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NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA, SURATHKAL

Centre for System Design, NITK Surathkal

POST SRINIVASNAGAR, MANGALORE ï 575 025 (D K)
A DEEMED UNIVERSITY
Phone: (0824) 2474000. Fax: (0824) 2474033
E- mail: info@nitk.ac.in **Website: http://www.nitk.ac.in**

TENDER DOCUMENT

Tender Notification No.: NITK/CSD/TPEM/2019/EC /NKP-04 Date: 02/08/2019

Name of Goods	: Electronic components (Rate contract)
Estimated amount put to Tender	: Rs. 9 Lakhs/per month (Rate Contract fixing ï period of 6 months)
E M D Amount	: Rs 18,000/-
Time for Supply of item after release of Purchase order	: As per requirement
Last Date for submission of tender	: **23-08-2019 before 3.00 PM**
Address for Submission of Tender	: Dr. Navin Karanth P. Asst. Professor, Dept. of Mechanical Engineering NITK Surathkal, Mnagaluru ï 575025 (M): 9449058052, navinkaranth@gmail.com

Enquires related to Item Contact details: Mr. Muthu Kumar, muthukumar@adityaauto.com 8600035302

Date of opening of technical bid : 23-08-2019 at 3.30 PM (if possible)

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NOTICE INVITING TENDER (NIT)

The National Institute of Technology Karnataka, Surathkal (in short ï NITK, Surathkal) is an autonomous body under Ministry of HRD Govt of India , a Deemed University , imparting Technical Education and engaged in Research Activities. It is proposed to procure the items for the departmental academic/research activities.

Sealed Tenders are invited for the following items in **two cover system** (i.e., Technical bid and financial bid) subject to the following terms and conditions, from the reputed manufacturers or its authorized dealers so as to reach this office on or before scheduled date and time**.** The tender (Technical bid) will be opened on the same day if possible in the presence of bidders or their authorized agents who may choose to be present. The financial bid of only such bidders whose technical bid is accepted shall be opened on the same day or later pre-informed date.

1. Name of Goods: Electronic components

2. Estimated Cost: Rs. 9 Lakhs/per month (Rate Contract fixing ï period of 6 months)

3. E M D : Rs. 18,000/- (Rupees Eighteen thousand only)

4. Time for completion of Supply after Placing Purchase Order: **As per requirement**

5. Last date at time for submission of Tender: 23-08-2019 before 03:00 PM

6. Tender to be submitted at the following address: Dr. Navin Karanth P
Asst. Professor,
Dept. of Mechanical Engineering
NITK Surathkal, Mnagaluru ï 575025
(M): 9449058052, navinkaranth@gmail.com

7. Communication Address:

1. Mr. Hemanth, Senior executive-Purchase,
13E, KIADB Industrial area, Doddaballapura
Bengaluru ï 561203, (M)9972833302
hemanth@adityaauto.com

2. Mr. Muthukumar, Assistant manager ï Development
180, Bommasandra Industrial area,
Bengaluru ï 560099, (M) 8600035302,
muthukumar@adityaauto.com

8. Place, Date and Time of opening of technical bid:
Date: 23-08-2019 Time: 03:30 PM VENUE: Dean P&D Office

Note: Institute shall not be responsible for any postal delay about non-receipt /non delivery of the bids or due to wrong addressee.

Sd/-
[Signature of Coordinator with Seal]

SECTION 1 : INSTRUCTION TO BIDDER (ITB)

1. **The bid should be submitted in two cover system-Technical Bid and Financial Bid**:

1.1 **Envelope No.1 – Technical Bid:** The agencies should give details of their technical soundness and provide list of customers of previous supply of similar items to Universities, Institutes or Government Departments/ Undertakings/ public sectors with contact details. The details of the agency/ profile should be furnished along with the copy of all related documents. This envelope should be sealed and duly super-scribed as ñ**Envelope No. 1 – Technical Bid**ò. Full name and address of the agency should also be mentioned on envelope and should be addressed to The Director, NITK, Surathkal.

1.2. **Documents to be submitted in the technical bid:**

a) The agency should possess Licence certificate for manufacture /supply of the item.
b) List of Owner/partners of the firm and their contact numbers
c) The agency should possess Income tax PAN number.
d) The agency should possess GST registration.
e) Catalogue of the Product with detailed product specifications.
f) List of customers with contact details.
g) The average annual turnover should not be less than 30% of the estimated cost put to tender/quotation for the job work. The copy of the Balance sheet, Profit & Loss A/c., Trade or Manufacturing A/c for the last 3 years should be enclosed
h) EMD in original form valid for minimum six months, through Bank Guarantee only drawn on any scheduled bank in favour of "Director NITK, Surathkal", payable at Surathkal should be submitted. EMD shall bear no interest. Any bid not accompanying with EMD is liable to be treated as non-responsive and rejected.
i) Contract form given in section 5 need to be submitted.

The above documents should be furnished in the technical bid envelope.

2**. Envelope No.2 – Financial bid:** The agencies should submit their financial bid as per the format given in Section 4 of the Notice Inviting Tender in this cover. The rate should be quoted both in words and figures. All the pages of the financial bid should be signed affixing the seal. All corrections and overwriting should be initialled. This envelope should be duly superscribed as **"Envelope No. 2 – Financial bid".** Full name and address of the agency should also be mentioned on the envelope and should be addressed to The Director, NITK, Surathkal.

Both the Envelope No. 1 and 2 should be kept in another separate envelope duly superscribed with the following details.
(i) Tender Notification Number (ii) " Tender for the supply of…….."., (iii) Not to Open before (Date and Time)

Mention "Kind Attention: Contact Person's Name and Phone Number" , and submit at the address given in the Notice Inviting Tender.

3 The tender will be acceptable only from the **manufacturers or its authorised supplier.**

4. The Institute **reserves the right to visit to the factory** before or after issue of supply order to satisfy itself regarding quality of production. In case of any remarks /default noted, the EMD will be forfeited even if pre-qualified.

5. **The Financial bid shall be in the format of Price Schedule given in Section 4. The Contract form as per format given in section 5 shall be submitted. Incomplete or conditional tender will be rejected.**

6. Details of item to be carried out approximate quantity and the specifications are mentioned in **"Section 3**ò appended to this Notice Inviting Tender.

7. The **item to be used is strictly according to the specification and subject to test by the institute/concerned authorities. It must be delivered and installed in good working condition.**

8. The Institute **reserves the right to cancel or reduce the quantity** included in the schedule of requirements at any time after acceptance of the tender with a notice. The Contractor/Supplier shall have no claim to any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from the execution of the work/supply in full but he did not derive in consequence of the foreclosure of the whole or part of the works.

9. **Performance Security of 5 % of contract value in terms of Bank Guarantee by scheduled banks shall be given by the successful bidder for the total period of Contract.**

9. **Release of EMD:** The EMD shall be released after receipt of performance security from successful bidder.

11 **Validity of bids:** The rate quoted should be valid for a minimum of 90 days.
No claim for escalation of rate will be considered after opening the Tender.

12. **Imports: In case, Goods are to be Imported, the Indian agent should furnish authorisation certificate by the principles abroad for submission of the bid in response to this Notice Inviting Tender.**

13. Clarification of Tender Document:
A prospective bidder requiring any clarification of the Tender Document may communicate to the contact person given in this notice inviting tender. The contact person will respond to any request for clarification for the Tender Document received not later than 5 working days prior to the last date for the receipt of bids

14. Amendment of Tender document: At any time prior to the last date for receipt of bids, Institute may for any reason, whether at its own initiative or in response to a clarification requested by prospective bidder, modify the Tender document by an amendment.

15. **Institute may at its own discretion extend the last date for the receipt of bids.**

16. The bids shall be written in English language and any information printed in other language shall be accompanied by an English translation, in which case for the purpose of interpretation of the bid , the English translation shall govern.

17. The Institute reserves the right of accepting any bid other than the lowest or even rejecting all the bids. The decision of the Institute Purchase Committee is final in all matters of tender and purchase.

18. The bidder should give the following declaration while submitting the Tender.

DECLARATION

I/we have not tampered/modified the tender forms in any manner. In case , if the same is found to be tampered/modified, I /we understand that my/our tender will be summarily rejected and full Earnest money deposit will be forfeited and I /we am/are liable to be banned from doing business with NITK, Surathkal and / or prosecuted.

Signature of the Bidder: _____

Name and Designation: _____

Business Address : _____

_____

Place: **Seal of the Bidder's Firm**
Date:

19. Any other details required may be obtained from the contact person given in the notice inviting tender during the office hours.

SECTION 2: CONDITIONS OF CONTRACT.

1. The rates should be quoted for preferably FOR destination from supply within India.
2. In case of import both CIF and/ or FOB rate should be quoted. All components of expenditure to arrive at Bangalore need to be explicitly specified.
3. The bidder shall indicate the excise duty exemption for the goods if applicable.
4. The institute is eligible for customs duty exemption, excise duty exemption, issuance of form D.
5. The rate quoted should be on unit basis. Taxes and other charges should be quoted separately, considering exemptions if any.
6. The rate quoted should be held for 6 months
7. For every 15 days, depending on the requirement, intent will be placed. Purchase order will be placed accordingly.
8. Total ordered quantity may be different from the estimated quantity.
9. Rate quoted should be inclusive of Testing, commissioning and Installation of equipment and Training.
10. Place of delivery: **M/s Aditya Auto Products and Engg (I) Pvt Ltd**
    180, Bommasandra Industrial Area
    Bengaluru - 560099
11. Original invoice has to be sent to NITK, Surathkal. Duplicate invoice has to be sent to Aditya Auto Products and Engg (l) Pvt Ltd, Bengaluru.
12. Payment: No advance payment will be made. Payment will be made only after the supply of the item in good and satisfactory condition and receipt of performance security by supplier. **In case of Imports, the payment will be made through LC / Sight Draft / After Installation, and performance security need to be submitted at the time of LC commitment / issue of sight draft.**
13. Guarantee and Warrantee period should be specified for the complete period conforming to the section 3 of this tender document.
14. Period requirement for the supply and installation of item should be specified conforming to the section 3 of this tender document.
15. In case of dispute, the matter will be subject to Mangalore Jurisdiction only.
16. Earnest Money Deposit (EMD) of Rs.10,000/- (Rs. Ten Thousand Only) in the form of Demand Draft in the favour of 'The Director NITK Surathkal' payable at Surathkal to be submitted in Technical Bid. Failing which, the submitted bid will be rejected.
17. EMD of unsuccessful bidders will be returned within 30 days after the award of the contract.
18. For successful bidder, EMD will be converted to security Deposit and will be retained with NITK Surathkal till the expiry/termination of rate contract without interest.
19. EMD of a tenderer will be forfeited if the tenderer withdraws or amends its tender or derogates from the tender in any respect within the period of validity of tender.

SECTION 3: SCHEDULE OF REQUIREMENTS, SPECIFICATIONS AND ALLIED DETAILS

[To be filled up by the Department / Center of NITK, Surathkal]

Item(s) Name to be Procured	: Electronic components
Type (Equipment / Software / Furniture / Others)	: Consumables
Brief Specifications of the Item(s) (Attach Additional Sheet if necessary)	: Attached
Quantity	: Requirement mentioned in Annexure
Any other details / requirement	: Nil
Warranty Period required	: Not Applicable
Delivery Schedule expected after release of Purchase order (in days)	: 15 days
Delivery Address	**: M/s Aditya Auto Products and Engg (I) Pvt Ltd** 180, Bommasandra Industrial Area Bengaluru - 560099
EMD (in Rupees)	:18,000/-
Performance Security to be given by Successful Bidder after release of Purchase Order (in Rupees)	: 5% of Price offered.

SECTION 4: PRICE SCHEDULE

[To be used by the bidder for submission of the bid]

1.	Item Name	:
2.	Specifications (Conforming to Section 3 of Tender document- Enclose additional sheets if necessary)	:
3.	Currency and Unit Price	:
4.	Quantity	:
5.	Item Cost (Sl No. 3 * Sl. No. 4)	:
6.	Taxes and Other Charges (i) Specify the type of taxes and duties in percentages and also in figures. (ii) Specify Other Charges in figures.	:
7.	**Warranty Period (Conforming to the Section 3 of Tender document- This should be mentioned in technical bid also in order to get qualified for financial bid)**	:
8.	Delivery Schedule (Conforming to the Section 3 of Tender document	:
9.	Name and address of the Firm for placing purchase order	:
10.	Name and address of Indian authorized agent (in case of imports only)	:

Signature of the Bidder: _____

Name and Designation: _____

Business Address : _____

_____

Place: **Seal of the Bidder's Firm**

Date:

SECTION 5: CONTRACT FORM

[To be provided by the bidder in the business letter head]

1. (Name of the Supplierôs Firm) hereby abide to deliver the by the delivery schedule mentioned in the section 3 tender document for supply of the items if the purchase order is awarded.

2. The item will be supplied conforming to the specifications stated in the tender document without any defect and deviations.

3. Warranty will be given for the period mentioned in the tender document and service will be rendered to the satisfaction of NITK, Surathkal during this period.

Signature of the Bidder : _____

Name and Designation : _____

Business Address : _____

_____

Place: **Seal of the Bidder's Firm**
Date:

Specifications:

Item Name: **Electronic components**

Estimated cost for monthly requirement: **Rs. 9 Lakhs (Rate contract fixing – period of 6 months)**

Delivery Address: **M/s Aditya Auto Products and Engg (I) Pvt Ltd**

180, Bommasandra Industrial Area

Bengaluru - 560099

Detailed Tender Specification for Consumables:

The consumable listed below are the parts required for building electric motors.

Equipments required:

1. **Electronic Components:** The different types of electric components required for the motor are listed below with their specifications.

a) Capacitor – Cap Kerko 100nF 50V 1608 X7R 10%:

Application & Main Feature
Automotive Grade (General (Up to 50V))

Series
CGA3(1608) [EIA CC0603]

Dimensions

L	1.60mm +/-0.1mm
W	0.80mm +/-0.1mm
T	0.80mm +/-0.1mm
B	0.20mm Min.
G	0.30mm Min.

Temperature Characteristic
X7R (-55 to 125 degC +/-15%)

Rated Voltage
1H (50Vdc)

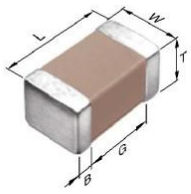
Capacitance
100nF

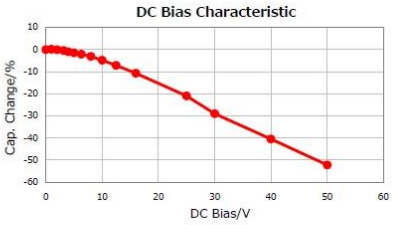
Capacitance Tolerance
K (+/-10%)

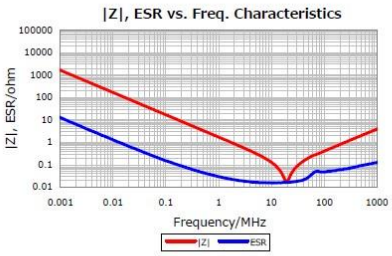
Dissipation Factor
3% Max.

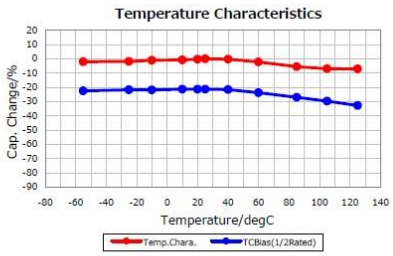
Insulation Resistance
5Gohm Min.

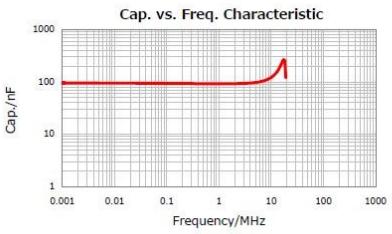
AEC-Q200
Yes

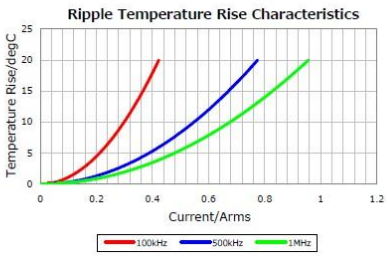












b) Capacitor – Cap Kerko 1µF 25V 1608 X7R 10%

Application & Main Feature
Automotive Grade (General (Up to 50V))

Series
CGA3(1608) [EIA CC0603]

Dimensions
L 1.60mm +/-0.1mm
W 0.80mm +/-0.1mm
T 0.80mm +/-0.1mm
B 0.20mm Min.
G 0.30mm Min.

Temperature Characteristic
X7R (-55 to 125 degC +/-15%)

Rated Voltage
1E (25Vdc)

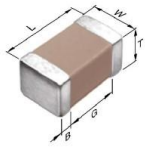
Capacitance
1uF

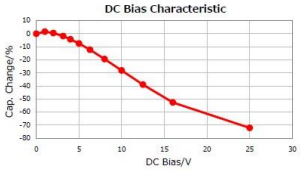
Capacitance Tolerance
K (+/-10%)

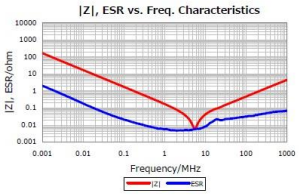
Dissipation Factor
7.5% Max.

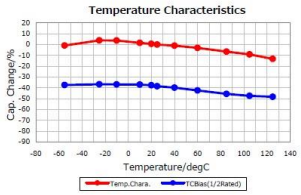
Insulation Resistance
500Mohm Min.

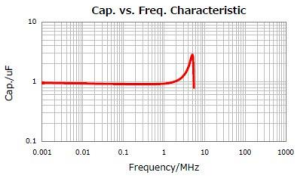
AEC-Q200
Yes

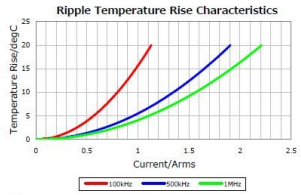












c) Capacitor – Cap Kerko 4.7µF 25V 2012 X7R 10%

Application & Main Feature
Automotive Grade (General (Up to 50V))

Series
CGA4(2012) [EIA CC0805]

Dimensions
L 2.00mm +/-0.2mm
W 1.25mm +/-0.2mm
T 1.25mm +/-0.2mm
B 0.20mm Min.
G 0.50mm Min.

Temperature Characteristic
X7R (-55 to 125 degC +/-15%)

Rated Voltage
1E (25Vdc)

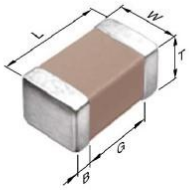
Capacitance
4.7uF

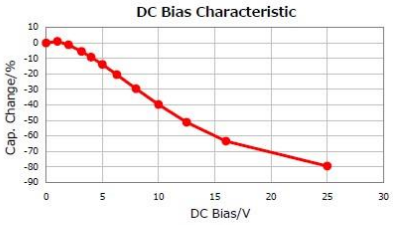
Capacitance Tolerance
K (+/-10%)

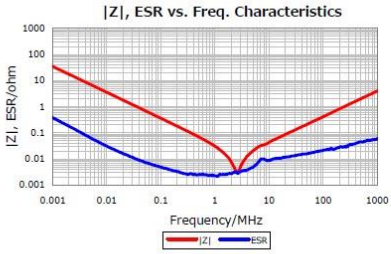
Dissipation Factor
7.5% Max.

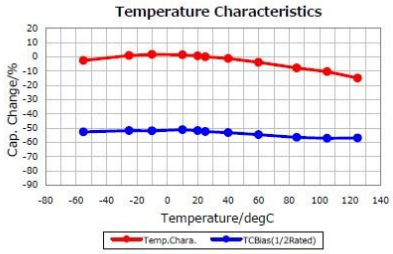
Insulation Resistance
106Mohm Min.

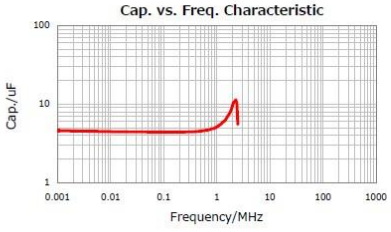
AEC-Q200
Yes

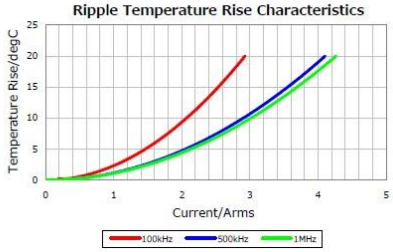












d) Capacitor – 22 mF 0V 105DEG 5*11 2KHRS

Specifications

No.	Item	Performance											
1	Temperature range (℃)	-55 to +105(6.3V ～ 100V)					-40 to +105(160V ～ 500V)						
2	Leakage current (μA)	Less than 0.01CV or 3 whichever is larger(after one minutes)					Less than 0.03CV or 3 whichever is larger (after one minutes)						
		C: Rated Capacitance (μF). V: Rated voltage (V) 20℃											
3	Capacitance tolerance (%)	ä20 (20℃ ,120Hz)											
4	Tangent of the loss angle (Tan δ)	Rated voltage (V)	6.3	10	16	25	35	50	63	100	160-250	350-500	20℃ 120Hz
		Tan δ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.15	0.15	
		0.02 is added to each 1000uF increase over 1000uF.											
5	Low temperature Characteristics	Rated voltage (V)		6.3	10	16	25	35	50	63	100	160-250	350-500	120Hz
		Impedance ratio (max)	$Z_{(-25℃)}/Z_{(+20℃)}$	4	3	2	2	2	2	2	2	3	3	
			$Z_{(-40℃)}/Z_{(+20℃)}$	8	6	4	3	3	3	3	3	8	6	
6	Endurance (105℃) (Applied ripple current)	Test time	2000hours										
		Leakage current	The initial specified value or less										
		Percentage of capacitance change	Within ±20% of initial value										
		Tangent of the loss angle	200% or less of the initial specified value										
7	Shelf life (105℃)	Test time	1000hours										
		Leakage current	The initial specified value or less										
		Percentage of capacitance change	Within ä20% of initial value										
		Tangent of the loss angle	200% or less of the initial specified value										
8	Applicable standards	JIS-C-5102 and JIS-C-5141											

Coefficient of Frequency for Ripple Current

Rated voltage (v)	Frequency (Hz) / Capacitance(μF)	50•60	120	1K	10K	100K
6.3 to 100	CAP ≤ 10	0.80	1.00	1.30	1.65	1.70
	10<CAP ≤ 100	0.80	1.00	1.23	1.48	1.53
	100<CAP ≤ 1000	0.80	1.00	1.16	1.35	1.38
	1000<CAP	0.80	1.00	1.11	1.25	1.28
160 to 500	0.47 to 330	0.80	1.00	1.30	1.40	1.60

Coefficient of Temperature for Ripple Current

Temperature (℃) / Rated voltage (V)	70 or less	85	105
6.3 to 100	2.00	1.70	1.00
160 to 500	1.80	1.40	1.00

V. DC / Content / μF	50V	
	ΦD X L	mA
22	5 X 11	78

e) Capacitor – 220 µF /25V/85D/6.3X11 105D

Specifications

No.	Item	Performance											
1	Temperature range (℃)	-55 to +105(6.3V ～ 100V)					-40 to +105(160V ～ 500V)						
2	Leakage current (µ A)	Less than 0.01CV or 3 whichever is larger(after one minutes)					Less than 0.03CV or 3 whichever is larger (after one minutes)						
		C: Rated Capacitance (µ F). V: Rated voltage (V) 20℃											
3	Capacitance tolerance (%)	ä20 (20℃ ,120Hz)											
4	Tangent of the loss angle (Tan δ)	Rated voltage (V)	6.3	10	16	25	35	50	63	100	160-250	350-500	20℃ 120Hz
		Tan δ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.15	0.15	
		0.02 is added to each 1000uF increase over 1000uF.											
5	Low temperature Characteristics	Rated voltage (V)		6.3	10	16	25	35	50	63	100	160-250	350-500	120Hz
		Impedance ratio (max)	$Z_{(-25℃)}/Z_{(+20℃)}$	4	3	2	2	2	2	2	2	3	3	
			$Z_{(-40℃)}/Z_{(+20℃)}$	8	6	4	3	3	3	3	3	8	6	
6	Endurance (105℃) (Applied ripple current)	Test time	2000hours										
		Leakage current	The initial specified value or less										
		Percentage of capacitance change	Within ±20% of initial value										
		Tangent of the loss angle	200% or less of the initial specified value										
7	Shelf life (105℃)	Test time	1000hours										
		Leakage current	The initial specified value or less										
		Percentage of capacitance change	Within ä20% of initial value										
		Tangent of the loss angle	200% or less of the initial specified value										
8	Applicable standards	JIS-C-5102 and JIS-C-5141											

Coefficient of Frequency for Ripple Current

Rated voltage (v)	Frequency (Hz) / Capacitance(µ F)	50•60	120	1K	10K	100K
6.3 to 100	CAP ≤ 10	0.80	1.00	1.30	1.65	1.70
	10<CAP ≤ 100	0.80	1.00	1.23	1.48	1.53
	100<CAP ≤ 1000	0.80	1.00	1.16	1.35	1.38
	1000<CAP	0.80	1.00	1.11	1.25	1.28
160 to 500	0.47 to 330	0.80	1.00	1.30	1.40	1.60

Coefficient of Temperature for Ripple Current

Temperature (℃) / Rated voltage (V)	70 or less	85	105
6.3 to 100	2.00	1.70	1.00
160 to 500	1.80	1.40	1.00

V. DC / µF Content	25V	
	ΦD X L	mA
220	8 X 11.5	236

f) Resistor 22 K(1206)

Product type	Wattage	Tolerance	Resistance Value	Packing type	Packing qty	Special Feature
1206	1/4 W	± 1%	2.2 ohm	T/R	5000pcs	Lead Free (standard)

g) Resistor Chip 1206 1% 0R ohm

Product type	Wattage	Tolerance	Resistance Value	Packing type	Packing qty	Special Feature
1206	1/4 W	± 1%	0 ohm	T/R	5000pcs	Lead Free (standard)

h) Resistor Chip 1206 1% 110K ohm

Product type	Wattage	Tolerance	Resistance Value	Packing type	Packing qty	Special Feature
1206	1/4 W	± 1%	110 ohm	T/R	5000pcs	Lead Free (standard)

i) Resistor Chip 1206 1% 47K ohm

Product type	Wattage	Tolerance	Resistance Value	Packing type	Packing qty	Special Feature
1206	1/4 W	± 1%	47 ohm	T/R	5000pcs	Lead Free (standard)

j) RES CHIP 1206 2K2 R-OHM

Product type	Wattage	Tolerance	Resistance Value	Packing type	Packing qty	Special Feature
1206	1/4 W	± 1%	2.2 ohm	T/R	5000pcs	Lead Free (standard)

k) RES CHIP 1206 91K 1%

Product type	Wattage	Tolerance	Resistance Value	Packing type	Packing qty	Special Feature
1206	1/4 W	± 1%	9.1 ohm	T/R	5000pcs	Lead Free (standard)

l) **RES CHIP 1206 10K 1%**

Product type	Wattage	Tolerance	Resistance Value	Packing type	Packing qty	Special Feature
1206	1/4 W	± 1%	1.0 ohm	T/R	5000pcs	Lead Free (standard)

m) **RES CHIP 1206 33 K 1%**

Product type	Wattage	Tolerance	Resistance Value	Packing type	Packing qty	Special Feature
1206	1/4 W	± 1%	3.3 ohm	T/R	5000pcs	Lead Free (standard)

n) **Varistor 11V RMS 10%:** The E series multilayer ceramic varistors has been developed to protect automotive electronic circuits transient overvoltages, such as electrostatic discharge and surge currents.

Features:

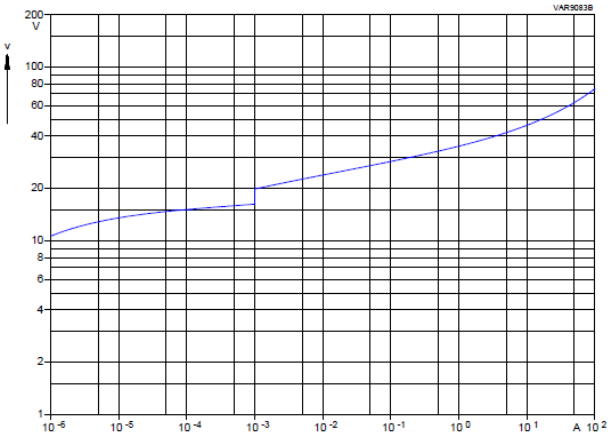
- Reliable ESD protection up to 30 kV acc. To IEC 61000-4-2
- High energy absorption capability
- Low leakage current
- No temperature derating up to 150 ^{0}C
- High life time robustness
- Stable protection level
- RoHS-compatible, lead-free
- Qualified based on AEC-Q200
- P Soice simulation models available

The required specifications are as follows:

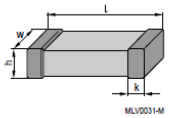
Electrical data

Max. operating voltage		
RMS voltage	V_{RMS}	= 11 V
DC voltage	V_{DC}	= 14 V
Varistor voltage (@ 1 mA, 25 °C)	V_V	= 16.2 … 19.8 V
Maximum leakage current (@ 14 V, 25 °C)	$I_{leak,max}$	= 20 µA
Maximum clamping voltage (@ 1 A)	$V_{clamp,max}$	= 35 V
Maximum average power dissipation	$P_{diss,max}$	= 5 mW
Maximum surge current (8/20 µs)	$I_{surge,max}$	= 1 x 120 A
Maximum energy absorption (2 ms)	W_{max}	= 200 mJ
Capacitance (@ 1 kHz, 1 V, 25 °C; typical)	C_{typ}	= 400 pF
Response time		<0.5 ns
Operating temperature		–55 … +150 °C
Storage temperature (mounted parts)		–55 … +150 °C

V/I characteristics



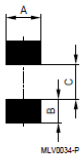
Dimensional drawing



Dimensions in mm

Case size	l	w	h	k
0805	2.0 ±0.20	1.25 ±0.15	1.4 max.	0.13 … 0.75

Recommended solder pad layout



Dimensions in mm

Case size	A	B	C
0805	1.40	1.20	1.00

o) Zener Diode 36V SOT 23 5%:

Features and benefits

- Total power dissipation: Ò250 mW
- Three tolerance series: ±1 %, ±2% and approximately ±5%
- AEC-Q101 qualified
- Working voltage range: nominal 2.4 V to 75 v (E24 range)
- Non-repetitive peak reverse power dissipation: Ò40 W

The below tables gives the details of the specifications required for the purpose.

Quick reference data

Table 1. Quick reference data

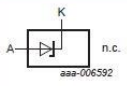
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_F	forward voltage	I_F = 10 mA [1]	-	-	0.9	V
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C [2]	-	-	250	mW

[1] Pulse test: $t_p \leq 100$ µs; $\delta \leq 0.02$

[2] Device mounted on a FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

Pinning information

Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode		
2	n.c.	not connected		
3	K	cathode		

Limiting values

Table Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
I_F	forward current		-	200	mA
P_{ZSM}	non-repetitive peak reverse power dissipation	[1]	-	40	W
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C [2]	-	250	mW
T_{amb}	ambient temperature		-	150	°C
T_{stg}	storage temperature		−55	+150	°C
T_j	junction temperature		−65	+150	°C

[1] $t_p = 100$ µs; square wave; $T_j = 25$ °C before surge

[2] Device mounted on a FR4 PCB, single-sided copper, tin-plated and standard footprint.

Thermal characteristics

Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air [1]	-	-	500	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point	[2]	-	-	330	K/W

[1] Device mounted on a FR4 PCB, single-sided copper, tin-plated and standard footprint.

[2] Soldering point of cathode tab.

Characteristics

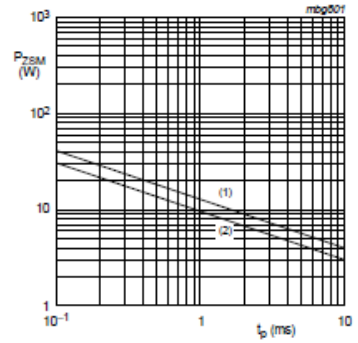
Table Characteristics

T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_F	forward voltage	I_F = 10 mA [1]	-	-	0.9	V

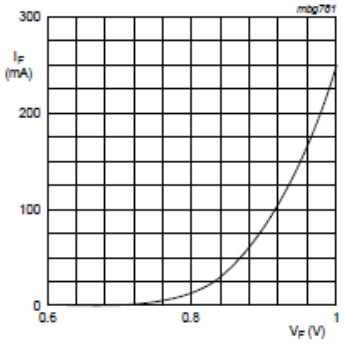
[1] Pulse test: $t_p \leq 100\ \mu s$; $\delta \leq 0.02$

BZX84-xxx	Sel	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)				Reverse current I_R (µA)		Temperature coefficient S_Z (mV/K)			Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
		I_Z = 2 mA		I_Z = 0.5 mA		I_Z = 2 mA				I_Z = 2 mA				
		Min	Max	Typ	Max	Typ	Max	Max	V_R (V)	Min	Typ	Max	Max	Max
36	C	37.0	41.0	80	350	35	90	0.05	25.2	30.4	33.0	37.4	45	0.8



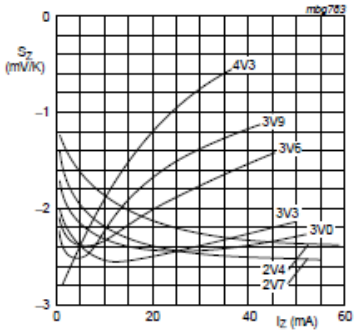
(1) T_j = 25 °C (before surge)
(2) T_j = 150 °C (before surge)

Fig 1. Non-repetitive peak reverse power dissipation as a function of pulse duration; maximum values



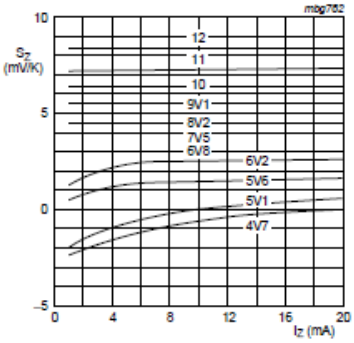
T_j = 25 °C

Fig 2. Forward current as a function of forward voltage; typical values



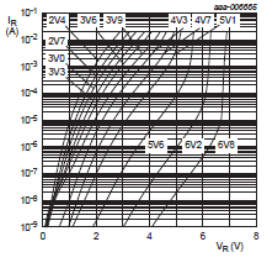
BZX84-A/B/C2V4 to BZX84-A/B/C4V3
T_j = 25 °C to 150 °C

Fig 3. Temperature coefficient as a function of working current; typical values



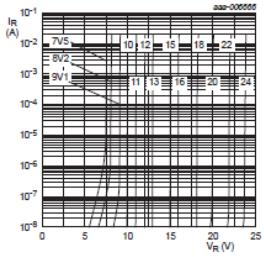
BZX84-A/B/C4V7 to BZX84-A/B/C12
T_j = 25 °C to 150 °C

Fig 4. Temperature coefficient as a function of working current; typical values



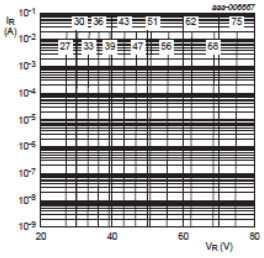
BZX84-A/B/C2V4 to BZX84-A/B/C6V8
T_{amb} = 25 °C

Fig 5. Reverse current as a function of reverse voltage; typical values



BZX84-A/B/C7V5 to BZX84-A/B/C24
T_{amb} = 25 °C

Fig 6. Reverse current as a function of reverse voltage; typical values



BZX84-A/B/C27 to BZX84-A/B/C75
T_{amb} = 25 °C

Fig 7. Reverse current as a function of reverse voltage; typical values

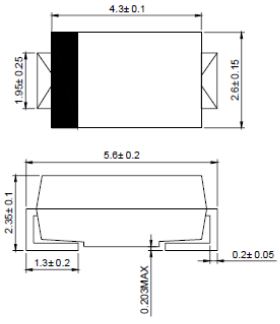
p) Diode 1N 4007 SMD M7 1000V 1 Amps:

The details of the Diode required for the purpose are as follows

VOLTAGE RANGE: 50 ---- 1000V

CURRENT: 1.0 A

SMAJ



Dimensions in millimeters

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25℃ ambient temperature unless otherwise specified.
Single phase,half wave,60 Hz,resistive or inductive load. For capacitive load,derate by 20%.

		M7J	UNITS
Device marking		M7	
Maximum recurrent peak reverse voltage	V_{RRM}	1000	V
Maximum RMS voltage	V_{RMS}	700	V
Maximum DC blocking voltage	V_{DC}	1000	V
Maximum average forward rectified current @T_L=110℃	$I_{(AV)}$	1.0	A
Peak forward surge current 8.3ms single half-sine-wave superimposed on rated load T_J=125℃	I_{FSM}	30	A
Maximum instantaneous forward voltage at 1.0 A	V_F	1.1	V
Maximum reverse current @T_A=25℃ at rated DC blocking voltage @T_A=100℃	I_R	5.0 50	μA
Typical junction capacitance (Note1)	C_J	15	pF
Typical thermal resistance (Note2)	$R_{\theta JA}$	75	℃/W
Operating temperature range	T_J	- 55 --- + 150	℃
Storage temperature range	T_{STG}	- 55 --- + 150	℃

FIG.1 – FORWARD DERATING CURVE

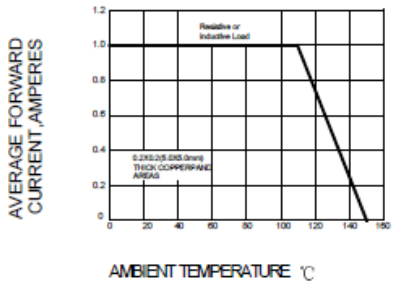


FIG.2 PEAK FORWARD SURGE CURRENT

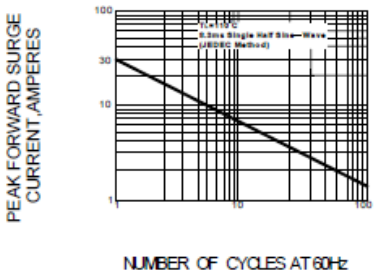


FIG.3 – TYPICAL FORWARD CHARACTERISTICS

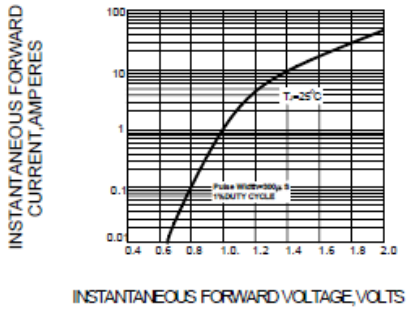


FIG.4 – TYPICAL REVERSE CHARACTERISTICS

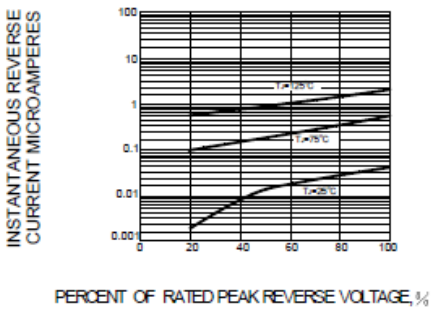


FIG.5-TYPICAL JUNCTION CAPACITANCE

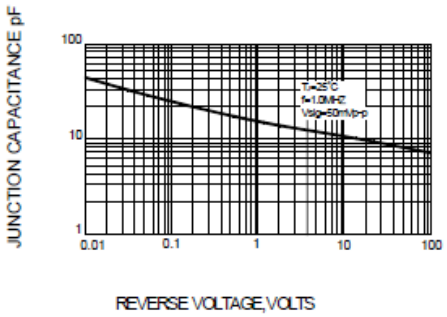
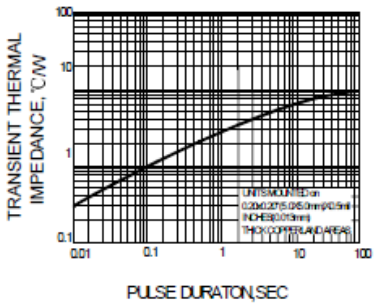


FIG.6-TRANSIENT THERMAL IMPEDANCE



q) PNP Transistor -45V -100mA SOT23:

General description: PNP general-purpose transistors in a small SOT23 (SMD) a Surface-Mounted Device (SMD) plastic package used for the general-purpose switching and amplification.

Features and benefits

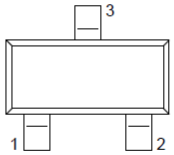
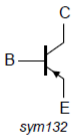
- Low current (max. 100 mA)
- Low voltage (max. 65 V)
- AEC-Q101qualified

The details are as given below

T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base					
	BC856			-	-	-65	V
	BC857			-	-	-45	V
	BC858B			-	-	-30	V
I_C	collector current			-	-	-100	mA
I_{CM}	peak collector current			-	-	-200	mA
h_{FE}	DC current gain	V_{CE} = -5 V; I_C = -2 mA					
	BC856			125	-	475	-
	BC857			125	-	800	-
	BC856A; BC857A			125	-	250	-
	BC856; BC857B; BC858B			220	-	475	-
	BC857C			420	-	800	-

Pinning Information:

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base		
2	E	emitter		
3	C	collector		

Limiting Values:

Symbol	Parameter	Conditions		Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter				
	BC856			-	-80	V
	BC857			-	-50	V
	BC858B			-	-30	V
V_{CEO}	collector-emitter voltage	open base				
	BC856			-	-65	V
	BC857			-	-45	V
	BC858B			-	-30	V
V_{EBO}	emitter-base voltage	open collector		-	-5	V
I_C	collector current			-	-100	mA
I_{CM}	peak collector current			-	-200	mA
I_{BM}	peak base current			-	-200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	250	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C

[1] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated and standard footprint.

Thermal Characteristics:

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	500	K/W

Characteristics:

T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	V_{CB} = -30 V; I_E = 0		-	-1	-15	nA
		V_{CB} = -30 V; I_E = 0; T_j = 150 °C		-	-	-4	µA
I_{EBO}	emitter-base cut-off current	V_{EB} = -5 V; I_C = 0		-	-	-100	nA
h_{FE}	DC current gain						
	BC856	V_{CE} = -5 V; I_C = -2 mA		125	-	475	
	BC857			125	-	800	
	BC856A; BC857A			125	-	250	
	BC856B; BC857B; BC858B			220	-	475	
	BC857C			420	-	800	
V_{CEsat}	collector-emitter saturation voltage	I_C = -10 mA; I_B = -0.5 mA		-	-75	-300	mV
		I_C = -100 mA; I_B = -5 mA	[1]	-	-250	-650	mV
V_{BEsat}	base-emitter saturation voltage	I_C = -10 mA; I_B = -0.5 mA		-	-700	-	mV
		I_C = -100 mA; I_B = -5 mA	[1]	-	-850	-	mV
V_{BE}	base-emitter voltage	V_{CE} = -5 V; I_C = -2 mA		-600	-650	-750	mV
		V_{CE} = -5 V; I_C = -10 mA		-	-	-820	mV
f_T	transition frequency	V_{CE} = -5 V; I_C = -10 mA; f = 100 MHz		100	-	-	MHz
C_c	collector capacitance	V_{CB} = -10 V; I_E = i_e = 0 A; f = 1 MHz		-	4.5	-	pF
F	noise figure	I_C = -200 µA; V_{CE} = -5 V; R_S = 2 kΩ; f = 1 kHz; B = 200Hz		-	2	10	dB

Annexure

#	Requirement	Item Description	Specification	UOM	Requirement		
					Month 1	Month 2	Month 3
1	Electronic Components	Capacitor	Cap Kerko 100nF 50V 1608 X7R 10%	NOS	45000 nos	45000 nos	45000 nos
2	Electronic Components	Capacitor	Cap Kerko 1µF 25V 1608 X7R 10%	NOS	90000 nos	90000 nos	90000 nos
3	Electronic Components	Capacitor	Cap Kerko 4 7µF 25V 2012 X7R 10%	NOS	45000 nos	45000 nos	45000 nos
4	Electronic Components	RESISTOR	RESISTOR 22 K (1206)	NOS	4200 nos	4200 nos	4200 nos
5	Electronic Components	Varistor	Varistor 11V RMS 10%	NOS	45000 nos	45000 nos	45000 nos
6	Electronic Components	RESISTOR	Resister Chip1206 1% 0R Ohm	NOS	8400 nos	8400 nos	8400 nos
7	Electronic Components	Capacitor	Cap. 22 mf	NOS	4200 nos	4200 nos	4200 nos
8	Electronic Components	Diode	Diode SOT 23 5%	NOS	4200 nos	4200 nos	4200 nos
9	Electronic Components	RESISTOR	Resister Chip1206 1% 110k Ohm	NOS	2100 nos	2100 nos	2100 nos
10	Electronic Components	RESISTOR	Resister Chip1206 1% 47k Ohm	NOS	8400 nos	8400 nos	8400 nos
11	Electronic Components	Transistor	Trans SOT 23 BC857B NXP	NOS	16800 nos	16800 nos	16800 nos
12	Electronic Components	Capacitor	220µ F Ele Capacitor 16V 8 X 12	NOS	4200 nos	4200 nos	4200 nos
13	Electronic Components	RESISTOR	RES CHIP 1206 2K2 R-OHM	NOS	4200 nos	4200 nos	4200 nos

14	Electronic Components	RESISTOR	RES CHIP 1206 91K 1% ROYALOHM	NOS	2100 nos	2100 nos	2100 nos
15	Electronic Components	Diode	Diode 1N4007 SMD M7	NOS	6300 nos	6300 nos	6300 nos
16	Electronic Components	RESISTOR	Res 10K 1206 1%	NOS	4200 nos	4200 nos	4200 nos
17	Electronic Components	RESISTOR	Res 33K 1% 1206	NOS	4200	4200 nos	4200 nos