXEL_OFFSET	7	7	7	7	7	7	7	7	7	7	7	7	7
MIN_PROGRAM_TEXTURE_GATHER_OFFSET	-32	0	0	-32	-32	-32	0	0	0	-32	0	-8	-8
MAX_PROGRAM_TEXTURE_GATHER_OFFSET	31	0	0	31	31	31	0	0	0	31	0	7	7
MAX_PROGRAM_TEXTURE_GATHER_COMPONENTS_ARB	4	0	0	4	4	4	0	0	0	4	0	4	4
MAX_COMBINED_TEXTURE_IMAGE_UNITS	80	48	48	80	80	80	48	48	48	80	48	80	80
MAX_COMBINED_VERTEX_UNIFORM_COMPONENTS	260K	227K	227K	227K	227K	227K	196K	196K	196K	228K	212K	244K	244K
MAX_COMBINED_TESS_CONTROL_UNIFORM_COMPONENTS	260K	0	0	227K	227K	227K	0	0	0	226K	0	244K	244K
MAX_COMBINED_TESS_EVALUATION_UNIFORM_COMPONENTS	260K	0	0	227K	227K	227K	0	0	0	226K	0	244K	244K
MAX_COMBINED_GEOMETRY_UNIFORM_COMPONENTS	260K	227K	227K	227K	227K	227K	194K	194K	194K	226K	212K	244K	244K
MAX_COMBINED_FRAGMENT_UNIFORM_COMPONENTS	260K	227K	227K	227K	227K	227K	194K	194K	194K	226K	212K	244K	244K
MAX_COMBINED_UNIFORM_BLOCKS	80	42	42	70	70	70	36	36	36	70	39	75	75
MAX_UNIFORM_BLOCK_SIZE	65536	65536	65536	65536	65536	65536	65536	65536	65536	65536	65536	65536	65536
MAX_UNIFORM_BUFFER_BINDINGS	80	42	42	70	70	70	36	36	36	70	39	75	75
UNIFORM_BUFFER_OFFSET_ALIGNMENT	256	256	256	256	256	256	256	256	256	256	256	256	256
MAX_SUBROUTINES	4096	0	0	256	256	256	0	0	0	1024	0	4096	4096
MAX_SUBROUTINE_UNIFORM_LOCATIONS	4096	0	0	1024	1024	1024	0	0	0	1024	0	4096	4096
MAX_VARYING_VECTORS	32	32	32	32	32	32	15	15	15	31	15	15	15
SHADER_COMPILER	1	1	1	1	1	1	1	1	1	1	1	1	1
NUM_SHADER_BINARY_FORMATS	0	0	0	0	0	0	0	0	0	0	0	0	0
NUM_PROGRAM_BINARY_FORMATS	0	0	0	0	0	0	0	0	0	0	0	0	0
MAX_XFB_INTERLEAVED_COMPONENTS	64	64	64	64	64	64	64	64	64	64	64	64	64
MAX_XFB_SEPARATE_ATTRIBS	4	4	4	4	4	4	4	4	4	4	4	4	4
MAX_XFB_SEPARATE_COMPONENTS	4	4	4	4	4	4	4	4	4	4	4	4	4
MAX_XFB_BUFFERS	4	4	4	4	4	4	4	4	4	4	4	4	4
MAX_VERTEX_STREAMS	4	0	0	4	4	4	0	0	0	4	0	4	4
PRIMITIVES_GENERATED (query bits)	32	32	32	32	32	32	32	32	32	32	32	32	32
XFB_PRIMITIVES_WRITTEN (query bits)	32	32	32	32	32	32	32	32	32	32	32	32	32
SAMPLES_PASSED (query bits)	32	63	63	63	63	63	32	32	32	32	64	64	64
TIME_ELAPSED (query bits)	32	32	32	32	32	32	32	32	32	32	32	32	32
TIMESTAMP (query bits)	0	0	0	0	0	0	0	0	0	0	0	0	0
MAX_SERVER_WAIT_TIMEOUT	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E	16E
Hardware Accelerated		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Backing Store	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Compliant	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Monoscopic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stereoscopic		✓	✓	✓	✓	✓	✓	✓	✓				
Single Buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Double Buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Color Buffer Modes (bpp RGB-A)	24-8 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15-1 24-8 30-2 48-16 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	15 24-8 48-16h 96-32f	24-8 48-16h 96-32f	24-8 48-16h 96-32f	24-8 48-16h 96-32f
Depth Buffer Modes (bpp)	0 32	0 16 24 32	0 16 24 32	0 16 24 32	0 16 24 32	0 16 24 32	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24	0 16 24
Stencil Buffer Modes (bpp)	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8	0 8
Max Sample Buffers	1	1	1	1	1	1	1	1	1	1	1	1	1
Max Samples	16	4	8	8	4	8	8	8	8	8	4	8	8
Supersampling	✓	✓	✓	✓	✓	✓							
Multisampling		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alphasampling	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GPU Vertex Processing		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GPU Fragment Processing		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Video Memory (megabytes)	0	128 512	256	1024	256	256 512 1024 2048	128 256 512 1536	256 1024 1536	256 512	512 1024 2048 4096	256 384 512	384 512 768 1024	1024

Notes
- This data describes functionality only. Actual rendering results may differ across renderers with identical reported capabilities; always verify your results on the real hardware.
- Renderers based on the same chipset (variants such as Pro/ Mobility) are condensed into single columns here. The exported capabilities are identical, the performance differs.
- ARB_gpu_shader_fp64 functionality is implied by OpenGL 4.0, but not exported on renderers marked by "~"
- ARB_vertex_attrib_64bit functionality is implied by OpenGL 4.1, but not exported on renderers marked by "~"