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PRODUCT RELIABILITY REPORT
FOR

DS28CZ04, Rev A1

Dallas Semiconductor

4401 South Beltwood Parkway
Dallas, TX 75244-3292

Prepared by:

Don Lipps
Staff Reliability Engineer
Dallas Semiconductor
4401 South Beltwood Pkwy.
Dallas, TX 75244-3292
Email : don.lipps@dalsemi.com
ph: 972-371-3739
fax: 972-371-6016

Conclusion

The following qualification successfully meets the quality and reliability standards required of all Dallas Semiconductor products:

DS28CZ04, Rev A1

In addition, Dallas Semiconductor's continuous reliability monitor program ensures that all outgoing product will continue to meet Maxim's quality and reliability standards. The current status of the reliability monitor program can be viewed at http://www.maxim-ic.com/TechSupport /dsreliability.html.

Device Description:

A description of this device can be found in the product data sheet. You can find the product data sheet at http://dbserv.maxim-ic.com/l_datasheet3.cfm.

Reliability Derating:

The Arrhenius model will be used to determine the acceleration factor for failure mechanisms that are temperature accelerated.

AfT = exp((Ea/k)*(1/Tu - 1/Ts)) = tu/ts
AfT = Acceleration factor due to Temperature
tu = Time at use temperature (e.g. 55°C)
ts = Time at stress temperature (e.g. 125°C)
k = Boltzmann's Constant (8.617 x 10-5 eV/°K)
Tu = Temperature at Use (°K)
Ts = Temperature at Stress (°K)
Ea = Activation Energy (e.g. 0.7 ev)

The activation energy of the failure mechanism is derived from either internal studies or industry accepted standards, or activation energy of 0.7ev will be used whenever actual failure mechanisms or their activation energies are unknown. All deratings will be done from the stress ambient temperature to the use ambient temperature.

An exponential model will be used to determine the acceleration factor for failure mechanisms, which are voltage accelerated.

AfV = exp(B*(Vs - Vu))
AfV = Acceleration factor due to Voltage
Vs = Stress Voltage (e.g. 7.0 volts)
Vu = Maximum Operating Voltage (e.g. 5.5 volts)
B = Constant related to failure mechanism type (e.g. 1.0, 2.4, 2.7, etc.)

The Constant, B, related to the failure mechanism is derived from either internal studies or industry accepted standards, or a B of 1.0 will be used whenever actual failure mechanisms or their B are unknown. All deratings will be done from the stress voltage to the maximum operating voltage. Failure rate data from the operating life test is reported using a Chi-Squared statistical model at the 60% or 90% confidence level (Cf).

The failure rate, Fr, is related to the acceleration during life test by:

Fr = X/(ts * AfV * AfT * N * 2)
X = Chi-Sq statistical upper limit
N = Life test sample size

Failure Rates are reported in FITs (Failures in Time) or MTTF (Mean Time To Failure). The FIT rate is related to MTTF by:

MTTF = 1/Fr

NOTE: MTTF is frequently used interchangeably with MTBF.

The calculated failure rate for this device/process is:

FAILURE RATE: MTTF (YRS): 34016 FITS: 3.4

The parameters used to calculate this failure rate are as follows:

Cf: 60% Ea: 0.7 B: 0 Tu: 25 °C Vu: 5.25 Volt

The reliability data follows. A the start of this data is the device information. The next section is the detailed reliability data for each stress. The reliability data section includes the latest data available and may contain some generic data. "*" after DATE CODE denotes specific product

Device Information:

Process:	E35WN-3P3M,DPE2,NTC,DSD,PDESD,PDRES,Cap,ENPN
Passivation:	TEOS Ox-Nit 2-Mask Laser/Pass for E35WM; Full BEOL at
Die Size:	88 x 88
Number of Transistors:	53074
Interconnect:	Aluminum / 1% Silicon / 0.5% Copper
Gate Oxide Thickness:	120 Å

ELECTRICAL CHARACTERIZATION

DESCRIPTION	DATE COD	CONDITION	READPOINT		QTY	FAILS	FA#
ESD SENSITIVITY	0614 *	EOS/ESD S5.1 HBM 500 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0614 *	EOS/ESD S5.1 HBM 1000 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0614 *	EOS/ESD S5.1 HBM 2000 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0614 *	EOS/ESD S5.1 HBM 3000 VOLTS	1	PUL'S	3	0	
ESD SENSITIVITY	0614 *	EOS/ESD S5.1 HBM 4000 VOLTS	1	PUL'S	3	3	No FA
LATCH-UP	0614 *	JESD78, I-TEST 125C	2	DYS	6	0	
LATCH-UP	0614 *	JESD78, V-SUPPLY TEST 125C	2	DYS	6	0	
				Total:		**3**	

OPERATING LIFE

DESCRIPTION	DATE COD	CONDITION	READPOINT		QTY	FAILS	FA#
HIGH TEMP REVERSE BIAS	0618	125C, 5.25 VOLTS	1000	HRS	80	0	
HIGH TEMP REVERSE BIAS	0618	125C, 5.25 VOLTS	1000	HRS	80	0	
HIGH TEMP OP LIFE	0620 *	125C, 5.25 VOLTS	192	HRS	77	0	
HIGH TEMP OP LIFE	0624	125C, 5.25 VOLTS	192	HRS	45	0	
HIGH TEMP OP LIFE	0627	125C, 5.25 VOLTS	500	HRS	77	0	

HIGH TEMP OP LIFE	0629	125C, 3.5 VOLTS	192	HRS	77	0
HIGH TEMP OP LIFE	0629	125C, 5.25 VOLTS	500	HRS	76	0
HIGH TEMP OP LIFE	0632	125C, 5.25 VOLTS	192	HRS	77	0
				Total:		**0**

W/E ENDURANCE AND DATA RET'N

DESCRIPTION	DATE	COD	CONDITION	READPOINT		QTY	FAILS	FA#
WRITE CYCLE STRESS (KCYS)	0620	*	85 C, 5.25 VOLTS	50	KCYS	77	0	
STORAGE LIFE		*	150C	96	HRS	77	0	
WRITE CYCLE STRESS (KCYS)	0627		85 C, 5.25 VOLTS	50	KCYS	77	0	
STORAGE LIFE			150C	500	HRS	77	0	
WRITE CYCLE STRESS (KCYS)	0629		85 C, 3.5 VOLTS	10	KCYS	77	0	
STORAGE LIFE			150C	96	HRS	77	0	
WRITE CYCLE STRESS (KCYS)	0629		25 C, 3.5 VOLTS	40	KCYS	77	0	
STORAGE LIFE			150C	96	HRS	77	0	
WRITE CYCLE STRESS (KCYS)	0629		85 C, 5.25 VOLTS	50	KCYS	76	0	
STORAGE LIFE			150C	96	HRS	76	0	
WRITE CYCLE STRESS (KCYS)	0632		85 C, 5.25 VOLTS	50	KCYS	77	0	
STORAGE LIFE			150C	96	HRS	77	0	
					Total:		**0**	

FAILURE RATE: **MTTF (YRS): 34016** **FITS: 3.4**