



PURCHASE SPECIFICATION


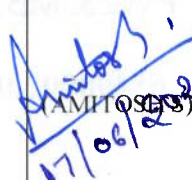


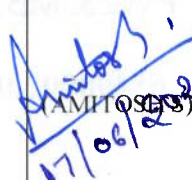


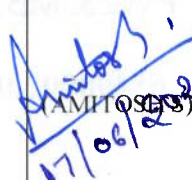


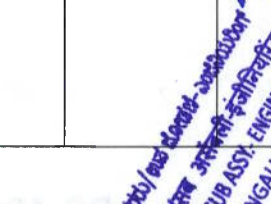
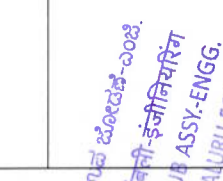
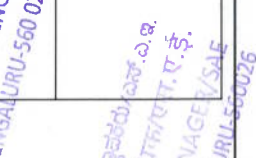
TITLE :- Printed Circuit Board 69235MB71A1A
CODE NO :- PW235MB71A1A
REFERENCE :- 65490992,0_MBSX


PUR.SPEC. NO : PS 4062448
NO. OF PAGES : 05
NO. OF ANNEXURES : 0
REVISION : 00


BHARAT HEAVY ELECTRICALS LIMITED

ELECTRONICS DIVISION


BANGALORE - 560026

		BHEL - EDN	PURCHASE SPECIFICATION GROUP: SUB ASSEMBLY ENGG.		PS4062448 REV.NO. 00																
					PAGE 00 OF 05																
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COPYRIGHT & CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited & must not be used directly or indirectly in any way detrimental to the interests of the company.		REVISION HISTORY SHEET																			
		<table border="1"> <thead> <tr> <th>REV NO</th> <th>DATE</th> <th>NATURE OF CHANGE</th> <th>REASONS</th> <th>PREPARED BY</th> <th>CHECKED BY</th> <th>APPROVED BY</th> </tr> </thead> <tbody> <tr> <td>00</td> <td>11.05.2026</td> <td>FIRST ISSUE</td> <td></td> <td>  (AMITOSH S) </td> <td>  (PRAVEESH K) </td> <td>  (S. SUJA) </td> </tr> </tbody> </table>						REV NO	DATE	NATURE OF CHANGE	REASONS	PREPARED BY	CHECKED BY	APPROVED BY	00	11.05.2026	FIRST ISSUE		 (AMITOSH S)	 (PRAVEESH K)	 (S. SUJA)
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<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p style="transform: rotate(-45deg);">  AMITOSH SINGH, ENGINEER/SUB ASSY. ENGINEERING BHEL-EDN, MYSURU ROAD, BENGALURU-560 026 </p> </div> <div style="width: 30%;"> <p style="transform: rotate(-45deg);">  PRAVEESH K., MANAGER/SUB ASSY-ENGG. BHEL-EDN, MYSURU ROAD, BENGALURU-560 026 </p> </div> <div style="width: 30%;"> <p style="transform: rotate(-45deg);">  S. SUJA, ADDL. GENERAL MANAGER/SALE BHEL-EDN, MYSURU ROAD, BENGALURU-560026 </p> </div> </div>																					
			APPROVED: S. SUJA																		
			PREPARED & CHECKED AMITOSH S /PRAVEESH K	ISSUED SUB. ASSY. ENGG	DATE 11.05.2026																

		BHEL - EDN 	<p align="center"><u>PURCHASE</u> <u>SPECIFICATION</u> <u>GROUP: SUB ASSEMBLY ENGG.</u></p>		<p>PS4062448 REV.NO. 00</p> <hr/> PAGE 01 OF 05				
		<p><u>APPLICABLE STANDARDS:</u> (Unless otherwise specified) Fabrication & Tolerances as per IPC6011 Performance & Qualification Specifications as per IPC6012-Class 2 Acceptability: IPC-A-600, Class 2, Positional tolerance of the hole centres +/-0.05mm All standards specified are the latest released revision or amendment.</p>							
<p align="center">COPYRIGHT & CONFIDENTIAL</p> <p>The information on this document is the property of Bharat Heavy Electricals Limited & must not be used directly or indirectly in any way detrimental to the interests of the company.</p>	<p><u>PRINTED CIRCUIT BOARD FEATURES:</u> PCB SIZE IN MM : 120 X 34.5 PANEL SIZE IN MM : 140 X 207.9 NO: OF PCBs PER PANEL: 4</p> <p><u>LAYERS:</u> <input type="checkbox"/> 2-LAYER BOARD <input type="checkbox"/> 4-LAYER BOARD <input type="checkbox"/> 6-LAYER BOARD <input checked="" type="checkbox"/> 8-LAYER BOARD <input type="checkbox"/> 10-LAYER BOARD</p> <p><u>PCB TYPE:</u> <input checked="" type="checkbox"/> THT <input type="checkbox"/> ONLY SMD <input type="checkbox"/> SMD BOTH SIDE <input checked="" type="checkbox"/> SMD TOP <input type="checkbox"/> SMD BOT</p> <p><u>MATERIAL:</u> ISOLA/NANYA make Epoxy-glass fiber cloth, NEMA FR4 of minimum Tg ≥ 140 °C as per latest revision of IPC 4101 FR4 for EU 2015/863 ("RoHS") and lead free soldering. CTI to be provided on demand. CTI ≥ 175, Material group IIIa, PLC 3. UL approved for use in according to UL94 V-0 in max. operating temp. 130 °C or higher. Material traceability required.</p> <p><u>BOARD THICKNESS:</u> <input checked="" type="checkbox"/> 1.6mm (Standard) <input type="checkbox"/> 2.4mm <input type="checkbox"/> 3.2mm <input type="checkbox"/> 1.0 mm Tolerance +/- 10% <input checked="" type="checkbox"/> Thickness is critical</p> <p><u>COPPER THICKNESS:</u></p> <p>Outer layers: <input type="checkbox"/> 1/2 oz <input type="checkbox"/> 1 oz <input checked="" type="checkbox"/> 2 oz <input type="checkbox"/> (>2) oz Inner layers: <input type="checkbox"/> 1/2 oz <input type="checkbox"/> 1 oz <input checked="" type="checkbox"/> 2 oz <input type="checkbox"/> (>2) oz</p> <p>Above specifications indicate base foil thickness before plating. Final Plated Copper thickness to be according to IPC-A-600 Class 3. Copper Thickness in holes to be minimum of 25u.</p>								
	<table border="1"> <tr> <td colspan="3" data-bbox="212 1765 1090 1951">APPROVED:</td> </tr> <tr> <td colspan="3" data-bbox="1090 1765 1525 1951">S. SUJA</td> </tr> <tr> <td data-bbox="212 1951 1090 2103"> PREPARED & CHECKED AMITOSH S /PRAVEESH K </td> <td data-bbox="1090 1951 1337 2103"> ISSUED SUB. ASSY. ENGG </td> <td data-bbox="1337 1951 1525 2103"> DATE 11.05.2026 </td> </tr> </table>	APPROVED:			S. SUJA			PREPARED & CHECKED AMITOSH S /PRAVEESH K	ISSUED SUB. ASSY. ENGG
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		BHEL - EDN	<u>PURCHASE</u>		PS4062448
			<u>SPECIFICATION</u>		REV.NO. 00
			<u>GROUP: SUB ASSEMBLY ENGG.</u>		PAGE 02 OF 05
<u>OVERPLATE/SURFACE FINISH:</u>					
<div><div><input checked="" type="checkbox"/> EU 2015/863 ("RoHS") <input checked="" type="checkbox"/> ENIG: Ni 3-6 µm, Au ≥ 0,05 µm <input type="checkbox"/> Hot Air Solder Levelling (HASL) on pads <input type="checkbox"/> Lead free HASL (LF-HASL)</div><div><input type="checkbox"/> Immersion gold (ENIG) <input type="checkbox"/> Immersion gold and palladium (ENEPIG) <input type="checkbox"/> Edge connectors hard gold plated <input type="checkbox"/> Other</div></div>					
<u>WARP AND TWIST:</u> Determined using IPC-TM-650 method 2.4.22 <input checked="" type="checkbox"/> ≤ 0.75 % <input type="checkbox"/> ≤ 0.5 % <input type="checkbox"/> ≤ 1.00 %					
<u>SOLDER RESIST:</u> Solder resist on outer sides: Glossy dark green colour: <input checked="" type="checkbox"/> Wet Photo resist <input type="checkbox"/> Dry Photo resist Solder resist thickness shall be Minimum of 8 microns on track top Minimum of 5 microns on track edge Minimum of 25 microns on epoxy					
<u>SCREEN PRINTING:</u> Manufacturer trade made and week and year of manufacturing in format (WW/YYYY). UL approval (See the last page)					
<u>MARKINGS METHOD AND SIDE:</u> <input type="checkbox"/> Solder Resist <input type="checkbox"/> Silkscreen <input type="checkbox"/> Component side <input checked="" type="checkbox"/> Solder side <input type="checkbox"/> Free to choose					
<u>MARKINGS LOCATION:</u> <input type="checkbox"/> Defined location <input checked="" type="checkbox"/> Location free to choose					
<u>IMPEDANCE REQUIREMENT:</u> <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO					
<u>PRINTED CIRCUIT BOARD TEST:</u> <div><div><input checked="" type="checkbox"/> Electrical test <input checked="" type="checkbox"/> Optical test</div><div><input checked="" type="checkbox"/> Test report <input checked="" type="checkbox"/> Micro section report</div><div><input type="checkbox"/> Impedance report <input type="checkbox"/> Impedance Coupons</div></div>					
			APPROVED:		
			S. SUJA		
			PREPARED & CHECKED AMITOSH S /PRAVEESH K	ISSUED SUB. ASSY. ENGG	DATE 11.05.2026



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		<div>PCB PHOTOPLOTTER DEFINITIONS</div> <div>Gerber RS-274X: 2.4 ASCII, ABSOLUTE, INCH, LEADING</div> <div>N.C. DRILL DEFINITION</div> <div>EXCELLON 2: 2.4 ASCII, ABSOLUTE, INCH, LEADING</div> <div>NOTES:<ul style="list-style-type: none">0.3 and 0.5 mm vias without soldermask opening must be filled and covered as per IPC 4761 Type VI-B.It is allowed to add holes and copper in panel's frame if needed in PCB manufacturing process</div> <div>GERBER FILES:<div>LAYER DETAILS</div><div><div><input checked="" type="checkbox"/></div>69235MB71A1A_MBSX_65490992_TOP SILK.gbr</div><div><div><input checked="" type="checkbox"/></div>69235MB71A1A_MBSX_65490992_TOP SOLDER MASK.gbr</div><div><div><input checked="" type="checkbox"/></div>69235MB71A1A_MBSX_65490992_TOP ELEC_LAYER1.gbr</div><div><div><input checked="" type="checkbox"/></div>69235MB71A1A_MBSX_65490992_LAYER2.gbr</div><div><div><input checked="" type="checkbox"/></div>69235MB71A1A_MBSX_65490992_LAYER3.gbr</div><div><div><input checked="" type="checkbox"/></div>69235MB71A1A_MBSX_65490992_LAYER4.gbr</div><div><div><input checked="" type="checkbox"/></div>69235MB71A1A_MBSX_65490992_LAYER5.gbr</div><div><div><input checked="" type="checkbox"/></div>69235MB71A1A_MBSX_65490992_LAYER6.gbr</div><div><div><input checked="" type="checkbox"/></div>69235MB71A1A_MBSX_65490992_LAYER7.gbr</div><div><div><input checked="" type="checkbox"/></div>69235MB71A1A_MBSX_65490992_BOT ELEC_LAYER8.gbr</div><div><div><input checked="" type="checkbox"/></div>69235MB71A1A_MBSX_65490992_BOT SOLDER MASK.gbr</div></div> <div>DRILL/OUTLINE/DIMENSION DETAILS:<div><div><input checked="" type="checkbox"/></div>69235MB71A1A_MBSX_65490992_DIMDRW.gbr</div><div><div><input checked="" type="checkbox"/></div>69235MB71A1A_MBSX_65490992_PANEL DRW.gbr</div><div><div><input checked="" type="checkbox"/></div>69235MB71A1A_MBSX_65490992_DRILL DRAWING.gbr</div></div>			

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<div>COPYRIGHT & CONFIDENTIAL</div> <div>The information on this document is the property of Bharat Heavy Electricals Limited & must not be used directly or indirectly in any way detrimental to the interests of the company.</div>		<div><u>NCDRILL DETAILS with report:</u></div> <div><input checked="" type="checkbox"/>_69235MB71A1A_MBSX_65490992_PLATED.exc</div> <div><input checked="" type="checkbox"/>_69235MB71A1A_MBSX_65490992_PLATED_UN.exc</div> <div> </div> <div><u>LINEAR DIMENSION TOLERANCE:</u></div> <div><input checked="" type="checkbox"/> ± 0.1mm</div> <div> </div> <div><u>FINISHED HOLE TOLERANCE:</u></div> <div><input checked="" type="checkbox"/> ± 0.076mm for PTHs. <input checked="" type="checkbox"/> ± 0.050mm for NPTHs.</div> <div> </div> <div><u>V-GROOVE DIMENSIONS</u></div> <div>30 ± 5°</div> <div>0.2mm to 0.5mm</div> <div> </div> <div><u>PCB DRAWINGS:</u></div> <div>36923509921 Revision is as per “Quotation Request.</div> <div> </div> <div><u>NON FUNCTIONAL THIEVING:</u></div> <div>Addition of non-functional thieving is permitted. A minimum of 2.54 mm must be maintained from all conductive surfaces.</div> <div> </div> <div><u>COPPER EXPOSURE AND SCREEN PRINT ON PADS:</u></div> <div>NOT ALLOWED.</div> <div> </div> <div><u>ANNULAR RING:</u></div> <div>2 mils minimum.</div> <div> </div> <div><u>PACKING:</u></div> <div>The PCBs should be packed in humidity sealed moisture barrier bags along with desiccant and Humidity Indicator Card in quantities of not more than 10 panels each to avoid warpage of PCBs due to handling.</div>			
			<div>APPROVED:</div> <div>S. SUJA</div> <div><div>PREPARED & CHECKED</div><div>AMITOSH S /PRAVEESH K</div></div> <div><div>ISSUED</div><div>SUB. ASSY. ENGG</div></div> <div><div>DATE</div><div>11.05.2026</div></div>		

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