Component Engineering
- BOM Management -

Scope : Ensuring the efficient and effective management of component information throughout the product lifecycle.

Application : Reliability, cost-effectiveness and Streamline PCB design.

BOM management in PCB design streamlines component selection, inventory tracking, and cost estimation. It ensures optimal component choices based on functionality, cost, and availability, while also facilitating inventory control to prevent shortages or overstocking. By maintaining accurate cost estimates, designers can meet budget constraints effectively.

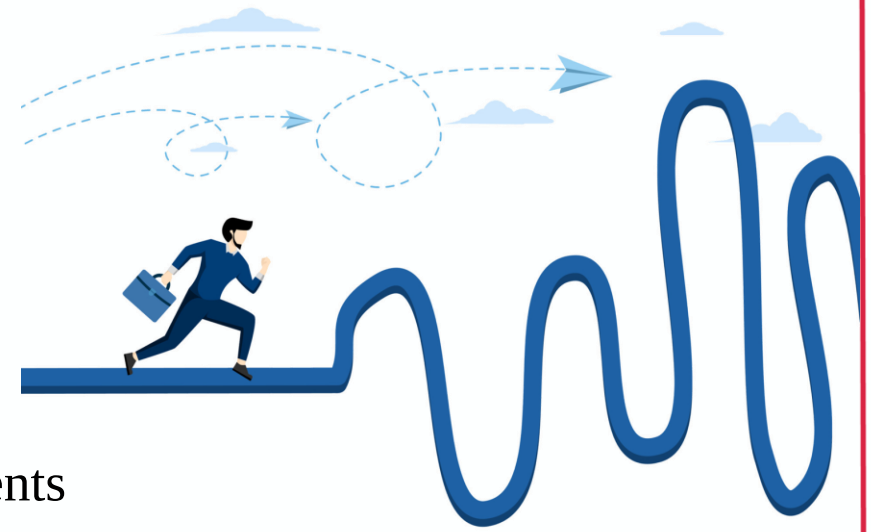
Additionally, it aids in supplier evaluation and selection, ensuring timely procurement of quality components. Version control of the BOM minimizes errors and discrepancies, while compliance documentation guarantees adherence to industry standards.

Component Engineering - Challenges

The client requested to manage the BOM of existing design for expedites the Design and Production Process with significant cost savings.

Challenges

- Alternate parts and cross selection
- Managing all component data & Keeping updated
- Parts - Obsolescence and EOL tracking
- Component lifecycle and availability tracking
- Lead time tracking
- Supply chain management
- Information from Supplier/Manufacturer
- Forecasting of obsolescence and Lifecycle
- Compatibility and Compliance with design requirements
- Revision management
- Risk management



Component Engineering - SoW

- Review of existing BOM
- Components Verification
- Selection of best Cross and Alternates
- Risk Evaluation
  - Life Cycle
  - Inventory
  - Compliance
- Cost Optimization
- Revision Control

Review and Verification of BOM

Customer's existing BOM was analyzed to identify any inconsistencies, inaccuracies, or missing information about the components/parts in the BOM.

Verify the accuracy and completeness of component data including part numbers, descriptions, manufacturers, quantities, and any other details/specifications.

PART NUMBER	DESCRIPTION	MANUFACTURER	QUANTITY
GH1G-AU	Rectifier /Diode	Panjit	1
BAV23C	Diode	Nexperia	1
PJA3440-AU	MOSFET	Panjit	4
TMP1200	LDO - 5V	Tamul Power Semiconductor	1
A80804	LED Driver	Allegro MicroSystems	1
MPM3551	LDO - PRE Buck	Monolithic Power Systems	1
S9KEAZN8AMFK	MCU	NXP	1
GCM155R71C104KA55D	CAP_CERAMIC_1005_100nF_16V_K	Murata Manufacturing	1
C0402C103K5RECAUTO7411	CAP_CERAMIC_1005_10nF_50V_K	KEMET Corporation	2
C0402C479K5GAC	CAP_CERAMIC_3225_47uF_10V_M	KEMET Corporation	1
GCM155R71H473KE01D	CAP_CERAMIC_1005_4.7pF_50V	Murata Manufacturing	1
C1210C476M8RACTU	CAP_CERAMIC_0402_100nF_50V_K	KEMET Corporation	2
C0603C105K4RACAUTO	CAP_CERAMIC_1608_1uF_16V_K	KEMET Corporation	1
ERJH2RD4701X	RES_1005_104_100mW_B	Panasonic	1
RK73H1ETTP7323F	RES_1005_4701_100mW_F	KOA Speer Electronics	1
ERJH2GJ103X	RES_1005_7323_100mW_F	Panasonic	2
ERJH2RF1023X	RES_1005_1023	Panasonic	1
ERJH2GJ473X	RES_1005_103_100mW_J	Panasonic	1
ERJH2RF1743X	RES_1005_473_100mW_F	Panasonic	1
ERJH2RD2611X	RES_1005_1743_100mW_F	Panasonic	1
ERJ3GEYJ153V	RES_1608_153_100mW_F	Panasonic	1
GRM022R61A104ME01L	RES_1005_2.61k_100mW_F	Murata Manufacturing	1

Generic Description

Incomplete Part Number

Missing Tolerance

Missing Power Rating, Tolerance

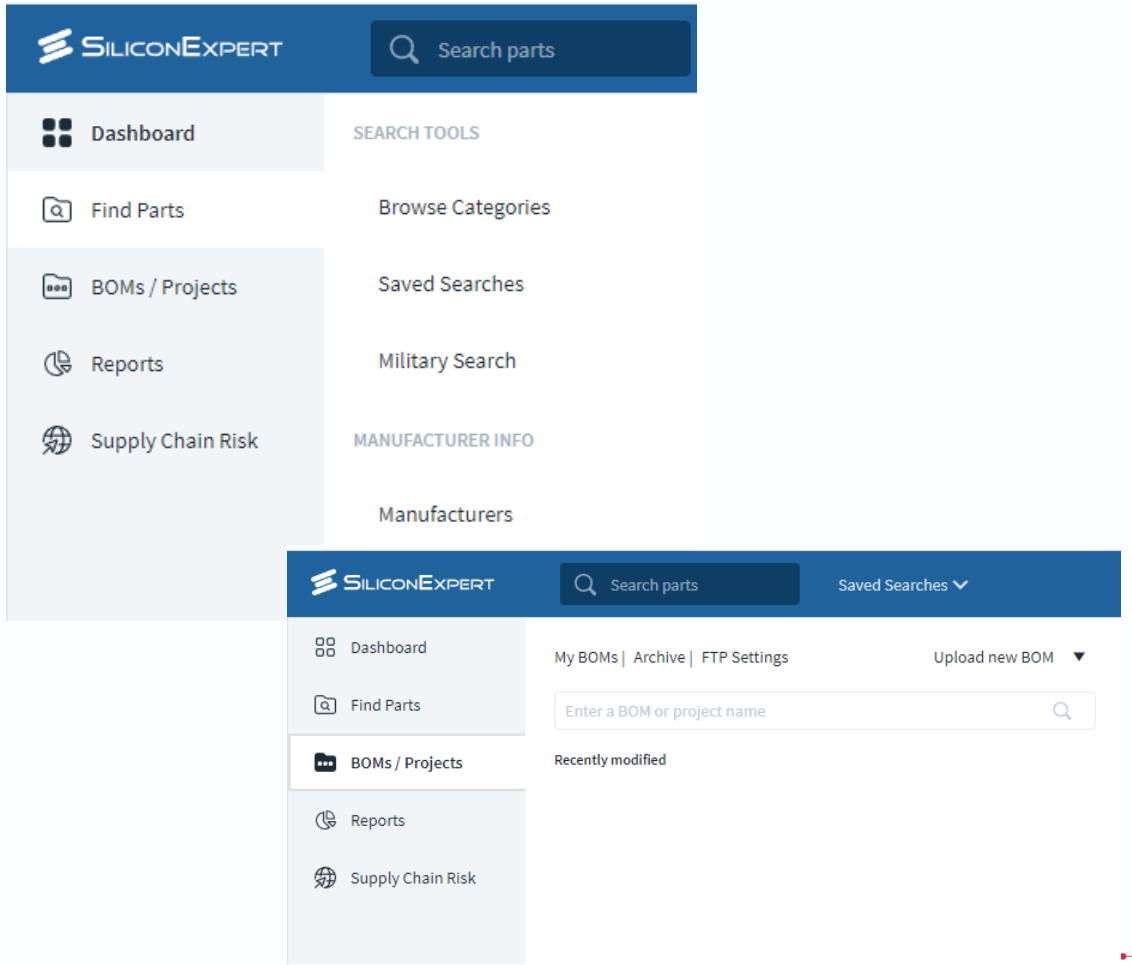
Selection of Cross / Alternates

We executed the alternate selection using the **Silicon Expert**.

In this, components are searched through
- Global search
- Find parts options.

Also, can be searched based on
- Component categories and
- Manufacturers.

For BOM, directly uploaded to the tool and accessed globally, which eliminate BOM revisions and version controls effectively.



Selection of Cross / Alternates (Cont.)

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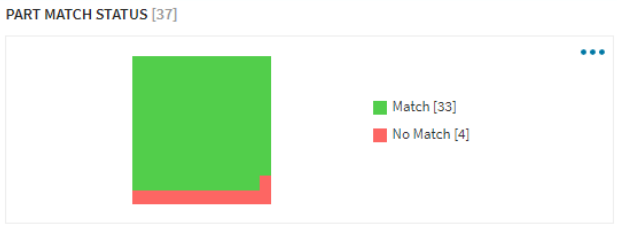
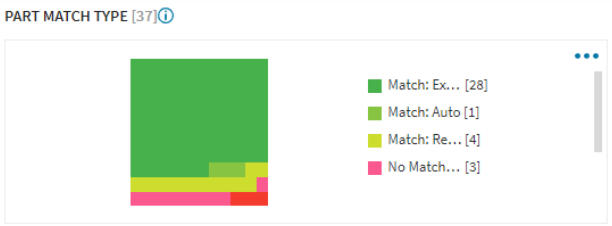
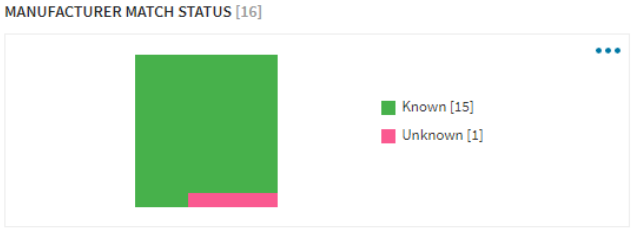
Client's BOM is uploaded as per the requirements of the tool. Based on the Components in the uploaded BOM following details are available in the dashboard.

Part Match Status Part Match Type Manufacturer Status and
List of BOM components with parameters along with their match type status







		Uploaded Part	Uploaded Mfg	DS	Part	Quantity	Manufacturer	Match Type	Description	RoHS	Lifecy
☐	6	MPM3551	Monolithic Power Systems	--	MPM3551	1	Monolithic Power...	1 Similar Matches available	--	--	--
☐	7	PNL6040-3R3M-A	DONGAN ELECTRONICS	--	PNL6040-3R3M-A	1	DONGAN ELECTR...	4 Similar Matches available	--	--	--
☐	8	KW_CDLMM1.TK_6L0	ams OSRAM	--	KW_CDLMM1.TK_6L0	4	ams OSRAM	1 Similar Matches available	--	--	--
☐	9	RMC1/16SK3162FTH	Kamaya Electric		RMC1/16SK3162FTH	1	Kamaya Electric ...	Exact	Res Thick Film 0402 31.6K Ohm 1% 0.1W(1/10W) ±100ppm/°C Pad SMD T/R	2011/65/EU, 2015/863 with Exemption	Activ
☐	10	TCT3GDF103F338V	TATEYAMA KAGAKU DEVICE TECHNOLOGY	--	TCT3GDF103F338V	1	TATEYAMA KAGAK...	No Match Submit a Ticket	--	--	--

Match Type with the Database

Component Parameters

Selection of Cross / Alternates (Cont.)

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Using Match Type, best cross or alternate selected, that is similar to the part already in the existing BOM.

SIMILAR MATCHES - 1 results

		IMAGE	PART	MANUFACTURER	MATCH CONFIDENCE	DESCRIPTION	LIFECYCLE	RoHS	REACH	Y-to-EOL	Inventory
☐	--	--	GH1G-AU	Panjit	--	--	--	--	--	--	--
☐	REPLACE		GH1G-AU_R2_000A	PANJIT International Inc.	--	Surface Mount Rectifier Diode Automotive AEC-Q101	Active	--	Affected	12.4 years	1

Using cross by parametric search, best alternate parts identified for the components list in the BOM (existing)

Ex- Best Alternate for PJA3400-AU

Cross By Parametric

Parametric – Max. Drain source Voltage – 40V, Max. Drain source Voltage – ±20V,
Mode – Enhancement ------PMV30ENEAR

		DS	Part	Manufacturer	Category	Channel Mode	Channel Type	Number of Elements per Chip	Process Technology	Maximum Drain Source Voltage	Maximum Gate Source Voltage	Maximum Continuous Drain Current (A)	Material
☐			PJA3440-AU_R1_000A1 BOM	PANJIT International Inc.			N			40	±20	4.3	
☐			PMV30ENEAR	Nexperia	Power MOSFET	Enhancement	N	1	--	40	±20	4.8	--

Risk Evaluation

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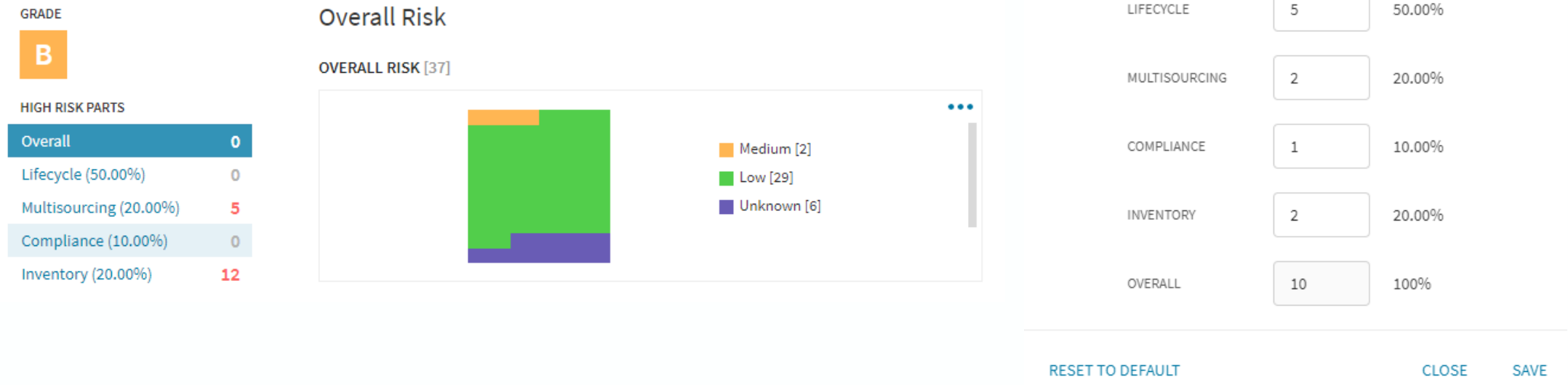
Risks involved in this BOM was analyzed based on four major categories.

*Life Cycle *Multi-sourcing *Compliance *Inventory

For each categories, priority can be configured manually based on the requirement from the client, here the most priority is for Lifecycle of the component.



Risk Evaluation (Cont.)

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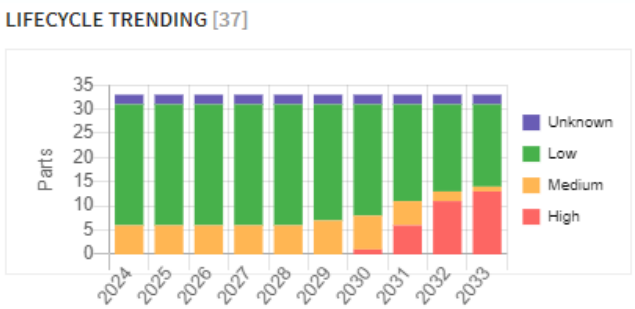
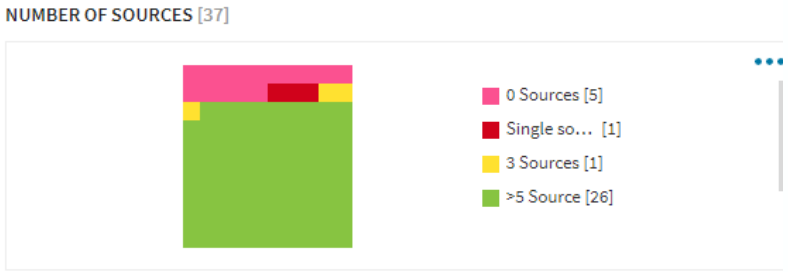
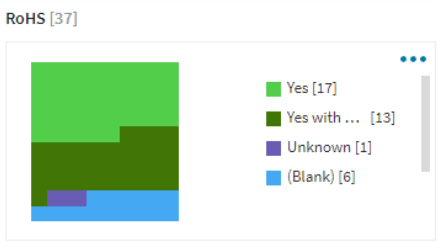
Life Cycle – For next 10Years
Components availability over the years based on years to end of life of the component.

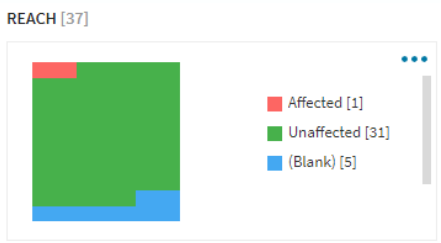


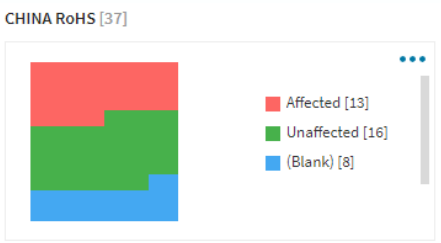
Multi-sourcing –
No. of cross/alternate availability for the parts in the BOM.



Compliance – Environmental Risk
Details related to the compliances – ROHS, REACH, etc., with the part.







Inventory – No. of Distributors
Details related to the different distributors for the ease of procurement.

Cost Optimization & Revision Control

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Cost Optimization

During the cross/ alternate selection of the part, cost effective part is selected using the budgetary prices.

New managed BOM provided with budgetary prices in the list to check with the cost comparison of existing BOM.

Budgetary Prices
Min: $0.031 Avg: $0.137500000000000
Min: $0.015 Avg: $0.038218181818181
Min: $0.0047 Avg: $0.021868750000000
Min: $0.065 Avg: $0.0975
Min: $0.056 Avg: $0.095868421052631
Min: $0.017 Avg: $0.040742705008973

Revision Control

Maintaining BOM in the cloud, eliminates the revision control of the BOM. Using the History tab, track of actions carried on the BOM with details are listed.

DASHBOARD | MATCH | BROWSE | RISK | REPORTS | SETTINGS | HISTORY

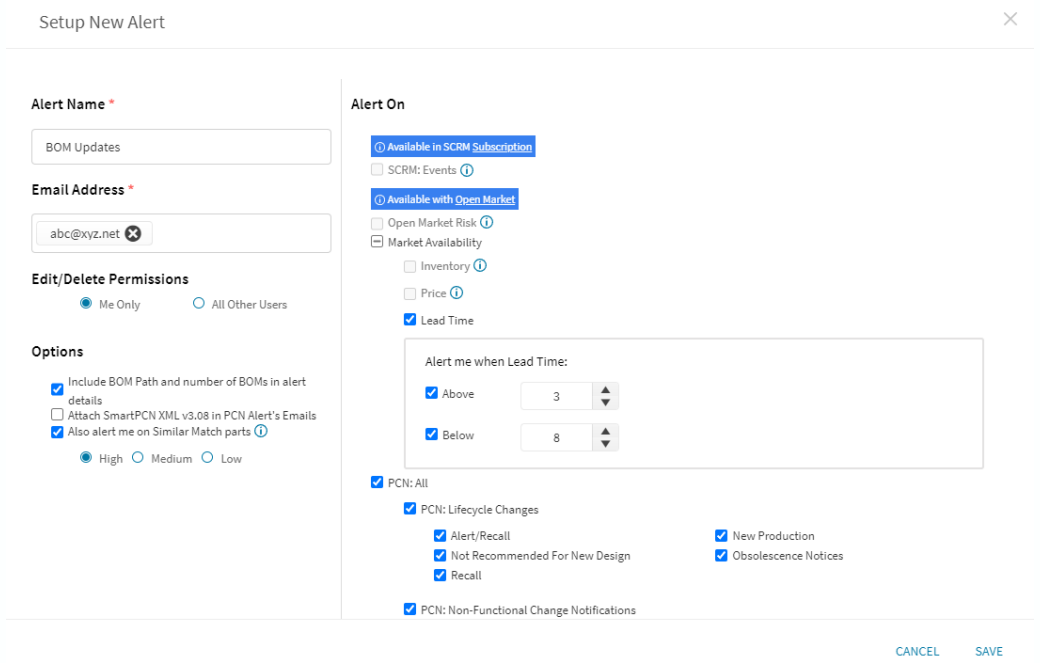
CHANGES	CHANGED ON	CHANGED BY	DETAILS
Part replaced - From -- to KW CDLMM1.TK-Y1Y4-5L06L0-24A4-700-R	Mar 21, 2024	XXXX XXXXXXXX	Part rule added, Check settings tab for details
Part replaced - From A80804KETASR to A80804KETASR	Mar 21, 2024	XXXX XXXXXXXX	--
Part replaced - From -- to A80804KETASR	Mar 21, 2024	XXXX XXXXXXXX	Part rule added, Check settings tab for details
Part replaced - From -- to PJA3440-AU_R1_000A1	Mar 21, 2024	XXXX XXXXXXXX	Part rule added, Check settings tab for details
Part replaced - From -- to GH1G-AU_R2_000A1	Mar 21, 2024	XXXX XXXXXXXX	Part rule added, Check settings tab for details
BOM created	Mar 21, 2024	XXXX XXXXXXXX	--

Value Adds - Alerts

Alerts

If any changes to the list of components in the BOM, like price change, lead time change, PCN changes and any other changes, Notifications about the change is updated to the client through mail.

To achieve this, alters are created for the managed BOM as per the requirement.



Outcome

- Provided the Managed BOM, with budgetary prices to compare the cost savings.
- Risk Report - Predicted for managed BOM based on Life cycle, Inventory, Multi-sourcing.
- Alerts through notifications, for any changes to the list components in the BOM.

Existing BOM

A	B	C	D
PART NUMBER	**DESCRIPTION**	**MANUFACTURER**	**QUANTITY**
GH1G-AU	Rectifier /Diode	Panjit	1
BAV23C	Diode	Nexperia	1
PJA3440-AU	MOSFET	Panjit	4
TMP1200	LDO - 5V	Tamul Power Semiconductor	1
A80804	LED Driver	Allegro MicroSystems	1
MPM3551	LDO - PRE Buck	Monolithic Power Systems	1
S9KEAZN8AMFK	MCU	NXP	1
PNL6040-3R3M-A	Inductor	DONGAN ELECTRONICS	1
KW_CDLMM1.TK_6L0	LED	ams OSRAM	4
RMC1/16SK3162FTH	Resistor	Kamaya Electric	1
TCT3GDF103F338V	Thermistor	TATEYAMA KAGAKU DEVICE TECHNOLOGY	1
GRJ31CR71H475KE11L	CAP_CERAMIC_3216_4.7uF_50V_K	Murata Manufacturing	3
GCM21BR71C225KA64L	CAP_CERAMIC_2012_2.2uF_16V_K	Murata Manufacturing	1
GCM155R71C104KA55D	CAP_CERAMIC_1005_100nF_16V_K	Murata Manufacturing	1
C0402C103K5RECAUTO7411	CAP_CERAMIC_1005_10nF_50V_K	KEMET Corporation	2
C0402C479K5GAC	CAP_CERAMIC_3225_47uF_10V_M	KEMET Corporation	1
GCM155R71H473KE01D	CAP_CERAMIC_1005_4.7pF_50V	Murata Manufacturing	1

Managed BOM

GIVEN PART	GIVEN MFG	PART	QUANTITY	MANUFACTURER	DESCRIPTION	ROHS	LIFECYCLE
GH1G-AU	Panjit	GH1G-AU_R2_000A1	1	PANJIT International Inc.	Surface Mount Rectifier Diode Automotive AEC-Q101		Active
BAV23C	Nexperia	BAV23C	1	Nexperia	Diode Switching 250V 0.225A 3-Pin SOT-23	Yes 2011/65/EU, 2015/863	Unconfirmed
PJA3440-AU	Panjit	PJA3440-AU_R1_000A1	4	PANJIT International Inc.	40V N-Channel Enhancement Mode MOSFET Voltage 40 V Current 4.3A Automotive AEC-Q101	Yes 2011/65/EU, 2015/863	Active
TMP1200	Tamul Power Semiconductor	TMP1200	1	Tamul Power Semiconductor	--	--	
A80804	Allegro MicroSystems	A80804KETASR	1	Allegro MicroSystems	High-Current Four-Channel Automotive AEC-Q100 LED Controller		Active
MPM3551	Monolithic Power Systems	MPM3551	1	Monolithic Power Systems	--	--	
PNL6040-3R3M-A	DONGAN ELECTRONICS	PNL6040-3R3M-A	1	DONGAN ELECTRONICS	--	--	
KW_CDLMM1.TK_6L0						/65/EU, 2015/863	Unconfirmed
RMC1/16SK3162FTH						2011/65/EU, 2015/863	Active
TCT3GDF103F338V	TATEYAN					--	
GRJ31CR71H475KE11L						/EU, 2015/863	Active
GCM21BR71C225KA64L						/EU, 2015/863	Active

YEAR	LIFECYCLE HIGH RISK PARTS	LIFECYCLE MEDIUM RISK PARTS	LIFECYCLE LOW RISK PARTS	UNKNOWN
2024	0	6	25	2
2025	0	6	25	2
2026	0	6	25	2
2027	0	6	25	2
2028	0	6	25	2
2029	0	7	24	2
2030	1	7	23	2
2031	6	5	20	2
2032	11	2	18	2
2033	13	1	17	2

Customer Testimonial

We are pleased to present a testimonial from a valued client, underscoring the effectiveness and positive outcomes of our BOM Management services.

"As a customer, we were thoroughly impressed with the exceptional BOM management task. Their expertise and dedication in managing our existing design's BOM surpassed our expectations. They meticulously identified alternate parts that not only met our requirements but also offered cost-effective solutions. Additionally, their thorough risk evaluation factors ensured that our project remained on track without compromising quality. Additionally, they completed the task well within our specified timeline, demonstrating their efficiency and reliability. We are highly satisfied with the outcome of their services and look forward to collaborating with them again in the future.!"

Conclusion

We delivered the client with a managed BOM, resulting in streamlined the client's operations, ensuring cost-effectiveness and efficiency. This underscores our unwavering dedication to delivering high-quality solutions and our technical expertise.

Our collaboration extends beyond technical aspects; it involves enhancing BOM efficiency to optimize design and production processes, by integrating our expertise with in-depth understanding of the client's specific requirements.

Our commitment is focused to delivering top-tier ECAD services (Component Engineering), showcasing our unparalleled skills and unwavering reliability in achieving outstanding results.