


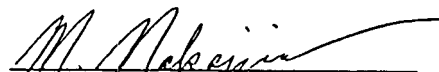
Qualification Test Results on NE272 series

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1. Test Device

NE272

Al GaAs /In GaAs hetero-junction FET

2. Qualification tests

A series of qualification tests consists of following items

- 1) High temperature DC Bias Test (H T P T)
- 2) High temperature Reverse Bias Test (H T R B T)

The test conditions and sample size are shown in Table 1.

The test parameters were measured before and after the tests.

3. Test Results

The summary of qualification test result is presented in Table 3-1,3-2.

1) High Temperature DC Bias Test

The following condition has been adopted:

$$V_{DS}=2V \quad I_D=10mA \quad T_{ch}=175^{\circ}C$$

The test results are shown in Table 3-1 and Fig.1(1)~Fig.1(8)

The test elapsed for 5000 hours under the above condition.

The changes of all parameters are within the delta criteria.

2) High temperature DC Bias Test

The following condition has been adopted:

$$V_{GDS}=-4V \quad T_{ch}=150^{\circ}C$$

The test results are shown in Table 3-2 and Fig.2(1)~Fig.2(8).

The test elapsed for 5000 hours under the above condition.

The changes of all parameters are within the delta criteria.

4. Conclusion

From the series of qualification test results described above it is concluded that:

- 1) There is no degradation up to 5000 hours at $T_{ch}=175^{\circ}C$ in High temperature DC bias test.
- 2) There is no degradation up to 5000 hours at $T_{ch}=150^{\circ}C$ in High temperature Reverse bias test.

NE272 is qualified for high reliability applications.

Table 1 Test Item and Test condition

Test Item	Test Condition	Sample size	Remarks
High temperature DC bias test	$V_{DS}=2V, I_D=10mA, T_{ch}=175^{\circ}C$ 5000 hours or up to $F(t)>50\%$	10	Test is continued ; No degradation up to 5000
High temperature reverse bias test	$V_{G-DS}=-4V, T_{ch}=150^{\circ}C$ 5000 hours or up to $F(t)>50\%$	10	Test is continued ; No degradation up to 5000

Table 2 Delta Parameters and Criteria

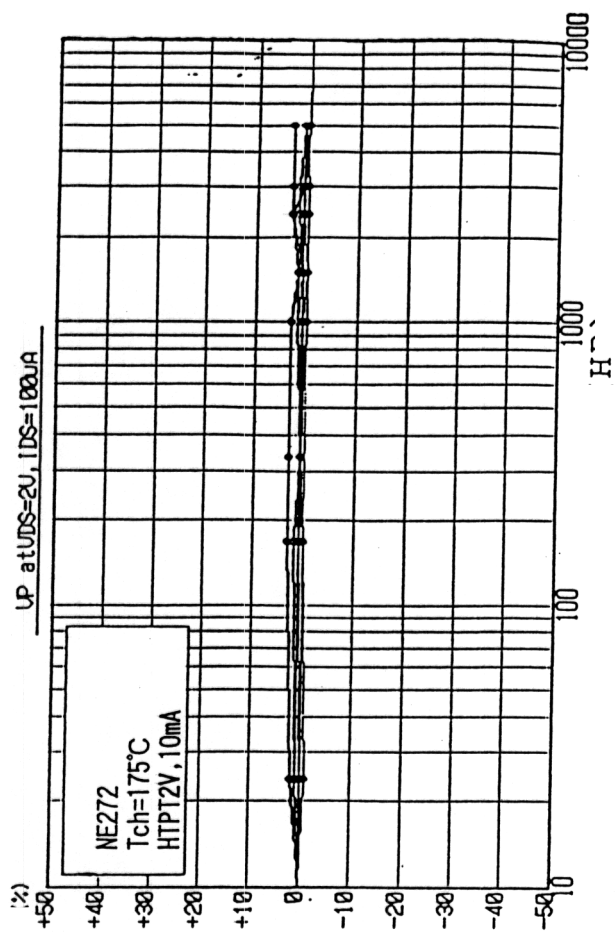
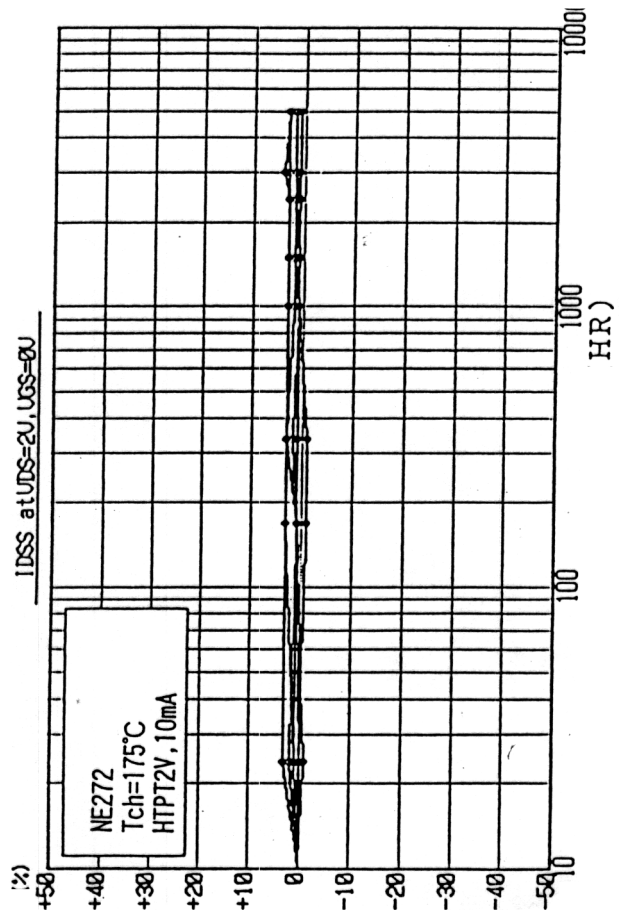
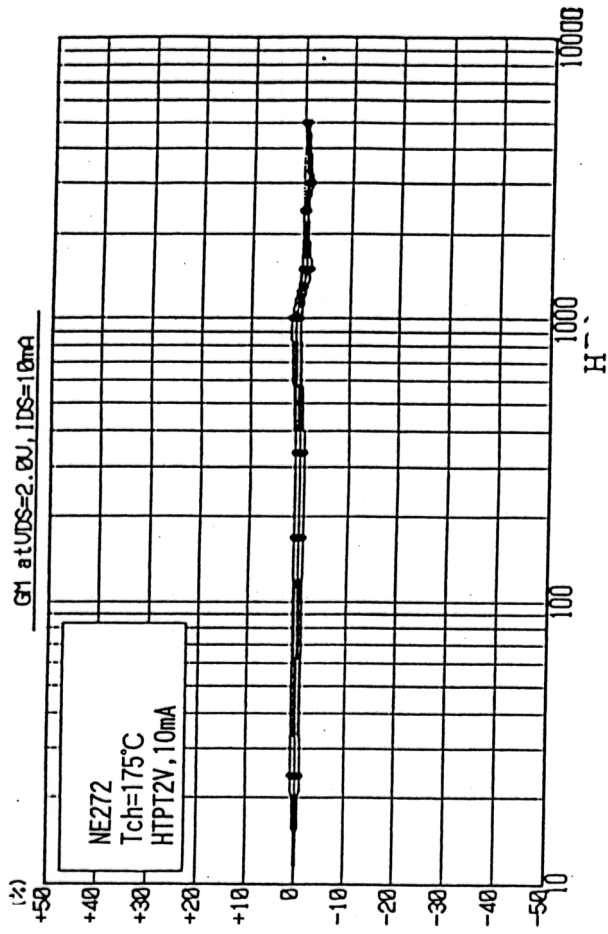
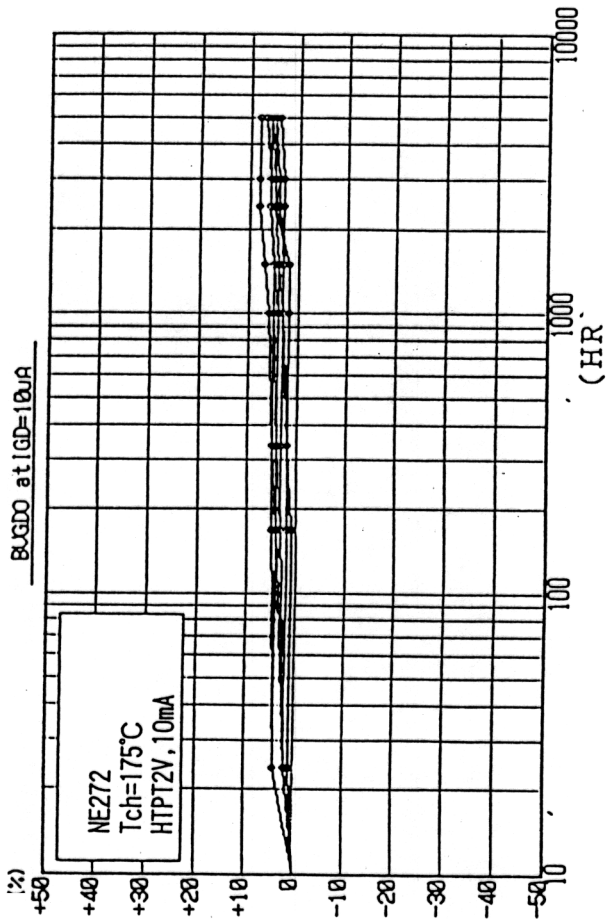
Parameter	Test condition	Delta Criteria
I_{DSS}	$V_{DS}=2V, V_{GS}=0V$	+20% ~ -20%
gm	$V_{DS}=2V, I_D=10mA$	+20% ~ -20%
$V_{GS(off)}$	$V_{DS}=2V, I_D=100 \mu A$	+20% ~ -20%
I_{GSO}	$V_{GS}=-3V$	+500nA or 100% whichever is greater
BVGDO	$I_{GD}=-10 \mu A$	+20% ~ -20%
V_{GF}	$I_{GF}=1 \mu A$	+20% ~ -20%
NF	$V_{DS}=2V, I_D=10mA$ $f=12GHz$	+0.2dB ~ -0.2dB
Ga		+0.5dB ~ -0.5dB

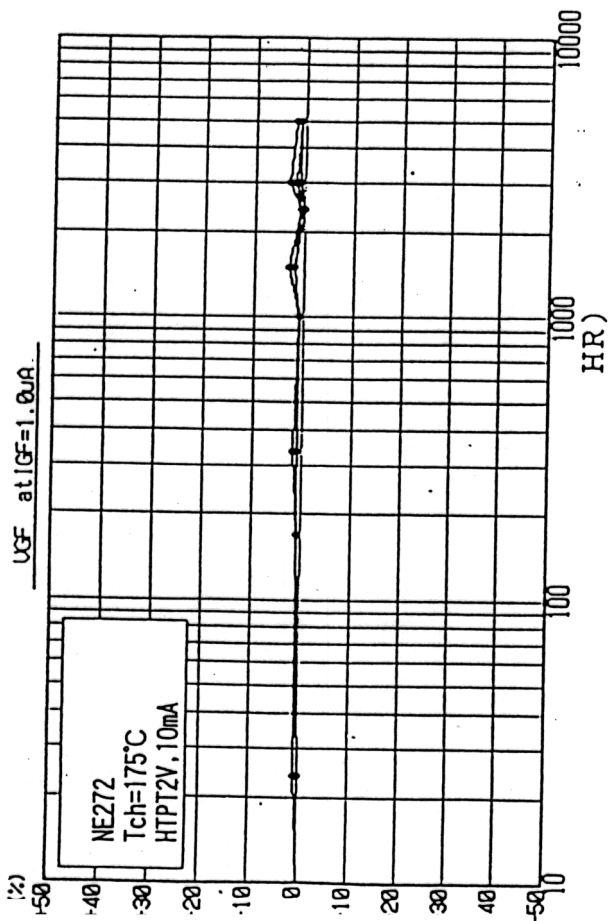
Table 3-1. Summary of Qualification Test Result

TEST ITEM	TEST CONDITION	CUMULATIVE FAILURE NUMBER WITH ELAPSED TIME					REF. FIG. OR TABLE	
		168H	336H	1000H	1500H	3000H		5000H
HIGH TEMPERATURE DC BIAS TEST	$V_{DS} = 2V$ $I_D = 10mA$ $T_{ch} = 175^\circ C$	0/10	0/10	0/10	0/10	0/10	0/10	FIG. 1

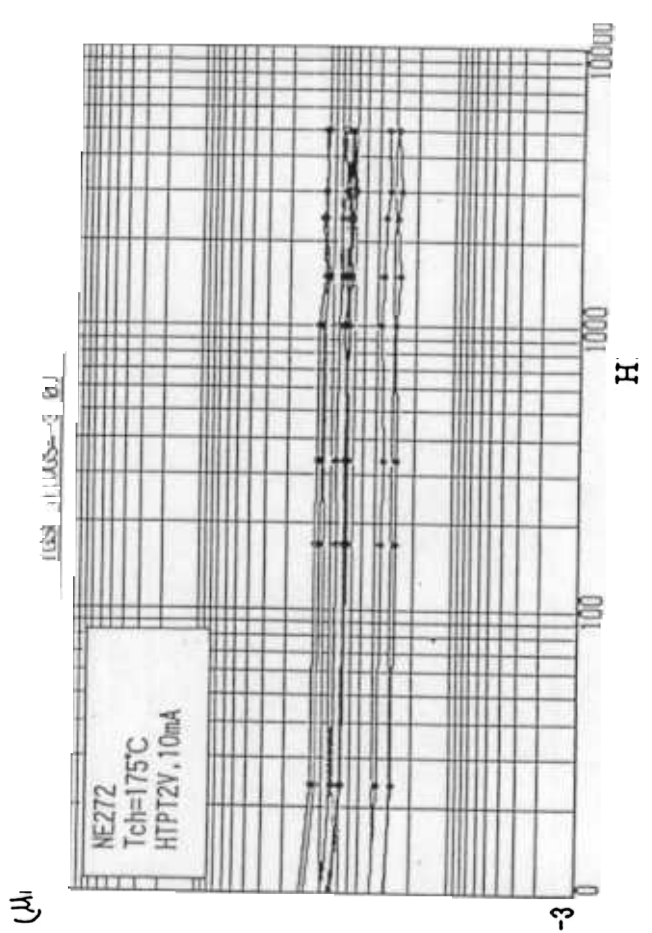
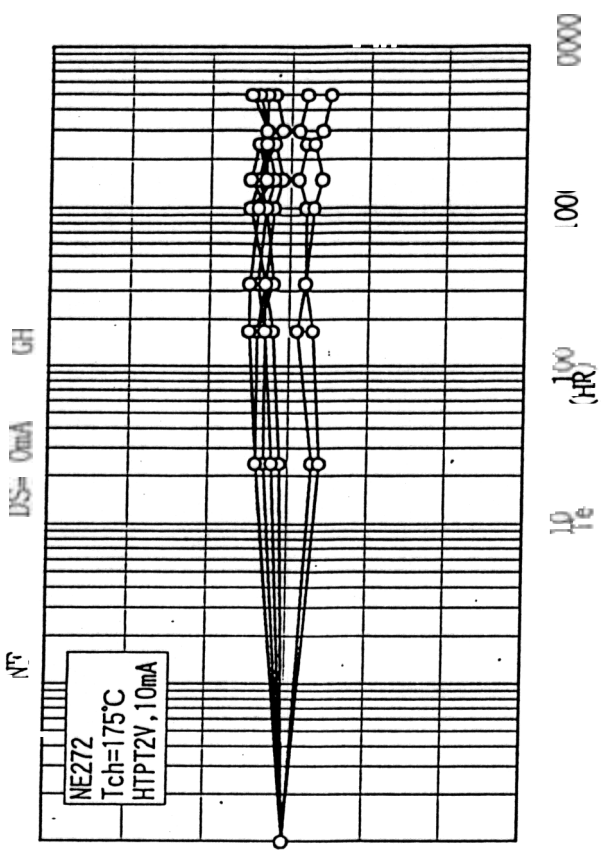
Table 3-2. Summary of Qualification Test Result

TEST ITEM	TEST CONDITION	CUMULATIVE FAILURE NUMBER WITH ELAPSED TIME					REF. FIG. OR TABLE	
		168H	336H	1000H	1500H	3000H		5000H
HIGH TEMPERATURE REVERSE BIAS TEST	$V_{G-DS} = -4V$ $T_{ch} = 150^\circ C$	0/10	0/10	0/10	0/10	0/10	0/10	FIG. 2

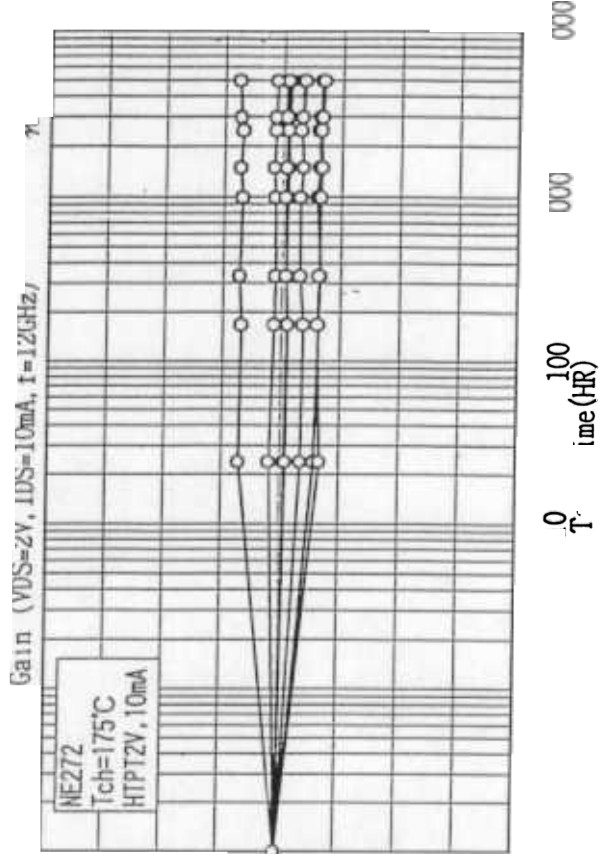




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