

LESSONS LEARNED FROM DSCC-VQ COMMERCIAL SITE AUDITS

This summary is designed to provide military contractors and System Program Offices (SPO) with more information to help them with risk analysis when using off-the-shelf commercial (data book) product in military hardware. This information has been assembled from the information gathered on DSCC- QML audits of various high volume commercial suppliers of leading edge microcircuit technology.

DSCC understands that situations may arise where the OEM has very few choices because, for instance, the needed product is not listed on the QML-38535. During these situations we recommend the OEM contact DSCC to determine if we can locate the product or are currently working with a potential source of supply.

PRODUCT LIFE CYCLE

- **AVERAGE LIFE CYCLE OF A COMMERCIAL OFF-THE-SHELF DATA BOOK PRODUCT IS 1 – 3 YEARS**
- **AVERAGE LIFE OF A WAFER FAB IS 6 – 10 YEARS. PRODUCT MAY GO THROUGH FOUR OR FIVE REVISIONS (GENERATIONS) DURING THAT PERIOD**
- **A TYPICAL HIGH VOLUME COMMERCIAL WAFER FABRICATION LINE PRODUCES APPROXIMATELY FIFTY THOUSAND TO EIGHTY THOUSAND EIGHT-INCH WAFERS PER MONTH (EACH WAFER MAY CONTAIN BETWEEN 400 TO 800 DIES).**
- **A TYPICAL COMMERCIAL ASSEMBLY/TEST OPERATION PRODUCES TWO MILLION TO FIVE MILLION PLASTIC UNITS PER DAY.**

CONCLUSION: DIMINISHING MANUFACTURING SOURCE (DMS) PROBLEMS CAN BE EXPECTED TO INCREASE SIGNIFICANTLY. CONTRACTORS/ SPO'S SHOULD ANTICIPATE A PRODUCT LIFE OF NO LONGER THAN THREE TO SIX YEARS FROM INITIAL PRODUCTION RELEASE WITH APPROXIMATELY FIVE TO SIX PRODUCT REVISIONS OVER THE LIFE.

END OF LIFE NOTICES

- END OF LIFE NOTICES (EOL) ARE NOT SENT OUT TO EVERYONE. ONLY HIGH VOLUME OEM COMPUTER/NETWORKING/TELECOM/AUTOMOTIVE CUSTOMERS AND HIGH VOLUME WAFER CUSTOMERS
- AFTER EOL DATE, WAFER FAB CAPABILITY IS ELIMINATED. NO AGREEMENTS OR SUPPORT OF AFTERMARKET MANUFACTURERS.

CONCLUSION: DMS SITUATIONS CAN BE EXPECTED TO BE MORE DIFFICULT TO MANAGE BECAUSE OF LACK OF NOTICE AND AVAILABLE AFTERMARKET SOLUTIONS

PROCESS CHANGE NOTIFICATION

- MAJOR CHANGE NOTIFICATION, ONLY TO HIGH VOLUME OEM COMPUTER/NETWORKING/TELECOM/AUTOMOTIVE CUSTOMERS AND SELECT HIGH VOLUME WAFER CUSTOMERS (PURCHASES OF AROUND \$1 MILLION PER FUNCTION). CUSTOMER IS RESPONSIBLE FOR DETERMINING IMPACT ON APPLICATION/ENVIRONMENT (NO COMPANY EVALUATION FOR EVEN THE LARGE WAFER CUSTOMERS).
- DEFINITION OF MAJOR CHANGES AND CUSTOMER NOTIFICATION DIFFERENT FROM TYPICAL MILITARY REQUIREMENTS.
- NOT ALL MAJOR FAB/MASK CHANGES RESULTS IN A DIE REVISION. CONSEQUENTLY ANY DISTRIBUTION PURCHASES (OFF THE SHELF) BY USERS, FOR MILITARY SYSTEMS, MUST QUALIFY AND COLLECT RELIABILITY DATA ON EVERY BUY AND WAFER LOT.
- HIGH VOLUME COMMERCIAL DEVICES ARE TYPICALLY PRODUCED IN MORE THAN ONE WAFER FAB AND MORE THAN ONE ASSEMBLY TEST SITE. THE DIE REVISION MAY NOT BE THE SAME, NOR THE PROCESS IDENTICAL. EVEN THOUGH THE PACKAGE IS THE SAME EXTERNALLY, INTERNALLY IT MAY USE DIFFERENT MATERIALS.

CONCLUSION: PROCESS CHANGE INFORMATION CAN NOT BE RELIED UPON. FULL QUALIFICATION AND RELIABILITY TESTING SHOULD BE PERFORMED ON EACH BUY FOR CRITICAL APPLICATIONS

CUSTOMER AUDITS AND AVAILABLE DATA

- BASELINE PARAMETERS, PROCESS FLOWS AND TRAVELERS ARE CONSIDERED PROPRIETARY AND ARE NOT AVAILABLE FOR CUSTOMERS
- QUALIFICATION/RELIABILITY REPORTS FOR SPECIFIC PRODUCT ARE ONLY RELEASED TO HIGH VOLUME OEM COMPUTER/NETWORKING/TELECOM/AUTOMOTIVE CUSTOMERS (TESTS PERFORMED AND DATA COLLECTED IS DIRECTED TOWARDS THE HIGH VOLUME CUSTOMERS APPLICATIONS AND ENVIRONMENT). PUBLICALLY AVAILABLE REPORTS CONTAIN CUMULATIVE GENERAL INFORMATION, ACROSS A WIDE SPECTRUM OF PRODUCTS, NOT SPECIFIC TO PRODUCT OR MANUFACTURING SITES.
- MAJOR COMPUTER/TELECOM CUSTOMER AUDITS ARE THE ONLY ON SITE AUDITS PERMITTED.
- ANY PRODUCT TESTING OR QUALIFICATIONS OUTSIDE THE DATA SHEET VOIDS WARRANTY

CONCLUSION: PUBLICALLY AVAILABLE QUALITY AND RELIABILITY DATA CAN NOT BE APPLIED TO A SPECIFIC PRODUCT (ESPECIALLY FOR MILITARY APPLICATIONS) PURCHASED THROUGH DISTRIBUTION OR WAFER BUYS. ATTEMPTS TO USE OR EXTRAPOLATE THIS DATA TO A SPECIFIC MILITARY APPLICATION IS NOT TECHNICALLY SOUND AND VERY RISKY

PROCUREMENT SYSTEM

- PRODUCT CAN ONLY BE PURCHASED AGAINST THE DATA BOOK NUMBER. NO OTHER DOCUMENT OR MARKING IS CONSIDERED.
- OTHER THAN THE HIGH VOLUME OEM CUSTOMERS MENTIONED ABOVE, THE ONLY OTHER DIRECT BUSINESS THAT IS CONSIDERED IS HIGH VOLUME WAFER CUSTOMERS (\$1 MILLION PER FUNCTION). THIS IS ONLY HANDLED THROUGH A COMPANY SALES REPRESENTATIVE WITH AGREED UPON TERMS AND CONDITIONS.
- BUYER ASSUMES FULL RESPONSIBILITY FOR ALL TESTING, WARRANTIES AND END PRODUCT USE. RELIABILITY IS THE RESPONSIBILITY OF THE USER. NOTE: PRODUCT SOLD IN WAFER FORM OR THROUGH DISTRIBUTION ARE NOT RECOMMENDED FOR CRITICAL APPLICATIONS OR WHERE COMPONENT FAILURE COULD RESULT IN LOSS OF LIFE OR PHYSICAL HARM (EX. MEDICAL, LIFE SUPPORT, SAFETY).
- MOST MAJOR SUPPLIERS HAVE A \$7 MILLION TO \$10 MILLION-DOLLAR THRESHOLD FOR DIRECT SUPPORT OF AN OEM.

CONCLUSION: MILITARY BUYERS MUST EXPECT TO BUY THIS PRODUCT THROUGH DISTRIBUTION WITH NO TECHNICAL SUPPORT OR DATA

CAUTION:

DSCC SUPPORTS THE PROCUREMENT OF COMMERCIAL (OFF THE SHELF) DATA BOOK PRODUCT (COTS) WHERE THE COTS PRODUCT (USED AS IS) WILL MEET THE REQUIREMENTS OF THE MILITARY SYSTEM AND ENVIRONMENT (E.G. SYSTEM REQUIREMENTS, LOGISTIC SUPPORT, PERFORMANCE, RELIABILITY AND CONFIGURATION CONTROL LIMITATIONS).

HOWEVER, LOGISTIC SUPPORT AND CONFIGURATION CONTROL MUST BE CAREFULLY CONSIDERED BY CONTRACTORS AND SPOs FOR THIS LEVEL OF PRODUCT. IN ADDITION, COST OF OWNERSHIP (LIFE CYCLE COSTS) SHOULD BE THOROUGHLY EVALUATED TO ASSURE OVERALL COST EFFECTIVENESS FOR DOD. TO LOGISTICALLY SUPPORT OR TO MAINTAIN CONFIGURATION CONTROL ON PRODUCTS THAT CAN BE ALTERED AT ANY TIME WITHOUT NOTICE, BY THE ORIGINAL MANUFACTURER AND PRODUCTS WHICH WERE SELECTED BASED ON LOT TO LOT TESTING ON EACH BUY (E.G. SCREENING, CHARACTERIZATION, REQUALIFICATION) WILL BE DIFFICULT AND COSTLY TO SUSTAIN DURING THE LOGISTIC PHASE.

SPOs SHOULD ALSO BE COGNIZANT OF HIDDEN PART COSTS (E.G. ENGINEERING EVALUATIONS, RECHARACTERIZATION, UPSCREENING, QUALIFICATION/RELIABILITY DATA COLLECTION, DOCUMENTATION) THAT MAYBE DIRECTLY BILLED TO THE GOVERNMENT BUT ARE NOT USED IN THE COST OF OWNERSHIP MODELS OR COMPARISONS OF THE VARIOUS PRODUCT GRADES.

DISCLAIMER:

IT IS UNDERSTOOD THIS INFORMATION IS PROVIDED TO MILITARY CONTRACTORS AND SPOs FOR GUIDANCE ONLY, IN ORDER TO ASSIST IN THE PRODUCT SELECTION PROCESS. IT IS NOT INTENDED TO BE A COMMITMENT OR A STATEMENT OF REQUIREMENTS BY THE GOVERNMENT WHICH COULD FORM THE BASIS FOR A CLAIM FOR COMPENSATION. A CONTRACTING OFFICER IS THE ONLY INDIVIDUAL AUTHORIZED TO INCUR LEGAL OBLIGATIONS ON BEHALF OF THE GOVERNMENT

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