



# LIBDEVICE USER'S GUIDE

Part 000 \_vRelease Version | July 2017



# TABLE OF CONTENTS

<b>Chapter 1. Introduction.....</b>	<b>1</b>
1.1. What Is libdevice?.....	1
<b>Chapter 2. Basic Usage.....</b>	<b>2</b>
2.1. Linking with libdevice.....	2
<b>Chapter 3. Function Reference.....</b>	<b>4</b>
3.1. __nv_abs.....	4
3.2. __nv_acos.....	4
3.3. __nv_acosf.....	5
3.4. __nv_acosh.....	5
3.5. __nv_acoshf.....	5
3.6. __nv_asin.....	6
3.7. __nv_asinf.....	6
3.8. __nv_asinh.....	6
3.9. __nv_asinhf.....	7
3.10. __nv_atan.....	7
3.11. __nv_atan2.....	7
3.12. __nv_atan2f.....	8
3.13. __nv_atanf.....	8
3.14. __nv_atanh.....	8
3.15. __nv_atanhf.....	9
3.16. __nv_brev.....	9
3.17. __nv_brevll.....	9
3.18. __nv_byte_perm.....	10
3.19. __nv_cbrt.....	10
3.20. __nv_cbrtf.....	10
3.21. __nv_ceil.....	11
3.22. __nv_ceilf.....	11
3.23. __nv_clz.....	11
3.24. __nv_clzll.....	12
3.25. __nv_copysign.....	12
3.26. __nv_copysignf.....	12
3.27. __nv_cos.....	13
3.28. __nv_cosf.....	13
3.29. __nv_cosh.....	13
3.30. __nv_coshf.....	14
3.31. __nv_cospi.....	14
3.32. __nv_cospif.....	14
3.33. __nv_dadd_rd.....	15
3.34. __nv_dadd_rn.....	15
3.35. __nv_dadd_ru.....	15

3.36. __nv_dadd_rz.....	16
3.37. __nv_ddiv_rd.....	16
3.38. __nv_ddiv_rn.....	16
3.39. __nv_ddiv_ru.....	17
3.40. __nv_ddiv_rz.....	17
3.41. __nv_dmul_rd.....	17
3.42. __nv_dmul_rn.....	18
3.43. __nv_dmul_ru.....	18
3.44. __nv_dmul_rz.....	18
3.45. __nv_double2float_rd.....	19
3.46. __nv_double2float_rn.....	19
3.47. __nv_double2float_ru.....	19
3.48. __nv_double2float_rz.....	20
3.49. __nv_double2hiint.....	20
3.50. __nv_double2int_rd.....	20
3.51. __nv_double2int_rn.....	21
3.52. __nv_double2int_ru.....	21
3.53. __nv_double2int_rz.....	21
3.54. __nv_double2ll_rd.....	22
3.55. __nv_double2ll_rn.....	22
3.56. __nv_double2ll_ru.....	22
3.57. __nv_double2ll_rz.....	23
3.58. __nv_double2loint.....	23
3.59. __nv_double2uint_rd.....	23
3.60. __nv_double2uint_rn.....	24
3.61. __nv_double2uint_ru.....	24
3.62. __nv_double2uint_rz.....	24
3.63. __nv_double2ull_rd.....	25
3.64. __nv_double2ull_rn.....	25
3.65. __nv_double2ull_ru.....	25
3.66. __nv_double2ull_rz.....	26
3.67. __nv_double_as_longlong.....	26
3.68. __nv_drcp_rd.....	26
3.69. __nv_drcp_rn.....	27
3.70. __nv_drcp_ru.....	27
3.71. __nv_drcp_rz.....	27
3.72. __nv_dsqrt_rd.....	28
3.73. __nv_dsqrt_rn.....	28
3.74. __nv_dsqrt_ru.....	28
3.75. __nv_dsqrt_rz.....	29
3.76. __nv_erf.....	29
3.77. __nv_erfc.....	29
3.78. __nv_erfcf.....	30

3.79. __nv_erfcinv.....	30
3.80. __nv_erfcinvf.....	30
3.81. __nv_erfcx.....	31
3.82. __nv_erfcxf.....	31
3.83. __nv_erff.....	31
3.84. __nv_erfinv.....	32
3.85. __nv_erfinvf.....	32
3.86. __nv_exp.....	32
3.87. __nv_exp10.....	33
3.88. __nv_exp10f.....	33
3.89. __nv_exp2.....	33
3.90. __nv_exp2f.....	34
3.91. __nv_expf.....	34
3.92. __nv_expm1.....	34
3.93. __nv_expm1f.....	35
3.94. __nv_fabs.....	35
3.95. __nv_fabsf.....	35
3.96. __nv_fadd_rd.....	36
3.97. __nv_fadd_rn.....	36
3.98. __nv_fadd_ru.....	36
3.99. __nv_fadd_rz.....	37
3.100. __nv_fast_cosf.....	37
3.101. __nv_fast_exp10f.....	37
3.102. __nv_fast_expf.....	38
3.103. __nv_fast_fdivdef.....	38
3.104. __nv_fast_log10f.....	38
3.105. __nv_fast_log2f.....	39
3.106. __nv_fast_logf.....	39
3.107. __nv_fast_powf.....	39
3.108. __nv_fast_sincosf.....	40
3.109. __nv_fast_sinf.....	40
3.110. __nv_fast_tanf.....	40
3.111. __nv_fdim.....	41
3.112. __nv_fdimf.....	41
3.113. __nv_fdiv_rd.....	41
3.114. __nv_fdiv_rn.....	42
3.115. __nv_fdiv_ru.....	42
3.116. __nv_fdiv_rz.....	42
3.117. __nv_ffs.....	43
3.118. __nv_ffsll.....	43
3.119. __nv_finitef.....	43
3.120. __nv_float2half_rn.....	44
3.121. __nv_float2int_rd.....	44

3.122. __nv_float2int_rn.....	44
3.123. __nv_float2int_ru.....	45
3.124. __nv_float2int_rz.....	45
3.125. __nv_float2ll_rd.....	45
3.126. __nv_float2ll_rn.....	46
3.127. __nv_float2ll_ru.....	46
3.128. __nv_float2ll_rz.....	46
3.129. __nv_float2uint_rd.....	47
3.130. __nv_float2uint_rn.....	47
3.131. __nv_float2uint_ru.....	47
3.132. __nv_float2uint_rz.....	48
3.133. __nv_float2ull_rd.....	48
3.134. __nv_float2ull_rn.....	48
3.135. __nv_float2ull_ru.....	49
3.136. __nv_float2ull_rz.....	49
3.137. __nv_float_as_int.....	49
3.138. __nv_floor.....	50
3.139. __nv_floorf.....	50
3.140. __nv_fma.....	50
3.141. __nv_fma_rd.....	51
3.142. __nv_fma_rn.....	51
3.143. __nv_fma_ru.....	51
3.144. __nv_fma_rz.....	52
3.145. __nv_fmaf.....	52
3.146. __nv_fmaf_rd.....	52
3.147. __nv_fmaf_rn.....	53
3.148. __nv_fmaf_ru.....	53
3.149. __nv_fmaf_rz.....	53
3.150. __nv_fmax.....	54
3.151. __nv_fmaxf.....	54
3.152. __nv_fmin.....	54
3.153. __nv_fminf.....	55
3.154. __nv_fmod.....	55
3.155. __nv_fmodf.....	55
3.156. __nv_fmul_rd.....	56
3.157. __nv_fmul_rn.....	56
3.158. __nv_fmul_ru.....	56
3.159. __nv_fmul_rz.....	57
3.160. __nv_frcp_rd.....	57
3.161. __nv_frcp_rn.....	57
3.162. __nv_frcp_ru.....	58
3.163. __nv_frcp_rz.....	58
3.164. __nv_frexp.....	58

3.165. __nv_frexp.....	59
3.166. __nv_frsqrt_rn.....	59
3.167. __nv_fsqrt_rd.....	59
3.168. __nv_fsqrt_rn.....	60
3.169. __nv_fsqrt_ru.....	60
3.170. __nv_fsqrt_rz.....	60
3.171. __nv_fsub_rd.....	61
3.172. __nv_fsub_rn.....	61
3.173. __nv_fsub_ru.....	61
3.174. __nv_fsub_rz.....	62
3.175. __nv_hadd.....	62
3.176. __nv_half2float.....	62
3.177. __nv_hiloInt2double.....	63
3.178. __nv_hypot.....	63
3.179. __nv_hypotf.....	63
3.180. __nv_ilogb.....	64
3.181. __nv_ilogbf.....	64
3.182. __nv_int2double_rn.....	64
3.183. __nv_int2float_rd.....	65
3.184. __nv_int2float_rn.....	65
3.185. __nv_int2float_ru.....	65
3.186. __nv_int2float_rz.....	66
3.187. __nv_int_as_float.....	66
3.188. __nv_isfinitd.....	66
3.189. __nv_isinfd.....	67
3.190. __nv_isinff.....	67
3.191. __nv_isnand.....	67
3.192. __nv_isnanf.....	68
3.193. __nv_j0.....	68
3.194. __nv_j0f.....	68
3.195. __nv_j1.....	69
3.196. __nv_j1f.....	69
3.197. __nv_jn.....	69
3.198. __nv_jnf.....	70
3.199. __nv_ldexp.....	70
3.200. __nv_ldexpf.....	70
3.201. __nv_lgamma.....	71
3.202. __nv_lgammaf.....	71
3.203. __nv_ll2double_rd.....	71
3.204. __nv_ll2double_rn.....	72
3.205. __nv_ll2double_ru.....	72
3.206. __nv_ll2double_rz.....	72
3.207. __nv_ll2float_rd.....	73

3.208. __nv_ll2float_rn.....	73
3.209. __nv_ll2float_ru.....	73
3.210. __nv_ll2float_rz.....	74
3.211. __nv_llabs.....	74
3.212. __nv_llmax.....	74
3.213. __nv_llmin.....	75
3.214. __nv_llrint.....	75
3.215. __nv_llrintf.....	75
3.216. __nv_llround.....	76
3.217. __nv_llroundf.....	76
3.218. __nv_log.....	76
3.219. __nv_log10.....	77
3.220. __nv_log10f.....	77
3.221. __nv_log1p.....	77
3.222. __nv_log1pf.....	78
3.223. __nv_log2.....	78
3.224. __nv_log2f.....	78
3.225. __nv_logb.....	79
3.226. __nv_logbf.....	79
3.227. __nv_logf.....	79
3.228. __nv_longlong_as_double.....	80
3.229. __nv_max.....	80
3.230. __nv_min.....	80
3.231. __nv_modf.....	81
3.232. __nv_modff.....	81
3.233. __nv_mul24.....	81
3.234. __nv_mul64hi.....	82
3.235. __nv_mulhi.....	82
3.236. __nv_nan.....	82
3.237. __nv_nanf.....	83
3.238. __nv_nearbyint.....	83
3.239. __nv_nearbyintf.....	83
3.240. __nv_nextafter.....	84
3.241. __nv_nextafterf.....	84
3.242. __nv_normcdf.....	84
3.243. __nv_normcdfff.....	85
3.244. __nv_normcdfinv.....	85
3.245. __nv_normcdfinvf.....	85
3.246. __nv_popc.....	86
3.247. __nv_popc11.....	86
3.248. __nv_pow.....	86
3.249. __nv_powf.....	87
3.250. __nv_powi.....	87

3.251. __nv_powif.....	87
3.252. __nv_rcbrt.....	88
3.253. __nv_rcbrtf.....	88
3.254. __nv_remainder.....	88
3.255. __nv_remainderf.....	89
3.256. __nv_remquo.....	89
3.257. __nv_remquof.....	89
3.258. __nv_rhadd.....	90
3.259. __nv_rint.....	90
3.260. __nv_rintf.....	90
3.261. __nv_round.....	91
3.262. __nv_roundf.....	91
3.263. __nv_rsqr.....	91
3.264. __nv_rsqrft.....	92
3.265. __nv_sad.....	92
3.266. __nv_saturatef.....	92
3.267. __nv_scalbn.....	93
3.268. __nv_scalbnf.....	93
3.269. __nv_signbitd.....	93
3.270. __nv_signbitf.....	94
3.271. __nv_sin.....	94
3.272. __nv_sincos.....	94
3.273. __nv_sincosf.....	95
3.274. __nv_sincospi.....	95
3.275. __nv_sincospif.....	95
3.276. __nv_sinf.....	96
3.277. __nv_sinh.....	96
3.278. __nv_sinhf.....	96
3.279. __nv_sinpi.....	97
3.280. __nv_sinpif.....	97
3.281. __nv_sqrt.....	97
3.282. __nv_sqrtf.....	98
3.283. __nv_tan.....	98
3.284. __nv_tanf.....	98
3.285. __nv_tanh.....	99
3.286. __nv_tanhf.....	99
3.287. __nv_tgamma.....	99
3.288. __nv_tgammaf.....	100
3.289. __nv_trunc.....	100
3.290. __nv_truncf.....	100
3.291. __nv_uhadd.....	101
3.292. __nv_uint2double_rn.....	101
3.293. __nv_uint2float_rd.....	101



3.294. __nv_uint2float_rn.....	102
3.295. __nv_uint2float_ru.....	102
3.296. __nv_uint2float_rz.....	102
3.297. __nv_ull2double_rd.....	103
3.298. __nv_ull2double_rn.....	103
3.299. __nv_ull2double_ru.....	103
3.300. __nv_ull2double_rz.....	104
3.301. __nv_ull2float_rd.....	104
3.302. __nv_ull2float_rn.....	104
3.303. __nv_ull2float_ru.....	105
3.304. __nv_ull2float_rz.....	105
3.305. __nv_ullmax.....	105
3.306. __nv_ullmin.....	106
3.307. __nv_umax.....	106
3.308. __nv_umin.....	106
3.309. __nv_umul24.....	107
3.310. __nv_umul64hi.....	107
3.311. __nv_umulhi.....	107
3.312. __nv_urhadd.....	108
3.313. __nv_usad.....	108
3.314. __nv_y0.....	108
3.315. __nv_y0f.....	109
3.316. __nv_y1.....	109
3.317. __nv_y1f.....	109
3.318. __nv_yn.....	110
3.319. __nv_ynf.....	110

## LIST OF TABLES

Table 1 Supported Reflection Parameters .....	2
---	---

# Chapter 1.

## INTRODUCTION

### 1.1. What Is libdevice?

The libdevice library is a collection of NVVM bitcode functions that implement common functions for NVIDIA GPU devices, including math primitives and bit-manipulation functions. These functions are optimized for particular GPU architectures, and are intended to be linked with an NVVM IR module during compilation to PTX.

This guide documents both the functions available in libdevice and the basic usage of the library from a compiler writer's perspective.

# Chapter 2.

## BASIC USAGE

### 2.1. Linking with libdevice

The libdevice library ships as an LLVM bitcode library and is meant to be linked with the target module early in the compilation process. The standard process for linking with libdevice is to first link it with the target module, then run the standard LLVM optimization and code generation passes. This allows the optimizers to inline and perform analyses on the used library functions, and eliminate any used functions as dead code.

Users of libnvvm can link with libdevice by adding the appropriate libdevice module to the `nvvmProgram` object being compiled. In addition, the following options for `nvvmCompileProgram` affect the behavior of libdevice functions:

Table 1 Supported Reflection Parameters

Parameter	Values	Description
-ftz	0 (default)	preserve denormal values, when performing single-precision floating-point operations
	1	flush denormal values to zero, when performing single-precision floating-point operations
-prec-div	0	use a faster approximation for single-precision floating-point division and reciprocals
	1 (default)	use IEEE round-to-nearest mode for single-precision floating-point division and reciprocals
-prec-sqrt	0	use IEEE round-to-nearest mode for single-precision floating-point square root
	1 (default)	use a faster approximation for single-precision floating-point square root

The following pseudo-code shows an example of linking an NVVM IR module with the libdevice library using libnvvm:

```

nvvmProgram prog;
size_t libdeviceModSize;

const char *libdeviceMod = loadFile('/path/to/libdevice.*.bc',
                                     &libdeviceModSize);
const char *myIr = /* NVVM IR in text or binary format */;
size_t myIrSize = /* size of myIr in bytes */;

// Create NVVM program object
nvvmCreateProgram(&prog);

// Add libdevice module to program
nvvmAddModuleToProgram(prog, libdeviceMod, libdeviceModSize);

// Add custom IR to program
nvvmAddModuleToProgram(prog, myIr, myIrSize);

// Declare compile options
const char *options[] = { "-ftz=1" };

// Compile the program
nvvmCompileProgram(prog, 1, options);

```

It is the responsibility of the client program to locate and read the libdevice library binary (represented by the `loadFile` function in the example).

# Chapter 3.

## FUNCTION REFERENCE

This chapter describes all functions available in libdevice.

### 3.1. `__nv_abs`

**Prototype:**

```
i32 @__nv_abs(i32 %)
```

**Description:**

**Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.2. `__nv_acos`

**Prototype:**

```
double @__nv_acos(double %)
```

**Description:**

**Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.3. `__nv_acosf`

**Prototype:**

```
float @__nv_acosf(float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.4. `__nv_acosh`

**Prototype:**

```
double @__nv_acosh(double %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.5. `__nv_acoshf`

**Prototype:**

```
float @__nv_acoshf(float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.6. `__nv_asin`

### Prototype:

```
double @__nv_asin(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.7. `__nv_asinf`

### Prototype:

```
float @__nv_asinf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.8. `__nv_asinh`

### Prototype:

```
double @__nv_asinh(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes



## 3.9. `__nv_asinhf`

### Prototype:

```
float @__nv_asinhf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.10. `__nv_atan`

### Prototype:

```
double @__nv_atan(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.11. `__nv_atan2`

### Prototype:

```
double @__nv_atan2(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.12. `__nv_atan2f`

### Prototype:

```
float @__nv_atan2f(float %, float %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.13. `__nv_atanf`

### Prototype:

```
float @__nv_atanf(float %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.14. `__nv_atanh`

### Prototype:

```
double @__nv_atanh(double %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.15. \_\_nv\_atanhf

### Prototype:

```
float @__nv_atanhf(float %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.16. \_\_nv\_brev

### Prototype:

```
i32 @__nv_brev(i32 %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.17. \_\_nv\_brevll

### Prototype:

```
i64 @__nv_brevll(i64 %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.18. \_\_nv\_byte\_perm

### Prototype:

```
i32 @__nv_byte_perm(i32 %, i32 %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.19. \_\_nv\_cbrt

### Prototype:

```
double @__nv_cbrt(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.20. \_\_nv\_cbrtf

### Prototype:

```
float @__nv_cbrtf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.21. \_\_nv\_ceil

### Prototype:

```
double @__nv_ceil(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.22. \_\_nv\_ceilf

### Prototype:

```
float @__nv_ceilf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.23. \_\_nv\_clz

### Prototype:

```
i32 @__nv_clz(i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.24. \_\_nv\_clzll

### Prototype:

```
i32 @__nv_clzll(i64 %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.25. \_\_nv\_copysign

### Prototype:

```
double @__nv_copysign(double %, double %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.26. \_\_nv\_copysignf

### Prototype:

```
float @__nv_copysignf(float %, float %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.27. \_\_nv\_cos

### Prototype:

```
double @__nv_cos(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.28. \_\_nv\_cosf

### Prototype:

```
float @__nv_cosf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.29. \_\_nv\_cosh

### Prototype:

```
double @__nv_cosh(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.30. `__nv_coshf`

### Prototype:

```
float @__nv_coshf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.31. `__nv_cosp_i`

### Prototype:

```
double @__nv_cosp_i(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.32. `__nv_cospif`

### Prototype:

```
float @__nv_cospif(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes



### 3.33. `__nv_dadd_rd`

**Prototype:**

```
double @__nv_dadd_rd(double %, double %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.34. `__nv_dadd_rn`

**Prototype:**

```
double @__nv_dadd_rn(double %, double %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.35. `__nv_dadd_ru`

**Prototype:**

```
double @__nv_dadd_ru(double %, double %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.36. \_\_nv\_dadd\_rz

### Prototype:

```
double @__nv_dadd_rz(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.37. \_\_nv\_ddiv\_rd

### Prototype:

```
double @__nv_ddiv_rd(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.38. \_\_nv\_ddiv\_rn

### Prototype:

```
double @__nv_ddiv_rn(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.39. \_\_nv\_ddiv\_ru

### Prototype:

```
double @__nv_ddiv_ru(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.40. \_\_nv\_ddiv\_rz

### Prototype:

```
double @__nv_ddiv_rz(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.41. \_\_nv\_dmul\_rd

### Prototype:

```
double @__nv_dmul_rd(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.42. \_\_nv\_dmul\_rn

### Prototype:

```
double @__nv_dmul_rn(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.43. \_\_nv\_dmul\_ru

### Prototype:

```
double @__nv_dmul_ru(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.44. \_\_nv\_dmul\_rz

### Prototype:

```
double @__nv_dmul_rz(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.45. `__nv_double2float_rd`

### Prototype:

```
float __nv_double2float_rd(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.46. `__nv_double2float_rn`

### Prototype:

```
float __nv_double2float_rn(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.47. `__nv_double2float_ru`

### Prototype:

```
float __nv_double2float_ru(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.48. `__nv_double2float_rz`

### Prototype:

```
float @__nv_double2float_rz(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.49. `__nv_double2hiint`

### Prototype:

```
i32 @__nv_double2hiint(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.50. `__nv_double2int_rd`

### Prototype:

```
i32 @__nv_double2int_rd(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.51. `__nv_double2int_rn`

### Prototype:

```
i32 @__nv_double2int_rn(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.52. `__nv_double2int_ru`

### Prototype:

```
i32 @__nv_double2int_ru(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.53. `__nv_double2int_rz`

### Prototype:

```
i32 @__nv_double2int_rz(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.54. `__nv_double2ll_rd`

### Prototype:

```
i64 __nv_double2ll_rd(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.55. `__nv_double2ll_rn`

### Prototype:

```
i64 __nv_double2ll_rn(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.56. `__nv_double2ll_ru`

### Prototype:

```
i64 __nv_double2ll_ru(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes



## 3.57. `__nv_double2ll_rz`

### Prototype:

```
i64 __nv_double2ll_rz(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.58. `__nv_double2loint`

### Prototype:

```
i32 __nv_double2loint(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.59. `__nv_double2uint_rd`

### Prototype:

```
i32 __nv_double2uint_rd(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.60. `__nv_double2uint_rn`

### Prototype:

```
i32 @__nv_double2uint_rn(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.61. `__nv_double2uint_ru`

### Prototype:

```
i32 @__nv_double2uint_ru(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.62. `__nv_double2uint_rz`

### Prototype:

```
i32 @__nv_double2uint_rz(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.63. `__nv_double2ull_rd`

### Prototype:

```
i64 __nv_double2ull_rd(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.64. `__nv_double2ull_rn`

### Prototype:

```
i64 __nv_double2ull_rn(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.65. `__nv_double2ull_ru`

### Prototype:

```
i64 __nv_double2ull_ru(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.66. `__nv_double2ull_rz`

### Prototype:

```
i64 @__nv_double2ull_rz(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.67. `__nv_double_as_longlong`

### Prototype:

```
i64 @__nv_double_as_longlong(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.68. `__nv_drcp_rd`

### Prototype:

```
double @__nv_drcp_rd(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.69. \_\_nv\_drcp\_rn

### Prototype:

```
double @__nv_drcp_rn(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.70. \_\_nv\_drcp\_ru

### Prototype:

```
double @__nv_drcp_ru(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.71. \_\_nv\_drcp\_rz

### Prototype:

```
double @__nv_drcp_rz(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.72. `__nv_dsqrt_rd`

### Prototype:

```
double @__nv_dsqrt_rd(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.73. `__nv_dsqrt_rn`

### Prototype:

```
double @__nv_dsqrt_rn(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.74. `__nv_dsqrt_ru`

### Prototype:

```
double @__nv_dsqrt_ru(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.75. `__nv_dsqrt_rz`

### Prototype:

```
double @__nv_dsqrt_rz(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.76. `__nv_erf`

### Prototype:

```
double @__nv_erf(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.77. `__nv_erfc`

### Prototype:

```
double @__nv_erfc(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.78. `__nv_erfcf`

### Prototype:

```
float @__nv_erfcf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.79. `__nv_erfcinv`

### Prototype:

```
double @__nv_erfcinv(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.80. `__nv_erfcinvf`

### Prototype:

```
float @__nv_erfcinvf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes



## 3.81. `__nv_erfcx`

### Prototype:

```
double @__nv_erfcx(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.82. `__nv_erfcxf`

### Prototype:

```
float @__nv_erfcxf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.83. `__nv_erff`

### Prototype:

```
float @__nv_erff(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.84. `__nv_erfinv`

### Prototype:

```
double @__nv_erfinv(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.85. `__nv_erfinvf`

### Prototype:

```
float @__nv_erfinvf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.86. `__nv_exp`

### Prototype:

```
double @__nv_exp(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.87. `__nv_exp10`

### Prototype:

```
double @__nv_exp10(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.88. `__nv_exp10f`

### Prototype:

```
float @__nv_exp10f(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.89. `__nv_exp2`

### Prototype:

```
double @__nv_exp2(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.90. \_\_nv\_exp2f

### Prototype:

```
float @__nv_exp2f(float %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.91. \_\_nv\_expf

### Prototype:

```
float @__nv_expf(float %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.92. \_\_nv\_expm1

### Prototype:

```
double @__nv_expm1(double %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.93. `__nv_expm1f`

**Prototype:**

```
float @__nv_expm1f(float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.94. `__nv_fabs`

**Prototype:**

```
double @__nv_fabs(double %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.95. `__nv_fabsf`

**Prototype:**

```
float @__nv_fabsf(float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.96. \_\_nv\_fadd\_rd

### Prototype:

```
float @__nv_fadd_rd(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.97. \_\_nv\_fadd\_rn

### Prototype:

```
float @__nv_fadd_rn(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.98. \_\_nv\_fadd\_ru

### Prototype:

```
float @__nv_fadd_ru(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.99. \_\_nv\_fadd\_rz

### Prototype:

```
float @__nv_fadd_rz(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.100. \_\_nv\_fast\_cosf

### Prototype:

```
float @__nv_fast_cosf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.101. \_\_nv\_fast\_exp10f

### Prototype:

```
float @__nv_fast_exp10f(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.102. `__nv_fast_expf`

### Prototype:

```
float @__nv_fast_expf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.103. `__nv_fast_fdividef`

### Prototype:

```
float @__nv_fast_fdividef(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.104. `__nv_fast_log10f`

### Prototype:

```
float @__nv_fast_log10f(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes



## 3.105. `__nv_fast_log2f`

### Prototype:

```
float @__nv_fast_log2f(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.106. `__nv_fast_logf`

### Prototype:

```
float @__nv_fast_logf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.107. `__nv_fast_powf`

### Prototype:

```
float @__nv_fast_powf(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.108. `__nv_fast_sincosf`

### Prototype:

```
void @__nv_fast_sincosf(float %, float* %, float* %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.109. `__nv_fast_sinf`

### Prototype:

```
float @__nv_fast_sinf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.110. `__nv_fast_tanf`

### Prototype:

```
float @__nv_fast_tanf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.111. `__nv_fdim`

### Prototype:

```
double @__nv_fdim(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.112. `__nv_fdimf`

### Prototype:

```
float @__nv_fdimf(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.113. `__nv_fdiv_rd`

### Prototype:

```
float @__nv_fdiv_rd(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.114. `__nv_fdiv_rn`

### Prototype:

```
float @__nv_fdiv_rn(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.115. `__nv_fdiv_ru`

### Prototype:

```
float @__nv_fdiv_ru(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.116. `__nv_fdiv_rz`

### Prototype:

```
float @__nv_fdiv_rz(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.117. `__nv_ffs`

### Prototype:

```
i32 @__nv_ffs(i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.118. `__nv_ffsll`

### Prototype:

```
i32 @__nv_ffsll(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.119. `__nv_finitef`

### Prototype:

```
i32 @__nv_finitef(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.120. `__nv_float2half_rn`

### Prototype:

```
i16 @__nv_float2half_rn(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.121. `__nv_float2int_rd`

### Prototype:

```
i32 @__nv_float2int_rd(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.122. `__nv_float2int_rn`

### Prototype:

```
i32 @__nv_float2int_rn(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.123. `__nv_float2int_ru`

**Prototype:**

```
i32 @__nv_float2int_ru(float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.124. `__nv_float2int_rz`

**Prototype:**

```
i32 @__nv_float2int_rz(float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.125. `__nv_float2ll_rd`

**Prototype:**

```
i64 @__nv_float2ll_rd(float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.126. \_\_nv\_float2ll\_rn

### Prototype:

```
i64 @__nv_float2ll_rn(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.127. \_\_nv\_float2ll\_ru

### Prototype:

```
i64 @__nv_float2ll_ru(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.128. \_\_nv\_float2ll\_rz

### Prototype:

```
i64 @__nv_float2ll_rz(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes



## 3.129. \_\_nv\_float2uint\_rd

### Prototype:

```
i32 @__nv_float2uint_rd(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.130. \_\_nv\_float2uint\_rn

### Prototype:

```
i32 @__nv_float2uint_rn(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.131. \_\_nv\_float2uint\_ru

### Prototype:

```
i32 @__nv_float2uint_ru(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.132. `__nv_float2uint_rz`

**Prototype:**

```
i32 @__nv_float2uint_rz(float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.133. `__nv_float2ull_rd`

**Prototype:**

```
i64 @__nv_float2ull_rd(float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.134. `__nv_float2ull_rn`

**Prototype:**

```
i64 @__nv_float2ull_rn(float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.135. `__nv_float2ull_ru`

**Prototype:**

```
i64 @__nv_float2ull_ru(float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.136. `__nv_float2ull_rz`

**Prototype:**

```
i64 @__nv_float2ull_rz(float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.137. `__nv_float_as_int`

**Prototype:**

```
i32 @__nv_float_as_int(float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.138. `__nv_floor`

### Prototype:

```
double @__nv_floor(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.139. `__nv_floorf`

### Prototype:

```
float @__nv_floorf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.140. `__nv_fma`

### Prototype:

```
double @__nv_fma(double %, double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.141. \_\_nv\_fma\_rd

### Prototype:

```
double @__nv_fma_rd(double %, double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.142. \_\_nv\_fma\_rn

### Prototype:

```
double @__nv_fma_rn(double %, double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.143. \_\_nv\_fma\_ru

### Prototype:

```
double @__nv_fma_ru(double %, double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.144. `__nv_fma_rz`

### Prototype:

```
double @__nv_fma_rz(double %, double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.145. `__nv_fmaf`

### Prototype:

```
float @__nv_fmaf(float %, float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.146. `__nv_fmaf_rd`

### Prototype:

```
float @__nv_fmaf_rd(float %, float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.147. `__nv_fmaf_rn`

### Prototype:

```
float @__nv_fmaf_rn(float %, float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.148. `__nv_fmaf_ru`

### Prototype:

```
float @__nv_fmaf_ru(float %, float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.149. `__nv_fmaf_rz`

### Prototype:

```
float @__nv_fmaf_rz(float %, float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.150. `__nv_fmax`

### Prototype:

```
double @__nv_fmax(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.151. `__nv_fmaxf`

### Prototype:

```
float @__nv_fmaxf(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.152. `__nv_fmin`

### Prototype:

```
double @__nv_fmin(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes



### 3.153. `__nv_fminf`

**Prototype:**

```
float @__nv_fminf(float %, float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.154. `__nv_fmod`

**Prototype:**

```
double @__nv_fmod(double %, double %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.155. `__nv_fmodf`

**Prototype:**

```
float @__nv_fmodf(float %, float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.156. `__nv_fmuls_rd`

### Prototype:

```
float @__nv_fmuls_rd(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.157. `__nv_fmuls_rn`

### Prototype:

```
float @__nv_fmuls_rn(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.158. `__nv_fmuls_ru`

### Prototype:

```
float @__nv_fmuls_ru(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.159. \_\_nv\_fmuls\_rz

### Prototype:

```
float @__nv_fmuls_rz(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.160. \_\_nv\_frcps\_rd

### Prototype:

```
float @__nv_frcps_rd(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.161. \_\_nv\_frcps\_rn

### Prototype:

```
float @__nv_frcps_rn(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.162. `__nv_frcp_ru`

### Prototype:

```
float @__nv_frcp_ru(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.163. `__nv_frcp_rz`

### Prototype:

```
float @__nv_frcp_rz(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.164. `__nv_frexp`

### Prototype:

```
double @__nv_frexp(double %, i32* %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.165. `__nv_frexp`

### Prototype:

```
float @__nv_frexp(float %, i32* %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.166. `__nv_frsqrt_rn`

### Prototype:

```
float @__nv_frsqrt_rn(float %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.167. `__nv_fsqrt_rd`

### Prototype:

```
float @__nv_fsqrt_rd(float %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.168. `__nv_fsqrt_rn`

### Prototype:

```
float @__nv_fsqrt_rn(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.169. `__nv_fsqrt_ru`

### Prototype:

```
float @__nv_fsqrt_ru(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.170. `__nv_fsqrt_rz`

### Prototype:

```
float @__nv_fsqrt_rz(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.171. `__nv_fsub_rd`

### Prototype:

```
float @__nv_fsub_rd(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.172. `__nv_fsub_rn`

### Prototype:

```
float @__nv_fsub_rn(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.173. `__nv_fsub_ru`

### Prototype:

```
float @__nv_fsub_ru(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.174. `__nv_fsub_rz`

### Prototype:

```
float @__nv_fsub_rz(float %, float %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.175. `__nv_hadd`

### Prototype:

```
i32 @__nv_hadd(i32 %, i32 %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.176. `__nv_half2float`

### Prototype:

```
float @__nv_half2float(i16 %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes



## 3.177. `__nv_hilooint2double`

### Prototype:

```
double @__nv_hilooint2double(i32 %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.178. `__nv_hypot`

### Prototype:

```
double @__nv_hypot(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.179. `__nv_hypotf`

### Prototype:

```
float @__nv_hypotf(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.180. `__nv_ilogb`

### Prototype:

```
i32 @__nv_ilogb(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.181. `__nv_ilogbf`

### Prototype:

```
i32 @__nv_ilogbf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.182. `__nv_int2double_rn`

### Prototype:

```
double @__nv_int2double_rn(i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.183. `__nv_int2float_rd`

### Prototype:

```
float @__nv_int2float_rd(i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.184. `__nv_int2float_rn`

### Prototype:

```
float @__nv_int2float_rn(i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.185. `__nv_int2float_ru`

### Prototype:

```
float @__nv_int2float_ru(i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.186. `__nv_int2float_rz`

### Prototype:

```
float @__nv_int2float_rz(i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.187. `__nv_int_as_float`

### Prototype:

```
float @__nv_int_as_float(i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.188. `__nv_isfinited`

### Prototype:

```
i32 @__nv_isfinited(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.189. `__nv_isinfd`

### Prototype:

```
i32 @__nv_isinfd(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.190. `__nv_isinff`

### Prototype:

```
i32 @__nv_isinff(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.191. `__nv_isnand`

### Prototype:

```
i32 @__nv_isnand(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.192. `__nv_isnanf`

### Prototype:

```
i32 @__nv_isnanf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.193. `__nv_j0`

### Prototype:

```
double @__nv_j0(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.194. `__nv_j0f`

### Prototype:

```
float @__nv_j0f(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.195. `__nv_j1`

**Prototype:**

```
double @__nv_j1(double %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.196. `__nv_j1f`

**Prototype:**

```
float @__nv_j1f(float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.197. `__nv_jn`

**Prototype:**

```
double @__nv_jn(i32 %, double %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.198. `__nv_jnf`

**Prototype:**

```
float @__nv_jnf(i32 %, float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.199. `__nv_ldexp`

**Prototype:**

```
double @__nv_ldexp(double %, i32 %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.200. `__nv_ldexpf`

**Prototype:**

```
float @__nv_ldexpf(float %, i32 %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes



## 3.201. `__nv_lgamma`

### Prototype:

```
double @__nv_lgamma(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.202. `__nv_lgammaf`

### Prototype:

```
float @__nv_lgammaf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.203. `__nv_ll2double_rd`

### Prototype:

```
double @__nv_ll2double_rd(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.204. \_\_nv\_ll2double\_rn

### Prototype:

```
double @__nv_ll2double_rn(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.205. \_\_nv\_ll2double\_ru

### Prototype:

```
double @__nv_ll2double_ru(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.206. \_\_nv\_ll2double\_rz

### Prototype:

```
double @__nv_ll2double_rz(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.207. `__nv_ll2float_rd`

### Prototype:

```
float @__nv_ll2float_rd(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.208. `__nv_ll2float_rn`

### Prototype:

```
float @__nv_ll2float_rn(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.209. `__nv_ll2float_ru`

### Prototype:

```
float @__nv_ll2float_ru(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.210. `__nv_ll2float_rz`

### Prototype:

```
float @__nv_ll2float_rz(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.211. `__nv_llabs`

### Prototype:

```
i64 @__nv_llabs(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.212. `__nv_llmax`

### Prototype:

```
i64 @__nv_llmax(i64 %, i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.213. `__nv_llmin`

### Prototype:

```
i64 @__nv_llmin(i64 %, i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.214. `__nv_llrint`

### Prototype:

```
i64 @__nv_llrint(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.215. `__nv_llrintf`

### Prototype:

```
i64 @__nv_llrintf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.216. `__nv_llround`

### Prototype:

```
i64 @__nv_llround(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.217. `__nv_llroundf`

### Prototype:

```
i64 @__nv_llroundf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.218. `__nv_log`

### Prototype:

```
double @__nv_log(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.219. `__nv_log10`

### Prototype:

```
double @__nv_log10(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.220. `__nv_log10f`

### Prototype:

```
float @__nv_log10f(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.221. `__nv_log1p`

### Prototype:

```
double @__nv_log1p(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.222. `__nv_log1pf`

### Prototype:

```
float @__nv_log1pf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.223. `__nv_log2`

### Prototype:

```
double @__nv_log2(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.224. `__nv_log2f`

### Prototype:

```
float @__nv_log2f(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes



## 3.225. `__nv_logb`

### Prototype:

```
double @__nv_logb(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.226. `__nv_logbf`

### Prototype:

```
float @__nv_logbf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.227. `__nv_logf`

### Prototype:

```
float @__nv_logf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.228. `__nv_longlong_as_double`

### Prototype:

```
double @__nv_longlong_as_double(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.229. `__nv_max`

### Prototype:

```
i32 @__nv_max(i32 %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.230. `__nv_min`

### Prototype:

```
i32 @__nv_min(i32 %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.231. `__nv_modf`

### Prototype:

```
double @__nv_modf(double %, double* %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.232. `__nv_modff`

### Prototype:

```
float @__nv_modff(float %, float* %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.233. `__nv_mul24`

### Prototype:

```
i32 @__nv_mul24(i32 %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.234. `__nv_mul64hi`

### Prototype:

```
i64 @__nv_mul64hi(i64 %, i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.235. `__nv_mulhi`

### Prototype:

```
i32 @__nv_mulhi(i32 %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.236. `__nv_nan`

### Prototype:

```
double @__nv_nan(i8* %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.237. `__nv_nanf`

**Prototype:**

```
float @__nv_nanf(i8* %)
```

**Description:**

**Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.238. `__nv_nearbyint`

**Prototype:**

```
double @__nv_nearbyint(double %)
```

**Description:**

**Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.239. `__nv_nearbyintf`

**Prototype:**

```
float @__nv_nearbyintf(float %)
```

**Description:**

**Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.240. `__nv_nextafter`

### Prototype:

```
double @__nv_nextafter(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.241. `__nv_nextafterf`

### Prototype:

```
float @__nv_nextafterf(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.242. `__nv_normcdf`

### Prototype:

```
double @__nv_normcdf(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.243. `__nv_normcdf`

### Prototype:

```
float @__nv_normcdf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.244. `__nv_normcdfinv`

### Prototype:

```
double @__nv_normcdfinv(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.245. `__nv_normcdfinvf`

### Prototype:

```
float @__nv_normcdfinvf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.246. `__nv_popc`

### Prototype:

```
i32 @__nv_popc(i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.247. `__nv_popc11`

### Prototype:

```
i32 @__nv_popc11(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.248. `__nv_pow`

### Prototype:

```
double @__nv_pow(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes



## 3.249. `__nv_powf`

### Prototype:

```
float @__nv_powf(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.250. `__nv_powi`

### Prototype:

```
double @__nv_powi(double %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.251. `__nv_powif`

### Prototype:

```
float @__nv_powif(float %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.252. `__nv_rcbrt`

### Prototype:

```
double @__nv_rcbrt(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.253. `__nv_rcbrtf`

### Prototype:

```
float @__nv_rcbrtf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.254. `__nv_remainder`

### Prototype:

```
double @__nv_remainder(double %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.255. `__nv_remainderf`

### Prototype:

```
float @__nv_remainderf(float %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.256. `__nv_remquo`

### Prototype:

```
double @__nv_remquo(double %, double %, i32* %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.257. `__nv_remquof`

### Prototype:

```
float @__nv_remquof(float %, float %, i32* %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.258. `__nv_rhadd`

### Prototype:

```
i32 @__nv_rhadd(i32 %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.259. `__nv_rint`

### Prototype:

```
double @__nv_rint(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.260. `__nv_rintf`

### Prototype:

```
float @__nv_rintf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.261. `__nv_round`

### Prototype:

```
double @__nv_round(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.262. `__nv_roundf`

### Prototype:

```
float @__nv_roundf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.263. `__nv_rsqrt`

### Prototype:

```
double @__nv_rsqrt(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.264. `__nv_rsqrtf`

### Prototype:

```
float @__nv_rsqrtf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.265. `__nv_sad`

### Prototype:

```
i32 @__nv_sad(i32 %, i32 %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.266. `__nv_saturatef`

### Prototype:

```
float @__nv_saturatef(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.267. `__nv_scalbn`

### Prototype:

```
double @__nv_scalbn(double %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.268. `__nv_scalbnf`

### Prototype:

```
float @__nv_scalbnf(float %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.269. `__nv_signbitd`

### Prototype:

```
i32 @__nv_signbitd(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.270. `__nv_signbitf`

### Prototype:

```
i32 @__nv_signbitf(float %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.271. `__nv_sin`

### Prototype:

```
double @__nv_sin(double %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.272. `__nv_sincos`

### Prototype:

```
void @__nv_sincos(double %, double* %, double* %)
```

### Description:

### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes



## 3.273. `__nv_sincosf`

### Prototype:

```
void @__nv_sincosf(float %, float* %, float* %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.274. `__nv_sincospi`

### Prototype:

```
void @__nv_sincospi(double %, double* %, double* %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.275. `__nv_sincospif`

### Prototype:

```
void @__nv_sincospif(float %, float* %, float* %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.276. `__nv_sinf`

### Prototype:

```
float @__nv_sinf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.277. `__nv_sinh`

### Prototype:

```
double @__nv_sinh(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.278. `__nv_sinhf`

### Prototype:

```
float @__nv_sinhf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.279. `__nv_sinpi`

### Prototype:

```
double @__nv_sinpi(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.280. `__nv_sinpif`

### Prototype:

```
float @__nv_sinpif(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.281. `__nv_sqrt`

### Prototype:

```
double @__nv_sqrt(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.282. `__nv_sqrtf`

### Prototype:

```
float @__nv_sqrtf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.283. `__nv_tan`

### Prototype:

```
double @__nv_tan(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.284. `__nv_tanf`

### Prototype:

```
float @__nv_tanf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.285. `__nv_tanh`

### Prototype:

```
double @__nv_tanh(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.286. `__nv_tanhf`

### Prototype:

```
float @__nv_tanhf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.287. `__nv_tgamma`

### Prototype:

```
double @__nv_tgamma(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.288. `__nv_tgammaf`

### Prototype:

```
float @__nv_tgammaf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.289. `__nv_trunc`

### Prototype:

```
double @__nv_trunc(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.290. `__nv_truncf`

### Prototype:

```
float @__nv_truncf(float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.291. `__nv_uhadd`

### Prototype:

```
i32 @__nv_uhadd(i32 %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.292. `__nv_uint2double_rn`

### Prototype:

```
double @__nv_uint2double_rn(i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.293. `__nv_uint2float_rd`

### Prototype:

```
float @__nv_uint2float_rd(i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.294. `__nv_uint2float_rn`

### Prototype:

```
float @__nv_uint2float_rn(i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.295. `__nv_uint2float_ru`

### Prototype:

```
float @__nv_uint2float_ru(i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.296. `__nv_uint2float_rz`

### Prototype:

```
float @__nv_uint2float_rz(i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes



## 3.297. `__nv_ull2double_rd`

### Prototype:

```
double @__nv_ull2double_rd(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.298. `__nv_ull2double_rn`

### Prototype:

```
double @__nv_ull2double_rn(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.299. `__nv_ull2double_ru`

### Prototype:

```
double @__nv_ull2double_ru(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.300. `__nv_ull2double_rz`

### Prototype:

```
double @__nv_ull2double_rz(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.301. `__nv_ull2float_rd`

### Prototype:

```
float @__nv_ull2float_rd(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.302. `__nv_ull2float_rn`

### Prototype:

```
float @__nv_ull2float_rn(i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.303. `__nv_ull2float_ru`

**Prototype:**

```
float @__nv_ull2float_ru(i64 %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.304. `__nv_ull2float_rz`

**Prototype:**

```
float @__nv_ull2float_rz(i64 %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.305. `__nv_ullmax`

**Prototype:**

```
i64 @__nv_ullmax(i64 %, i64 %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.306. `__nv_ullmin`

### Prototype:

```
i64 @__nv_ullmin(i64 %, i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.307. `__nv_umax`

### Prototype:

```
i32 @__nv_umax(i32 %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.308. `__nv_umin`

### Prototype:

```
i32 @__nv_umin(i32 %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.309. `__nv_umul24`

### Prototype:

```
i32 @__nv_umul24(i32 %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.310. `__nv_umul64hi`

### Prototype:

```
i64 @__nv_umul64hi(i64 %, i64 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.311. `__nv_umulhi`

### Prototype:

```
i32 @__nv_umulhi(i32 %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.312. `__nv_urhadd`

### Prototype:

```
i32 @__nv_urhadd(i32 %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.313. `__nv_usad`

### Prototype:

```
i32 @__nv_usad(i32 %, i32 %, i32 %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.314. `__nv_y0`

### Prototype:

```
double @__nv_y0(double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.315. `__nv_y0f`

**Prototype:**

```
float @__nv_y0f(float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.316. `__nv_y1`

**Prototype:**

```
double @__nv_y1(double %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

### 3.317. `__nv_y1f`

**Prototype:**

```
float @__nv_y1f(float %)
```

**Description:****Library Availability:**

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.318. \_\_nv\_yn

### Prototype:

```
double @__nv_yn(i32 %, double %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes

## 3.319. \_\_nv\_ynf

### Prototype:

```
float @__nv_ynf(i32 %, float %)
```

### Description:

#### Library Availability:

Compute 2.0: Yes

Compute 3.0: Yes

Compute 3.5: Yes



## **Notice**

ALL NVIDIA DESIGN SPECIFICATIONS, REFERENCE BOARDS, FILES, DRAWINGS, DIAGNOSTICS, LISTS, AND OTHER DOCUMENTS (TOGETHER AND SEPARATELY, "MATERIALS") ARE BEING PROVIDED "AS IS." NVIDIA MAKES NO WARRANTIES, EXPRESSED, IMPLIED, STATUTORY, OR OTHERWISE WITH RESPECT TO THE MATERIALS, AND EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES OF NONINFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE.

Information furnished is believed to be accurate and reliable. However, NVIDIA Corporation assumes no responsibility for the consequences of use of such information or for any infringement of patents or other rights of third parties that may result from its use. No license is granted by implication of otherwise under any patent rights of NVIDIA Corporation. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all other information previously supplied. NVIDIA Corporation products are not authorized as critical components in life support devices or systems without express written approval of NVIDIA Corporation.

## **Trademarks**

NVIDIA and the NVIDIA logo are trademarks or registered trademarks of NVIDIA Corporation in the U.S. and other countries. Other company and product names may be trademarks of the respective companies with which they are associated.

## **Copyright**

© 2017 NVIDIA Corporation. All rights reserved.