



聯 傑 國 際 股 份 有 限 公 司

DAVICOM SEMICONDUCTOR INC.

RELIABILITY TEST REPORT

PART No. : DM9161AE/DM9161AEP

PACKAGE TYPE: LQFP 48L

REPORT VERSION: [4]

RA No.: DSI-RA-9161AE

DATE: 05.10.2006

PREPARED BY

APPROVED BY

Vivian

Martin Lu

Vivian Chang

Martin Lu



聯傑國際股份有限公司

DAVICOM SEMICONDUCTOR INC.

新竹科學工業園區
 力行六路 6 號
 No.6 Li-Hsin Rd. VI, Science Park,
 Hsin-Chu, Taiwan, R.O.C.

TEL: 886-3-5798797

FAX: 886-3-5798859

PART No. : DM9161AE/DM9161AEP

Test Item	Start Date	Finished Date	Sample Size	Test Time	ACC / REJ	Test LTPD	Test Result	Test Purpose	Remark
ESD	030828	030828	18	-	-	-	CLASS 2	NEW PD	SEE NOTE 1
ESD	051229	060113	18	-	-	-	CLASS 3	NEW PD	SEE NOTE 1
Latch UP	021231	030103	9	-	-	-	CLASS 1	NEW PD	SEE NOTE 2
Latch UP	030828	030829	9	-	-	-	CLASS 1	NEW PD	SEE NOTE 2
Latch UP	060407	060406	9	-	-	-	CLASS 1	NEW PD	SEE NOTE 2
HTOL	060314	060502	77	1000H	1/2	5%	Pass 77ea	NEW PD	FIT=153
BLT	060314	060502	77	1000H	1/2	5%	Pass 77ea	NEW PD	-
HSLT	060314	060502	77	1000H	1/2	5%	Pass 77ea	NEW PD	-
LSLT	060314	060502	77	1000H	1/2	5%	Pass 77ea	NEW PD	-
Note 1:					Note 2:				
CLASS 1 : 0V – 1999V CLASS 2 : 2000V – 3999V CLASS 3 : 4000V – or ABOVE					CLASS 1 : $+VT = 1.5 \times VDD$ $-VT = -0.5 \times VDD$ $+IT = I_{nom} + 100mA$ $-IT = -100mA$				

Reliability Test Item & Condition

Test Items	Test Conditions	Reference Standard	Sample Size	Accept /Reject.	LTPD
High Temperature Operating Life Test (HTOLT)	TA=125°C 1000 hours	MIL-STD-883D-1005.8	77	1/2	5%
High Temperature Bias Life Test (HTBLT)	TA=125°C 1000 hours	MIL-STD-883D-1005.8	77	1/2	5%
High Temperature Storage Life Test (HTSLT)	TA=150°C 1000 hours	EIAJ-ED-4701B-111	77	1/2	5%
Low Temperature Storage Life Test (LTSLT)	TA=-65°C 1000 hours	EIAJ-ED-4701B-112	77	1/2	5%
Latch-up	Current/Voltage Trigger pulse width =10ms	JEDEC-STD No. 78	2/mode	-	-
ESD	R=1.5kΩ, C=100pF	MIL-STD-883 Method 3015.7	2/mode	-	-



聯傑國際股份有限公司

DAVICOM SEMICONDUCTOR INC.

THE FIT OF DM9161AE/DM9161AEP

1. CONCLUSION: The FIT value of DM9161AE/AEP is 153.

The MTBF value of DM9161AE/AEP is $1/\text{FIT} \sim 6,535,947$ hours

2. EXPLANATION :

(1) HISTORY of OLT :

For each lot: sample size = 77, test time = 1000 hours

Result: Pass 1000 hours * 1 lot

(2) CALCULATION OF FIT

$$\text{FIT} = \lambda(t_2) = \lambda(t_1)/F(t_1, t_2)$$

Where $\lambda_1 = X^2(2n-2, CL)/2*N*T$ failure rate

$F(t_1, t_2) = \text{Exp}[-(Ea/K)(1/t_1 - 1/t_2)]$ acceleration factor

Note 1: Meaning of Symbols

N: test sample size

T: test time

X^2 : CHI-SQUARE function

n: failure no.

CL: confidence level

Ea: activation energy (eV)

K: Boltzman's constant ($8.63*10^{-5}$ eV/⁰k)

t_1 : test temperature in ⁰k

t_2 : desired temperature in ⁰k

Note 2: Example of Calculation

CL = 60%

Ea = 0.7Ev

$t_1 = 125^{\circ}\text{C} = 398^{\circ}\text{k}$

$t_2 = 55^{\circ}\text{C} = 328^{\circ}\text{k} \rightarrow F = 77.63$ (acceleration factor)

$N*T = 77*1*1000 = 77000$

$\lambda(t_1) = X^2[2*(n+1), 60%]/(2*N*T)$

$= 1.83/(2*77000)$

$= 1.18*10^{-5}$

$\therefore \lambda(t_2) = \lambda(t_1)/F = 1.18*10^{-5}/77.63 = 153*10^{-9} = 153$ (FIT)