



SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(AN AUTONOMOUS INSTITUTION)



DEPARTMENT OF
ELECTRICAL AND ELECTRONICS ENGINEERING

ELECTRIC VEHICLE CLUB ANNUAL REPORT

(Academic Year: 2025 to 2026)



Submitted by
Mr.B.Parthiban / Mr.S.Mugunthan
Assistant Professor
Club Coordinator



Preface

The EV Club of the Department of Electrical and Electronics Engineering at Sri Manakula Vinayagar Engineering College serves as a progressive technical platform dedicated to fostering awareness, innovation, and research-oriented learning in the field of sustainable mobility and emerging transportation technologies. The club provides a structured environment where students gain a comprehensive understanding of modern energy-efficient systems, sustainable engineering practices, and evolving mobility solutions through systematic technical engagement and collaborative learning. Guided by faculty coordinators and actively supported by student members, the club organizes expert talks, technical discussions, design challenges, workshops, project-based learning activities, and industry interaction sessions to bridge the gap between academic knowledge and real-world applications. It encourages analytical thinking, system-level understanding, design optimization approaches, and innovation-driven project development, thereby strengthening students' technical competence and problem-solving abilities. By promoting teamwork, leadership qualities, research orientation, and professional ethics, the EV Club plays a vital role in preparing students to contribute effectively to the advancement of sustainable technologies and to meet the growing demands of the modern engineering landscape with responsibility and technical excellence.

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ABOUT THE INSTITUTE

Sri Manakula Vinayaga Educational Trust was founded to provide quality and affordable education to the weaker sections of society. The trust established Sri Manakula Vinayagar Engineering College (SMVEC) in 1999. SMVEC is an autonomous institution affiliated to Pondicherry University. It offers 13 undergraduate, 8 postgraduate and 11 Research programs in engineering. SMVEC has been accredited by NAAC with “A” grade and NBA. The institution is also accredited by TATA consultancy services. The college has a good placement record with students getting job offers from top companies in India and abroad. SMVEC students have won many awards and accolades for their academic achievements. To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

Vision

- To nurture the cornerstone of excellence in engineering education and drive innovation by seamlessly integrating the fundamentals of Science and Humanities

Mission

M1: Quality Education : To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

M2: Research and Innovation : To foster value-based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

M3: Employability and Entrepreneurship : To inculcate the employability and entrepreneurial skills through value and skill based training.

M4: Ethical Values : To instill deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

DEPARTMENT VISION AND MISSION

Vision

To promote proficiency in the field of Electrical and Electronics Engineering by creating a stimulating environment for research, innovation and entrepreneurship.

Mission

- Academic Excellence: To impart high quality technical education with problem solving capabilities by innovative pedagogy in emerging technologies
- Industrial and Societal Needs: To cater the dynamic needs of the industry and society by strengthening industry - institute interaction.
- Research and Innovation: To nurture the spirit of research attitude by carrying out innovative technologies pragmatically.
- Placement and Entrepreneurship: To inculcate the professionalism in career by advancing synergetic skills to compete in the corporate world.



"Commanding circuits. Controlling motion. Creating change."

ABOUT ELECTRIC VEHICLE CLUB

Electric Vehicles club serves as a place of community for students to discuss, learn, and working on projects related to Electric Vehicles. Members of the Electric Vehicles club are offered with a range of programs and activities such as seminars, project competitions and exposition. The club is supported the students in strategizing and organising activities that will help them knowledge and skills in Electric Vehicles. The clubs aims to guide students and prepare them to pursue their professional careers in industries specialising in Electric Vehicles.

Objectives and Functions of Electric Vehicle Club

- To develop basic understanding of Electric Vehicles.
- To develop basic understanding of electric motors, battery technology.
- To aid in enhancing management skills by organizing events and working in teams.
- To give students hands-on learning experience in the field of electric vehicle and battery management system.
- To aid students to build proto-types of electric vehicles
- To conduct technical programmes such as training, workshops, internships, and expert talks in relevant areas.
- Provide detail budgeting for making electric vehicle proto-types.
- Model components or modules of electric vehicles using appropriate software
- Take part in electric vehicle competitions.
- The EV club can organize awareness campaigns, workshops, and presentations to introduce and educate the college community about electric vehicles. These initiatives can cover topics such as EV technology, benefits, charging infrastructure, government incentives, and the role of EVs in combating climate change.
- The EV club can organize educational workshops and seminars on campus to deepen the understanding of EV technology, charging infrastructure, and related topics.
- The EV club can foster collaboration and networking among students, faculty and industry professionals interested in electric vehicles.



"Commanding circuits. Controlling motion. Creating change."

OFFICE BEARERS AND STUDENT MEMBERS

S.No	Name	Position
1.	Mr.B.Parthiban – Assistant Professor / EEE	Staff Coordinators
2.	Mr.S.Mugunthan – Assistant Professor / EEE	
3.	Gokul	President
4.	DharaniKumar	Vice President
5.	Gaushik	Secretary
6.	Shreekanth	Treasurer
7.	Malaravan	Joint Secretary
8.	Jaiadithiyam	
9.	Kiruthik	Joint Treasurer
10.	Mathiyarasan	
11.	Neeraja	Executive Members
12.	Baranidharan	
13.	Ashok kumar	
14.	Ayishu	Technical Members



Mr. B. Parthiban
Assistant Professor
Faculty Coordinator



Gokul
President



Dharani Kumar
Vice President



Gaushik
Secretary



Malaravan
Joint Secretary



Kiruthik
Joint treasurer

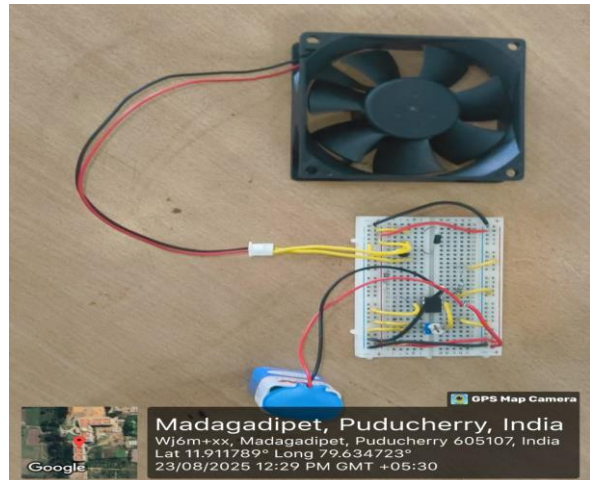
S.NO	NAME OF THE STUDENT	PRESENT/ABSENT
1	Vaitheeswaran N	III
2	Anjana Berlin	III
3	Kokilavani S	III
4	Mugilan. P	III
5	A.Tamilvanan	III
6	Premkumar T	III
7	Ramanan	III
8	Bhuvanesh M	III
9	Navanithiyan K	III
10	Gopinath.V	III
11	S Raghul	III
12	Aarthi.P	III
13	Praveenkumar.S	III
14	Vishwa	II
15	Lokesh.N	II
16	R.Archana	II
17	Vijayalakshmi.S	II
18	Gandham Nagendra Karthik	II
19	Sowmya.S	II
20	M.Sivaganesh	II
21	Nijanthan S	II
22	Elamparuthi. K	II
23	D.Naveenkumar	I
24	Arunaish.R	I
25	Saileshwar. T	I
26	Nathesh.N.B	I
27	Mohamed Harun Rasheed.S	I
28	Vishva P	I
29	Harinee	I
30	Iyyappan	I
31	Ramesh Kumar. P	I
32	Ragul A	I
33	Mohamed Abdul Kalam.K	I
34	Herwin	I
35	Karmukilan. A	I
36	S. Ramya	I
37	A. Balakumaran	I
38	M.Sivapothiskalicahran	I
39	Callis Joseph. E	I
40	Mohamad Kaseem M	I
41	Thogesh.M	I
42	P.Gopikrishnan	I
43	Srilogeshwaran S	I
44	Mukesh Kumar R	I
45	Thiruvengadam P	I
46	Karthikraja S	I
47	Dhinish.N	I
48	Raakesh.K	I
49	Tharanitharan.M	I
50	Thilipan Siva Hari . S	I
51	Unil Kumar.D	I
52	B. Surya Prakash	I
53	Yuganigan. J	I
54	Poojitha.A	I

55	Gokulraj. R	I
56	Vishva. S	I
57	R.Yugandiran	I
58	G.Praveen	I
59	Arun Pratap	I
60	Tharani	I
61	Ashwin kumar.A	I

S.No	Date	Activities	Student Benefited
1.	23.08.2025	Design of Temperature Controlled Fan using Thermistor	61 II / EEE III / EEE

DESIGN OF TEMPERATURE CONTROLLED FAN USING THERMISTOR

Title	Design of Temperature Controlled Fan using Thermistor
Date	23.08.2025
Venue	Power Electronics Laboratory
Name of the Staff	Mr. G. Rajavel AP/EEE Mr. R. Vignesh AP/EEE
Audience	II Year and III Year EEE Students
No. of Students	235
E-Vehicle Club Incharges	Dr.D.Sivaraj, AP/EEE



When the temperature rises above the threshold point, then the DC fan will rotate to regulate the temperature.

INTRODUCTION

This activity focuses on the Design of a Temperature Controlled Fan an automatic electronic control system engineered to enhance energy efficiency and ensure the thermal safety of equipment. The system is designed to automatically activate a DC fan when the ambient temperature exceeds a set threshold and deactivate it when the temperature drops below that limit.

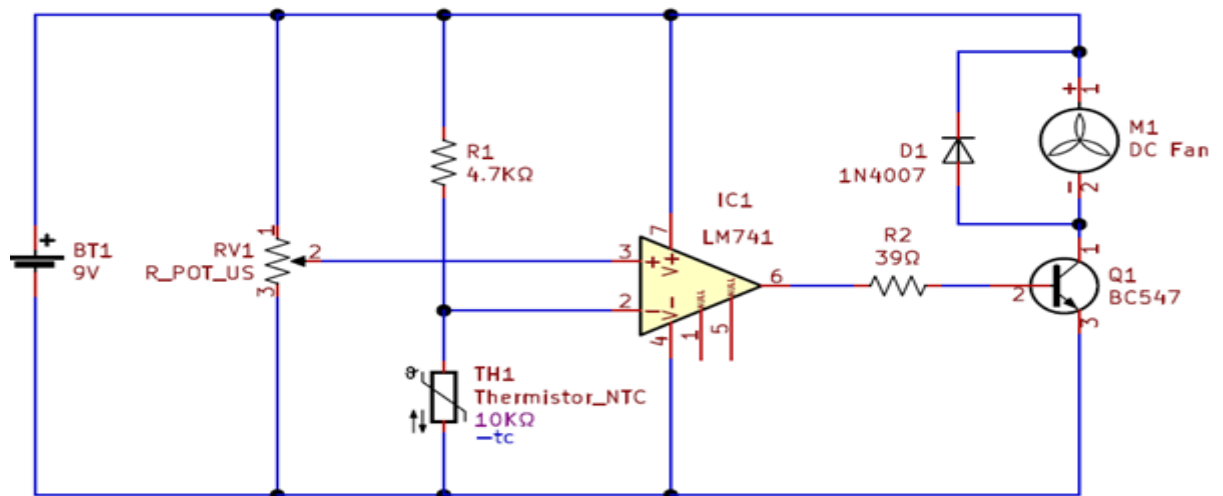
The core sensing component is a Negative Temperature Coefficient (NTC) thermistor, which varies its resistance inversely with temperature. This thermistor's signal is processed by an LM741 operational amplifier (op-amp), configured as a comparator, which establishes the threshold point against a reference voltage set by a potentiometer. The output of the op-amp controls a transistor switch (BC547/BC548) that drives the fan. A crucial protection measure is the inclusion of a flyback diode (1N4007) placed across the

motor terminals to suppress the inductive voltage spikes (back-EMF) generated during switching.

APPLICATIONS:

- Cooling for power supplies, amplifiers, chargers, and small enclosures where temperature-based automatic airflow is required.
- Smart ventilation for PCs, 3D-printer cabinets, battery packs, and automotive electronics compartments.
- Educational demonstration of thermistor sensing, op-amp comparators, and transistor switching for control systems labs.

CIRCUIT DIAGRAM OF TEMPERATURE CONTROLLED FAN :



WORKING OF TEMPERATURE CONTROLLED FAN:

The LM741 op-amp compares two voltages: the reference from the potentiometer at the non-inverting input and the temperature-dependent voltage from the NTC divider at the inverting input. As temperature rises, the NTC resistance falls, raising the divider voltage; when it crosses the set reference, the op-amp output goes high, biasing the BC547 through a base resistor to energize the DC fan; when temperature drops below the threshold, the output goes low and the fan turns off. The 1N4007 across the motor clamps inductive voltage spikes, preventing damage to the transistor and ensuring reliable operation

DESIGN CALCULATION:

1. NTC at 45°C (B-parameter):

$$R_{NTC}(T) = R_{25} \cdot e^{B(T-298.15)}$$

At T=318.15 K (45°C)

$$R_{NTC}(45^\circ\text{C}) \approx 4,348 \Omega$$

2. Divider voltage at 45°C (inverting input):

$$V_{NTC} = V_{CC} \cdot R_1 / (R_{NTC} + R_1)$$

$$V_{NTC}(45^\circ C) \approx 9 \cdot 4700 / (4700 + 43484348) \approx 4.33 \text{ V}$$

3. Pot setting (to get $V_{REF} = 4.33 \text{ V}$):

$$\text{Fraction } f = V_{REF} / V_{CC} = 4.33 / 9 \approx 0.4806 (\approx 48.06\%)$$

For 10 k Ω pot:

$$R_{\text{bottom}} \approx 4.81 \text{ k}\Omega, R_{\text{top}} \approx 5.19 \text{ k}\Omega$$

4. Base drive required (saturation rule):

$$I_B \approx I_C / 10$$

$$= 150 \text{ mA} / 10$$

$$= 15 \text{ mA}$$

5. Base resistor R_B (choose standard):

$$R_B = (V_{OH} - V_{BE}) / I_B$$

With $V_{OH} = 8.5 \text{ V}$

$$R_B \approx (8.5 - 0.7) / 0.015$$

$$\approx 520 \Omega \rightarrow \text{choose } 470 \Omega \text{ (standard)}$$

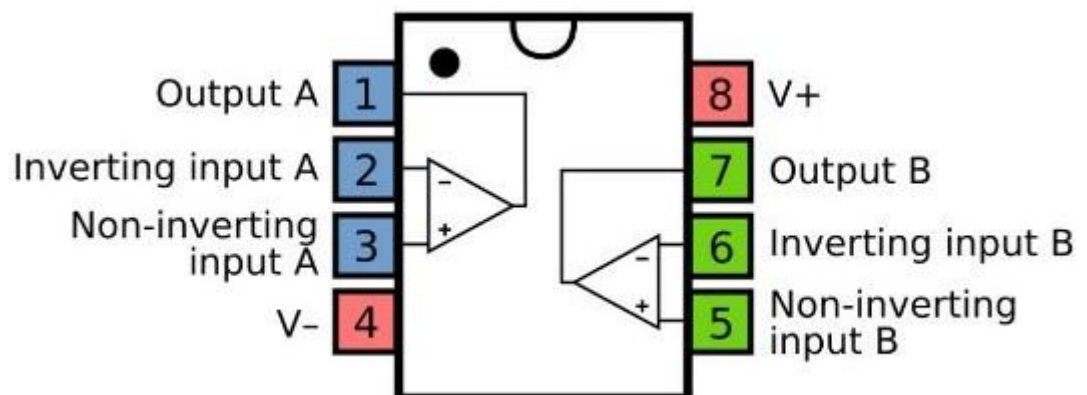
This gives $I_B \approx (8.5 - 0.7) / 470$

$$\approx 16.6 \text{ mA}$$

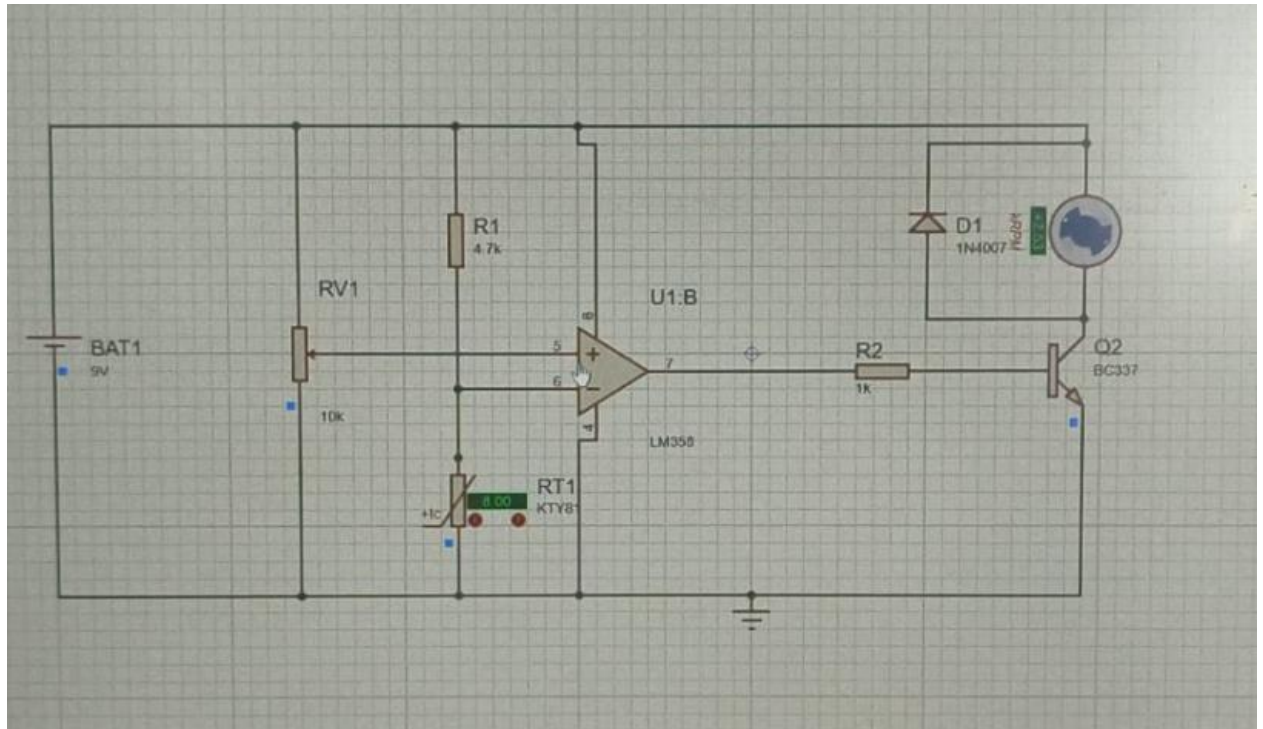
COMPONENTS REQUIRED FOR CIRCUIT:

S.No	Components	Specifications	Quantity
1	Op-amp	LM358	1
2	Resistor	4.7 k Ω , 39 Ω	1 each
3	Potentiometer	10K Ω	2
4	NTC Thermistor	MF52 10K (10 k Ω @ 25 $^\circ$ C)	1
5	DC Fan	9 V brushless DC fan	1
6	Transistor	BC548	1
7	Diode	1N4007	1
8	Battery	9V	1
9	Wires	—	As Required

Pin Details of LM358



SIMULATION DIAGRAM OF TEMPERATURE CONTROLLED FAN:



OUTPUT:

PARAMETERS	THEORETICAL VALUE	SIMULATION VALUE	PRACTICAL VALUE
Supply Voltage	9V	9V	9V
Base Current of Q1(Fan OFF)	0.0 mA	0.00 mA	0.01 mA
Base Current of Q1(Fan ON)	7.3 mA	6.8 mA	6.5 mA
Voltage Across Q1(Fan OFF)	9.0 V	8.99 V	8.6 V
Voltage Across Q1(Fan ON)	0.2 V	0.15 V	0.28 V
Resistance across Thermistor (Fan ON)	2.5 kΩ	2.6 kΩ	2.7 kΩ
Resistance across Thermistor (Fan OFF)	8.0 kΩ	7.95kΩ	8.0 kΩ



1N4001-1N4007

PLASTIC SILICON RECTIFIERS

VOLTAGE 50 to 1000 Volts **CURRENT** 1.0 Ampere

DO-41

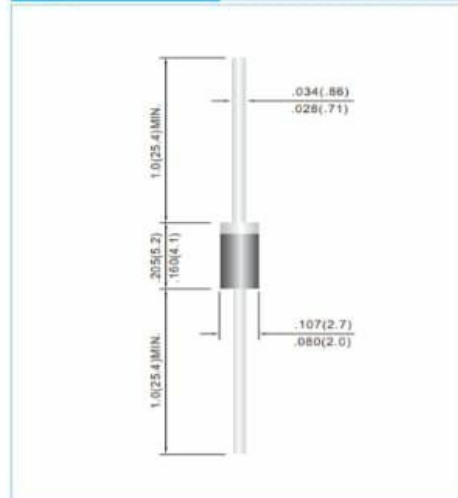
Unit: inch(mm)

FEATURES

- Low forward voltage drop
- High current capability
- High reliability
- High surge current capability
- Exceeds environmental standards of MIL-S-19500/228
- In compliance with EU RoHS 2002/95/EC directives

MECHANICAL DATA

- Case: DO-41 Molded plastic
- Epoxy: UL 94V-O rate flame retardant.
- Lead: Axial leads, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode end
- Mounting Position: Any
- Weight: 0.012 ounces, 0.30 gram



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	1N4001	1N4002	1N4003	1N4004	1N4005	1N4006	1N4007	UNITS	
Maximum Recurrent Peak Reverse Voltage	V_{RRM}	50	100	200	400	600	800	1000	V	
Maximum RMS Voltage	V_{RMS}	35	70	140	280	420	560	700	V	
Maximum DC Blocking Voltage	V_{DC}	50	100	200	400	600	800	1000	V	
Maximum Average Forward Current .375" (9.5mm) lead length at $T_J=75^\circ\text{C}$	$I_{F(AV)}$					1.0				A
Peak Forward Surge Current : 8.3ms single half sine-wave superimposed on rated load (JEDEC method)	I_{FSM}					30				A
Maximum Forward Voltage at 1.0A	V_F					1.1				V
Maximum DC Reverse Current at $T_J=25^\circ\text{C}$ Rated DC Blocking Voltage $T_J=100^\circ\text{C}$	I_R					5 50				μA
Typical Junction capacitance (Note 1)	C_J					15				pF
Typical Thermal Resistance (Note 2)	$R_{\theta JA}$ $R_{\theta JL}$					50 25				$^\circ\text{C} / \text{W}$
Operating Junction and Storage Temperature Range	T_J, T_{STG}					-55 TO +150			$^\circ\text{C}$	

NOTES:

1. Measured at 1 MHz and applied reverse voltage of 4.0 VDC.
2. Thermal Resistance from Junction to Ambient and from junction to lead at 0.375" (9.5mm) lead length P.C.B. mounted.



Micro Commercial Components



Micro Commercial Components
 20736 Marilla Street Chatsworth
 CA 91311
 Phone: (818) 701-4933
 Fax: (818) 701-4939

Features

- Halogen free available upon request by adding suffix "-HF"
- Low Zener Impedance
- Low Regulation Factor
- V_z - tolerance: $\pm 5\%$
- For Surface Mount Applications
- Epoxy meets UL 94 V-0 flammability rating
- Moisture Sensitivity Level 1
- Lead Free Finish/Rohs Compliant (Note1) ("P" Suffix designates Compliant. See ordering information)

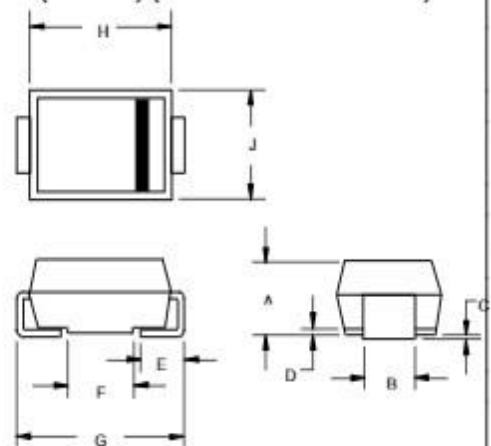
Maximum Ratings@25°C Unless Otherwise Specified

Parameters	Test Conditions	Symbol	Value	Unit
Power Dissipation	$T_{amb} \leq 50^\circ\text{C}$	P_d	1	W
Z-Current		I_z	P_d/V_z	mA
Operating Junction Temperature		T_j	-65~+150	$^\circ\text{C}$
Storage Temperature		T_{stg}	-65~+150	$^\circ\text{C}$
Thermal Resistance	FR-4 Board, MOC's	$R_{\theta ja}$	100	K/W
	Suggested Solder Pad	$R_{\theta jL}$	75	
Max. Forward Voltage Drop	$I_F=100\text{mA}$	V_f	1.2	V

SMAJ4728A THRU SMAJ4764A

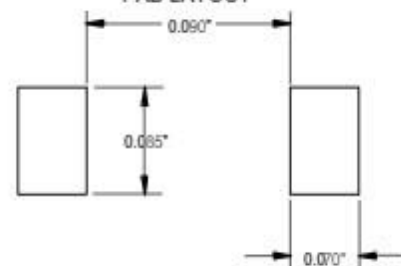
1 Watt
Zener Diode
3.3 to 100 Volts

DO-214AC (SMA)(LEAD FRAME)



DIM	DIMENSIONS				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	.079	.096	2.00	2.44	
B	.050	.064	1.27	1.63	
C	.002	.008	.05	.20	
D	—	.02	—	.51	
E	.030	.060	.76	1.52	
F	.065	.091	1.65	2.32	
G	.189	.220	4.80	5.59	
H	.157	.181	4.00	4.60	
J	.090	.115	2.25	2.92	

SUGGESTED SOLDER PAD LAYOUT



Note: 1. High Temperature Solder Exemptions Applied, see EU Directive Annex 7.

ELECTRICAL CHARACTERISTICS @25°C

Micro Commercial Components

MCC PART NUMBER	ZENER VOLTAGE V_Z	TEST CURRENT I_{ZT}	MAXIMUM DYNAMIC IMPEDANCE $Z_{ZT} @ I_{ZT}$	MAXIMUM REVERSE CURRENT I_R	REVERSE VOLTAGE V_R	KNEE IMPEDANCE Z_{ZK}	KNEE CURRENT I_{ZK}	DEVICE MARKING
	VOLTS	mA	OHMS	µA	VOLTS	OHMS	mA	



April 2014

**BC546 / BC547 / BC548 / BC549 / BC550
NPN Epitaxial Silicon Transistor**

Features

- Switching and Amplifier
- High-Voltage: BC546, $V_{CEO} = 65\text{ V}$
- Low-Noise: BC549, BC550
- Complement to BC556, BC557, BC558, BC559, and BC560



Ordering Information

Part Number	Marking	Package	Packing Method
BC546ABU	BC546A	TO-92 3L	Bulk
BC546ATA	BC546A	TO-92 3L	Ammo
BC546BTA	BC546B	TO-92 3L	Ammo
BC546BTF	BC546B	TO-92 3L	Tape and Reel
BC546CTA	BC546C	TO-92 3L	Ammo
BC547ATA	BC547A	TO-92 3L	Ammo
BC547B	BC547B	TO-92 3L	Bulk
BC547BBU	BC547B	TO-92 3L	Bulk
BC547BTA	BC547B	TO-92 3L	Ammo
BC547BTF	BC547B	TO-92 3L	Tape and Reel
BC547CBU	BC547C	TO-92 3L	Bulk
BC547CTA	BC547C	TO-92 3L	Ammo
BC547CTFR	BC547C	TO-92 3L	Tape and Reel
BC548BU	BC548	TO-92 3L	Bulk
BC548BTA	BC548B	TO-92 3L	Ammo
BC548CTA	BC548C	TO-92 3L	Ammo
BC549BTA	BC549B	TO-92 3L	Ammo
BC549BTF	BC549B	TO-92 3L	Tape and Reel
BC549CTA	BC549C	TO-92 3L	Ammo
BC550CBU	BC550C	TO-92 3L	Bulk
BC550CTA	BC550C	TO-92 3L	Ammo

BC546 / BC547 / BC548 / BC549 / BC550 — NPN Epitaxial Silicon Transistor



Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Value	Unit	
V_{CBO}	Collector-Base Voltage	BC546	80	V
		BC547 / BC550	50	
		BC548 / BC549	30	
V_{CEO}	Collector-Emitter Voltage	BC546	65	V
		BC547 / BC550	45	
		BC548 / BC549	30	
V_{EBO}	Emitter-Base Voltage	BC546 / BC547	6	V
		BC548 / BC549 / BC550	5	
I_C	Collector Current (DC)	100	mA	
P_C	Collector Power Dissipation	500	mW	
T_J	Junction Temperature	150	$^\circ\text{C}$	
T_{STG}	Storage Temperature Range	-65 to +150	$^\circ\text{C}$	

Electrical Characteristics

Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cut-Off Current	$V_{CB} = 30\text{ V}, I_E = 0$			15	nA
h_{FE}	DC Current Gain	$V_{CE} = 5\text{ V}, I_C = 2\text{ mA}$	110		800	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10\text{ mA}, I_B = 0.5\text{ mA}$		90	250	mV
		$I_C = 100\text{ mA}, I_B = 5\text{ mA}$		250	600	
$V_{BE(sat)}$	Collector-Base Saturation Voltage	$I_C = 10\text{ mA}, I_B = 0.5\text{ mA}$		700		mV
		$I_C = 100\text{ mA}, I_B = 5\text{ mA}$		900		
$V_{BE(on)}$	Base-Emitter On Voltage	$V_{CE} = 5\text{ V}, I_C = 2\text{ mA}$	580	660	700	mV
		$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$			720	
f_T	Current Gain Bandwidth Product	$V_{CE} = 5\text{ V}, I_C = 10\text{ mA}, f = 100\text{ MHz}$		300		MHz
C_{ob}	Output Capacitance	$V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$		3.5	6.0	pF
C_{ib}	Input Capacitance	$V_{EB} = 0.5\text{ V}, I_C = 0, f = 1\text{ MHz}$		9		pF
NF	Noise Figure	BC546 / BC547 / BC548	$V_{CE} = 5\text{ V}, I_C = 200\text{ }\mu\text{A}, f = 1\text{ kHz}, R_G = 2\text{ k}\Omega$	2	10	dB
		BC549 / BC550		1.2	4.0	
		BC549	$V_{CE} = 5\text{ V}, I_C = 200\text{ }\mu\text{A}, R_G = 2\text{ k}\Omega, f = 30\text{ to }15000\text{ MHz}$	1.4	4.0	
		BC550		1.4	3.0	

h_{FE} Classification

Classification	A	B	C
h_{FE}	110 ~ 220	200 ~ 450	420 ~ 800

Mr.B.Parthiban/Mr.S.Mugunthan

Club Co-Ordinator

HOD/ EEE

(Dr.P.Jamuna)

Dean Academics

(Dr.S.Anbumalar)

Director cum Principal

(Dr.V.S.K,Venkatachalapathy)

